RiverCOG
Lower Connecticut River Valley Council of Governments

Tighe&Bond

Route 66 Transportation Study
Portland and East Hampton, CT

Existing Conditions Technical Memorandum (DRAFT)

Prepared For:

RiverCOG and the Towns of Portland & East Hampton

August 2018

Executive Summary

1 Introduction

2 Traffic and Transportation

Technical Appendices

Section 1
Introduction

The *Route 66 Engineering Planning Study* is being conducted by the Lower Connecticut River Valley Council of Governments (RiverCOG) on behalf of the Towns of Portland and East Hampton (Towns). The project is funded by the Federal Highway Administration, the Connecticut Department of Transportation (CTDOT) and the Towns; and administered by RiverCOG on their behalf.

The purpose of the study is to develop a comprehensive transportation improvement plan for Route 66, within the study area, and provide a planning document for the Towns, RiverCOG and State to facilitate the identification of funding to support implementation of transportation system improvements to address existing and future needs and deficiencies and support future economic development goals.

The goals and objectives of the plan were identified by the Study Advisory Committee (SAC). The SAC includes members from the following agencies and organizations:

- **Town of Portland Staff**
- **Town of East Hampton Staff**
- **First Selectwoman of Portland**
- **Town of Portland Economic Development Commission member**
- **RiverCOG Staff**
- **Connecticut Department of Transportation Staff**

In addition to the SAC, a Community Advisory Committee (CAC) also advises the study team. The CAC membership is still under development at the time this document was prepared.

The study goals and objectives were identified at the onset of the study through meetings and public input. The goals and objectives include the following:

- Develop cost effective physical transportation system solutions that improve operations to mitigate congestion, address identified safety concerns, and provide guidance on access management issues while accommodating future land use expansion opportunities

- Improve transportation system access and mobility for alternative travel modes including sidewalk and bicycle infrastructure; exclusive pedestrian signalization, accessible sidewalk ramps and push-buttons at intersections; enhanced access and connectivity to the Air Line Trail system; and improve transit access and amenities to provide a complete transportation system that serves the needs for all travelers

- Develop a comprehensive transportation improvement plan that prioritizes and defines implementation time frames to enable the programming and funding of improvements

The study process includes five primary work tasks that are included in the overall scope of the project.

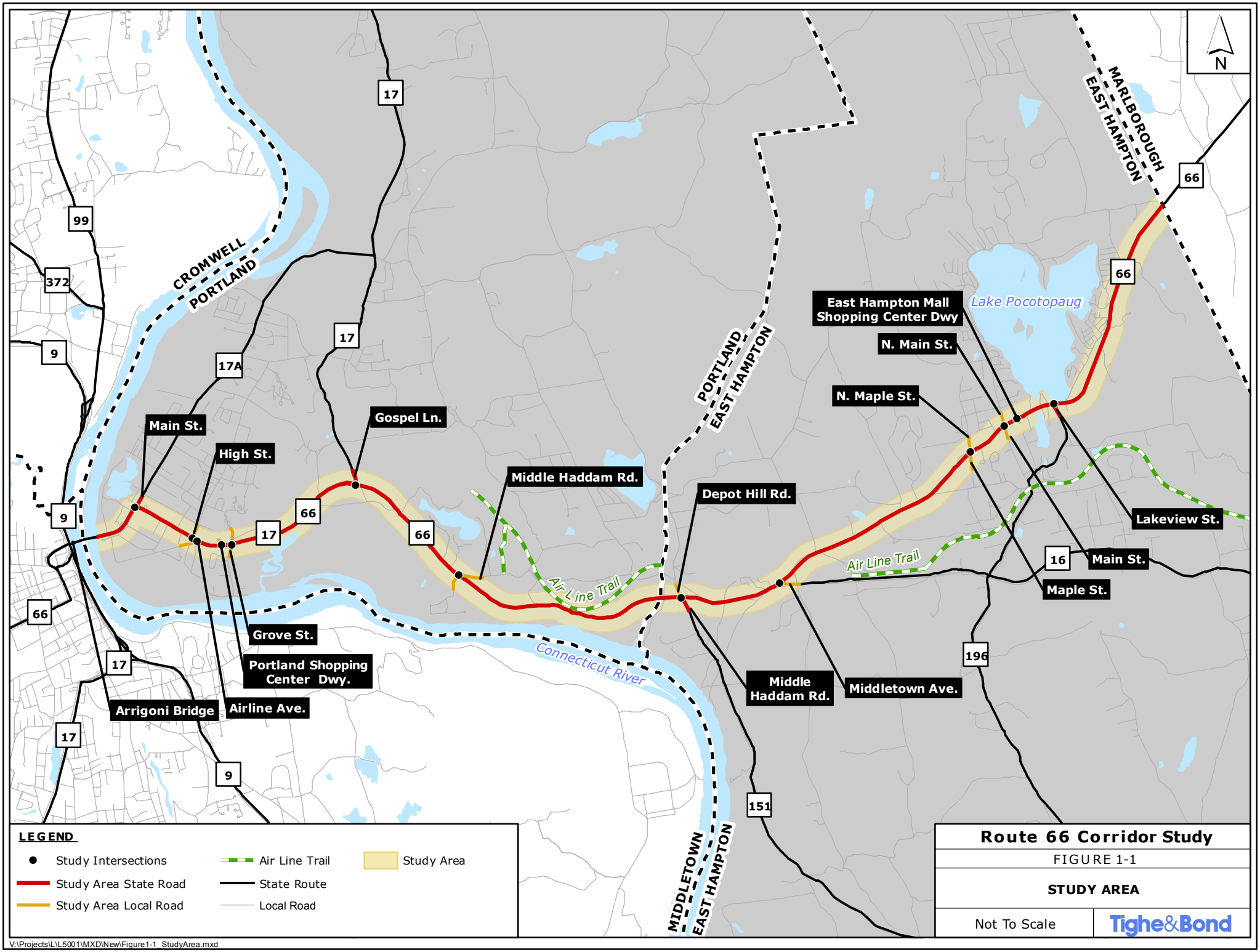
- Data Collection
- Analysis of Existing Conditions
- Analysis of Future Conditions
- Identification and Analysis of Improvement Alternatives
- Final Improvement and Implementation Plan

In addition, a Public Outreach program will be conducted throughout the study process to engage and obtain input from the public. The program includes meetings with the Technical Advisory Committee, the Community Advisory Committee, Public Information Meetings during key points in the study process and meetings with the governing bodies for each of the Towns to seek endorsement of the study recommendations. The Public Outreach program is described in more detail in Section 1.4.

1.1 Study Area

The study area includes approximately eleven-miles of Route 66 in the Towns of Portland and East Hampton. The study area begins at the east end of the Arrigoni Bridge in Portland, continuing north on Main Street before turning east on Route 66 and extending through Portland and East Hampton to the Marlborough town line. The study area includes thirteen signalized intersections, described in Section 2.2. In addition, the Study Area is also inclusive of the Airline Trail corridor, as the study will seek to identify opportunities to improve connectivity and access to the trail system through the two Towns. The study area is illustrated in Figure 1-1.

Route 66 in Portland looking West towards the Arrigoni Bridge


N
CROMWELL
PORTLAND
PORTLAND
EAST HAMPTON
MARLBOROUGH
EAST HAMPTON
MIDDLETOWN
EAST HAMPTON
Lake Pocotopaug
Connecticut River
Air Line Trail
Air Line Trail
99
372
9
17
17A
66
16
196
151
Main St.
High St.
Gospel Ln.
Middle Haddam Rd.
Depot Hill Rd.
East Hampton Mall
Shopping Center Dwy
N. Main St.
N. Maple St.
Lakeview St.
Main St.
Maple St.
Middle
Haddam Rd.
Middletown Ave.
Grove St.
Portland Shopping
Center Dwy.
Arrigoni Bridge
Airline Ave.
LEGEND
Study Intersections
Study Area State Road
Study Area Local Road
Air Line Trail
State Route
Local Road
Study Area
Route 66 Corridor Study
FIGURE 1-1
STUDY AREA
Not To Scale
Tighe&Bond
V:\Projects\L\L5001\MXD\New\Figure1-1_StudyArea.mxd

1.2 Study Team

The study team includes representatives from the Towns of Portland and East Hampton, RiverCOG, and CTDOT, in addition to the consultant team. The consulting team includes Tighe & Bond, the prime consultant, and subconsultants VHB, Freeman Companies, and RKG Associates, Inc. Tighe & Bond is providing overall project management, traffic and transportation engineering and is leading the public involvement process. VHB will assist in transportation planning and public involvement. Freeman Companies is tasked in developing landscape and streetscape improvements along the corridor. RKG is responsible for the economic development analysis and future land use portion of the study.

The Towns of Portland and East Hampton are represented by staff from:

- **Board of Selectman**
- **Economic Development Commission**
- **Planning & Zoning Department**
- **Police Department**

CTDOT staff from the Bureau of Policy and Planning are actively involved in the study through their participation on the Study Advisory Committee. Additionally, CTDOT staff from various other Units will be involved in the review of the findings and recommendations to ensure that the Department's policies and vision for Route 66 is reflected in the final report.

RiverCOG is the Council of Governments for the Towns of Portland and East Hampton and overall project manager for the study. RiverCOG staff are actively participating in the public outreach initiatives in cooperation with the Towns. RiverCOG staff are members on the Study Advisory Committee and Community Advisory Committee. Additionally, RiverCOG is hosting the project website.

In total the study team is comprised of parties at the State, Regional, and Local levels to ensure that the planning activities conducted under this study fit within the overall planning goals at all levels of government.

1.3 Study Process

The study is following a process defined by RiverCOG. The key elements of the study include:

- Conducting technical analyses and observations of the study corridor to assess existing conditions and identify deficiencies and needs
- Forecasting future travel demand, analyzing future traffic conditions, and identifying potential future areas of concern within the 20-year study horizon
- Identifying economic development opportunities along the study corridor and assessing their effect on the transportation system
- Identifying feasible improvement alternatives to mitigate the effects of future traffic on the corridor
- Seeking opportunities to enhance the overall transportation system to better accommodate all modes of travel
- Conduct a comprehensive public outreach program involving meetings and a project website to obtain public input and feedback

This Existing Condition Assessment Technical Memorandum summarizes the following:

- Review of the existing transportation system and identification of needs and deficiencies
- Observations of traffic volumes, vehicle classifications, and travel speeds within the study area and developing 2020 Corridor Traffic volumes
- Analysis of historical crash data and traffic safety for all travel modes
- Analysis of traffic operations during the weekday morning and weekday afternoon peak hours which are the periods of peak travel demand on the roadway
- Review current multi-modal transportation services and facilities
- Screening of the natural and environmental resources to identify existing resources that may limit the scope and extent of physical improvements
- Identification of areas of concern in the study area, which will be reviewed to determine opportunities for potential improvement

1.4 Public Involvement and Outreach

Community involvement and public outreach is an important initiative of the study. A variety of techniques will be used to inform the public of study findings and to obtain feedback throughout the study process. Residents and businesses in the study area will have ample opportunities to monitor the progress of the study and offer input to the study team to help inform the decisions and recommendations of the study. The goals of the community involvement and public outreach program include:

- Obtain input from the public and project stakeholders on study area issues, concerns, and help identify and frame the study goals and objectives
- Advise the public of the study findings
- Provide the opportunity for the public to educate the study team with local knowledge
- Involve stakeholders and the public in the development and refinement of recommendations that fit the character and future vision of the Towns
- Facilitate reviews by the Town Councils, Boards and Commissions, Businesses, and Residents, leading to a Final Improvement Plan that can be endorsed by the Towns and Region to help guide future transportation system improvements and enhancements.

1.4.1 Project Committees

The study effort will be guided through oversight provided by the Towns of Portland and East Hampton, RiverCOG, and CTDOT. The public outreach initiatives will be facilitated through a Study Advisory Committee and Community Advisory Committee. The following section describes the groups.

1.4.1.1 Study Advisory Committee (SAC)

This committee will provide consistent input and oversight throughout the study process. The committee will be comprised of:

- **Town Representatives**: Staff from the engineering, planning and zoning, public works, and police departments
- **RiverCOG Representatives:** Staff from RiverCOG will participate to ensure that the planning activities meet regional goals and objectives
- **CTDOT Representatives:** CTDOT Staff from the Division of Policy and Planning will represent the Department on this project and serve as a liaison between the study and other Department Units

SAC meetings are conducted at key milestones of the study process to provide an update on the study progress and obtain guidance on the results, findings, and recommendations of the study. There are four meetings scheduled with this Committee.

The first SAC meeting was conducted on May 31, 2018 to discuss the study tasks, areas of concerns, goals and objectives for the study, and public outreach programs of the study. During the meeting a workshop session where the SAC members identified their key concerns along the study corridor was held. Insight from this meeting is included in this Existing Conditions Report.

1.4.1.2 Community Advisory Committee

The purpose of the Community Advisory Committee (CAC) is to provide a cohesive public outreach process. The CAC is comprised of key project stakeholders and community members that are directly impacted by operations in the study area. The membership of the CAC is still under development at the time this memorandum was published.

1.4.2 Public Information Meetings

In addition to the guidance provided by the SAC and CAC, general public information meetings are conducted throughout the study process.. The initial public information meetings were held on June 12, 2018, in East Hampton, and June 14, 2018, in Portland. These meetings introduced the study team to the public in each Town and During the meetings, the public provided key concerns and issues, many of which are presented in this memo following the completion of the existing condition analysis. Meeting summaries are provided in Appendix A.

Portland Public Information Meeting
June 14, 2018, Portland Library

1.4.3 Project Website and Social Media Presence

RiverCOG has developed a project website that will provide information on the study. The website can be found at the following link:

www.rivercog.org/route66

The website provides study information, meeting information and dates, and access to study publications as they become available.

A Facebook page has also been developed to provide periodic information related to the study progress, meetings, and publications. Access to the page can be found at the following link:

www.facebook.com/Route66CorridorStudy

1.5 Route 66 Corridor Improvement Plan (1998 Study)

The *Route 66 Corridor Improvement Plan* was published in August 1998 by Midstate Regional Planning Agency. The plan looked at the segment of Route 66 that traverses Portland and East Hampton. The goal of the *Route 66 Corridor Improvement Plan* was to analyze existing corridor conditions, project 2020 future traffic patterns, identify problem areas, and develop improvement plans to reduce congestion and improve safety through the corridor. Individual Route 66 Access Management Plans for Portland and East Hampton were also developed to supplement the 1998 plan. The final report from the previously prepared 1998 *Route 66 Corridor Improvement Plan* documents are included in Appendix B.

A number of the proposed improvements identified by the 1998 plan have been implemented during the past 20 years, including:

- The installation of a traffic signal at the intersection of Route 66 and Middle Haddam Road/ Payne Boulevard in Portland
- The addition of dedicated left turn lanes on all approaches at the intersection of Route 66 and Main Street/ North Main Street in East Hampton
- Addition of left turn storage lanes on East High Street near Brooks Plaza in East Hampton
- The realignment of Lakeview Street (Route 196) at Route 66 and the installation of a traffic signal at the intersection in East Hampton

The current study will build upon the 1998 plan. The current planning effort will utilize current data to assess the existing conditions of traffic volumes, safety concerns, and intersection operations. The study will also assess the current and future land use demands on the road network and recommend strategies to improve safety and encourage multi-model travel modes based on the present roadway conditions.

Section 2
Traffic and Transportation

The assessment of existing conditions includes extensive data collection to establish the current condition of the transportation system in the study area. The data has been reviewed and analyzed by the study team. This section describes the assessment of the existing study area transportation system.

2.1 Roadway Network

The primary roadways in the study area were reviewed in the field to observe the condition of the roadway network and identify any deficiencies. These roadways are classified as either Urban Principal (Major) Arterials, Urban Minor Arterials, Urban Collectors or Urban Local Roadways by the Connecticut Department of Transportation (CTDOT). Roadway functional classification were also reviewed based on the Towns' Plan of Conservation and Development (POCD). Both CTDOT and Town POCD functional classification maps are included in Appendix C. Based on the classifications of the study area roadways, a review of roadway characteristics was conducted to determine if deficiencies exist. The following sections summarize the results of the observations for each of the roadways.

2.1.1 State Route 66 (Main Street / Marlborough Street / Portland-Cobalt Road / West High Street / East High Street)

Connecticut State Route 66 is classified as an Urban Principal Arterial by CTDOT. It is classified as an Arterial Road by the Towns of Portland and East Hampton. The roadway runs west to east through Portland and East Hampton. Route 66 begins in Meriden at the Interstate 691 Junction and terminates at the U.S. Route 6 Junction in Windham.

Route 66 in Portland looking East near Adams Supermarket Plaza

Route 66 in East Hampton looking West near American Distilling, Inc.

Route 66 is a major east-west transportation corridor, serving as the primary access route to residences and commercial areas across the region. There are numerous commercial properties and a number of residences that front Route 66 in the study area.

The section of Route 66 in the study area is approximately 11 miles long. Approximately 5.4 miles of which is located in Portland, and 5.6 miles of which is located in East Hampton. From the Portland town center to the Route 17 junction (approximately 2 miles) the roadway consists of four travel lanes, two in each direction, with a raised median and dedicated left turn lane at major intersections. For the remainder of the corridor, the cross section becomes two lanes, one lane in each direction, and widens to provide exclusive left or right turn lanes at key intersections. Within the study area, Route 66 contains thirteen signalized intersections, which are further described in Section 2.2.

Intersection of Main Street (Route 17A) and Marlborough St (Route 66) in Portland

The posted speed limit on Route 66 varies across the study area. The posted speed limit on Route 66 from the end of the Arrigoni Bridge to Grove Street is 35 miles per hour, increasing to 45 miles per hour from Grove Street to the Portland-East Hampton Town Line. The posted speed limit decreases to 35 miles per hour east of the Portland-East Hampton Town Line to Keighley Pond Road, and increases to 45 miles per hour east of Keighley Pond Road. At Maple Street, the posted speed limit drops to 30 miles per hour, before increasing to 45 miles per hour approximately 0.4 miles east of Old Marlborough Road.

2.1.2 State Route 17A (Main Street)

Route 17A intersects Route 66 at a signalized intersection. Connecticut State Route 17A is classified as an Urban Minor Arterial by CTDOT and an Arterial Road by the town of Portland. Route 17A runs north from Route 66 through Portland, terminating at State Route 17. In the study area the roadway is approximately 62 feet wide with two 11-foot travel lanes in both directions, in addition to a 6-foot and 11-foot shoulder in the northbound and southbound direction, respectively. The southbound approach has a shared through-left lane and a through lane. Route 17A abuts a number of residences and businesses in the study area and provides a regional connection to Route 17. The posted speed limit on Route 17A is 30 miles per hour in the study area.

Intersection of Main Street (Route 17A) and Marlborough St (Route 66) in Portland

2.1.3 High Street

High Street is classified as an Urban Major Collector by CTDOT. The roadway is classified as a Collector Road by the Town of Portland. It runs north from Route 66 (Marlborough Street) to Bartlett Street. The roadway is approximately 40 feet wide with two travel lanes and moderate shoulders. High Street intersects Route 66 at a signalized intersection. High Street provides access to commercial properties near Route 66 and residential areas traveling further north. Valley View School and Portland High School are also located on High Street. The posted speed limit is 30 miles per hour from Route 66 to William Street and 25 miles per hour from William Street to Bartlett Street.

2.1.4 Airline Avenue

Airline Avenue is classified as an Urban Local Road by both CTDOT and the Town of Portland. It runs west from Route 66 to Lower Main Street. Airline Avenue intersects Route 66 at a signalized intersection with a skewed angle approach. A 'Stop Here' sign is present at the stop bar, alerting motorists to come to a complete stop at the stop bar before inching up slowly to make a right turn on red onto Route 66. The roadway width varies from approximately 19 to 21 feet, providing a single travel lane in each direction and no shoulders. Airline Avenue provides access to residences, industrial properties, Brownstone Park, and a marina. The posted speed limit is 25 miles per hour.

2.1.5 Portland Shopping Center Driveway

The Portland Shopping Center Driveway intersects Route 66 at a signalized T-intersection. The driveway provides an exclusive left turn and right turn lane exiting the plaza and a single entering lane. The entrance and exit are separated by a narrow raised island. A secondary unsignalized right-only exit is provided approximately 180 feet west of the signalized driveway. There is no traffic control device at this exit. The driveway serves an approximately 54,000 square foot shopping plaza comprised of a grocery store, gym, and various retail locations.

Portland Shopping Center Driveway, looking South towards Route 66

2.1.6 Grove Street / Grandview Terrace

Grove Street and Grandview Terrace intersect Route 66 at a signalized intersection. Grove Street is classified as an Urban Local Road by both CTDOT and the town of Portland. It runs south from Route 66 to Riverview Street. The roadway width is approximately 25 feet with no shoulders. Grove Street provides access to residences as well as a marina at the south end of the road. The posted speed limit is 25 miles per hour.

Grandview Terrace is classified as an Urban Local Road by both CTDOT and the Town of Portland. Grandview Terrace runs parallel to Route 66 and intersect Route 66 approximately 0.4 miles to the east. The roadway is approximately 25 feet wide, providing a single travel lane in each direction with no shoulders. Grandview Terrace provides access to residences, including the Grandview Farms development. The private development has no outlet. The posted speed limit is 25 miles per hour.

2.1.7 State Route 17 (Gospel Lane)

Gospel Lane, designated as Connecticut State Route 17, is classified as an Urban Principal Arterial by CTDOT. It is classified as an Arterial Road by the Town of Portland. Route 17 intersects Route 66 at a signalized intersection. It runs north from Route 66 through the Town of Portland, becoming an expressway in the Town of Glastonbury, and terminates at Connecticut State Route 2 outside of the study area providing a north-south commuter route towards Hartford. The roadway is approximately 28 feet wide, with one 12-foot travel lane in each direction and narrow shoulders in the study area. At the intersection with Route 66, Route 17 widens to provide left and right turn lanes turning onto Route 66. Route 17 is a major north-south route, providing access to mostly residential neighborhoods except for a few commercial developments. The posted speed limit is 35 miles per hour.

Route 17 (Gospel Lane) in Portland looking South towards Route 66

2.1.8 Middle Haddam Road (W Junction) / Payne Boulevard

Middle Haddam Road (W Junction) and Payne Boulevard intersect Route 66 at a signalized intersection. Middle Haddam Road is classified as an Urban Collector Road by both CTDOT and the Town of Portland. It runs east from Route 66 in Portland, continuing into East Hampton before turning into Old Middletown Road at Penfield Hill Road. The roadway is approximately 24 feet wide at Route 66 before narrowing to 20 feet, providing a single travel lane in each direction with no shoulders. The posted speed limit is 25 miles per hour.

Payne Boulevard is classified as an Urban Local Road by both CTDOT and the Town of Portland. It runs south of Route 66 and has no outlet. The roadway is approximately 30 feet wide, with a single travel lane in each direction with narrow shoulders. It serves a residential neighborhood and a farm. The posted speed limit is 25 miles per hour.

2.1.9 State Route 151 (Middle Haddam Road) / Depot Hill Road

Route 151 and Depot Hill Road intersect Route 66 at a signalized intersection. Middle Haddam Road, designated as Connecticut State Route 151, is classified as an Urban Collector by both CTDOT and the Town of East Hampton. The roadway runs south from Route 66 through East Hampton and Haddam before terminating at Route 196 in Haddam. The roadway is approximately 25 feet wide, with a single travel lane in each direction and no shoulders. At Route 66, the roadway splits to provide a shared through-left lane that is signal-controlled and a channelized right turn lane that is controlled by a stop sign. These two lanes are separated by a raised island. Middle Haddam Road provides access to a mix of residential and commercial properties. The roadway is a scenic road. The posted speed limit is 35 miles per hour within the study area.

Route 151 (Middle Haddam Road) in Cobalt looking North towards Route 66

Depot Hill Road is classified as an Urban Collector from south of Old Middletown Road, and an Urban Local Road north of Old Middletown Road. It is classified as an Collector Road by the Town of East Hampton. Depot Hill Road runs north through East Hampton and Portland before terminating at Gadpouch Road. The roadway is approximately 25 feet wide, with a single travel lane in each direction and no shoulder. Depot Hill Road provides access to an exclusively residential area. The posted speed limit on Depot Hill Road is 25 miles per hour.

2.1.10 State Route 16 (Middletown Avenue) / Park and Ride Driveway

Route 16 and the Park and Ride Driveway intersect at Route 66 at a signalized intersection. Middletown Avenue, designated as Connecticut State Route 16, is classified as an Urban Minor Arterial by CTDOT and an Arterial Road by the Town of East Hampton. Route 16 runs from Route 66 to the east through East Hampton and Colchester before terminating at State Route 85 in Colchester. The roadway is approximately 24 feet wide, with a single travel lane in each direction. At the intersection of Route 66, Route 16 widens to provide a dedicated right turn lane and shared through-left lane. Route 16 provides access to a mix of commercial and residential developments in addition to serving as a commuter route to Colchester and points south and east via Route 2. The posted speed limit is 50 miles per hour in the study area.

Route 16 (Middletown Avenue) in East Hampton looking North towards Route 66

The Park and Ride Driveway provides access to a commuter parking lot a state highway maintenance facility. The driveway is approximate 28-feet wide and provides a single entrance lane and single exit lane to the Park and Ride.

2.1.11 Maple Street / North Maple Street / Old West High Street

Maple Street, North Maple Street, and Old West High Street intersect Route 66 at a signalized intersection. Maple Street is classified as an Urban Local Road by both CTDOT and the Town of East Hampton. The roadway runs south from Route 66 before terminating at Barton Hill Road. Maple Street is approximately 20 feet wide, with a single travel lane in each direction and no shoulders. Maple Street provides access to residential neighborhoods. The posted speed limit on Maple Street is 25 miles per hour.

North Maple Street is classified as an Urban Local Road by both CTDOT and the Town of East Hampton. The roadway runs north from Route 66 for approximately 0.60 miles before ending at a dead end. North Maple Street is approximately 30 feet wide, with a single travel lane in each direction and narrow shoulders. North Maple Street provides access to residential neighborhoods and East Hampton High School. The posted speed limit on North Maple Street is 25 miles per hour.

Old West High Street is classified as an Urban Local Road by both CTDOT and the Town of East Hampton. The roadway runs parallel to Route 66 and the west junction at Route 66 is approximately 0.15 miles away. Old West High Street is approximately 17 feet wide, with a single travel lane in each direction and no shoulders. The roadway provides access to residences and a restaurant. The posted speed limit is 25 miles per hour.

2.1.12 Main Street/ North Main Street

Main Street and North Main Street intersect at Route 66 at a signalized intersection. Main Street is classified as an Urban Minor Arterial by CTDOT and a Collector Road by the Town of East Hampton. Main Street runs south from Route 66 through East Hampton, turning into South Main Street at State Route 16. The roadway is approximately 28 feet wide, with a single travel lane in each direction and narrow shoulders. At the intersection of Route 66, the roadway widens to provide a dedicated left turn lane and shared through-right lane. The Air Line Trail intersects Main Street just south of Barton Hill Road with a trail parking lot located on the east side of Main Street. Main Street provides access to a variety of residential and commercial uses, including restaurants and retail in the Town center. The posted speed limit on Main Street is 30 miles per hour.

North Main Street is classified as an Urban Minor Arterial by CTDOT and a Collector Road by the Town of East Hampton. The roadway runs north from Route 66 to Clark Hill Road, where it turns into Lake Drive. North Main Street is approximately 24 feet wide, with a single travel lane in each direction and narrow shoulders. At the intersection of Route 66, the roadway widens to provide a dedicated left turn lane and shared through-right lane. The roadway provides access to a mix of residential and commercial properties as well as access to Lake Pocotopaug. The posted speed limit on North Main Street is 25 miles per hour.

Intersection of Route 66 and Main Street/ North Main Street in East Hampton

2.1.13 East Hampton Shopping Center Driveway/ Eversource Driveway

The East Hampton Shopping Center Driveway and Eversource Driveway intersect Route 66 at a signalized intersection. The East Hampton Shopping Center Driveway provides two lanes entering the plaza and two lanes exiting the plaza, separated by a raised island. The East Hampton Shopping Center consists of an approximately 75,000 square foot shopping plaza anchored by Stop and Shop, as well as a standalone 3,500 square foot Bank of America. The Eversource Driveway provides a single entrance lane and a single exit lane providing access to the Eversource Area Work Center.

Looking North towards the East Hampton Shopping Center Driveway

The Eversource Driveway provides a single entrance lane and a single exit lane providing access to the Eversource Area Work Center.

2.1.14 State Route 196 (Lakeview Street)

Route 196 (Lakeview Street) intersects Route 66 at a signalized intersection. Route 196 is classified as an Urban Collector by both CTDOT and the Town of East Hampton. Route 196 runs southwest from Route 66 through East Hampton, Haddam and East Haddam before terminating at State Route 151 in East Haddam. The roadway is approximately 28 feet wide, with a single travel lane in each direction and narrow shoulders. At the intersection of Route 66, the roadway widens to provide a dedicated left and dedicated right turn lane. A raised landscaped median island separates the northbound and southbound approaches on Route 196. The posted speed limit is 25 miles per hour in the study area.

Route 196 (Lakeview Street) in East Hampton looking North towards Route 66

2.2 Intersection Traffic Control

Within the study area, Route 66 intersection traffic control is generally signalized at major intersecting roadways and major driveways. Minor roadways and smaller commercial driveways are typically unsignalized with stop control on the side-street approaches. The study area features 13 signalized intersections which are listed in Table 2-1 and illustrated in Figure 2-1.

Seven of the traffic control signals in the study area operate in one of the three time-based coordination systems owned and operated by CTDOT. Each system functions to provide coordination between several intersections to promote efficient traffic operations. One system includes the intersection of Route 66 and Main Street in Portland, which coordinates with the signals on Main Street to the north. Another coordination system includes the Route 66 intersections with High Street, Airline Avenue, Portland Shopping Center Driveway, and Grove Street in Portland. The High Street and Airline Avenue signals operate with one traffic signal controller in a cluster intersection configuration. The cluster intersection operation allows for coordination of side street and main line movements for closely spaced intersections that would not allow efficient progression under separate, coordinated operation. The third system controls the intersections of Route 66 with Main Street and East Hampton Shopping Center Driveway in East Hampton.

The Route 66 intersections with Gospel Lane and Middle Haddam Road in Portland operate with uncoordinated traffic signals. Additionally, the route 66 intersections with Route 151, Route 16, Maple Street, and Lakeview Street in East Hampton also operate with uncoordinated traffic signals.

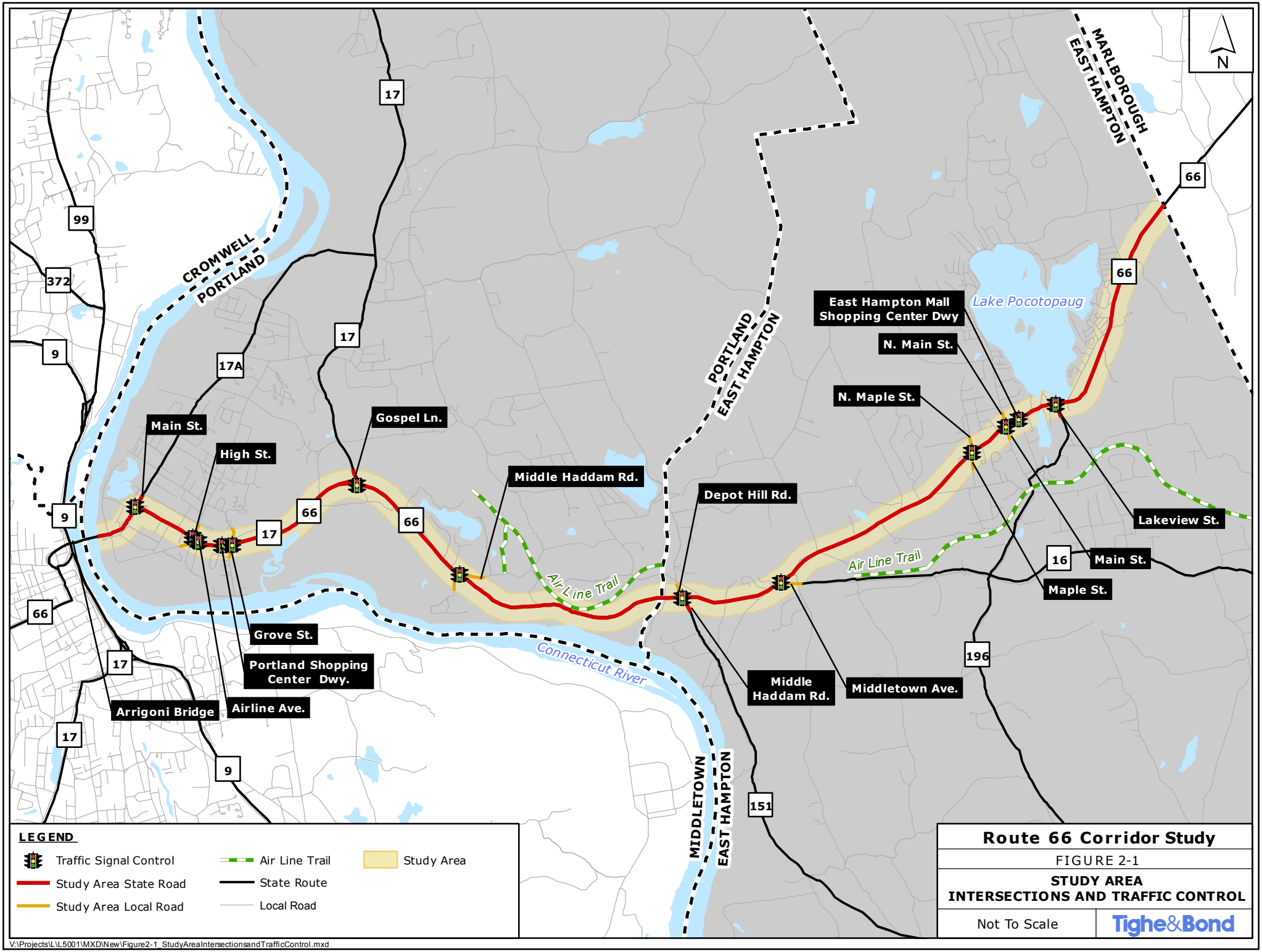
Traffic signal control settings including coordination system signal settings related to cycle lengths, time of day signal patterns, and traffic control signal phasing information was obtained from CTDOT. These settings were utilized in the traffic model to analyze 2020 Corridor Conditions traffic control signal operations. The results of the analysis are summarized in Section 2.6 – 2020 Corridor Conditions Traffic Operations. Copies of the traffic signal plans for each of the 13 signalized intersections are provided in Appendix D.

TABLE 2-1
Study Area Signalized Intersections

Intersection
Route 66 (Marlborough Street) at Route 17A (Main Street) [1, 2]
Route 66 (Marlborough Street) at High Street [2, 3, 4]
Route 66 (Marlborough Street) at Airline Avenue [2, 3, 4]
Route 66 (Marlborough Street) at Portland Shopping Center Driveway [3, 5]
Route 66 (Marlborough Street) at Grove Street / Grandview Terrace [3, 5]
Route 66 (Portland-Cobalt Road) at Route 17 (Gospel Lane) [5]
Route 66 (Portland-Cobalt Road) at Middle Haddam Road / Payne Boulevard [5]
Route 66 (Portland-Cobalt Road) at Route 151 (Middle Haddam Road) / Depot Hill Road [2]
Route 66 (West High Street) at Route 16 (Middletown Avenue) / Park & Ride Driveway [5]
Route 66 (West High Street) at Maple Street / North Maple Street / Old West High Street [5]
Route 66 (West High Street / East High Street) at Main Street / North Main Street [2, 6]
Route 66 (East High Street) at East Hampton Shopping Center / Eversource Driveway [2, 6]
Route 66 (East High Street) at Route 196 (Lake View Street) [2]

1 - Intersections operating under a time-based coordination system on Route 17A
2 - Intersections include an exclusive pedestrian phase
3 - Intersections operating under a time-based coordination system on the west end of Route 66
4 - Intersections operate under one traffic signal controller in a cluster intersection configuration
5 - Intersections include a concurrent pedestrian phase
6 - Intersections operating under a time-based coordination system on the east end of Route 66

Currently, 6 intersections in the study area provide pedestrian push button actuated exclusive pedestrian phase, listed in Table 2-1 above. The remaining 7 signalized intersections are equipped with pedestrian push buttons to actuate the minor street (side street) pedestrian clearance time to allow pedestrians to cross Route 66 concurrently with vehicular traffic. Opportunities to improve access and accommodations for pedestrians will be identified as part of this study. Further detail on the existing pedestrian accommodations within the study area is provided in Section 2.9 – Alternative Travel Modes.



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2.3 Traffic Signs

Traffic signs along Route 66 were reviewed to record the traffic control signage and assess the condition of the signs within the study limit. Existing signage in the study area includes the following:

- **Regulatory Signs**: lane-use control signs, stop signs, signs for no parking, traffic signal signs, do not enter signs, no passing signs, keep right signs, and speed limit signs
- **Warning Signs**: signal ahead signs, curve signs and chevrons, arrows and intersection warning signs, deer crossing warning signs, merge sign, and pedestrian crossing signs
- **Guide & Informational Signs**: town line signs, state property & facility signs, commuter parking and park & ride signs, route markers, and a series of wayfinding signs for park, trail, and attractive destinations

The majority of the signage was observed to be effective at indicating the purpose, compliant with Manual of Uniform Traffic Control Devices (MUTCD) and CTDOT Catalog of Signs standards, and in satisfactory retroreflectivity conditions.

However, there are locations along the study corridor where signs can be installed or improved to enhance roadway safety:

- The current lane merge warning sign at the eastbound four-lane to two-lane transition area east of Gospel Street in Portland is not installed at an appropriate location that meets the design guidelines included in the MUTCD. Additionally, the lane-reduction transition pavement marking isn't provided to guide traffic through the transition area.
- School zone signs and speed limit signs for school zone do not exist in vicinity of Childs Road, where East Hampton Middle School is located along the corridor
- Speed enforcement signs including change of speed limit signs and radar speed signs don't exist and are considered necessary to help regulate travel speeds on the corridor.

Merge sign on Route 66 in East Hampton, looking East

School Crossing sign on Route 66 near East Hampton Middle School

Due to the fact that Route 66 is a State Route, signage along this roadway, as well as on Routes 17, 16 and 151, are owned and maintained by CTDOT. Signage on the local roadways is owned and maintained by the towns in which they are located.

2.4 Traffic Volumes

2.4.1 Historic and Current Daily Traffic Volumes

Available historical traffic volume data was obtained from CTDOT. In addition, a traffic counting program was conducted to supplement the available data. Data sources included:

- CTDOT triennial 24-hour continuous automatic traffic recorder (ATR) data between 2003 and 2015. The most recent count year for the Towns was 2015.
- ATR counts at 14 locations along Route 66 in April and May 2018 as part of the study data collection effort. The raw ATR data is included in Appendix E.

A review of the historic average daily traffic (ADT) volume data collected indicates daily traffic volumes along Route 66 peaked around 2006 before the economic recession and began to decline. In some cases, this decline was significant. Route 66 started to recover in 2012. Volumes have since returned to their approximate levels prior to the recession. Figures 2-2 and 2-3 show the change in average daily traffic at multiple count locations in the study area. Figure 2-4 illustrates the 2018 Weekday Average Daily Traffic Volumes at count locations throughout the study area.

FIGURE 2-2
Route 66 Historical Average Daily Traffic – Portland Count Stations

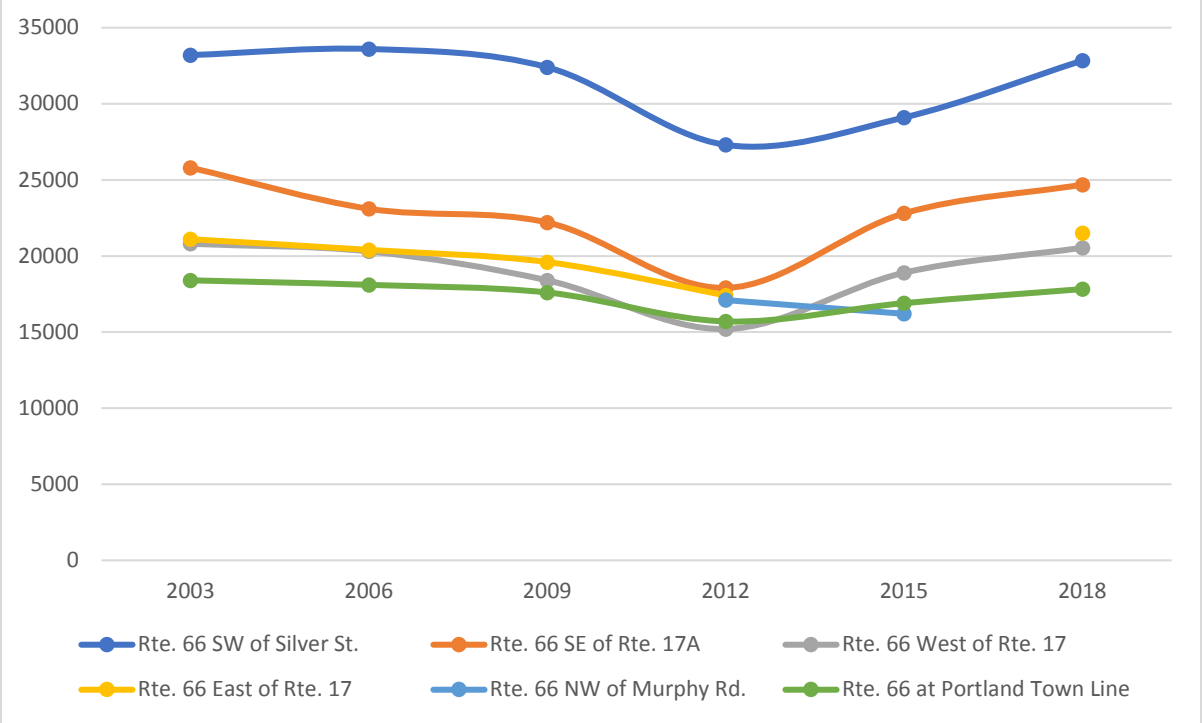

FIGURE 2-3
Route 66 Historical Average Daily Traffic – East Hampton Count Stations

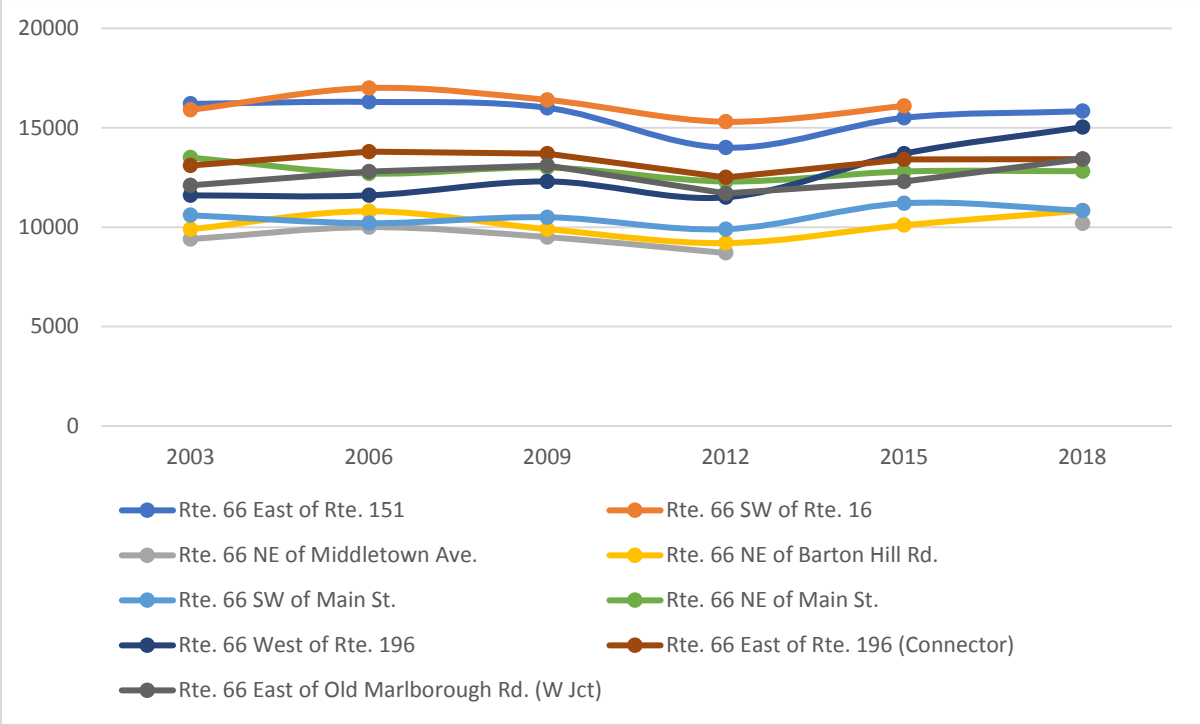

Table 2-2 and Table 2-3 summarizes the weekday and Saturday ADT data, respectively, at select study area locations. Peak hour traffic with directional distributions and the peak hour "K" factor for the morning and afternoon peak periods are also presented on the tables. The "K" factor is calculated by determining the percentage of the total ADT that occurs during the peak hour period and is used to indicate the relative intensity of the peak hour volume with respect to the balance of the average daily traffic.

A review of Table 2-2 indicates weekday ADT volumes of almost 33,000 just east of the Arrigoni Bridge on Main Street. The volume drops to under 25,000 east of Route 17A in the study area. The volumes decrease by just over 5,000 vehicles per day to the east of the Route 16 (Middletown Avenue) intersection. The volumes then steadily increase beyond the intersection of Route 66 and Maple Street, reaching a peak of just over 15,000 vehicles per day at the intersection to the west of Route 196 (Lake View Street) before decreasing to approximately 13,400 vehicles per day at the Marlborough Town Line. The "K" factors of 7-10% suggest that commuter traffic volume is consistent with regional travel routes. The directional distribution along the Route 66 corridor is 0-15% higher westbound in the morning and eastbound in the afternoon.

A review of Table 2-3 indicates a similar trend in Saturday ADT volumes, as compared to the weekday ADT volumes. Traffic volumes east of the Arrigoni Bridge are just over 28,500 vehicles per day. West of Route 17A, the volume drops to about 22,000. East of Route 16 (Middletown Avenue), the volumes bottom out at just over 9,500 vehicles per day. Beyond Route 16, the volumes fluctuate between 10,000 to 13,000, reaching a peak of 13,000 vehicles per day west of Route 196 (Lakeview Street).

TABLE 2-2
2018 Existing Weekday Average Daily Traffic Volumes Summary

Location	Weekday ADT	Morning Peak Hour				Afternoon Peak Hour			
		Vehicles Per Hour	Dist.		"K" Factor	Vehicles Per Hour	Dist.		"K" Factor
Southwest of Silver Street	32,840	2,125	56%	WB	6.47%	2,755	64%	EB	8.39%
East of Route 17A (Main Street)	24,690	1,830	64%	WB	7.41%	2,085	64%	EB	8.45%
West of Pickering Street	23,960	1,845	66%	WB	7.70%	2,015	63%	EB	8.41%
West of Grandview Terrace	22,055	1,705	68%	WB	7.73%	1,730	53%	WB	7.84%
West of Route 17 (Gospel Lane)	20,540	1,660	69%	WB	8.08%	1,920	73%	EB	9.35%
East of Route 17 (Gospel Lane)	21,510	1,665	68%	WB	7.74%	1,855	65%	EB	8.62%
Portland/ East Hampton Town Line	17,830	1,545	71%	WB	8.67%	1,515	67%	EB	8.50%
East of Route 151 (Middle Haddam Road)	15,830	1,285	69%	WB	8.12%	1,440	67%	EB	9.10%
East of Route 16 (Middletown Avenue)	10,185	830	68%	WB	8.15%	910	62%	EB	8.93%
East of Barton Hill Road	10,835	915	57%	WB	8.44%	995	53%	EB	9.18%
East of Main Street	12,815	945	57%	EB	7.37%	1,105	51%	EB	8.62%
West of Route 196 (Lake View Street)	15,030	1,090	57%	EB	7.25%	1,370	57%	WB	9.12%
Near Paul and Sandy's Too	13,430	1,095	58%	EB	8.15%	1,245	57%	WB	9.27%
East Hampton/ Marlborough Town Line	11,370	885	63%	EB	7.78%	1,010	59%	WB	8.88%

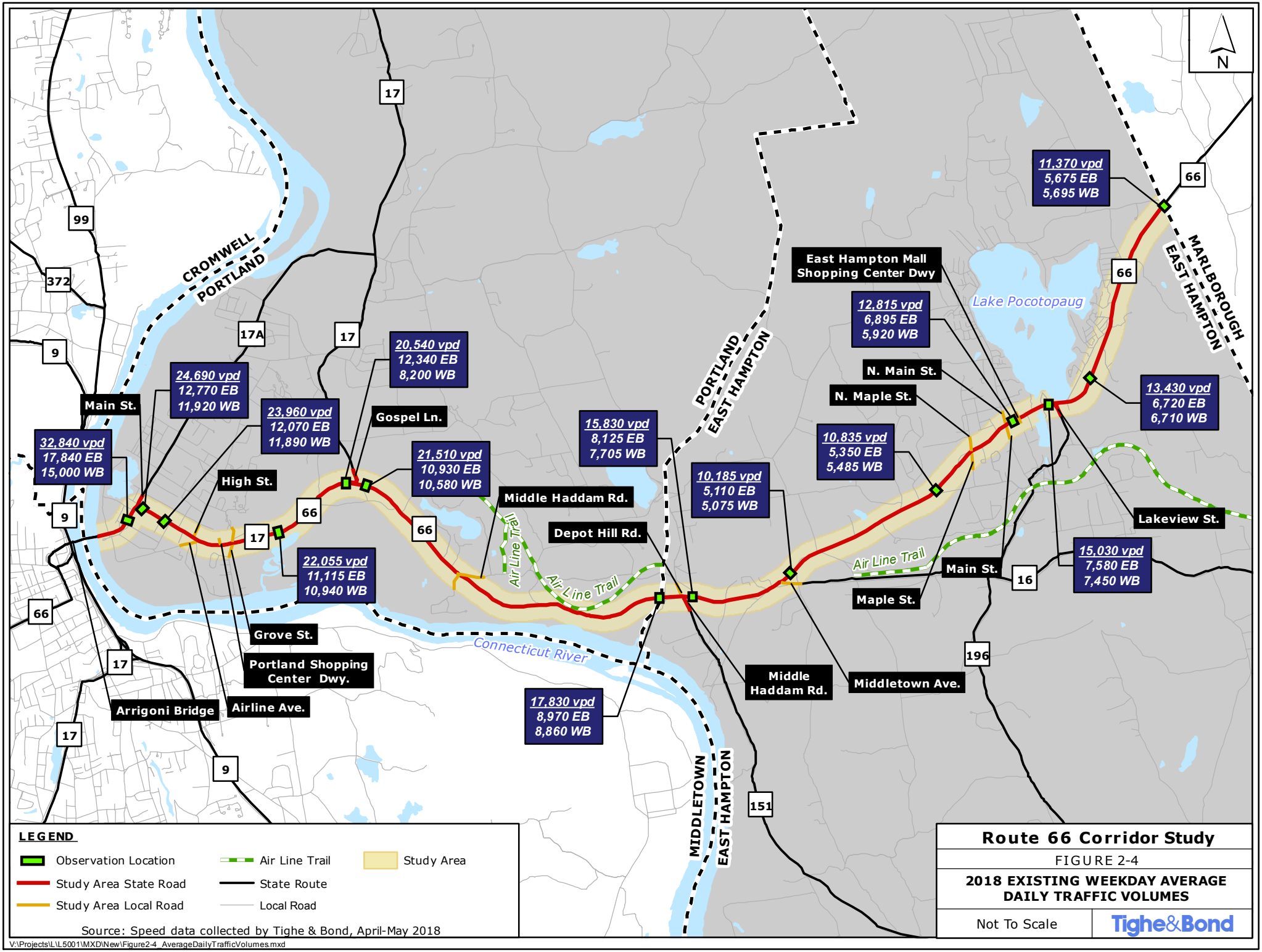

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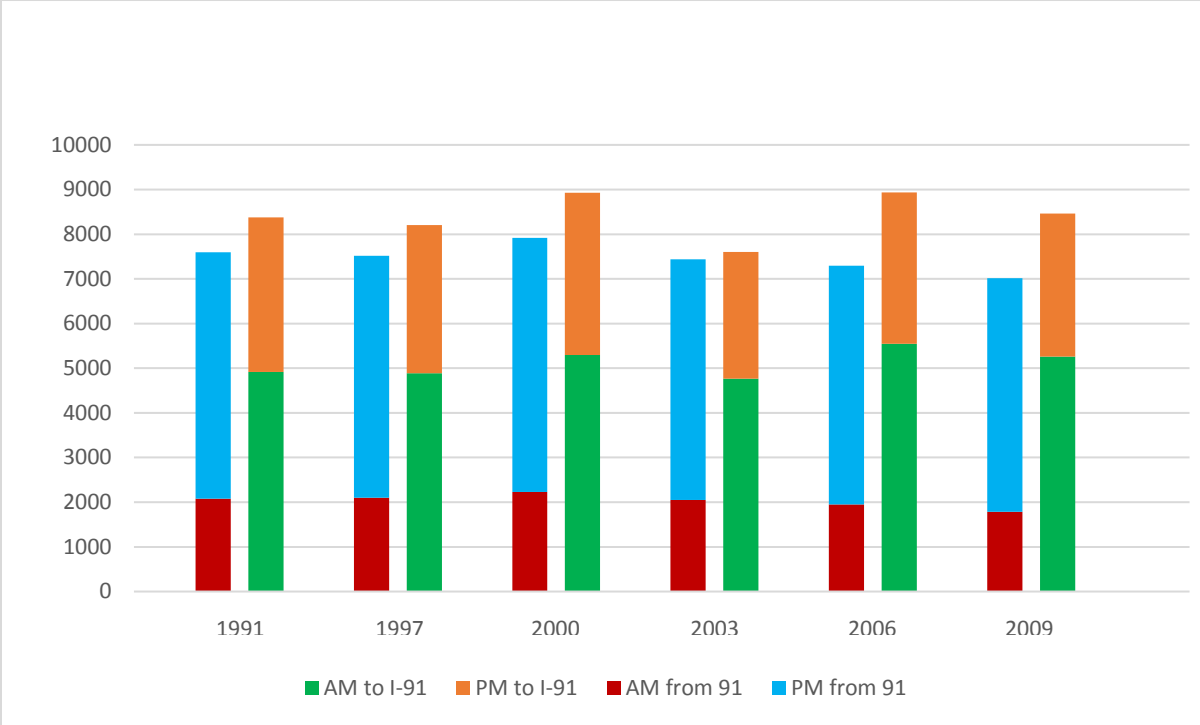
TABLE 2-3
2018 Existing Saturday Average Daily Traffic Volumes Summary

Location	Saturday ADT	Saturday Peak Hour			
		Vehicles Per Hour	Dist.		"K" Factor
Route 66					
Southwest of Silver Street	28,625	2,218	58%	EB	7.75%
East of Route 17A (Main Street)	22,145	1,746	53%	EB	7.88%
West of Pickering Street	21,140	1,582	52%	EB	7.48%
West of Grandview Terrace	20,007	1,640	52%	EB	8.20%
West of Route 17 (Gospel Lane)	12,000	1,593	53%	EB	13.28%
East of Route 17 (Gospel Lane)	19,480	1,093	83%	WB	5.61%
Portland/ East Hampton Town Line	17,245	1,380	52%	EB	8.00%
East of Route 151 (Middle Haddam Road)	15,255	1,201	53%	EB	7.87%
East of Route 16 (Middletown Avenue)	9,685	711	54%	WB	7.34%
East of Barton Hill Road	10,350	822	52%	WB	7.94%
East of Main Street	12,870	1,058	54%	EB	8.22%
West of Route 196 (Lake View Street)	13,020	1,124	50%	EB	8.63%
Near Paul and Sandy's Too	12,645	1,033	51%	WB	8.17%
East Hampton/ Marlborough Town Line	10,570	871	50%	EB	8.24%

Historic peak-hour directional trends in the study area were also reviewed to examine if there have been directional shifts in commuter traffic utilizing Route 66. There have not been any major shifts traveling west towards the State Route 9/ Interstate 91 (I-91) corridor or traveling east from I-91. A majority of vehicles travel towards Route 9/ I-91 during the morning commute, and from Route 9/ I-91 during the afternoon commute. Figure 2-5 shows the peak-hour directional traffic volumes between 1991 and 2009 have remained relatively constant.

FIGURE 2-5
Route 66 Directional Peak-Hour Traffic Flow



2.4.2 2018 Existing Conditions Peak Hour Traffic Volumes

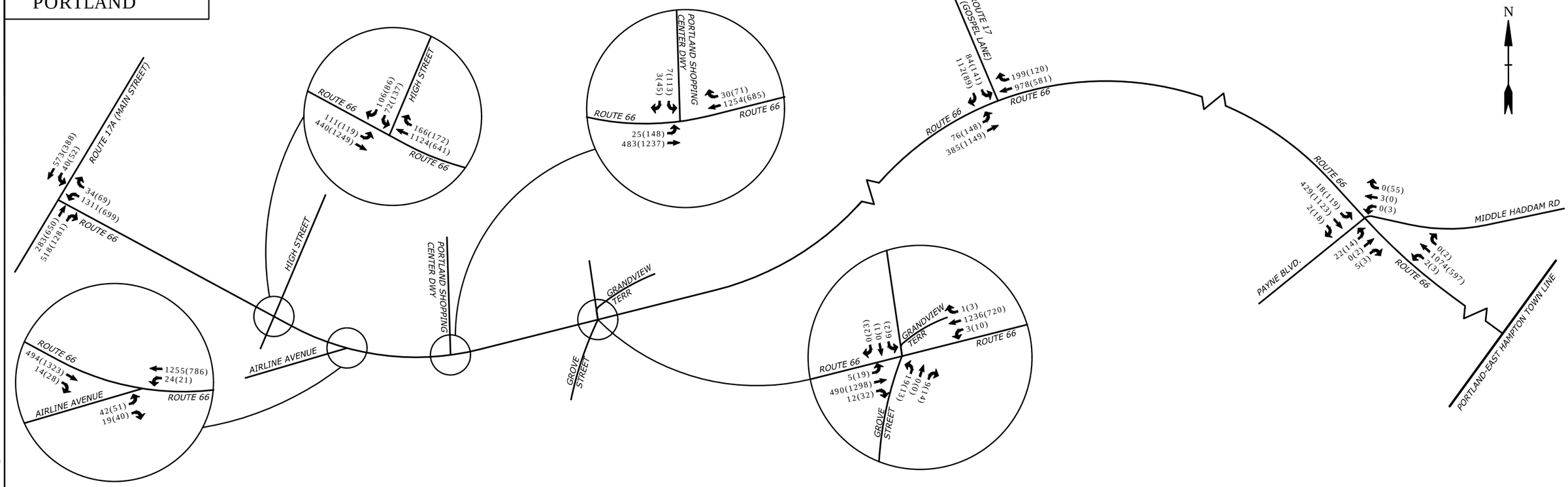
Traffic volumes during the weekday morning and afternoon commuter peak hours are higher than other periods throughout the day. Weekday morning (7:00 to 9:00 AM) and weekday afternoon (4:00 to 6:00 PM) peak period intersection turning movement counts were collected at the 13 study intersections on Thursday, April 26, 2018. The intersection turning movement data was analyzed and balanced between closely spaced intersections. The raw turning movement counts are included in Appendix E.

2.4.3 2020 Corridor Conditions Peak Hour Traffic Volumes

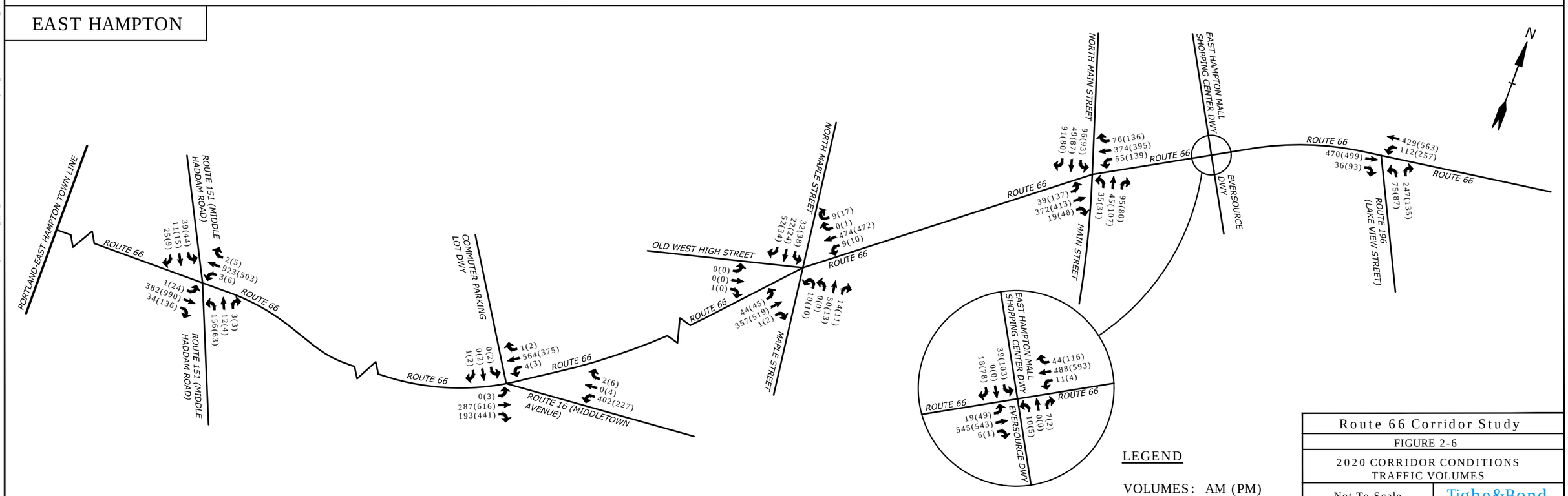
In order to establish the 2020 Corridor Peak Hour Traffic Volumes, CTDOT Bureau of Policy and Planning, Portland Economic Development Commission, and East Hampton Planning and Zoning Department were consulted. CTDOT advised that an ambient growth rate of 0.7 percent per year and 1.2 percent per year should be used to estimate the increase in traffic between 2018 and 2020 for the segment within Portland and East Hampton, respectively.

Portland Economic Development Commission staff indicates that the only approved major development in the town of Portland, Brainerd Place, will mostly likely not be occupied by 2020. Meanwhile, based on discussions with the East Hampton Planning and Zoning Department, portions of a few major developments including Edgewater Hills, Skyline Estates, and Dollar General within the town will be occupied by 2020. The site-generated trips for these portions of the developments were estimated and included to develop 2020 Corridor peak hour traffic volumes. The resulting traffic volumes are shown in Figure 2-6 as the 2020 Corridor traffic volumes for the two peak hours, respectively.

PORTLAND



EAST HAMPTON



LEGEND

VOLUMES: AM (PM)

Route 66 Corridor Study	
FIGURE 2-6	
2020 CORRIDOR CONDITIONS TRAFFIC VOLUMES	
Not To Scale	Tighe&Bond

2.5 Travel Speed

Travel speed data was collected along Route 66 in the study area using Automatic Traffic Recorders (ATRs). The data was recorded during April and May 2018. Table 2-4 and Figure 2-7 summarize the results of the speed observations within the study area with average speeds or 85th percentile speeds that exceed the posted speed limit by 10 miles per hour or more highlighted in red. The 85th percentile speed, also known as the operating speed, is the speed at which 85% of all traffic is travelling at or below. Raw speed data is included in Appendix E.

Along Route 66, average travel speeds were higher than the posted speed limit at a number of observation locations. Travel speeds generally increase traveling east on Route 66. The divided nature of the roadway, long spacing between traffic signals, and a number of steep downgrades encourages high travel speeds along much of the corridor. In Portland, between Route 17A (Main Street) and High Street, average speeds are greater than 10 miles per hour over the posted speed limit at each observation locations. From Route 17 (Gospel Lane) to the Portland-East Hampton Town Line, average speeds are greater than 10 miles per hour over the posted speed limit at both observation locations within this segment. East of Route 16, travel speeds increase with the increase in posted speed limit, but remain within 10 miles per hour of the posted speed limit. Average travel speeds decrease significantly east of Maple Street. Travel speeds are lower along this stretch due to the high density of driveways and closer spacing of signals. The 85th percentile speed is over 10 miles per hour of the posted speed at 8 out of the 14 observation locations.

During two public information meetings, residents of Portland and East Hampton expressed concerns with speeding in the study area. In Portland, high speeds have been observed on Route 66 over the Arrigoni Bridge and the segment from the Airline Avenue intersection to Cobalt Village. In East Hampton, speed issues have been noted on Route 66 near the Edgewater Hills development and in the vicinity of Paul & Sandy's Too. Residents have also seen high speeds on cut-through roads including Middle Haddam Road in Portland and Old Marlborough Road in East Hampton. In general, these concerns with high travel speeds have been confirmed with the ATR speed data that has been collected.

TABLE 2-4
Travel Speed Observations (MPH)

Location	Posted Speed Limit	Average Speed		85th Percentile Speed	
		EB	WB	EB	WB
Southwest of Silver Street	35	38	39	44	44
East of Route 17A (Main Street)	35	**47**	40	**52**	44
West of Pickering Street	35	41	**45**	**47**	**52**
West of Grandview Terrace	45	**57**	54	**63**	**59**
West of Route 17 (Gospel Lane)	45	54	54	**60**	**59**
East of Route 17 (Gospel Lane)	45	**56**	53	**63**	**58**
Portland/ East Hampton Town Line	35	**46**	**48**	52	52
East of Route 151 (Middle Haddam Road)	35	36	44	**46**	**50**
East of Route 16 (Middletown Avenue)	45	41	38	47	45
East of Barton Hill Road	45	49	49	54	53
East of Main Street	30	30	30	36	34
West of Route 196 (Lakeview Street)	30	40	39	**44**	**43**
Near Paul and Sandy's Too	45	46	46	51	51
East Hampton/ Marlborough Town Line	45	49	47	54	52

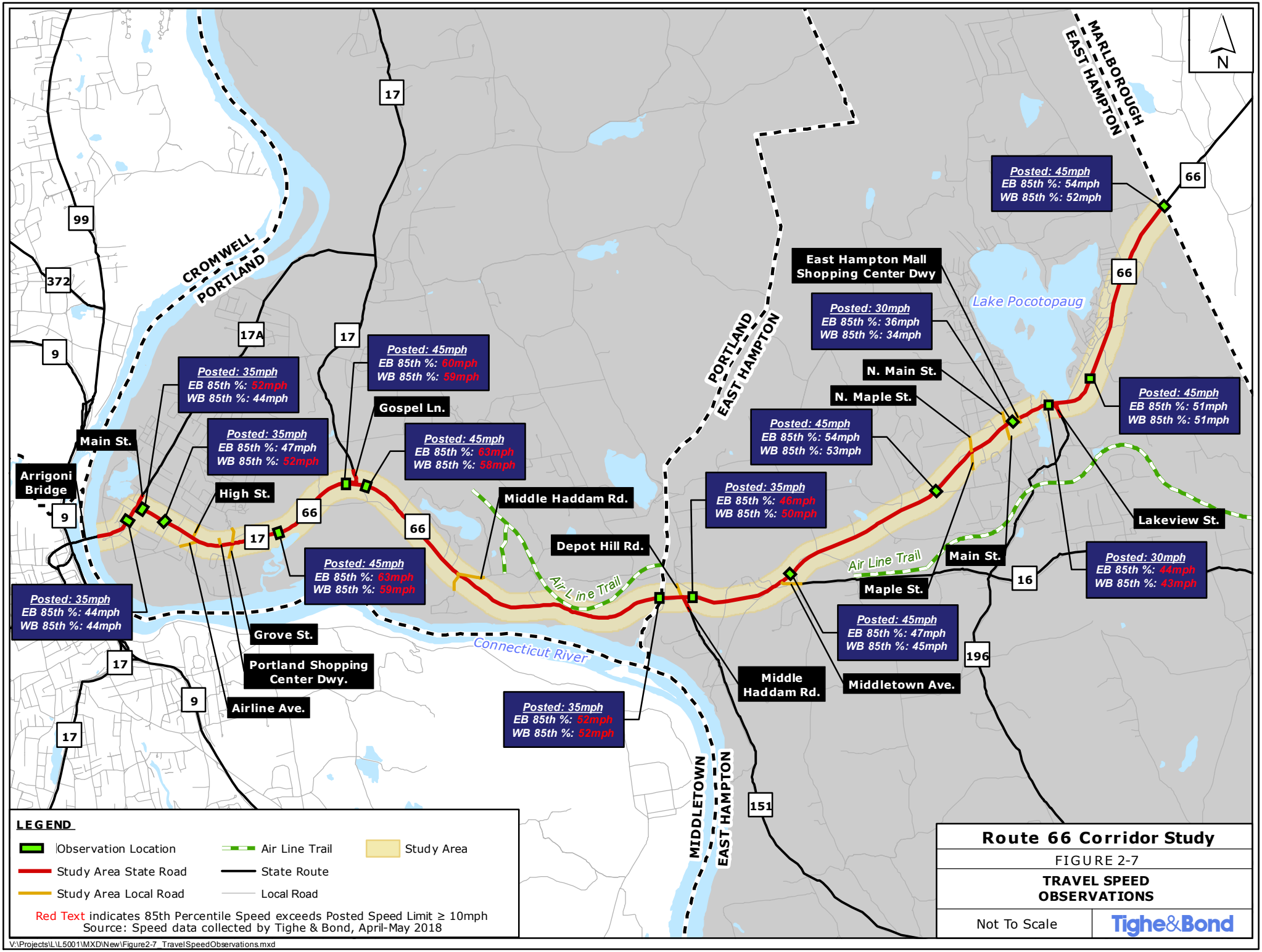
Red Text indicates 85th Percentile Speed exceeds Posted Speed Limit ≥ 10mph

2.6 2020 Corridor Conditions Traffic Operations

Traffic operations were evaluated for the study area intersections during the weekday morning and weekday afternoon peak hours. Capacity and queue analyses were conducted using Trafficware's *Synchro plus SimTraffic 10 – Traffic Signal Coordination Software,* based on the *Highway Capacity Manual (HCM), 6th Edition* methodology.

An intersection's qualitative operational condition is described by the HCM in terms of average control delay per vehicle and volume to capacity (v/c) ratio. Average control delay is measured in seconds of delay that occurs at an intersection, per vehicle, due to the traffic control. The v/c ratio is a measurement of the volume of particular traffic movement or approach in comparison with the capacity of the movement/approach. V/C ratios closer to zero represent that the approach has significant capacity remaining while approaches with v/c values approaching or exceeding 1.0 indicates that the approach is near or at capacity and not able to accommodate the traffic flow.

Together the average control delay and v/c ratio are combined to assign a Level of Service (LOS) to a particular intersection or intersection approach movement. LOS is defined by HCM, using average control delay and v/c, to assign letter grades A through F to indicate the efficiency of the traffic control at an intersection. The definitions of the letter grades in terms of average control delay and v/c are provided in the table below.



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In general intersections that exhibit a LOS A or B are considered to have excellent to good operating conditions with little congestion or delay. LOS C indicates an intersection with acceptable operations. LOS D indicates an intersection that has tolerable operations with average delays approaching one minute. Intersections with Levels of Service E and F are operating with poor or failing conditions and typically warrant a more thorough review and possible improvement to mitigate the capacity issues. Improvements can include geometric, lane use, timing modifications, or different form of traffic control to mitigate the operational issues and reduce average delay. In the context of this planning process, during the analysis of both existing and future conditions, intersections exhibiting LOS E and F will be identified for further analysis and potential improvements to mitigate poor or failing operations.

Level of Service	**Signalized Intersection Criteria** Average Control Delay (Seconds per Vehicle)	**Unsignalized Intersection Criteria** Average Control Delay (Seconds per Vehicle)	**V/C Ratio >1.00[a]**
A	≤10	≤10	F
B	>10 and ≤20	>10 and ≤15	F
C	>20 and ≤35	>15 and ≤25	F
D	>35 and ≤55	>25 and ≤35	F
E	>55 and ≤80	>35 and ≤50	F
F	>80	>50	F

Note: [a]For approach-based and intersection-wide assessments, LOS is defined solely by control delay.

Source: *HCM2010: Highway Capacity Manual.* Washington, D.C.: Transportation Research Board, 2010. Pages 18-6 and 19-2.

In addition to LOS, the HCM methodology also allows for the calculation of queues. Queues are the expected length of vehicles waiting at an intersection due to the delay incurred by the traffic control. The 50th percentile queues, or average queues, are the average number of vehicles expected on an approach at any given time. The 95th percentile, or design queues, are the maximum expected queues on a given approach.

Figure 2-8 and Tables 2-6 to 2-7 summarize the intersection operations in terms of LOS, v/c ratio, and queues at the study area intersections for the 2020 Corridor Conditions. Within the LOS tables, intersections, approaches and/or movements operating at LOS E have been highlighted yellow. Within the queue tables, approaches that exceed available storage have been highlighted in red. Capacity analysis worksheets for 2020 Corridor Conditions are included in Appendix F for the weekday morning and weekday afternoon peak hours.

TABLE 2-5

Study Area Signalized Intersection Operational Summary – 2020 Corridor Conditions – LOS

	Lane Use	Weekday Morning Peak Hour LOS	Weekday Morning Peak Hour Avg. Delay (s/veh)	Weekday Morning Peak Hour v/c	Weekday Afternoon Peak Hour LOS	Weekday Afternoon Peak Hour Avg. Delay (s/veh)	Weekday Afternoon Peak Hour v/c
Traffic Signal - Route 66 at Route 17A (Main Street)							
Overall		**B**	**18.1**	**0.85**	**B**	**17.8**	**0.86**
Route 66	WB	B	19.8	0.85	C	20.7	0.73
Route 66	NBT	C	27.2	0.37	D	39.2	0.83
	NBR	A	0.7	0.36	A	7.6	0.86
Route 17A	SB	C	24.9	0.62	B	10.6	0.28
Traffic Signal - Route 66 (Marlborough Street) at High Street							
Overall		**A**	**7.3**	**0.67**	**B**	**10.6**	**0.68**
Route 66	EBL	A	6.1	0.38	A	4.2	0.25
	EBT	A	7.7	0.23	B	11.7	0.61
Route 66	WB	A	4.7	0.67	A	2.7	0.40
High Street	SB	C	25.9	0.60	D	36.6	0.68
Traffic Signal - Route 66 (Marlborough Street) at Airline Avenue							
Overall		**A**	**6.3**	**0.62**	**A**	**5.0**	**0.67**
Route 66	EB	A	3.9	0.25	A	4.9	0.67
Route 66	WBL	A	1.2	0.04	A	1.7	0.08
	WBT	A	6.4	0.62	A	3.3	0.39
Airline Avenue	NB	C	25.7	0.27	C	20.3	0.31
Traffic Signal - Route 66 (Marlborough Street) at Portland Shopping Center Driveway							
Overall		**A**	**5.2**	**0.45**	**B**	**11.2**	**0.48**
Route 66	EBL	A	1.4	0.07	A	8.6	0.28
	EBTR	A	0.8	0.16	B	11.5	0.47
Route 66	WBTR	A	6.7	0.45	A	7.2	0.37
Portland Shopping Center Dr.	SBL	C	32.3	0.04	D	37.7	0.48
	SBR	C	22.3	0.02	B	10.8	0.18
Traffic Signal - Route 66 (Marlborough St/Portland-Cobalt Rd) at Grove Street/ Grandview Terrace							
Overall		**A**	**3.6**	**0.48**	**A**	**2.7**	**0.48**
Route 66	EBL	A	0.6	0.01	A	0.7	0.03
	EBT	A	2.0	0.19	A	2.0	0.48
Route 66	WBL	A	1.7	0.00	A	1.8	0.03
	WBT	A	4.1	0.48	A	3.6	0.27
Grove Street	NBT	A	1.4	0.15	A	1.5	0.14
Grandview Terrace	SBT	D	35.3	0.05	B	19.3	0.19
Traffic Signal - Route 66 (Portland-Cobalt Road) at Route 17 (Gospel Lane)							
Overall		**B**	**11.7**	**0.62**	**B**	**12.4**	**0.60**
Route 66	EBL	D	36.5	0.45	C	34.8	0.48
	EBTR	A	3.1	0.17	A	5.5	0.48
Route 66	WBT	B	13.3	0.62	B	15.1	0.39
	WBR	A	2.6	0.25	A	3.4	0.16
Route 17 (Gospel Lane)	SBL	C	33.1	0.40	D	42.1	0.60
	SBR	B	10.3	0.40	B	10.1	0.31
Traffic Signal - Route 66 (Portland-Cobalt Road) at Middle Haddam Road/Payne Boulevard							
Overall		**A**	**9.7**	**0.76**	**B**	**12.0**	**0.82**
Route 66	EBL	A	1.9	0.07	A	2.6	0.21
	EBTR	A	3.3	0.30	B	14.6	0.82
Route 66	WBL	A	1.5	0.00	A	2.0	0.01
	WBTR	B	12.5	0.76	A	8.4	0.49
Payne Boulevard	NB	A	1.6	0.15	D	39.6	0.16
Middle Haddam Road	SB	D	43.7	0.02	A	9.7	0.31

TR and LT denote shared “through-right” and shared “left-through” lanes

TABLE 2-5 (Continued)

Study Area Signalized Intersection Operational Summary – 2020 Corridor Conditions – LOS

		Weekday Morning Peak Hour			Weekday Afternoon Peak Hour		
	Lane Use	LOS	Avg. Delay (s/veh)	v/c	LOS	Avg. Delay (s/veh)	v/c
Traffic Signal - Route 66 (Portland-Cobalt Rd/West High St) at Rte. 151 (Middle Haddam Rd)/Depot Hill							
Overall		**C**	**26.6**	**0.88**	**C**	**22.0**	**0.92**
Route 66	EB	A	8.7	0.40	C	24.1	0.92
Route 66	WB	C	24.6	0.88	A	5.6	0.41
Route 151 (Middle Haddam	NBLT	E	74.1	0.82	E	69.5	0.58
Road)	NBR	A	0.0	0.01	A	0.0	0.02
Depot Hill Road	SB	D	45.3	0.42	E	65.9	0.58
Traffic Signal - Route 66 (West High Street) at Route 16 (Middletown Avenue)/Park & Ride Driveway							
Overall		**C**	**26.2**	**0.89**	**B**	**13.4**	**0.70**
Route 66	EBLT	B	14.0	0.43	B	15.6	0.70
	EBR	A	2.5	0.28	A	2.5	0.45
Route 66	WBL	A	9.0	0.01	A	7.7	0.01
	WBTR	C	26.8	0.84	B	10.6	0.42
Route 16 (Middletown Ave.)	NBLT	D	45.8	0.89	C	33.3	0.70
	NBR	A	0.0	0.00	A	0.0	0.01
Park & Ride Driveway	SB	A	0.0	0.00	B	17.3	0.01
Traffic Signal - Route 66 (West High Street) at Maple Street/North Maple Street/Old West High Street							
Overall		**B**	**15.4**	**0.61**	**B**	**10.1**	**0.54**
Route 66	EB	B	12.7	0.55	A	9.0	0.54
Route 66	WB	B	13.5	0.61	A	7.7	0.45
Main Street	NB	C	24.6	0.28	C	21.7	0.13
North Main Street	SB	C	28.5	0.45	C	25.1	0.36
Old West High Street	SEB	C	29.0	0.00	0	0.0	0.00
Traffic Signal - Route 66 (East Main St/West Main St) at Main Street/North Main Street							
Overall		**B**	**18.2**	**0.56**	**C**	**21.7**	**0.72**
Route 66	EBL	A	6.3	0.08	A	8.9	0.32
	EBTR	B	14.2	0.42	B	19.3	0.52
Route 66	WBL	A	7.1	0.10	A	5.5	0.29
	WBTR	B	18.3	0.47	B	18.9	0.62
Main Street	NBL	C	29.0	0.17	C	26.1	0.13
	NBTR	C	20.2	0.56	D	41.4	0.72
North Main Street	SBL	C	32.1	0.34	C	29.1	0.30
	SBTR	C	22.6	0.50	C	33.8	0.56
Traffic Signal - Route 66 (East High St.) at East Hampton Mall Shopping Center Dwy/Eversource Dwy							
Overall		**A**	**9.0**	**0.41**	**B**	**13.9**	**0.61**
Route 66	EBL	A	3.7	0.03	A	5.0	0.12
	EBT	A	9.0	0.41	B	10.2	0.42
Route 66	WBL	A	2.0	0.02	A	3.2	0.01
	WBT	A	6.0	0.41	B	12.7	0.61
Eversource Driveway	NBT	D	40.3	0.13	C	33.3	0.03
East Hampton Mall Shopping	SBT	D	45.1	0.30	D	48.9	0.56
Center Driveway	SBR	A	0.7	0.09	A	9.8	0.28
Traffic Signal - Route 66 (East High Street) at Route 196 (Lake View Street)							
Overall		**B**	**13.4**	**0.75**	**B**	**15.8**	**0.80**
Route 66	EB	C	22.6	0.75	C	29.0	0.80
Route 66	WBL	A	4.7	0.24	A	8.0	0.48
	WBTR	A	5.2	0.38	A	4.9	0.42
Lake View Street	NBL	C	26.9	0.27	C	31.1	0.33
	NBR	A	8.8	0.53	A	9.1	0.38

TR and LT denote shared “through-right” and shared “left-through” lanes

TABLE 2-6

Study Area Signalized Intersection Operational Summary – 2020 Corridor Conditions – Queues

			Weekday Morning Peak Hour		Weekday Afternoon Peak Hour	
	Lane Use	Available Storage	Avg. Queues	Design Queues	Avg. Queues	Design Queues
Traffic Signal - Route 66 at Route 17A (Main Street)						
Route 66	WB	>500	355	444	181	196
Route 66	NBT	510	65	101	167	#252
	NBR	>500	0	0	0	#20
Route 17A	SB	510	132	186	56	100
Traffic Signal - Route 66 (Marlborough Street) at High Street						
Route 66	EBL	225	9	m25	12	m21
	EBT	>500	44	88	193	m318
Route 66	WBT	150	31	67	0	25
High Street	SB	>500	49	106	91	151
Traffic Signal - Route 66 (Marlborough Street) at Airline Avenue						
Route 66	EB	145	21	33	56	68
Route 66	WBL	175	1	m3	1	m3
	WBT	>500	190	71	23	39
Airline Avenue	NB	>500	20	52	24	60
Traffic Signal - Route 66 (Marlborough Street) at Portland Shopping Center Driveway						
Route 66	EBL	350	1	6	35	m76
	EBTR	>500	0	35	211	387
Route 66	WBTR	370	0	437	101	173
Portland Shopping Center D	SBL	155	3	15	54	98
	SBR	155	0	8	0	27
Traffic Signal - Route 66 (Marlborough St / Portland-Cobalt Rd) at Grove Street / Grandview Terrace						
Route 66	EBL	125	1	0	1	m1
	EBTR	370	22	35	127	55
Route 66	WBL	150	0	1	1	3
	WBTR	>500	95	217	41	99
Grove Street	NB	>500	0	0	0	0
Grandview Terrace	SB	>500	3	15	1	25
Traffic Signal - Route 66 (Portland-Cobalt Road) at Route 17 (Gospel Lane)						
Route 66	EBL	200	32	75	68	134
	EBT	>500	21	42	98	175
Route 66	WBT	>500	138	268	95	152
	WBR	200	0	33	0	29
Route 17 (Gospel Lane)	SBL	>500	35	81	69	126
	SBR	100	0	43	0	38
Traffic Signal - Route 66 (Portland-Cobalt Road) at Middle Haddam Road / Payne Boulevard						
Route 66	EBL	175	2	5	11	20
	EBTR	>1500	58	142	343	#1002
Route 66	WBL	300	0	1	0	2
	WBTR	>1000	307	#922	156	247
Payne Boulevard	NB	>500	0	0	9	34
Middle Haddam Road	SB	>500	2	11	0	24

m: Volume for 95th percentile queue is metered by upstream signal.

#: 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

TR and LT denote shared “through-right” and shared “left-through” lanes

TABLE 2-6 (Continued)

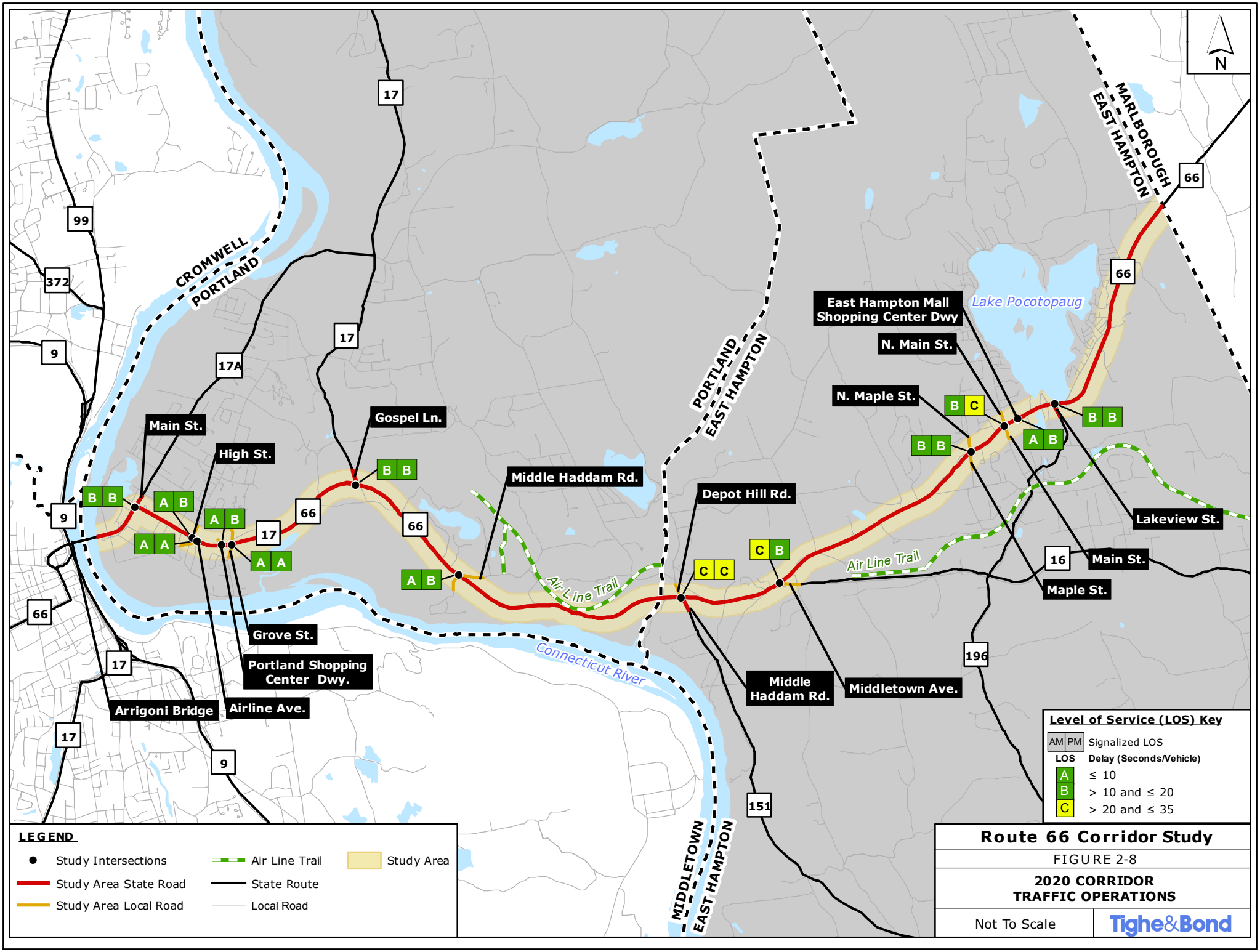
Study Area Signalized Intersection Operational Summary – 2020 Corridor Conditions – Queues

			Weekday Morning Peak Hour		Weekday Afternoon Peak Hour	
	Lane Use	Available Storage	Avg. Queues	Design Queues	Avg. Queues	Design Queues
Traffic Signal - Route 66 (Portland-Cobalt Rd / West High St) at Rte. 151 (Middle Haddam Rd) / Depot Hill Rd						
Route 66	EB	>1500	142	193	612	#1244
Route 66	WB	>1000	584	789	114	201
Route 151 (Middle Haddam	NBLT	>500	150	#270	53	102
	NBR	65	0	0	0	0
Depot Hill Road	SB	>500	49	102	50	100
Traffic Signal - Route 66 (West High Street) at Route 16 (Middletown Avenue) / Park & Ride Driveway						
Route 66	EBLT	>500	86	133	139	321
	EBR	250	0	26	0	38
Route 66	WBL	125	1	6	0	4
	WBTR	>500	216	318	70	165
Route 16 (Middletown Ave	NBLT	>500	167	#450	66	194
	NBR	100	0	0	0	0
Park & Ride Driveway	SB	75	0	0	1	11
Traffic Signal - Route 66 (West High Street) at Maple Street / North Maple Street / Old West High Street						
Route 66	EB	>500	74	251	99	205
Route 66	WB	>500	96	312	80	163
Main Street	NB	>500	0	0	0	0
North Main Street	SB	>500	30	108	0	0
Old West High Street	SEB	>500	0	5	0	0
Traffic Signal - Route 66 (East Main St / West Main St) at Main Street / North Main Street						
Route 66	EBL	275	7	21	28	64
	EBTR	>500	140	251	181	348
Route 66	WBL	225	16	25	25	m20
	WBTR	485	245	359	282	#480
Main Street	NBL	225	16	40	14	33
	NBTR	>500	27	77	85	140
North Main Street	SBL	175	51	90	48	81
	SBTR	>500	33	91	76	136
Traffic Signal - Route 66 (East High Street) at East Hampton Mall Shopping Center Dwy / Eversource Dwy						
Route 66	EBL	225	2	m11	7	m19
	EBTR	485	135	369	126	292
Route 66	WBL	125	1	4	1	3
	WBTR	>500	79	224	228	422
Eversource Driveway	NB	260	11	32	4	16
East Hampton Mall Shoppir	SBL	140	24	56	62	109
	SBR	140	0	0	0	37
Traffic Signal - Route 66 (East High Street) at Route 196 (Lake View Street)						
Route 66	EB	>500	143	280	216	#479
Route 66	WBL	250	10	28	27	82
	WBTR	>500	50	108	74	153
Lake View Street	NBL	170	23	69	36	80
	NBR	>500	0	59	0	46

m: Volume for 95th percentile queue is metered by upstream signal.

#: 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

TR and LT denote shared “through-right” and shared “left-through” lanes



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2.6.1 2020 Weekday Morning Peak Hour Operations

During the weekday morning peak hour, all the study area intersections and movements operate at LOS D or better with the exception of the northbound approach of the Route 66 at Route 151 (Middle Haddam Road)/ Depot Hill Road intersection, which operates at LOS E. Throughout the corridor, longer delays occur on several side streets as vehicles attempting to access the corridor from the side streets have to wait through long signal timing splits for Route 66 approaches. Additionally, there are a few intersections on Route 66 with long queues on the eastbound and westbound approaches. The following capacity issues are noted in the analysis:

- **Route 66 at Route 17A (Main Street)**
    - Queues of 444 feet on the westbound approach were reported based on the capacity analysis results. Field observations indicate vehicles form a rolling queue platoon up to 2,000 feet on the westbound approach during the weekday morning peak hour. The rolling queue can require 2-3 cycles to travel through the intersection.

- **Route 66 at Portland Shopping Center Driveway**
    - A 95th percentile queue of 437 feet and a 50th percentile queue of 0 feet on the westbound shared through-right lane were reported based on the operational analysis results. Given that there is an upstream signal approximately 370 feet to the east at Grove Street, the 95th queue on the westbound approach at the Portland Shopping Center Driveway intersection may not be experienced in many cases due to the upstream metering. Instead, the 50th percentile queue may represent the maximum queue experienced. Field observations indicate only a small number of vehicles may back up on the westbound approach during weekday morning commuter peak hours.

- **Route 66 at Middle Haddam Road/ Payne Boulevard**
    - The capacity analysis results indicate that the volume for the 95th percentile cycle exceeds capacity and the 95th percentile queue exceeds 920 feet on the westbound shared through-right approach. Synchro software is developed to simulate up to two complete cycles of 95th percentile traffic to account for the effects of spillover between cycles. In reality, heavy traffic may spill over among more than two complete cycles during weekday commuter peak hours. Field observations indicate vehicles on the westbound approach may back up to the Citgo Gas Station Driveway, approximately 3,400 feet to the east during weekday morning peak hour.

- **Route 66 at Route 151 (Middle Haddam Road)/ Depot Hill Road**
    - LOS E operation on the northbound shared through-left approach with a v/c ratio of 0.82 and delays of approximately 74 seconds per vehicle.
    - Significant queuing approaching the intersection at approximately 790 feet for the westbound approach. Rolling queues longer than 790 feet that form a vehicle platoon have been observed in the field during weekday morning commuter peak hour.

- **Route 66 at East Hampton Mall Shopping Center Driveway**
    - Delays of approximately 45 seconds on the southbound shared through-left approach due to a short green time splits during each cycle for the side streets at the intersection.

2.6.2 2020 Weekday Afternoon Peak Hour Operations

Similar to the traffic operation during weekday morning peak hour, the weekday afternoon peak hour's most significant deficiency occurs at the northbound and southbound approaches of the Route 66 at Route 151 (Middle Haddam Road)/ Depot Hill Road intersection, which operate at LOS E. However, the remaining study intersections and movements all operate at acceptable LOS D or better. Minor delays on side street approaches exist during the afternoon peak hour throughout the corridor. As was the case during the morning peak hour, there are a few intersections on Route 66 with long queues on the eastbound and westbound approaches. The following capacity issues are noted from the analysis:

- **Route 66 at Middle Haddam Road/ Payne Boulevard**
    - The capacity analysis results indicate that the volume for the 95th percentile cycle exceeds capacity and the 95th percentile queue exceeds 1,000 feet on the eastbound shared through-right approach. As mentioned previously, Synchro only simulates up to two complete cycles of 95th percentile traffic to account for the effects of spillover between cycles, and in reality, heavy traffic may spill over among more than two complete cycles during weekday commuter peak hours.

- **Route 66 at Route 151 (Middle Haddam Road)/ Depot Hill Road**
    - LOS E operation on the northbound through/ left and southbound approach.
    - Significant queuing exceeding 1,250 feet on the eastbound approach approaching the intersection.

- **Route 66 at Main Street/ North Main Street**
    - Queues of approximately 480 feet on the westbound shared through-right lane, nearing the approximately 485-foot available storage before reaching the East Hampton Shopping Center Driveway intersection.

- **Route 66 at East Hampton Mall Shopping Center Driveway**
    - Delays of approximately 50 seconds per vehicle on the southbound shared through-left approach exiting the supermarket plaza are a result of a 95 second cycle with short green time splits during each cycle for the side streets at the intersection.

2.7 2020 Corridor Conditions Optimized Traffic Operations

The 2020 Corridor Conditions Traffic Volumes were also analyzed with an optimized traffic network where the physical lane geometry remained unchanged but traffic signal timings including the coordination along the corridor was optimized. The purpose of the 2020 Corridor Conditions Optimized traffic analysis is to determine how the existing signalization along the corridor could be adjusted to better process expected traffic without any significant physical improvements.

The optimization process included a review of the coordinated system along Route 66, the coordinated system cycle lengths, and signal phase timing splits at each of the study area intersections to balance delays on the intersection approaches to increase the overall efficiency of the traffic operations. The optimization process was similar to those employed by CTDOT, which monitors state-maintained time-based coordination systems, periodically modifying the signal timing based on current volumes to maintain operational efficiency. A study area minimum cycle length of 60 seconds and maximum cycle length of 120 seconds were utilized during optimization. The optimization of the traffic signal operation included the following:

- Optimization of the phase splits at the time-based coordinated intersections of Route 66 at Main Street, High Street, Airline Avenue, Portland Shopping Center Driveway, and Grove Street. Retain the existing cycle length of 80 seconds at these intersections.

- Optimization of the cycle length and phase splits at the uncoordinated intersections of Route 66 at Gospel Lane (Route 17) and Middle Haddam Road (West Junction), respectively.

- Adjustment of cycle length (decrease from 128.1 seconds to 110 seconds) and optimization of phase splits at the uncoordinated intersection of Route 66 at Depot Hill Road & Route 151 to better balance green time splits between the major corridor and the side road approaches to help mitigate the unacceptable LOS on the side street approaches.

- Optimization of the cycle length and phase splits at the uncoordinated intersections of Route 66 at Middletown Avenue (Route 16) and Maple Street, respectively.

- Adjustment of cycle length (decrease from 95 seconds to 80 seconds) and optimization of phase splits at the time-based coordinated intersections of Route 66 at Main Street/North Main Street and East Hampton Shopping Center Driveway.

- Optimization of the cycle length and phase splits at the uncoordinated intersection of Route 66 at Lakeview Street.

- A study area minimum cycle length of 60 seconds and maximum cycle length of 120 seconds were utilized during optimization.

A summary of the expected traffic operations following optimization is provided in Tables 2-7 and 2-8. Figure 2-8 illustrates the overall signalized intersection LOS on the study area map with the LOS color coded by letter. As shown in Table 2-7, all of the study intersections are expected to operate at acceptable LOS D or better with the timings optimization. Capacity analysis worksheets for the 2020 Corridor Conditions-Optimized traffic network are included in Appendix G for the weekday morning and afternoon peak hours. Tables comparing the 2020 Corridor Conditions and 2020 Optimized Corridor Conditions are provided in Appendix H.

The traffic signal optimization mitigates some of the delay and queues caused by the heavy peak traffic flow along the corridor. Overall intersection LOS at select intersections during the peak periods are improved to acceptable levels.

TABLE 2-7

Study Area Signalized Intersection Operational Summary – 2020 Optimized Corridor Conditions – LOS

		Weekday Morning Peak Hour			Weekday Afternoon Peak Hour		
	Lane Use	LOS	Avg. Delay (s/veh)	v/c	LOS	Avg. Delay (s/veh)	v/c
Traffic Signal - Route 66 at Route 17A (Main Street)							
Overall		**B**	**17.4**	**0.87**	**B**	**17.9**	**0.86**
Route 66	WB	B	19.1	0.87	C	29.6	0.74
Route 66	NBT	C	29.3	0.42	C	29.5	0.68
	NBR	A	0.7	0.36	A	7.6	0.86
Route 17A	SB	C	22.4	0.59	B	10.3	0.28
Traffic Signal - Route 66 (Marlborough Street) at High Street							
Overall		**A**	**6.4**	**0.67**	**B**	**11.9**	**0.67**
Route 66	EBL	A	6.4	0.38	A	4.2	0.25
	EBT	A	7.5	0.22	B	12.2	0.61
Route 66	WB	A	3.6	0.67	A	6.0	0.41
High Street	SB	C	24.2	0.59	D	35.3	0.67
Traffic Signal - Route 66 (Marlborough Street) at Airline Avenue							
Overall		**A**	**10.0**	**0.62**	**A**	**8.3**	**0.67**
Route 66	EB	A	3.7	0.25	A	5.1	0.67
Route 66	WBL	A	1.5	0.04	A	7.2	0.08
	WBT	B	11.9	0.62	B	12.4	0.39
Airline Avenue	NB	C	25.9	0.27	C	20.4	0.31
Traffic Signal - Route 66 (Marlborough Street) at Portland Shopping Center Driveway							
Overall		**A**	**6.4**	**0.45**	**A**	**8.9**	**0.48**
Route 66	EBL	A	4.1	0.07	A	3.8	0.28
	EBTR	A	3.1	0.16	A	3.1	0.47
Route 66	WBTR	A	7.5	0.45	B	14.9	0.37
Portland Shopping Center Dr.	SBL	C	32.3	0.04	D	37.9	0.48
	SBR	C	22.3	0.02	B	10.7	0.18
Traffic Signal - Route 66 (Marlborough St/Portland-Cobalt Rd) at Grove Street/ Grandview Terrace							
Overall		**A**	**3.2**	**0.48**	**A**	**7.1**	**0.48**
Route 66	EBL	A	0.6	0.01	A	2.7	0.03
	EBT	A	0.6	0.19	A	8.9	0.48
Route 66	WBL	A	1.7	0.00	A	1.8	0.03
	WBT	A	4.1	0.48	A	3.6	0.27
Grove Street	NBT	A	1.4	0.15	A	1.5	0.14
Grandview Terrace	SBT	D	35.3	0.05	B	19.3	0.19
Traffic Signal - Route 66 (Portland-Cobalt Road) at Route 17 (Gospel Lane)							
Overall		**B**	**13.4**	**0.75**	**B**	**10.9**	**0.50**
Route 66	EBL	C	27.7	0.41	C	27.0	0.50
	EBTR	A	3.7	0.18	A	5.9	0.49
Route 66	WBT	B	17.9	0.75	B	15.0	0.46
	WBR	A	3.3	0.29	A	4.2	0.19
Route 17 (Gospel Lane)	SBL	C	23.5	0.35	C	26.1	0.48
	SBR	A	8.2	0.36	A	7.4	0.27
Traffic Signal - Route 66 (Portland-Cobalt Road) at Middle Haddam Road/Payne Boulevard							
Overall		**B**	**10.0**	**0.75**	**B**	**12.7**	**0.84**
Route 66	EBL	A	2.1	0.07	A	2.7	0.22
	EBTR	A	3.4	0.29	B	15.6	0.84
Route 66	WBL	A	1.5	0.00	A	2.0	0.01
	WBTR	B	13.0	0.75	A	9.0	0.51
Payne Boulevard	NB	A	1.0	0.12	D	36.8	0.15
Middle Haddam Road	SB	C	34.7	0.02	A	7.2	0.29

TR and LT denote shared “through-right” and shared “left-through” lanes

TABLE 2-7 (Continued)

Study Area Signalized Intersection Operational Summary – 2020 Optimized Corridor Conditions – LOS

	Lane Use	Weekday Morning Peak Hour LOS	Weekday Morning Peak Hour Avg. Delay (s/veh)	Weekday Morning Peak Hour v/c	Weekday Afternoon Peak Hour LOS	Weekday Afternoon Peak Hour Avg. Delay (s/veh)	Weekday Afternoon Peak Hour v/c
Traffic Signal - Route 66 (Portland-Cobalt Rd/West High St) at Rte. 151 (Middle Haddam Rd)/Depot Hill							
Overall		**C**	**31.2**	**0.95**	**C**	**22.5**	**0.93**
Route 66	EB	**B**	**10.9**	**0.43**	**C**	**26.6**	**0.93**
Route 66	WB	**D**	**36.6**	**0.95**	**A**	**6.2**	**0.41**
Route 151 (Middle Haddam	NBLT	**D**	**55.0**	**0.78**	**D**	**54.8**	**0.56**
Road)	NBR	**A**	**0.0**	**0.01**	**A**	**0.0**	**0.01**
Depot Hill Road	SB	**C**	**25.6**	**0.33**	**D**	**46.6**	**0.50**
Traffic Signal - Route 66 (West High Street) at Route 16 (Middletown Avenue)/Park & Ride Driveway							
Overall		**C**	**27.2**	**0.88**	**B**	**13.0**	**0.72**
Route 66	EBLT	B	15.8	0.44	B	15.2	0.70
	EBR	A	3.1	0.29	A	2.6	0.46
Route 66	WBL	B	11.5	0.01	A	7.3	0.01
	WBTR	C	31.3	0.86	B	10.2	0.43
Route 16 (Middletown Ave.)	NBLT	D	41.3	0.88	C	32.0	0.72
	NBR	A	0.0	0.00	A	0.0	0.01
Park & Ride Driveway	SB	A	0.0	0.00	B	13.7	0.01
Traffic Signal - Route 66 (West High Street) at Maple Street/North Maple Street/Old West High Street							
Overall		**B**	**14.7**	**0.56**	**B**	**10.3**	**0.56**
Route 66	EB	B	12.3	0.50	A	9.8	0.56
Route 66	WB	B	13.4	0.56	A	8.3	0.47
Main Street	NB	C	21.7	0.28	B	17.4	0.13
North Main Street	SB	C	25.4	0.45	C	21.1	0.36
Old West High Street	SEB	C	22.0	0.00	0	0.0	0.00
Traffic Signal - Route 66 (East Main St/West Main St) at Main Street/North Main Street							
Overall		**B**	**14.8**	**0.51**	**B**	**18.9**	**0.68**
Route 66	EBL	A	6.6	0.09	B	10.0	0.38
	EBTR	B	15.5	0.46	C	20.2	0.58
Route 66	WBL	A	3.3	0.11	A	6.2	0.33
	WBTR	B	12.2	0.51	B	15.6	0.68
Main Street	NBL	C	22.8	0.14	C	20.8	0.11
	NBTR	B	15.9	0.50	C	33.4	0.66
North Main Street	SBL	C	26.1	0.33	C	23.9	0.30
	SBTR	B	17.5	0.46	C	24.1	0.46
Traffic Signal - Route 66 (East High St.) at East Hampton Mall Shopping Center Dwy/Eversource Dwy							
Overall		**A**	**8.5**	**0.40**	**B**	**12.2**	**0.59**
Route 66	EBL	A	3.7	0.03	A	4.3	0.11
	EBT	A	8.5	0.40	A	8.2	0.41
Route 66	WBL	A	2.3	0.02	A	3.5	0.01
	WBT	A	6.2	0.40	B	12.4	0.59
Eversource Driveway	NBT	C	32.9	0.12	C	27.1	0.03
East Hampton Mall Shopping	SBT	D	36.3	0.26	D	39.5	0.51
Center Driveway	SBR	A	0.5	0.07	A	6.4	0.25
Traffic Signal - Route 66 (East High Street) at Route 196 (Lake View Street)							
Overall		**B**	**12.6**	**0.75**	**B**	**13.5**	**0.78**
Route 66	EB	C	20.8	0.75	C	23.1	0.78
Route 66	WBL	A	4.9	0.26	A	9.2	0.55
	WBTR	A	5.3	0.39	A	4.9	0.44
Lake View Street	NBL	C	23.5	0.27	C	25.8	0.30
	NBR	A	8.4	0.53	A	8.1	0.35

TR and LT denote shared “through-right” and shared “left-through” lanes

TABLE 2-8

Study Area Signalized Intersection Operational Summary – 2020 Optimized Corridor Conditions – Queues

	Lane Use	Available Storage	Weekday Morning Peak Hour Avg. Queues	Weekday Morning Peak Hour Design Queues	Weekday Afternoon Peak Hour Avg. Queues	Weekday Afternoon Peak Hour Design Queues
Traffic Signal - Route 66 at Route 17A (Main Street)						
Route 66	WB	>500	394	357	213	150
Route 66	NBT	510	67	105	155	214
	NBR	>500	0	0	0	#20
Route 17A	SB	510	128	178	55	98
Traffic Signal - Route 66 (Marlborough Street) at High Street						
Route 66	EBL	225	9	m25	12	m21
	EBT	>500	43	88	193	m334
Route 66	WBT	150	11	40	53	59
High Street	SB	>500	44	101	88	148
Traffic Signal - Route 66 (Marlborough Street) at Airline Avenue						
Route 66	EB	145	21	33	55	68
Route 66	WBL	175	4	m0	2	m17
	WBT	>500	313	2	53	196
Airline Avenue	NB	>500	20	52	24	60
Traffic Signal - Route 66 (Marlborough Street) at Portland Shopping Center Driveway						
Route 66	EBL	350	1	0	9	m31
	EBTR	>500	0	130	43	110
Route 66	WBTR	370	0	455	154	242
Portland Shopping Center D	SBL	155	3	15	54	98
	SBR	155	0	8	0	27
Traffic Signal - Route 66 (Marlborough St/Portland-Cobalt Rd) at Grove Street/ Grandview Terrace						
Route 66	EBL	125	0	1	3	m4
	EBTR	370	5	10	270	357
Route 66	WBL	150	0	1	1	3
	WBTR	>500	95	217	41	99
Grove Street	NB	>500	0	0	0	0
Grandview Terrace	SB	>500	3	15	1	25
Traffic Signal - Route 66 (Portland-Cobalt Road) at Route 17 (Gospel Lane)						
Route 66	EBL	200	23	60	44	99
	EBT	>500	20	41	84	160
Route 66	WBT	>500	131	#280	76	131
	WBR	200	0	34	0	29
Route 17 (Gospel Lane)	SBL	>500	25	61	44	88
	SBR	100	0	36	0	30
Traffic Signal - Route 66 (Portland-Cobalt Road) at Middle Haddam Road/Payne Boulevard						
Route 66	EBL	175	1	5	11	21
	EBTR	>1500	0	148	343	#977
Route 66	WBL	300	0	1	0	2
	WBTR	>1000	0	#848	156	250
Payne Boulevard	NB	>500	0	0	9	32
Middle Haddam Road	SB	>500	1	10	0	19

m: Volume for 95th percentile queue is metered by upstream signal.

#: 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

TR and LT denote shared “through-right” and shared “left-through” lanes

TABLE 2-8 (Continued)

Study Area Signalized Intersection Operational Summary – 2020 Optimized Corridor Conditions – Queues

	Lane Use	Available Storage	Weekday Morning Peak Hour Avg. Queues	Weekday Morning Peak Hour Design Queues	Weekday Afternoon Peak Hour Avg. Queues	Weekday Afternoon Peak Hour Design Queues
Traffic Signal - Route 66 (Portland-Cobalt Rd / West High St) at Rte. 151 (Middle Haddam Rd) / Depot Hill Rd						
Route 66	EB	>1500	121	231	577	#1067
Route 66	WB	>1000	494	#923	108	198
Route 151 (Middle Haddam	NBLT	>500	102	171	39	82
	NBR	65	0	0	0	0
Depot Hill Road	SB	>500	29	67	36	80
Traffic Signal - Route 66 (West High Street) at Route 16 (Middletown Avenue) / Park & Ride Driveway						
Route 66	EBLT	>500	97	155	135	265
	EBR	250	0	32	0	36
Route 66	WBL	125	1	7	0	4
	WBTR	>500	245	#385	68	134
Route 16 (Middletown Ave	NBLT	>500	183	#352	62	#161
	NBR	100	0	0	0	0
Park & Ride Driveway	SB	75	0	0	1	8
Traffic Signal - Route 66 (West High Street) at Maple Street / North Maple Street / Old West High Street						
Route 66	EB	>500	72	233	99	209
Route 66	WB	>500	92	#306	80	164
Main Street	NB	>500	0	0	0	0
North Main Street	SB	>500	0	0	0	0
Old West High Street	SEB	>500	0	0	0	0
Traffic Signal - Route 66 (East Main St / West Main St) at Main Street / North Main Street						
Route 66	EBL	275	7	19	31	55
	EBTR	>500	136	227	195	286
Route 66	WBL	225	9	6	8	m42
	WBTR	485	162	302	233	182
Main Street	NBL	225	13	34	10	30
	NBTR	>500	22	68	78	126
North Main Street	SBL	175	40	77	35	72
	SBTR	>500	24	76	47	118
Traffic Signal - Route 66 (East High Street) at East Hampton Mall Shopping Center Dwy / Eversource Dwy						
Route 66	EBL	225	1	m10	7	m12
	EBTR	485	69	353	112	215
Route 66	WBL	125	1	4	1	3
	WBTR	>500	78	225	216	416
Eversource Driveway	NB	260	9	27	3	13
East Hampton Mall Shoppir	SBL	140	20	49	51	94
	SBR	140	0	0	0	26
Traffic Signal - Route 66 (East High Street) at Route 196 (Lake View Street)						
Route 66	EB	>500	132	228	179	#349
Route 66	WBL	250	10	23	27	59
	WBTR	>500	50	89	73	123
Lake View Street	NBL	170	21	59	30	68
	NBR	>500	0	54	0	42

m: Volume for 95th percentile queue is metered by upstream signal.

#: 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

TR and LT denote shared “through-right” and shared “left-through” lanes

2.8 Traffic Safety

Historical motor vehicle collision data for the study area was collected from University of Connecticut Crash Data Repository for the latest three-year period of available data between January 1, 2015 and December 31, 2017. Summaries and details of the collision history at each individual intersection are included in Appendix I. Figure 2-9 shows a graphical summary of the collisions and collision rates along the corridors and at the study area intersections. Further details for select intersections with high collision rates are provided in the following sections.

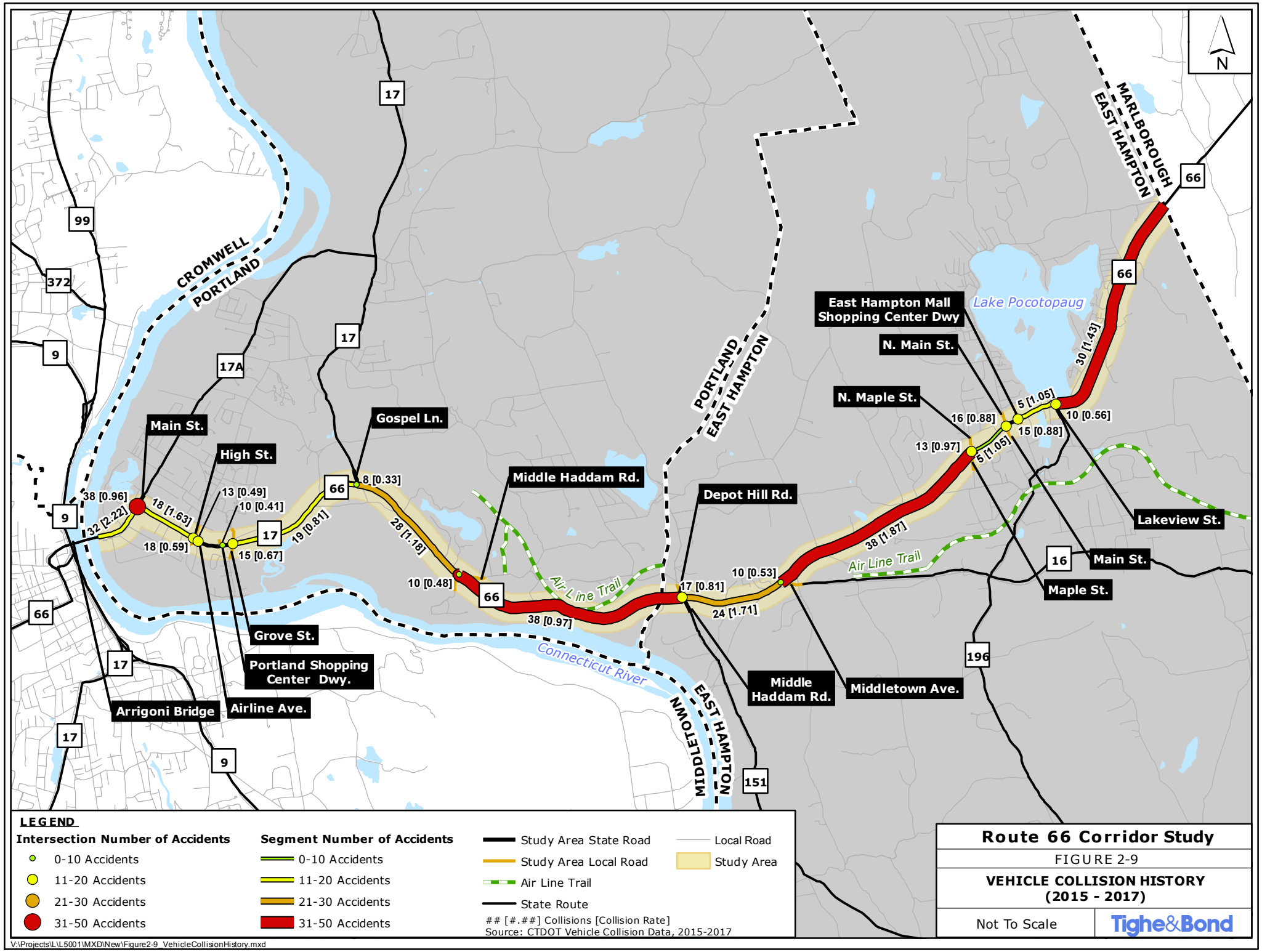
2.8.1 Collision History

Table 2-9 summarizes the number and type of collisions recorded along Route 66 within the study area from 2015 through 2017. During this three-year period, 455 crashes were reported. Rear-end type collisions accounted for just over half of the total number of collisions with 236 crashes (52%) recorded. The second most common type of collision was angle with 78 crashes (17%), fixed object with 60 crashes (13%), and sideswipe, same direction with 26 crashes (6%). The remaining collision types accounted for 5% or less of the total number of crashes.

Four fatalities occurred over the three-year collision history. The first occurred when a vehicle exiting a private driveway west of Sand Hill Road at Route 66 collided with a motorcycle, causing the motorcycle to hit the guardrail. The second fatality was caused by a vehicle colliding with a tree west of the intersection of Route 66 and Grandview Terrace. The third fatality occurred when a person fell from his motorcycle traveling westbound on Route 66 near 78 Marlborough Street. The fourth fatality was the result of a head-on collision that took place near the Portland-East Hampton Town Line. A total of 10 crashes (2%) resulted in an injury, while the remaining 442 collisions (97%) resulted in property damage only. Table 2-10 summarizes the collision severity data along Route 66.

Table 2-11 summarizes the Route 66 collisions by study area intersection. In general, collisions were defined as occurring at an intersection if occurring within approximately 200 feet of the intersection mile post. Additionally, engineering judgement was used on a case by case basis to determine if the collision should be classified under a specific intersection. As shown in Figure 2-10, the intersection of Route 66 at Route 17A (Main Street) experienced the most collisions with 38 crashes (13 crashes per year). The intersection of Route 66 at High Street and Route 66 at Route 151 (Middle Haddam Road)/ Depot Hill Road experienced 18 and 17 collisions (6 crashes per year), respectively, as shown in Figures 2-11 and 2-12, respectively. The remaining study area intersections experienced lower collision rates.

A review of the collision rates along the Route 66 segments between the intersections shows that the majority of the segments have typical rates for an urban, principal arterial roadway. The Route 66 segment between the East Hampton Mall Shopping Center Driveway and Route 196 (Lake View Street) intersections experiences a high collision rate, likely due to collisions caused by the high number of driveway access points for businesses along the segment.


N
CROMWELL
PORTLAND
PORTLAND
EAST HAMPTON
MARLBOROUGH
EAST HAMPTON
MIDDLETOWN
EAST HAMPTON
Lake Pocotopaug
Connecticut River
Air Line Trail
Air Line Trail
99
372
9
17
17A
17
66
66
66
66
16
196
151
Main St.
High St.
Gospel Ln.
Middle Haddam Rd.
Depot Hill Rd.
East Hampton Mall Shopping Center Dwy
N. Main St.
N. Maple St.
Lakeview St.
Main St.
Maple St.
Middle Haddam Rd.
Middletown Ave.
Grove St.
Portland Shopping Center Dwy.
Airline Ave.
Arrigoni Bridge
38 [0.96]
32 [2.22]
18 [1.63]
18 [0.59]
13 [0.49]
10 [0.41]
15 [0.67]
19 [0.81]
8 [0.33]
28 [1.18]
10 [0.48]
38 [0.97]
17 [0.81]
10 [0.53]
24 [1.71]
38 [1.87]
13 [0.97]
16 [0.88]
5 [1.05]
15 [0.88]
5 [1.05]
10 [0.56]
30 [1.43]
LEGEND
Intersection Number of Accidents
0-10 Accidents
11-20 Accidents
21-30 Accidents
31-50 Accidents
Segment Number of Accidents
0-10 Accidents
11-20 Accidents
21-30 Accidents
31-50 Accidents
Study Area State Road
Study Area Local Road
Air Line Trail
State Route
Local Road
Study Area
[#.##] Collisions [Collision Rate]
Source: CTDOT Vehicle Collision Data, 2015-2017
Route 66 Corridor Study
FIGURE 2-9
VEHICLE COLLISION HISTORY
(2015 - 2017)
Not To Scale
Tighe&Bond
V:\Projects\L\L5001\MXD\New\Figure2-9_VehicleCollisionHistory.mxd

The area west of the study area on Route 66, beyond the Arrigoni Bridge was reviewed separately as part of the collision analysis. The segment between the western limit of the study area and the Spring Street intersection in Middletown exhibits a high crash rate, affecting downstream traffic operations in the study area on Route 66. This segment experienced 59 collisions (20 crashes per year). Rear end accounted for just under half of the collisions along this segment with 26 crashes (44%). The second and third most common type of collisions in this segment were fixed object with 12 crashes (20%) and sideswipes with 9 crashes (15%). The remaining collision types accounted for 5% or less of all collisions on this segment.

TABLE 2-9

Route 66 Collisions – Type

Collision Type	Number of Collisions				% of Total Collisions
	2015	2016	2017	Total	
Rear-End	76	86	73	**235**	**51.80%**
Angle	21	34	23	**78**	**17.20%**
Fixed Object	21	16	23	**60**	**13.20%**
Sideswipe, Same Direction	9	9	8	**26**	**5.70%**
Animal	2	9	7	**18**	**4.00%**
Other Non-Fixed Object	4	3	2	**9**	**2.00%**
Overturn/Rollover	0	3	3	**6**	**1.30%**
Other Non-Collision	3	2	1	**6**	**1.30%**
Head-On	2	0	2	**4**	**0.90%**
Sideswipe, Opposite Direction	2	2	0	**4**	**0.90%**
Bicycle	1	2	0	**3**	**0.70%**
Backing	0	2	1	**3**	**0.70%**
Pedestrian	0	1	0	**1**	**0.20%**
Other	0	0	1	**1**	**0.20%**
Jacknife	0	0	0	**0**	**0.00%**
Not Applicable	0	0	0	**0**	**0.00%**
TOTAL	**143**	**168**	**144**	**454**	**100%**

TABLE 2-10

Route 66 Collisions – Severity

Severity	Number of Collisions				% of Total Collisions
	2015	2016	2017	Total	
Property Damage Only (PDO)	140	163	139	**442**	**96.90%**
Injury	2	4	4	**10**	**2.20%**
Fatal	1	2	1	**4**	**0.90%**
TOTAL	**143**	**169**	**144**	**456**	**100%**

TABLE 2-11
Route 66 Collisions – Study Area Intersection Summary

Study Area Intersection	Number of Collisions				% of Total Collisions
	2015	2016	2017	Total	
Route 66 at Route 17A (Main Street)	6	19	12	**37**	**8.1%**
Route 66 at High Street	4	4	10	**18**	**4.0%**
Route 66 at Airline Avenue	5	6	2	**13**	**2.9%**
Route 66 at Portland Shopping Center Driveway	4	2	5	**11**	**2.4%**
Route 66 at Grove Street/ Grandview Terrace	4	6	5	**15**	**3.3%**
Route 66 at Route 17 (Gospel Lane)	4	1	3	**8**	**1.8%**
Route 66 at Middle Haddam Road/ Payne	2	7	1	**10**	**2.2%**
Route 66 at Route 151 (Middle Haddam Road)/ Depot Hill Road	10	3	4	**17**	**3.7%**
Route 66 at Route 16 (Middletown Avenue)	1	6	3	**10**	**2.2%**
Route 66 at Maple Street/ North Maple Street	3	7	3	**13**	**2.9%**
Route 66 at Main Street/ North Main Street	4	9	4	**17**	**3.7%**
Route 66 at East Hampton Mall Shopping Center	5	7	3	**15**	**3.3%**
Route 66 at Route 196 (Lake View Street)	2	2	6	**10**	**2.2%**
TOTAL	**54**	**79**	**61**	**194**	**43%**

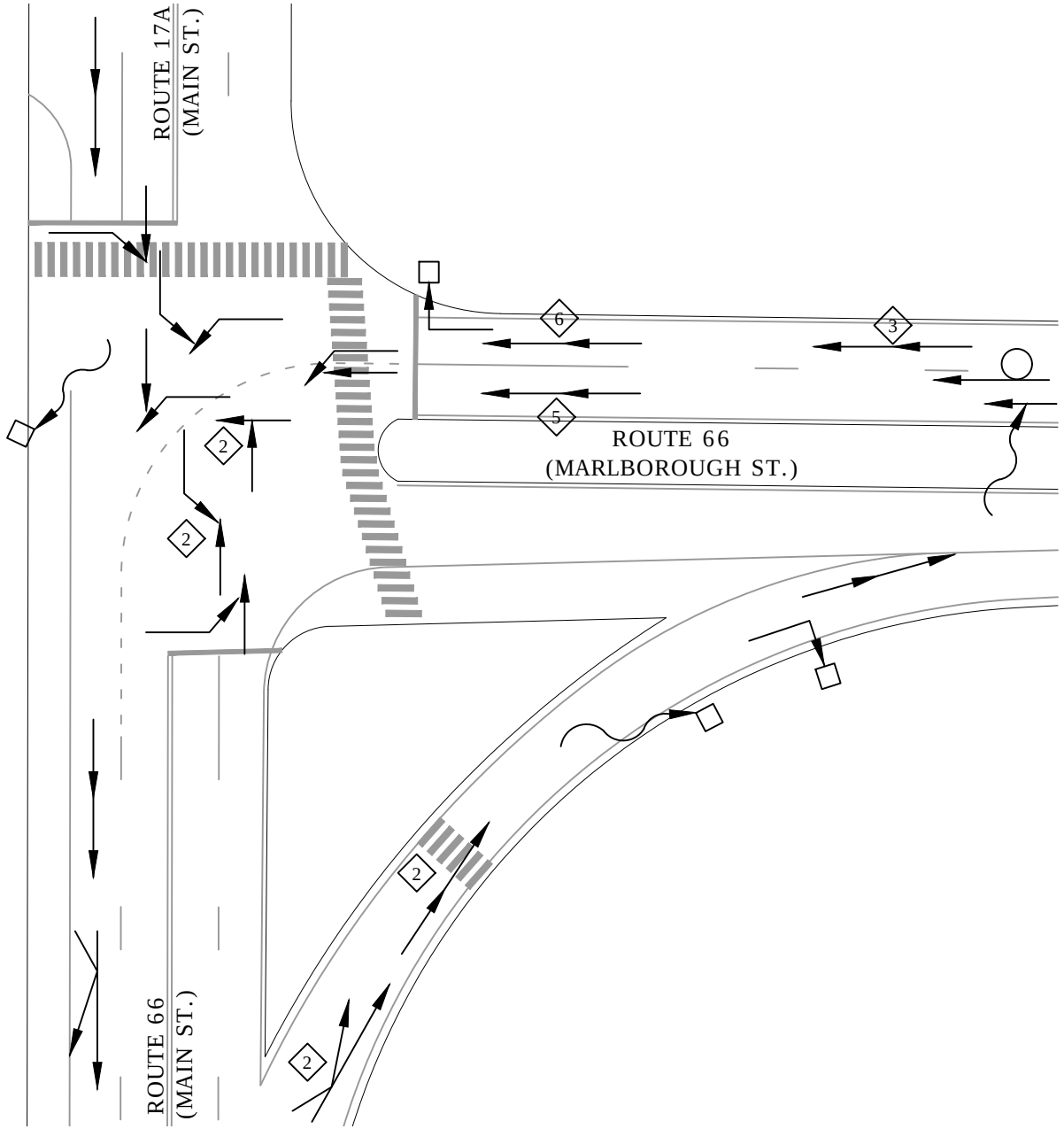
2.8.2 Bicycle and Pedestrian Crash History

The crash data from the study area was reviewed for crashes caused by or involving bicyclists and/or pedestrians. The data, summarized in Table 2-12 revealed that four direct collisions with pedestrians or bicyclists occurred within the study area.

TABLE 2-12
Pedestrians and Bicyclists Collisions Summary

Date	Type	Location	Contributing Factor	Injury
9/4/2015	Bicycle	Route 66 at Arrigoni Bridge (EB approach)	Unknown	Possible Injury
3/27/2016	Bicycle	Route 66 at Maple Street	Unknown	Suspected Minor Injury
5/25/2016	Bicycle	Route 66 at Mallard Cove	Unsafe Use of Highway By Bicyclist	None
9/4/2016	Pedestrian	Route 66 at North Main Street	Work Zone	Suspected Serious Injury

Due to the limited number of incidents, no pattern is discernable that would suggest a specific safety hazard within the study area. However, the study area is lacking in bicycle and pedestrian facilities which exposes users to crash risk.



TOTAL
37 COLLISIONS
0 WITH INJURIES
0 FATALITY

LEGEND

- FATAL ACCIDENT
- PERSONAL INJURY
- PROPERTY DAMAGE ONLY
- REAR END
- ANGLE
- SIDESWIPE
- OUT OF CONTROL
- FIXED OBJECT
- OVERTURN/JACKKNIFE
- # NUMBER OF COLLISIONS

Route 66 Corridor Study

FIGURE 2-10

VEHICLE COLLISION DIAGRAM:
ROUTE 66 (MARLBOROUGH ST.) AT ROUTE 17A

Not To Scale

Tighe&Bond

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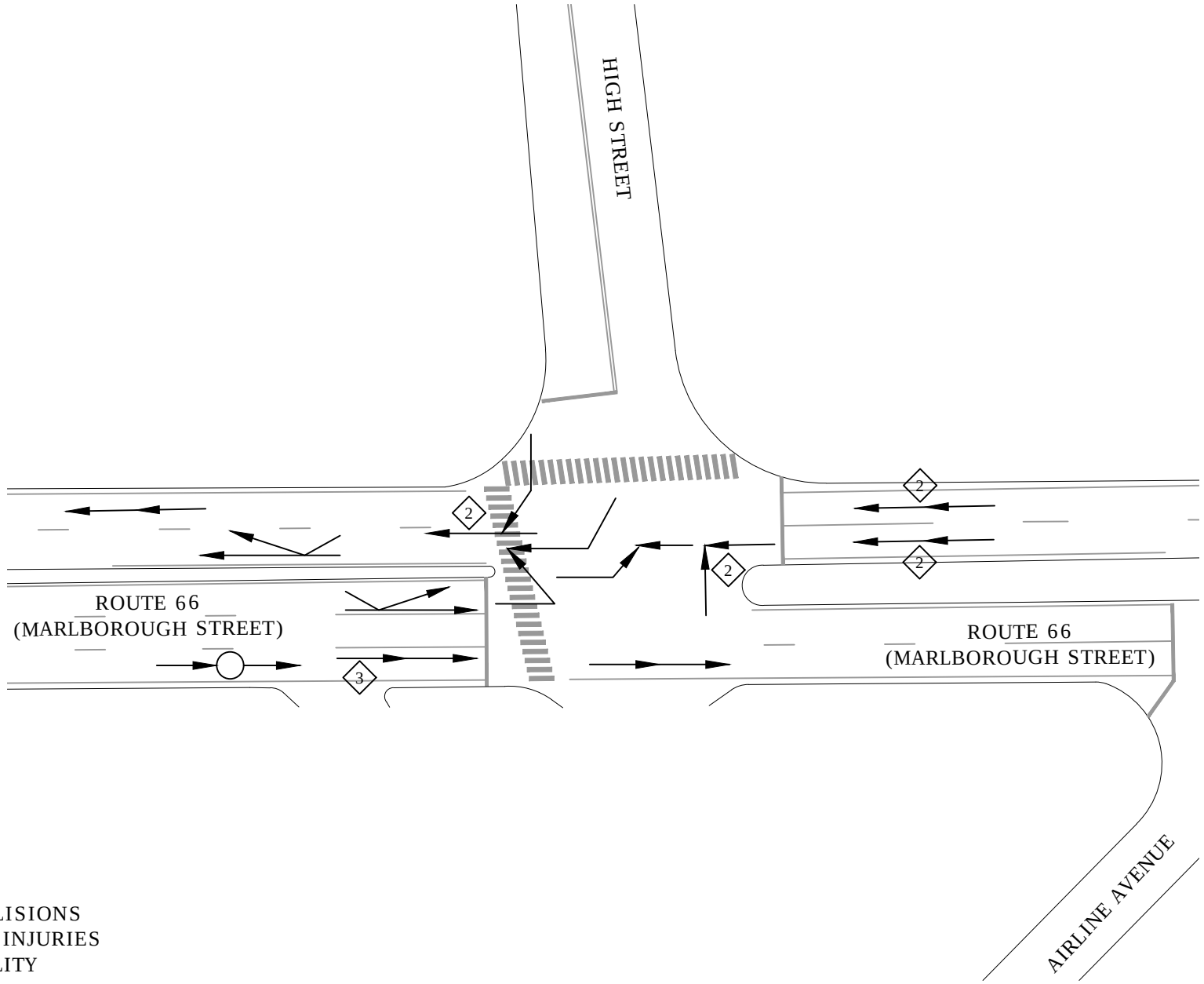

TOTAL
18 COLLISIONS
1 WITH INJURIES
0 FATALITY

LEGEND

- FATAL ACCIDENT
- PERSONAL INJURY
- PROPERTY DAMAGE ONLY
- REAR END
- ANGLE
- SIDESWIPE
- OUT OF CONTROL
- # NUMBER OF COLLISIONS

Route 66 Corridor Study

FIGURE 2-11

VEHICLE COLLISION DIAGRAM:
ROUTE 66 (MARLBOROUGH ST.) AT HIGH ST.

Not To Scale

Tighe&Bond

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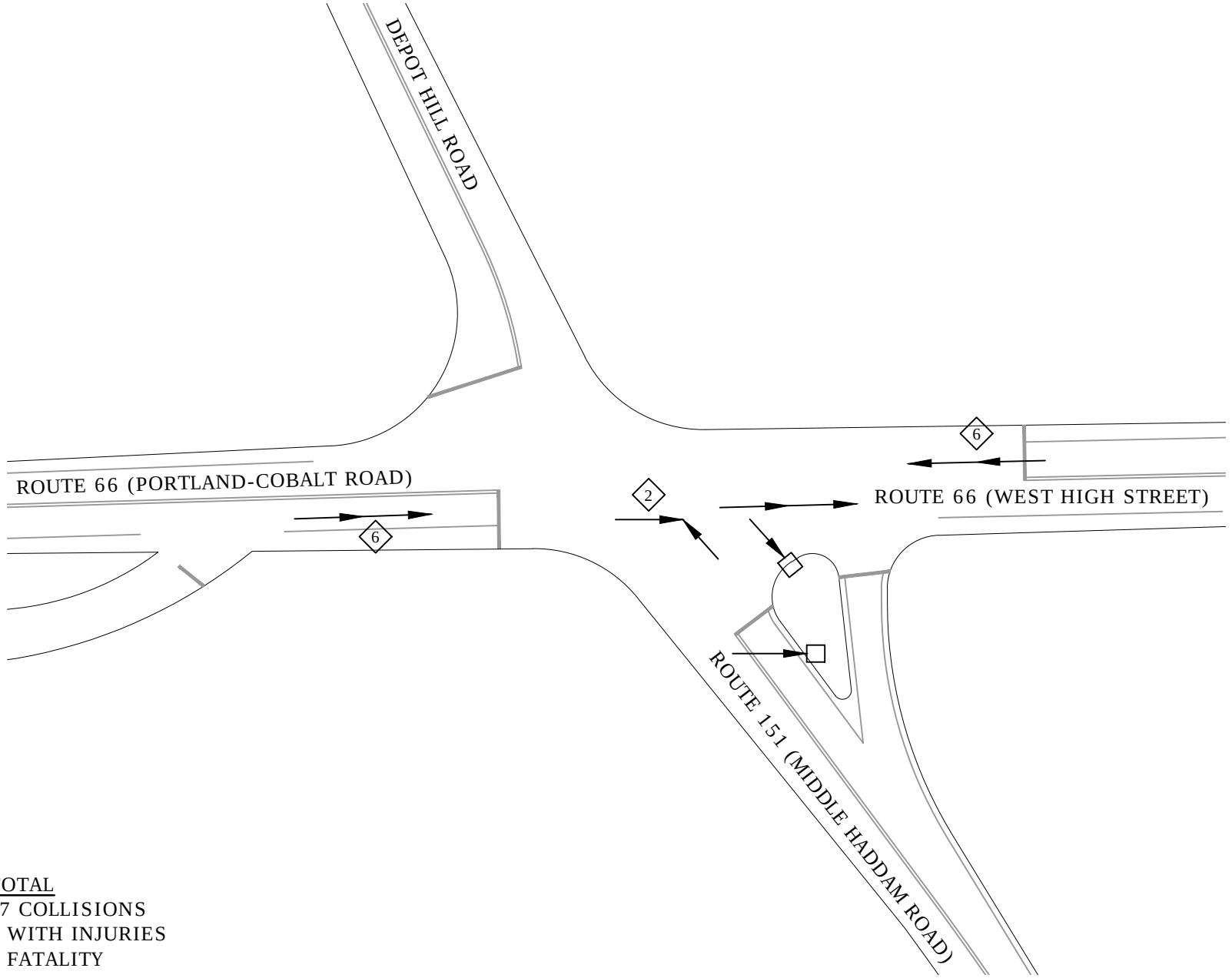

TOTAL
17 COLLISIONS
0 WITH INJURIES
0 FATALITY

LEGEND

- FATAL ACCIDENT
- PERSONAL INJURY
- PROPERTY DAMAGE ONLY
- REAR END
- ANGLE
- FIXED OBJECT
- # NUMBER OF COLLISIONS

Route 66 Corridor Study

FIGURE 2-12

VEHICLE COLLISION DIAGRAM:
ROUTE 66 (WEST HIGH ST.) AT ROUTE 151

Not To Scale

Tighe&Bond

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2.8.3 Portland Road Safety Audit

A Road Safety Audit (RSA) was conducted for the Town of Portland in June 2016 under the assistance of CTDOT's Community Connectivity Program. A RSA is a process that identifies safety issues and counter-measures to help improve safety of all road users, including pedestrians and bicyclists. A RSA typically includes a Pre-Audit Meeting, to review the objective and information relative to the RSA location, a Field Audit, to walk the area and conduct a safety evaluation of the location, and a Post-Audit Meeting, to identify safety concerns and develop recommendations for improvements. Upon completion of these tasks, a detailed RSA report documents the safety issues and identifies short-term and long-term recommendations for safety improvements.

The Portland RSA location is along Main Street (Route 17A) at Route 66 intersection and near Arrigoni Bridge, which is recognized as a high-collision location based on UConn Connecticut Crash Data Repository. During the RSA process, the following safety issues and recommendations for improvements were developed for this area in Portland, as summarized in Table 2-13.

TABLE 2-13

Portland RSA Safety Issues and Recommended Improvements

Safety Issues	Recommended Improvements	Implementation
There is overgrown vegetation at the northeast corner of the intersection blocking the pedestrian push button and the town's welcome sign	Trim overgrown vegetation at the intersection of Main Street and Route 66 to increase visibility	Short-Term
Vehicles entering the Village Center area from the Arrigoni Bridge travel fast because of the curve and downhill slope of the bridge	Coordinate with neighboring towns to share radar speed control signs to enforce vehicle speeds on the Arrigoni Bridge; Potential parking police cruiser on the triangular channelizing island at the intersection to reduce vehicle speeds entering the Village Center area	Short-Term
	Evaluate feasibility of installing traffic signal near the Arrigoni Bridge ramp	Long-Range
Vehicles traveling north have a hard time turning left into Quarry Heights because the signal doesn't have a dedicated green arrow; The southbound lane also blocks this driveway due to the location of the stop bar; Emergency vehicle access is a challenge	Move the stop bar further back before the entrance to Quarry Heights for southbound traffic; Consider adjusting traffic signal to include a green arrow phase for vehicles turning left into Quarry Heights	Medium-Term
The crosswalk at the Arrigoni Bridge and Lower Main Street is located on a curve and slope and has limited visibility for both pedestrians and motorists	Install advanced warning signs ahead of crosswalks	Short-Term
	Realign crosswalk at Lower Main Street near the Arrigoni Bridge to improve visibility; Evaluate feasibility of a pedestrian bridge near Arrigoni Bridge	Long-Range
Numerous driveways along Main Street contribute to conflicting turning movements and traffic flow	Evaluate developing access management plan to consolidate commercial driveways on Main Street and Route 66	Long-Range
Pedestrian signals for Main Street crosswalk are not ADA compliant and there are no pedestrian signals for Route 66 crosswalk at the intersection	Upgrade all pedestrian crossings to be ADA compliant including tactile warning strips and pedestrian countdown and audible signals; Potential pedestrian signals and push buttons for Route 66 crossings at the intersection	Medium-Term

2.9 Alternative Travel Modes

Route 66, from west to east within the study area, features a suburban commercial area from Arrigoni Bridge to Portland Shopping Center Plaza in Portland, a rural setting traversing to the east within the Towns of Portland and East Hampton, including the area of the corridor referred to as the 'Ledges', a suburban commercial area from Maple Street to Old Marlborough Road in East Hampton, and another rural area traveling east to the Marlborough Town Line.

Pedestrian facilities are present at the cohesive village centers within the Towns of Portland and East Hampton, respectively. Sidewalks, crosswalks, pedestrian signals, and sidewalk ramps are provided in these areas. However, sidewalk gaps still exist resulting in a disconnected sidewalk network. Pedestrian facilities and amenities are non-existent in the relatively rural areas along the corridor.

On-street bicycle facilities are not available along the corridor. The primary bicycle facility within the study area is the Air Line Trail, a non-motorized recreational facility connecting Portland and East Hampton to Thompson, CT. In Portland, a newly opened segment of the Air Line Trail currently runs from the YMCA Camp Ingersoll to the Portland-East Hampton Town Line. The Airline Trail runs from Aldens Crossing east through East Hampton and into Colchester and points east. Air Line Trail extension to connect the Towns of Portland and East Hampton has been proposed and the property negotiation and purchase is underway.

Bus transit service in the study area is provided by Middletown Area Transit (MAT) Route F. Bus stops or waiting areas are not designated along the bus route. Rather, the bus driver will stop and service passengers waiting along the route. Bus schedule information isn't easily accessible. The lack of bus stop amenities within the study area acts to discourage, rather than encourage bus transit usage in the area.

2.9.1 Pedestrian and Sidewalk Infrastructure

Route 66 abuts commercial and residential properties along the corridor in a low to moderate density suburban setting within the study area. Although the majority of Route 66 in the study area has been designed to prioritize the automobile and is uninviting to walking activities, pedestrian infrastructure including sidewalks, crosswalks, ramps, and pedestrian signals are present in the village center areas within the towns of Portland and East Hampton.

Generally, sidewalks have been recognized to be vital in pedestrian environment by delineating a safe zone for pedestrians to walk between destinations and providing a sense of community. Crosswalks at major intersections provide pedestrians a safe area to cross streets and a continuous pathway to key destinations. Additionally, pedestrian signals provide safety enforcement for pedestrian crossings by separating crossing pedestrians from conflicting vehicular movements. The inventory of existing pedestrian infrastructure along the study corridor is summarized below:

Town of Portland

- Sidewalks are present along both sides of Route 66/Route 17 between the Arrigoni Bridge and the intersection of Main Street and Marlborough Street. Traveling to the east along Route 66, sidewalks are provided along the north side of the corridor between Main Street and the western driveway of Portland Shopping Center. An off-road walking path is provided connecting the eastern portion of the Portland Shopping Center Plaza and the residential neighborhood located at the north end of Johnson Farm Road. The sidewalks west of High Street are in fair condition while some portions of the sidewalks east of High Street have deteriorated. Sidewalks are not provided east of Grove Street along the study corridor in the Town of Portland.

- Marked crosswalks, sidewalk ramps with warning strips, and pedestrian signals are provided on the north leg and east leg of the intersection of Main Street and Marlborough Street. Concrete sidewalk is present within the channelized right-turn island to provide continuous sidewalk on the east leg of the intersection. The traffic signal at the intersection provides an exclusive pedestrian phase upon the actuation of pedestrian push buttons.

Crosswalk at the intersection of Route 66 and Route 17A (Main Street)

- A mid-block crosswalk is present approximately 500 feet east of Main Street connecting the proposed Brainerd Place Development driveway to the existing sidewalk on the north side of Route 66. A pedestrian refuge island is provided in the raised median. Pedestrian crossing signs and pedestrian crossing ahead warning signs are installed at and in the vicinity of the mid-block crosswalk, respectively. However, this marked crosswalk is installed without other substantial measures such as pedestrian beacons or ADA compliant sidewalk ramps. Once the Brainerd Place offsite improvements are determined, consideration of pedestrian facilities in this section of the study area will be reevaluated.

- Crosswalks and pedestrian signals exist on the west leg and north leg of the intersection of Route 66 at High Street. Pedestrian crossing is provided via an exclusive pedestrian phase. ADA compliant sidewalk ramps are lacking at the intersection.

- Similarly, crosswalks and pedestrian signals exist on the east leg of the intersection of Route 66 at Airline Avenue with pedestrian crossing provided via an exclusive pedestrian phasing. ADA compliant sidewalk ramps are not provided at this intersection.

Non-compliant ADA pedestrian accommodations at the intersection of Route 66 and Airline Avenue

- Traveling east from Grove Street to the Portland-East Hampton Town Line within the Town of Portland features a rural setting and lacks destinations that would attract pedestrian activities. Pedestrian infrastructure including sidewalks, crosswalks, and pedestrian signals are not provided along this segment. Greenlight push buttons are provided on both sides of the corridor to allow pedestrians to cross with the green light at the signalized intersections in this area.

Town of East Hampton

- The Route 66 corridor continues its rural setting from the Portland-East Hampton Town Line through Cobalt Village to approximately Maple Street within the Town of East Hampton. Pedestrian infrastructure is not provided except push buttons at the traffic signals that allow pedestrians to cross concurrently with vehicular with the green light at the signalized intersections along this segment of the corridor.

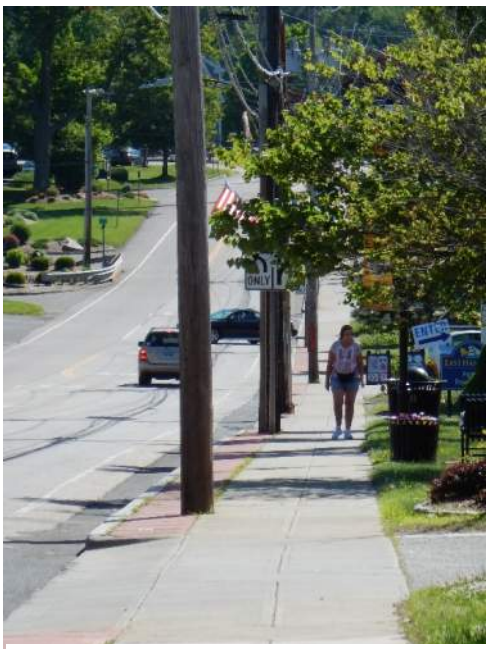
- A crosswalk is provided on Route 66 at the unsignalized Childs Road intersection in the vicinity of East Hampton Middle School. School crossing signs are present in both directions on Route 66.

- Sidewalks begin near Maple Street, continuing east toward the commercial center in East Hampton. Sidewalks are continuously provided along the south side of the road between Maple Street and Erlandson Drive. Along the north side of the road, sidewalks are provided between North Main Street and the west junction of Old Marlborough Road with gaps existing between American Distilling & Manufacturing and Lakeview Street. Route 66 is constrained at the bridge crossing in front of American Distilling & Manufacturing, limiting the available width to add a sidewalk. Furthermore, it is the town and property owners' responsibility to maintain sidewalks along a state route, so developers are often reluctant to install sidewalks or infill sidewalk gaps along the site frontage, particularly if the town regulations on sidewalks in commercial zones are not clearly designated.

- Crosswalks and sidewalk ramps are provided on the north and east leg of the intersection of Route 66 at Maple Street. There are green light push buttons on both sides of Route 66 that allow pedestrian to cross with the green light at this intersection.

- Marked crosswalks, pedestrian signals, and ADA compliant sidewalk ramps are provided on all four legs of the intersection of Route 66 at Main Street/North Main Street. Pedestrian crossing is provided via an exclusive pedestrian phasing.

- Crosswalks, pedestrian signals, and sidewalk ramps with warning strips are provided on the west leg of the intersection of Route 66 at East Hampton Shopping Plaza driveway. Exclusive pedestrian phasing is provided at this intersection to facilitate pedestrian crossing.



Route 66 in East Hampton looking East near the East Hampton Town Hall

- Similarly, marked crosswalks, pedestrian signals, and ADA compliant sidewalk ramps are provided on all three legs of the intersection of Route 66 at Lakeview Street. Pedestrian crossing is provided via an exclusive pedestrian phasing at this intersection.

- Pedestrian infrastructure is not provided between Erlandson Drive and the East Hampton-Marlborough Town Line. Paul's & Sandy's Too and the proposed Edgewater Hill development along this segment are considered to be attractive destinations for pedestrian activities. The lack of pedestrian facilities in this area contributes to an unwelcoming environment to those on foot in this area.

2.9.2 Bicycle Facilities

There are currently no separated bike routes, "shared the road" signage, or facilities for bicyclists along the Route 66 corridor. The Air Line Trail, a shared-use non-motorized recreational trail, is the only bicycle facility within the study area.

As previously noted, the Air Line Trail is currently open from the YMCA Camp Ingersoll to The Portland-East Hampton Town Line in Portland. In East Hampton, the trail begins at Aldens Crossing near Route 16, extending east though the study area. Beyond the study area, the trail continues northeast through the eastern portion of Connecticut and extends into Massachusetts.

Air Line Trail access at Old Middletown Road in Portland

Air Line Trail extension projects have been planned to connect Portland and East Hampton. The Town of East Hampton is working with the Connecticut Department of Energy and Environmental Protection (CT DEEP) to extend the Air Line Trail from its current termination point at Alden Crossing to Depot Hill Road at the Portland Town Line. This project is currently held up by complications related to a wetland issue but is expected to be resolved soon. In Portland, potential trail routes include the possible use of Route 66 as well as private property such as the Old Railroad Depot Station. Possible extensions seek to link its current termination point at YMCA Camp Ingersoll to the Arrigoni Bridge, Portland Riverfront Park, the City of Middletown and a possible future trail north along the Connecticut River.

2.9.3 Air Line Trail Usage

"Ridership" counts have been collected on the Air Line Trail in East Hampton as part of the Connecticut Trail Census project. A permanent infrared (IR) counter was installed just northeast of Cranberry Bog on Air Line Trail in East Hampton. It has been continuously collecting data since November 2016.

The 2017 counts and indicate that a total of 62,415 uses or trips were recorded on the trail in 2017 with an average daily count of 171 uses.

The heaviest monthly use of the trail occurred in June 2017, with a total of 8,100 trips. Between the months of April and October 2017, approximately 83% of total 2017 uses were recorded.

Generally, heavier use occurred on the weekends than during the week. Based on the 2017 ridership count report, approximately 15,523 trips (25%) and 11,792 trips (19%) occurred on Sundays and Saturdays, respectively. The trail uses during the week are evenly split between Mondays and Fridays. Most trail use (97.9%) took place between 7am and 8pm.

The Connecticut Trail Census 2017 Counts Report is included in Appendix J of this report.

Air Line Trail looking west in Portland

2.9.4 Transit Facilities

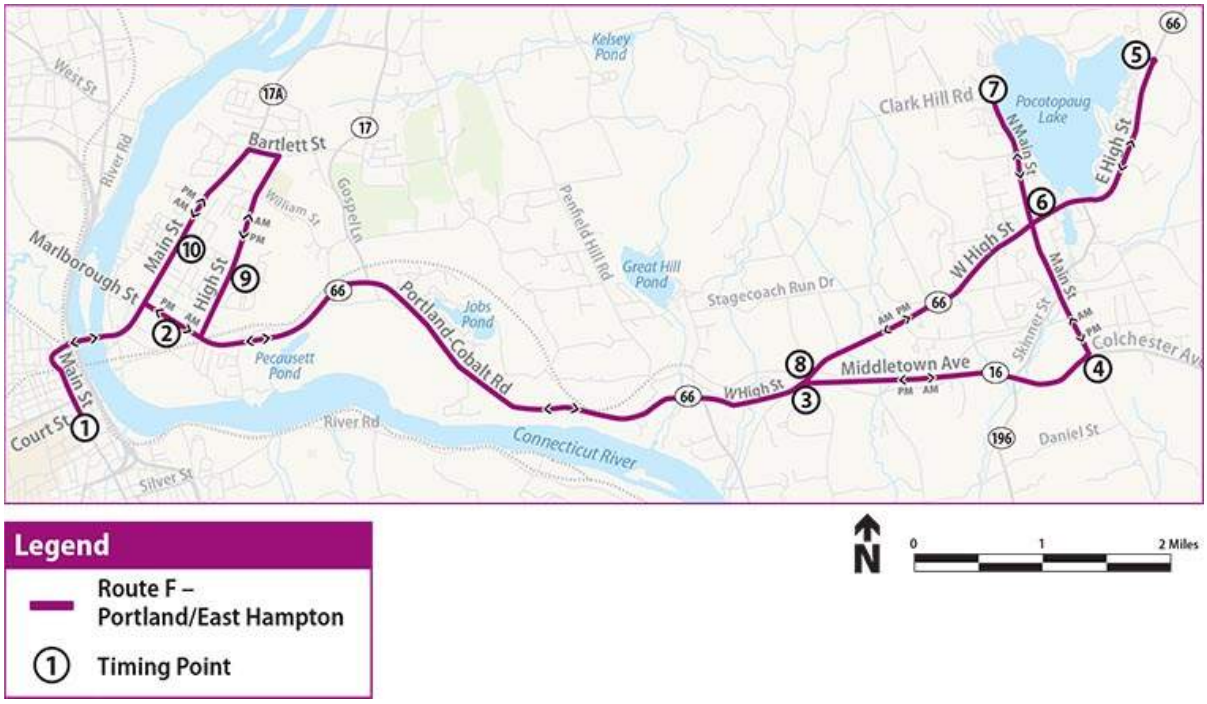
The towns of Portland and East Hampton are currently served by Bus Route F operated by Middletown Area Transit (MAT). The bus route and stop locations are illustrated on Figure 2-13. This service connects Portland and East Hampton to downtown Middletown and other bus connections.

Route F – Portland/East Hampton buses run from 5:45 a.m. to 5:45 p.m. Monday to Friday and from 9:15 a.m. to 4:45 p.m. on Saturdays. Route F does not operate on Sundays.

On weekdays, Route F buses run every hour from 5:45 a.m. to 8:45 a.m., at 12 p.m., and every hour from 3:45 p.m. to 5:45 p.m. for a total of 8 trips. On Saturdays, Route F buses run every 90 minutes from 9:15 a.m. to 11:45 a.m. in the morning and from 2:15 p.m. to 4:45 p.m. in the afternoon for a total of 4 trips.

Bus stops, shelters, waiting areas, and bus stop signage are not present along the entire bus route. Buses along the corridor stop to pick up passengers at sporadic locations, causing potential safety concerns for riders and vehicles in the area.

FIGURE 2-13
Middletown Area Transit – Bus Route F



The Towns of Portland and East Hampton both participate in a regional dial-a-ride service for the elderly and disabled, operated by MAT. Eligible persons can schedule trips for medical, shopping, educational, and recreational purposes. It is anticipated that the elderly population will increase in both towns and the transit usage demand may increase as the age composition of the community changes.

A Park and Ride lot with 27 parking spaces is provided at the intersection of Route 66 and Route 16 in East Hampton. The Park and Ride commuter lot helps to facilitate ridesharing to reduce transportation costs, roadway congestion, and air pollution. A field visit of the area indicates that the existing park and ride lot is very lightly utilized.

Park & Ride Lot at Route 66 and Route 16 (Middletown Avenue) in East Hampton

2.9.5 Transit Ridership

Ridership data was collected for three consecutive weekdays (Monday July 30, 2018 – Wednesday August 1, 2018) and Saturday (August 11, 2018) by MAT. The ridership data indicates that transit ridership on Route F that serves the project area is light. There was an average of 26 boardings each weekday and 7 boardings on Saturday.

The most popular locations for boarding include the Downtown Middletown Terminal with an average of 17 boardings per weekday. The most popular locations for alighting (passengers dropped off by bus) include the Downtown Middletown Terminal, Marlborough Street in Portland, and Food Bag on Route 16 in East Hampton.

Table 2-14 summarizes the transit usage within the study area. Day to day ridership and bus stop usage could vary. Because this analysis is limited to three weekdays and one Saturday, it provides only a "snap shot" of typical usage based on MAT's ridership data collection.

TABLE 2-14

Middletown Area Transit – Route F – Boardings and Alightings Summary

Bus Stop	Weekday (Average)			Saturday		
	Boardings	Alightings	Total	Boardings	Alightings	Total
Downtown Terminal (Departure)	17.0	11.3	28.3	5	2	7
Marlborough Street	2.3	6.3	8.7	0	1	1
Route 16/Route 66	1.0	0.3	1.3	0	0	0
Food Bag - Route 16	2.7	1.7	4.3	1	0	1
Clark Hill Road/North Main Street	0.3	5.3	5.7	1	3	4
Route 16/Route 66	1.7	0.7	2.3	0	1	1
Greystone Manor	0.3	0.3	0.7	0	0	0
Portland Convalescent	0.7	0.0	0.7	0	0	0
Total	26	26	52	7	7	14

In addition to the ridership data previously discussed, RiverCOG has recently published a draft report of the *Lower Connecticut River Valley Regional Bus Ridership Study*. Ridership data was collected from April to July 2017. According to the report data, MAT Route F averaged 59 passenger trips per day on the weekdays, and 15 passenger trips per day on Saturdays. This translates to an average of 9.7 passengers per hour during the week and 4.3 passengers per hour on Saturday. Based on the findings, RiverCOG has recommended that Route F be considered for on-demand service due to the relatively low number of passengers. The elimination of the route shall not be considered, as Route F provides a vital service to the Towns of Portland and East Hampton serving as the only option for transit service in each town.

2.9.6 MAT Route F Passenger Survey

As part of the study, Tighe & Bond developed a passenger survey in collaboration with MAT and the study committee to better understand the existing system and passenger experience on Route F. The survey included a total of 8 questions intended to identify needs and deficiencies relating to the frequency of service, bus stop locations and amenities, reliability, and access to bus schedule information. The questions were mostly multiple choice and collected information regarding origin and destination of trips, purpose of trips, and suggestions on how to improve bus services. The passenger survey results are included in Appendix K.

The survey was administered by MAT staff onboard 24 circulatory bus routes during the peak commute hours of 6:45 a.m. to 9:45 a.m. and 3:45 p.m. to 5:45 p.m. between Wednesday, July 11, 2018 and Friday, July 13, 2018. A total of ten passengers participated in the survey and provided answers to the survey questions.

Trip Origin and Destination

Based on the survey results, 70% of those surveyed used Route F bus service five or more days a week, 10% used it three to four days a week, while 20% used it one to two days a week.

Forty percent of those surveyed were picked up or dropped off at the Portland Terminal located at 340 Main Street in Portland. The rest were picked up or dropped off at various locations along Bus Route F, including Middletown Bus Station; Portland Convalescent, Ferry Lane, Riverdale Motel, Butler Construction, and Dunkin Donuts in Portland; Food Bag on Route 16, North Maple Street, 140 East High Street, Dunkin Donuts, and McDonald's in East Hampton. Twenty percent of those surveyed didn't specify their pickup or drop-off locations.

Eighty percent of those surveyed walked to and from their pickup and drop-off locations. The remaining 20% rode a different bus to Bus Route F bus stop locations.

Trip Purpose

Work related trips accounted for 60% of the passengers surveyed with morning rides occurred between 5:45 a.m. and 8 a.m. and afternoon rides occurred between 3:45 p.m. and 4:30 p.m. The rest of the trips included grocery shopping, medical service, and others.

Passenger Suggestions

Of the passengers who completed the survey, 90% were extremely satisfied or satisfied with the bus service on F Route. Ten percent answered "neutral" to the question. Additionally, suggestions provided by passengers to improve the bus service are summarized below:

- More bus frequency (30%)
- Bus stop facilities (20%)
- Cost (20%)
- Onboard comfort (20%)
- Access to information (10%)
- On-board assistance for old people with food carriage or kids with strollers (10%)

2.10 Access Management

Access management is the process of overseeing access to land development while simultaneously preserving the flow of traffic on the surrounding roadway system in terms of safety and capacity. Access management focuses on safety of travel and minimizing conflict points (locations where vehicles can cross paths) to maintain the smooth flow of traffic along a roadway. Maintaining smooth traffic flow can, in turn, reduce the need for roadway widening induced by growing congestion. Access design characteristics of a roadway that directly impact traffic flow and safety include the location, spacing, and design of access drives entering the roadway as well as location of signals, medians, and turn lanes.

The assessment of existing access management for this study included a field review of the existing driveways to identify multiple driveways within close proximity, driveways in excess width, and redundant driveways along the study corridor. Furthermore, driveway design guidelines available for State highways are reviewed and summarized in this document to facilitate the evaluation of current access management and development of subsequent access management plans for this study.

2.10.1 Existing Access Management Conditions

In general, Route 66 abuts suburban and rural communities with a cohesive village center along the corridor in each town. The evaluation of access management conditions for this study focuses on the central business area from Main Street to Gospel Lane in Portland and from Maple Street to Lakeview Street in East Hampton, respectively.

Town of Portland – Main Street to Gospel Lane

The Route 66 segment between Main Street and Gospel Lane in Portland is approximately 2 miles long. Route 66 within this segment consists of two travel lanes in each direction, separated by a raised median, and widens to include dedicated turn lanes at major intersections and driveways. There are 6 signalized intersections, 7 side streets, and approximately 75 private driveways within the segment. Developments along this stretch from west to east include Rite Aid, Burger King, a dozen small but densely spaced residential homes, auto sales, Cumberland Farms, Subway, Farrell's, Adams Market, NAPA Auto Parts, Family Dollar, Portland Veterinary Hospital, Dental office, True Value Hardware store, Dairy Queen, among others. Sidewalks are provided from Main Street to the Portland Shopping Center Driveway along the north side of the corridor only. Crosswalks and pedestrian signals are generally non-exist along this segment. A driveway inventory map was created to illustrate the location, spacing, access restriction, redundancy, and connection of existing driveways within this segment, as shown on Figures 2-14 to 2-17.

The following observations were made to assess existing driveway access along the segment:

- The raised median within the segment helps regulate driveway access and circulation while significantly reducing vehicular conflicting points and crashes at the driveway locations.
- Exclusive left turn lanes along the corridor are provided at some driveway locations, resulting in reduction of vehicle conflicts and rear-end collisions in the immediate vicinity of these driveways. These median breaks also facilitate access to side streets from Route 66 facilitating local circulation and access.

- A number of properties have multiple full-access driveways, which result in potential conflicts on the roadway.
- Some driveways are located within 25 feet of a major intersection, making the driveway access challenging and a safety concern.
- A number of driveways are closely spaced at adjacent properties, which generates confusion for travelers unfamiliar to the area as well as for drivers accessing and egressing from closely spaced driveways.
- Many driveways are poorly delineated and the pavement is in poor condition or non-existent.

Route 66 in Portland looking north near the Gulf Gas Station

Town of East Hampton – Maple Street to Lakeview Street

The Route 66 segment between Maple Street and Lakeview Street (Route 196) in East Hampton is approximately 0.84 miles long. Route 66 within this segment consists of two travel lanes west of Main Street and two lanes with a centered back-to-back left-turn lane between Main Street and American Distilling. There are 4 signalized intersections, 5 side streets, and approximately 51 private driveways within the segment. Developments along this stretch from west to east include church, butcher shop, houses, offices, car wash, hair salon, banks, Stop & Shop, Eversource Energy area work center, East Hampton Police Department, Dunkin' Donuts, Ace Hardware, Rite Aid, Citgo Gas Station, a jewelry store, Food Bag, Subway, Belltown Smoke Shop, American Distilling & Manufacturing, Island Coffee Traders, Spirit Shop, and a few small but densely settled residential houses. Sidewalks, crosswalks, and pedestrian countdown signals are generally provided within the segment, but sidewalk gaps exist between Belltown Smoke Shop and Lakeview Street along the north side of the roadway. Continuous sidewalks are provided along the east side of Main Street and the west side of Lakeview Street in the area. A driveway inventory map was created to illustrate the location, spacing, access restriction, redundancy, and connection of existing driveways within this segment, as shown on Figures 2-18 to 2-20.

The following observations were made during a field visit to assess the existing access management along the segment:

- The centered back-to-back left turn lane within the segment helps regulate driveway access entering the properties and reduces vehicle conflicts and rear-end collisions in the immediate vicinity of the driveways.
- Dense and poorly delineated driveways are frequent through this segment.
- A number of properties have multiple full-access driveways, which results in increased number of driveways, confusion to drivers, and potential conflicts on the road.
- Some driveways are closely spaced at adjacent properties, generating confusion to travelers unfamiliar to the area.
- A few small size properties provide front yard parking backing into Route 66, which generates safety concern.
- The driveways at Citgo Gas Station, the jewelry store, and Subway are wide and closely spaced. Vehicles tend to line up alongside one another attempting to enter Route 66 simultaneously, resulting in poor visibility.
- Some poor pavement conditions along the roadway gutter in front of some driveways results in slower entering/existing turning movements which can decrease safety along this segment given all the turning movements that take place.

Route 66 in East Hampton looking East near the East Hampton Town Hall

2.10.2 CTDOT Driveway Design Guidelines

The multiple, uncoordinated, closely spaced access points can be dangerous for motorized and non-motorized travel, disruptive to traffic flow, and increased congestion. Fewer driveways spaced further apart allow for more orderly merging of traffic and present fewer challenges to drivers.

CTDOT established driveway design guidelines in the 2003 Highway Design Manual (Revised February 2013). These guidelines should be reviewed when considering consolidation of redundant driveways and integration of all travel modes in the corridor, as part of the subsequent development of the corridor improvement plan. The primary design standards for driveways along a state route include the following:

- Driveway Alignment – Driveways and side streets should preferably be perpendicular to the state highway. All curb cuts and/or roadway intersections on opposite sides of the road should preferably be aligned directly opposite one another.
- Driveway Width – Minimum 10 feet for residential driveways and maximum 30 feet for all type of driveways, depending on 1-way or 2-way operation and selected design vehicle template.
- Maximum Driveway Grade – 12 percent for residential driveways and 8% for commercial driveways.
- Number of Driveways – No more than one combination entrance and exit shall be allowed for any property with frontage of less than 50 feet. Parcels having a frontage from 50 to 100 feet may be permitted two entrances if a minimum of one-third of the total frontage is used to separate driveways.
- Driveway Location – No entrance or exit should be constructed at the un-signalized intersection of two State highways, town road, and city street for a distance of 25 feet from the intersection.
- Driveway Spacing - Access driveways on the same side of the road should be separated as far apart as is practical, with a minimum separation of 60 feet for residential drives and 120 for commercial drives.
- Driveway Sight Distance - All entrances and exits shall be so located that vehicle operators approaching or using them shall have adequate sight distances in both directions along the State highway in accordance with current Department of Transportation geometric design standards. The permit applicant shall stabilize all slopes by loaming and seeding or other method directed by the Permit Inspector.
- Driveway Connections – Provide internal circulation among adjoining properties of similar existing or potential use when possible.

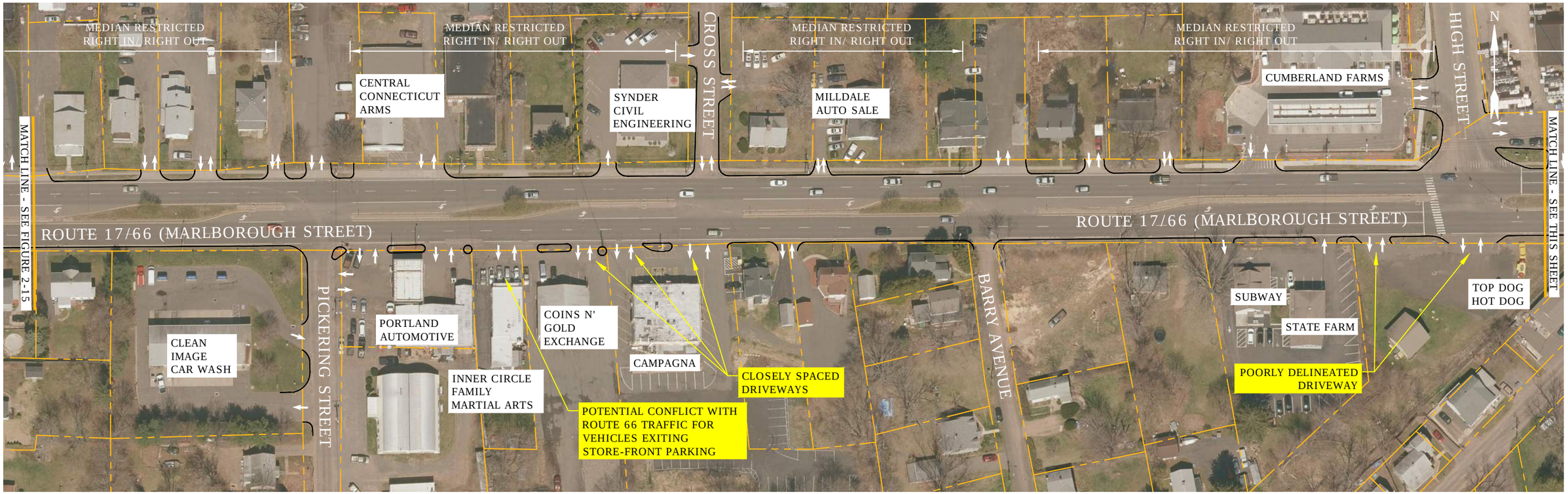
Route 66 Corridor Study

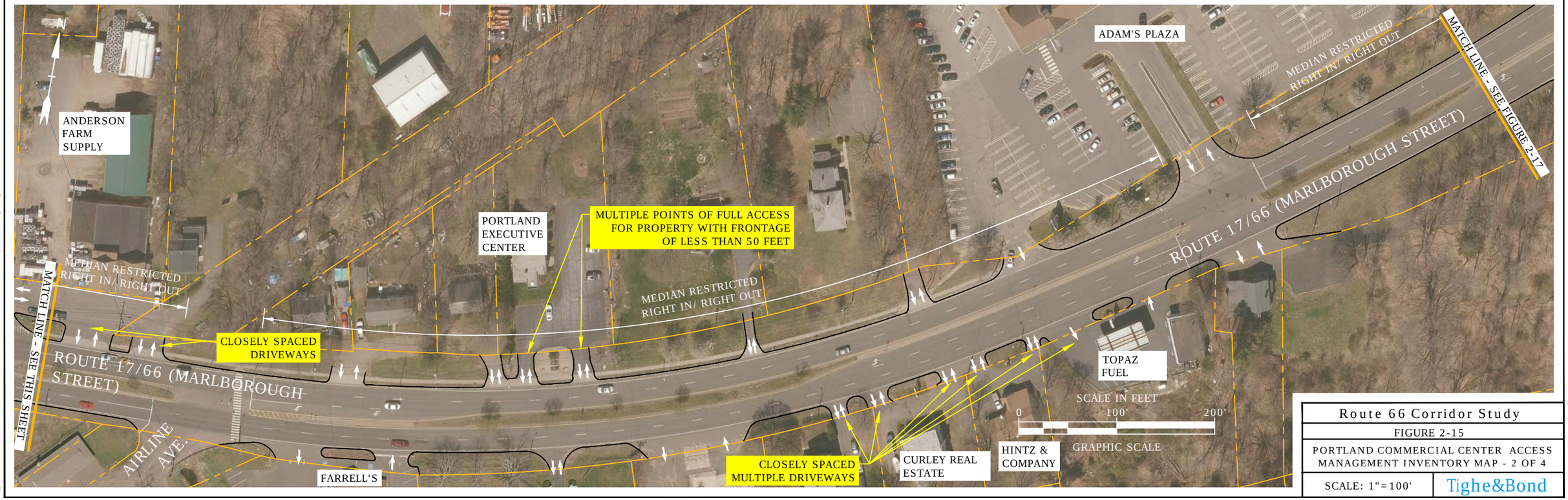
FIGURE 2-14

PORTLAND COMMERCIAL CENTER ACCESS MANAGEMENT INVENTORY MAP - 1 OF 4

SCALE: 1"=100'

Tighe&Bond





Route 66 Corridor Study	
FIGURE 2-15	
PORTLAND COMMERCIAL CENTER ACCESS MANAGEMENT INVENTORY MAP - 2 OF 4	
SCALE: 1"=100'	Tighe&Bond

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Route 66 Corridor Study

FIGURE 2-16

PORTLAND COMMERCIAL CENTER ACCESS MANAGEMENT INVENTORY MAP - 3 OF 4

SCALE: 1"=100'

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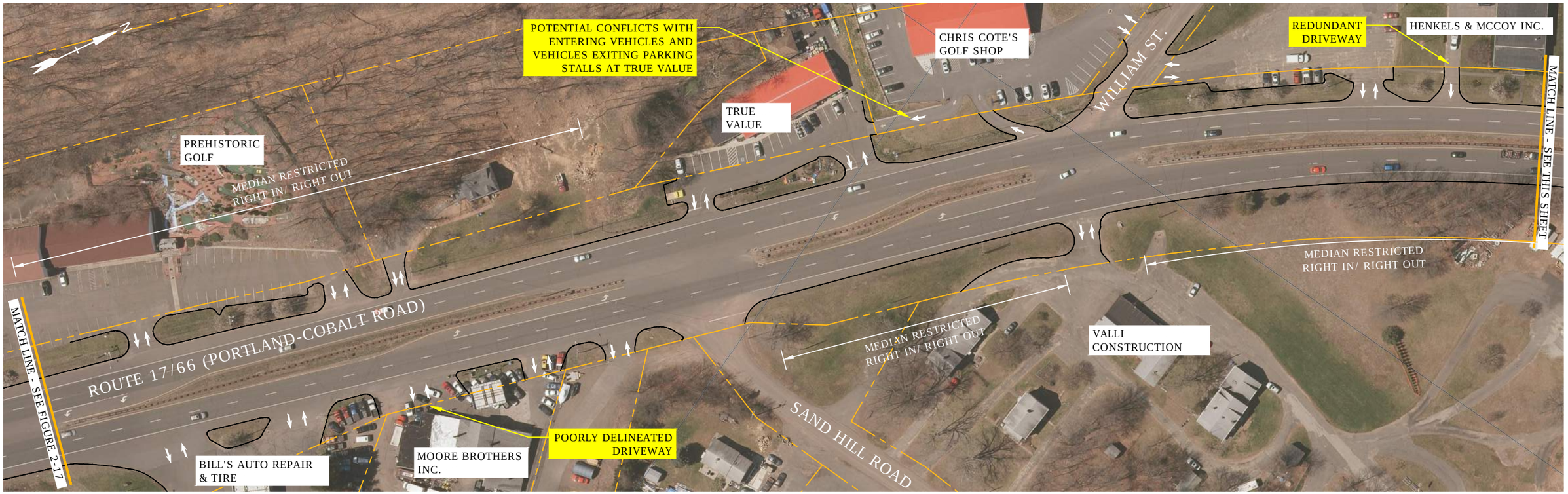

Route 66 Corridor Study	
FIGURE 2-17	
PORTLAND COMMERCIAL CENTER ACCESS MANAGEMENT INVENTORY MAP - 4 OF 4	
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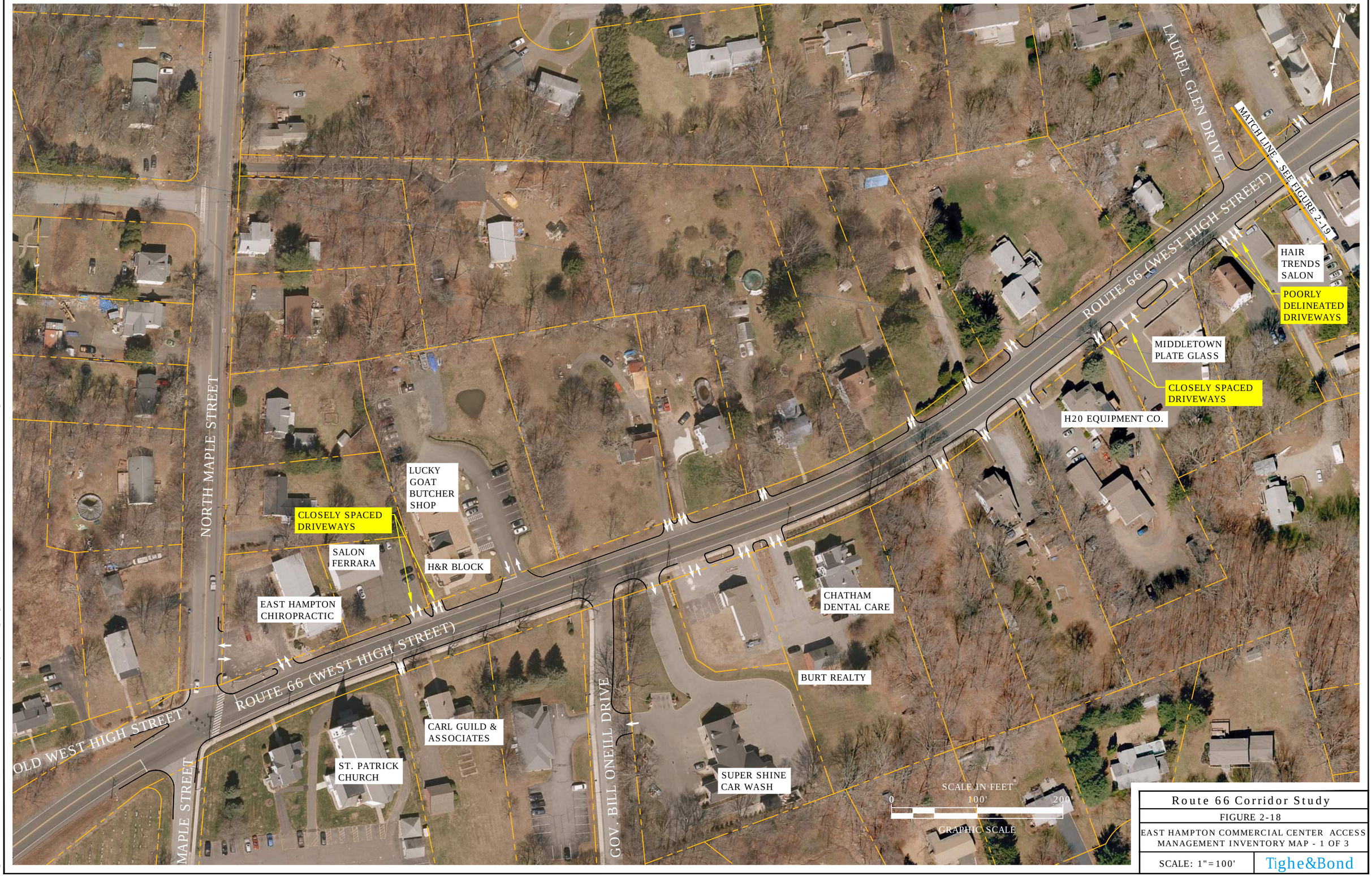


Route 66 Corridor Study

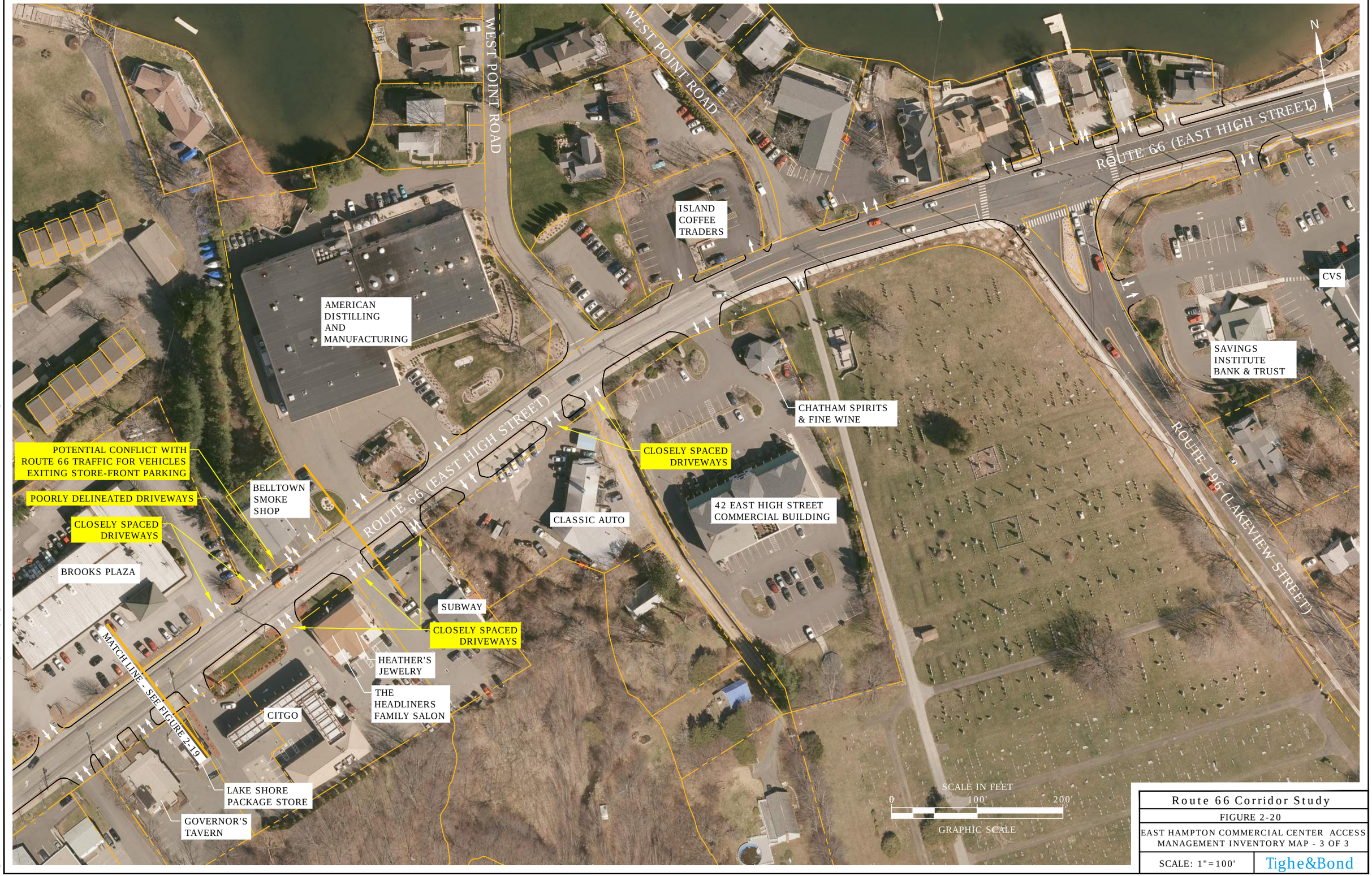
FIGURE 2-18

EAST HAMPTON COMMERCIAL CENTER ACCESS MANAGEMENT INVENTORY MAP - 1 OF 3

SCALE: 1"=100'

Tighe&Bond

Route 66 Corridor Study	
FIGURE 2-19	
EAST HAMPTON COMMERCIAL CENTER ACCESS MANAGEMENT INVENTORY MAP - 2 OF 3	
SCALE: 1"=100'	Tighe&Bond

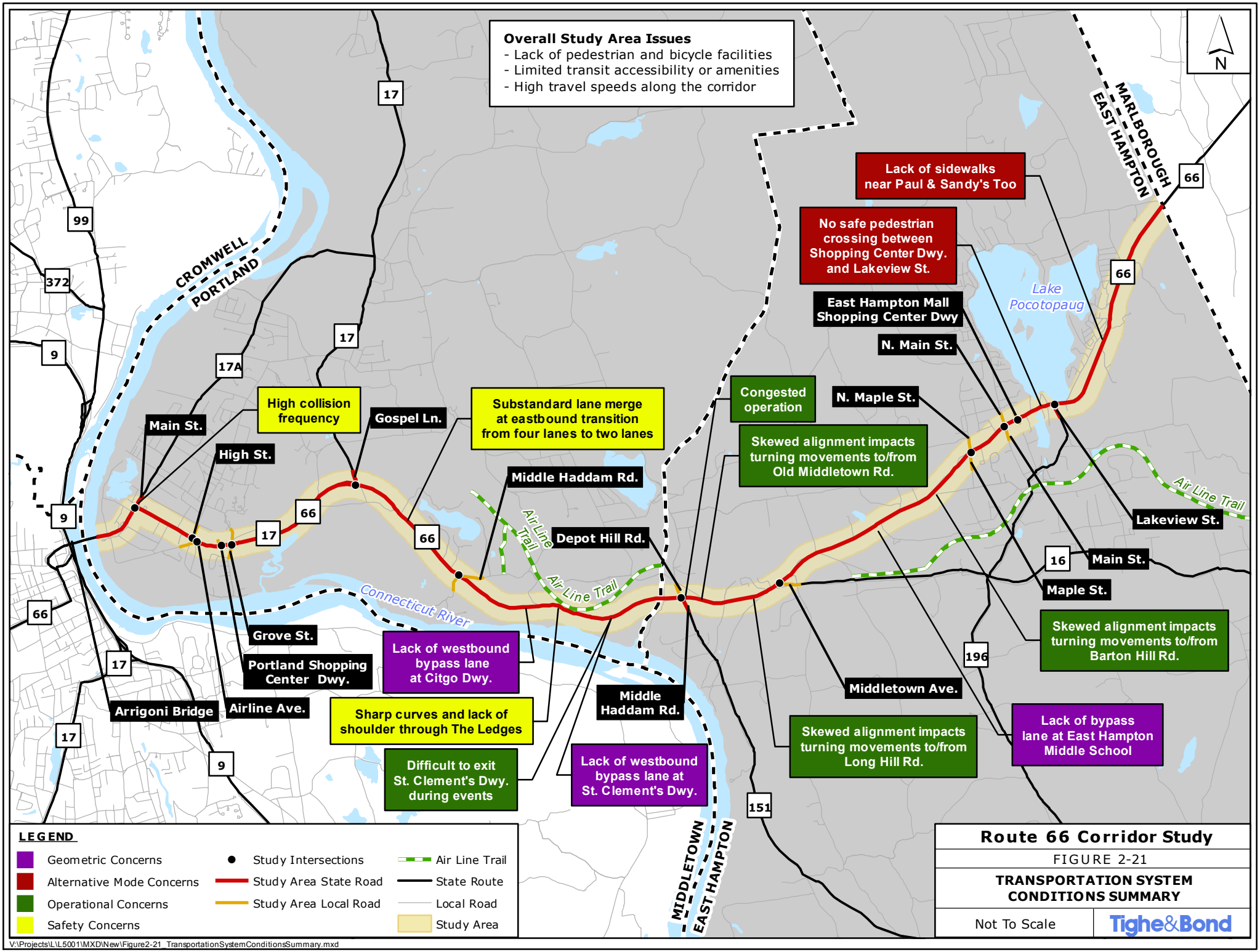


Route 66 Corridor Study	
FIGURE 2-20	
EAST HAMPTON COMMERCIAL CENTER ACCESS MANAGEMENT INVENTORY MAP - 3 OF 3	
SCALE: 1"=100'	Tighe&Bond

2.11 Transportation System Condition

During data collection, the study team conducted observations of the existing roadway network seeking to identify deficiencies or areas of concern that warrant a more detailed review during subsequent study phases. The major observations are described below with additional information presented graphically in Figure 2-21.

- High travel speeds exist along the Route 66 corridor.
- High collision rates occur at the following intersections:
    - Route 66 at Route 17A (Main Street)
    - Route 66 at High Street
    - Route 66 at Route 151 (Middle Haddam Road)/ Depot Hill Road
- Skewed alignments impact turning movements to and from Route 66 causing safety concerns at the following locations:
    - Long Hill Road
    - Barton Hill Road
    - Lake Drive
    - Steath Road
    - Sand Hill Road
    - Old Middletown Road
- Safety concerns in the Ledges area of East Hampton related to travel speeds, limited sight distances, and limited roadway shoulder areas.
- Lack of by-pass/left turn lane and safety concerns at Citgo Gas Station driveway, as well as St. Clement's Castle & Marina driveway during events.
- Substandard merge lane at the eastbound transition from four lanes to two lanes on Route 66 east of Route 17.
- Areas with significant cut-through traffic utilizing local roadways have caused speeding and safety concerns at the following locations:
    - Wolcott Avenue in Portland to avoid Route 66 and Route 17A intersection.
    - William Street Extension as an alternative to Route 17 intersection.
    - Middle Haddam Road in Cobalt as an alternative to Route 66.
- Limited transit usage, accessibility or amenities don't exist within the study area.


Overall Study Area Issues
- Lack of pedestrian and bicycle facilities
- Limited transit accessibility or amenities
- High travel speeds along the corridor
N
CROMWELL
PORTLAND
MARLBOROUGH
EAST HAMPTON
MIDDLETOWN
EAST HAMPTON
Lake Pocotopaug
Connecticut River
Air Line Trail
Lack of sidewalks near Paul & Sandy's Too
No safe pedestrian crossing between Shopping Center Dwy. and Lakeview St.
East Hampton Mall Shopping Center Dwy
N. Main St.
N. Maple St.
Congested operation
Skewed alignment impacts turning movements to/from Old Middletown Rd.
Lakeview St.
Main St.
Maple St.
Skewed alignment impacts turning movements to/from Barton Hill Rd.
Middletown Ave.
Lack of bypass lane at East Hampton Middle School
Skewed alignment impacts turning movements to/from Long Hill Rd.
Lack of westbound bypass lane at St. Clement's Dwy.
Middle Haddam Rd.
Depot Hill Rd.
Substandard lane merge at eastbound transition from four lanes to two lanes
Gospel Ln.
High collision frequency
Main St.
High St.
Grove St.
Portland Shopping Center Dwy.
Lack of westbound bypass lane at Citgo Dwy.
Arrigoni Bridge
Airline Ave.
Sharp curves and lack of shoulder through The Ledges
Difficult to exit St. Clement's Dwy. during events
99
372
9
17
17A
66
16
196
151
LEGEND
Geometric Concerns
Alternative Mode Concerns
Operational Concerns
Safety Concerns
Study Intersections
Study Area State Road
Study Area Local Road
Air Line Trail
State Route
Local Road
Study Area
Route 66 Corridor Study
FIGURE 2-21
TRANSPORTATION SYSTEM CONDITIONS SUMMARY
Not To Scale
Tighe&Bond
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- Lack of pedestrian and bicycle accommodations throughout the study area. Sidewalks are sparse along Route 66 and shoulders are narrow which discourage bicycling and walking.

2.12 Existing Site Analysis

2.12.1 Portland Commercial Center

Portland's commercial center is characterized by business and residential uses in a mix of historic and recent architecture. The gateway into Portland from the Arrigoni Bridge is distinguished by wide pavement, high-speed traffic, and entrance and exit ramps to Lower Main Street, with challenging sight lines and no opportunity to cross Main Street. A large billboard-style gateway sign on the west side of Main Street is difficult to see when entering the gateway from the bridge. Two other welcome signs are located at the intersection of Route 17 and Route 66 but no wayfinding signage directs visitors toward the nearby Brownstone Exploration and Discovery Park or towards parking for the new Airline Rail Trail located east of the commercial center. The sidewalk on the east side of Main Street is set back from the roadway, safely separating pedestrians from vehicles with lawn and street trees. The sidewalk along the west side abuts a street wall of mainly historic two-story architecture occupied by small businesses and punctuated by some new development including a Dunkin' Donuts and gas station. This broad sidewalk features streetscape elements such as ornamental banners and poles, benches, brownstone walls, colored and stamped concrete bands, trash receptacles, and young street trees. There are no provisions for cyclists, formalized bus stops, or on-street parking to support the businesses and off-street parking is limited. Large utility poles with overhead wires located on the east side Main Street and north side of Marlborough Street detract from the view and provide the only source of street lighting. The intersection of these streets is marked by an exclusive right turn onto Marlborough Street with a landscaped island which provides some refuge for pedestrians crossing Marlborough Street. In contrast to Main Street, a grass and tree lined median along Route 66 breaks up the wide road and reduces the scale, calming traffic and making a more comfortable pedestrian experience. The median width is reduced to allow for left turn lanes at intersecting side streets and the road shoulder is narrow, limiting bicycle access.

On Marlborough Street, a narrow sidewalk connects businesses and homes on the north side. Only one mid-block crosswalk and two corner crossings, at High Street and Airline Ave, connect the north and south sides of the street, but none are ADA accessible and do not connect to sidewalks or formalized bus stops. Most businesses along the north side have controlled access and concrete driveway aprons which aids in protecting pedestrians. Newer businesses, such as Cumberland Farms and Burger King, also have aesthetic features such as brownstone walls and landscaping along the sidewalk although other amenities such as seating, trash receptacles, and bus and bike amenities are lacking. Existing businesses on the south side tend to have wide, undefined driveways and front yard parking. The speed limit increases and the road shoulder widens to the east of Grove Street and Johnson Farm Road, providing space for bicyclists.

The locations of the following photos in Portland are shown on the Photo Location Inventory Key Map, Figure 2-22.

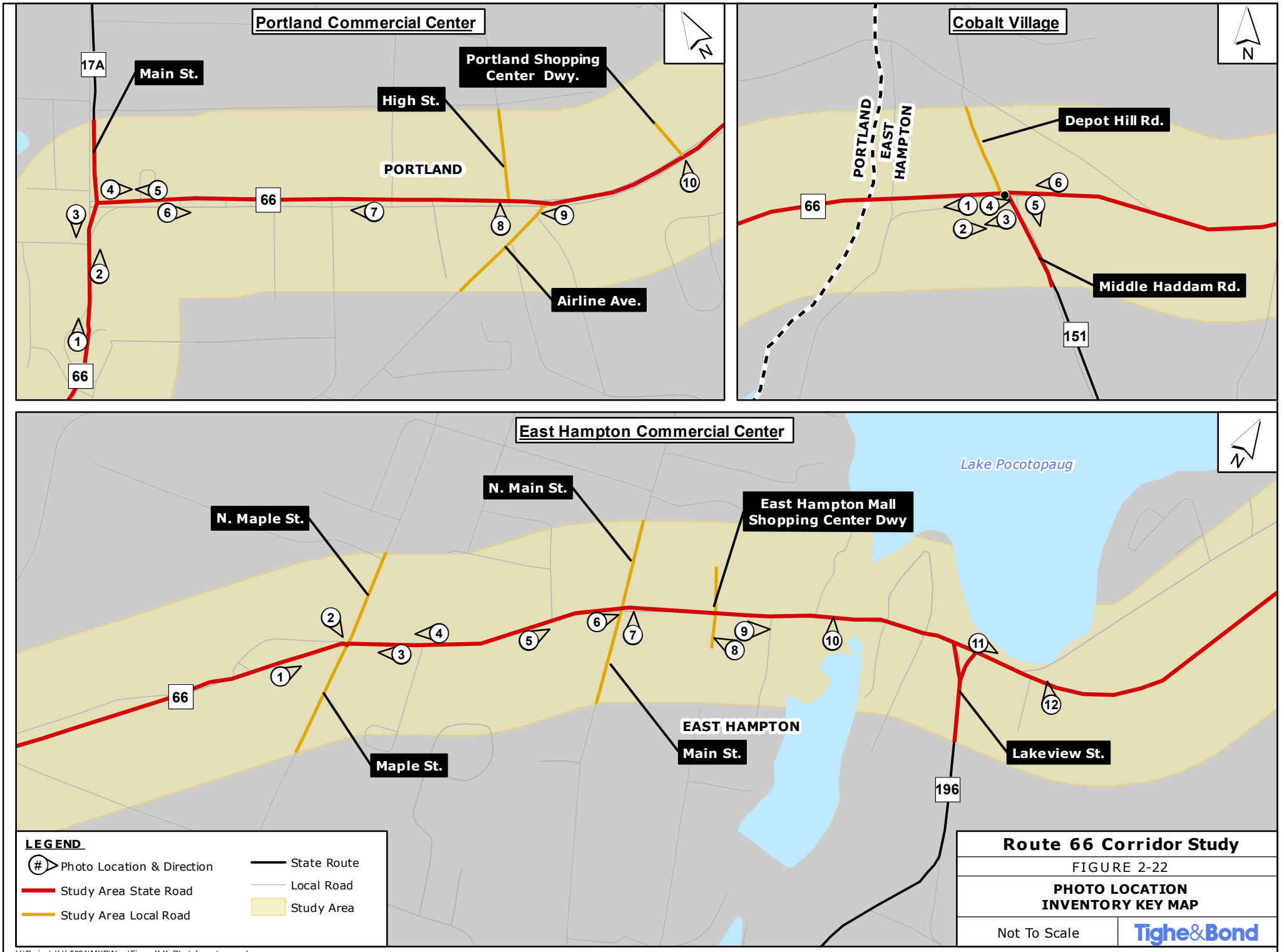
Portland Commercial Center
17A
Main St.
High St.
Portland Shopping Center Dwy.
PORTLAND
66
Airline Ave.
Cobalt Village
PORTLAND
EAST HAMPTON
Depot Hill Rd.
66
Middle Haddam Rd.
151
East Hampton Commercial Center
Lake Pocotopaug
N. Main St.
N. Maple St.
East Hampton Mall Shopping Center Dwy
66
Maple St.
EAST HAMPTON
Main St.
Lakeview St.
196
LEGEND
Photo Location & Direction
Study Area State Road
Study Area Local Road
State Route
Local Road
Study Area
Route 66 Corridor Study
FIGURE 2-22
PHOTO LOCATION INVENTORY KEY MAP
Not To Scale
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Photo 1	
Arrigoni Bridge Gateway Area: Poor sight lines, expansive pavement, lacks human scale	
	Looking North along Main Street

Photo 2	
Wide roadway & overhead utilities dominate streetscape	
	Looking North along Main Street

Photo 3	
Historic architecture and streetscape elements	Looking South along Main Street

Photo 4	
Sidewalks on north side only; narrow width	Looking East along Route 66 near Main Street

Photo 5	
Commercial property with human scale streetscape elements	Looking West along Route 66 near Main Street

Photo 6	
Midblock crossing with signage, pavement markings, & refuge island but no flashing beacon or accessible ramps	Looking East along Route 66 in Portland

Photo 7	
Excessive wide curb cuts; lack of pedestrian amenities	Looking West along Route 66 near Pickering Street

Photo 8	
Non-compliant pedestrian crosswalks	Looking North towards Route 66 at High Street

Photo 9	
No sidewalk along south side; narrow shoulder limits bicycle access	Looking West on Route 66 at Airline Avenue

Photo 10	
Signaled intersection lacks pedestrian crossing & bus provisions	Looking East on Route 66 at the Portland Shopping Center

2.12.2 Cobalt Village

Cobalt is the western gateway to East Hampton. It is a dominantly residential area marked by small businesses, a gas station, post office, and fire House at the intersection of West High Street (Highway 66), Middle Haddam Road (Highway 151; a designated scenic road), and Depot Hill Road; just over the town line into East Haddam. This rural commercial center consists of a signaled intersection without sidewalks, defined curb cuts, crosswalks, or other streetscape amenities and lacks human scale. Middle Haddam Road is split by a bituminous island to allow right turning traffic to meet West High Street at a right angle. This traffic island, along with the wide driveway entrances and front parking lots, creates a gateway dominated by pavement. State wayfinding and road signage direct vehicles to nearby towns and Hurd State Park. A historic home which has been adaptively re-used as a doll store marks the southwest corner and further east an old gas station has been converted to a pizzeria with outdoor seating. There are no formalized bus stops or provisions for bicyclists.

The locations of the following photos in Cobalt are shown on the Photo Location Inventory Key Map, Figure 2-22.

Photo 1	
One of many skewed intersecting roads with difficult sight lines	Looking West along Route 66 near Middle Haddam Road

Photo 2	
Vehicle / pavement dominated gateway	Looking East along Route 66 at Middle Haddam Road

Photo 3	
Adaptive reuse of historic architecture enhances sense of place	Looking West from Middle Haddam Road

Photo 4	
Intersection lacks pedestrian crosswalks & ramps; bituminous islands & excessive pavement lack visual interest	Looking East along Route 66 at Middle Haddam Road

Photo 5	
Unorganized front yard parking	Looking Southeast from Middle Haddam Road

Photo 6	
Excessive pavement; lacks visual & pedestrian amenities	Looking West on Route 66 towards Middle Haddam Road

2.12.3 East Hampton Commercial Center

East Hampton's commercial center begins upon a steep ascent up West High Street (Highway 66) to the intersection of Maple Street. This western gateway is signified by St. Patrick Church, cemetery, and historic residences adaptively re-used as small businesses. Pavement dominates the northeast corner at this 5-way intersection. There is a traffic and pedestrian signal and crosswalk striping, but not all corners have accessible curb ramps. East Hampton High School is accessed to the North by a narrow bituminous walk adjacent to the west side of N. Maple Street.

Sidewalks line the south side of West and East High Street (Highway 66) from Maple Street to just east of Lakeview Street. On the North Side of the street, sidewalks connect businesses between North Main Street to the Rite Aid driveway and begin again between Lakeview Street and Old Marlborough Road. The shoulder width varies with limited provisions for bicyclists. East of Main Street, the shoulder narrows to accommodate center turn lanes which continue to Lake View Street. A cyclist was observed on the north sidewalk near Stop and Shop. Pedestrian amenities such as seating areas with benches and trash receptacles have been installed in front of the Town Hall and Classic Auto on the south side of the street and the furnishings match the ones found in East Haddam Village Center.

Opportunities to cross West High Street are limited to the signaled intersections of Main Street, Lakeview Street, and the entrance to Stop and Shop. Each of these intersections is complete with crosswalks and accessible curb ramps. Sidewalks with a colored concrete band and unique scoring pattern along the south side are associated with recent streetscape improvements. Gaps in sidewalks on the north side impede safe circulation and overall pedestrian connection to adjacent residential areas is lacking. The Street is lit from cobra-heads on utility poles along the south side of the street.

Town wayfinding signage is located throughout the commercial center and Village Center, directing to schools, services, and recreation within East Hampton. The best views of Lake Pocotopaug can be observed driving down Lakeview Street, but it can also be seen from either direction down East High Street just east of the Lakeview Street intersection. On the north side, wayfinding signage, road signage, utility poles, and vegetation obscure a sign for the lake and the view beyond. The speed limit increases entering and exiting the central commercial area.

The locations of the following photos in the East Hampton Commercial Center are shown on the Photo Location Inventory Key Map, Figure 2-22.

Photo 1	
Gateway signage & steep slope approaching commercial center	Looking East along Route 66 near Maple Street

Photo 2	
Signaled intersection lacks pedestrian crossing & bus provisions	Looking Southeast at Route 66 and Maple Street

Photo 3	
Overhead utilities dominate; misshapen trees. Flags on utility poles are a repetitive element throughout East Hampton.	Looking West along Route 66 near Maple Street

Photo 4	
Sense of place enhanced by historic elements	Looking West along Route 66 near Gov. Bill O'Neill Drive

Photo 5	
Sidewalks on South side. Wide shoulders provide room for cyclists.	Looking East along Route 66 near Laurel Glen Drive

Photo 6	
Town standard wayfinding signage	
	Looking East along Route 66 at Main Street

Photo 7	
Recent streetscape improvements provide safe pedestrian crossing	
	Looking East along Route 66 at Main Street

Photo 8	
Narrow shoulders inadequate for cyclists; concrete driveway ramps emphasize pedestrian way	Looking West along Route 66 at the Eversource Driveway

Photo 9	
Streetscape amenities provide visual interest & enhances walkability	Looking East along Route 66 at the East Hampton Town Hall

Photo 10	
Front yard parking backs into the road; gap in sidewalk on north side	Looking North from Route 66 near Mallard Cove

Photo 11	
Safe pedestrian crossing at signaled intersection; however, lacks continuous walk on north side	Looking East along Route 66 at Lakeview Street

Photo 12	
Lake Pocotopaug: visual & recreational amenity at eastern town center gateway	Looking North towards Lake Pocotopaug from Route 66

Section 3
Environmental and Natural Resources

The study area was screened for the following natural and cultural resources and physical environment features:

- **Surface Water Resources**
- **Groundwater Resources**
- **Wetlands**
- **Floodplains**
- **Threatened and Endangered Species and Critical Habitats**

In addition to reviewing aerial images of the study area, current Geographic Information Systems (GIS) data from the Connecticut Department of Energy and Environmental Protection (CTDEEP), and the Towns of Portland and East Hampton were obtained and reviewed during this screening analysis.

3.1 Surface Water Resources

Surface water resources within or near the study area include the Connecticut River, and Pocotopaug Lake, as well as numerous ponds and creeks.

In Portland, the Connecticut River is classified by CT DEEP as Class SB, which designated uses are habitat for marine fish and aquatic life and wildlife, commercial shellfish harvesting, recreation, industrial water supply, and navigation.

The water quality of Pocotopaug Lake in East Hampton is classified by CT DEEP as Class A, which is a designated for potential drinking water supply, fish and wildlife habitat, recreational use, agricultural and industrial supply, and other legitimate uses including navigation. Discharges are restricted form drinking water treatment systems, dredging and dewatering, and emergency and clean water discharges. The water quality of Bevins Pond is classified as Class B water. Designated uses include recreational use, fish and wildlife habitat, and other legitimate uses including navigation. In addition to the restricted discharges for Class A surface water, Class B waters are also restricted to cooling waters and discharges from industrial and municipal wastewater treatment facilities. The 2016 East Hampton Watershed Based Plan finds that the water quality of the Pocotopaug Lake is fully supportive of aquatic life.

3.2 Groundwater Resources

The groundwater in the study area in Portland is classified by the CTDEEP as GB near the Connecticut River and GA or GAA near Pecausett Pond. In East Hampton the groundwater is classified as Class GA or GAA in East Hampton near Pocotopaug Lake.

Class GB designated uses are industrial process water and cooling waters, and presumed unsuitable for human consumption without treatment. Class GAA designated uses are existing or potential public supply of water suitable for drinking without treatment and baseflow for hydraulically-connected surface water bodies. Class GA designated uses are existing private and potential public or private supplies of water suitable for drinking without treatment and baseflow for hydraulically-connected surface water bodies. All groundwaters not specifically classified are considered as Class GA.

3.3 Wetlands

According to the U.S. Army Corps of Engineers (ACOE) 1987 Wetlands Delineation Manual, federal wetlands can generally be defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The State of Connecticut defines wetlands as land, including submerged land, which consists of any of the soil types designated as poorly drained, very poorly drained, alluvial, and floodplain by the Natural Resources Conservation Services (NRCS).

Based on a review of CTDEEP GIS mapping, as shown in Figure 3-1, poorly drained and very poorly drained soils are located throughout the study area. Additionally, alluvial and floodplain soils are located within the study area. These areas indicate potential for the presence of wetlands, but do not represent delineated wetland areas.

3.4 Floodplains and Stream Channel Encroachment Lines

Floodplains are low-lying areas adjacent to rivers or streams that are inundated periodically by floodwaters. A 100-year floodplain is an area that has a one percent chance of being inundated by floodwaters in a given year, whereas a 500-year floodplain is an area that has a one-five hundredth chance (0.2%) of being inundated by floodwaters in a given year. Floodways are located within floodplains and consist of the river or stream channel plus any portion of the 100-year floodplain which carries stream flows during flood events. Floodplains and floodways are important for storing floodwaters so that adjacent properties and downstream areas are not damaged during flood events. In Connecticut, stream channel encroachment lines (SCELs) are jurisdictional boundaries established by the CTDEEP that generally outline riverine floodplain areas and which may also include portions of 100-year floodplains and floodways.

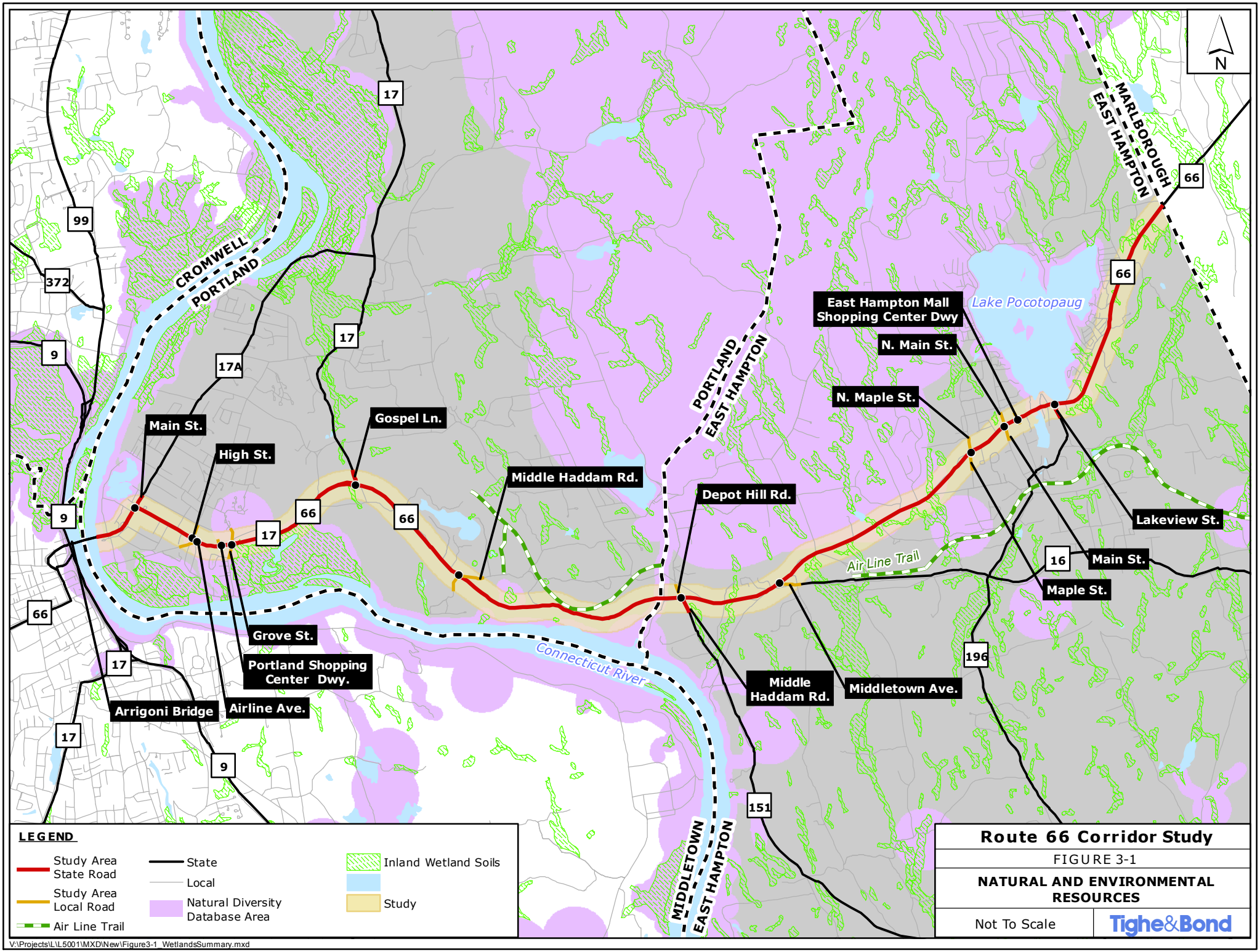
There are 100-year floodplains and 500-year floodplains within the study area, primarily associated with the Connecticut River and Pocotopaug Lake.

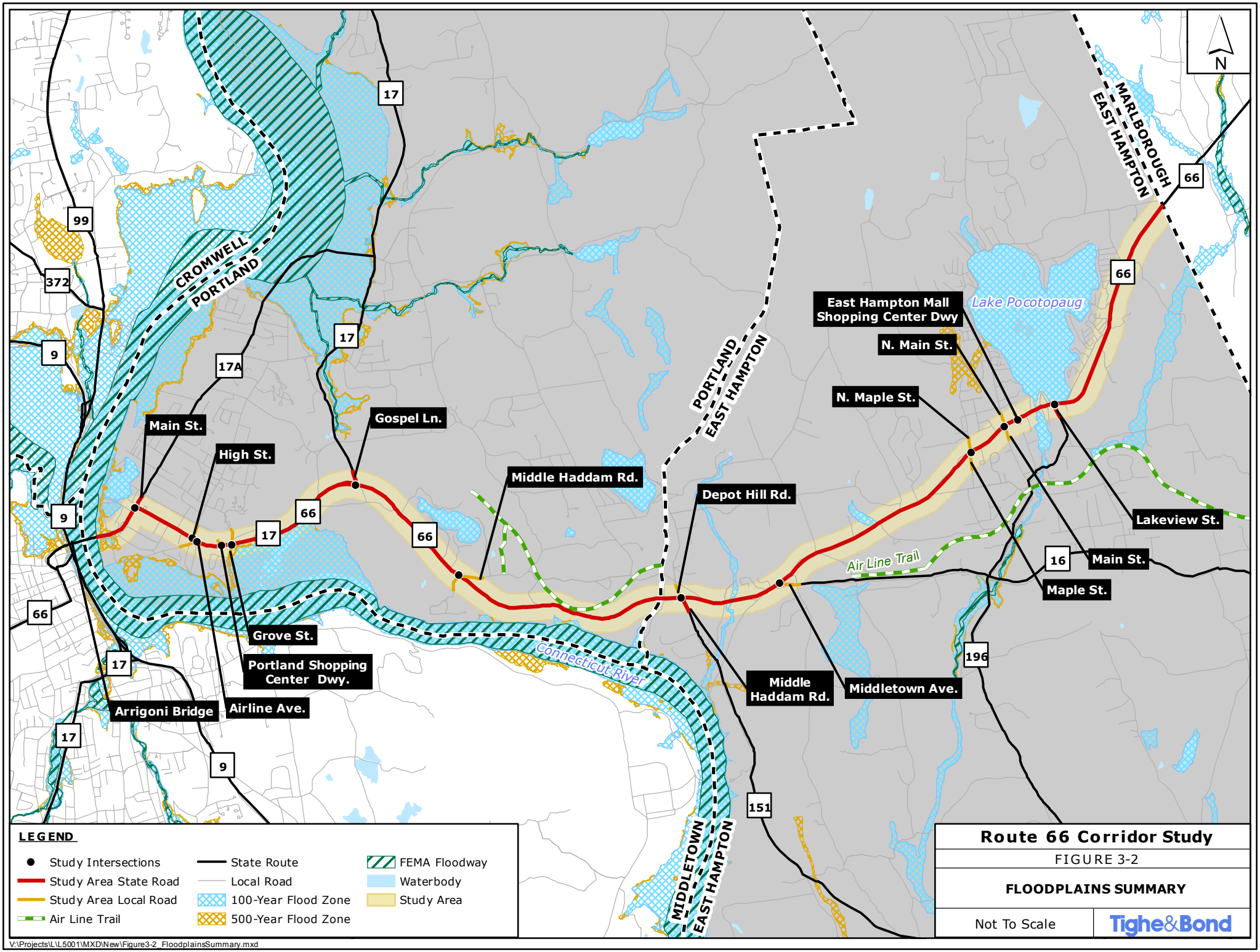
There are no Stream Channel Encroachment Lines within the study area.

3.5 Threatened and Endangered Species

Rare, threatened, and endangered species are protected by federal and state legislation. Information on species designated (listed) as threatened and endangered at the state and federal levels is compiled and made available through the CTDEEP's Natural Diversity Data Base (NDDB).

The CTDEEP NDDB GIS data layer was consulted to determine if there were any records in the study area. Due to the sensitivity of the information, the GIS data layer only depicts approximate locations of protected species, their habitats, and/or significant natural communities. The GIS data review revealed NDDB areas surrounding the Connecticut River in Portland and areas surrounding Pocotopaug Lake in East Hampton.


N
CROMWELL
PORTLAND
MARLBOROUGH
EAST HAMPTON
PORTLAND
EAST HAMPTON
MIDDLETOWN
EAST HAMPTON
Lake Pocotopaug
Connecticut River
Air Line Trail
99
372
9
17
17A
66
16
196
151
Main St.
High St.
Gospel Ln.
Middle Haddam Rd.
Depot Hill Rd.
East Hampton Mall Shopping Center Dwy
N. Main St.
N. Maple St.
Lakeview St.
Maple St.
Grove St.
Portland Shopping Center Dwy.
Airline Ave.
Arrigoni Bridge
Middle Haddam Rd.
Middletown Ave.
LEGEND
Study Area State Road
Study Area Local Road
Air Line Trail
State
Local
Natural Diversity Database Area
Inland Wetland Soils
Study
Route 66 Corridor Study
FIGURE 3-1
NATURAL AND ENVIRONMENTAL RESOURCES
Not To Scale
Tighe&Bond
V:\Projects\L\L5001\MXD\New\Figure3-1_WetlandsSummary.mxd



V:\Projects\L\L5001\MXD\New\Figure3-2_FloodplainsSummary.mxd