CENTRAL MASSACHUSETTS

METROPOLITAN PLANNING ORGANIZATION

New Braintree/North Brookfield/Oakham: Route 148 Corridor Profile

September 2026

Document Prepared by:
Staff of the Central Massachusetts Metropolitan Planning Organization
1 Mercantile Street, Suite 520, Worcester MA 01608

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1.0 Introduction

A Corridor Profile combines the information produced by the transportation Management Systems along a particular highway corridor, sometimes in multiple host communities, and analyzes performance-based data, suggests both operational and physical improvements, and often identifies candidate projects for further study.

Utilizing the range of data and analyses produced by the ongoing transportation Management Systems maintained by the staff of the Central Massachusetts Regional Planning Commission (CMRPC) and overseen by the Central Massachusetts Metropolitan Planning Organization (CMMPO), Corridor Profile efforts allow for comprehensive integration through the consideration of a broad range of key transportation planning factors.

Ultimately, a range of suggested improvement options are compiled for the consideration of the host communities and the Massachusetts Department of Transportation (MassDOT), Highway Division. When local consensus is achieved, proposed improvement projects supported by the community that are eligible for federal-aid funding have the potential to be selected by the CMMPO for programming in the annual Transportation Improvement Program (TIP) document.

As the Corridor Profile study series has evolved, it has become increasingly multi-modal and intermodal. The Management Systems have also served as the foundation for the full consideration of performance-based planning. Performance-based planning seeks to measure the value of investments made in the region's transportation infrastructure. US DOT's required national focus areas include reducing congestion, improving pavement, reducing vehicle crashes and, in the spirit of the state's Complete Streets Program, increasing the use of other modes such as transit, bicycling, and walking.

The Route 148 Corridor Profile includes the analysis and interpretation of Management System data, which includes the following:

Traffic Counting: Daily Automatic Traffic Recorder (ATR) counts and MassDOT Highway Division count data.

Congestion Management Process (CMP): Current Travel Time & Delay study along Route 148; current peak-hour Turning Movement Counts (TMC) at focus intersections and associated Level of Service (LOS) analyses for intersections.

Freight Planning: Peak hour percentages of heavy vehicles utilizing Route 148 focus intersections.

Transportation Safety Planning Program: In-depth vehicle crash research using crash data provided by MassDOT, utilizing a three-year history of reported crashes and subsequent analysis.

Pavement Management System (PMS): Observation of pavement surface distress and extent in the field along with subsequent analysis and calculated Overall Condition Index (OCI).

Bridge Management System (BMS): Bridge condition data available through MassDOT Highway Division; GIS-based inventory of major roadway drainage structures, such as culverts, as well as staff observations in the field using standardized condition assessment techniques.

1.1 Performance Management

Reaffirmed by the Infrastructure Investment & Jobs Act (IIJA), the CMMPO is continuing the evolution of the development of performance-driven, multimodal TIP projects in the planning region. Performance Based Planning & Programming (PBP&P) is intended to improve public transparency, fiscal accountability, and investment decisions affecting the condition and performance of the nation's transportation system.

The CMMPO's established Performance Management program includes both federal transportation performance management requirements as well as the MPO's regionally customized measures. The goals and objectives are then integrated through a range of Federal Transportation Planning Emphasis Areas. The areas are safety, security, state of good repair, congestion, multimodality, sustainability, geographic distribution, economic vitality, stormwater management & resiliency, and travel & tourism. Using the goals and objectives from these Emphasis Areas, a Performance Measures Scoresheet was created to assess both currently programmed as well as candidate future-year TIP projects to determine to what extent they address regional goals. Those projects that rank high most often provide substantive measurable outcomes for each goal and thus have an increased regional impact.

The findings from this Corridor Profile Report resulted in the compilation of a list of suggested improvement options. Ideally, these suggested improvements will support a TIP project that can positively influence regional performance. A table showing the integration of the suggested improvements and how each can realistically support the goals and objectives for the Federal Emphasis Areas is included in the Overall Findings chapter of this report.

1.2 Route 148 Corridor Profile: New Braintree & North Brookfield & Oakham

The Route 148 Corridor Profile was completed as part of CMRPC's Unified Planning Work Program (UPWP). Management Systems data was collected and analyzed to enable the host communities to use the findings to support various improvements along the Route 148

corridor. Route 148 is classified as an urban minor arterial in the town of North Brookfield and rural major collector in the towns of New Braintree and Oakham. The entire study corridor is also eligible for US DOT federal-aid improvement funding. The major goals of this Corridor Profile effort include improving safety, preserving and improving pavement, maintaining drainage structures as well as improving the roadway to accommodate all users. The Route 148 study corridor is shown in **Figure 1** along with other significant features of the region's multi-modal transportation network, including long-distance trails.

The study limits of this Corridor Profile are between Route 122 in Oakham and Route 67 in North Brookfield. Route 148 is known as Oakham Road in North Brookfield and North Brookfield Road in both New Braintree and Oakham. Route 148 starts at Route 122 in Oakham and continues southerly, terminating at US Route 20 in Sturbridge. Within the Route 148 study area, it is a two-lane highway with mostly residential along with a few commercial properties. Further, the North Brookfield public schools are located on Route 148, just north of Route 67.

The study segment of Route 148 is 7.36 miles in length and is maintained by the host communities. The study corridor segment within the town of New Braintree (0.48 miles) is very minimal when compared to the segment lengths in North Brookfield (2.94 miles) and Oakham (3.94 miles). According to MassDOT's Roadway Inventory File (RIF), Route 148 has a right-of-way width of 50 feet and a surface width generally between 22-24 feet, with minimal to no shoulders.

NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE

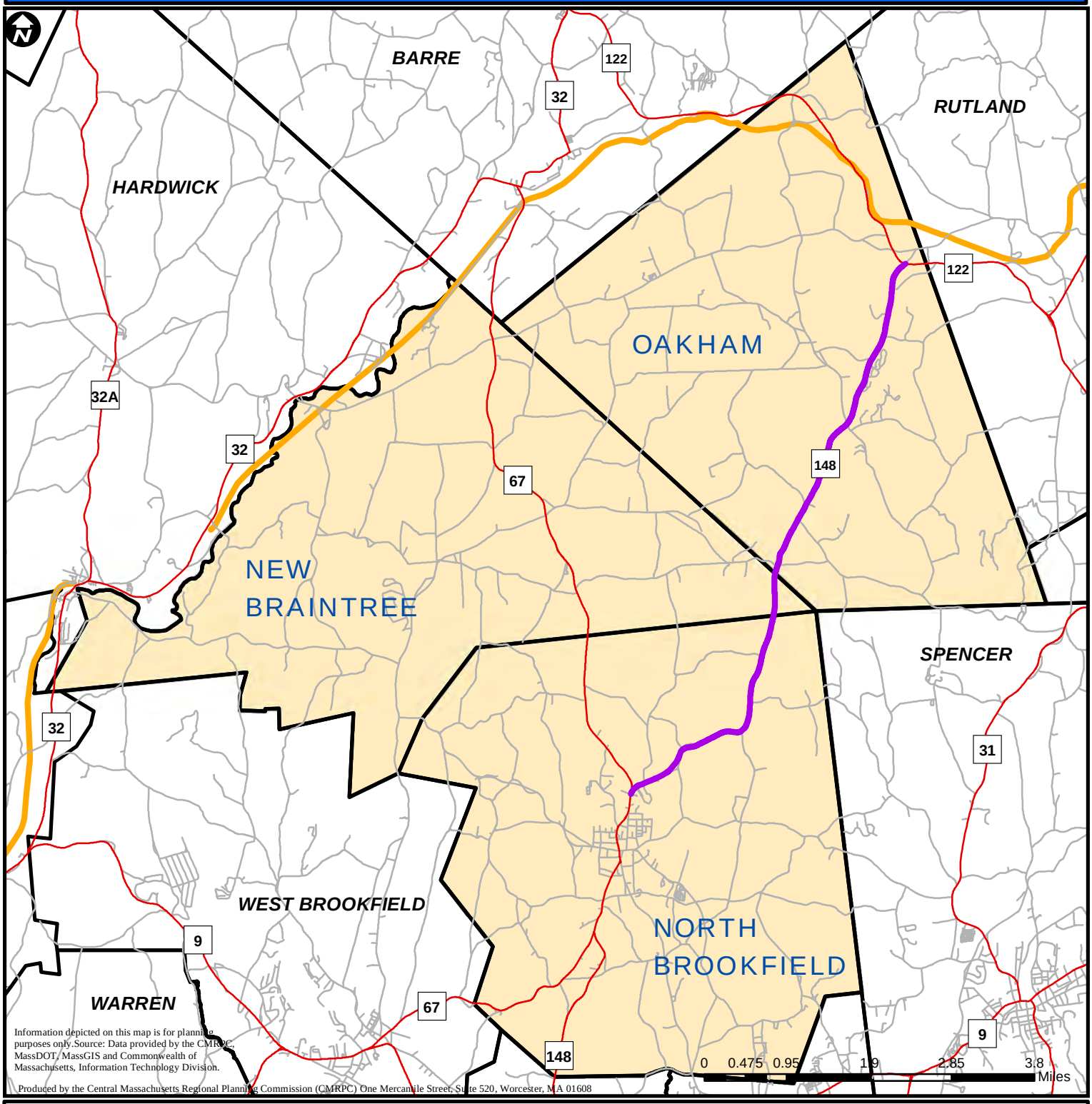

Figure 1: Corridor Profile Study Area



- Route 148 Corridor Profile
- Other Roads
- Interstate
- State Route
- US Highway
- Mass Central Rail Trail

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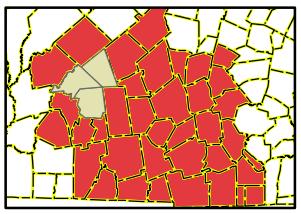

1.3 Corridor Profile Work Activities Defined in UPWP

This Corridor Profile effort has been completed as part of CMRPC's Unified Planning Work Program (UPWP). The following provides an overview of the major tasks that were included within the defined scope of the Route 148 Corridor Profile effort:

- CMRPC coordination on an entire range of Corridor Profile aspects including data collection and analysis.
- Vehicle crash analyses were completed using MassDOT-maintained vehicle crash data.
- Completion of an "Environmental Profile" for the entire Route 148 study corridor in the towns of New Braintree, North Brookfield, and Oakham. This consists of GIS-based maps featuring overlays developed by the Massachusetts Department of Conservation & Recreation (DCR), the Massachusetts Department of Environmental Protection (DEP), the National Heritage & Endangered Species Program (NHESP), and flood zones.
- Range of suggested improvement options compiled for host community consideration.
- Preparation of report document, complete with color graphics and maps, along with accompanying Appendices.
- If needed, attend meetings with host communities included in the study.

1.4 Route 148 Observations & Existing Deficiencies

The following observations and existing deficiencies, also shown in **Figure 2**, were summarized for the length of the Route 148 study corridor:

<u>Route 148/Route 67 Intersection (North Brookfield)</u>

- Vehicles turning right onto Route 148 are not required to reduce travel speeds due to the geometry of the intersection.
- Observed Level of Service (LOS) was a "B" for both AM and PM.
- There were no reported crashes at this intersection between 2020-2022.

<u>Route 148/Brooks Pond Road Intersection (North Brookfield)</u>

- Minimal vehicles entering/exiting Brooks Pond Road.
- Observed Level of Service (LOS) was a "A" for both AM and PM.
- There were no reported crashes within the three-year study period.

<u>Route 148/Robinson Road Intersection (Oakham)</u>

- Observed Level of Service (LOS) was a "A" in the AM and "B" in the PM.
- One (1) reported vehicle crash within the three-year study period.

Route 148/Ware Corner Road/Spencer Road Intersection (Oakham)

- Observed Level of Service (LOS) was a "A" in the AM and "B" in the PM.
- Ware Corner Road leads to Oakham town center.
- There were no reported crashes within the three-year study period.

Route 148/Route 122 (Oakham) Intersection

- Observed Level of Service (LOS) was a "B" for both AM and PM.
- Study location with the highest number of reported vehicle crashes with a total of four (4).

Corridor-Wide Observations & Deficiencies

- Route 148 is a two-lane highway for the entire length of the study corridor.
- Daily traffic volumes include a significant number of observed large trucks, averaging approximately 17% on Route 148.
- A total of 13 reported vehicle crashes occurred on Route 148 within the study area during the three-year period between 2020 and 2022. One (1) of the crashes resulted in a fatality.
- There are no WRTA fixed-route bus routes in the three (3) host communities. Council on Aging (COA) and Elderbus transportation options are available for the elderly.
- There are no dedicated bicycle lanes along the study corridor. Further, there are minimal or no roadway shoulders to safely ride a bicycle.
- The only existing sidewalks are located on the northbound side of Route 148 between Route 67 and the entrance to the High School in the town of North Brookfield.
- There is only one (1) crosswalk across Route 148 located at Valley View School.
- There are 13 major culverts crossing beneath the Route 148 study corridor, seven (7) in North Brookfield and six (6) in Oakham.
- Pavement was observed to be a mix of conditions along the length of the study corridor, with North Brookfield having sections of "poor" and "very poor" pavement conditions and Oakham being in "good" or "excellent" condition.

NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE

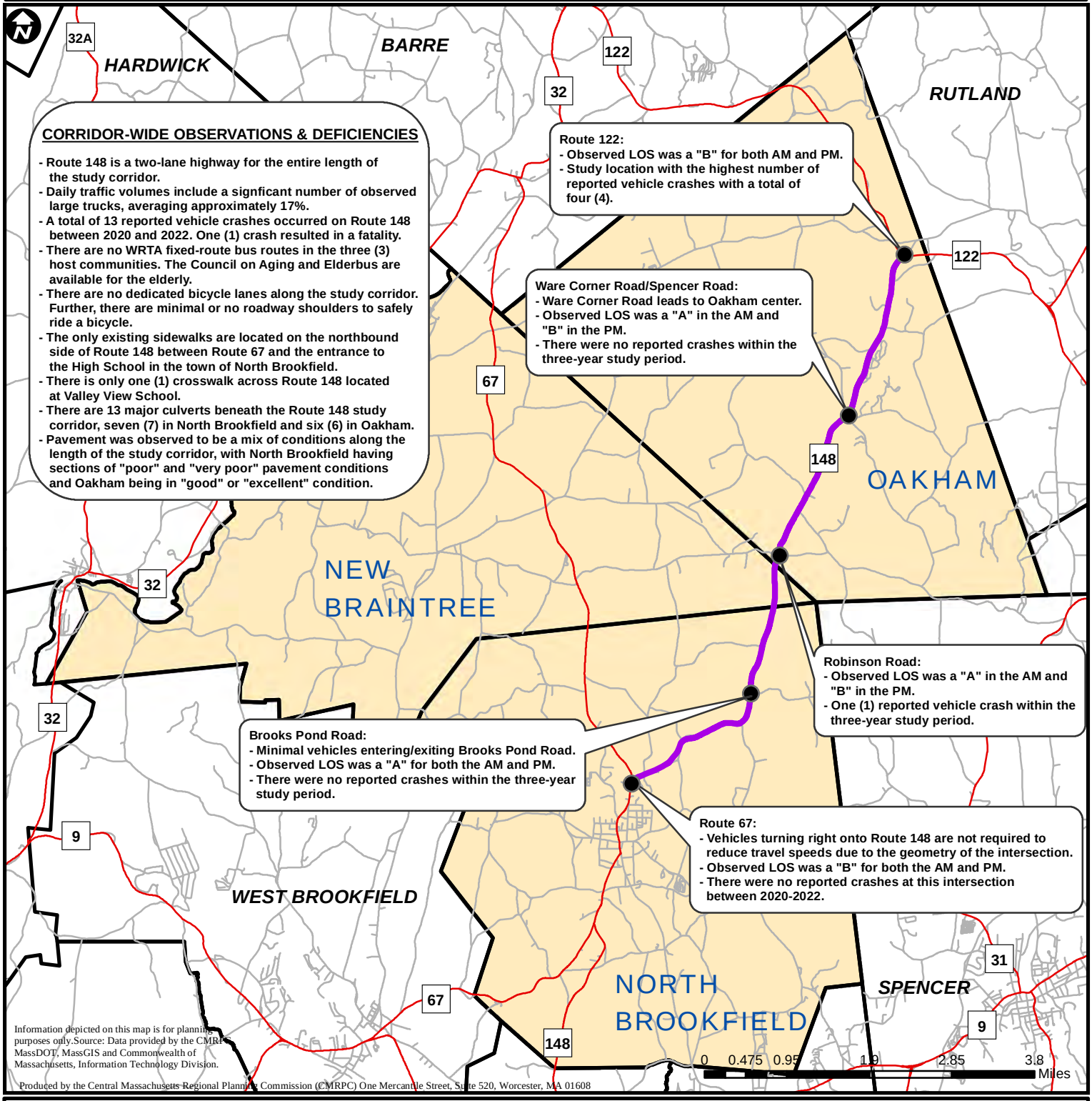

Figure 2: Observations & Deficiencies



Route 148 Corridor Profile
State Route
Other Roads
US Highway
Interstate

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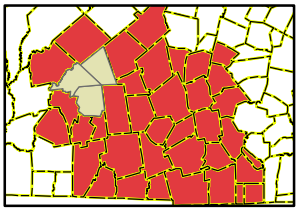


2.0 Disadvantaged Populations Overview & Analysis

This chapter gives an overview of the Route 148 study corridor in relation to disadvantaged populations and other data from the American Community Survey (ACS). As all populations should have access to the Route 148 study corridor, it is important to know which populations live along the corridor to allow for focused public outreach should any improvements be planned for implementation in the future.

2.1 Route 148 Corridor Analysis

As for the disadvantaged populations, there are six types that are part of this analysis. They are:

- **Low Income**: Annual median household income.
- **Race & Ethnicity (nonwhite)**: Percent of individuals that identify as Hispanic or Latino; Black or African American; American Indian or Alaska Native; Asian; Native Hawaiian or Other Pacific Islander; Some other race; or Two or more races and do not identify as White alone.
- **Limited English Proficiency (LEP)**: Percent of households with LEP speaking members.
- **Car Ownership (zvhh)**: Percent of households without an available vehicle.
- **Disability**: Percent of households with one or more people with a disability.
- **Age (senior)**: Percent of individuals aged 65 or older.

Using block group data, the most dominant disadvantaged populations within each Census Tract are shown in **Figure 3**. As the map shows, there is a dominant disadvantaged population of households with people with disabilities in North Brookfield near the Route 67 intersection.

NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE

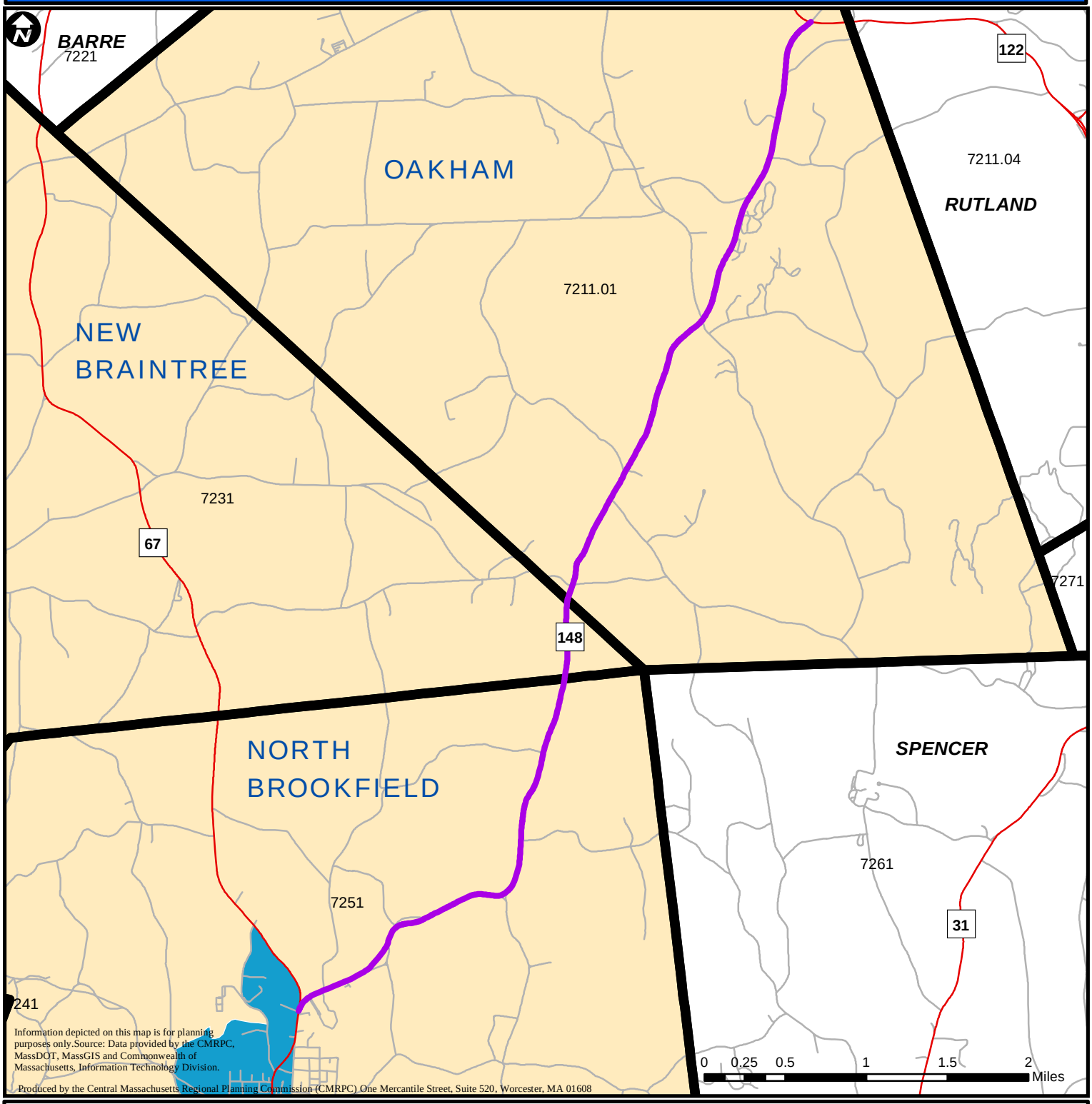
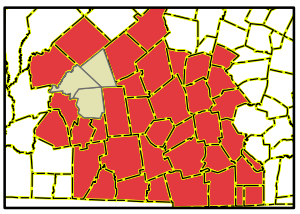


Figure 3: Disadvantaged Population Areas



- Route 148 Corridor Profile
- CENSUS2020TRACTS
- Other Roads
- Interstate
- State Route
- US Highway
- MDF: disability
- MDF: income
- MDF: lep
- MDF: nonwhite
- MDF: senior
- MDF: zvhh



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In addition to the disadvantaged population areas shown previously in **Figure 3**, the map also includes the 2020 Census Tracts. Focusing on the three Census Tracts (Oakham-7211.01, New Braintree-7231, North Brookfield-7251) that border the Route 148 study corridor, staff used available demographic data to complete an analysis. **Table 1** includes various demographics from the 2024 American Community Survey (ACS) data comparing the three Census Tracts bordering the Route 148 study corridor.

Table 1 – American Community Survey (ACS) Census Tract Demographics

Category	Census Tract 7211.01	Census Tract 7231	Census Tract 7251
Total Population	1,639	3,657	4,760
Primary Language			
English	1,490	3,450	4,455
Spanish	8	84	8
Indo/Europe	51	13	74
Asian/Pacific	0	6	1
Other	0	0	16
Commuting			
Drove Alone	74.8%	75.9%	80.7%
Carpooled	7.1%	14.2%	5.3%
Public Trans	4.4%	1.3%	0.0%
Walked	1.2%	0.3%	0.6%
Other	0.1%	0.0%	0.4%
At Home	12.4%	8.3%	13.1%
Travel Time to Work			
<10 Minutes	4.1%	11.1%	9.3%
10-14 Minutes	12.2%	12.7%	6.8%
15-19 Minutes	16.2%	9.2%	6.1%
20-24 Minutes	9.0%	3.6%	7.0%
25-29 Minutes	8.6%	6.2%	7.8%
30-34 Minutes	6.7%	11.3%	9.1%
35-44 Minutes	9.4%	10.0%	13.7%
45-59 Minutes	12.7%	24.3%	20.2%
>=60 Minutes	21.1%	11.5%	19.9%
Disability Percentage	13.7%	14.5%	17.6%
Median Age	49.0	45.9	45.2

As shown in the table, the Census Tract with the highest population is 7251, with a total of 4,760 persons. The primary language for all three Census Tracts is English, and the highest commuting type is driving alone. The working from home percentage ranges from 8.3% to 13.1%. The travel time to work data shows that the highest percentage in Census Tract 7211.01 is greater than 60 minutes, which is 21.1%. For Census Tract 7231, the highest percentage is

24.3%, which is a travel time between 45 and 59 minutes. The highest percentage in Census Tract 7251 is 20.2%, which is a travel time between 45 and 59 minutes. Disability percentages range from 13.7% to 17.6% and the median age is between 45 to 49 years.

2.2 Performance Management

The Performance Measure related to this chapter is Geographic Distribution and it is a regionally customized measure within the CMMPO. The goal of the Geographic Distribution measure is to ensure that improvements are fairly distributed among all populations, communities, and subregions.

1. **Geographic Distribution**: The first measure under Geographic Distribution is to have an equitable distribution of TIP projects within the communities and the entire planning region. Any improvement projects that result from this Corridor Profile study will contribute to this measure for the North and West subregions, which include the three host communities. It is also important that any future year roadway improvements provide benefit to all populations within the Route 148 study corridor.

   The second measure is to increase the percentage of disadvantaged populations that can access fixed route transit. As there are no WRTA fixed-route buses that presently serve the Route 148 study corridor, this measure will not be affected.

3.0 Route 148 Environs

3.1 Natural Environment

Major features of the natural environment were identified as part of the Route 148 Corridor Profile effort and were used to create Environmental Profile maps for the greater study area. Such maps are compiled to view major environmental systems beyond the focus roadway that have impacts on such concerns as drainage, water quality and wildlife migration. Notably, the entire study area is located within the Chicopee River Watershed.

The following Environmental Profile Maps produced for the Route 148 Corridor Profile study include environmental features such as open space, wetlands, impaired waters, wellhead protection areas, vernal pools, and flood zones. Wetlands are areas where water covers the soil or is present either at or near the surface of the soil all year or for varying periods of time during the year. Under the Clean Water Act, states, territories, and authorized tribes are required to develop lists of impaired waterways. These are waters that are too polluted or otherwise degraded to meet the water quality standards set by states, territories, or authorized tribes. The law requires that these jurisdictions establish priority rankings for waters on the lists and develop a Total Maximum Daily Load (TMDL) for these waters. A TMDL is the calculated limit of the maximum amount of pollutant that a waterbody can receive daily and still safely meet water quality standards. A wellhead protection area is that area of an aquifer which contributes water to a given well under the most severe pumping and recharge conditions that can be realistically anticipated. Vernal pools are small, shallow ponds characterized by lack of fish and by periods of dryness.

These maps of the Route 148 study area showing major environmental features were compiled from the following key resources:

<u>Department of Conservation and Recreation (DCR)</u>

DCR manages state parks and oversees more than 450,000 acres throughout Massachusetts. The mission of the DCR is to protect, promote and enhance the state's wealth of natural, cultural, and recreational resources. The health and happiness of people across Massachusetts depends on the accessibility and quality of our natural resources, recreational facilities, and great historic landscapes. DCR continues to improve the vital connection between people and the environment. Using DCR data, **Figure 4** includes recreation, conservation, and water supply protection areas near the Route 148 study corridor. As shown, there are two conservation areas near Route 148 in North Brookfield. In Oakham, there are nearby conservation and recreation areas as well as a large water supply protection area near the Route 122 intersection.

NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE

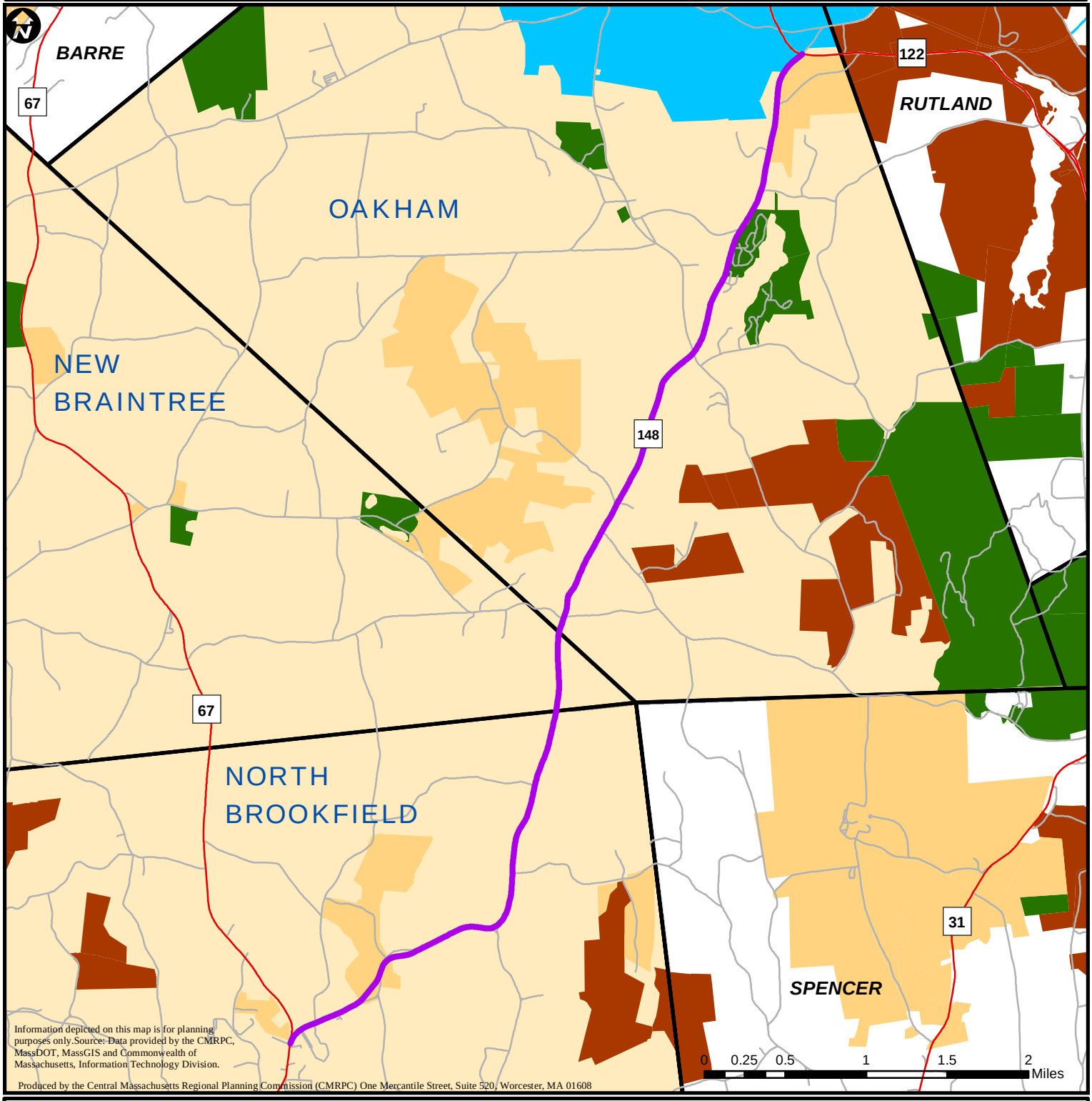

Figure 4: Open Space



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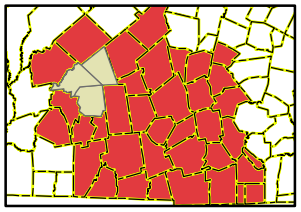
- Route 148 Corridor Profile
- Other Roads
- Interstate
- State Route
- US Highway
- Recreation/Conservation
- Conservation (Non Facility)
- Recreation (Facility Based)
- Water Supply Protection

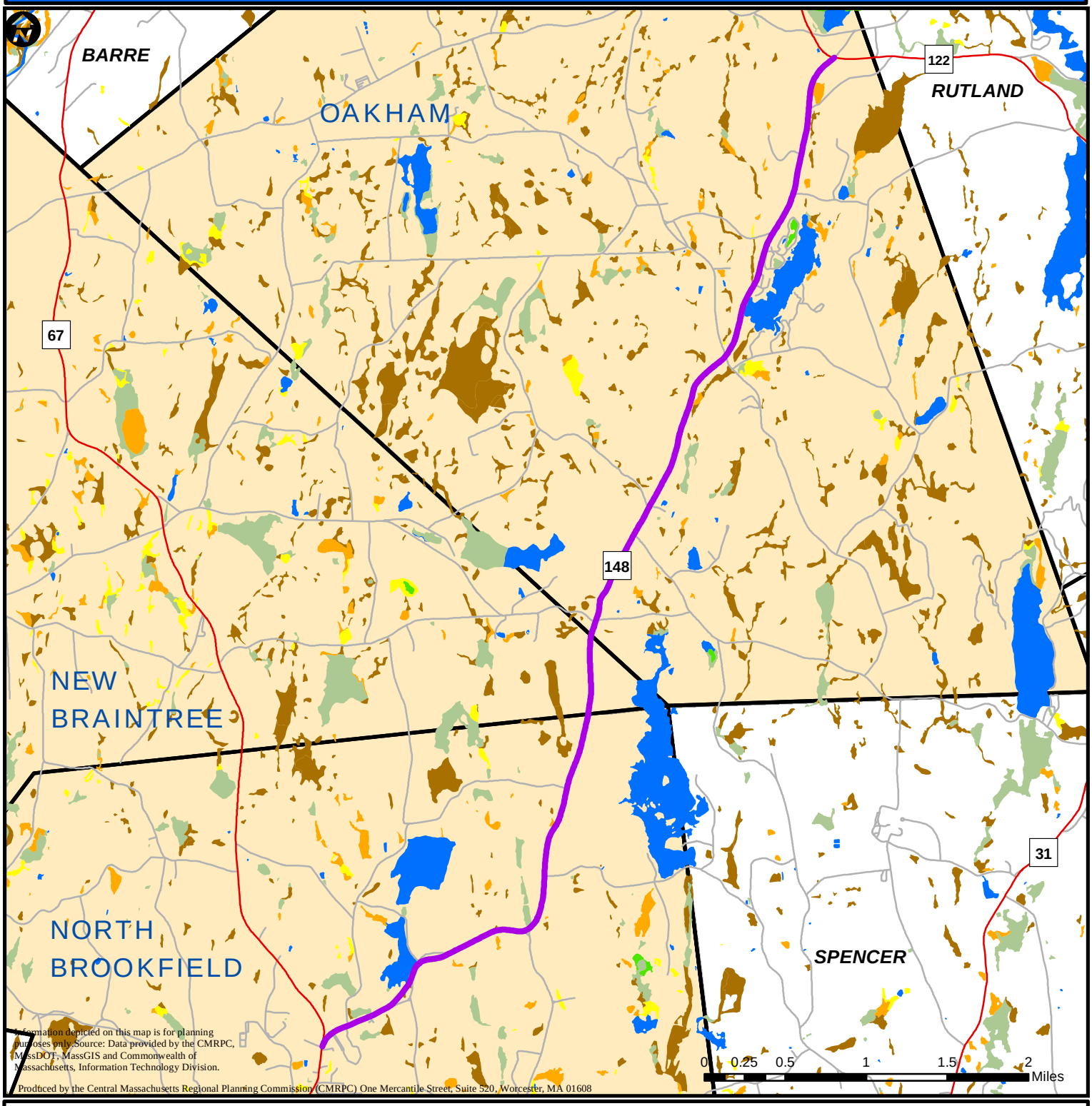


Department of Environmental Protection (DEP)

MassDEP's mission is to protect and enhance the Commonwealth's natural resources – air, water, and land – to provide for the health, safety, and welfare of all people, and to ensure a clean and safe environment for future generations. In carrying out this mission, MassDEP commits to address and advance environmental equity for all people of the Commonwealth, provides meaningful opportunities for people to participate in agency decisions that affect their lives; and ensures a workforce that reflects the communities they serve.

The types of data from DEP include wetlands, impaired waterbodies, and wellhead protection areas. As **Figure 5** shows, there are numerous types of wetlands along the entire Route 148 study corridor. **Figure 6** shows the impaired waterbodies and wellhead protection areas. As shown on the map, Doane Pond in North Brookfield requires a TMDL. Brooks Pond, also in North Brookfield, has an impairment that is not caused by pollution. In Oakham, Dean Pond also requires a TMDL. None of the host communities have wellhead protection areas near the study corridor.

NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE



Information depicted on this map is for planning purposes only. Source: Data provided by the CMRPC, MassDOT, MassGIS and Commonwealth of Massachusetts, Information Technology Division.

Produced by the Central Massachusetts Regional Planning Commission (CMRPC) One Mercantile Street, Suite 520, Worcester, MA 01608

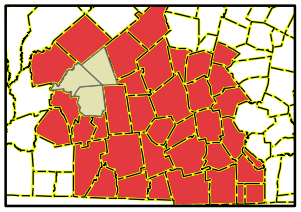
Figure 5: Wetlands



CENTRAL MASSACHUSETTS Regional Planning Commission

- Route 148 Corridor Profile
- Other Roads
- Interstate
- State Route
- US Highway

- OPEN WATER
- BOG
- DEEP MARSH
- SHALLOW MARSH
- SHRUB SWAMP
- WOODED SWAMP



NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE

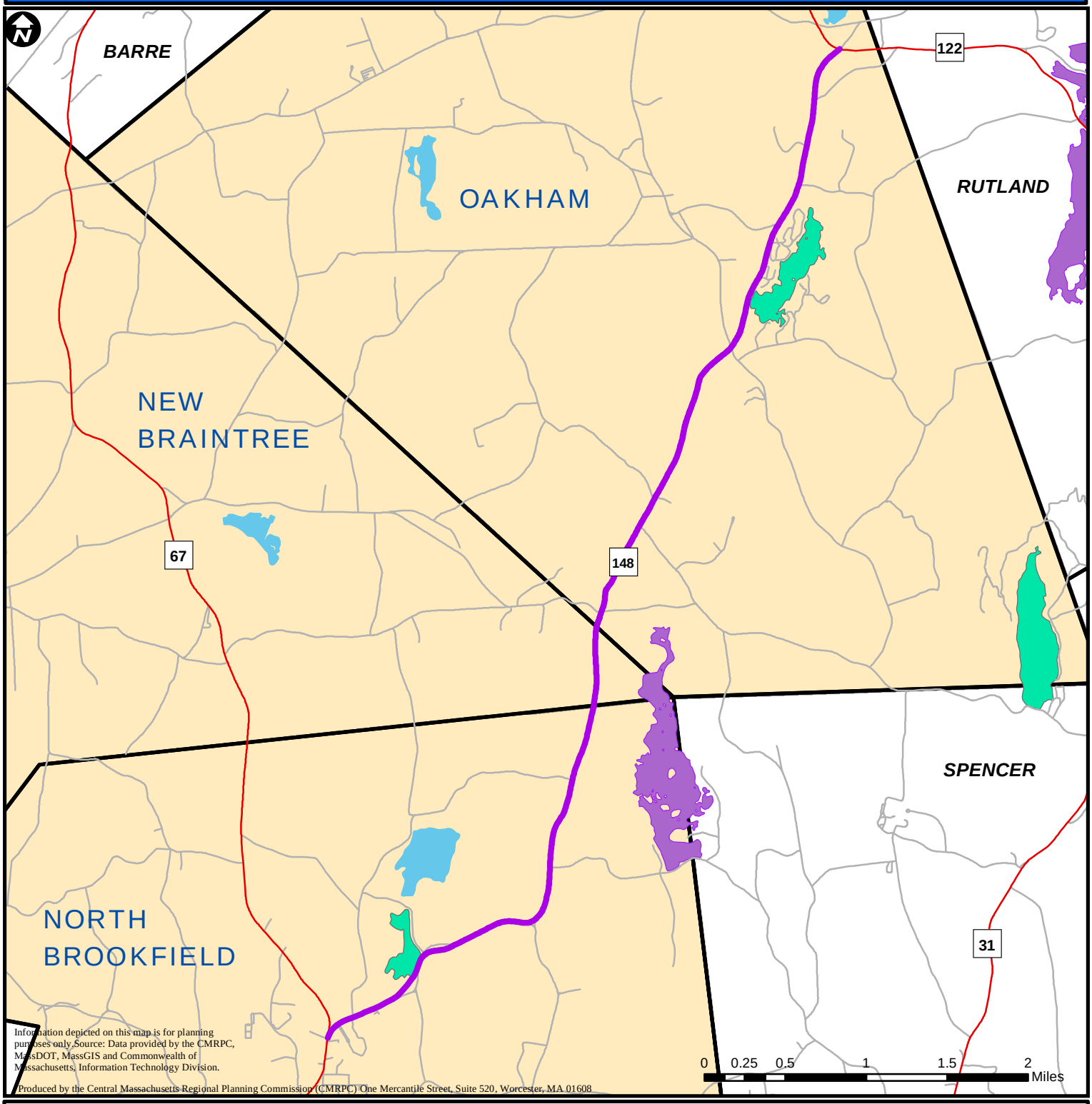
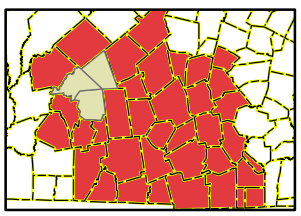


Figure 6: Impaired Waters & Wellhead Protection Areas



- Route 148 Corridor Profile
- Other Roads
- Interstate
- State Route
- US Highway
- Wellhead Protection Area
- Attaining Some Uses
- No Uses Assessed
- A TMDL is Completed
- Impairment not Caused by a Pollutant
- Waters Requiring a TMDL

CENTRAL MASSACHUSETTS Regional Planning Commission



National Heritage & Endangered Species Program (NHESP)

MassWildlife's NHESP is responsible for the conservation and protection of hundreds of species that are not hunted, fished, trapped, or commercially harvested in the state, as well as the protection of the natural communities that make up their habitats. Priority habitats of rare species can be either plants or animals. **Figure 7** includes the vernal pools and rare species habitats near the Route 148 study corridor. As the map shows, there are numerous potential vernal pools along the study corridor. There are also two habitats of rare species, one in North Brookfield and one in Oakham.

NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE

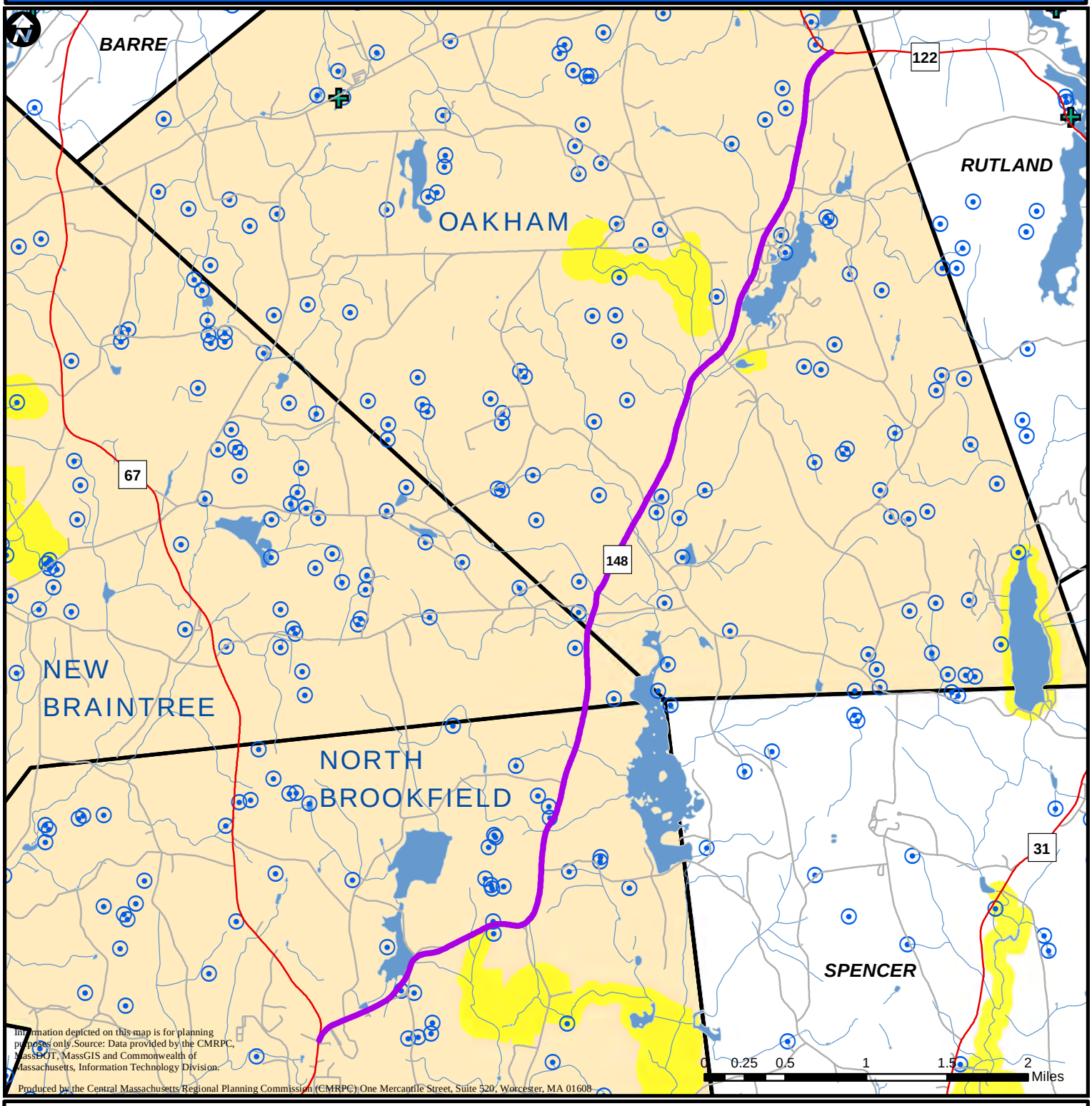
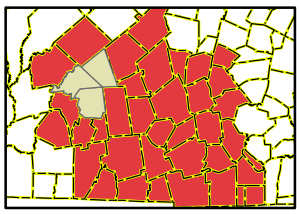


Figure 7: Vernal Pools & Rare Species Habitats



CENTRAL MASSACHUSETTS Regional Planning Commission

- Route 148 Corridor Profile
- Other Roads
- Interstate
- State Route
- US Highway
- NHESP Certified Vernal Pools
- NHESP Potential Vernal Pools
- NHESP Priority Habitats of Rare Species
- Water Bodies
- Streams



Flood Zones

Created by the Federal Emergency Management Agency (FEMA) concerning National Flood Insurance Rates, **Figure 8** shows the 100 and 500-year flood zones near the Route 148 study corridor. The 100-year flood zone means that there is a one percent annual chance of a flood within that defined area. The 500-year flood zone means that there is a 0.2 percent annual chance of a flood. The closer something is to the flooding source (e.g., river, stream, pond, etc.), the greater the risk of flooding. As such, defined flood zones are used to calculate flood insurance rates for the homes and businesses within the zones.

As the map shows, there are multiple 100-year flood zones along the Route 148 study corridor. There are also a number of 500-year flood zones in North Brookfield.

NEWBRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE

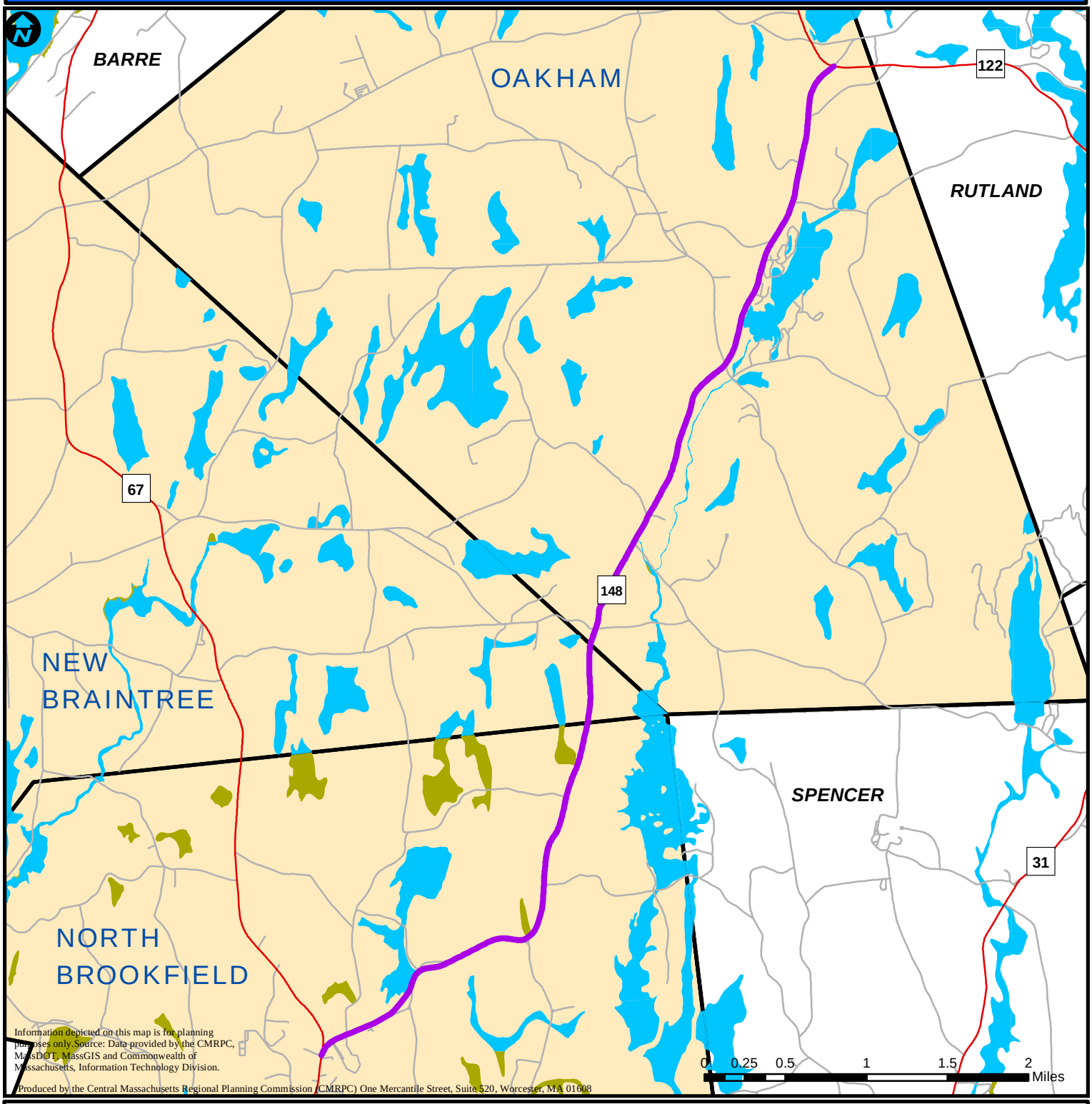
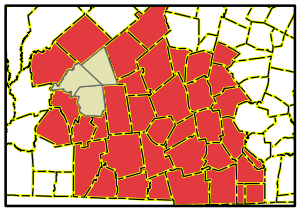


Figure 8: Flood Zones

- Route 148 Corridor Profile
- Other Roads
- Interstate
- State Route
- US Highway
- FEMA 100 Year Flood Zone
- FEMA 500 Year Flood Zone





CENTRAL MASSACHUSETTS Regional Planning Commission

3.2 Route 148 Major Drainage Structures

Major drainage structures, like culverts and small bridges, serve a vital role in the region's transportation network and ecological sustainability, providing the ability to maintain connections within watersheds, as well as protecting property and other infrastructure from floods and storm damage. In coordination with the Massachusetts Department of Environmental Restoration (MassDER) and the North Atlantic Aquatic Connectivity Collaborative (NAACC), a number of CMRPC staff have been trained to assess the condition and non-tidal aquatic passability of culverts in the region based on the established Massachusetts Stream Crossing Standards. To date, over 6,700 culverts and small bridges (both tidal and non-tidal) across the Commonwealth have been assessed through the NAACC. These assessments have been used to support many projects that restore both tidal and non-tidal aquatic connectivity while also providing resiliency benefits.

Each major drainage structure passing beneath Route 148 was identified through a GIS analysis. This mapping exercise allowed for the identification of all major stream crossings along the length of the Route 148 study area in the host communities of New Braintree, North Brookfield, and Oakham. **Figure 9** shows the location and current barrier status of each identified drainage structure. As seen in the figure, the current barrier status is provided for each culvert based on the resulting NAACC passability scores. The breakdown of these scores is shown in **Table 2**.

Table 2
NAACC Culvert Aquatic Passability Scoring

Aquatic Passability Score	Barrier Type
1.0	No Barrier
0.80 – 0.99	Insignificant Barrier
0.60 – 0.79	Minor Barrier
0.40 – 0.59	Moderate Barrier
0.20 – 0.39	Significant Barrier
0.00 – 0.19	Severe Barrier

NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE

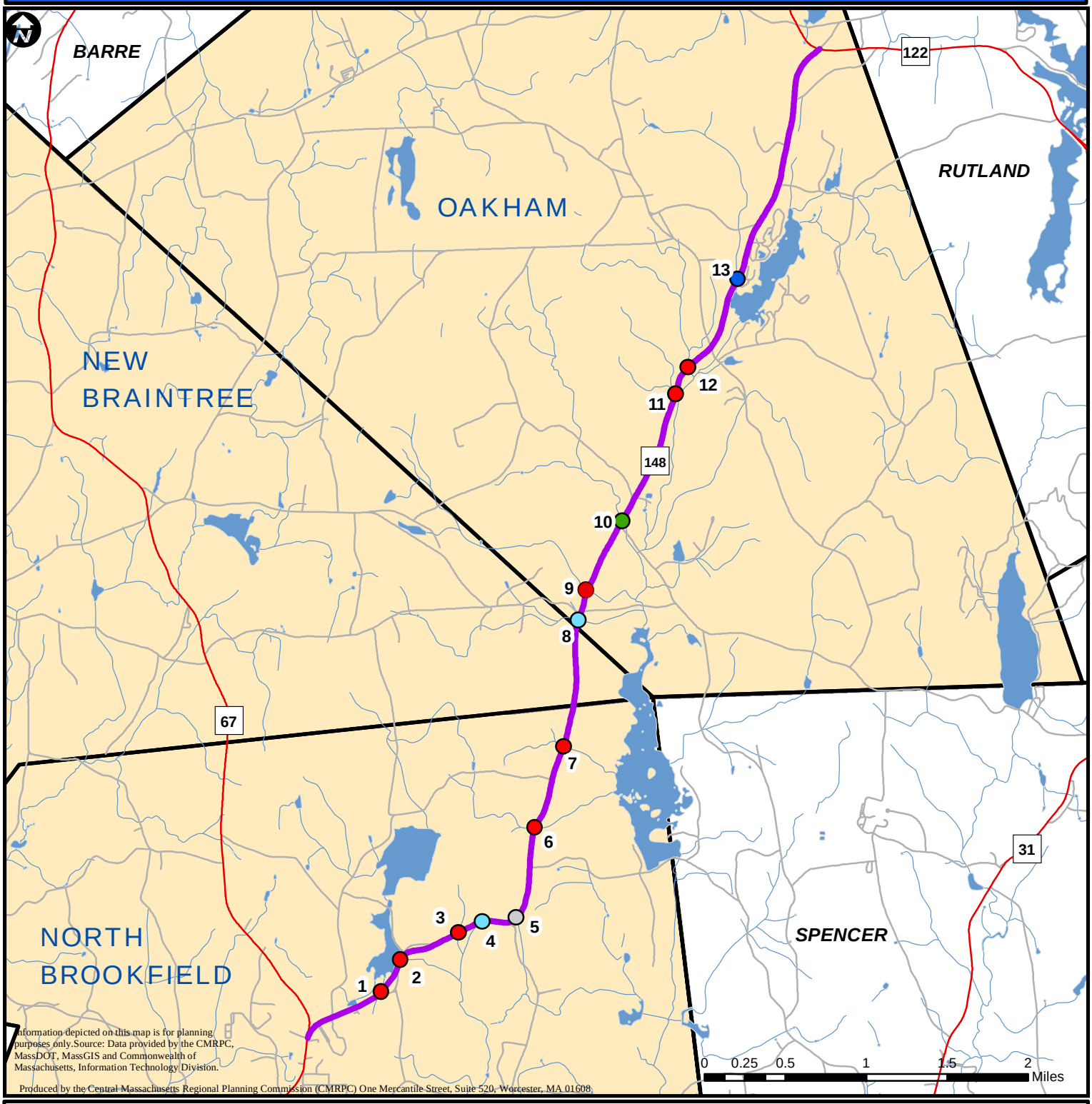
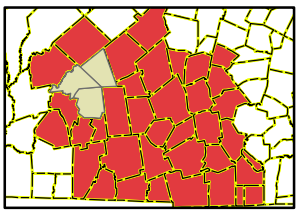


Figure 9: Major Drainage Structures



Severe barrier
Moderate barrier
Minor barrier
Insignificant barrier
no score - missing data

Route 148 Corridor Profile
Other Roads
Interstate
State Route
US Highway



CENTRAL MASSACHUSETTS Regional Planning Commission

In order to assess the 13 identified Route 148 drainage structures, staff conducted field visits and completed a NAACC Non-Tidal Aquatic Connectivity Survey Data Form for each structure. (The completed assessment forms are included in the Appendices.) **Table 3** summarizes key information for each of the major drainage structures surveyed in the field. This information includes the assigned map #, host community, structure materials, pipe diameter and length, NAACC passability score, and any additional observations.

There was a mix of observed conditions for the 13 structures along the Route 148 study corridor, but the majority exhibited a severe barrier. There are eight (8) structures (#1, #2, #3, #6, #7, #9, #11, and #12) that are considered "severe" barriers. Additionally, one (1) structure (#13) is a "moderate" barrier, two (2) structures are a "minor" barrier, one (1) structure is a "insignificant" barrier, while one (1) culvert did not have a score due to the culvert being partially inaccessible and having an incomplete assessment. All the surveyed structures were either made of concrete, metal, plastic, or stone. Following the table, **Figure 10** displays photos taken in the field of the major drainage structures assessed along Route 148.

Table 3
Route 148
Inventory of Major Drainage Structures

Assigned Map #	Host Community	Structure Materials	Approx. Pipe Size	Approx. Length	NAACC Passability Score	Additional Notes
1	North Brookfield	Stone / Concrete	1.5' x 1.5'	29'	0.093	Adjacent to Doane Pond near 39 Oakham St. The culvert itself is deteriorating .
2	North Brookfield	Concrete	3' x 3' / 8' x 4'	29'	0.007	Culvert located at Doane Pond Dam. Two culverts at this location.
3	North Brookfield	Metal	2' x 2'	45'	0.155	Culvert located at 107 Oakham Rd.
4	North Brookfield	Rock / Stone	2' x 1'	29'	0.739	Culvert located near 116 Oakham Rd.
5	North Brookfield	Metal	2' x 1'	38'	Unknown	Culvert located near 129 Oakham Rd. Culvert is partially inaccessible.
6	North Brookfield	Metal	3' x 3'	38'	0.093	Culvert located just north of 167 Oakham Rd. Lots of debris.
7	North Brookfield	Plastic	2' x 2'	33'	0.041	Culvert located between 189 & 191 Oakham Rd.
8	Oakham	Concrete / Stone	3' x 5' / 3' x 3'	45'	0.606	Culvert located at New Braintee Town Line.
9	Oakham	Concrete	3' x 3'	50'	0.079	Culvert located near 1934 North Brookfield Road.
10	Oakham	Concrete	6' x 6'	35'	0.801	Culvert located near telephone pole #26.
11	Oakham	Metal	2' x 3'	43'	0.079	Culvert located near 1246 North Brookfield Road.
12	Oakham	Plastic	4' x 4'	43'	0.186	Culvert located near 1158 North Brookfield Road / South Cemetery.
13	Oakham	Metal	3' x 4'	58'	0.518	Culvert located at 807 North Brookfield Road.

Figure 10A

New Braintree/North Brookfield/Oakham
Route 148 Major Drainage Structures Photos



Culvert #1 – Inlet Side



Culvert #2 – Outlet Side



Culvert #3 –Outlet Side



Culvert #4 – Outlet Side

Figure 10B

New Braintree/North Brookfield/Oakham
Route 148 Major Drainage Structures Photos



Culvert #5 – Outlet Side



Culvert #6 – Outlet Side



Culvert #7 –Outlet Side



Culvert #8 – Inlet Side

Figure 10C

New Braintree/North Brookfield/Oakham
Route 148 Major Drainage Structures Photos



Culvert #9 – Outlet Side



Culvert #10 – Inlet Side



Culvert #11 –Outlet Side



Culvert #12 – Outlet Side



Culvert #13 – Inlet Side

Based on the observations made in the field, the following provides a concise listing of specific maintenance and suggested improvement options that target the inspected and assessed Route 148 drainage structures:

- Regularly inspect & clean.
- Clear trash, vegetation, branches and other blockages.
- Inspect for adverse wildlife activity, ex. animal nests, beaver dams.
- As appropriate, maintain passage for both aquatic & land animals.
- Install safety fencing where needed.
- As necessary, institute a planned, prioritized reconstruction and replacement program.
- Consider assessing *all* town-owned culverts in each of the three host communities using the NAACC Non-Tidal Aquatic Connectivity protocol to determine their aquatic passability and condition.

For culverts located along Route 148 in New Braintree, North Brookfield, and Oakham, the Massachusetts Division of Ecological Restoration (MassDER) has a Culvert Replacement Municipal Assistance Grant Program to replace undersized, perched, and/or degraded culverts located in areas of high ecological value. Information about this program can be found on the MassDER Website. Historically, individual awards have ranged from $25,000 to $400,000, however DER is investigating ways to increase award sizes in the future. Eligible projects must be a culvert or bridge replacement along a public way, owned and maintained by the applying municipality, and must cross a natural freshwater, non-tidal river or stream channel. The stream channel may be either intermittent, or perennial and the project must meet the established Massachusetts Stream Crossing Standards.

3.3 Performance Management

The regional Performance Measure of Stormwater Management & Resiliency pertains to this chapter. The goal is to create a transportation network that is resilient to the impact of stormwater. For any new CMMPO Transportation Improvement Program (TIP) projects, it is important to consider the use of Green Infrastructure or Nature-Based Solutions to help manage stormwater. Also, older culverts should be upgraded to new, modern structures that can adequately handle the heavy water flows from stronger storms with increasing frequency. A higher priority should be given to areas that are within a 100 or 500-year flood zone. By effectively applying such best-practice approaches, the goal of a stormwater resilient transportation network in the planning region is obtainable.

4.0 Congestion Management Process (CMP)

Congestion management is the application of strategies to improve transportation system performance and reliability by reducing the adverse impacts of congestion on the movement of people and goods. A Congestion Management Process (CMP) is a systematic and regionally accepted approach for managing congestion that provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meet both state and local needs. The CMP is intended to progress these congestion management strategies into both the project funding and implementation stages.

The CMP, as defined in federal regulation, is intended to serve as a systematic process that provides for safe and effective integrated management and operation of the multimodal transportation system. The process includes:

- Development of congestion management objectives.
- Establishment of measures of multimodal transportation system performance.
- Collection of data and system performance monitoring to define the extent and duration of congestion and determine the causes of congestion.
- Identification of congestion management strategies.
- Implementation activities, including identification of an implementation schedule and possible funding sources for each strategy.
- Evaluation of the effectiveness of implemented strategies.

The Congestion Management System (CMS) was first introduced by the **Intermodal Surface Transportation Efficiency Act** (ISTEA) of 1991 and continued under the successor law, the **Transportation Equity Act for the 21st Century** (TEA-21). The CMS was intended to augment and support effective decision making as part of the overall metropolitan planning process. In 2006, the **Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users** (SAFETEA-LU) called for the CMS to evolve into a Congestion Management Process (CMP), with a greater focus on the implementation of operational improvements to the highway system to mitigate congestion. In 2012, the **Moving Ahead for Progress in the 21st Century Act** (MAP-21) called for the continuation of the CMP program while also requiring a transition to performance-based planning. This was reaffirmed by 2015's successor national legislation **Fixing America's Surface Transportation** (FAST) **Act**. Presently, the CMP continues as reflected in the requirements of the 2021 **Infrastructure Investment & Jobs Act** (IIJA).

4.1 Daily Traffic Volumes

Figure 11 shows locations along Route 148 in the host communities of New Braintree, North Brookfield, and Oakham where CMRPC placed Automatic Traffic Recorders (ATRs) to determine the daily volume of traffic. Counts were completed in June 2026. The ATRs were installed

along Route 148 and left in place for at least 48 hours. There were three (3) count locations completed for this Corridor Profile. **Table 4** shows traffic volume count results from each of the Route 148 ATR locations. As the data shows, the highest traffic volumes are just north of Route 67 in North Brookfield and just south of Route 122 in Oakham. The lowest volumes observed on Route 148 are near the New Braintree town line.

Table 4
Route 148 Daily Traffic Volumes

ATR Location	Date	Volume*
Route 148 north of Route 67	6/9/2026	2,248
Route 148 at New Braintree TL	6/25/2026	1,644
Route 148 south of Route 122	6/24/2026	2,374

*Vehicles Per Day (VPD)

NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE

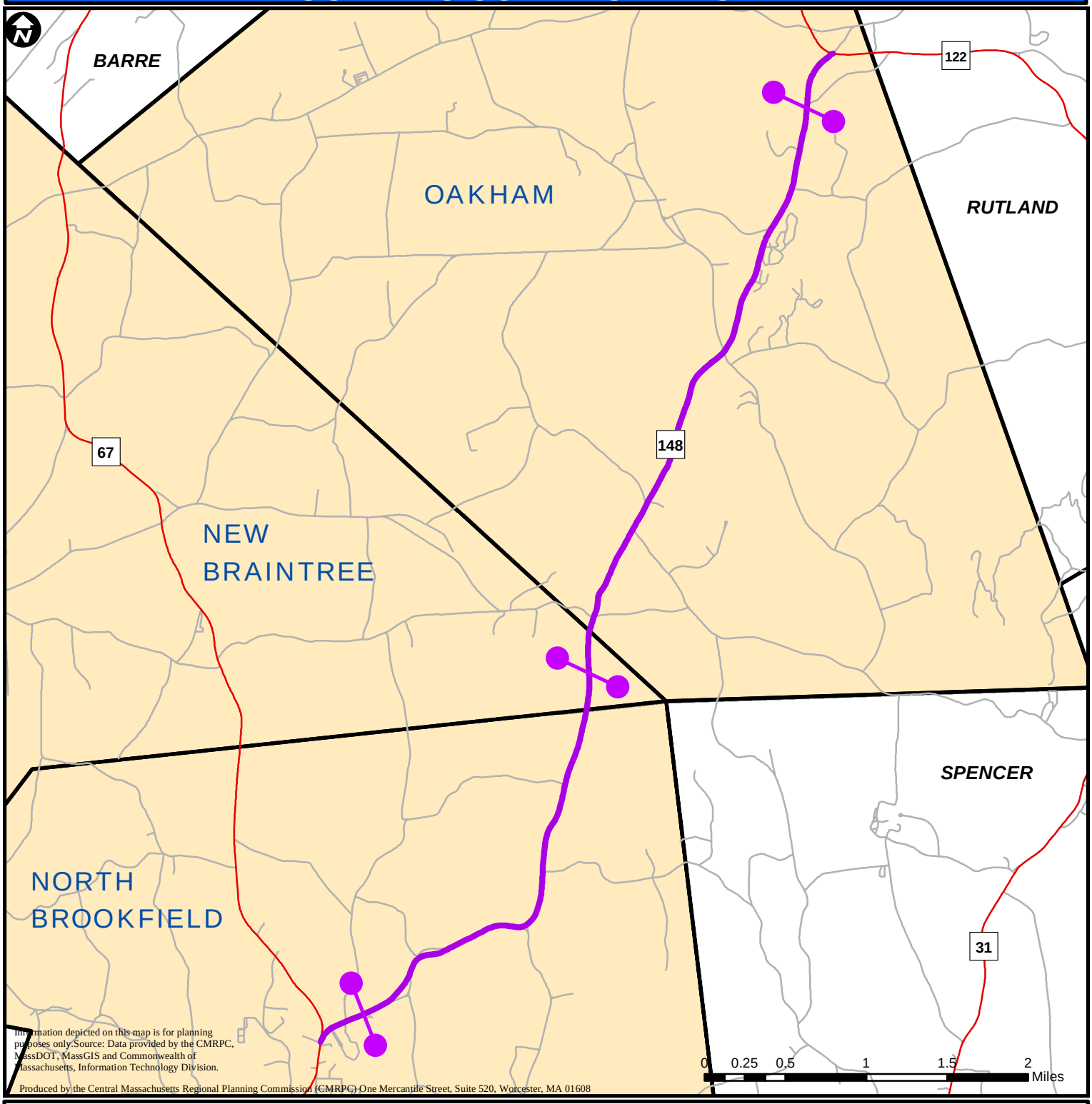
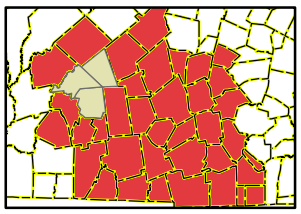


Figure 11: Traffic Count Locations



CENTRAL MASSACHUSETTS Regional Planning Commission

- Route 148 Corridor Profile
- Other Roads
- Interstate
- State Route
- US Highway
- ATR Locations



4.2 Route 148 Travel Time and Delay Study

CMRPC staff conducted a travel time and delay study for this Corridor Profile effort. The travel time data was collected using a Global Positioning System (GPS) unit. The study occurred between 7:00 AM – 9:00 AM and 4:00 PM – 6:00 PM. After the field data was collected, it was downloaded into the *TravTime* software (developed by Geo Stats) to analyze the data. As indicated in **Table 5**, it takes between 11 and 12 minutes to travel the length of the Route 148 study corridor during both the AM and PM peak periods. The "Congested Time" shown in the table is when observed vehicle speeds are either below 20 MPH or 60% of the posted speed limit. The posted speed limit for the corridor ranges between 30 MPH and 40 MPH. There are also two 20 MPH school zones in the host community of North Brookfield. As the data shows, congested time is minimal along the study corridor.

Table 5
Route 148 Travel Time and Delay Study Results

Peak Period	Direction	Study Year	Distance	Travel Time (average minutes)	Average Travel Speed	Congested Time (average minutes)
AM	Northbound	2026	7.36 miles	12.1	36 mph	0.1
AM	Southbound	2026	7.36 miles	11.7	37 mph	0.4
PM	Northbound	2026	7.36 miles	12.0	37 mph	0.2
PM	Southbound	2026	7.36 miles	11.1	39 mph	0.2

Figures 12 and 13 show average Route 148 travel speeds for each section of the study corridor obtained from the travel time and delay study completed in May 2026. According to the previous table, the average travel speed for the study corridor is between 36 MPH and 39 MPH. Staff established six (6) checkpoints so as to divide the Route 148 corridor into five (5) study segments. The following maps show the average travel speeds observed in both directions of travel for each defined segment. During the travel time study, observed vehicle speeds and travel times were very consistent for the entirety of both data collection periods.

NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE

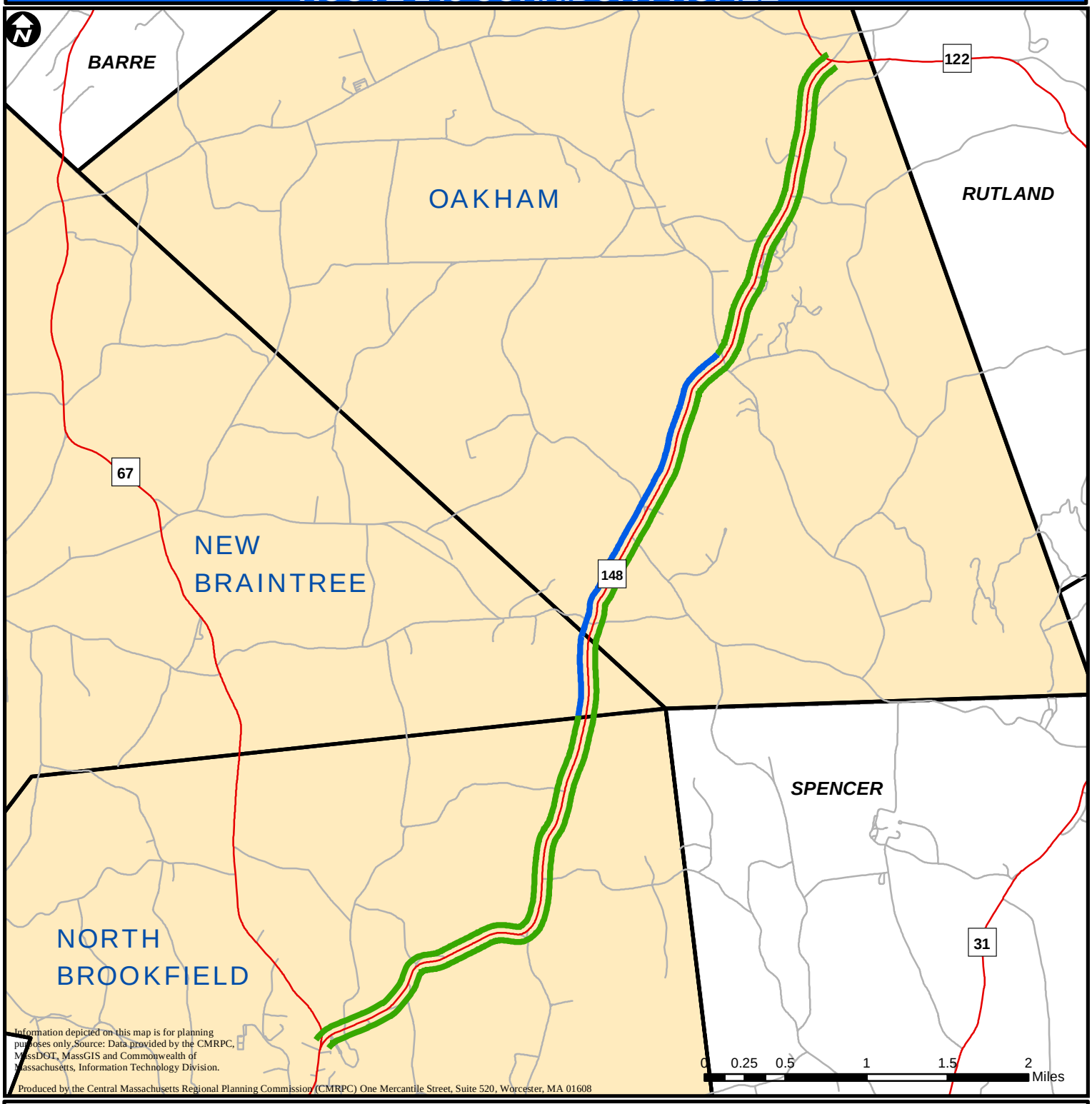


Figure 12: AM Peak Period Average Travel Speeds

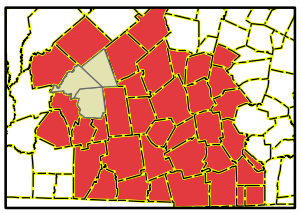


CENTRAL MASSACHUSETTS Regional Planning Commission

Average Travel Speed

- 30-39 mph
- 40-49 mph

- Other Roads
- Interstate
- State Route
- US Highway



NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE

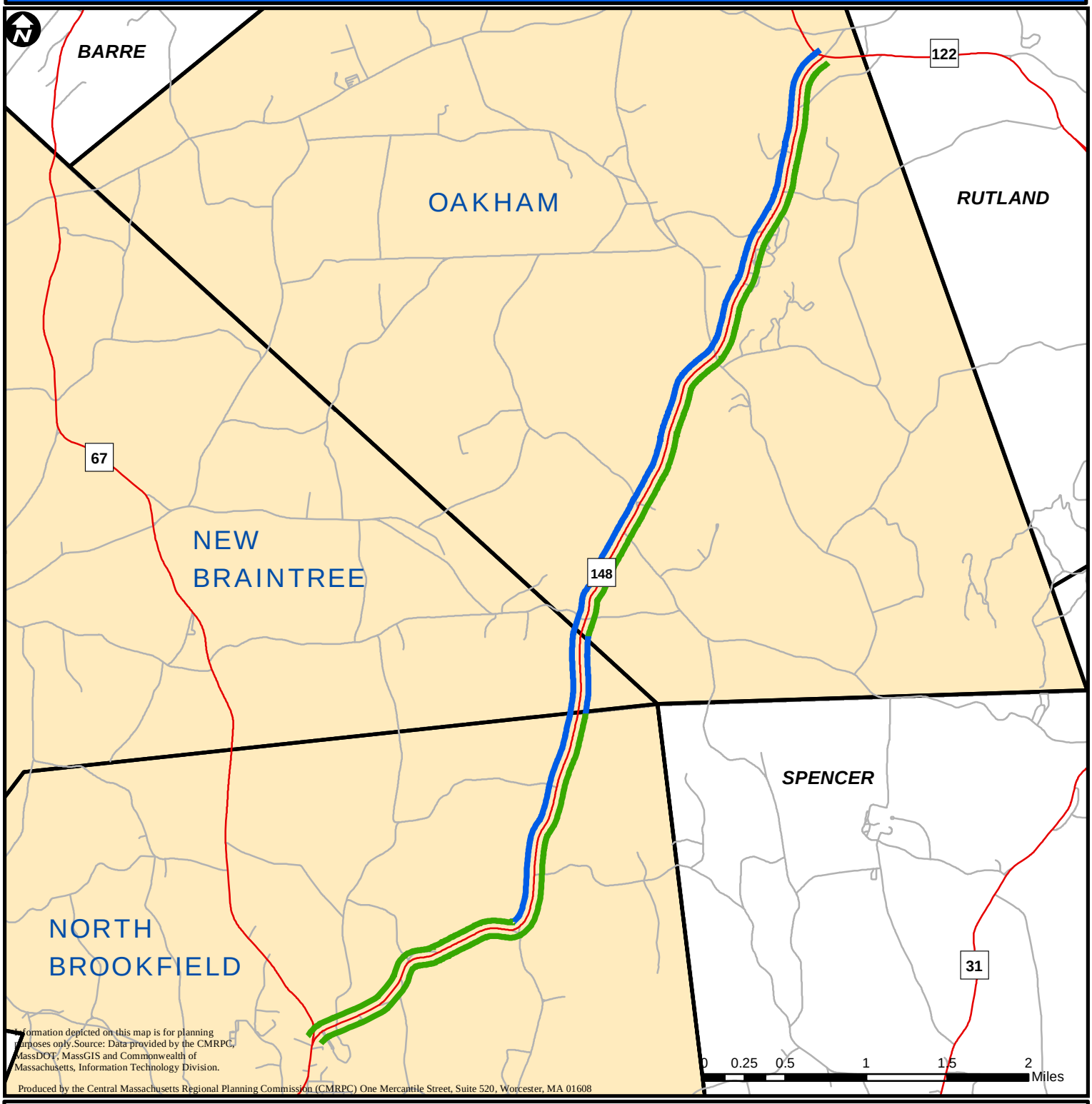


Figure 13: PM Peak Period Average Travel Speeds

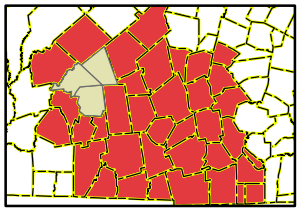


Average Travel Speed

- 30-39 mph
- 40-49 mph

- Other Roads
- Interstate
- State Route
- US Highway

CENTRAL MASSACHUSETTS Regional Planning Commission



4.3 Route 148 Intersections Existing Peak Hour Traffic Volumes & Level of Service (LOS) Analyses

CMRPC staff conducted Turning Movement Counts (TMCs) at five (5) focus intersections for the Route 148 Corridor Profile effort. All counts were completed in 2026 during peak travel months while local schools were in session. When displaying these observed counts as a network, a "balancing" exercise is conducted, if needed, to account for the typical addition and loss of traffic between adjacent study intersections (due to local streets, site drives serving major land uses, and other private driveways) as well as expected statistical variations encountered when TMCs are conducted on different weekdays. The observed turning volumes are shown in **Figure 14** and **Figure 15**, respectively, for existing AM and PM peak hour traffic flows. (All TMC datasheets are provided in the document's Appendices).

NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE

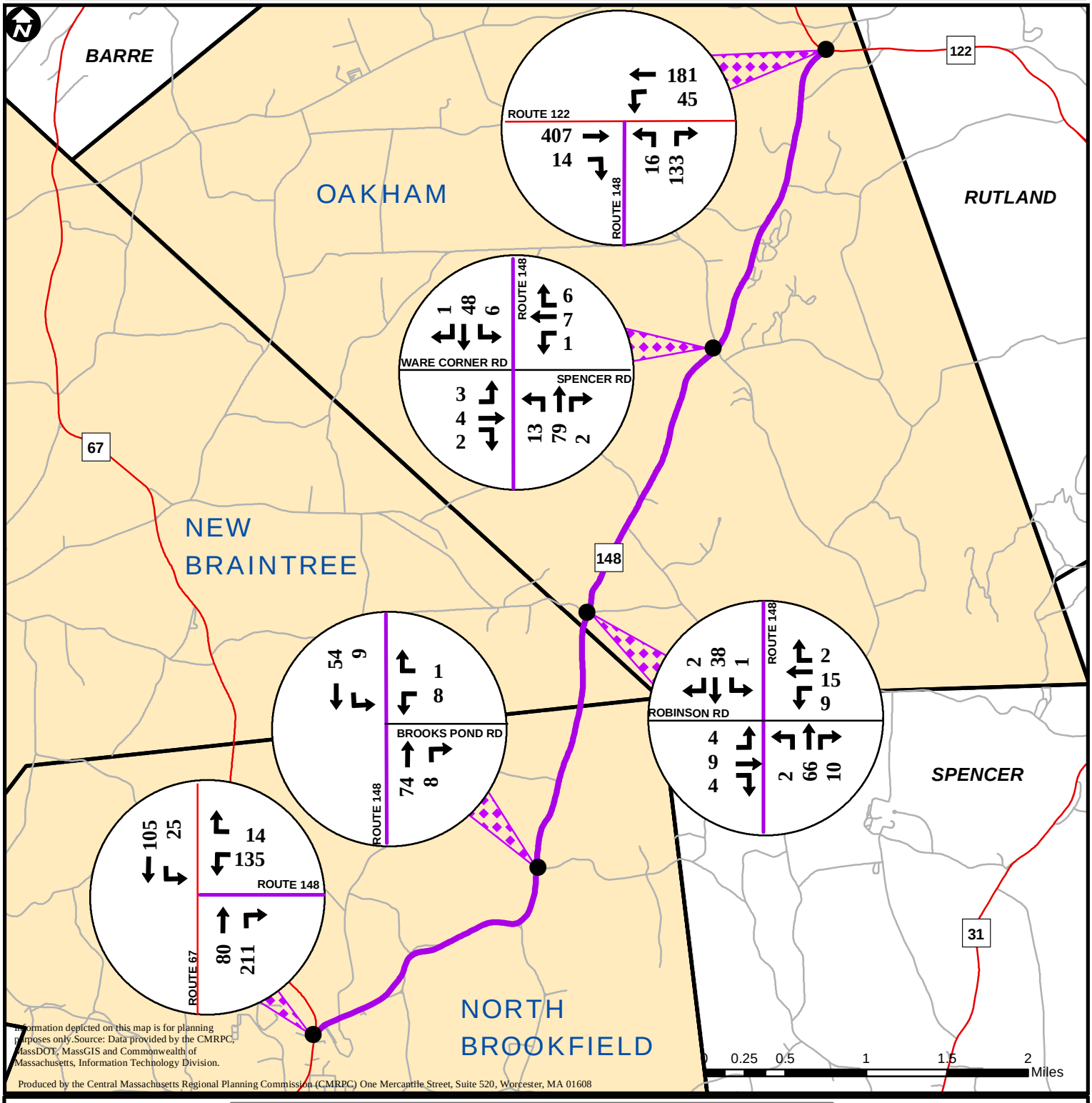
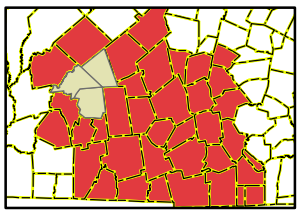


Figure 14: AM Peak Hour Existing Traffic Flows

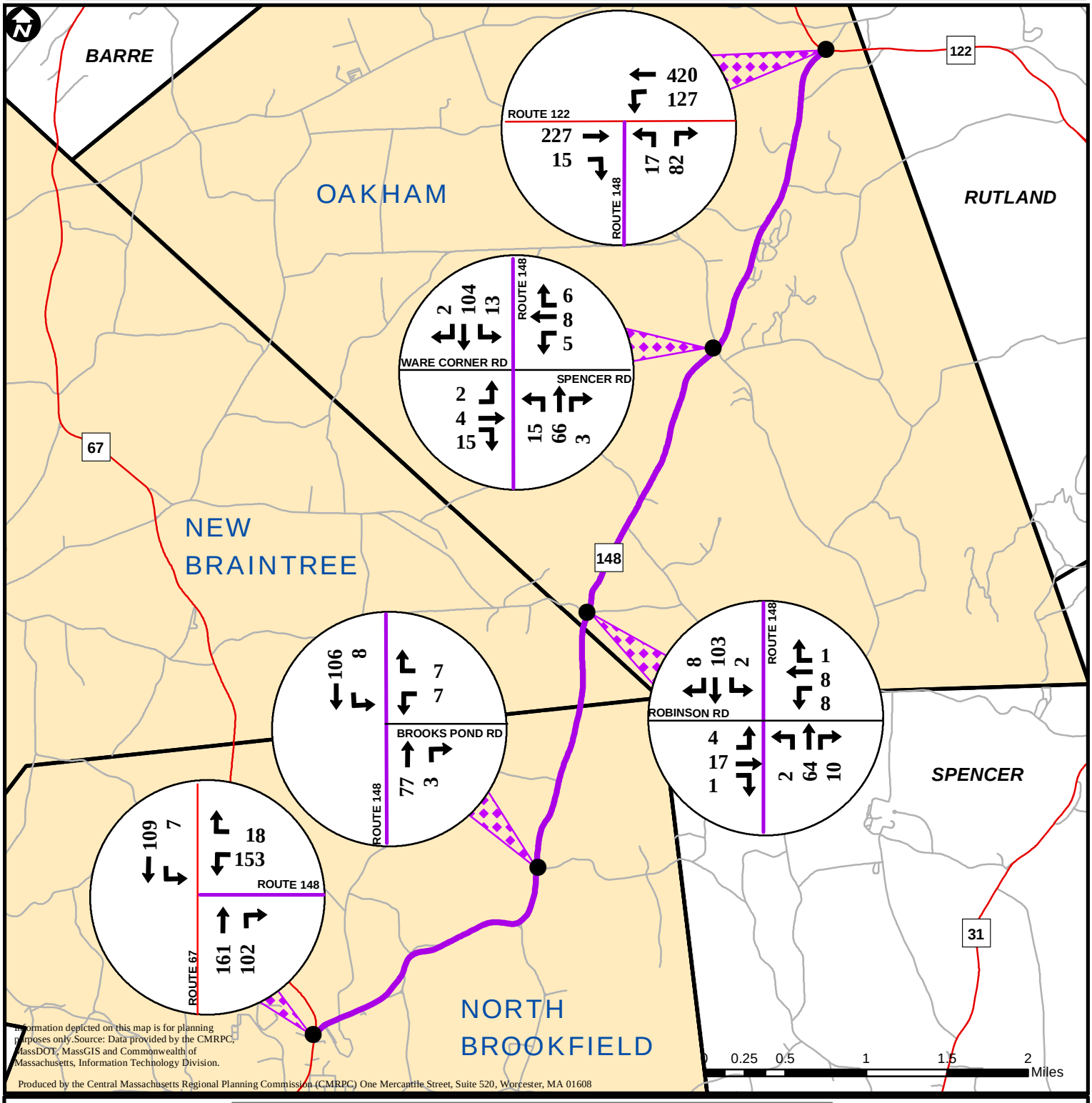


CENTRAL MASSACHUSETTS Regional Planning Commission

- Route 148 Corridor Profile
- Other Roads
- Interstate
- State Route
- US Highway



NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE



Information depicted on this map is for planning purposes only.Source: Data provided by the CMRPC, MassDOT, MassGIS and Commonwealth of Massachusetts, Information Technology Division.

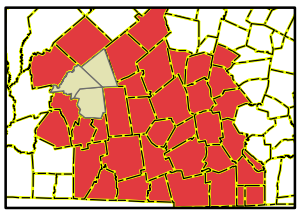
Produced by the Central Massachusetts Regional Planning Commission (CMRPC) One Mercantile Street, Suite 520, Worcester, MA 01608

Figure 15: PM Peak Hour Existing Traffic Flows



CENTRAL MASSACHUSETTS Regional Planning Commission

- Route 148 Corridor Profile
- Other Roads
- Interstate
- State Route
- US Highway



Existing Peak Hour Level of Service (LOS) Analyses

Using the existing observed traffic volumes on Route 148, a Level of Service (LOS) grade was calculated for each focus intersection. The LOS is calculated through the *Highway Capacity Software (HCS)*. The software calculates the amount of delay (in seconds) for each approach and the entire intersection. Using the estimated length of delay in seconds, a LOS grade between "A" and "F" is assigned. LOS "A" is indicative of free flow conditions while LOS "F" indicates highly congested conditions. All five (5) focus intersections are under "Stop" sign control and the delay and LOS are for the minor street approaches. **Table 6** lists the existing LOS for each Route 148 focus intersection. (The detailed LOS worksheets are provided in the document's Appendices). Based on the calculated results, the following notable trends were observed:

- There are five (5) focus intersections included in the scope of the Route 148 Corridor Profile.
- The intersections with both Route 67 and Route 122 have the lengthiest delays in the AM and PM peak periods. Even though these intersections exhibit the longest delays, both intersections have a LOS of "B" and operate very well with minimal congestion.
- The remainder of the focus intersections operate at a LOS of "A" or "B" during both the AM and PM peak travel periods.

Table 6
Route 148 Focus Intersections Existing LOS Summary

Host Community	Route 148 Intersection	Intersection Level of Service Analysis Results					
		AM			PM		
		V/C*	Delay**	LOS	V/C*	Delay**	LOS
Unsignalized* **							
North Brookfield	Route 148 / Route 67	0.32	13.8	B	0.25	11.6	B
	Route 148 / Brooks Pond Rd	0.01	9.4	A	0.02	9.3	A
Oakham	Route 148 / Robinson Rd	0.04	9.7	A	0.04	10.3	B
	Route 148 / Ware Corner Rd / Spencer Rd	0.01	9.8	A	0.03	10.2	B
	Route 148 / Route 122	0.29	14.0	B	0.19	13.0	B

*V(volume)/C(capacity) is for worst lane group; C is maximum flow under prevailing conditions
**Delay in seconds
***Stop Sign delay and LOS are for minor street approaches

4.4 Percentage of Heavy Vehicles Utilizing Route 148 Focus Intersections

According to the Highway Capacity Manual (HCM), heavy vehicles are vehicles that have more than four tires touching the pavement. Trucks, buses, and recreational vehicles (RVs) are the three primary groups of heavy vehicles. Heavy vehicles have the potential to adversely affect traffic flows in two ways: 1) they are larger than passenger cars and occupy more roadway space and 2) they have inferior operating capabilities when compared to passenger cars, particularly with respect to acceleration, deceleration, and the ability to maintain speed on upgrades.

Table 7 lists the percentage of heavy vehicles that were observed at each of the five (5) study intersections. Route 148 focus intersections average 4.1% in the morning peak hour and 2.3% during the evening peak hour. In the AM, the highest heavy vehicle percentage observed was at Brooks Pond Road with 7.1% while the lowest was at Robinson Road with 0.6%. In the PM, the highest percentages were observed at Robinson Road with 3.1% and the lowest were at Route 67 with 1.4%. Further, staff observed in the field that school buses accounted for some of the heavy vehicle traffic, especially in the AM.

It should be noted that the heavy vehicle percentages shown in the table were observed on one random weekday. The percentages are, by nature, subject to variation due to sample size and temporary or permanent local conditions as well as other factors, such as the prevailing

weather. As such, the figures in the table should be used only as a general indicator of trends and conditions, as opposed to absolute statements of prevailing circumstance.

Table 7

Percentage of Heavy Vehicles Utilizing Route 148 Focus Intersections

Study Intersection	Date of Count	Morning Peak Hour %	Evening Peak Hour %
Route 148/Route 67	May 2026	4.7%	1.4%
Route 148/Brooks Pond Road	May 2026	7.1%	1.9%
Route 148/Robinson Road	May 2026	0.6%	3.1%
Route 148/Ware Corner Rd/Spencer Rd	May 2026	1.2%	2.5%
Route 148/Route 122	May 2026	6.7%	2.5%
Peak Hour Averages:		**4.1%**	**2.3%**

4.5 Route 148 Intersections Projected 2036 Peak Hour Traffic Volumes & Level of Service (LOS) Analyses

As this is a planning document, meant to be used to suggest and assist in the design of improvements that may not be built or implemented for several years, it is typical to estimate or "project" future traffic conditions in the study area. Transportation changes and solutions are rarely made instantly, and pertinent area circumstances can change. As such, this is an attempt to modify current levels of traffic volume to reflect what might be anticipated in ten (10) years – reasonable lead time for planning purposes.

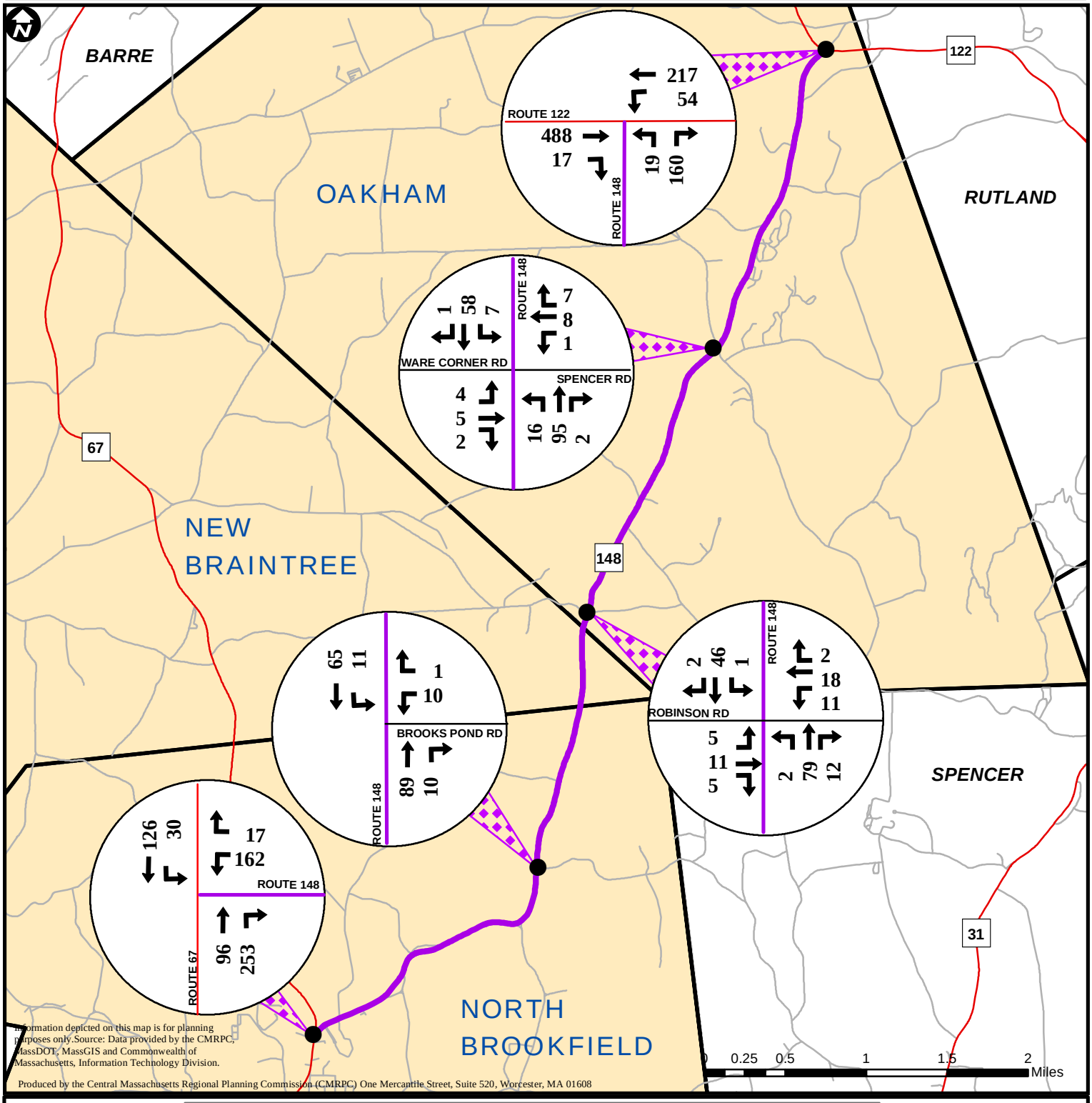
Regional Travel Demand Forecast Model

The Regional Travel Demand Forecast Model is an advanced computer simulation of the region's network of major highways and other modal networks, such as fixed route transit, that is maintained by the CMRPC transportation staff. It considers the greater region's population, housing stock, and employment. For this Corridor Profile effort, anticipated overall growth in traffic volumes was estimated by the Model and used by staff to analyze potential future year conditions.

The study looks ten years into the future by estimating year 2036 projected traffic increases. This allows for an assessment of potential future year operational conditions and, if necessary, the suggestion of possible improvement options for host community consideration. The Model currently projects approximately 2.0% per year growth in traffic volumes over the next decade in the general Route 148 study area of the planning region. This annual growth results in about an overall 20% increase of Route 148 traffic volumes over the 10-year period between 2026 and 2036. This percentage increase, meant to account for both known and unknown growth, was applied to the existing observed traffic flows in order to assess potential future year operational conditions.

The resulting 2036 traffic flow networks for the AM and PM peak hours were then analyzed to characterize likely future operating conditions. **Figure 16** and **Figure 17** illustrate the 10-year projection of existing traffic volumes by applying the growth rate of 2.0% per year for the entire length of the Route 148 study corridor in New Braintree, North Brookfield, and Oakham.

NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE



Information depicted on this map is for planning purposes only.Source: Data provided by the CMRPC, MassDOT, MassGIS and Commonwealth of Massachusetts, Information Technology Division.

Produced by the Central Massachusetts Regional Planning Commission (CMRPC) One Mercantile Street, Suite 520, Worcester, MA 01608

Figure 16: AM Peak Hour Projected 2036 Traffic Flows



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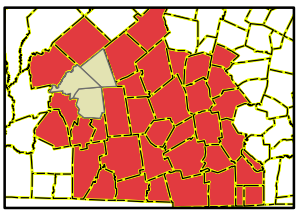
- Route 148 Corridor Profile
- Other Roads
- Interstate
- State Route
- US Highway



NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE

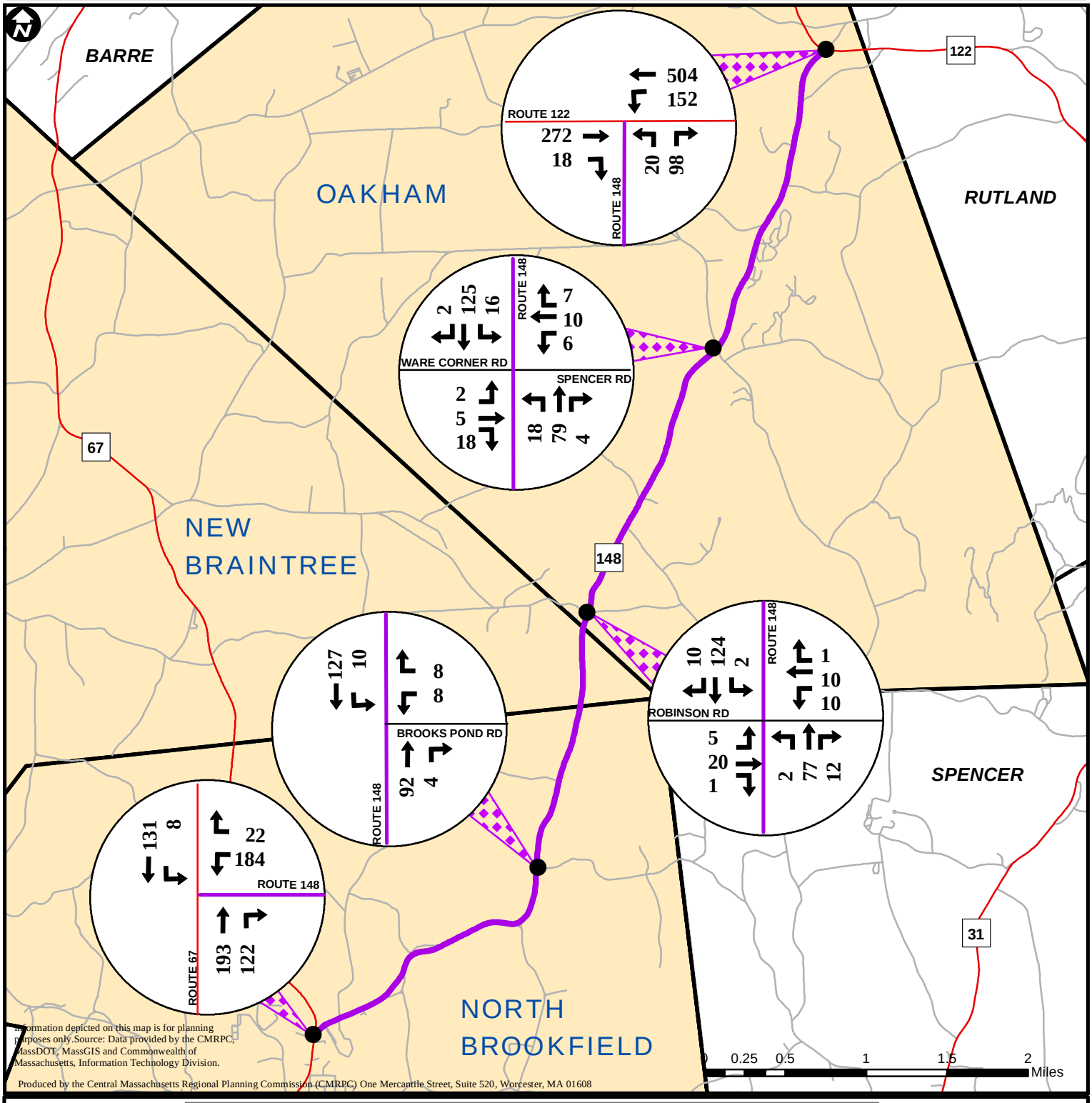


Figure 17: PM Peak Hour Projected 2036 Traffic Flows



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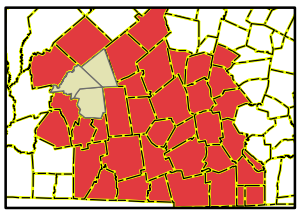
- Route 148 Corridor Profile
- Other Roads
- Interstate
- State Route
- US Highway



Route 148 Intersections Projected 2036 Peak Hour Level of Service (LOS) Analyses

Using the projected future year 2036 traffic volumes anticipated on Route 148, a Level of Service (LOS) grade was calculated for each focus intersection. The *Highway Capacity Software (HCS)* was again used to calculate the LOS, which includes the amount of delay (in seconds) for each approach and the entire intersection while also assigning a LOS grade between "A" and "F". All five (5) focus intersections are under "Stop" sign control and the delay and LOS are for the minor street approaches. **Table 8** lists the projected 2036 LOS for each Route 148 focus intersection. (The completed LOS worksheets are provided in the document's Appendices). Based on the calculated results, the following notable trends were observed:

- Encountered vehicle delays for the study intersections at Brooks Pond Road, Robinson Road, and Ware Corner Road remained relatively the same as under existing 2026 conditions with an LOS of either "A" or "B".
- Similar to the AM existing conditions, both the Route 67 and Route 122 intersections had the lengthiest delays during both the AM and PM peak travel periods. Further, the calculated LOS at both study locations dropped from "B" to "C".

Table 8
Route 148 Focus Intersections Projected 2036 LOS Summary

Host Community	Route 148 Intersection	Intersection Level of Service Analysis Results					
		AM			PM		
		V/C*	Delay**	LOS	V/C*	Delay**	LOS
Unsignalized							
North Brookfield	Route 148 / Route 67	0.44	17.0	C	0.33	13.1	B
	Route 148 / Brooks Pond Rd	0.01	9.6	A	0.02	9.5	A
Oakham	Route 148 / Robinson Rd	0.05	10.0	A	0.04	10.7	B
	Route 148 / Ware Corner Rd / Spencer Rd	0.02	10.2	B	0.04	10.6	B
	Route 148 / Route 122	0.40	17.2	C	0.27	15.5	C

*V(volume)/C(capacity) is for worst lane group; C is maximum flow under prevailing conditions
**Delay in seconds
***Stop Sign delay and LOS are for minor street approaches

4.6 Performance Management

The Performance Measures related to the Congestion Management Process (CMP) are 1) the federal rule of System Performance & Air Quality (PM3) and 2) the regionally customized measure of Economic Vitality which deals with access to jobs. The goal of the System Performance & Air Quality (PM3) measure is to achieve a significant reduction in congestion on the National Highway System (NHS). This rule has five measures that are linked to reliability, congestion, and emissions. The CMMPO continues to support the established five statewide targets regarding Level of Travel Time Reliability (LOTTR), Level of Truck Travel Time Reliability (TTTR), Percentage of Non-Single Occupancy Vehicle (SOV) Travel, Peak Hour Excessive Delay (PHED), and Total Reduction of On-Road Mobile Source Emissions. In addition, as previously mentioned, the CMMPO's Economic Vitality measure deals with accessibility to jobs in the region.

1. **System Performance & Air Quality (PM3)**: As for the measure of LOTTR, this study segment of Route 148 is not part of the NHS so any improvements to travel time reliability would not affect this performance measure but could potentially improve locally observed travel times.

   Similarly, the TTTR target only pertains to the Interstate System. As such, improvements on Route 148 will not affect this measure but could potentially improve truck travel times in the study area. Numerous heavy vehicles have been observed using the Route 148 study corridor. Based on 24-hour traffic volumes, about 16%-19% are heavy vehicles that use the study corridor on a daily basis.

   For the non-SOV travel measure, creating other travel options (e.g. carpool, public transit, walking, bicycling, or telecommuting) through MassDOT's Complete Streets program or public outreach & awareness could perhaps contribute towards reaching the established target.

   For the PHED measure, any improvements made to Route 148 regarding the prior measures that would help reduce incurred vehicle delay would also likely contribute positively towards this statewide target.

   The Reduction of Emissions measure is related to Congestion Mitigation & Air Quality (CMAQ) projects, a TIP funding category, where such projects are intended to reduce emissions. Examples of these types of projects include intersection improvements, bicycle & pedestrian improvements, and new transit services or buses. A series of standardized calculations indicating measurable emissions reductions are mandatory for all projects seeking CMAQ funding on the TIP. Currently, there are no CMAQ funded projects programmed on the TIP along the Route 148 study corridor in New Braintree, North Brookfield, or Oakham.

2. **Economic Vitality**: This measure is used to improve accessibility to jobs in the region. The reliability of freight movement is similarly important. Since Route 148 appears to accommodate a significant volume of daily heavy vehicles, suggested roadway improvements would likely benefit freight movement as well as improve travel conditions for passenger vehicles and both the bicycling & walking modes.

5.0 Safety Management System (SMS)

For this Corridor Profile, CMRPC staff obtained crash data from the Massachusetts Department of Transportation (MassDOT) IMPACT portal. The crash information used for this Corridor Profile is from the three-year period from 2020 to 2022. This chapter will discuss the results of this data analysis for Route 148 in the host communities of New Braintree, North Brookfield, and Oakham.

Figure 18 shows the location of the reported crashes that occurred on the Route 148 corridor in the host communities of New Braintree, North Brookfield, and Oakham between 2020 and 2022. The colored dots on the map indicate whether an incident was a fatal injury, non-fatal injury, or property damage-only type crash. Also, any Highway Safety Improvement Program (HSIP) eligible "crash clusters" would be shown on the map, however, there are currently none identified within the Route 148 study corridor. To be HSIP eligible, any clusters would need to be within the top 5% worst documented locations within each MPO. Such clusters are defined based on the number of crashes adjacent to one another within a defined radius that has a high incidence of crash severity. MassDOT has developed an automated procedure for processing, standardizing, matching, and aggregating by geographical location the crash data collected by the Registry of Motor Vehicles (RMV) branch. Geographic Information System (GIS) tools and procedures are used to determine the locations of vehicle crash clusters as well as bicycle crash clusters and pedestrian crash clusters.

NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE

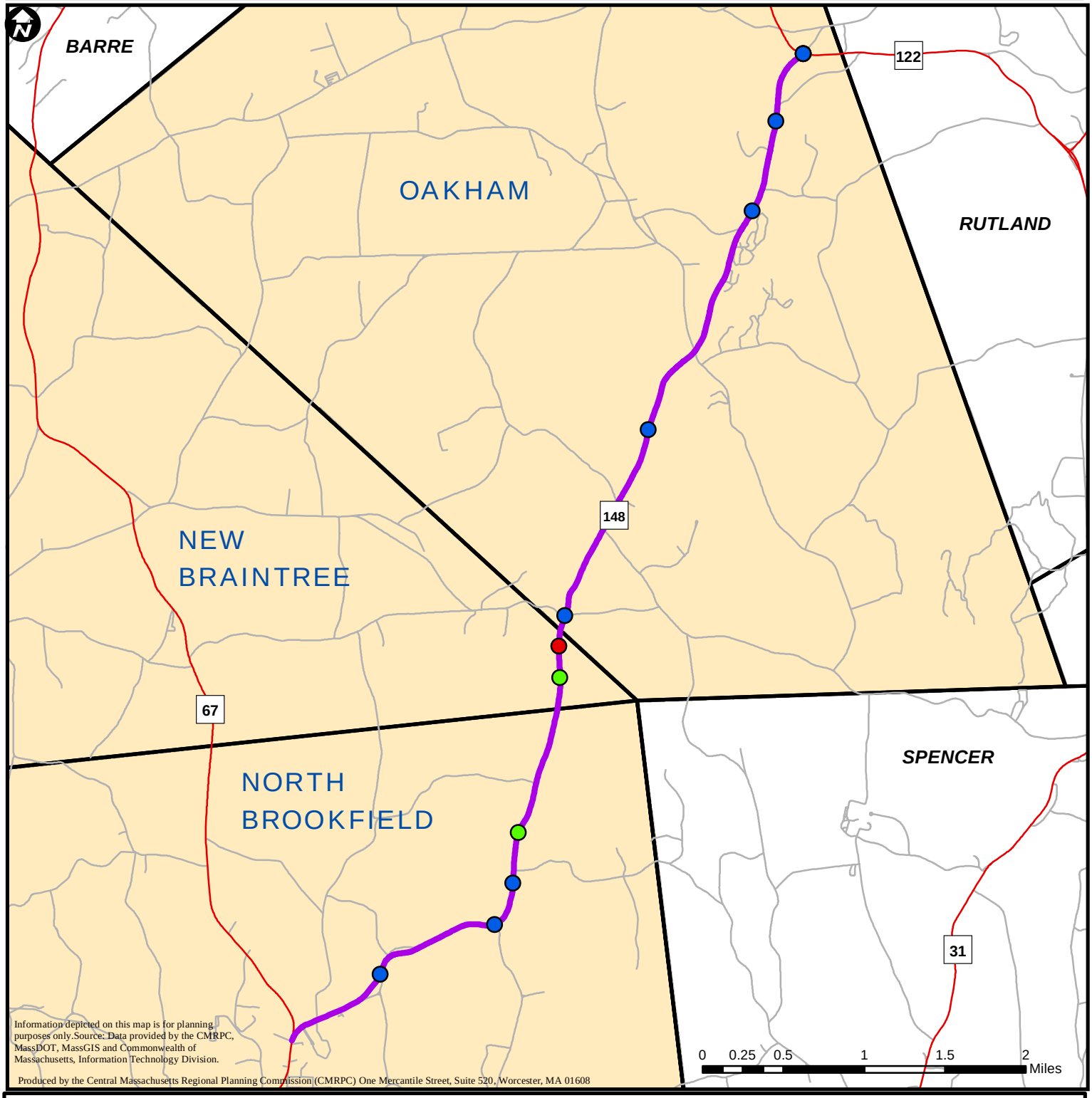


Figure 18: Crash Data (2020-2022)



Crash Severity

- Fatal injury
- Non-fatal injury
- Property damage only

- Other Roads
- Interstate
- State Route
- US Highway
- Route 148 Corridor Profile

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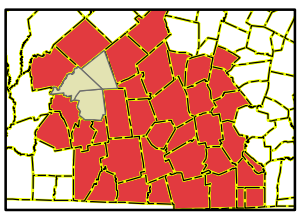

5.1 Route 148 Crash Analysis

MassDOT vehicle crash records for the host communities of New Braintree, North Brookfield, and Oakham were analyzed for the three-year period 2020 - 2022. All crashes along Route 148 from Route 67 to Route 122 were tabulated. Also, incidents on minor streets that were close to or at Route 148 were also included. All key information from the crash reports was summarized and included in the various tables that follow.

There was a total of 13 reported study area crashes on Route 148 within the three-year analysis period. Of which, two (2) were in New Braintree, four (4) were in North Brookfield, and seven (7) were in Oakham. **Table 9** shows a summary of the reported crashes where the details are shown in a variety of ways. Property damage-only crashes accounted for 77% of the total, non-fatal injuries accounted for 15%, and the lone fatal crash accounted for 8%. The one fatal crash occurred in the town of New Braintree. Single vehicle crashes were the most prevalent with a total of seven (7), while rear-end crashes were the next highest with a total of three (3). The intersection with the most reported crashes was Route 148/Route 122 in Oakham, with a total of four (4). Often the case, most crashes occurred under dry roadway conditions, in daylight, and in clear weather. The highest number of crashes occurred before 7 AM and between 4 PM and 6 PM. The most crashes occurred during the months of January and August.

Table 9
Summary of Route 148 Reported Crashes
January 1, 2020 - December 31, 2022

Crash Severity

	Number	Percent
Property Damage Only	10	76.9%
Non-Fatal Injury	2	15.4%
Fatal	1	7.7%
Total	**13**	**100.0%**

Manner of Collision

	Number	Percent
Angle	1	7.7%
Rear-end	3	23.1%
Head On	1	7.7%
Sideswipe, opposity direction	1	7.7%
Single vehicle crash	7	53.8%
Total	**13**	**100.0%**

Type of Collision

	Number	Percent
Collision with a motor vehicle in traffic	6	46.2%
Collision with curb/embankment	1	7.7%
Collision with fixed object	5	38.5%
Overturn/rollover	1	7.7%
Total	**13**	**100.0%**

Intersections with the highest number of crashes

	Number
Route 148 / Route 122	4

Road Surface Condition

	Number	Percent
Dry	8	61.5%
Snow/Ice	5	38.5%
Total	**13**	**100.0%**

Time of Day

	Number	Percent
Before 7 AM	3	23.1%
7 AM - 10 AM	2	15.4%
10 AM - 12 PM	1	7.7%
12 PM - 4 PM	1	7.7%
4 PM - 6 PM	3	23.1%
6 PM - 9 PM	2	15.4%
After 9 PM	1	7.7%
Total	**13**	**100.0%**

Light Conditions

	Number	Percent
Daylight	8	61.5%
Dark	5	38.5%
Total	**13**	**100.0%**

Weather Conditions

	Number	Percent
Clear	9	69.2%
Rain	1	7.7%
Cloudy	1	7.7%
Snow/Sleet	2	15.4%
Total	**13**	**100.0%**

Month of the Year

	Number	Percent
January	3	23.1%
February	2	15.4%
March	1	7.7%
April	1	7.7%
May	1	7.7%
August	3	23.1%
September	1	7.7%
December	1	7.7%
Total	**13**	**100.0%**

Table 10 shows the collision type by study area location on Route 148. The table lists the total number of reported crashes at each intersection and at other Route 148 locations (non-intersection crashes) and what type of crash occurred. There were seven (7) non-intersection crashes and six (6) intersection crashes. Single vehicle crashes were the most prevalent with a total of seven (7). The single vehicle crashes resulted from striking utility poles, trees, or driving off the road. Additionally, there were three (3) rear ends, one (1) sideswipe, one (1) angle, and one (1) head on crashes that were documented. Rear ends often occur during congested roadway conditions and from driver inattention. Roadway surface conditions can also be a factor.

Table 10
Collision Type by Location on Route 148, 2020-2022

Location	Total	Type				
		Angle	Rear-End	Sideswipe	Head-On	Single Vehicle Crash
Route 148 / Crooks Rd	**1**	-	-	1	-	-
Route 148 / 150' East of Mad Brook Rd	**1**	-	-	-	-	1
150 Oakham Rd (148)	**1**	1	-	-	-	-
165 Oakham Rd (148)	**1**	-	-	-	-	1
120 North Brookfield Rd (148)	**1**	-	-	-	-	1
241 North Brookfield Rd (148)	**1**	-	-	-	1	-
Route 148 / Robinson Rd	**1**	-	-	-	-	1
1352 North Brookfield Rd (148)	**1**	-	-	-	-	1
541 North Brookfield Rd (148)	**1**	-	1	-	-	-
Route 148 / Route 122	**4**	-	2	-	-	2
Total	**13**	**1**	**3**	**1**	**1**	**7**

Table 11 below shows the types of reported collisions that occurred and the severity. Ten (10) of the 13 crashes caused property damage only while two (2) resulted in non-fatal injuries while one (1) caused a fatality. Single vehicle crashes caused the most property damage with a total of five (5) and rear-end crashes were second with a total of three (3). Of the two (2) crashes that caused a non-fatal injury, both were single vehicle crashes. There was also one (1) head-on crash which caused the fatality.

Table 11
Route 148 Crashes by Severity and Type of Collision, 2020-2022

Type of Collision	Severity		
	Fatal Injury	Non-Fatal Injury	Property Damage Only
Angle	-	-	1
Rear-end	-	-	3
Sideswipe	-	-	1
Head-on	1	-	-
Single vehicle crash	-	2	5
Total Number of Crashes	**1**	**2**	**10**

5.2 Performance Management

The Performance Measures related to this chapter are Safety and Security. The first is Safety, where the goal is to reduce the number and rate of fatal and serious injury crashes throughout the region for all types of vehicles. Non-motorized fatalities and serious injuries are also included. The second measure is Security, where the goal is to enhance transportation security coordination and preparedness regionwide.

1. **Safety**: In February 2026, the CMMPO chose to adopt the statewide Safety Performance Measure targets set by MassDOT for calendar year 2026. The objectives of the safety performance measures are to reduce the total number of fatalities, rate of fatalities per 100 million vehicle miles traveled (VMT), total number of serious injuries, rate of serious injuries per 100 million VMT, and the total number of combined serious injuries and fatalities for non-motorized modes.

   MassDOT has established a long-term target towards "Zero Deaths" and intends to continue establishing safety targets for the CMMPO to consider for future adoption each calendar year. For the Route 148 study corridor, any suggested safety improvements to reduce crashes would potentially assist in reaching the statewide safety targets set forth by MassDOT.

2. **Security**: The objective of this measure is to enhance transportation security coordination and preparedness regionwide. One measure is to identify the primary highway evacuation routes in the region. Accordingly, in a previous joint effort between the CMRPC and the Montachusett Regional Planning Commission (MRPC), a Central Region Homeland Security Evacuation Plan was completed in 2013. In this evacuation plan, numerous roadways within the central region were designated as either "primary" or "secondary" evacuation routes. Route 148 was designated as a primary evacuation route, so it is critical for this route to remain both safe and secure.

   Another Security goal is for all communities in the CMRPC planning region to have a Hazard Mitigation Plan and/or Municipal Vulnerability Preparedness (MVP) Plan. These plans identify vulnerable or hazardous locations within the community. Hazard Mitigation Plans for all three host communities were completed in 2019. Additionally, New Braintree and North Brookfield also completed an MVP Plan in 2021. North Brookfield noted Doane Pond dam, which is near Route 148, as a significant hazard. Oakham's plan had the Dean Pond dam, which is also near Route 148, listed as a significant hazard. Route 148 flooding near South Road in Oakham was also noted as a potential hazard. Lastly, New Braintree's plans did not mention any specific hazards on Route 148.

6.0 Pavement Management System (PMS)

Pavement management is an asset management system designed to assist decision makers in determining the most cost-effective strategies to address poor or failing roadway conditions. In general, a successful Pavement Management System (PMS) defines a roadway network, identifies the condition of each segment of the network, develops a list of needed improvements, and balances those needs with the available resources of the party responsible for maintaining the defined roadway network. OPENGOV | Asset Management is the software package used by CMRPC in its pavement management program to assess overall pavement conditions as well as to assist in developing cost-effective strategies for addressing observed pavement distress.

For this Corridor Profile effort, pavement distress information was collected for the entirety of Route 148 in the host communities of New Braintree, North Brookfield, and Oakham. The pavement data was collected by conducting "windshield surveys." A team of two CMRPC staff members inspected Route 148, taking notes on both the severity and extent of the following pavement distresses:

- Potholes
- Distortions
- Alligator Cracking
- Transverse and Longitudinal Cracking
- Block Cracking
- Rutting
- Bleeding/Polished Aggregate
- Surface Wear and Raveling
- Corrugations, Shoving, and Slippage

Based on the field-observed distresses, an Overall Condition Index (OCI) was calculated for each roadway segment surveyed. The OCI is used to rate each segment on a scale of 0 to 100. An OCI of 100 indicates optimal pavement conditions, usually a newly paved roadway segment. Conversely, a score of 0 indicates a roadway that has failed entirely and is likely impassable for an average passenger vehicle. Starting at a top index rating of 100, the OCI is calculated by subtracting a series of deduct values, each associated with the severity and extent of the various pavement distresses described above. OPENGOV's deduct values are determined through a series of deduct curves, which were developed by pavement engineers using years of research on pavement performance. The resulting OCI is a quantified rating of pavement condition.

OPENGOV's Recommended Action category definitions are as follows:

- Do Nothing (Excellent Condition, OCI 100 – 88) – used when a road is in relatively perfect condition and prescribes no maintenance.
- Routine Maintenance (Good Condition, OCI 88 – 68) – used on roads in reasonably good condition to prevent deterioration from the normal effects of traffic and pavement age. This treatment category would include either crack sealing or local repair (potholes, depressions, poorly constructed utility patches, etc.), or minor localized leveling.
- Preventative Maintenance (Fair Condition, OCI 68 – 48) – slightly greater response to more pronounced signs of age and wear. This includes crack sealing, full-depth patching, and minor leveling, as well as surface treatments such as chip seals, micro-surfacing, and thin overlays.
- Structural Improvement (Poor Condition, OCI 48 – 24) – when the pavement deteriorates beyond the need for surface maintenance applications, but the road base appears to be sound. These include structural overlays, shim and overlay, cold planing and overlay, and hot in-place recycling.
- Base Rehabilitation (Very Poor Condition, OCI 24 – 0) – represents roads that exhibit weakened pavement foundation base layers. Complete reconstruction and full depth reclamation are indicated.

Each Recommended Action category has an associated cost, which includes the design, materials, and labor to complete such action. OPENGOV's produced OCI Recommended Action categories suggest the type of remedial improvements necessary to bring a road segment to "Excellent" condition. As a roadway's OCI drops, the associated Recommended Action becomes more demanding, and the cost of repairs increase. Therefore, the cost of "Routine Maintenance," which categorically falls under "Do Nothing," is only a fraction of the cost of "Base Rehabilitation," the most financially demanding Recommended Action category. As a practical example, the cost of applying crack seal to minor alligator cracking over a half mile segment of road is significantly less than the cost to fully reconstruct a half mile of impassable roadway. Accordingly, it is prudent to conduct "Routine Maintenance" on a roadway to prevent the unabated deterioration of the pavement.

Figure 19 displays the current pavement condition for Route 148 represented by Overall Condition Index (OCI) Recommended Action. Again, OPENGOV's produced OCI Recommended Action categories suggest the type of action that would be necessary to bring a given roadway segment to "Excellent" condition.

NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE

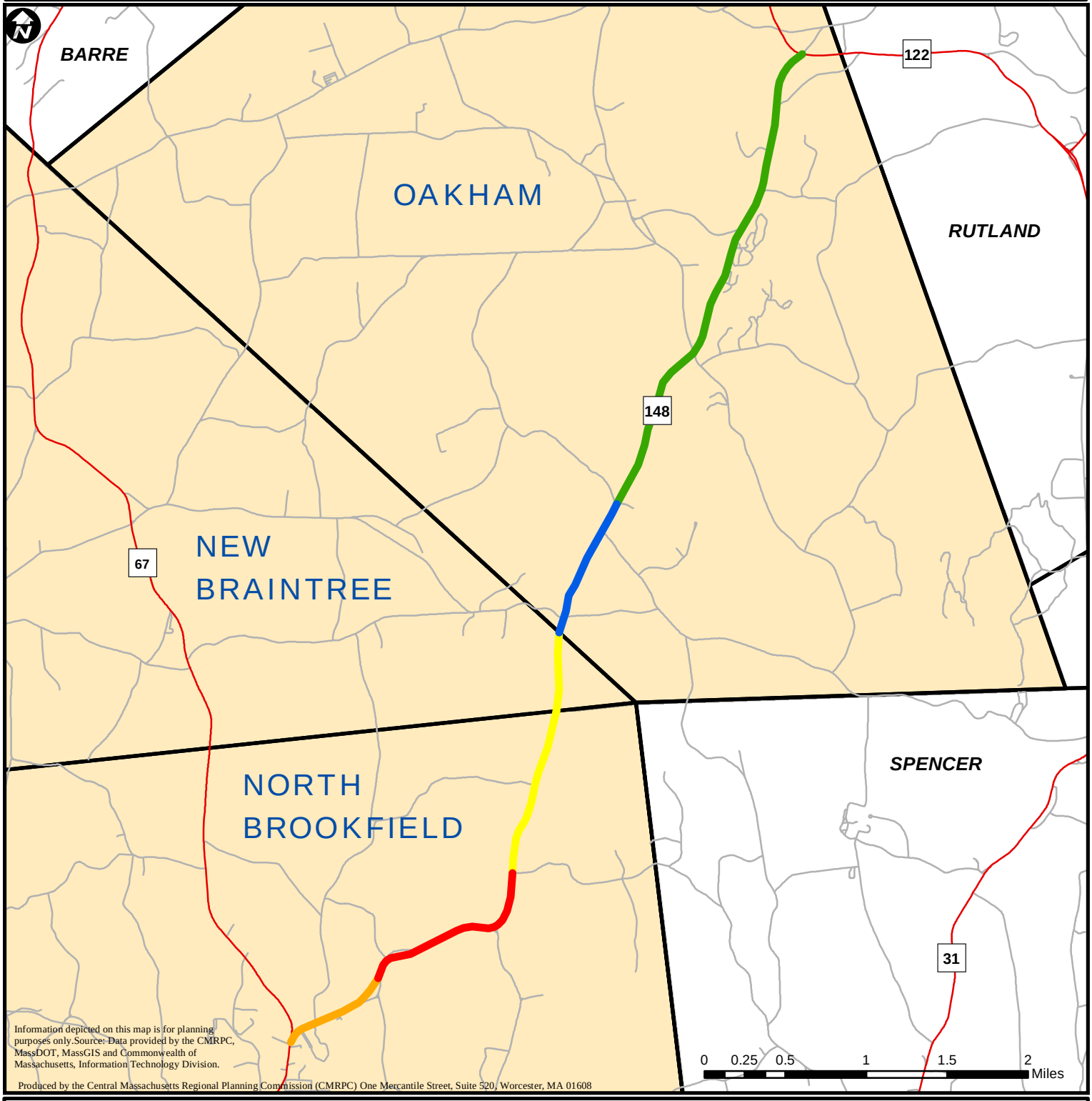

Figure 19: Pavement Condition



- Very Poor
- Poor
- Fair
- Good
- Excellent

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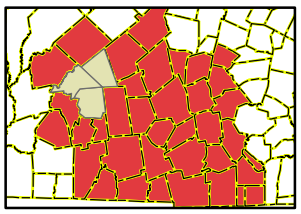


6.1 Route 148 Overall Condition Index (OCI)

The most recent pavement data for Route 148 in New Braintree, North Brookfield, and Oakham was collected in the summer of 2026. **Figure 19** shows the observed conditions for the entirety of the Route 148 study corridor. **Table 12** shows each assessed roadway segment, segment length, as well as the suggested Recommended Action for the segment to reach "Excellent" condition. The following are the distresses found along each of the ten (10) defined roadway segments from Route 67 in North Brookfield to Route 122 in Oakham.

North Brookfield

- **Route 67 to Crooks Cross Road**: This segment is considered in "Poor" condition. This segment contains a medium severity of potholes, distortions, and block cracking as well as a high severity of rutting and surface wear. Most pavement distresses are either of a low or medium extent within the segment.
- **Crooks Cross Road to Mad Brook Road**: This segment is considered in "Very Poor" condition. This segment contains a low severity of potholes, a medium severity of block cracking, and a high severity of distortions, alligator cracking, rutting, and surface wear. Most of the pavement distresses were observed to be of a medium extent within this segment.
- **Mad Brook Road to Brooks Pond Road**: This segment is also considered in "Very Poor" condition. This segment contains a medium severity of potholes and transverse and longitudinal cracking as well as a high severity of distortions, alligator cracking, rutting, and surface wear. Within the segment, the potholes and transverse and longitudinal cracking are localized, the distortions are of a medium extent, while the alligator cracking, rutting, and surface wear are observed to be of a high extent.
- **Brooks Pond Road to Barnes Road**: This segment is considered in "Fair" condition. This segment contains a low severity of potholes and distortions, a medium severity of transverse and longitudinal cracking and rutting, and a high severity of alligator cracking and surface wear. All pavement distresses are either localized or of a low extent within this roadway segment.
- **Barnes Road to North Brookfield/New Braintree TL**: This segment is considered in "Fair" condition. This segment contains a medium severity of potholes, distortions, and block cracking as well as a high severity of alligator cracking and surface wear. All pavement distresses are either localized or are of a low extent within the segment.

New Braintree

- **North Brookfield/New Braintree TL to New Braintree/Oakham TL**: This segment is also considered in "Fair" condition. This segment contains a low severity of rutting, a medium severity of distortions and surface wear, and a high severity of alligator

cracking. All pavement distresses are either localized or are of a low extent within this study segment.

Oakham

- **New Braintree/Oakham TL to Lincoln Road**: This segment is considered in "Excellent" condition. This segment contains a low severity of distortions, transverse and longitudinal cracking, and surface wear as well as a medium severity of alligator cracking. All pavement distresses are localized within the segment.
- **Lincoln Road to Ware Corner Road**: This segment is considered in "Good" condition. This segment contains a low severity of distortions, transverse and longitudinal cracking, and surface wear as well as a medium severity of alligator cracking. All pavement distresses are localized within the segment.
- **Ware Corner Road to Crawford Road**: This segment is considered in "Good" condition. This segment includes low severity of distortions and transverse and longitudinal cracking, medium severity of alligator cracking, and high severity of surface wear. All pavement distresses are localized within this segment.
- **Crawford Road to Route 122**: This segment is also considered in "Good" condition. This segment contains a low severity of distortions and transverse and longitudinal cracking, medium severity of alligator cracking, and high severity of surface wear. All pavement distresses are localized within this roadway segment.

Table 12
Route 148 Pavement Analysis Recommendations

Street	From	To	Length	Plan Activity	OCI
Route 148	Route 67	Crooks Cross Rd	0.68 mi	Structural Improvement	44.9
Route 148	Crooks Cross Rd	Mad Brook Rd	0.83 mi	Base Rehabilitation	13.4
Route 148	Mad Brook Rd	Brooks Pond Rd	0.36 mi	Base Rehabilitation	5.8
Route 148	Brooks Pond Rd	Barnes Rd	0.56 mi	Preventative Maintenance	65.0
Route 148	Barnes Rd	New Braintree TL	0.47 mi	Preventative Maintenance	63.3
Route 148	North Brookfield TL	Oakham TL	0.48 mi	Preventative Maintenance	62.9
Route 148	New Braintree TL	Lincoln Rd	0.87 mi	Do Nothing	90.0
Route 148	Lincoln Rd	Ware Corner Rd	1.06	Routine Maintenance	88.0

Street	From	To	Length	Plan Activity	OCI
Route 148	Ware Corner Rd	Crawford Rd	1.10	Routine Maintenance	88.0
Route 148	Crawford Rd	Route 122	0.90	Routine Maintenance	88.0

6.2 Performance Management

Regarding pavement, the Performance Measure utilized is from the FHWA State of Good Repair (PM2) rule which is to have at least 30% of non-Interstate National Highway System (NHS) pavement in good condition and have 5% or less of non-Interstate NHS pavement in poor condition. Additionally, the targets are 70% or higher for Interstate NHS pavement in good condition and 2% or lower for Interstate NHS pavement in poor condition. The Route 148 study corridor was observed to have a variety of pavement conditions; however, this highway is neither an Interstate nor part of the NHS. As such, any future improvements to the observed pavement condition would not support the established PM2 targets. Nevertheless, the continued monitoring of pavement distress while also carrying out recommended maintenance activities will serve to benefit each Route 148 host community.

7.0 Bridges

7.1 Statewide Bridge Management System

MassDOT has a Bridge Inspection Management System (BIMS) that inventories the location and available inspection data for bridges in accordance with the National Bridge Inventory (NBI). The NBI is a national database maintained by the Federal Highway Administration (FHWA) that contains the type, condition, and inspection data for any bridge over 20 feet in length. As part of this program, these bridges are inspected on a biannual basis. The condition of bridges is evaluated in four major categories (deck, superstructure, substructure, and culvert) and ranked on a scale of 0-9. If any of these categories receive a ranking of 4 or less, they are considered "Structurally Deficient" (SD), meaning there is a need for further monitoring and/or repair. To date, complete inspections are only available for all NBI bridges in Massachusetts. Currently, inspection and inventory efforts are underway for all short span bridges and culverts in Massachusetts.

7.2 MassDOT Municipal Small Bridge Program

The MassDOT Municipal Small Bridge Program provides financial support to cities and towns for small bridge replacement, preservation, and rehabilitation projects. The program was first created through the 2016 Transportation Bond Bill and has since been reauthorized in the 2021 Transportation Bond Bill. To be considered for funding, bridges must be on a local public way and must be on the Bridges Web Application with a recorded span between 10 and 20 feet. These bridges are not eligible for federal aid under existing bridge programs.

The Municipal Small Bridge Program utilizes phased grants to municipalities to separately fund the design and construction of small bridge projects. A Phase 1 grant is designated for the costs of bridge design and permitting. The engineered designs of the small bridges awarded a Phase 1 grant are supported by a MassDOT-led consultant team. MassDOT provides Phase 1 awardees with direct MassDOT-led consultant support for the needed bridge design work. There is the option for awarded municipalities to also work with design consultants outside of the MassDOT-led consultant team. Permission is necessary from MassDOT, and the community will only receive a maximum of $150,000. Any design and permitting costs in excess of that amount will be the responsibility of the municipality.

Subsequently, a Phase 2 grant provides funding for the costs of construction up to a maximum of $1,000,000. The phased grant structure is intended to ensure that available funds are spent efficiently between design and construction activities. Prior to applying for a Phase 2 construction grant, a municipality must provide a final design completed by either MassDOT's

consultant or a MassDOT prequalified engineering firm, through a Phase 1 grant or other funding resources, and undergo a successful Chapter 85 review.

The Municipal Small Bridge Program is 100% state funded. When a municipality utilizes MassDOT-led consultant support for an awarded Phase 1 grant, no funds are provided directly to the municipality. Phase 2 construction grants are reimbursement-based, meaning that municipalities are reimbursed for approved expenses after the costs are incurred as the municipalities are responsible for the construction of the small bridge. MassDOT and the awarded municipality will enter into a contractual agreement to ensure that all approved projects will be completed.

It should be noted that only municipal officials may apply, and, further, official municipal Grant Central accounts must be used. As the Municipal Small Bridge Program is a competitive program, the grant application provides the opportunity for municipalities to provide details concerning various criteria, such as financial need, emergency closure impacts, detour length if the small bridge was closed, first responder response times, school bus route delays, and accessibility accommodations. More Information about the program and application deadlines can be found at MassDOT's Municipal Small Bridge Program webpage.

7.3 Route 148 Corridor Profile Bridges

There are no bridges along the Route 148 study corridor. There are 13 culverts beneath Route 148, as discussed in Chapter 3.

7.4 Performance Management

The Performance Measure related to this chapter is from the FHWA State of Good Repair (PM2) rule which is to maintain at least 16% of National Highway System (NHS) bridges by deck area in good condition and to also have less than 12% of NHS bridges by deck area in poor condition. Since there are no bridges on the study corridor and Route 148 is not an NHS roadway, any suggested roadway improvements for this corridor will not affect this Performance Measure.

8.0 Public Transit (Public & Private)

8.1 Regional and Profile Study Area Services

Worcester Regional Transit Authority

The Worcester Regional Transit Authority (WRTA) provides transit service for the City of Worcester and 36 additional communities within the Central Massachusetts area. Fixed-route bus service is provided within thirteen (13) communities, and flexible Community Shuttle service is available in six (6) communities.

Paratransit service is available to eligible individuals, including Americans with Disabilities Act (ADA) complementary paratransit service. ADA paratransit services operate within a 3/4-mile "buffer" surrounding the fixed-route service and is available during the corresponding fixed-route schedule. Non-ADA paratransit service is available for elders and people with disabilities, with service hours varying by community or eligibility. These services are generally provided by local Councils on Aging (COA), or other contractors, and are subsidized by the WRTA.

Ridesharing/Transportation Network Companies (TNCs)

In Massachusetts, rideshare companies such as Uber and Lyft are referred to as Transportation Network Companies (TNCs). Generally, ridesharing is commonly provided as a curb-to-curb on-demand ride service. Customers can order a ride through various providers using either a smartphone application or other online service. In turn, the operator provides the trip in a privately-owned vehicle. In Central Massachusetts, TNC services are available through both Uber and Lyft.

Taxicab and Other Providers

Yellow Cab and Red Cab taxicab companies also provide public transportation opportunities to and from New Braintree, North Brookfield, and Oakham, however, these are considered long-distance trips. The Quaboag Connector also provides service to ten (10) communities on the border of Central and Western Massachusetts, which includes Belchertown, Brookfield, East Brookfield, Hardwick, Monson, North Brookfield, Palmer, Ware, Warren, and West Brookfield. The town of North Brookfield is the only community from the Corridor Profile study area that has service. Further, other specialized transportation services are available to eligible individuals within the area, as discussed below.

8.2 Host Communities of New Braintree, North Brookfield, & Oakham

Existing WRTA Services

Currently, there is no WRTA fixed-route bus service or flexible Community Shuttle service within the host communities of New Braintree, North Brookfield, and Oakham. Since there is no fixed-route bus service, there is also no ADA complementary paratransit service available. However, non-ADA paratransit services are offered to New Braintree, North Brookfield, and Oakham elders (age 60 and over) and people with disabilities on weekdays between 9:00 AM and 3:00 PM. Non-ADA paratransit services are provided by SCM Elderbus and reservations must be made at least 48 hours in advance. In FY 2026, SCM Elderbus provided 49 trips in New Braintree, 432 trips in North Brookfield, and 376 trips in Oakham.

Future WRTA Outlook

A new Comprehensive Regional Transit Plan (CRTP) was recently completed in February 2026 which was led by the WRTA with support from MassDOT. The plan will shape and guide the region's transit priorities and improvements over the next five years. There were many identified needs and potential recommendations resulting from the CRTP update. Some of the identified needs include the increased frequency of high-ridership routes, improved demand response service, improved marketing and technology to increase ridership, identification of alternative revenue sources, and funding to sustain fare-free service. Further, recommendations were also provided related to service, outreach & engagement, technology, capital assets, training & operations, data & performance, and partnerships & funding.

Existing TNC Services

The transportation situation in Massachusetts experienced widespread multimodal changes in 2020 due to pandemic-related factors. Rideshare volumes substantially declined across the entire state. In 2021, there were only about 12.5% more rideshare trips statewide than in 2020, and this modest recovery was not seen in all areas. In 2022, a broader recovery occurred, with a 52% increase in rideshare trips statewide. Recovery continued in 2023 with an increase of 29.9% and, in 2024, with an increase of 15.4%. Per the 2025 Rideshare Data Report, growth continued in 2025 with the number of rides reaching 100.5 million, the highest total recorded since the collection of annual ride data began in 2017. In Central Massachusetts, Worcester trip volumes grew to 2.87 million rides in 2025, up 23.17% from 2024.

The Massachusetts Department of Public Utilities (DPU) annually releases trip count data provided to the agency by Uber, Lyft, and other TNC providers. The TNCs provided approximately 90.9 million rides that started in Massachusetts in 2024 and, in 2025, there were 100.5 million rides. In 2025, there were 58 trips that originated in New Braintree, 1,204 trips in North Brookfield, and 277 trips in Oakham. In 2025, trips ending in New Braintree were 104, North Brookfield had 1,401, while Oakham had 360. Also in 2025, there was only one (1) trip

that started and ended in New Braintree, 103 trips started and ended in North Brookfield, and 25 trips that started and ended in Oakham.

In 2025, the average ride time in Massachusetts lasted 16.93 minutes and covered 6.10 miles at 21.53 miles per hour (MPH). For comparison, the average ride time in the town of New Braintree lasted 36.12 minutes and covered 19.8 miles. North Brookfield had an average ride time of 36.07 minutes and covered an average of 19.94 miles. Lastly, Oakham had an average ride time of 35.38 minutes and covered an average of 21.63 miles.

Quaboag Connector Services

The Quaboag Connector was established by the Quaboag Valley Community Development Corporation (QVCDC) and the town of Ware. Launched in 2017, it is a demand-response shuttle service covering ten (10) towns, including the town of North Brookfield. The hours of operation are from 6:00 AM – 7:00 PM Monday through Friday and 8:00 AM – 4:00 PM on Saturday.

From 2022 to April 2026, there were a total of 272 trips originating in North Brookfield. The average trip duration was 23 minutes, and the average trip distance was 8.8 miles. The purpose of the trips was mainly medical, shopping, and work. The most common destinations were Ware, Warren, and West Brookfield. Within the same timeframe, there were 312 trips terminating in North Brookfield. The average trip duration was 23 minutes, and the average trip distance was 9.4 miles. The most common purpose and destinations were the same as the trips originating in North Brookfield, medical, shopping, and work.

8.3 Performance Management

There are two Performance Measures related to this chapter, Multimodality and Geographic Equity. The Multimodality objective is to improve access to transit services and to increase ridership totals for all transit providers and the Geographic Equity objective is to increase the magnitude of disadvantaged populations that intersect WRTA fixed-route bus service.

1. **Multimodality**: Currently, there is no fixed-route bus service, however, the towns of New Braintree, North Brookfield, and Oakham do provide service to the elderly and disabled through SCM Elderbus. In the future, should the WRTA decide to expand their service area to include Route 148 in New Braintree, North Brookfield, and Oakham, it would help meet the CMMPO's regionally customized multimodality performance goal.
2. **Geographic Equity**: This measure seeks to ensure that all populations benefit from roadway improvements, WRTA service, and any other public transportation services. There is a population with disabilities in North Brookfield on the western side of Route 67, near the Route 148 intersection. Any future WRTA services or roadway improvements, targeting such appropriate areas, would help meet the CMMPO's regionally customized geographic equity goal.

9.0 Other Modes

Traffic congestion, or traffic "jams", occurs when demand for the highway infrastructure exceeds capacity. Because of recurring congestion, various state initiatives, design criteria revisions, funding opportunities and compacts have evolved the design parameters of both the planning region's transportation and other physical infrastructure such that alternatives to driving alone are now available and highly encouraged. These other modes include bicycling, public transit (detailed in a separate chapter), and walking.

9.1 MassDOT Healthy Transportation Compact

The Transportation Reform Law (2009) established the Healthy Transportation Compact (HTC) which promotes improved public health through active transportation. Active transportation refers to bicycling, transit, and walking. The HTC is an interagency initiative co-chaired by the Commonwealth's Secretary of Transportation and Secretary of Health & Human Services, including the Secretary of Energy & Environmental Affairs, MassDOT Highway Administrator, MassDOT Transit Administrator, the Commissioner of Public Health, and the Secretary of Housing & Economic Development. The HTC goals are to facilitate transportation decisions that balance the needs of all users, expand mobility, improve public health, support a cleaner environment and, in turn, create stronger communities. Overall, the intent is to adopt best practices to increase efficiency in achieving positive health outcomes through the coordination of land use, transportation, and public health policy.

Some of the programs and/or initiatives promoted by MassDOT and its partners that are currently in place, making the connection between health and transportation, are:

- Mass in Motion
- Safe Routes to School
- Healthy Transportation Policy Directive
- Healthy Transportation Engineering Directive
- Complete Streets

9.2 Healthy Transportation Policy Directive

MassDOT's Healthy Transportation Policy Directive requires all state transportation projects to increase bicycling, transit, and walking options. The Directive is intended to promote multimodal access for all transportation customers. MassDOT has indicated that everyone in the Commonwealth must be provided with the opportunity to bike, take transit, or walk instead of driving alone in a motor vehicle.

All MassDOT facilities will consider adjacent land uses and, as applicable, be designed to include sidewalks of sufficient width, landscaping, street crossing opportunities and other features to enhance healthy transportation options. Safety audits will be conducted at vehicle crash cluster sites where incidents have occurred involving healthy-mode transportation users. MassDOT has also developed a Shared Use Path Planning and Design Guide to assist communities proposing shared use paths on or adjacent to former railroad right-of-way to accelerate the path design process. To view the guide, click on the following link Shared Use Path Planning and Design Guide. The resources compiled in this guide help communities understand the process of planning, designing, funding, and constructing shared use paths.

9.3 Complete Streets

What is widely known as the "Complete Streets" approach was first included in MassDOT's 2006 *Project Development and Design Guide*. Multimodal design guidelines are part of MassDOT's current policy for Context Sensitive Design. In a Complete Streets approach, roadway projects need to accommodate all users, not only vehicular traffic. All highway projects shall, from the earliest design stages, provide safe access and connectivity for pedestrians and bicyclists. The Healthy Transportation Policy Directive expands on how, when and where these accommodations should be provided, including ADA design compliance. The *Complete Streets Initiative*, which requires roadway designs that accommodate all users, calls for bicycle & pedestrian accommodation as part of most highway projects, a major exception being limited access highways.

The state's 2014 Transportation Bond Bill authorized funding for the creation of the Complete Streets Funding Program. It offers Massachusetts municipalities incentives to adopt complete streets policies and practices. Under the MassDOT Grants Central website, the Complete Streets Program website is available to assist municipalities with the policy development, prioritization planning, and project approval steps of the application process.

When launched in 2016, the program utilized a three-tiered system to incentivize long-term change through the adoption of local Complete Street Policies (Tier 1), Prioritization Plans (Tier 2), and construction grants (Tier 3). Now, after a decade of successful program operation and nearly 100% municipal participation across the Commonwealth, the program no longer requires advancement through the tiers to be eligible for construction funding. Additionally, although still encouraged, the program also no longer requires attending a Complete Streets 101 or 201 training course.

Construction grants for a maximum of $1,000,000 are awarded for eligible projects. While a prioritization plan is no longer a requirement for construction funding, the program still offers technical assistance funding up to $38,000 for communities with none to develop a plan. Furthermore, MassDOT has indicated that communities with previously adopted Complete

Streets Policies and Prioritization Plans will receive extra consideration when seeking construction funding. Municipalities may also submit new policies and plans to be approved for this purpose. A given community may only be awarded one grant per funding program per grant round.

Since the Complete Streets Program's launch in 2016, in excess of $100 million in infrastructure grants have been awarded statewide to improve pedestrian safety, bicycle lanes, and multimodal transit accessibility. The town of North Brookfield's Prioritization Plan was approved by MassDOT in March 2020. The Prioritization Plan did not suggest any project along the Route 148 study corridor. However, North Brookfield was awarded $400,000 in FY 2022 to improve sidewalks within their downtown area along Route 148 and Route 67. The towns of New Braintree and Oakham do not have a Prioritization Plan and have yet to receive any grant awards from the Complete Streets Program.

9.4 Bicycling in the Corridor

Paved shoulders reduce passing conflicts between motor vehicles, bicyclists and pedestrians while also making pedestrians more visible. The shoulders also provide for stormwater discharge from outside the travel lanes, thus reducing hydroplaning, along with splash & spray to other following vehicles, bicyclists, and pedestrians. In rural areas, roadway shoulders often provide space for bicyclists to ride at their own pace. For safety purposes, shoulder widths should optimally be at least five feet wide to accommodate bicyclists. Within the study corridor there are minimal to no shoulders on both sides of Route 148. There are also no dedicated bike lanes.

During 2025 the CMRPC staff completed an update to the Regional Bicycle Plan. The vision of the Plan is for bicycling in Central Massachusetts to be a safe, comfortable, and convenient option for everyday travel. The Plan will be used to identify opportunities for both encouraging and enhancing bicycle travel within the CMRPC region. The recommendations contained in the Plan are intended to be used as a guide for local jurisdictions, enabling them to benefit from these opportunities. The continued implementation of the Plan's recommendations will eventually result in a comprehensive bicycle transportation network in the region that is focused on accessibility, mobility, and safety. For more information, follow this link to the Regional Bicycle Plan on the CMRPC website 2025 Regional Bicycle Plan.

As a supplement to the previous 2018 Regional Bicycle Plan, a Bicycle Compatibility Index (BCI) was created to serve as a guide to evaluate the capability of both urban & rural roadways to accommodate bicyclists. The BCI spotlights individual road segments as they pertain to the larger bicycle network. This includes identifying what infrastructure currently exists as well as an understanding of the viability of implementing bicycle facilities on a given roadway segment. The BCI provides insight to guide decision making with stakeholders and local officials

concerning projects along federal-aid eligible highways within the community. For the BCI, a rating or grading system is used to help stakeholders make the most informed decisions. Various criteria are used to determine the scoring of the roadway segments. The resulting scores allow for project prioritization, in turn targeting funding towards those projects that can best meet the goals of the community and/or region.

According to the BCI rating system, the Route 148 study corridor has a rating of Class E for the entire study corridor. Class A or B ratings are typically welcoming to most types of riders, and these roadways are often characterized by low traffic volumes & speeds along with wider accommodating shoulders. A Class C rating would be comfortable for more experienced riders. These roadways typically have higher speeds and traffic volumes, along with narrow shoulders. Class D though F rated roadways are likely to exhibit high traffic volumes and travel speeds with multiple travel lanes. These conditions often provide limited capacity for bicycle accommodation. Further, these ratings indicate that fairly extensive improvements are necessary to more fully support safe and comfortable bicycling. Only highly confident and experienced riders would be comfortable utilizing these types of roadways.

9.5 Pedestrian Facilities and Activity in the Corridor

As observed in the field, the only sidewalk on Route 148 is between Route 67 and the entrance to the North Brookfield Elementary School. Further, the sidewalk is only on the northbound side of the roadway. In 2026, staff assessed the condition of both the sidewalk and associated ADA ramps for the Route 148 Corridor Profile. The assessments revealed that the short section of sidewalk has a mix of poor, fair, and good conditions. Concerning the ADA ramps, there were three locations with no ramps, two ramps in good condition, and one ramp in poor condition. The two ramps in good condition also have detectable warning panels for accessibility. Additionally, Route 148 has only one crosswalk, which is located at Valleyview School.

In 2018, CMRPC staff also completed a Regional Pedestrian Plan. This Plan was intended to facilitate the expansion and upgrade of the pedestrian network in the region to encourage more walking trips and to also safely link important destinations to where people live. Further, the Plan also documented the extensive pedestrian-related planning and project development work being conducted in the CMRPC communities. The recommendations within the Plan are intended to be used as a guide for local jurisdictions when considering available opportunities. For more information, the Plan can be found on the CMRPC website at 2018 Regional Pedestrian Plan.

Through the public input process, related meetings and stakeholder outreach, some major recommendations of the Regional Pedestrian Plan included connecting emerging residential development with traditional village centers while also improving crosstown connectivity, an

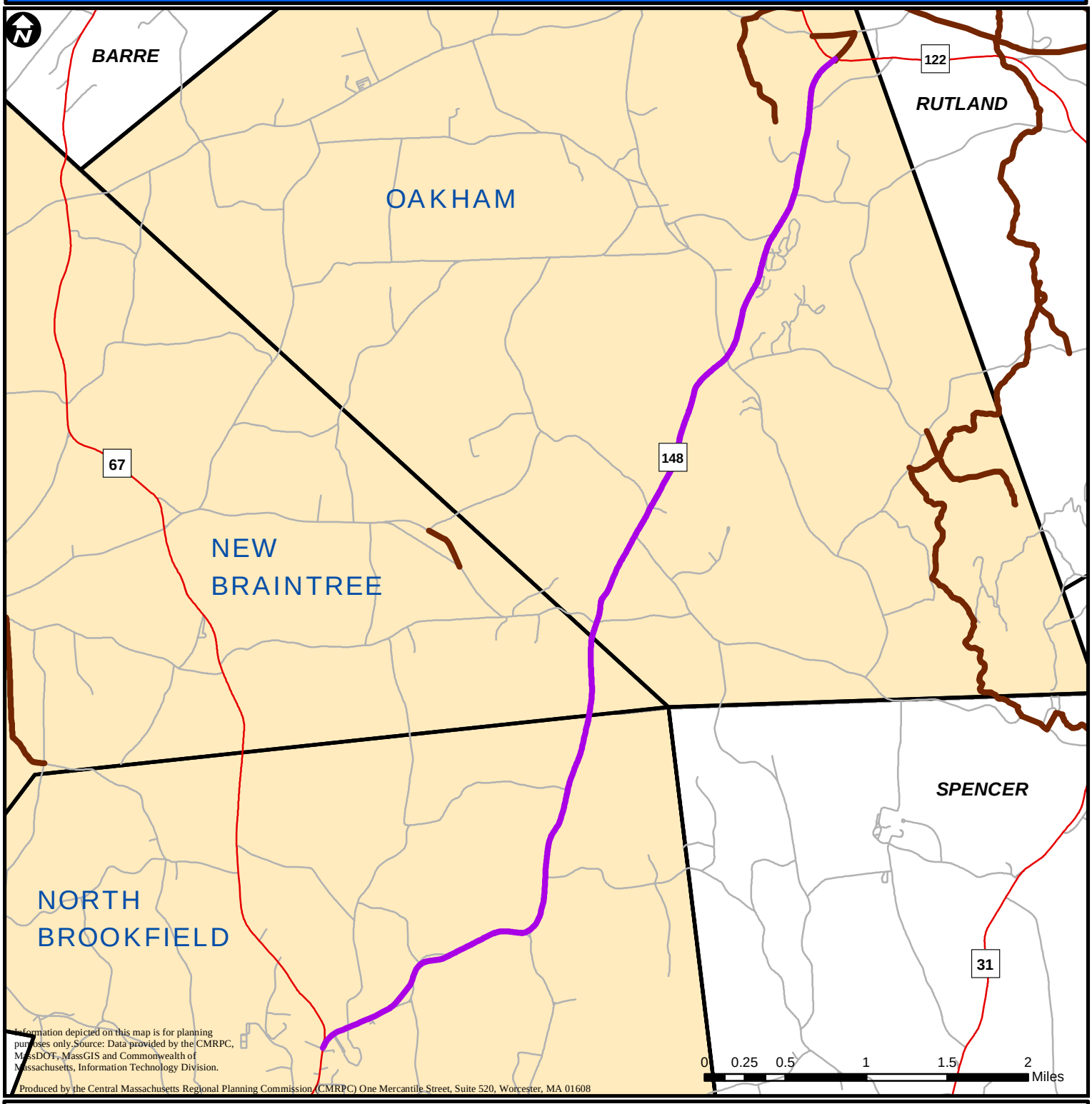
example being joining segments of already existing pathways and trails. Some priority recommendations for the host communities of New Braintree, North Brookfield, and Oakham included participation in the Complete Streets funding program and partnering eligible K-8 grade schools with the MassDOT Safe Routes to School (SRTS) Program to increase safe biking and walking among students.

CMRPC staff are currently working on an update to the Regional Pedestrian Plan, expected to complete by the end of September 2026. This update of the Pedestrian Plan focuses on continued safety considerations and access to destinations. The final report will be posted on the CMRPC website when complete.

9.6 Regional Trails in the Corridor

In addition to on-road facilities like sidewalks and marked bicycle lanes, regional trails are also used by hikers and bicyclists. During the winter, trails can also be used by cross-country skiers. These trails are often built on former railroad right-of-way as well as through forests, recreational areas, and parks. **Figure 20** features the existing regional trails in the host communities of New Braintree, North Brookfield, and Oakham that are in proximity to the study corridor. As the map shows, there are a number of regional trails near the Route 148 study corridor. The trail located just north of Route 148 is the Mass Central Rail Trail, which, when complete, will cover a length of 104 miles from Northampton to Boston. Another regional trail located to the east of Route 148 is the Midstate Trail. This 92-mile hiking trail extends from Rhode Island through Central Massachusetts and eventually connects to the Wapack Trail in New Hampshire.

NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE



Information depicted on this map is for planning purposes only.Source: Data provided by the CMRPC, MassDOT, MassGIS and Commonwealth of Massachusetts, Information Technology Division.

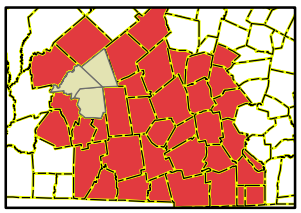
Produced by the Central Massachusetts Regional Planning Commission (CMRPC) One Mercantile Street, Suite 520, Worcester, MA 01608

Figure 20: Regional Trails



CENTRAL MASSACHUSETTS Regional Planning Commission

- Route 148 Corridor Profile
- RegionalTrails
- Other Roads
- Interstate
- State Route
- US Highway



9.7 Performance Management

The Performance Measures related to this chapter are 1) Multimodal, 2) Economic Vitality, and 3) Travel & Tourism. All three are regionally customized measures approved by the CMMPO. The goal of the Multimodal measure is to improve and/or expand transportation accessibility for all modes (bicycle, pedestrian, transit) in the region. The goal of the Economic Vitality measure is to make employment opportunities accessible and available, thus allowing for job expansion by improving bicycle, pedestrian, and transit networks near major employment centers. Next, the Travel & Tourism goal is to enhance the access, safety and effectiveness of the region's transportation network that serves places of touristic value.

1. **Multimodal**: The first measure under Multimodal is to increase the miles of sidewalks in good condition. Sidewalk conditions are rated on a scale of poor, fair, good and excellent. Any sidewalks within the good or excellent categories are included in this measure. The sidewalks along the Route 148 study corridor were observed to have a mix of conditions including poor, fair, and good. If new sidewalks were to be constructed where observed gaps exist, they would improve this measure by adding to the miles in good or excellent condition. Improvements to the existing sidewalks observed to be in either poor or fair condition would also help with this measure.

   The second measure is to increase the number of ADA ramps in good condition. ADA ramp conditions are rated on a scale of good, poor, and no ramp. Any ramp observed in poor condition, when improved, will help towards the goal of this measure. New ramps will also help with this measure.

   The third measure is to increase bicycle facility miles in the region. Bicycle facilities include shared use paths, bike lanes, separated bike lanes, and bicycle/pedestrian priority roadways. Route 148 does not currently have any bicycle facilities along the entire length of the study corridor so any improvements would help with this measure.

2. **Economic Vitality**: The measure is to improve the accessibility to jobs using all modes in the region. By improving accessibility on the roadway for all modes, people can drive, walk, and ride a bicycle for a greater distance with reduced congestion. As more travel options become increasingly available, there exists the potential for fewer vehicles on the roadway network.

3. **Travel & Tourism**: The goal of this emphasis area is to enhance the access and safety of the transportation network that serves tourist and recreation areas. Enhancing the Route 148 corridor has the potential to improve access to the nearby Rutland State Park along Route 122 as well as both the nearby Mass Central Rail Trail and the Midstate Trail.

10.0 Overall Corridor Profile Findings

This Corridor Profile effort considers the results of all Management System and environmental analyses and, in conjunction with local public processes, selects those improvement options viewed as feasible for the host community. Based on all the analysis completed and discussed previously, this section of the study summarizes the Corridor Profile findings for both intersections and roadway segments as well as those Performance Measures applicable to the Route 148 corridor.

10.1 Route 148 Intersections

Table 13 summarizes the findings for intersections. It includes study intersection locations, nearby disadvantaged populations, environmental considerations adjacent to Route 148, calculated intersection Level of Service (LOS), the percentage of heavy vehicles during the morning & evening peak hour travel periods, number of documented vehicle crashes, the availability of public transit and other considerations.

The following observations for Route 148 are based on the table:

- Disadvantaged populations were included in the equity analysis conducted for the Route 148 Corridor Profile. The data shows that there are three (3) Census Tracts that intersect Route 148, one for each host community. The only disadvantaged population near the Route 148 study corridor was at the Route 67 intersection and it was a block group with people with disabilities.
- All focus intersections are in the Chicopee River Watershed. Most intersections have nearby wetlands and potential vernal pools. There are also conservation areas, rare species habitats, flood zones, and a water supply protection area near the corridor's study intersections.
- All study intersections had a LOS of either a "A" or "B" for both the AM and PM peak periods. The intersections with the longest calculated delays were Route 67 and Route 122 but these intersections are not considered congested.
- Typically, heavy vehicles travel at slower speeds than passenger cars. As such, the heavier the vehicles using the roadway, the more likely field observed travel times are slower. The percentage of heavy vehicles using the Route 148 intersections, as is typically the case in the region, was higher during the morning peak hour than during the evening peak hour except for two intersections. Often local trucking activities follow a 7:00 AM to 3:00 PM shift, leading to a decrease in activity during the evening peak. The Brooks Pond Road intersection had the highest morning (7.1%) heavy vehicle

percentage, and the Robinson Road intersection had the highest evening (3.1%) heavy vehicle percentage.

- MassDOT crash data from 2020-2022 was used for this Corridor Profile. There were only five (5) crashes at the study intersections over the three-year period. Four (4) of the crashes were at Route 122 and one (1) crash was at Robinson Road. There are currently no Highway Safety Improvement Program (HSIP) identified crash clusters along the Route 148 study corridor.
- The WRTA does not provide fixed-route bus service in New Braintree, North Brookfield, or Oakham. Non-ADA paratransit services are provided by the Councils on Aging (COA) and Elderbus. Additionally, the Quaboag Connector provides service in the town of North Brookfield.
- Route 148 at Route 67 is a "Y"-shaped intersection and right turns onto Route 148 do not need to reduce travel speeds. Both Brooks Pond Road and Robinson Road are in a residential area, and both intersections have minimal vehicles entering or exiting. Ware Corner Road provides a connection to Oakham's town center. The Route 122 intersection has the highest volumes, largely on Route 122.

Table 13

New Braintree/North Brookfield/Oakham
Route 148 Focus Intersections:
Overall Corridor Profile Findings

Study Intersection Location	Disadvantaged Populations Analysis	Environmental Consultation Analysis	Level-of-Service (LOS)	Freight Movement Heavy Vehicle %	Safety Analysis*	Public Transit	Other Considerations
Route 148 / Route 67	Nearby disability population	Nearby conservation area.	AM = B PM = B	AM = 4.7% PM = 1.4%	0	No WRTA fixed-route bus service available. Non-ADA paratransit services provided by Elderbus. Quaboag Connector also provides service.	"Y"-shaped intersection. Right turns onto Route 148 do not need to slow down.
Route 148 / Brooks Pond Road	None	Nearby wetlands, and potential vernal pools.	AM = A PM = A	AM = 7.1% PM = 1.9%	0	No WRTA fixed-route bus service available. Non-ADA paratransit services provided by Elderbus. Quaboag Connector also provides service.	Residential area with minimal vehicles entering / exiting Brooks Pond Road.
Route 148 / Robinson Road	None	Nearby wetlands, potential vernal pools, and flood zones.	AM = A PM = B	AM = 0.6% PM = 3.1%	1	No WRTA fixed-route bus service available. Non-ADA paratransit services provided by Elderbus.	Residential area with minimal vehicles entering / exiting Robinson Road. Sight line issues exiting Robinson Road.
Route 148 / Spencer Road / Ware Corner Road	None	Nearby wetlands, rare species habitats, and flood zones.	AM = A PM = B	AM = 1.2% PM = 2.5%	0	No WRTA fixed-route bus service available. Non-ADA paratransit services provided by Elderbus.	Ware Corner Road connects to the town center of Oakham.
Route 148 / Route 122	None	Nearby conservation/recreation & water supply protection area, wetlands, and potential vernal pools.	AM = B PM = B	AM = 6.7% PM = 2.5%	4	No WRTA fixed-route bus service available. Non-ADA paratransit services provided by Elderbus.	Highest volume intersection, specifically on Route 122.

*Total number of crashes (2020-2022)

10.2 Route 148 Roadway Segments

The Corridor Profile findings for Route 148 roadway segments are summarized in **Table 14**. Similar to the previous intersection table, the roadway segment table lists each Route 148 study segment, disadvantaged populations, environmental considerations adjacent to Route 148 and beyond, the daily percentage of heavy vehicles, number of documented vehicle crashes, the field-observed condition of the paved roadway surface, any bridges or culverts, the availability of public transit and other considerations.

Based on the information summarized in the table, the following observations are provided:

- Disadvantaged populations were included in the equity analysis conducted for the Route 148 Corridor Profile. The data shows that there are three (3) Census Tracts, one for each host community. Accordingly, the only disadvantaged population are the people with disabilities located near Route 67 in North Brookfield.
- The entire study corridor is situated within the Chicopee River Watershed. Most roadway segments have nearby conservation/recreational areas, potential vernal pools, wetlands, rare species habitats, and flood zones.
- Using data obtained through the ongoing traffic count program maintained by CMRPC, staff were able to determine the heavy vehicle percentages along Route 148 for a 24-hour period (count data located in the Appendices). The data listed in the table is the daily percentage of heavy vehicles traveling along the focus roadway segments. Depending on roadway segment, the percentage of daily heavy vehicles ranges between 15.9% and 19.0%.
- From 2020 to 2022 there were eight (8) reported roadway segment vehicle crashes on Route 148 within the study area. Most of the crashes (3) occurred between Route 67 and Brooks Pond Road and between Brooks Pond Road and Robinson Road. The other two (2) segments both had one (1) crash. There was a fatal crash in New Braintree, near the Oakham town line.
- Roadway pavement condition along Route 148 is based on a calculated “Overall Condition Index” (OCI) which is derived from the pavement distresses (cracking, distortions, etc.) observed in the field. The OCI scale ranges from 100, indicative of a new roadway, down to zero, where total failure of the paved surface is evident. As can be seen in the table, some study segments have two pavement condition scores. This is because the previously established pavement management segments are not the same as the CP study roadway segments. The table shows that the Route 148 study corridor pavement exhibits a variety of conditions, with the town of Oakham having the best observed pavement condition.

- There are no bridges along the Route 148 study corridor. However, there are 13 culverts identified below Route 148. There is at least one (1) culvert within each study segment. The segment between Route 67 and Brooks Pond Road has the most culverts, with a total of five (5).
- Similar to the intersection findings table, the WRTA does not provide fixed-route bus service in the host communities of New Braintree, North Brookfield, or Oakham. Non-ADA paratransit services are provided by Elderbus. In the town of North Brookfield, the Quaboag Connector also provides service.
- Route 148 is a two-lane roadway for the entire study corridor and has minimal to no shoulders. The only sidewalk is located on the northbound side of Route 148 between Route 67 and the entrance to the Elementary School.

Table 14

New Braintree/North Brookfield/Oakham
Route 148 Roadway Segments:
Overall Corridor Profile Findings

Route 148 Roadway Segments	Disadvantaged Populations Analysis	Environmental Consultation Analysis	Freight Movement Daily % of Heavy Vehicles	Safety Analysis*	Pavement Condition**	Bridges / Culverts	Public Transit	Other Considerations
Route 67 to Brooks Pond Road	Nearby disability population	Nearby conservation areas, wetlands, waters requiring a TMDL, potential vernal pools, rare species habitats, and flood zones.	15.9%	3	Poor (Structural Improvement) & Very Poor (Base Rehabilitation)	Culverts #1 - #5	No WRTA fixed-route bus service available. Non-ADA paratransit services provided by Elderbus. Quaboag Connector also provides service.	Two-lane roadway with minimal shoulders. Entrance to Elementary / High School and only sidewalk located in this segment.
Brooks Pond Road to Robinson Road	None	Nearby wetlands, potential vernal pools, and flood zones.	16.7%	3	Fair (Preventative Maintenance) & Excellent (Do Nothing	Culverts #6 - #8	No WRTA fixed-route bus service available. Non-ADA paratransit services provided by Elderbus. Quaboag Connector also provides service.	Two-lane roadway with minimal shoulders. This segment includes the small part of New Braintree.
Robinson Road to Spencer Road	None	Nearby conservation/recreation areas, wetlands, potential vernal pools, rare species habitats, and flood zones.	19.0%	1	Excellent (Do Nothing) & Good (Routine Maintenance)	Culverts #9 - #12	No WRTA fixed-route bus service available. Non-ADA paratransit services provided by Elderbus.	Two-lane roadway with minimal shoulders.
Spencer Road to Route 122	None	Nearby conservation/recreation & water supply protection areas, wetlands, waters requiring a TMDL, potential vernal pools, rare species habitats, and flood zones.	19.0%	1	Good (Routine Maintenance)	Culvert #13	No WRTA fixed-route bus service available. Non-ADA paratransit services provided by Elderbus.	Two-lane roadway with minimal shoulders.

*Total number of crashes (2020-2022)

**OCI = Overal Condition Index, Ranging From 0 - 100

10.3 Performance Management

Table 15 shows the integration of the Route 148 Corridor Profile findings as they relate to performance management. This table lists numerous federal transportation planning emphasis areas and the associated report chapter in which they are discussed. The performance objectives for each of the emphasis areas are also listed in the table. As can be realized, there are multiple performance areas that are included in multiple chapters. The "Corridor Context" column describes how the Route 148 corridor relates to each of the performance areas and associated objectives. Further, the last two columns list the observed deficiencies on Route 148 then followed by what type of suggested corridor improvements could likely assist in obtaining the planning region's overall performance objectives.

Table 15 - Integrating Corridor Profile Findings with Performance Management

Associated Chapter	Performance Area	Performance Objective	Corridor Context	Observed Deficiencies	Suggested Improvement and Regional Impact
Chapter 5	SAFETY	Reduce the number and rate of fatal & serious injury crashes in the region for all types of vehicles. Also includes non-motorized fatalities and serious injuries. (PM1)	Route 148 connects Route 122 in Oakham to Route 67 in North Brookfield and continues southerly to US Route 20 in Sturbridge. Safety improvements could reduce vehicle crashes that involve injuries and fatalities along the roadway.	A total of 13 crashes occurred within the Route 148 study corridor between 2020 and 2022. Of those crashes, only two (2) caused a non-fatal injury, but there was also one (1) fatality.	Improve pavement and pavement markings. Consider minor widening along Route 148 to provide more space between vehicles as the roadway is now fairly narrow with 10' - 11' lanes and no shoulders as well as fixed objects near edges of the roadway.
Chapter 5	SECURITY	Enhance the transportation security coordination and preparedness regionwide.	Route 148 is considered a primary evacuation route and it is important for the roadway to be safe and secure. Hazard Mitigation Plans (HMP) and/or Municipal Vulnerability Plans (MVP) are developed to identify vulnerable or hazardous locations within a community.	The completed HMP or MVP plans identified the Dean Pond dam as a significant hazard in North Brookfield and Route 148 flooding near South Road in Oakham was also noted as a potential hazard.	Improve and maintain the Route 148 corridor in good condition as it is an evacuation route for the region. Inspect nearby dams on a periodic basis.
Chapters 6 & 7	STATE OF GOOD REPAIR	Maintain the highway infrastructure asset system in a state of good repair (PM2): **6)** Increase % of pavement in good condition and reduce % of pavement in poor condition. **7)** Increase % of bridges by deck area in good condition and reduce % of bridge by deck area in poor condition.	**6)** There is a mix pavement conditions found along the study corridor. **7)** There are no bridges along the Route 148 study corridor.	**6)** North Brookfield has the worst pavement with multiple segments observed in poor or very poor condition. New Braintree segment is in fair condition and Oakham pavement is in good to excellent condition. **7)** There are no bridges on the Route 148 study corridor.	**6)** Improvement the pavement condition along the study corridor, particularly in North Brookfield. Also, maintain the pavement on Route 148 in New Braintree and Oakham in good condition. **7)** As there are no bridges on Route 148 in the study corridor, there is no need for improvements.
Chapter 4	CONGESTION	To achieve a significant reduction in congestion on the National Highway System (NHS). Travel time reliability, non-SOV travel, peak hour excessive delay, and emissions reduction are the focus of this Performance Measure (PM3).	Route 148 is a major route from Route 122 in Oakham to US Route 20 in Stubridge. Route 148 is used by both passenger vechicles and heavy trucks.	All focus intersections have a LOS of "A" or "B" for both the AM & PM peak periods. Average travel speeds are between 36 mph and 39 mph. There is minimal congestion along the study corridor and traffic volumes range from 1,600 to 2,400 vehicles per day (vpd).	As Route 148 has fairly low traffic volumes along the study corridor and at the focus intersections. Maintain and/or improve signage and pavement markings.
Chapters 8 & 9	MULTIMODALITY	Improve and/or expand transportation accessibility for all modes (bicycle, pedestrian, transit) in the region.	**8)** Currently, there is no WRTA fixed-route bus service in New Braintree, North Brookfield, or Oakham. **9)** Minimal to no pedestrian and bicycle accommodations along the corridor.	**8)** There is no WRTA fixed-route bus service in the three host communities. **9)** Sidewalks only exist in North Brookfield between Route 67 and the school entrance. There are no dedicated bicycle lanes and minimal to no shoulders to safely ride a bicycle.	**8)** If a need is identified, look into the feasibility of appropriate transit services serving the three host communities. **9)** Where needed, construct new sidewalks and ADA ramps where none currently exist. Also, consider widening Route 148 to provide shoulders for safer bicycle use. Potentially use the Complete Streets program to fund these types of suggested improvements.
Chapters 2 & 8	GEOGRAPHIC EQUITY	Achieve geographic and population equity across the region. Also, increase disadvantaged populations that intersect WRTA fixed-route bus service and also ensure all subregions benefit from TIP projects.	**2)** There is one identified disadvantaged populations near the Route 148 study corridor. **8)** There is no WRTA fixed-route service along Route 148.	**2)** The only disadvantaged population is near the Route 67 intersection, but not actually along the study corridor. **8)** There is no WRTA fixed-route service along the study corridor.	**2)** Any Route 148 improvement projects should consider the benefits and burdens of all populations in the project area. **8)** If needed, consider transit services for the study corridor.
Chapters 4 & 9	ECONOMIC VITALITY	To improve the accessibility to jobs in the CMMPO region for all modes and also including reliable freight movement.	**4)** Trucks represent over 15% of daily traffic on Route 148. 9) Although most residential, there are some businesses along the study corridor being accessed by various modes.	**4)** Narrow roadway that accommodates over 15% daily trucks using corridor. 9**)** There are no dedicated bicycle lanes and no shoulders for bicycles to use. Sidewalks only exist between Route 67 and the North Brookfield school driveway.	**4)** Consider widening Route 148 for improved and safer widths for heavy vehicles. 9**)** Consider using the Complete Streets program to improve the roadway for bicycles and pedestrians.
Chapter 3	STORMWATER MGMT & RESILIENCY	Create a transportation network that is resilient to the impacts of strormwater.	There are 13 culverts located along Route 148 within the study area, seven (7) in North Brookfield and six (6) in Oakham.	The majority of culverts exhibit either a "severe" or "moderate" barrier. There are multiple flood zones near the Route 148 study corridor.	Upgrade/replace culverts that have "moderate" or "severe" barriers. Also, consider Green Infrastructure or Nature-Based Solutions for other potential resiliency improvements within the study corridor.
Chapter 9	TRAVEL & TOURISM	To enhance the access, safety and effectiveness of the region's transportation network that serves places of touristic value.	Rutland State Park, the Mass Central Rail Trail, and the Midstate Trail are nearby the Route 148 study corridor.	Minimal tourist areas along Route 148. Nearby are Rutland State Park, Mass Central Rail Trail, and Midstate Trail.	Install or improve standardized wayfinding signs to recreation areas and popular tourist attractions such as the Rutland State Park, Mass Central Rail Trail, and Midstate Trail. Improve roadways adjacent and near these local tourist attractions/recreation areas.

11.0 Suggested Improvement Options

CMRPC provides a broad range of suggested improvement options within each finalized Corridor Profile document. Depending on identified host community needs, some suggestions are targeted for specific locations while others can be applied to the entire length of the study corridor. In addition, staff will typically meet with officials in each community included within the Corridor Profile scope to discuss and incorporate their ideas for proposed improvements based on local knowledge. Some improvements can be implemented on a short-term basis while others are targeted for the future, perhaps 5 to 10 years from the present.

For reference purposes, listed below are some of the short-term improvement options that were suggested in previously completed Corridor Profiles which can be applied at specific intersections or along an entire corridor. These suggestions have included:

- Check the traffic signal timing & phasing of signalized intersections.
- Maintain all traffic control signals, signs, and pavement markings.
- Selectively trim any overgrown vegetation that is obstructing the sight lines of vehicles, signs, or traffic signals.
- Maintain pavement surfaces in good condition.
- Maintain bridges, culverts, and other roadside drainage structures and features.
- Install new or improve existing guide signs for nearby sites of touristic value.
- Consider access management techniques, such as curb cut consolidation and shared site access.
- Incorporate additional signage for safety purposes, such as appropriate yellow diamond warning signs.
- Enhance pedestrian and bicyclist safety corridor-wide, with a focus on high-use locations.
- Reconfigure marked travel lanes at an intersection where applicable and feasible allowing for exclusive turning lanes.
- Use streetscaping for both beautification and nature-based drainage purposes.

Additionally, the following suggested improvements included in prior Corridor Profile efforts have been intended for either the mid-term or long-term time frames. These types of improvements will likely cost more and take longer to implement or construct. Each has been suggested on a community-by-community basis and can generally be used for multiple locations. These suggested actions have included:

- Realignment of intersection approaches.
- The installation of a modern roundabout as an alternative to signalized traffic control where appropriate and feasible.

- Widen roadways where additional shoulder width, travel or turning lanes are determined necessary.
- Incorporate Intelligent Transportation Systems (ITS) components into the roadway network, such as dynamic messaging signs or, for pedestrians, Rectangular Rapid-Flashing Beacons (RRFB).
- Install overhead highway lighting where deemed necessary for safety purposes.
- Utilize a "Complete Streets" approach, designing for all roadway users.
- Coordinate nearby successive traffic signals where appropriate and feasible.
- Install new traffic signals or modernize/update existing signal equipment.
- Utilize traffic calming measures along densely settled sections of a roadway, as appropriate and feasible.

Reaffirmed by the Infrastructure Investment and Jobs Act (IIJA), the CMMPO is continuing the development of performance-driven, multimodal TIP projects. Performance Based Planning & Programming (PBP&P) is intended to improve public transparency, fiscal accountability, and investment decisions affecting the condition and performance of the multimodal transportation system.

The CMMPO's Performance Management program includes numerous goals and objectives across the range of federal transportation planning emphasis areas. Each established goal and objective has corresponding performance metrics that are monitored. Progress towards the established goals is measured and reported annually. A Performance Measures Scoresheet was created to assess both current and future year TIP projects, helping to determine to what extent regional goals have been addressed. TIP projects that rank high are often projects that provide substantive measurable outcomes for each goal, thus having increased regional impact.

This Corridor Profile report includes a range of suggested improvement options for Host Community consideration and potential MassDOT grant opportunity applications. Entirely maintained by the host communities, Route 148 is federal-aid eligible. As such, many of the suggested improvement options could be incorporated into a potential future candidate TIP project that has the likelihood of producing higher Performance Management scores. Higher scores may increase the probability of CMMPO programming. In addition to the TIP, the MassWorks Infrastructure Program, which is now part of the Community One Stop for Growth, could also serve as a potential funding source for some of the improvements suggested for Route 148.

11.1 Route 148 Suggested Improvement Options

The following suggested improvement options, meant to address general overall deficiencies observed along the Route 148 study corridor have been compiled for the host community's consideration as well as potential MassDOT grant opportunity applications. These improvement options are also shown in **Figure 21**.

- Trim overgrown vegetation along the study corridor that will create better sight lines for vehicles exiting the minor intersecting streets and help melt ice on the roadway during the winter months. It was noted that Robinson Road sight lines were obstructed for exiting vehicles.
- Consider using a Rectangular Rapid Flashing Beacon (RRFB) at the Valley View School crosswalk. Install necessary accompanying advance warning signs.
- Consider ITS applications along the study corridor, such as active speed monitoring, currently in use elsewhere in the planning region.
- Periodically conduct necessary traffic control sign maintenance. Replace worn and faded traffic control signs to ensure nighttime reflectivity.
- Maintain pavement surfaces in good condition on the entirety of the Route 148 study corridor, especially in North Brookfield and New Braintree where pavement was observed to be in fair, poor, and very poor condition.
- Repaint/upgrade worn pavement markings to enhance travel lane delineation through increased reflectivity.
- Consider extending the current sidewalk in North Brookfield further to the north as the CMRPC transportation staff had observed pedestrians regularly walking along the roadway edge.
- Upgrade/replace the numerous culverts along Route 148 that were determined to act as a "severe" barrier to natural stream flow. Regularly inspect the culverts along the study corridor.
- Install new or improve existing wayfinding signs to established nearby recreation areas and popular tourist attractions including Rutland State Park, the Mass Central Rail Trail, as well as the Midstate Trail.

NEW BRAINTREE/NORTH BROOKFIELD/OAKHAM ROUTE 148 CORRIDOR PROFILE

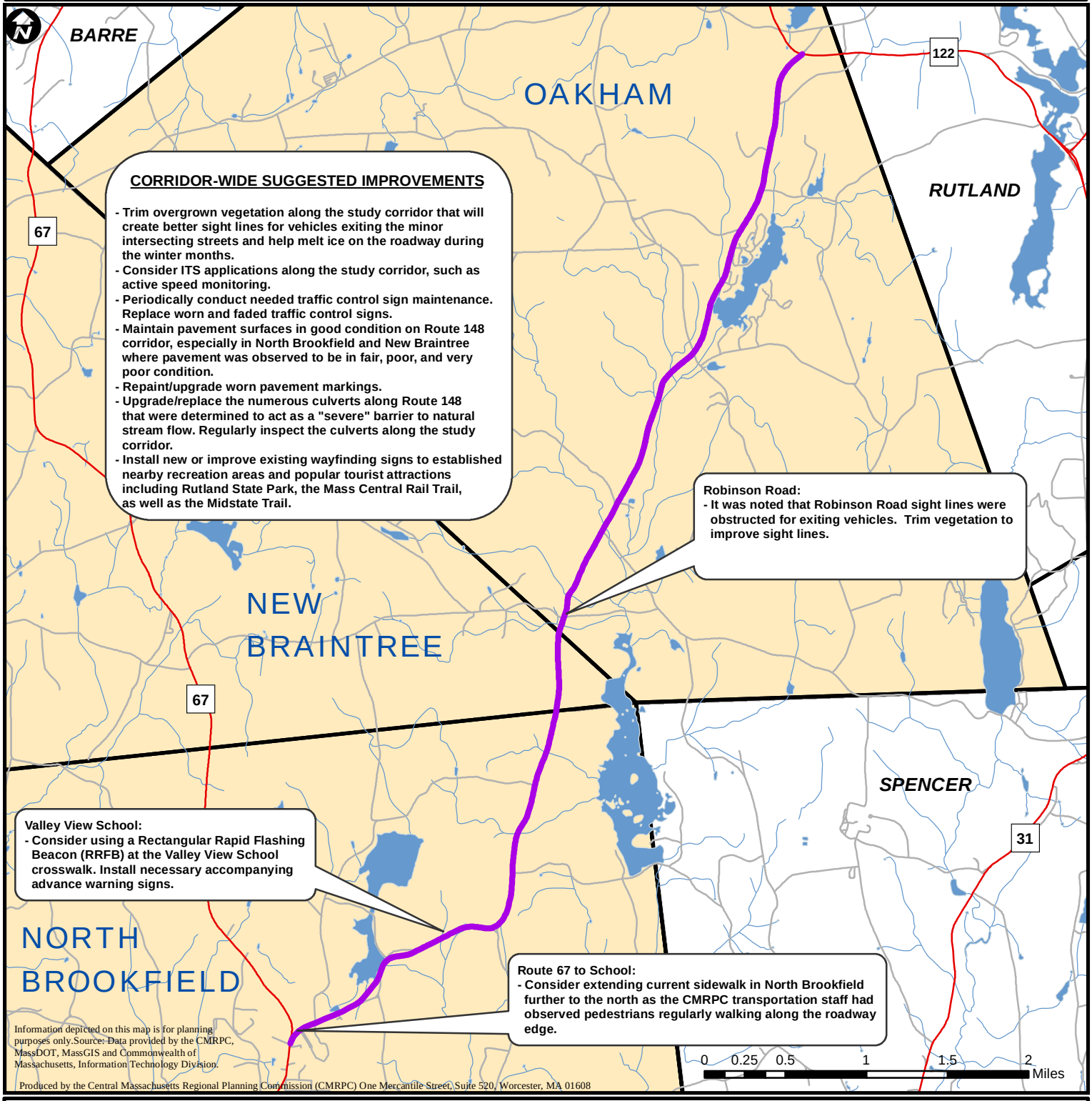
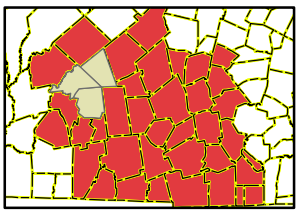


Figure 21: Suggested Improvements



CENTRAL MASSACHUSETTS Regional Planning Commission

- Route 148 Corridor Profile
- Other Roads
- Interstate
- State Route
- US Highway
- Water Bodies
- Streams



Appendix A: Route 148 Culvert Assessment Forms

Appendix A includes the assessment forms that CMRPC staff used to collect culvert data along Route 148 study corridor. An assessment form is available for the 13 culverts that were surveyed.

NAACC Culvert Survey Form

Crossing Data

General Information		
Crossing Code: xy4228217672073687		
Date Observed: April 8, 2026	**Lead Observer:** Ryan Hurley	**Town:** North Brookfield
Stream: Unknown	**Road:** Oakham Road (Route 148)	**Road Type:** Paved
Latitude: 42.282176	**Longitude:** -72.073687	
Location Description: Near telephone pole 33 adjacent to Doane Pond on 39 Oakham Street.		

Crossing Information	
Crossing Type: Culvert	**Number of Culverts/Bridges:** 1

Inlet Image:



Outlet Image:



Upstream Image:	Downstream Image:
	

Flow Condition: Typical-Low	**Crossing Condition:** Poor	**Tidal Site:** No
Alignment: Flow Aligned	**Road Fill Height:** 1	**Bankfull Width:**
Confidence (bankfull): High	**Constriction:** Moderate	
Tailwater Scour Pool: Large		
Crossing Comments: The culvert itself is deteriorating and the bottom is gone (outlet).		

Structure 1

Structure Material: Combination		
Outlet Data		
Outlet Shape: 3 – Open Bottom	**Outlet Armoring:** Extensive	**Outlet Grade:** Cascade
Outlet Width: 1.6	**Outlet Height:** 1.6	**Outlet Substrate/Water Width:** 1.6
Outlet Water Depth: 0.2	**Outlet Drop to Water Surface:** 1.4	**Outlet Drop to Stream Bottom:** 2
Abutment Height:	**Structure Length:** 29	
Inlet Data		
Inlet Shape: 3 – Open Bottom	**Inlet Type:** Wingwalls	**Inlet Grade:** At Stream Grade
Inlet Width: 1.5	**Inlet Height:** 1.3	
Inlet Substrate/Water Width: 1.5	**Inlet Water Depth:** 0.7	
Additional Conditions		

Slope %:	**Slope Confidence:** Low	
Internal Structures: Baffles/Weirs	**Structure Substrate Matches Stream:** Comparable	
Structure Substrate Type: Silt	**Structure Substrate Coverage:** 100%	
Physical Barrier: None	**Severity:** None	
Water Depth Matches Stream: Yes	**Water Velocity Matches Stream:** Yes	
Dry Passage Through Structure: No		**Height Above Dry Passage:**
Comments:		

NAACC Culvert Survey Form

Crossing Data

General Information		
Crossing Code: xy4228503272071398		
Date Observed: April 8, 2026	**Lead Observer:** Ryan Hurley	**Town:** North Brookfield
Stream: Horse Pond Brook	**Road:** Oakham Road (Route 148)	**Road Type:** Paved
Latitude: 42.285032	**Longitude:** -72.071398	
Location Description: Doane Pond Dam		

Crossing Information	
Crossing Type: Multiple Culvert	**Number of Culverts/Bridges:** 2

Inlet Image:



Outlet Image:



Upstream Image:	Downstream Image:
	

Flow Condition: Moderate	**Crossing Condition:** OK	**Tidal Site:** No
Alignment: Flow Aligned	**Road Fill Height:** 2	**Bankfull Width:**
Confidence (bankfull):	**Constriction:** Moderate	
Tailwater Scour Pool: Large		
Crossing Comments: Inlet is the dam and outlet is an actual culvert.		

Structure 1

Structure Material: Concrete		
Outlet Data		
Outlet Shape: 1 - Round Culvert	**Outlet Armoring:** Extensive	**Outlet Grade:** At Stream Grade
Outlet Width: 3	**Outlet Height:** 3	**Outlet Substrate/Water Width:** 2
Outlet Water Depth: 0.4	**Outlet Drop to Water Surface:** 0.0	**Outlet Drop to Stream Bottom:** 3.4
Abutment Height:	**Structure Length:** 29	
Inlet Data		
Inlet Shape: 1 - Round Culvert	**Inlet Type:** Headwalls and Wingwalls	**Inlet Grade:** Inlet Drop
Inlet Width: 3	**Inlet Height:** 3	
Inlet Substrate/Water Width: 2	**Inlet Water Depth:** 0.5	

Additional Conditions		
Slope %:	**Slope Confidence:**	
Internal Structures: None	**Structure Substrate Matches Stream:** None	
Structure Substrate Type: None	**Structure Substrate Coverage:** None	
Physical Barrier: Fencing	**Severity:** Moderate	
Water Depth Matches Stream: No-Deeper	**Water Velocity Matches Stream:** Yes	
Dry Passage Through Structure: No	**Height Above Dry Passage:**	
Comments:		

Structure 2

Structure Material: Concrete		
Outlet Data		
Outlet Shape: 6 - Box/Bridge with abutments	**Outlet Armoring:** Extensive	**Outlet Grade:** At Stream Grade
Outlet Width: 8.3	**Outlet Height:** 4.1	**Outlet Substrate/Water Width:** 7.7
Outlet Water Depth: 0.4	**Outlet Drop to Water Surface:** 3.7	**Outlet Drop to Stream Bottom:** 4.5
Abutment Height:	**Structure Length:** 29	
Inlet Data		
Inlet Shape: 5 - Bridge w/ slide slopes	**Inlet Type:** Headwalls and Wingwalls	**Inlet Grade:** At Stream Grade
Inlet Width: 8.3	**Inlet Height:** 7.7	
Inlet Substrate/Water Width: 0.4	**Inlet Water Depth:** 0	
Additional Conditions		
Slope %:	**Slope Confidence:**	
Internal Structures: None	**Structure Substrate Matches Stream:** None	
Structure Substrate Type: None	**Structure Substrate Coverage:** None	
Physical Barrier: Fencing	**Severity:** Moderate	
Water Depth Matches Stream: Yes	**Water Velocity Matches Stream:** Yes	
Dry Passage Through Structure: No	**Height Above Dry Passage:**	

Comments:

NAACC Culvert Survey Form

Crossing Data

General Information		
Crossing Code: xy4228749672064401		
Date Observed: April 24, 2026	**Lead Observer:** Ryan Hurley	**Town:** North Brookfield
Stream: Unknown	**Road:** Oakham road	**Road Type:** Paved
Latitude: 42.287496	**Longitude:** -72.064401	
Location Description: 107 Oakham Road		

Crossing Information	
Crossing Type: Culvert	**Number of Culverts/Bridges:** 1

Inlet Image:



Outlet Image:



Upstream Image:	Downstream Image:
	

Flow Condition: Typical-Low	**Crossing Condition:** OK	**Tidal Site:** No
Alignment: Flow Aligned	**Road Fill Height:** 2	**Bankfull Width:**
Confidence (bankfull):	**Constriction:** Moderate	
Tailwater Scour Pool: Large		
Crossing Comments: There was plenty of vegetation and debris blocking the inlet, but managed to clear it.		

Structure 1

Structure Material: Metal		
Outlet Data		
Outlet Shape: 1 - Round Culvert	**Outlet Armoring:** Extensive	**Outlet Grade:** Free Fall onto Cascade
Outlet Width: 2	**Outlet Height:** 1.8	**Outlet Substrate/Water Width:** 2
Outlet Water Depth: 0.7	**Outlet Drop to Water Surface:** 1.1	**Outlet Drop to Stream Bottom:** 2.5
Abutment Height:	**Structure Length:** 45	
Inlet Data		
Inlet Shape: 1 - Round Culvert	**Inlet Type:** Headwalls and Wingwalls	**Inlet Grade:** At Stream Grade
Inlet Width: 2	**Inlet Height:** 2	
Inlet Substrate/Water Width: 1.5	**Inlet Water Depth:** 0.5	

Additional Conditions		
Slope %:	**Slope Confidence:**	
Internal Structures: None	**Structure Substrate Matches Stream:** Comparable	
Structure Substrate Type: Silt	**Structure Substrate Coverage:** 100%	
Physical Barrier: Debris/Sediment/Rock	**Severity:** Moderate	
Water Depth Matches Stream: No-Deeper	**Water Velocity Matches Stream:** Yes	
Dry Passage Through Structure: No		**Height Above Dry Passage:**
Comments:		

NAACC Culvert Survey Form

Crossing Data

General Information		
Crossing Code: xy4228847372061569		
Date Observed: April 8, 2026	**Lead Observer:** Ryan Hurley	**Town:** North Brookfield
Stream:	**Road:** Oakham Road	**Road Type:** Paved
Latitude: 42.288473	**Longitude:** -72.061569	
Location Description: Near 116 Oakham Road		

Crossing Information	
Crossing Type: Culvert	**Number of Culverts/Bridges:** 1
Inlet Image:	**Outlet Image:** 

Upstream Image:	**Downstream Image:** 

Flow Condition: Typical-Low	**Crossing Condition:** Poor	**Tidal Site:** No
Alignment: Flow Aligned	**Road Fill Height:** 0	**Bankfull Width:**
Confidence (bankfull): Low/Estimated	**Constriction:** Spans full channel and banks	
Tailwater Scour Pool: Small		
Crossing Comments: Hardly noticeable and difficult to determine the crossing condition.		

Structure 1

Structure Material: Rock/Stone		
Outlet Data		
Outlet Shape: 2 - Pipe Arch/Squashed Round	**Outlet Armoring:** Extensive	**Outlet Grade:** At Stream Grade
Outlet Width: 1.6	**Outlet Height:** 0.4	**Outlet Substrate/Water Width:** 1.6
Outlet Water Depth: 0.1	**Outlet Drop to Water Surface:** 0.0	**Outlet Drop to Stream Bottom:** 0.3
Abutment Height:	**Structure Length:** 29	
Inlet Data		
Inlet Shape: 2 - Pipe Arch/Squashed Round	**Inlet Type:** Headwall	**Inlet Grade:** At Stream Grade

Inlet Width: 2	**Inlet Height:** 0.4
Inlet Substrate/Water Width: 1.6	**Inlet Water Depth:** 0.2

Additional Conditions

Slope %:	**Slope Confidence:** Low
Internal Structures: None	**Structure Substrate Matches Stream:** Comparable
Structure Substrate Type: Silt	**Structure Substrate Coverage:** 100%
Physical Barrier: None	**Severity:** None
Water Depth Matches Stream: Yes	**Water Velocity Matches Stream:** Yes
Dry Passage Through Structure: No	**Height Above Dry Passage:**
Comments:	

NAACC Culvert Survey Form

Crossing Data

General Information		
Crossing Code: xy4228884572057473		
Date Observed: April 27, 2026	**Lead Observer:** Ryan Hurley	**Town:** North Brookfield
Stream: Unknown	**Road:** Oakham Road (Route 148)	**Road Type:** Paved
Latitude: 42.288845	**Longitude:** -72.057473	
Location Description: Northeast of Mad Brook Road intersection on 129 Oakham Road.		

Crossing Information	
Crossing Type: Partially inaccessible	**Number of Culverts/Bridges:** 1

Inlet Image:



Outlet Image:



Upstream Image:	Downstream Image:
	

Flow Condition: Typical-Low	**Crossing Condition:** Poor	**Tidal Site:** No
Alignment: Flow Aligned	**Road Fill Height:** 1.8	**Bankfull Width:**
Confidence (bankfull):	**Constriction:** Moderate	
Tailwater Scour Pool: Small		
Crossing Comments: The inlet is deteriorating while the outlet is just rocks.		

Structure 1

Structure Material: Metal		
Outlet Data		
Outlet Shape: Unknown (when shape is unidentifiable)	**Outlet Armoring:** Extensive	**Outlet Grade:** At Stream Grade
Outlet Width: 1.1	**Outlet Height:** 2.2	**Outlet Substrate/Water Width:** 1.1
Outlet Water Depth: 0.9	**Outlet Drop to Water Surface:** 0.0	**Outlet Drop to Stream Bottom:** 2.3
Abutment Height:	**Structure Length:** 38	
Inlet Data		
Inlet Shape: 1 - Round Culvert	**Inlet Type:** None	**Inlet Grade:** At Stream Grade
Inlet Width: 1.7	**Inlet Height:** 1.4	
Inlet Substrate/Water Width: 1.7	**Inlet Water Depth:** 0.7	

Additional Conditions		
Slope %:	**Slope Confidence:**	
Internal Structures: None	**Structure Substrate Matches Stream:** Comparable	
Structure Substrate Type: Silt	**Structure Substrate Coverage:** 100%	
Physical Barrier: Deformation	**Severity:** Severe	
Water Depth Matches Stream: No-Deeper	**Water Velocity Matches Stream:** Yes	
Dry Passage Through Structure: No		**Height Above Dry Passage:**
Comments:		

NAACC Culvert Survey Form

Crossing Data

General Information		
Crossing Code: xy4229692472055278		
Date Observed: April 27, 2026	**Lead Observer:** Ryan Hurley	**Town:** North Brookfield
Stream: North Brook	**Road:** Oakham Road (Route 148)	**Road Type:** Paved
Latitude: 42.296924	**Longitude:** -72.055278	
Location Description: North of 167 Oakham Road		

Crossing Information	
Crossing Type: Culvert	**Number of Culverts/Bridges:** 1

Inlet Image:



Outlet Image:



Upstream Image:	Downstream Image:
	

Flow Condition: Typical-Low	**Crossing Condition:** Poor	**Tidal Site:** No
Alignment: Flow Aligned	**Road Fill Height:** 2	**Bankfull Width:**
Confidence (bankfull):	**Constriction:** Moderate	
Tailwater Scour Pool: Small		
Crossing Comments: Inlet culvert deteriorated, while both are barely accessible but manageable.		

Structure 1

Structure Material: Metal		
Outlet Data		
Outlet Shape: 3 – Open Bottom	**Outlet Armoring:** Extensive	**Outlet Grade:** At Stream Grade
Outlet Width: 2.9	**Outlet Height:** 3	**Outlet Substrate/Water Width:** 2.9
Outlet Water Depth: 1.7	**Outlet Drop to Water Surface:** 0.0	**Outlet Drop to Stream Bottom:** 3
Abutment Height:	**Structure Length:** 38	
Inlet Data		
Inlet Shape: 3 – Open Bottom	**Inlet Type:** Headwall	**Inlet Grade:** At Stream Grade
Inlet Width: 2.5	**Inlet Height:** 3	
Inlet Substrate/Water Width: 2.5	**Inlet Water Depth:** 1	

Additional Conditions		
Slope %:	**Slope Confidence:**	
Internal Structures: None	**Structure Substrate Matches Stream:** Comparable	
Structure Substrate Type: Silt	**Structure Substrate Coverage:** 100%	
Physical Barrier: None, Debris/Sediment/Rock	**Severity:** Moderate	
Water Depth Matches Stream: No-Deeper	**Water Velocity Matches Stream:** No-Slower	
Dry Passage Through Structure: No		**Height Above Dry Passage:**
Comments: Surounded by debris.		

NAACC Culvert Survey Form

Crossing Data

General Information		
Crossing Code: xy4230420272051905		
Date Observed: April 27, 2026	**Lead Observer:** Ryan Hurley	**Town:** North Brookfield
Stream: Unknown	**Road:** Oakham Road (Route 148)	**Road Type:** Paved
Latitude: 42.304202	**Longitude:** -72.051905	
Location Description: Between 189 and 191 Oakham Road.		

Crossing Information	
Crossing Type: Culvert	**Number of Culverts/Bridges:** 1

Inlet Image:



Outlet Image:



Upstream Image:	Downstream Image:
	

Flow Condition: Typical-Low	**Crossing Condition:** OK	**Tidal Site:** No
Alignment: Flow Aligned	**Road Fill Height:** 2	**Bankfull Width:**
Confidence (bankfull):	**Constriction:** Moderate	
Tailwater Scour Pool: Small		
Crossing Comments: Accessible, inlet has scour pool but drops into the culvert.		

Structure 1

Structure Material: Plastic		
Outlet Data		
Outlet Shape: 1 - Round Culvert	**Outlet Armoring:** Extensive	**Outlet Grade:** At Stream Grade
Outlet Width: 2	**Outlet Height:** 2.2	**Outlet Substrate/Water Width:** 1
Outlet Water Depth: 0.4	**Outlet Drop to Water Surface:** 1.9	**Outlet Drop to Stream Bottom:** 2.4
Abutment Height:	**Structure Length:** 33	
Inlet Data		
Inlet Shape: 1 - Round Culvert	**Inlet Type:** None	**Inlet Grade:** Inlet Drop
Inlet Width: 1.7	**Inlet Height:** 1.3	
Inlet Substrate/Water Width: 1.7	**Inlet Water Depth:** 1	

Additional Conditions		
Slope %:	**Slope Confidence:**	
Internal Structures: None	**Structure Substrate Matches Stream:** Comparable	
Structure Substrate Type: None	**Structure Substrate Coverage:** None	
Physical Barrier: None	**Severity:** None	
Water Depth Matches Stream: No-Deeper	**Water Velocity Matches Stream:** No-Faster	
Dry Passage Through Structure: No		**Height Above Dry Passage:**
Comments:		

NAACC Culvert Survey Form

Crossing Data

General Information		
Crossing Code: xy4231554072050201		
Date Observed: April 1, 2026	**Lead Observer:** Ryan Hurley	**Town:** Oakham
Stream:	**Road:** North Brookfield Road (Route 148)	**Road Type:** Paved
Latitude: 42.315540	**Longitude:** -72.050201	
Location Description: New Braintree Town Line on North Brookfield Road (Route 148)		

Crossing Information	
Crossing Type: Culvert	**Number of Culverts/Bridges:** 1

Inlet Image:



Outlet Image:



Upstream Image:	Downstream Image:
	

Flow Condition: Typical-Low	**Crossing Condition:** OK	**Tidal Site:** No
Alignment: Flow Aligned	**Road Fill Height:** 2	**Bankfull Width:**
Confidence (bankfull):	**Constriction:** Spans only bankfull/active channel	
Tailwater Scour Pool: Small		
Crossing Comments: Outlet distance to Road is about 16 feet compared to inlet at 3.5 feet.		

Structure 1

Structure Material: Combination		
Outlet Data		
Outlet Shape: 4 - Box	**Outlet Armoring:** Extensive	**Outlet Grade:** At Stream Grade
Outlet Width: 2.9	**Outlet Height:** 4.6	**Outlet Substrate/Water Width:** 2.9
Outlet Water Depth: 0.3	**Outlet Drop to Water Surface:** 0	**Outlet Drop to Stream Bottom:** 0.8
Abutment Height:	**Structure Length:** 44.5	
Inlet Data		
Inlet Shape: 1 - Round Culvert	**Inlet Type:** Headwalls and Wingwalls	**Inlet Grade:** At Stream Grade
Inlet Width: 3.3	**Inlet Height:** 3	
Inlet Substrate/Water Width: 2.8	**Inlet Water Depth:** 0.6	
Additional Conditions		

Slope %:	**Slope Confidence:**	
Internal Structures: None	**Structure Substrate Matches Stream:** Comparable	
Structure Substrate Type: None	**Structure Substrate Coverage:** None	
Physical Barrier: None	**Severity:** None	
Water Depth Matches Stream: No-Shallower	**Water Velocity Matches Stream:** No-Faster	
Dry Passage Through Structure: No		**Height Above Dry Passage:**
Comments:		

NAACC Culvert Survey Form

Crossing Data

General Information		
Crossing Code: xy4231821472049341		
Date Observed: August 25, 2026	**Lead Observer:** Ryan Hurley	**Town:** Oakham
Stream: Unknown tributary to Brooks Pond	**Road:** North Brookfield Road (148)	**Road Type:** Paved
Latitude: 42.31820	**Longitude:** -72.04935	
Location Description: Near 1934 North Brookfield Road		

Crossing Information	
Crossing Type: Culvert	**Number of Culverts/Bridges:** 1

Inlet Image:



Outlet Image:



Upstream Image:	Downstream Image:
	

Flow Condition: Typical-Low	**Crossing Condition:** OK	**Tidal Site:** No
Alignment: Flow Aligned	**Road Fill Height:** 1.5	**Bankfull Width:**
Confidence (bankfull):	**Constriction:** Spans only bankfull/active channel	
Tailwater Scour Pool: Small		
Crossing Comments: Cracks in concrete.		

Structure 1

Structure Material: Concrete		
Outlet Data		
Outlet Shape: 1 - Round Culvert	**Outlet Armoring:** Extensive	**Outlet Grade:** Free Fall onto Cascade
Outlet Width: 3	**Outlet Height:** 3.1	**Outlet Substrate/Water Width:** 1
Outlet Water Depth: 0.1	**Outlet Drop to Water Surface:** 1.5	**Outlet Drop to Stream Bottom:** 5
Abutment Height:	**Structure Length:** 50	
Inlet Data		
Inlet Shape: 1 - Round Culvert	**Inlet Type:** Headwalls and Wingwalls	**Inlet Grade:** Inlet Drop
Inlet Width: 3.4	**Inlet Height:** 3.3	
Inlet Substrate/Water Width: 1.5	**Inlet Water Depth:** 0.3	

Additional Conditions		
Slope %:	**Slope Confidence:**	
Internal Structures: None	**Structure Substrate Matches Stream:** Comparable	
Structure Substrate Type: Gravel	**Structure Substrate Coverage:** None	
Physical Barrier: None	**Severity:** None	
Water Depth Matches Stream: No-Shallower	**Water Velocity Matches Stream:** No-Faster	
Dry Passage Through Structure: No		**Height Above Dry Passage:**
Comments:		

NAACC Culvert Survey Form

Crossing Data

General Information		
Crossing Code: xy4232441772045032		
Date Observed: April 2, 2026	**Lead Observer:** Ryan Hurley	**Town:** Oakham
Stream: Maynard Brook	**Road:** North Brookfield Road (Route 148)	**Road Type:** Paved
Latitude: 42.324418	**Longitude:** -72.045017	
Location Description: Located on North Brookfield Road (Route 148) near pole number 26.		

Crossing Information	
Crossing Type: Culvert	**Number of Culverts/Bridges:** 1

Inlet Image:



Outlet Image:



Upstream Image:	Downstream Image:
	

Flow Condition: Typical-Low	**Crossing Condition:** OK	**Tidal Site:** No
Alignment: Flow Aligned	**Road Fill Height:** 2	**Bankfull Width:**
Confidence (bankfull): High	**Constriction:** Moderate	
Tailwater Scour Pool: Large		
Crossing Comments: Culvert is in pretty good condition apart from graffiti and cracks.		

Structure 1

Structure Material: Concrete		
Outlet Data		
Outlet Shape: 4 - Box	**Outlet Armoring:** Not Extensive	**Outlet Grade:** At Stream Grade
Outlet Width: 6	**Outlet Height:** 5.9	**Outlet Substrate/Water Width:** 5.9
Outlet Water Depth: 0.3	**Outlet Drop to Water Surface:** 0	**Outlet Drop to Stream Bottom:** 0
Abutment Height:	**Structure Length:** 35	
Inlet Data		
Inlet Shape: 4 - Box	**Inlet Type:** Headwall	**Inlet Grade:** structure1inlet_grade_free_casc
Inlet Width: 6	**Inlet Height:** 6.2	
Inlet Substrate/Water Width: 5.9	**Inlet Water Depth:** 0.5	

Additional Conditions		
Slope %:	**Slope Confidence:**	
Internal Structures: None	**Structure Substrate Matches Stream:** Comparable	
Structure Substrate Type: Silt	**Structure Substrate Coverage:** 25%	
Physical Barrier: None	**Severity:** None	
Water Depth Matches Stream: Yes	**Water Velocity Matches Stream:** Yes	
Dry Passage Through Structure: No		**Height Above Dry Passage:**
Comments:		

NAACC Culvert Survey Form

Crossing Data

General Information		
Crossing Code: xy4233580172038691		
Date Observed: April 1, 2026	**Lead Observer:** Ryan Hurley	**Town:** Oakham
Stream: Tributary to Fivemile River	**Road:** North Brookfield Road (Route 148)	**Road Type:** Paved
Latitude: 42.335801	**Longitude:** -72.038691	
Location Description: near driveway to 1246 North Brookfield Road		

Crossing Information	
Crossing Type: Culvert	**Number of Culverts/Bridges:** 1

Inlet Image:



Outlet Image:



Upstream Image:	Downstream Image:
	

Flow Condition: Moderate	**Crossing Condition:** OK	**Tidal Site:** No
Alignment: Flow Aligned	**Road Fill Height:** 0	**Bankfull Width:**
Confidence (bankfull): High	**Constriction:** Moderate	
Tailwater Scour Pool: Small		
Crossing Comments: Pool depth is 1.5 feet deeper than bottom of culvert for Outlet.		

Structure 1

Structure Material: Metal		
Outlet Data		
Outlet Shape: 1 - Round Culvert	**Outlet Armoring:** Extensive	**Outlet Grade:** Free Fall
Outlet Width: 2.3	**Outlet Height:** 3	**Outlet Substrate/Water Width:** 1.2
Outlet Water Depth: 0.3	**Outlet Drop to Water Surface:** 1.5	**Outlet Drop to Stream Bottom:** 3
Abutment Height:	**Structure Length:** 42.5	
Inlet Data		
Inlet Shape: 1 - Round Culvert	**Inlet Type:** Headwalls and Wingwalls	**Inlet Grade:** At Stream Grade
Inlet Width: 2	**Inlet Height:** 2	
Inlet Substrate/Water Width: 2	**Inlet Water Depth:** 0.9	

Additional Conditions		
Slope %:	**Slope Confidence:**	
Internal Structures: None	**Structure Substrate Matches Stream:** None	
Structure Substrate Type: None	**Structure Substrate Coverage:** None	
Physical Barrier: None	**Severity:** None	
Water Depth Matches Stream: No-Deeper	**Water Velocity Matches Stream:** Yes	
Dry Passage Through Structure: No		**Height Above Dry Passage:**
Comments:		

NAACC Culvert Survey Form

Crossing Data

General Information		
Crossing Code: xy4233820772037179		
Date Observed: April 1, 2026	**Lead Observer:** Ryan Hurley	**Town:** Oakham
Stream: Tributary to Fivemile River	**Road:** North Brookfield Road	**Road Type:** Paved
Latitude: 42.338207	**Longitude:** -72.037179	
Location Description: Near South Cemetery and house #1158 on North Brookfield Road (Route 148).		

Crossing Information	
Crossing Type: Culvert	**Number of Culverts/Bridges:** 1

Inlet Image:



Outlet Image:



Upstream Image:	Downstream Image:
	

Flow Condition: Moderate	**Crossing Condition:** OK	**Tidal Site:** No
Alignment: Flow Aligned	**Road Fill Height:** 1	**Bankfull Width:**
Confidence (bankfull): Low/Estimated	**Constriction:** Moderate	
Tailwater Scour Pool: Small		
Crossing Comments: Culvert is in pretty good condition, the outlet has rocks stacked below the culvert.		

Structure 1

Structure Material: Plastic		
Outlet Data		
Outlet Shape: 1 - Round Culvert	**Outlet Armoring:** Not Extensive	**Outlet Grade:** Cascade
Outlet Width: 3.5	**Outlet Height:** 3.7	**Outlet Substrate/Water Width:** 2
Outlet Water Depth: 0.5	**Outlet Drop to Water Surface:** 1	**Outlet Drop to Stream Bottom:** 1.5
Abutment Height:	**Structure Length:** 42.5	
Inlet Data		
Inlet Shape: 1 - Round Culvert	**Inlet Type:** Projecting	**Inlet Grade:** At Stream Grade
Inlet Width: 3.5	**Inlet Height:** 3.7	

Inlet Substrate/Water Width: 2	**Inlet Water Depth:** 0.5

Additional Conditions

Slope %:	**Slope Confidence:**	
Internal Structures: None	**Structure Substrate Matches Stream:** Comparable	
Structure Substrate Type: None	**Structure Substrate Coverage:** None	
Physical Barrier: None	**Severity:** None	
Water Depth Matches Stream: Yes	**Water Velocity Matches Stream:** Yes	
Dry Passage Through Structure: No		**Height Above Dry Passage:**
Comments:		

NAACC Culvert Survey Form

Crossing Data

General Information		
Crossing Code: xy4234613272031266		
Date Observed: March 31, 2026	**Lead Observer:** Ryan Hurley	**Town:** Oakham
Stream: Tributary to Dean Pond	**Road:** North Brookfield Road	**Road Type:** Paved
Latitude: 42.346132	**Longitude:** -72.031266	
Location Description: Located on 807 New Braintree Road.		

Crossing Information	
Crossing Type: Culvert	**Number of Culverts/Bridges:** 1

Inlet Image:



Outlet Image:



Upstream Image:	Downstream Image:
	

Flow Condition: Moderate	**Crossing Condition:** OK	**Tidal Site:** No
Alignment: Flow Aligned	**Road Fill Height:** 1	**Bankfull Width:**
Confidence (bankfull): High	**Constriction:** Moderate	
Tailwater Scour Pool: None		
Crossing Comments: Culvert runs through peoples yard, but still accessible.		

Structure 1

Structure Material: Metal		
Outlet Data		
Outlet Shape: 2 – pipe arch/elliptical culvert	**Outlet Armoring:** Extensive	**Outlet Grade:** At Stream Grade
Outlet Width: 3.9	**Outlet Height:** 3	**Outlet Substrate/Water Width:** 3
Outlet Water Depth: 0.5	**Outlet Drop to Water Surface:** 0	**Outlet Drop to Stream Bottom:** 0
Abutment Height:	**Structure Length:** 58	
Inlet Data		
Inlet Shape: 2 – pipe arch/elliptical culvert	**Inlet Type:** Headwall	**Inlet Grade:** structure1inlet_grade_cascade
Inlet Width: 4	**Inlet Height:** 2.8	
Inlet Substrate/Water Width: 3.11	**Inlet Water Depth:** 0.4	

Additional Conditions		
Slope %:	**Slope Confidence:** Low	
Internal Structures: Supports	**Structure Substrate Matches Stream:** Comparable	
Structure Substrate Type: Silt	**Structure Substrate Coverage:** 100%	
Physical Barrier: None	**Severity:** None	
Water Depth Matches Stream: No-Shallower	**Water Velocity Matches Stream:** No-Faster	
Dry Passage Through Structure: No		**Height Above Dry Passage:**
Comments:		

Appendix B: Route 148 Traffic Volume Counts

Appendix B includes the results from the three (3) traffic counts completed on Route 148 study corridor. The data shows the 60-minute volumes for each direction at each traffic count location as well as the combined vehicle classification data.

Town : North Brookfield
Street : Route 148
Locations : North of Route 67

Site: 2026023

Weekly Volume

Interval Start	Mon 6/8/2026		Tue 6/9/2026		Wed 6/10/2026		Thu 6/11/2026		Fri 6/12/2026		Sat 6/13/2026		Sun 6/14/2026		Mon - Fri Average		Weekly Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	-	-	2	3	0	7	2	7	4	2	1	6	5	5	2.0	4.8	2.3	5.0
1:00 AM	-	-	0	3	0	3	2	2	0	1	5	2	0	2	0.5	2.3	1.2	2.2
2:00 AM	-	-	0	0	0	1	4	1	1	2	1	6	2	3	1.3	1.0	1.3	2.2
3:00 AM	-	-	8	5	8	4	7	3	9	4	5	1	2	3	8.0	4.0	6.5	3.3
4:00 AM	-	-	22	2	22	3	19	3	23	4	4	2	2	2	21.5	3.0	15.3	2.7
5:00 AM	-	-	56	16	51	10	54	5	54	8	13	6	9	3	53.8	9.8	39.5	8.0
6:00 AM	-	-	79	41	74	40	69	41	64	37	30	8	12	5	71.5	39.8	54.7	28.7
7:00 AM	-	-	105	60	101	75	110	56	111	42	43	22	26	23	106.8	58.3	82.7	46.3
8:00 AM	-	-	83	61	87	53	73	53	55	58	39	39	44	36	74.5	56.3	63.5	50.0
9:00 AM	-	-	57	59	67	62	69	48	63	42	79	55	47	54	64.0	52.8	63.7	53.3
10:00 AM	-	-	68	49	70	48	51	45	41	45	76	52	59	67	57.5	46.8	60.8	51.0
11:00 AM	14	15	66	52	63	60	57	53	66	55	66	73	86	52	63.0	55.0	67.3	57.5
12:00 PM	51	60	64	64	54	52	69	51	74	59	91	65	87	59	62.4	57.2	70.0	58.6
1:00 PM	80	66	80	64	61	50	65	46	77	65	65	63	75	54	72.6	58.2	71.9	58.3
2:00 PM	95	70	116	66	83	48	103	57	104	68	80	63	72	68	100.2	61.8	93.3	62.9
3:00 PM	87	67	92	109	84	92	82	90	88	104	89	68	76	89	86.6	92.4	85.4	88.4
4:00 PM	77	103	87	101	91	108	80	94	94	113	77	83	74	64	85.8	103.8	82.9	95.1
5:00 PM	72	95	76	90	93	74	72	83	79	82	77	58	60	41	78.4	84.8	75.6	74.7
6:00 PM	55	57	51	69	53	66	59	60	71	55	55	45	43	59	57.8	61.4	55.3	58.7
7:00 PM	35	45	33	45	45	39	87	62	42	50	37	51	69	44	48.4	48.2	49.7	48.0
8:00 PM	32	24	37	34	36	35	51	42	31	25	37	43	56	33	37.4	32.0	40.0	33.7
9:00 PM	13	19	14	19	21	34	41	35	16	30	19	29	38	19	21.0	27.4	23.1	26.4
10:00 PM	12	11	14	8	9	6	20	13	19	21	26	17	18	10	14.8	11.8	16.9	12.3
11:00 PM	4	7	4	14	4	8	8	14	4	18	10	15	9	11	4.8	12.2	6.1	12.4
Totals	627	639	1214	1034	1177	978	1254	964	1190	990	1025	872	971	806	1194.5	984.7	1129.0	939.7
Combined	1266		2248		2155		2218		2180		1897		1777		2179.2		2068.7	
Split (%)	49.5	50.5	54.0	46.0	54.6	45.4	56.5	43.5	54.6	45.4	54.0	46.0	54.6	45.4	54.8	45.2	54.6	45.4

Peak Hours

12:00 AM - 12:00 PM	-	-	7:15 AM	7:45 AM	6:30 AM	7:00 AM	7:00 AM	7:45 AM	7:00 AM	7:45 AM	9:15 AM	11:00 AM	11:00 AM	9:45 AM	7:00 AM	7:45 AM	7:00 AM	11:00 AM
Volume	-	-	111	71	105	75	110	59	111	58	83	73	86	67	106.8	60.5	82.7	57.4
Factor	-	-	0.69	0.85	0.82	0.69	0.86	0.70	0.93	0.81	0.83	0.73	0.77	0.88	0.84	0.89	0.83	0.93
12:00 PM - 12:00 AM	1:45 PM	4:15 PM	2:00 PM	3:30 PM	4:30 PM	4:00 PM	2:00 PM	3:45 PM	2:15 PM	3:30 PM	12:00 PM	3:15 PM	12:00 PM	3:00 PM	2:00 PM	4:00 PM	2:00 PM	3:30 PM
Volume	95	105	116	114	100	108	103	94	105	126	91	90	87	89	100.2	103.8	93.3	96.3
Factor	0.85	0.91	0.71	0.75	0.83	0.90	0.80	0.87	0.80	0.81	0.84	0.83	0.84	0.93	0.91	0.95	0.91	0.89

Town : North Brookfield
Street : Route 148
Locations : North of Route 67

Site: 2026023
6/9/2026
Tuesday

Daily Classification

Combined Channels

Interval Start	Total	Motor Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Tailgating
12:00 AM	5	0	4	0	0	0	0	0	1	0	0	0	0	0	0
1:00 AM	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	13	0	8	2	0	3	0	0	0	0	0	0	0	0	0
4:00 AM	24	0	14	7	1	2	0	0	0	0	0	0	0	0	0
5:00 AM	72	0	40	23	0	9	0	0	0	0	0	0	0	0	0
6:00 AM	121	0	76	24	4	14	2	0	0	0	1	0	0	0	0
7:00 AM	165	1	100	36	4	20	0	2	0	1	0	1	0	0	0
8:00 AM	144	1	87	24	7	17	2	1	1	4	0	0	0	0	0
9:00 AM	116	0	78	19	3	14	0	0	1	1	0	0	0	0	0
10:00 AM	118	0	76	26	1	11	1	0	2	0	1	0	0	0	0
11:00 AM	118	0	82	19	0	12	1	0	2	1	1	0	0	0	0
12:00 PM	129	0	80	29	3	12	0	0	3	2	0	0	0	0	0
1:00 PM	144	0	77	36	2	26	0	0	2	1	0	0	0	0	0
2:00 PM	182	0	121	35	2	20	1	0	2	1	0	0	0	0	0
3:00 PM	202	0	124	47	4	24	0	0	1	1	1	0	0	0	0
4:00 PM	189	0	103	40	4	39	0	0	2	1	0	0	0	0	0
5:00 PM	167	0	111	36	2	17	0	0	1	0	0	0	0	0	0
6:00 PM	120	0	83	28	1	7	0	0	1	0	0	0	0	0	0
7:00 PM	78	0	53	12	1	10	1	0	1	0	0	0	0	0	0
8:00 PM	71	0	52	13	0	6	0	0	0	0	0	0	0	0	0
9:00 PM	33	0	22	3	0	7	0	0	1	0	0	0	0	0	0
10:00 PM	22	0	17	4	0	1	0	0	0	0	0	0	0	0	0
11:00 PM	18	0	14	4	0	0	0	0	0	0	0	0	0	0	0
Total	2254	2	1425	467	39	271	8	3	21	13	4	1	0	0	0
%		0.1	63.2	20.7	1.7	12.0	0.4	0.1	0.9	0.6	0.2	0.0	0.0	0.0	0.0

Town : Oakham
Street : Route 148
Location : At New Braintree Town Line

Site: 2026022

Weekly Volume

Interval Start	Mon 6/22/2026		Tue 6/23/2026		Wed 6/24/2026		Thu 6/25/2026		Fri 6/26/2026		Sat 6/27/2026		Sun 6/28/2026		Mon - Fri Average		Weekly Average	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	-	-	4	0	2	2	5	1	5	1	-	-	-	-	4.0	1.0	4.0	1.0
1:00 AM	-	-	0	1	0	0	1	1	1	0	-	-	-	-	0.5	0.5	0.5	0.5
2:00 AM	-	-	2	2	1	2	4	1	1	1	-	-	-	-	2.0	1.5	2.0	1.5
3:00 AM	-	-	2	6	3	7	4	8	5	6	-	-	-	-	3.5	6.8	3.5	6.8
4:00 AM	-	-	4	12	4	12	3	13	4	18	-	-	-	-	3.8	13.8	3.8	13.8
5:00 AM	-	-	16	44	15	50	13	46	11	35	-	-	-	-	13.8	43.8	13.8	43.8
6:00 AM	-	-	32	59	40	58	39	49	26	50	-	-	-	-	34.3	54.0	34.3	54.0
7:00 AM	-	-	58	82	65	68	57	70	37	52	-	-	-	-	54.3	68.0	54.3	68.0
8:00 AM	-	-	49	70	39	64	40	72	43	56	-	-	-	-	42.8	65.5	42.8	65.5
9:00 AM	-	-	41	33	33	44	39	43	47	40	-	-	-	-	40.0	40.0	40.0	40.0
10:00 AM	-	-	36	45	37	39	42	46	6	5	-	-	-	-	38.3	43.3	38.3	43.3
11:00 AM	35	33	49	53	33	50	34	41	-	-	-	-	-	-	38.7	48.0	38.7	48.0
12:00 PM	40	41	37	49	38	39	33	38	-	-	-	-	-	-	37.0	41.8	37.0	41.8
1:00 PM	44	43	38	37	40	40	56	49	-	-	-	-	-	-	44.5	42.3	44.5	42.3
2:00 PM	50	59	43	53	51	56	55	57	-	-	-	-	-	-	49.8	56.3	49.8	56.3
3:00 PM	94	51	98	54	74	51	72	48	-	-	-	-	-	-	84.5	51.0	84.5	51.0
4:00 PM	90	45	88	61	89	63	91	58	-	-	-	-	-	-	89.5	56.8	89.5	56.8
5:00 PM	79	44	96	56	91	84	74	61	-	-	-	-	-	-	85.0	61.3	85.0	61.3
6:00 PM	40	22	39	27	58	26	60	42	-	-	-	-	-	-	49.3	29.3	49.3	29.3
7:00 PM	25	13	29	19	32	30	40	24	-	-	-	-	-	-	31.5	21.5	31.5	21.5
8:00 PM	15	12	20	18	31	7	40	24	-	-	-	-	-	-	26.5	15.3	26.5	15.3
9:00 PM	10	8	21	3	21	10	19	9	-	-	-	-	-	-	17.8	7.5	17.8	7.5
10:00 PM	12	5	9	6	13	9	10	5	-	-	-	-	-	-	11.0	6.3	11.0	6.3
11:00 PM	10	1	7	7	10	6	5	2	-	-	-	-	-	-	8.0	4.0	8.0	4.0
Totals	544	377	818	797	820	817	836	808	186	264	0	0	0	0	810.0	779.1	810.0	779.1
Combined	921		1615		1637		1644		450		0		0		1589.1		1589.1	
Split (%)	59.1	40.9	50.7	49.3	50.1	49.9	50.9	49.1	41.3	58.7	-	-	-	-	51.0	49.0	51.0	49.0

Peak Hours

12:00 AM - 12:00 PM	11:00 AM	11:00 AM	7:15 AM	7:15 AM	7:00 AM	7:15 AM	6:45 AM	7:30 AM	7:30 AM	7:45 AM	-	-	-	-	7:15 AM	7:15 AM	7:15 AM	7:15 AM
Volume	35	33	67	86	65	74	60	74	50	61	-	-	-	-	56.3	70.3	56.3	70.3
Factor	0.67	0.59	0.80	0.74	0.96	0.71	0.79	0.80	0.89	0.90	-	-	-	-	0.89	0.86	0.89	0.86
12:00 PM - 12:00 AM	4:30 PM	2:00 PM	3:30 PM	4:00 PM	4:30 PM	5:00 PM	4:00 PM	4:45 PM	-	-	-	-	-	-	4:30 PM	4:45 PM	4:30 PM	4:45 PM
Volume	96	59	102	61	102	84	91	64	-	-	-	-	-	-	94.8	64.3	94.8	64.3
Factor	0.83	0.82	0.65	0.90	0.88	0.78	0.78	0.80	-	-	-	-	-	-	0.92	0.93	0.92	0.93

Town : Oakham
Street : Route 148
Location : At New Braintree Town Line

Site: 2026022
6/25/2026
Thursday

Daily Classification

Combined Channels

Interval Start	Total	Motor Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Tailgating
12:00 AM	6	0	4	1	0	1	0	0	0	0	0	0	0	0	0
1:00 AM	2	0	1	0	0	0	0	0	1	0	0	0	0	0	0
2:00 AM	5	0	3	1	1	0	0	0	0	0	0	0	0	0	0
3:00 AM	12	0	6	2	0	4	0	0	0	0	0	0	0	0	0
4:00 AM	16	0	11	2	0	3	0	0	0	0	0	0	0	0	0
5:00 AM	58	0	31	12	1	14	0	0	0	0	0	0	0	0	0
6:00 AM	88	0	49	19	0	19	0	0	0	1	0	0	0	0	0
7:00 AM	126	0	77	30	0	17	0	1	0	1	0	0	0	0	0
8:00 AM	112	0	77	20	2	12	1	0	0	0	0	0	0	0	0
9:00 AM	82	0	48	19	4	5	4	0	1	0	1	0	0	0	0
10:00 AM	88	0	67	9	1	8	1	0	2	0	0	0	0	0	0
11:00 AM	75	0	50	13	0	6	2	0	2	1	1	0	0	0	0
12:00 PM	71	0	45	14	0	10	0	0	1	1	0	0	0	0	0
1:00 PM	105	0	52	34	1	13	0	0	2	3	0	0	0	0	0
2:00 PM	111	0	59	24	1	22	2	0	2	0	1	0	0	0	0
3:00 PM	121	2	73	29	2	12	1	1	1	0	0	0	0	0	0
4:00 PM	150	0	83	40	0	24	1	0	2	0	0	0	0	0	0
5:00 PM	135	0	92	21	0	19	2	0	1	0	0	0	0	0	0
6:00 PM	102	0	70	18	0	14	0	0	0	0	0	0	0	0	0
7:00 PM	64	0	44	14	0	6	0	0	0	0	0	0	0	0	0
8:00 PM	64	0	47	9	2	6	0	0	0	0	0	0	0	0	0
9:00 PM	28	0	20	5	0	3	0	0	0	0	0	0	0	0	0
10:00 PM	15	0	11	4	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	7	0	5	2	0	0	0	0	0	0	0	0	0	0	0
Total	1643	2	1025	342	15	218	14	2	15	7	3	0	0	0	0
%		0.1	62.4	20.8	0.9	13.3	0.9	0.1	0.9	0.4	0.2	0.0	0.0	0.0	0.0

Town : Oakham
Street : Route 148
Location : South of Route 122

Site: 2026021

Weekly Volume

Interval Start	Mon 6/22/2026		Tue 6/23/2026		Wed 6/24/2026		Thu 6/25/2026		Fri 6/26/2026		Sat 6/27/2026		Sun 6/28/2026		Mon - Fri Average		Weekly Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	-	-	2	5	3	6	2	4	4	4	-	-	-	-	2.8	4.8	2.8	4.8
1:00 AM	-	-	1	1	0	1	1	0	1	4	-	-	-	-	0.8	1.5	0.8	1.5
2:00 AM	-	-	2	1	4	0	1	3	2	1	-	-	-	-	2.3	1.3	2.3	1.3
3:00 AM	-	-	10	2	9	1	10	4	5	1	-	-	-	-	8.5	2.0	8.5	2.0
4:00 AM	-	-	21	4	28	3	21	2	28	3	-	-	-	-	24.5	3.0	24.5	3.0
5:00 AM	-	-	77	9	75	13	75	12	77	10	-	-	-	-	76.0	11.0	76.0	11.0
6:00 AM	-	-	108	29	96	41	97	32	85	25	-	-	-	-	96.5	31.8	96.5	31.8
7:00 AM	-	-	122	53	118	55	118	42	105	40	-	-	-	-	115.8	47.5	115.8	47.5
8:00 AM	-	-	115	58	100	52	106	60	96	51	-	-	-	-	104.3	55.3	104.3	55.3
9:00 AM	-	-	54	47	72	63	52	55	51	35	-	-	-	-	59.3	55.0	59.3	55.0
10:00 AM	27	23	49	47	47	55	72	46	-	-	-	-	-	-	56.0	49.3	56.0	49.3
11:00 AM	65	58	41	58	66	58	55	54	-	-	-	-	-	-	56.8	57.0	56.8	57.0
12:00 PM	66	68	58	54	57	69	60	70	-	-	-	-	-	-	60.3	65.3	60.3	65.3
1:00 PM	64	69	47	55	38	60	62	78	-	-	-	-	-	-	52.8	65.5	52.8	65.5
2:00 PM	49	88	57	79	44	85	72	98	-	-	-	-	-	-	55.5	87.5	55.5	87.5
3:00 PM	75	122	58	121	67	104	69	120	-	-	-	-	-	-	67.3	116.8	67.3	116.8
4:00 PM	66	127	72	132	75	135	71	148	-	-	-	-	-	-	71.0	135.5	71.0	135.5
5:00 PM	45	134	64	135	104	142	66	124	-	-	-	-	-	-	69.8	133.8	69.8	133.8
6:00 PM	25	72	22	67	56	102	50	99	-	-	-	-	-	-	38.3	85.0	38.3	85.0
7:00 PM	20	42	22	46	39	57	47	60	-	-	-	-	-	-	32.0	51.3	32.0	51.3
8:00 PM	13	28	14	41	17	55	26	53	-	-	-	-	-	-	17.5	44.3	17.5	44.3
9:00 PM	4	14	8	28	11	37	16	30	-	-	-	-	-	-	9.8	27.3	9.8	27.3
10:00 PM	7	12	5	10	9	27	9	15	-	-	-	-	-	-	7.5	16.0	7.5	16.0
11:00 PM	0	12	5	7	5	13	1	10	-	-	-	-	-	-	2.8	10.5	2.8	10.5
Totals	526	869	1034	1089	1140	1234	1159	1219	454	174	0	0	0	0	1087.6	1157.8	1087.6	1157.8
Combined	1395		2123		2374		2378		628		0		0		2245.4		2245.4	
Split (%)	37.7	62.3	48.7	51.3	48.0	52.0	48.7	51.3	72.3	27.7	-	-	-	-	48.4	51.6	48.4	51.6

Peak Hours

12:00 AM - 12:00 PM	10:45 AM	10:45 AM	7:30 AM	7:45 AM	7:00 AM	10:45 AM	7:15 AM	7:45 AM	7:00 AM	7:30 AM	-	-	-	-	7:30 AM	7:30 AM	7:30 AM	7:30 AM
Volume	70	64	133	60	118	65	120	62	105	58	-	-	-	-	117.3	57.5	117.3	57.5
Factor	0.76	0.84	0.88	0.83	0.89	0.77	0.86	0.82	0.91	0.85	-	-	-	-	0.95	0.93	0.95	0.93
12:00 PM - 12:00 AM	2:45 PM	4:15 PM	3:45 PM	4:45 PM	5:00 PM	4:30 PM	3:45 PM	4:00 PM	-	-	-	-	-	-	3:15 PM	4:30 PM	3:15 PM	4:30 PM
Volume	86	141	73	139	104	148	86	148	-	-	-	-	-	-	75.5	141.5	75.5	141.5
Factor	0.83	0.88	0.79	0.97	0.90	0.90	0.74	0.93	-	-	-	-	-	-	0.85	0.98	0.85	0.98

Town : Oakham
Street : Route 148
Location : South of Route 122

Site: 2026021
6/24/2026
Wednesday

Daily Classification

Combined Channels

Interval Start	Total	Motor Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Tailgating
12:00 AM	9	0	5	2	0	2	0	0	0	0	0	0	0	0	0
1:00 AM	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	4	0	2	1	0	1	0	0	0	0	0	0	0	0	0
3:00 AM	10	0	3	1	1	5	0	0	0	0	0	0	0	0	0
4:00 AM	31	0	15	8	0	8	0	0	0	0	0	0	0	0	0
5:00 AM	88	0	42	28	0	18	0	0	0	0	0	0	0	0	0
6:00 AM	137	0	73	27	2	33	0	1	1	0	0	0	0	0	0
7:00 AM	173	0	92	40	2	36	0	1	1	1	0	0	0	0	0
8:00 AM	152	0	94	35	2	19	1	0	1	0	0	0	0	0	0
9:00 AM	135	1	86	29	1	12	1	0	3	2	0	0	0	0	0
10:00 AM	102	0	61	19	4	16	0	0	1	1	0	0	0	0	0
11:00 AM	124	0	70	34	1	16	0	0	3	0	0	0	0	0	0
12:00 PM	126	1	70	27	1	23	0	0	3	1	0	0	0	0	0
1:00 PM	98	1	59	25	0	11	1	0	0	1	0	0	0	0	0
2:00 PM	130	0	77	28	1	23	0	0	1	0	0	0	0	0	0
3:00 PM	171	0	96	40	2	30	1	0	2	0	0	0	0	0	0
4:00 PM	210	0	113	49	1	43	1	0	1	2	0	0	0	0	0
5:00 PM	246	0	168	44	1	29	0	0	3	1	0	0	0	0	0
6:00 PM	159	0	87	36	0	35	0	0	1	0	0	0	0	0	0
7:00 PM	97	0	57	27	0	11	0	0	2	0	0	0	0	0	0
8:00 PM	72	0	45	17	0	10	0	0	0	0	0	0	0	0	0
9:00 PM	48	0	31	8	0	8	0	0	1	0	0	0	0	0	0
10:00 PM	36	0	25	7	0	4	0	0	0	0	0	0	0	0	0
11:00 PM	18	0	14	4	0	0	0	0	0	0	0	0	0	0	0
Total	2377	3	1386	536	19	393	5	2	24	9	0	0	0	0	0
%		0.1	58.3	22.5	0.8	16.5	0.2	0.1	1.0	0.4	0.0	0.0	0.0	0.0	0.0

Appendix C: Route 148 Turning Movement Counts (TMCs) and Level of Service (LOS) Analyses

Appendix C includes the results from the five (5) TMCs completed on the Route 148 study corridor. The results contain the full 4-hour count, the AM and PM peak hour data diagram, and the current and projected LOS results calculated by the Highway Capacity Software (HCS).

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: Town of North Brookfield

DATE: 5/19/2026

LOCATION: Route 148 / Route 67

DAY OF WEEK: Tuesday

WEATHER: AM: Clear PM: Clear

TECHNICIAN: Camera

Time Period					Route 148 WB				Route 148/67 NB				Route 67 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15					18		0	1		24	39	2	12	32		0	125	
7:15 - 7:30					28		3	2		14	53	2	7	35		1	140	
7:30 - 7:45					26		2	2		13	49	2	3	20		1	113	
7:45 - 8:00					29		6	4		11	51	4	8	27		0	132	510
8:00 - 8:15					52		3	1		42	58	7	7	23		1	185	570
8:15 - 8:30					28		3	0		20	26	3	4	17		1	98	528
8:30 - 8:45					19		0	3		20	28	3	4	24		0	95	510
8:45 - 9:00					34		2	2		13	20	0	5	26		0	100	478
TOTAL	0	0	0	0	234	0	19	15	0	157	324	23	50	204	0	4	988	
		EBPct	0.0			**WBPct**	26.1			**NBPct**	51.1			**SBPct**	22.8			
Peak Sums:	**0**	**0**	**0**	**0**	**135**	**0**	**14**	**9**	**0**	**80**	**211**	**15**	**25**	**105**	**0**	**3**	**570**	
Total Trucks	27					**TrkPct**	4.74			**PHF**	0.77							

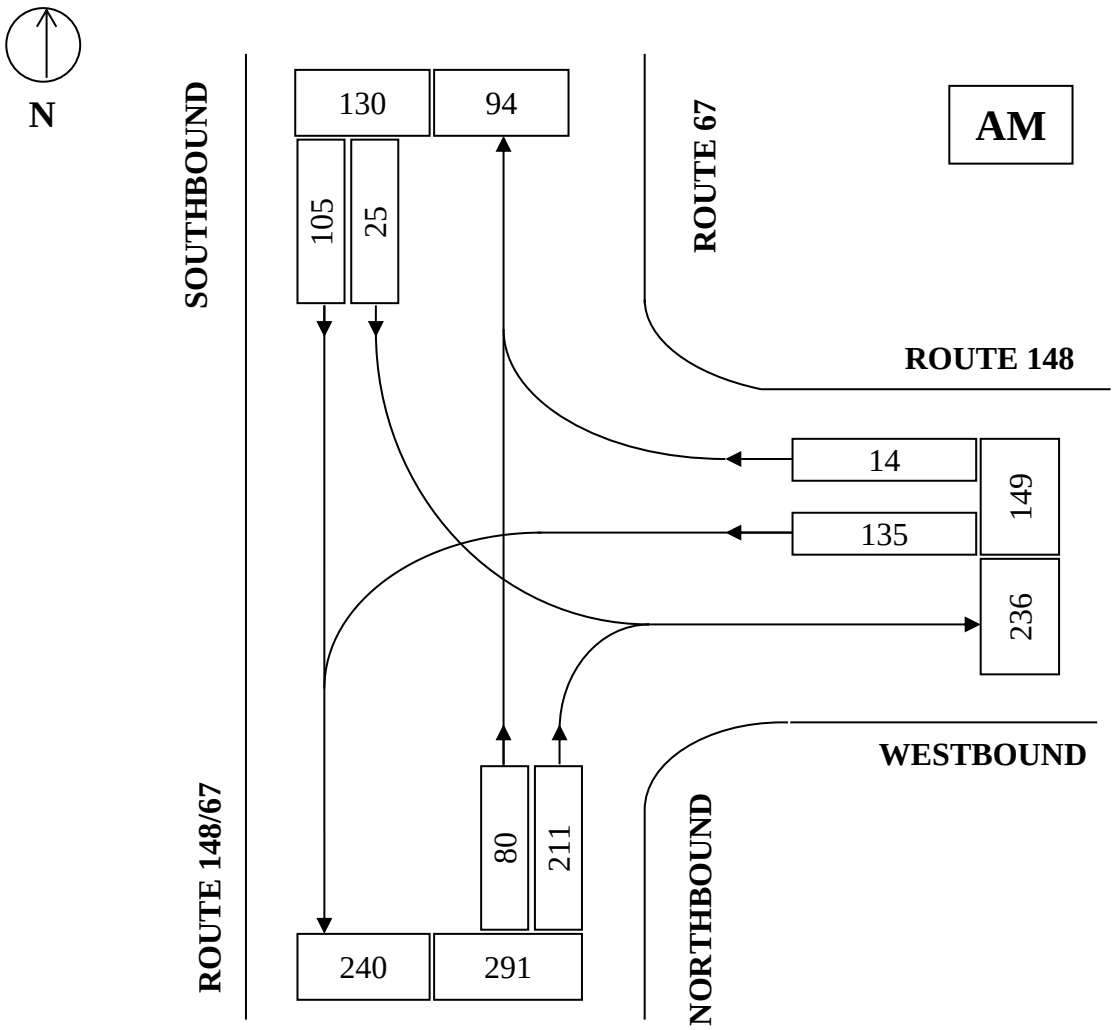
Time Period					Route 148 WB				Route 148/67 NB				Route 67 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15					29		5	0		26	35	1	5	15		0	115	
4:15 - 4:30					38		4	1		31	26	1	5	29		1	133	
4:30 - 4:45					40		4	1		35	26	1	0	21		1	126	
4:45 - 5:00					40		2	1		35	21	1	3	38		1	139	513
5:00 - 5:15					42		7	0		46	26	0	2	19		0	142	540
5:15 - 5:30					31		5	1		45	29	1	2	31		0	143	550
5:30 - 5:45					27		8	0		24	20	1	1	16		0	96	520
5:45 - 6:00					34		6	0		18	11	0	3	21		0	93	474
TOTAL	0	0	0	0	281	0	41	4	0	260	194	6	21	190	0	3	987	
		EBPct	0.0			**WBPct**	31.1			**NBPct**	47.8			**SBPct**	21.1			
Peak Sums:	**0**	**0**	**0**	**0**	**153**	**0**	**18**	**3**	**0**	**161**	**102**	**3**	**7**	**109**	**0**	**2**	**550**	
Total Trucks	8					**TrkPct**	1.45			**PHF**	0.96							

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: North Brookfield **DATE:** 5/19/2026 **DAY OF WEEK:** Tuesday

INTERSECTION: Route 148 / Route 67



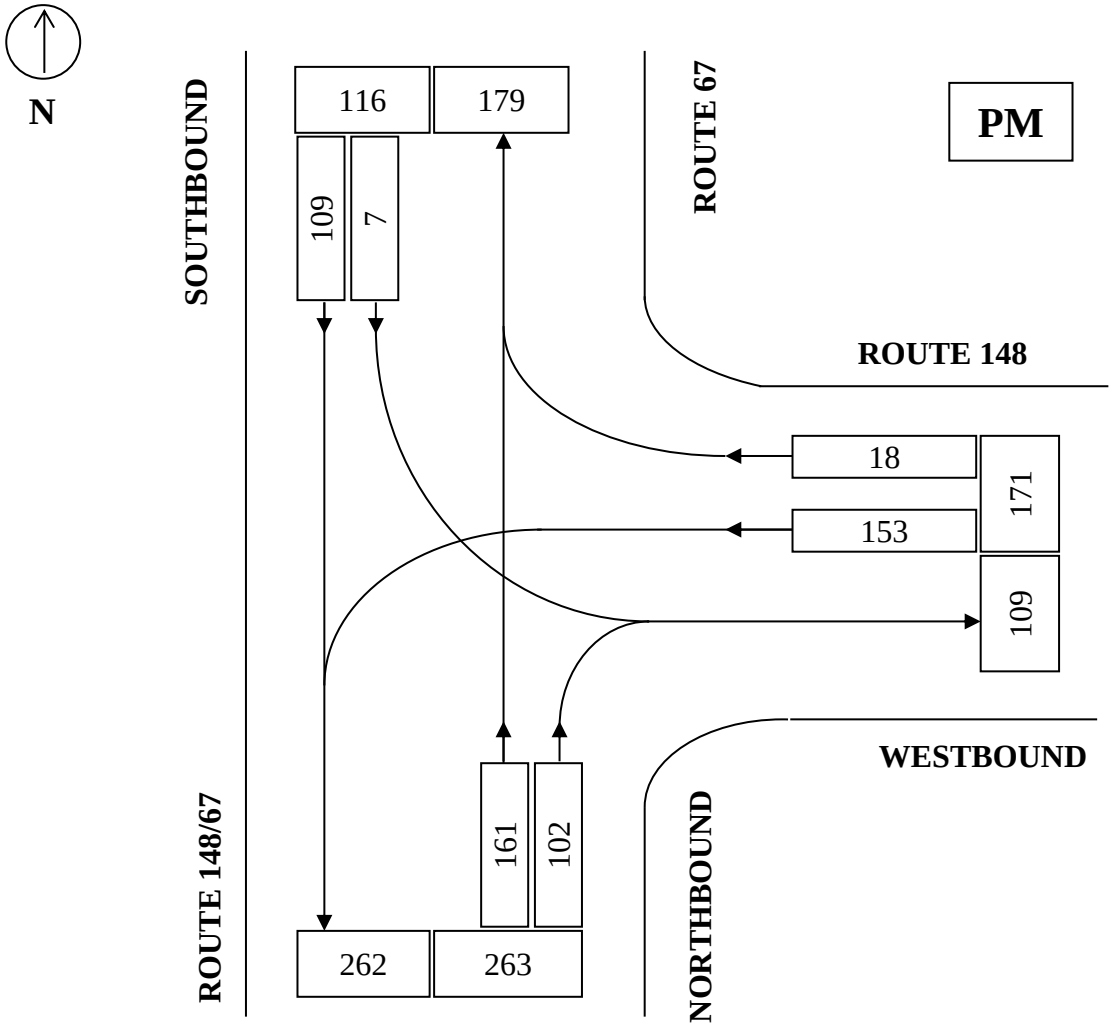
STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			7:15 - 8:15 AM
Route 148 WB	149	26.1%	
			PHF = .77
Route 148/67 NB	291	51.1%	
			VEHICLES COUNTED
Route 67 SB	130	22.8%	
			ALL VEHICLES: 570
TOTAL	570	100.00%	**TRUCKS:** 27
			PERCENT TRUCKS: 4.74%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: North Brookfield **DATE:** 5/19/2026 **DAY OF WEEK:** Tuesday

INTERSECTION: Route 148 / Route 67



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			4:30 - 5:30 PM
Route 148 WB	171	31.1%	
			PHF = .96
Route 148/67 NB	263	47.8%	
			VEHICLES COUNTED
Route 67 SB	116	21.1%	
			ALL VEHICLES: 550
TOTAL	550	100.00%	**TRUCKS:** 8
			PERCENT TRUCKS: 1.45%

HCS Two-Way Stop-Control Report

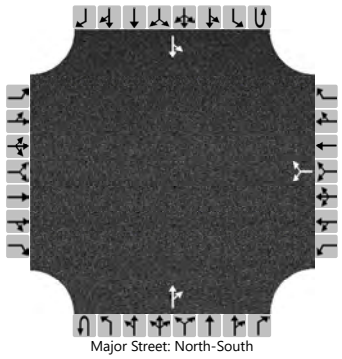
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/19/26
Analysis Year	2026
Time Analyzed	7:15 - 8:15 AM
Intersection Orientation	North-South
Project Description	Route 148 CP

Site Information

Intersection	Route 148/Route 67
Jurisdiction	North Brookfield
East/West Street	Route 148
North/South Street	Route 67
Peak Hour Factor	0.77
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						135		14			80	211		25	105	
Percent Heavy Vehicles (%)						5		5						5		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.45		6.25						4.15		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.55		3.35						2.25		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							194							32		
Capacity, c (veh/h)							600							1160		
v/c Ratio							0.32							0.03		
95% Queue Length, Q_{95} (veh)							1.4							0.1		
95% Queue Length, Q_{95} (ft)							36.4							2.6		
Control Delay (s/veh)							13.8							8.2	0.2	
Level of Service (LOS)							B							A	A	
Approach Delay (s/veh)						13.8								1.8		
Approach LOS						B								A		

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HCS Two-Way Stop-Control Report

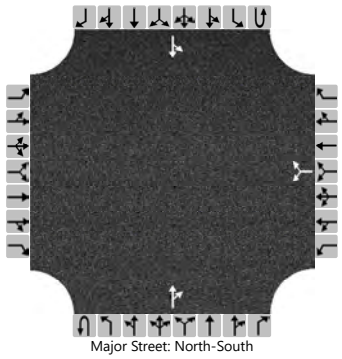
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/19/26
Analysis Year	2026
Time Analyzed	4:30 - 5:30 PM
Intersection Orientation	North-South
Project Description	Route 148 CP

Site Information

Intersection	Route 148/Route 67
Jurisdiction	North Brookfield
East/West Street	Route 148
North/South Street	Route 67
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						153		18			161	102		7	109	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.41		6.21						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.31						2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							178							7		
Capacity, c (veh/h)							719							1295		
v/c Ratio							0.25							0.01		
95% Queue Length, Q_{95} (veh)							1.0							0.0		
95% Queue Length, Q_{95} (ft)							25.2							0.0		
Control Delay (s/veh)							11.6							7.8	0.0	
Level of Service (LOS)							B							A	A	
Approach Delay (s/veh)						11.6								0.5		
Approach LOS						B								A		

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HCS Two-Way Stop-Control Report

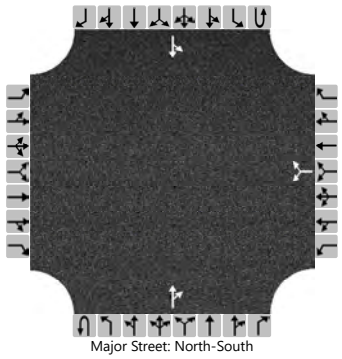
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/19/26
Analysis Year	2026
Time Analyzed	7:15 - 8:15 AM
Intersection Orientation	North-South
Project Description	Route 148 CP - Projected 2036

Site Information

Intersection	Route 148/Route 67
Jurisdiction	North Brookfield
East/West Street	Route 148
North/South Street	Route 67
Peak Hour Factor	0.77
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						162		17			96	253		30	126	
Percent Heavy Vehicles (%)						5		5						5		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.45		6.25						4.15		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.55		3.35						2.25		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							232							39		
Capacity, c (veh/h)							529							1088		
v/c Ratio							0.44							0.04		
95% Queue Length, Q_{95} (veh)							2.2							0.1		
95% Queue Length, Q_{95} (ft)							57.2							2.6		
Control Delay (s/veh)							17.0							8.4	0.3	
Level of Service (LOS)							C							A	A	
Approach Delay (s/veh)						17.0								1.9		
Approach LOS						C								A		

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HCS Two-Way Stop-Control Report

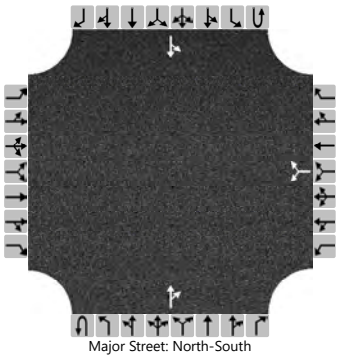
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/19/26
Analysis Year	2026
Time Analyzed	4:30 - 5:30 PM
Intersection Orientation	North-South
Project Description	Route 148 CP - Projected 2036

Site Information

Intersection	Route 148/Route 67
Jurisdiction	North Brookfield
East/West Street	Route 148
North/South Street	Route 67
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						184		22			193	122		8	131	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.41		6.21						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.31						2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							215							8		
Capacity, c (veh/h)							657							1237		
v/c Ratio							0.33							0.01		
95% Queue Length, Q_{95} (veh)							1.4							0.0		
95% Queue Length, Q_{95} (ft)							35.3							0.0		
Control Delay (s/veh)							13.1							7.9	0.1	
Level of Service (LOS)							B							A	A	
Approach Delay (s/veh)						13.1								0.5		
Approach LOS						B								A		

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TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: Town of North Brookfield

DATE: 5/14/2026

LOCATION: Route 148 / Brooks Pond Road

DAY OF WEEK: Thursday

WEATHER: AM: Clear PM: Clear

TECHNICIAN: Camera

Time Period					Brooks Pond Rd WB				Route 148 NB				Route 148 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15					1		0	1		26	0	0	1	10		0	38	
7:15 - 7:30					1		0	0		17	2	1	2	17		0	39	
7:30 - 7:45					2		1	1		20	5	3	0	12		1	40	
7:45 - 8:00					4		0	3		11	1	1	6	15		0	37	154
8:00 - 8:15					0		0	0		28	2	1	0	2		0	32	148
8:15 - 8:30					3		1	1		11	2	2	1	16		0	34	143
8:30 - 8:45					0		1	0		15	2	0	0	14		1	32	135
8:45 - 9:00					3		0	1		8	4	2	3	10		0	28	126
TOTAL	0	0	0	0	14	0	3	7	0	136	18	10	13	96	0	2	280	
		EBPct	0.0			**WBPct**	5.8			**NBPct**	53.2			**SBPct**	40.9			
Peak Sums:	**0**	**0**	**0**	**0**	**8**	**0**	**1**	**5**	**0**	**74**	**8**	**5**	**9**	**54**	**0**	**1**	**154**	
Total Trucks	11					**TrkPct**	7.14			**PHF**	0.96							

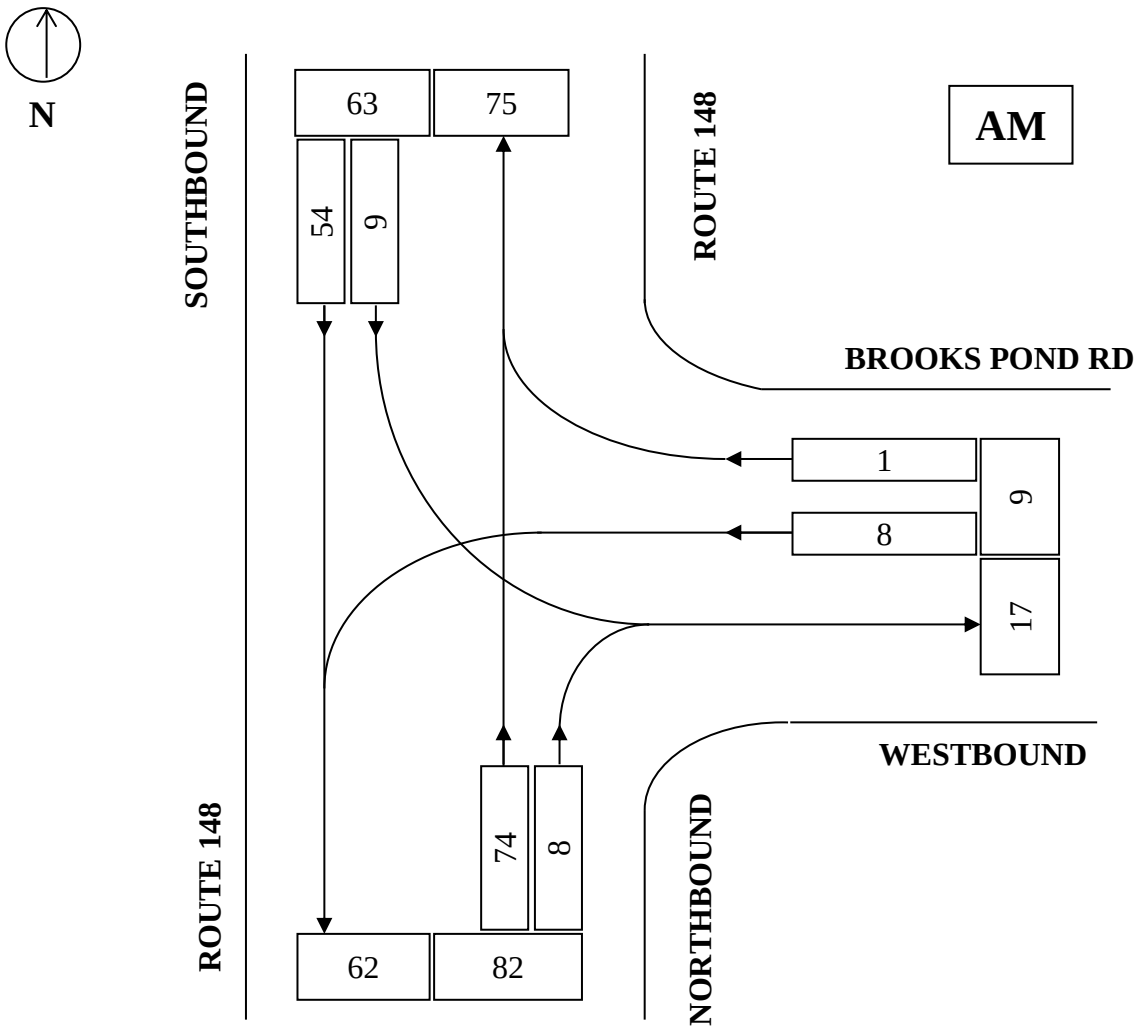
Time Period					Brooks Pond Rd WB				Route 148 NB				Route 148 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15					3		3	0		24	1	1	4	19		1	54	
4:15 - 4:30					2		2	0		13	0	0	0	27		0	44	
4:30 - 4:45					0		1	0		19	0	1	2	37		0	59	
4:45 - 5:00					2		1	0		21	2	1	2	23		0	51	208
5:00 - 5:15					2		1	0		19	2	0	1	16		0	41	195
5:15 - 5:30					2		3	0		18	2	0	1	23		1	49	200
5:30 - 5:45					1		5	0		16	3	2	0	23		0	48	189
5:45 - 6:00					1		2	0		13	1	0	1	22		0	40	178
TOTAL	0	0	0	0	13	0	18	0	0	143	11	5	11	190	0	2	386	
		EBPct	0.0			**WBPct**	6.7			**NBPct**	38.5			**SBPct**	54.8			
Peak Sums:	**0**	**0**	**0**	**0**	**7**	**0**	**7**	**0**	**0**	**77**	**3**	**3**	**8**	**106**	**0**	**1**	**208**	
Total Trucks	4					**TrkPct**	1.92			**PHF**	0.88							

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: North Brookfield **DATE:** 5/14/2026 **DAY OF WEEK:** Thursday

INTERSECTION: Route 148 / Brooks Pond Road



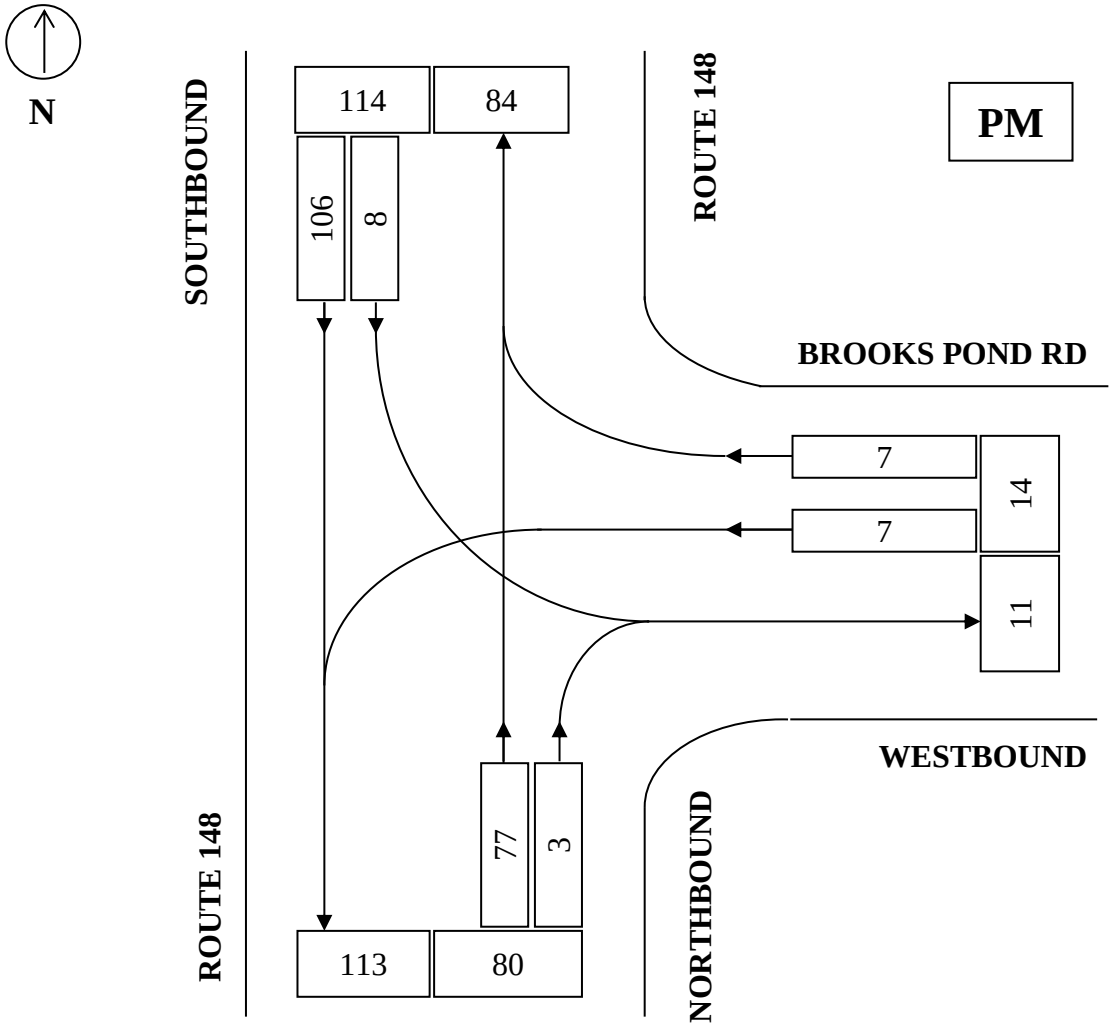
STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			7:00 - 8:00 AM
Brooks Pond Rd WB	9	5.8%	
			PHF = .96
Route 148 NB	82	53.2%	
			VEHICLES COUNTED
Route 148 SB	63	41.0%	
			ALL VEHICLES: 154
TOTAL	154	100.00%	**TRUCKS:** 11
			PERCENT TRUCKS: 7.14%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: North Brookfield **DATE:** 5/14/2026 **DAY OF WEEK:** Thursday

INTERSECTION: Route 148 / Brooks Pond Road



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			4:00 - 5:00 PM
Brooks Pond Rd WB	14	6.7%	
			PHF = .88
Route 148 NB	80	38.5%	
			VEHICLES COUNTED
Route 148 SB	114	54.8%	
			ALL VEHICLES: 208
TOTAL	208	100.00%	**TRUCKS:** 4
			PERCENT TRUCKS: 1.92%

HCS Two-Way Stop-Control Report

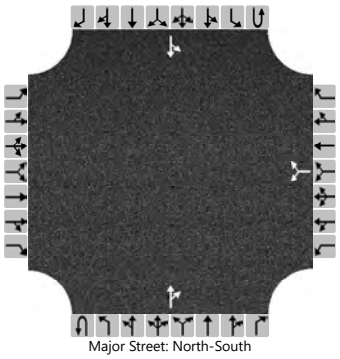
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/14/2026
Analysis Year	2026
Time Analyzed	7:00 - 8:00 AM
Intersection Orientation	North-South
Project Description	Route 148 CP

Site Information

Intersection	Route 148/Brooks Pond Rd
Jurisdiction	North Brookfield
East/West Street	Brooks Pond Rd
North/South Street	Route 148
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						8		1			74	8		9	54	
Percent Heavy Vehicles (%)						7		7						7		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.47		6.27						4.17		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.56		3.36						2.26		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							9							9		
Capacity, c (veh/h)							832							1480		
v/c Ratio							0.01							0.01		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
95% Queue Length, Q_{95} (ft)							0.0							0.0		
Control Delay (s/veh)							9.4							7.4	0.0	
Level of Service (LOS)							A							A	A	
Approach Delay (s/veh)						9.4								1.1		
Approach LOS						A								A		

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HCS Two-Way Stop-Control Report

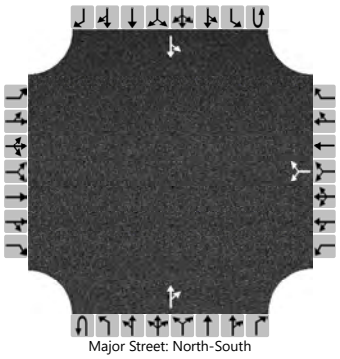
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/14/2026
Analysis Year	2026
Time Analyzed	4:00 - 5:00 PM
Intersection Orientation	North-South
Project Description	Route 148 CP

Site Information

Intersection	Route 148/Brooks Pond Rd
Jurisdiction	North Brookfield
East/West Street	Brooks Pond Rd
North/South Street	Route 148
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						7		7			77	3		8	106	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.42		6.22						4.12		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.52		3.32						2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							16							9		
Capacity, c (veh/h)							849							1504		
v/c Ratio							0.02							0.01		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
95% Queue Length, Q_{95} (ft)							2.5							0.0		
Control Delay (s/veh)							9.3							7.4	0.0	
Level of Service (LOS)							A							A	A	
Approach Delay (s/veh)						9.3								0.6		
Approach LOS						A								A		

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HCS Two-Way Stop-Control Report

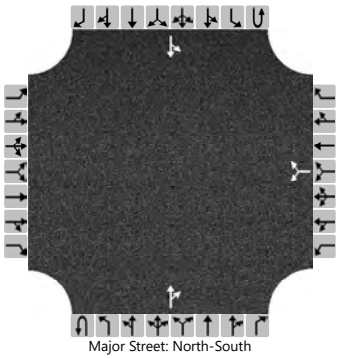
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/14/2026
Analysis Year	2026
Time Analyzed	7:00 - 8:00 AM
Intersection Orientation	North-South
Project Description	Route 148 CP - Projected 2036

Site Information

Intersection	Route 148/Brooks Pond Rd
Jurisdiction	North Brookfield
East/West Street	Brooks Pond Rd
North/South Street	Route 148
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						10		1			89	10		11	65	
Percent Heavy Vehicles (%)						7		7						7		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.47		6.27						4.17		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.56		3.36						2.26		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							11							11		
Capacity, c (veh/h)							795							1458		
v/c Ratio							0.01							0.01		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
95% Queue Length, Q_{95} (ft)							0.0							0.0		
Control Delay (s/veh)							9.6							7.5	0.1	
Level of Service (LOS)							A							A	A	
Approach Delay (s/veh)						9.6								1.1		
Approach LOS						A								A		

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HCS Two-Way Stop-Control Report

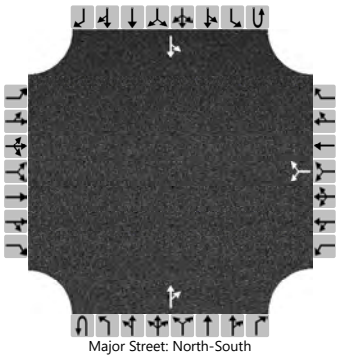
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/14/2026
Analysis Year	2026
Time Analyzed	4:00 - 5:00 PM
Intersection Orientation	North-South
Project Description	Route 148 CP - Projected 2036

Site Information

Intersection	Route 148/Brooks Pond Rd
Jurisdiction	North Brookfield
East/West Street	Brooks Pond Rd
North/South Street	Route 148
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						8		8			92	4		10	127	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.42		6.22						4.12		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.52		3.32						2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							18							11		
Capacity, c (veh/h)							811							1481		
v/c Ratio							0.02							0.01		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
95% Queue Length, Q_{95} (ft)							2.5							0.0		
Control Delay (s/veh)							9.5							7.4	0.1	
Level of Service (LOS)							A							A	A	
Approach Delay (s/veh)						9.5								0.6		
Approach LOS						A								A		

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TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: Town of Oakham

DATE: 5/14/2026

LOCATION: Route 148 / Robinson Road

DAY OF WEEK: Thursday

WEATHER: AM: Clear PM: Clear

TECHNICIAN: Camera

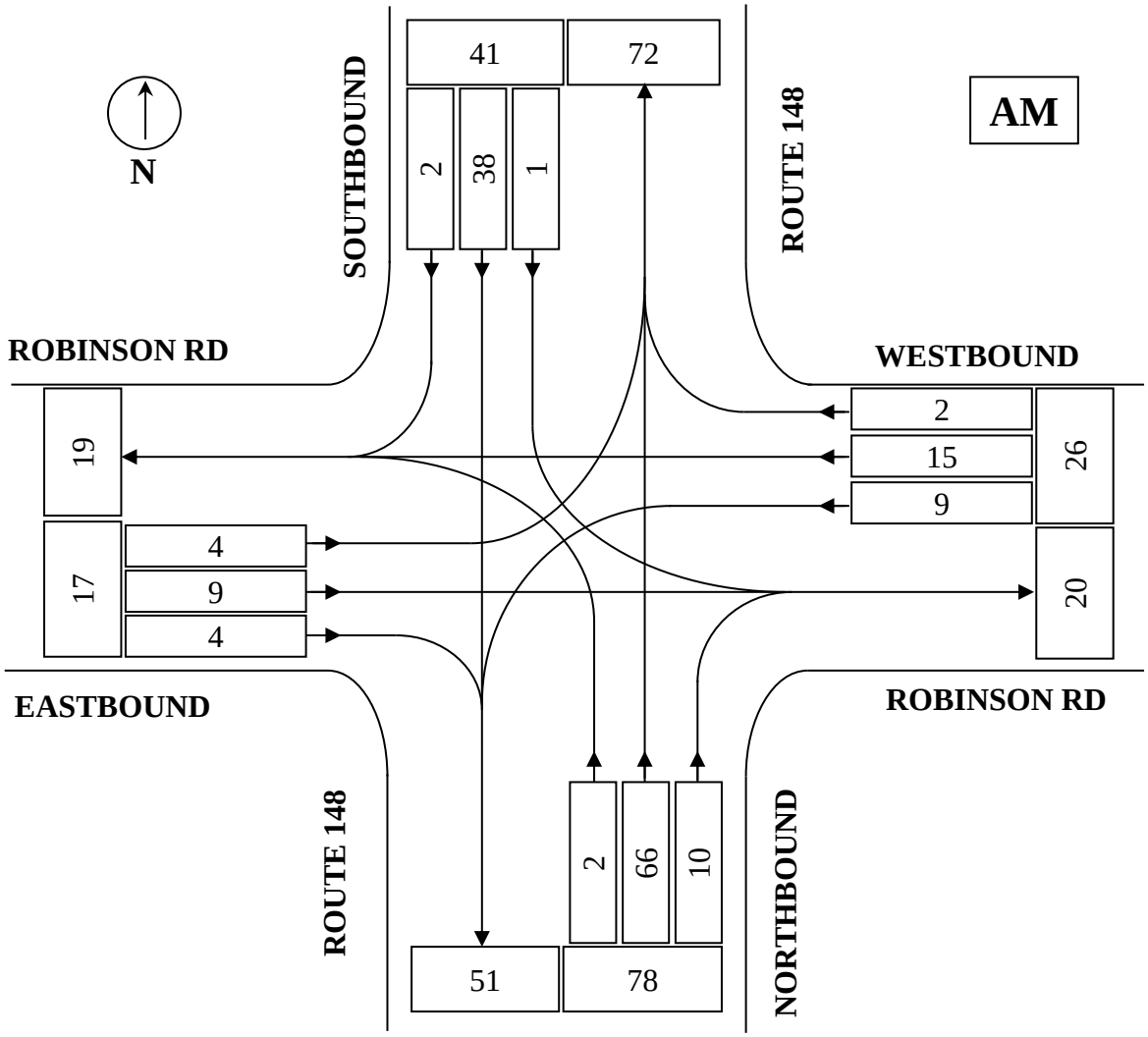
Time Period	Robinson Rd EB				Robinson Rd WB				Route 148 NB				Route 148 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	1	0	1	0	3	3	1	0	1	21	3	0	1	9	2	1	46	
7:15 - 7:30	1	2	0	0	1	4	0	0	0	13	3	0	0	11	0	0	35	
7:30 - 7:45	1	4	2	0	1	1	0	0	1	17	1	0	0	11	0	0	39	
7:45 - 8:00	1	3	1	0	4	7	1	0	0	15	3	0	0	7	0	0	42	162
8:00 - 8:15	3	3	0	0	0	0	0	0	0	21	6	1	0	5	0	1	38	154
8:15 - 8:30	1	3	1	1	4	2	0	0	0	13	2	0	0	9	1	0	36	155
8:30 - 8:45	2	6	0	2	0	2	0	0	0	13	1	0	0	14	2	1	40	156
8:45 - 9:00	1	1	0	0	2	1	0	0	1	9	1	1	0	6	0	0	22	136
TOTAL	11	22	5	3	15	20	2	0	3	122	20	2	1	72	5	3	298	
		EBPct	10.5			**WBPct**	16.0			**NBPct**	48.1			**SBPct**	25.3			
Peak Sums:	**4**	**9**	**4**	**0**	**9**	**15**	**2**	**0**	**2**	**66**	**10**	**0**	**1**	**38**	**2**	**1**	**162**	
Total Trucks	1					**TrkPct**	0.62			**PHF**	0.88							

Time Period	Robinson Rd EB				Robinson Rd WB				Route 148 NB				Route 148 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	0	6	0	0	0	2	0	0	0	15	3	1	1	21	0	1	48	
4:15 - 4:30	1	8	1	0	6	2	0	0	0	16	3	0	0	25	2	0	64	
4:30 - 4:45	2	2	0	0	0	1	0	0	1	14	3	1	0	31	4	0	58	
4:45 - 5:00	1	1	0	0	2	3	1	1	1	19	1	2	1	26	2	1	58	228
5:00 - 5:15	1	1	0	0	1	3	1	1	0	15	3	0	0	18	1	0	44	224
5:15 - 5:30	2	3	1	0	2	3	1	0	0	16	1	0	0	18	1	2	48	208
5:30 - 5:45	0	4	0	0	3	1	1	0	4	15	2	1	0	21	3	0	54	204
5:45 - 6:00	0	1	1	0	2	2	0	0	0	9	4	1	0	17	1	0	37	183
TOTAL	7	26	3	0	16	17	4	2	6	119	20	6	2	177	14	4	411	
		EBPct	9.6			**WBPct**	7.5			**NBPct**	33.3			**SBPct**	49.6			
Peak Sums:	**4**	**17**	**1**	**0**	**8**	**8**	**1**	**1**	**2**	**64**	**10**	**4**	**2**	**103**	**8**	**2**	**228**	
Total Trucks	7					**TrkPct**	3.07			**PHF**	0.89							

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Oakham **DATE:** 5/14/26 **DAY OF WEEK:** Thursday
INTERSECTION: Route 148 / Robinson Road

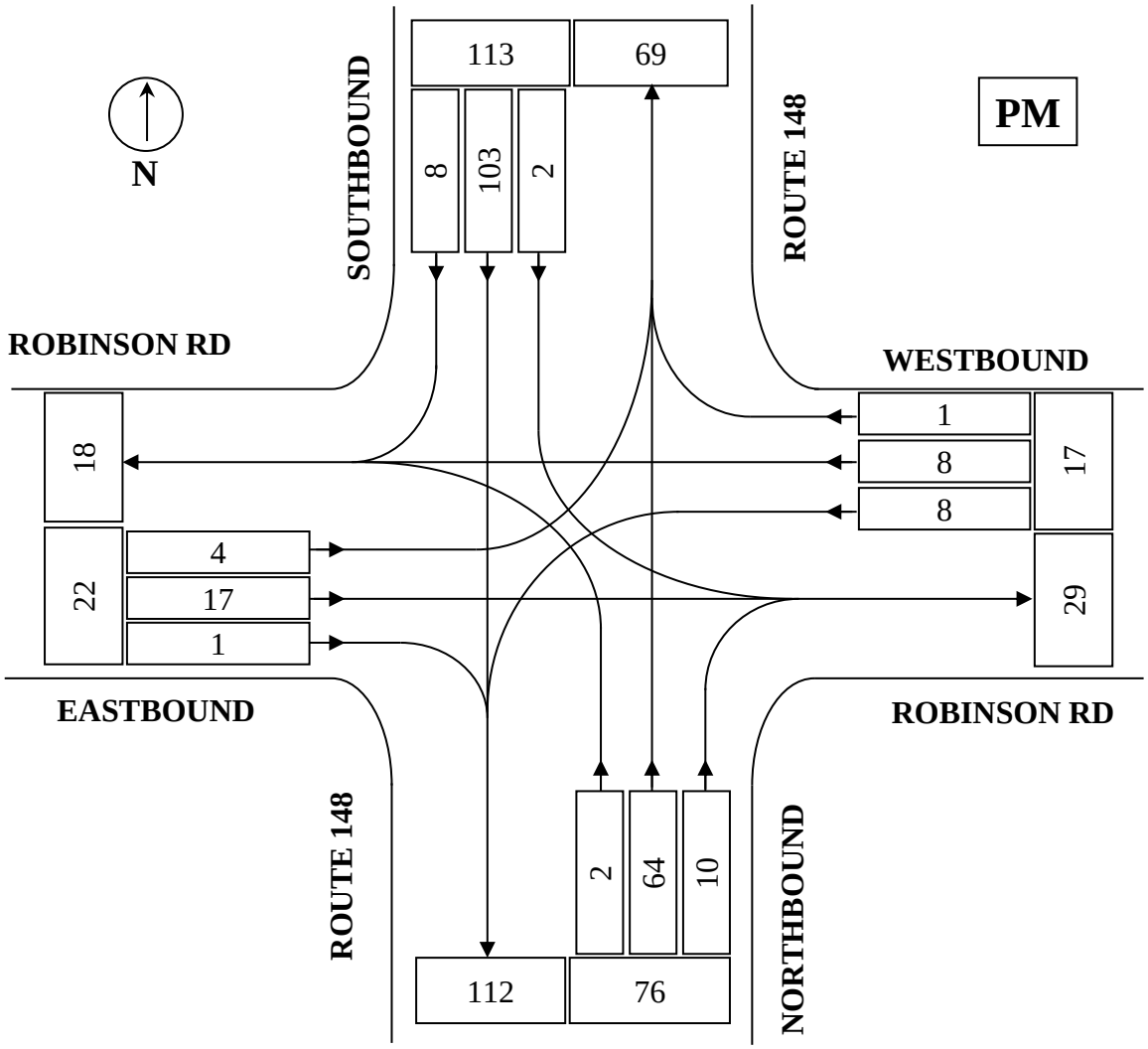


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Robinson Rd EB	17	10.5%	7:00 - 8:00 AM
Robinson Rd WB	26	16.0%	PHF = .88
Route 148 NB	78	48.1%	**VEHICLES COUNTED**
Route 148 SB	41	25.4%	**ALL VEHICLES:** 162
TOTAL	162	100.0%	**TRUCKS:** 1
			PERCENT TRUCKS: 0.62%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Oakham **DATE:** 5/14/26 **DAY OF WEEK:** Thursday
INTERSECTION: Route 148 / Robinson Road



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Robinson Rd EB	22	9.6%	4:00 - 5:00 PM
Robinson Rd WB	17	7.5%	PHF = .89
Route 148 NB	76	33.3%	**VEHICLES COUNTED**
Route 148 SB	113	49.6%	**ALL VEHICLES:** 228
TOTAL	228	100.0%	**TRUCKS:** 7
			PERCENT TRUCKS: 3.07%

HCS Two-Way Stop-Control Report

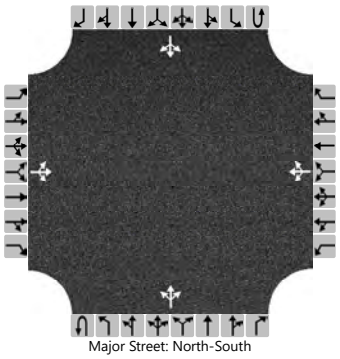
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/14/26
Analysis Year	2026
Time Analyzed	7:00 - 8:00 AM
Intersection Orientation	North-South
Project Description	Route 148 CP

Site Information

Intersection	Route 148/Robinson Rd
Jurisdiction	Oakham
East/West Street	Robinson Rd
North/South Street	Route 148
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		4	9	4		9	15	2		2	66	10		1	38	2
Percent Heavy Vehicles (%)		1	1	1		1	1	1		1				1		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.11	6.51	6.21		7.11	6.51	6.21		4.11				4.11		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.51	4.01	3.31		3.51	4.01	3.31		2.21				2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			19				30			2				1		
Capacity, c (veh/h)			818				791			1569				1516		
v/c Ratio			0.02				0.04			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.1				0.1			0.0				0.0		
95% Queue Length, Q_{95} (ft)			2.5				2.5			0.0				0.0		
Control Delay (s/veh)			9.5				9.7			7.3	0.0	0.0		7.4	0.0	0.0
Level of Service (LOS)			A				A			A	A	A		A	A	A
Approach Delay (s/veh)		9.5				9.7				0.2				0.2		
Approach LOS		A				A				A				A		

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HCS Two-Way Stop-Control Report

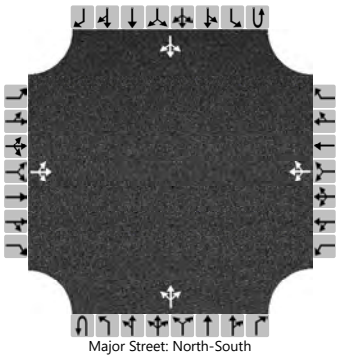
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/14/26
Analysis Year	2026
Time Analyzed	4:00 - 5:00 PM
Intersection Orientation	North-South
Project Description	Route 148 CP

Site Information

Intersection	Route 148/Robinson Rd
Jurisdiction	Oakham
East/West Street	Robinson Rd
North/South Street	Route 148
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		4	17	1		8	8	1		2	64	10		2	103	8
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			25				19			2				2		
Capacity, c (veh/h)			698				710			1456				1508		
v/c Ratio			0.04				0.03			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.1				0.1			0.0				0.0		
95% Queue Length, Q_{95} (ft)			2.6				2.6			0.0				0.0		
Control Delay (s/veh)			10.3				10.2			7.5	0.0	0.0		7.4	0.0	0.0
Level of Service (LOS)			B				B			A	A	A		A	A	A
Approach Delay (s/veh)		10.3				10.2				0.2				0.1		
Approach LOS		B				B				A				A		

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HCS Two-Way Stop-Control Report

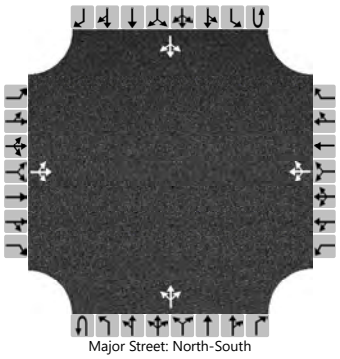
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/14/26
Analysis Year	2026
Time Analyzed	7:00 - 8:00 AM
Intersection Orientation	North-South
Project Description	Route 148 CP - Projected 2036

Site Information

Intersection	Route 148/Robinson Rd
Jurisdiction	Oakham
East/West Street	Robinson Rd
North/South Street	Route 148
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		5	11	5		11	18	2		2	79	12		1	46	2
Percent Heavy Vehicles (%)		1	1	1		1	1	1		1				1		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.11	6.51	6.21		7.11	6.51	6.21		4.11				4.11		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.51	4.01	3.31		3.51	4.01	3.31		2.21				2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			24				35			2				1		
Capacity, c (veh/h)			793				762			1557				1495		
v/c Ratio			0.03				0.05			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.1				0.1			0.0				0.0		
95% Queue Length, Q_{95} (ft)			2.5				2.5			0.0				0.0		
Control Delay (s/veh)			9.7				10.0			7.3	0.0	0.0		7.4	0.0	0.0
Level of Service (LOS)			A				A			A	A	A		A	A	A
Approach Delay (s/veh)	9.7				10.0				0.2				0.2			
Approach LOS	A				A				A				A			

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HCS Two-Way Stop-Control Report

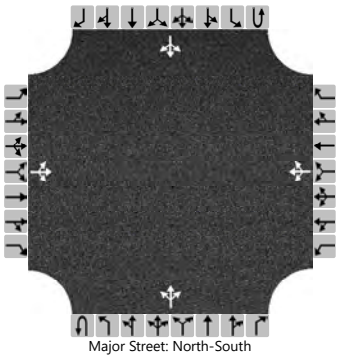
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/14/26
Analysis Year	2026
Time Analyzed	4:00 - 5:00 PM
Intersection Orientation	North-South
Project Description	Route 148 CP - Projected 2036

Site Information

Intersection	Route 148/Robinson Rd
Jurisdiction	Oakham
East/West Street	Robinson Rd
North/South Street	Route 148
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		5	20	1		10	10	1		2	77	12		2	124	10
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			29				24			2				2		
Capacity, c (veh/h)			660				666			1424				1486		
v/c Ratio			0.04				0.04			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.1				0.1			0.0				0.0		
95% Queue Length, Q_{95} (ft)			2.6				2.6			0.0				0.0		
Control Delay (s/veh)			10.7				10.6			7.5	0.0	0.0		7.4	0.0	0.0
Level of Service (LOS)			B				B			A	A	A		A	A	A
Approach Delay (s/veh)		10.7				10.6				0.2				0.1		
Approach LOS		B				B				A				A		

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TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: Town of Oakham

DATE: 5/12/2026

LOCATION: Route 148 / Ware Corner Rd / Spencer Rd

DAY OF WEEK: Tuesday

WEATHER: AM: Clear PM: Clear

TECHNICIAN: Camera

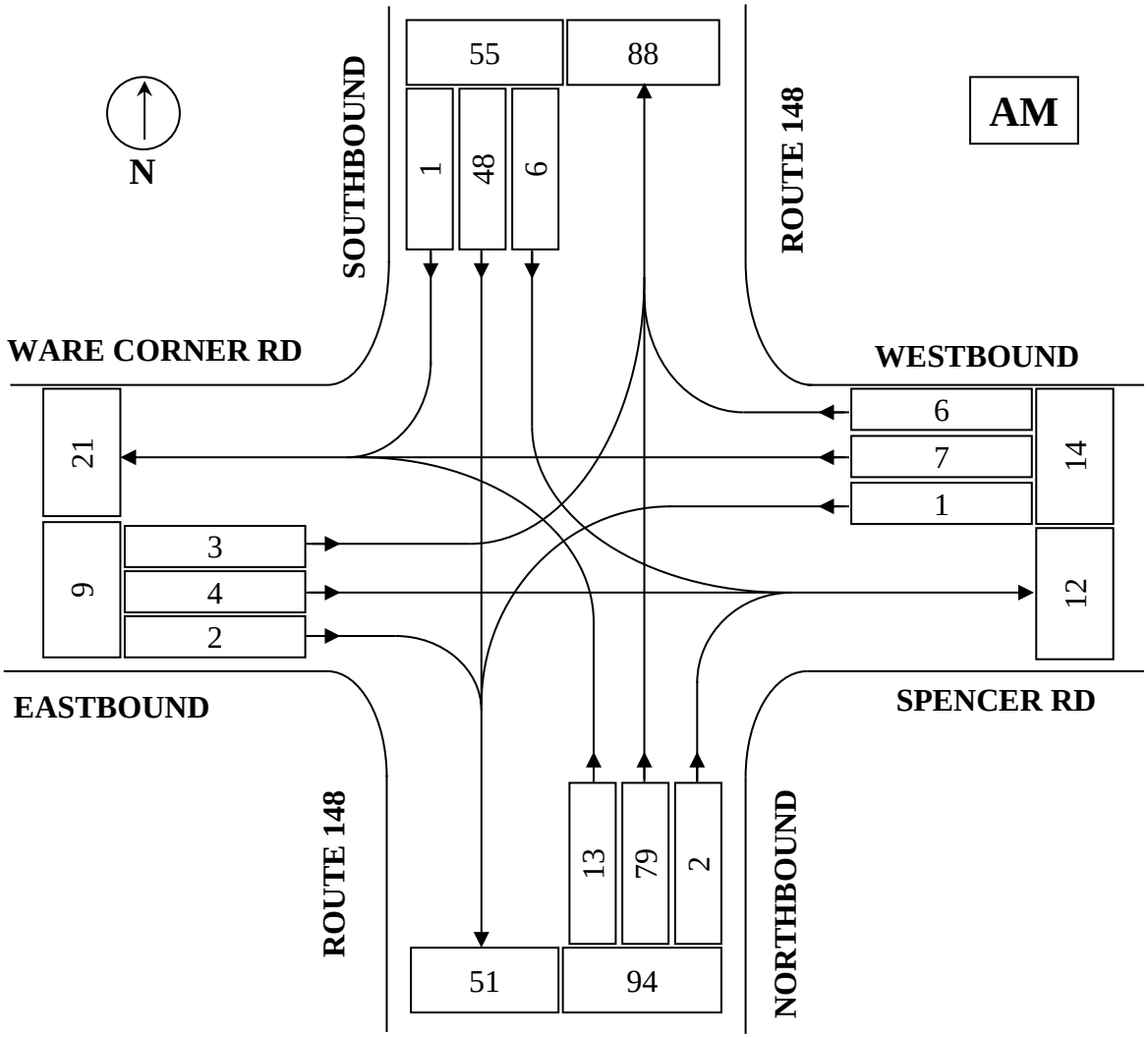
Time Period	Ware Corner Rd EB				Spencer Rd WB				Route 148 NB				Route 148 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	0	0	3	1	1	1	3	0	1	20	0	0	0	7	0	0	36	
7:15 - 7:30	2	1	1	0	1	1	2	0	2	22	2	0	4	13	0	0	51	
7:30 - 7:45	1	2	0	0	0	1	1	0	2	16	0	0	0	14	1	0	38	
7:45 - 8:00	0	0	0	0	0	0	2	0	3	24	0	2	2	8	0	0	39	164
8:00 - 8:15	0	1	1	0	0	5	1	0	6	17	0	0	0	13	0	0	44	172
8:15 - 8:30	0	3	3	0	0	2	1	0	5	15	0	1	1	6	0	1	36	157
8:30 - 8:45	0	2	5	0	0	0	2	0	2	11	2	1	1	12	0	1	37	156
8:45 - 9:00	0	2	3	0	0	0	3	0	1	13	2	0	1	7	0	1	32	149
TOTAL	3	11	16	1	2	10	15	0	22	138	6	4	9	80	1	3	313	
		EBPct	5.2			**WBPct**	8.1			**NBPct**	54.7			**SBPct**	32.0			
Peak Sums:	**3**	**4**	**2**	**0**	**1**	**7**	**6**	**0**	**13**	**79**	**2**	**2**	**6**	**48**	**1**	**0**	**172**	
Total Trucks	2					**TrkPct**	1.16			**PHF**	0.84							

Time Period	Ware Corner Rd EB				Spencer Rd WB				Route 148 NB				Route 148 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	1	2	0	0	1	2	4	1	5	18	2	1	1	22	1	0	59	
4:15 - 4:30	1	0	2	0	0	1	2	0	4	11	2	0	5	28	0	0	56	
4:30 - 4:45	1	0	4	0	0	5	2	0	4	20	0	2	3	29	0	0	68	
4:45 - 5:00	1	2	7	0	0	1	1	0	2	13	2	1	4	18	1	2	52	235
5:00 - 5:15	0	2	1	0	2	1	2	0	6	13	0	0	2	25	0	0	54	230
5:15 - 5:30	0	0	3	0	3	1	1	0	3	20	1	0	4	32	1	1	69	243
5:30 - 5:45	0	0	2	0	3	0	2	0	1	14	1	1	4	19	0	0	46	221
5:45 - 6:00	0	0	1	0	1	2	1	0	1	19	2	1	2	12	1	1	42	211
TOTAL	4	6	20	0	10	13	15	1	26	128	10	6	25	185	4	4	446	
		EBPct	8.6			**WBPct**	7.8			**NBPct**	34.6			**SBPct**	49.0			
Peak Sums:	**2**	**4**	**15**	**0**	**5**	**8**	**6**	**0**	**15**	**66**	**3**	**3**	**13**	**104**	**2**	**3**	**243**	
Total Trucks	6					**TrkPct**	2.47			**PHF**	0.88							

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Oakham **DATE:** 5/12/26 **DAY OF WEEK:** Tuesday
INTERSECTION: Route 148 / Ware Corner Road / Spencer Road

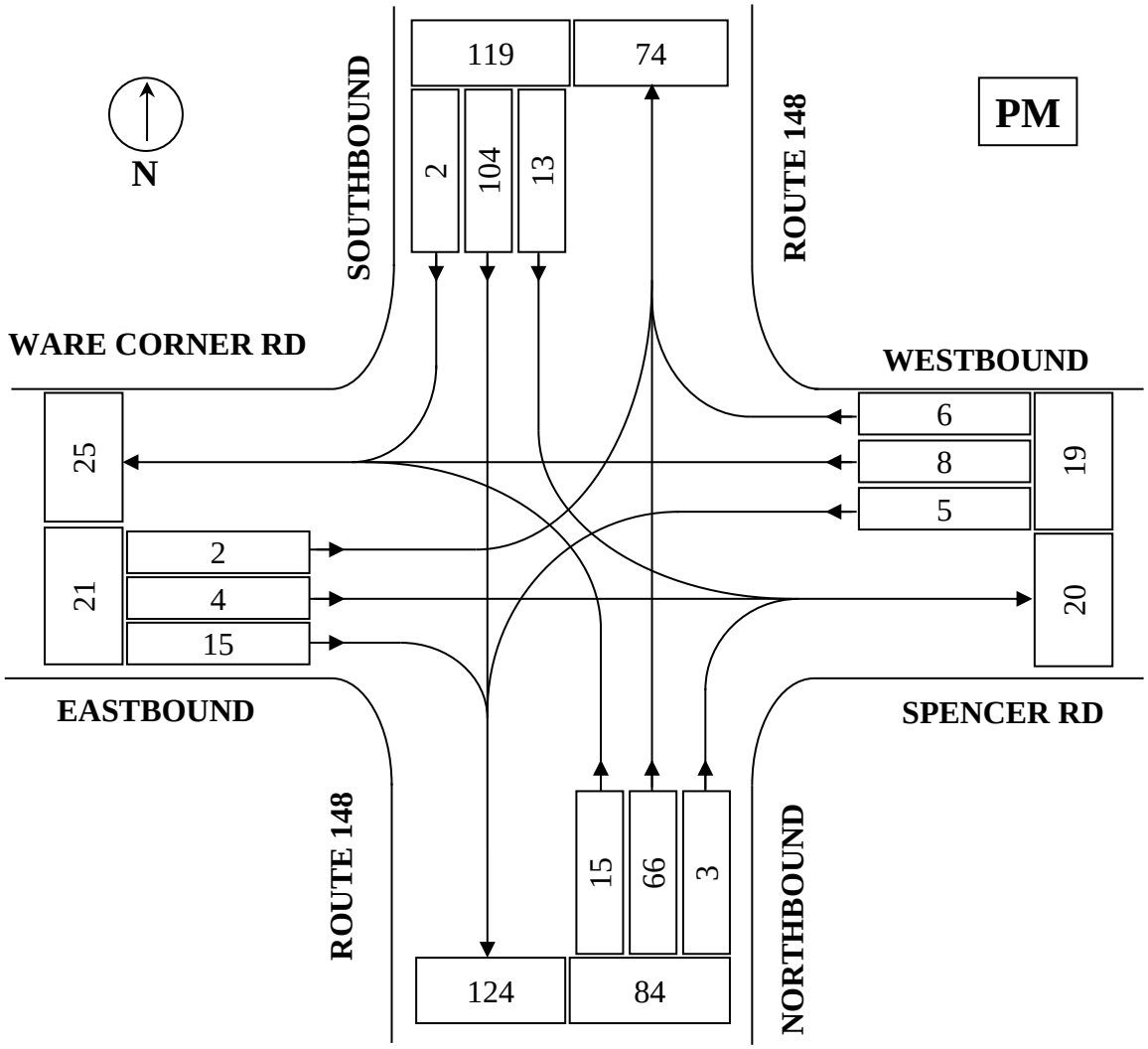


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Ware Corner Rd EB	9	5.2%	7:15 - 8:15 AM
Ware Corner Rd WB	14	8.1%	PHF = .84
Route 148 NB	94	54.7%	**VEHICLES COUNTED**
Route 148 SB	55	32.0%	**ALL VEHICLES:** 172
TOTAL	172	100.0%	**TRUCKS:** 2
			PERCENT TRUCKS: 1.16%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Oakham **DATE:** 5/12/26 **DAY OF WEEK:** Tuesday
INTERSECTION: Route 148 / Ware Corner Road / Spencer Road



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Ware Corner Rd EB	21	8.6%	4:30 - 5:30 PM
Ware Corner Rd WB	19	7.8%	PHF = .88
Route 148 NB	84	34.6%	**VEHICLES COUNTED**
Route 148 SB	119	49.0%	**ALL VEHICLES:** 243
TOTAL	243	100.0%	**TRUCKS:** 6
			PERCENT TRUCKS: 2.47%

HCS Two-Way Stop-Control Report

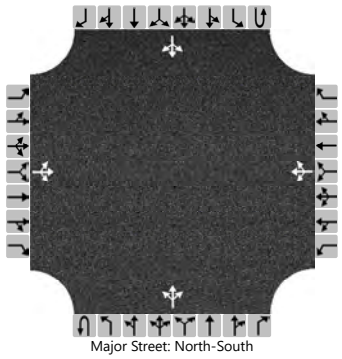
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/12/26
Analysis Year	2026
Time Analyzed	7:15 - 8:15 AM
Intersection Orientation	North-South
Project Description	Route 148 CP

Site Information

Intersection	Route 148/Ware Corner Rd
Jurisdiction	Oakham
East/West Street	Ware Corner Rd
North/South Street	Route 148
Peak Hour Factor	0.84
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		3	4	2		1	7	6		13	79	2		6	48	1
Percent Heavy Vehicles (%)		1	1	1		1	1	1		1				1		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.11	6.51	6.21		7.11	6.51	6.21		4.11				4.11		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.51	4.01	3.31		3.51	4.01	3.31		2.21				2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			11				17			15				7		
Capacity, c (veh/h)			755				789			1552				1503		
v/c Ratio			0.01				0.02			0.01				0.00		
95% Queue Length, Q_{95} (veh)			0.0				0.1			0.0				0.0		
95% Queue Length, Q_{95} (ft)			0.0				2.5			0.0				0.0		
Control Delay (s/veh)			9.8				9.7			7.3	0.1	0.1		7.4	0.0	0.0
Level of Service (LOS)			A				A			A	A	A		A	A	A
Approach Delay (s/veh)		9.8				9.7				1.1				0.8		
Approach LOS		A				A				A				A		

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HCS Two-Way Stop-Control Report

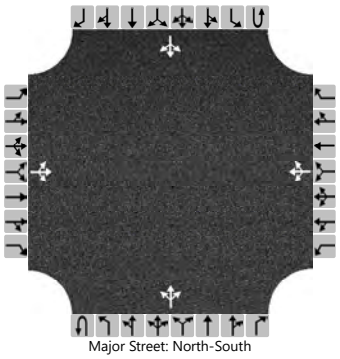
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/12/26
Analysis Year	2026
Time Analyzed	4:30 - 5:30 PM
Intersection Orientation	North-South
Project Description	Route 148 CP

Site Information

Intersection	Route 148/Ware Corner Rd
Jurisdiction	Oakham
East/West Street	Ware Corner Rd
North/South Street	Route 148
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		2	4	15		5	8	6		15	66	3		13	104	2
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			24				22			17				15		
Capacity, c (veh/h)			824				717			1467				1520		
v/c Ratio			0.03				0.03			0.01				0.01		
95% Queue Length, Q_{95} (veh)			0.1				0.1			0.0				0.0		
95% Queue Length, Q_{95} (ft)			2.5				2.5			0.0				0.0		
Control Delay (s/veh)			9.5				10.2			7.5	0.1	0.1		7.4	0.1	0.1
Level of Service (LOS)			A				B			A	A	A		A	A	A
Approach Delay (s/veh)	9.5				10.2				1.4				0.9			
Approach LOS	A				B				A				A			

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HCS Two-Way Stop-Control Report

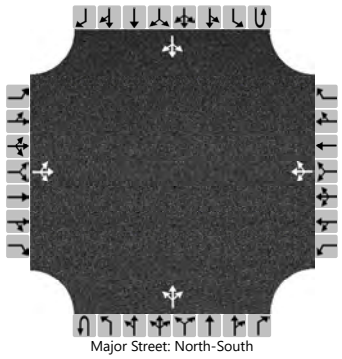
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/12/26
Analysis Year	2026
Time Analyzed	7:15 - 8:15 AM
Intersection Orientation	North-South
Project Description	Route 148 CP - Projected 2026

Site Information

Intersection	Route 148/Ware Corner Rd
Jurisdiction	Oakham
East/West Street	Ware Corner Rd/Spencer Rd
North/South Street	Route 148
Peak Hour Factor	0.84
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		4	5	2		1	8	7		16	95	2		7	58	1
Percent Heavy Vehicles (%)		1	1	1		1	1	1		1				1		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.11	6.51	6.21		7.11	6.51	6.21		4.11				4.11		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.51	4.01	3.31		3.51	4.01	3.31		2.21				2.21		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			13				19			19				8		
Capacity, c (veh/h)			706				756			1537				1480		
v/c Ratio			0.02				0.03			0.01				0.01		
95% Queue Length, Q_{95} (veh)			0.1				0.1			0.0				0.0		
95% Queue Length, Q_{95} (ft)			2.5				2.5			0.0				0.0		
Control Delay (s/veh)			10.2				9.9			7.4	0.1	0.1		7.4	0.0	0.0
Level of Service (LOS)			B				A			A	A	A		A	A	A
Approach Delay (s/veh)		10.2				9.9				1.1				0.8		
Approach LOS		B				A				A				A		

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HCS Two-Way Stop-Control Report

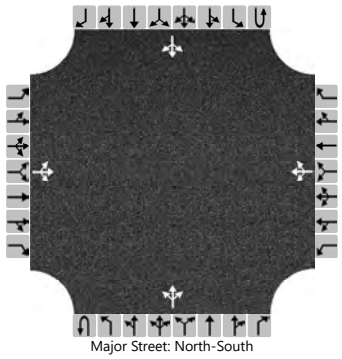
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/12/26
Analysis Year	2026
Time Analyzed	4:30 - 5:30 PM
Intersection Orientation	North-South
Project Description	Route 148 CP - Projected 2036

Site Information

Intersection	Route 148/Ware Corner Rd
Jurisdiction	Oakham
East/West Street	Ware Corner Rd/Spencer Rd
North/South Street	Route 148
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		2	5	18		6	10	7		18	79	4		16	125	2
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			28				26			20				18		
Capacity, c (veh/h)			786				666			1438				1500		
v/c Ratio			0.04				0.04			0.01				0.01		
95% Queue Length, Q_{95} (veh)			0.1				0.1			0.0				0.0		
95% Queue Length, Q_{95} (ft)			2.5				2.5			0.0				0.0		
Control Delay (s/veh)			9.8				10.6			7.5	0.1	0.1		7.4	0.1	0.1
Level of Service (LOS)			A				B			A	A	A		A	A	A
Approach Delay (s/veh)	9.8				10.6				1.4				0.9			
Approach LOS	A				B				A				A			

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TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: Town of Oakham

DATE: 5/12/2026

LOCATION: Route 148 / Route 122

DAY OF WEEK: Tuesday

WEATHER: AM: Clear PM: Clear

TECHNICIAN: Camera

Time Period	Route 122 EB				Route 122 WB				Route 148 NB								Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15		91	2	1	8	34		3	9		35	1					179	
7:15 - 7:30		113	6	6	10	46		8	1		43	2					219	
7:30 - 7:45		106	4	7	14	42		5	2		23	0					191	
7:45 - 8:00		97	2	9	13	59		7	4		32	4					207	796
8:00 - 8:15		74	2	2	18	52		5	2		30	1					178	795
8:15 - 8:30		88	0	3	8	52		5	2		32	2					182	758
8:30 - 8:45		77	0	2	10	54		3	6		19	1					166	733
8:45 - 9:00		73	5	6	12	44		3	6		20	0					160	686
TOTAL	0	719	21	36	93	383	0	39	32	0	234	11	0	0	0	0	1482	
		EBPct	52.9			**WBPct**	28.4			**NBPct**	18.7			**SBPct**	0.0			
Peak Sums:	**0**	**407**	**14**	**23**	**45**	**181**	**0**	**23**	**16**	**0**	**133**	**7**	**0**	**0**	**0**	**0**	**796**	
Total Trucks	53					**TrkPct**	6.66			**PHF**	0.91							

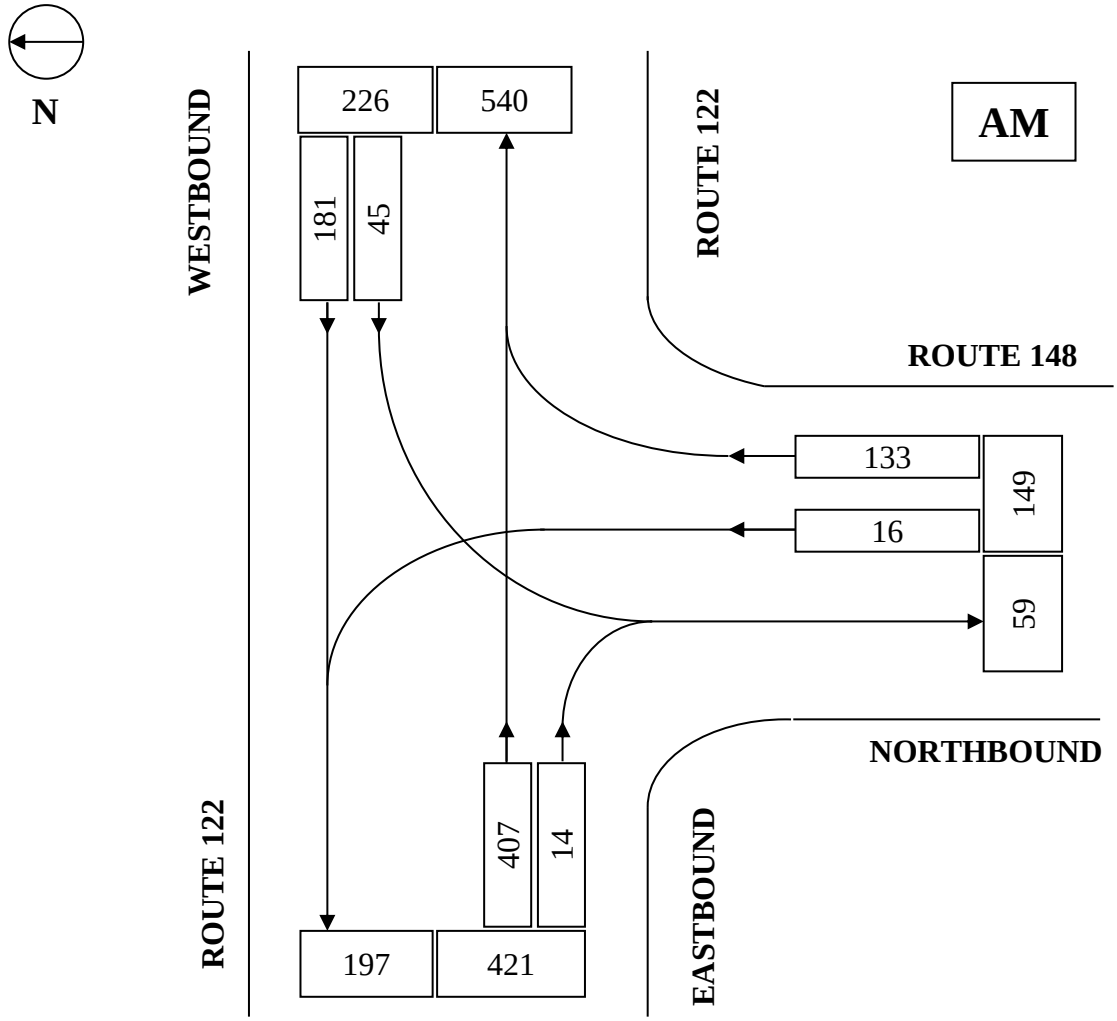
Time Period	Route 122 EB				Route 122 WB				Route 148 NB								Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15		68	4	2	33	87		2	4		24	1					220	
4:15 - 4:30		53	5	1	31	112		5	4		20	1					225	
4:30 - 4:45		55	3	2	39	117		1	3		24	2					241	
4:45 - 5:00		51	3	1	24	104		3	6		14	1					202	888
5:00 - 5:15		59	7	3	39	83		2	2		10	0					200	868
5:15 - 5:30		54	10	2	33	92		1	5		21	0					215	858
5:30 - 5:45		47	2	0	30	87		2	2		14	1					182	799
5:45 - 6:00		47	0	0	20	70		2	5		17	2					159	756
TOTAL	0	434	34	11	249	752	0	18	31	0	144	8	0	0	0	0	1644	
		EBPct	27.3			**WBPct**	61.6			**NBPct**	11.1			**SBPct**	0.0			
Peak Sums:	**0**	**227**	**15**	**6**	**127**	**420**	**0**	**11**	**17**	**0**	**82**	**5**	**0**	**0**	**0**	**0**	**888**	
Total Trucks	22					**TrkPct**	2.48			**PHF**	0.92							

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Oakham **DATE:** 5/12/2026 **DAY OF WEEK:** Tuesday

INTERSECTION: Route 148 / Route 122



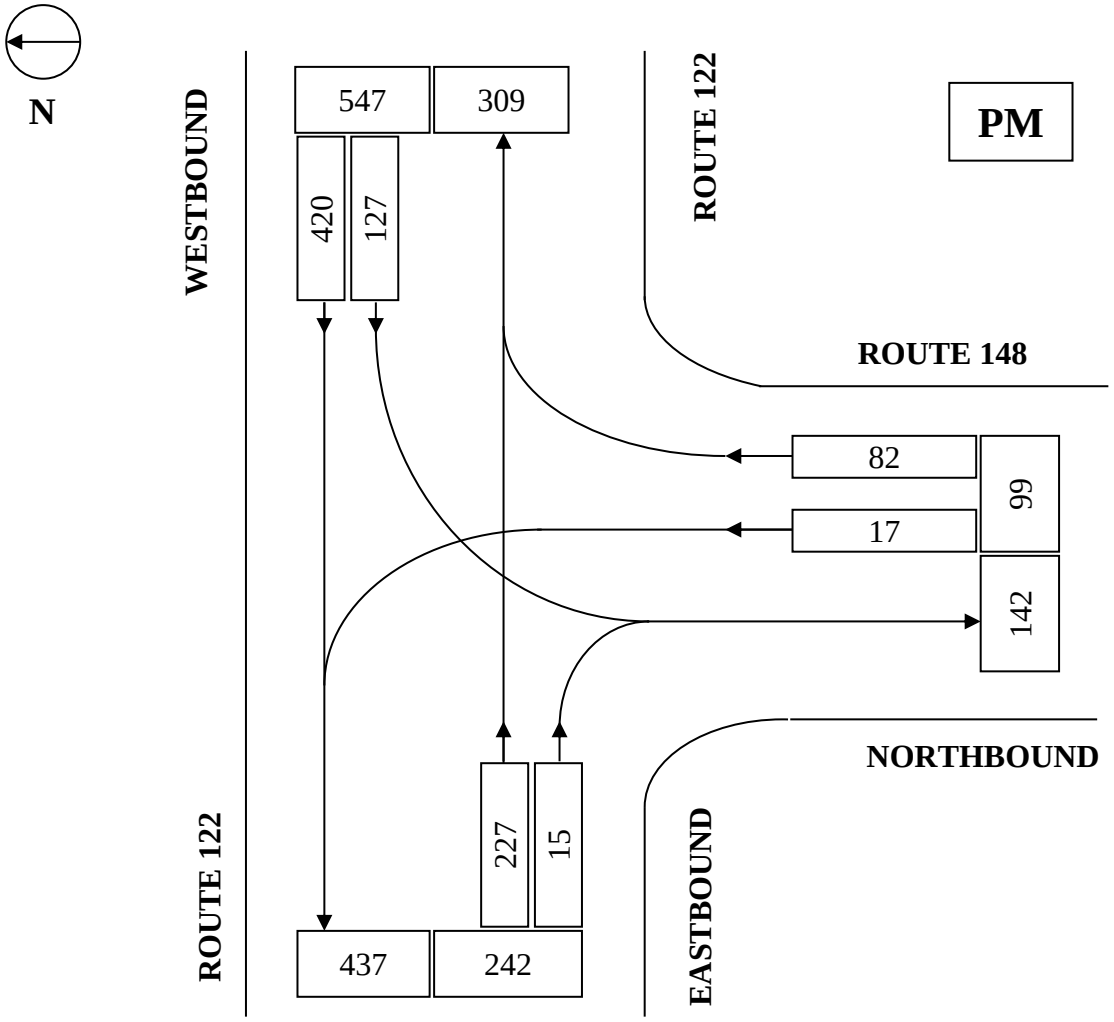
STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			7:00 - 8:00 AM
Route 122 EB	421	52.9%	
			PHF = .91
Route 122 WB	226	28.4%	
			VEHICLES COUNTED
Route 148 NB	149	18.7%	
			ALL VEHICLES: 796
TOTAL	796	100.00%	**TRUCKS:** 53
			PERCENT TRUCKS: 6.66%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Oakham **DATE:** 5/12/2026 **DAY OF WEEK:** Tuesday

INTERSECTION: Route 148 / Route 122



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			4:00 - 5:00 PM
Route 122 EB	242	27.3%	
			PHF = .92
Route 122 WB	547	61.6%	
			VEHICLES COUNTED
Route 148 NB	99	11.1%	
			ALL VEHICLES: 888
TOTAL	888	100.00%	**TRUCKS:** 22
			PERCENT TRUCKS: 2.48%

HCS Two-Way Stop-Control Report

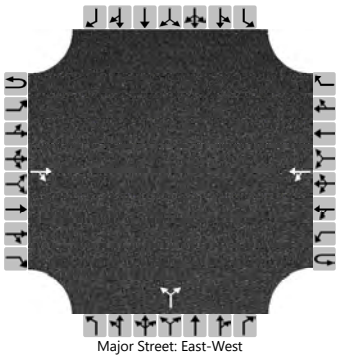
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/12/26
Analysis Year	2026
Time Analyzed	7:00 - 8:00 AM
Intersection Orientation	East-West
Project Description	Route 148 CP

Site Information

Intersection	Route 148/Route 122
Jurisdiction	Oakham
East/West Street	Route 122
North/South Street	Route 148
Peak Hour Factor	0.91
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			407	14		45	181			16		133				
Percent Heavy Vehicles (%)						6				3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.16				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.25				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						49					164					
Capacity, c (veh/h)						1078					562					
v/c Ratio						0.05					0.29					
95% Queue Length, Q_{95} (veh)						0.1					1.2					
95% Queue Length, Q_{95} (ft)						2.6					30.7					
Control Delay (s/veh)						8.5	0.4				14.0					
Level of Service (LOS)						A	A				B					
Approach Delay (s/veh)					2.0				14.0							
Approach LOS					A				B							

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HCS Two-Way Stop-Control Report

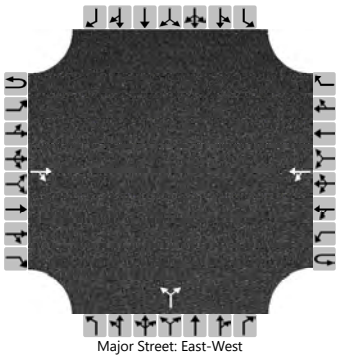
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/12/26
Analysis Year	2026
Time Analyzed	4:00 - 5:00 PM
Intersection Orientation	East-West
Project Description	Route 148 CP

Site Information

Intersection	Route 148/Route 122
Jurisdiction	Oakham
East/West Street	Route 122
North/South Street	Route 148
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			227	15		127	420			17		82				
Percent Heavy Vehicles (%)						2				2		2				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.12				6.42		6.22				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.22				3.52		3.32				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						138					108					
Capacity, c (veh/h)						1301					560					
v/c Ratio						0.11					0.19					
95% Queue Length, Q_{95} (veh)						0.4					0.7					
95% Queue Length, Q_{95} (ft)						10.2					17.8					
Control Delay (s/veh)						8.1	1.2				13.0					
Level of Service (LOS)						A	A				B					
Approach Delay (s/veh)					2.8				13.0							
Approach LOS					A				B							

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HCS Two-Way Stop-Control Report

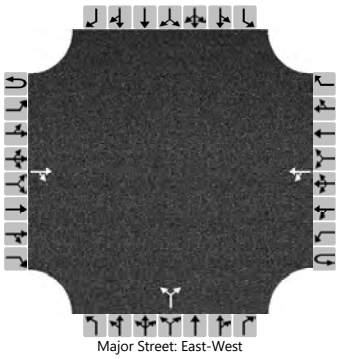
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/12/26
Analysis Year	2026
Time Analyzed	7:00 - 8:00 AM
Intersection Orientation	East-West
Project Description	Route 148 CP - Projected 2036

Site Information

Intersection	Route 148/Route 122
Jurisdiction	Oakham
East/West Street	Route 122
North/South Street	Route 148
Peak Hour Factor	0.91
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			488	17		54	217			19		160				
Percent Heavy Vehicles (%)						6				3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.16				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.25				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						59					197					
Capacity, c (veh/h)						996					490					
v/c Ratio						0.06					0.40					
95% Queue Length, Q_{95} (veh)						0.2					1.9					
95% Queue Length, Q_{95} (ft)						5.2					48.6					
Control Delay (s/veh)						8.8	0.6				17.2					
Level of Service (LOS)						A	A				C					
Approach Delay (s/veh)					2.2				17.2							
Approach LOS					A				C							

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HCS Two-Way Stop-Control Report

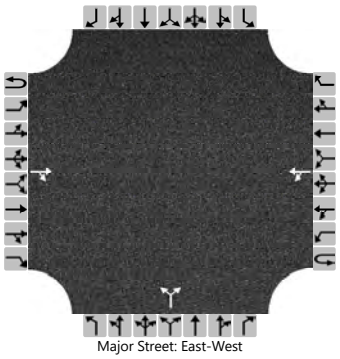
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/12/26
Analysis Year	2026
Time Analyzed	4:00 - 5:00 PM
Intersection Orientation	East-West
Project Description	Route 148 CP - Projected 2036

Site Information

Intersection	Route 148/Route 122
Jurisdiction	Oakham
East/West Street	Route 122
North/South Street	Route 148
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			272	18		152	504			20		98				
Percent Heavy Vehicles (%)						2				2		2				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.12				6.42		6.22				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.22				3.52		3.32				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						165					128					
Capacity, c (veh/h)						1245					469					
v/c Ratio						0.13					0.27					
95% Queue Length, Q_{95} (veh)						0.5					1.1					
95% Queue Length, Q_{95} (ft)						12.7					27.9					
Control Delay (s/veh)						8.3	1.6				15.5					
Level of Service (LOS)						A	A				C					
Approach Delay (s/veh)					3.2				15.5							
Approach LOS					A				C							

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Central Massachusetts Regional Planning Commission

Member Communities

Auburn	Northborough
Barre	Northbridge
Berlin	Oakham
Blackstone	Oxford
Boylston	Paxton
Brookfield	Princeton
Charlton	Rutland
Douglas	Shrewsbury
Dudley	Southbridge
East Brookfield	Spencer
Grafton	Sturbridge
Hardwick	Sutton
Holden	Upton
Hopedale	Uxbridge
Leicester	Warren
Mendon	Webster
Millbury	West Boylston
Millville	West Brookfield
New Braintree	Westborough
North Brookfield	Worcester

Central Mass Regional Planning Commission



1 Mercantile Street, Suite 520
Worcester, MA 01608