City of Meriden
Traffic Signal Study

June 2010

FUSS & O'NEILL
Disciplines to Deliver

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1 Introduction

Fuss & O'Neill was retained by the South Central Regional Council of Governments (SCRCOG) to perform a comprehensive inventory and review of the 64 City owned and maintained traffic signals in Meriden as illustrated in the Project Map provided in *Appendix A*. Existing signal equipment and intersection elements such as pedestrian and vehicular signal heads, cabinets, controller hardware, signage, and pavement markings were reviewed at each location for consistency with current State standards and National standards as published in the Manual on Uniform Traffic Control Devices (MUTCD).

In order to greatly simplify the retrieval, storage, and maintenance of the information collected, a custom database was developed and integrated with the City's existing Geographic Information Systems (GIS) platform. The new traffic signal inventory and evaluation database was populated with City GIS layers and each of the signalized intersection locations within the City was geocoded so that intersections could be easily identified on a map.

Having roadway intersection data and geographic records located in a single electronic database is advantageous to SCRCOG and the City of Meriden as field data collection and evaluation activities will consume significantly less time and resources than a piecemeal system. The ability to maintain and update all inventory data on a portable device such as a laptop will increase staff flexibility and organizational capabilities.

This report has been prepared to supplement the database application, summarize the findings of our signalized intersection reviews, and prioritize locations where signal equipment upgrades, complete signal replacement, or the elimination of traffic signals should be pursued. Recommendations are provided for locations where geometric improvements should be considered, from minor improvements such as traffic island modifications to major roadway realignments and intersection reconfigurations.

2 Study Objectives

The primary objective of this study is to identify intersections in the City of Meriden where existing vehicle and pedestrian traffic signal equipment is non-compliant with current State and MUTCD standards. Several of Meriden's City-owned signals have been in operation for over 20 years and have reached or exceeded the typical life span of a traffic signal. In many cases, existing signalized intersections would benefit from equipment upgrades, signal coordination, complete signal replacement, signal removal, or geometric modifications. These improvements are important to increase safety, improve the efficiency of traffic operations, and reduce vehicle greenhouse gas emissions.

Specific objectives of the study are as follows:

- Perform a comprehensive inventory of the 64 City-owned signalized intersections in Meriden, including pavement markings, signage, signal heads, cabinets, and controllers
- Review each intersection for compliance with State and MUTCD standards
- Identify existing capacity and safety issues at each intersection
- Develop recommendations for intersection improvements, signal equipment upgrades or removal, and coordination opportunities
- Develop a web-based GIS database to dynamically retrieve, store, and maintain signal inventory data.
- Position the City to apply for State and Federal funding to upgrade traffic signal equipment at critical locations

3 Signal Inventory Application Development

A unique feature of this project was the development of two applications: a field inventory database, and a web-based GIS map for the City and SCRCOG to interactively retrieve, store, and maintain signal inventory data into the future, long after this study has been completed. The Microsoft Access database that was developed works with the City of Meriden's existing GIS mapping platform and in the future, can be integrated into the City's database software (HTE), which already contains some limited signal inventory data. The webpage will allow city personnel to view all data associated with a selected intersection simply by clicking on a map.

3.1 Field Database Application

The database application that was developed enables personnel to enter notes and information in the field for the various components of the traffic signal and other intersection control features. Existing intersection signal information already in the City's current HTE database was included in the new database application. Additionally, the application has the ability to associate multiple documents with an intersection including photos, scanned signal plans, and other documents such as accident data reports.

The application was developed with an underlying tool to search for or query specific information entered based on intersection ID or intersection name. For example, a query of the vertical clearance to signal heads at all intersections could be generated or a summary of all intersections with 8" signal heads could be created. A long and short report for each intersection is included in pdf format detailing our findings.

3.2 Intranet Webpage

A webpage was developed for use by internal staff on the City's secure network (intranet) utilizing the City's pre-installed version of ArcGIS Server 9.3 running on a Windows Server platform. An ArcGIS Server application was developed utilizing the Adobe Flex technology through the ArcGIS Flex API. The content of this website includes a basemap with planimetric data in GIS format and a live map layer with colored nodes showing the locations of inventoried intersections. This feature enables users to interactively point and click on an intersection location in the map and retrieve all information collected on that location in a window. Additionally, the webpage has a tool to thematically map the intersections based on condition, age, or other similar attributes.
Application screen shots for a sample intersection inventory location have been provided in *Appendix B*.

4 Study Methodology

Representatives of Fuss & O'Neill conducted comprehensive inventories of each of the City's 64 signalized intersections during March and April 2010. In advance of the field inventories, existing available documentation including the latest traffic signal plans were researched and compiled for each intersection. These files were then linked into the GIS database for ease of storing and retrieving the data for future use.

During our field review, an inventory of existing signal equipment, signs, and pavement markings was completed by recording the information into the appropriate database fields on a laptop. The following information was collected at each intersection in the field:

- Intersection approach, cabinet, and controller photos
- General intersection notes and issues
- Improvement recommendations
- Cabinet condition, support type, and accessories
- Controller type, in service date, and replacement year
- Coordination and interconnect type (if applicable)
- Detector type and number
- Number, type and condition of signal heads
- Type and size of lens, lens material and visor type
- Sign type, condition, and location
- Pavement marking type, condition, and location
- Field observations and measurements to ensure consistency with MUTCD and Connecticut Department of Transportation (CTDOT) Traffic Control Signal Design Manual standards
- Operational and safety concerns
- Potential geometric improvements (e.g. correcting an offset or skewed intersection)

- Identification of signals to consider for potential removal

The following specific features were reviewed at each intersection for consistency with current industry practice as recommended by the MUTCD and CTDOT:

- Number of signal faces by approach
- Appropriate use of turn indications
- Size and type of vehicle and pedestrian signal displays
- Vertical clearance to signal and pedestrian heads
- Horizontal signal head separation
- Clearance of signal poles/pedestals from curb-line
- Appropriate use of pedestrian signals and ADA compliance
- Timing and clearance intervals of vehicle and pedestrian phases
- Visibility to signal heads
- Distance from signal heads to stop bar

5 Signal Inventory Results and Recommendations

Intersection Summary Reports for each location have been provided in *Appendix C*. Notes and recommendations, intersection photos, historical signal information, and observations/measurements of key MUTCD evaluation criteria have been compiled. These Summary reports represent only a portion of the overall inventory data gathered at each location. The pertinent record for each intersection location should be accessed within the GIS database application for a complete, interactive listing of all information recorded. As identified in the Intersection Summary Reports, some of the more common intersection improvement recommendations included:

- Complete Traffic Signal Replacement
- Signal Lens or Head Replacements
- Pedestrian Signal Upgrades
- Vehicle phase revisions
- Extension of pedestrian crossing clearance times (for 3.5 ft/sec walking speed)
- ADA Ramp Improvements
- Signage and Pavement Marking Upgrades
- Raising height of signal heads to provide greater than 16' clearance above road
- Adjusting vehicle head locations to provide greater than 8' horizontal separation
- Moving stop bar or signal heads to provide minimum 40' separation
- Upgrade to LED lenses
- Replace 8" signal heads with 12" heads
- Coordination of Signal with nearby intersections
- Consider Traffic Signal Removal
- Geometric Intersection Improvements such as approach alignment modifications or striping of turn lanes

The measurement and recommendation results for each intersection have been sorted and queried by each item inventoried to isolate signal components and other intersection features that are either missing, in poor or unsafe condition, or are non-compliant with current MUTCD and CTDOT standards. For quick reference, MUTCD compliance characteristics are presented in tabular format in *Appendix D*.

5.1 Full Replacement Locations

Several critical intersections with deficient and non-compliant signal equipment or intersection features were identified. In general, these signals have been in operation for at least 25 years, have exceeded their typical life span, and have signal equipment in generally poor condition. Intersections recommended for full traffic signal replacement include the following 14 locations:

- East Main Street at Preston Avenue/Cone Avenue/Pomeroy Avenue
- East Main Street at Pratt Street
- Paddock Avenue at Miller Avenue/Sandy Lane
- Center Street at Camp Street
- Center Street at Liberty Street
- Center Street at Pratt Street (anticipated 2011)
- Colony Street at Brooks Street
- West Main Street at Lewis Avenue/Linsley Avenue (anticipated 2012)
- West Main Street at Windsor Avenue/North 3rd Street
- West Main Street at Bradley Avenue (scheduled 2010)
- West Main Street at Centennial Avenue/Home Avenue
- West Main Street at Johnson Avenue/Sylvan Avenue
- Hanover Street at South Grove Street
- Hanover Street at Columbus Avenue/Winthrop Terrace

As noted above, three of these 14 intersections recommended for full replacement are currently under design and slated for construction in the next two years. The signals along the West Main Street corridor west of downtown and the Center Street/Pratt Street corridors east of downtown are mostly outdated and in poor condition. Full replacement is recommended for these signals.

5.2 Consideration for Signal Removal

A number of signalized intersections within the City should be reviewed for signal warrants in accordance with the latest MUTCD guidelines. Several intersections within Downtown Meriden contain full traffic signals that appear to be used for the sole purpose of providing safe crossing for pedestrians on West Main Street and Hanover Street. The traffic signals are placed relatively close to each other, with an average spacing of approximately 250 feet,

while pedestrian activity at many of these locations was observed to be minimal. In most cases, it is likely that the number of pedestrian calls falls significantly short of the required signal warrants based on the volume of through traffic on these roadways.

The frequent use of traffic signals in the Downtown area results in increased energy and maintenance costs for the City and increased vehicle emissions. Safety is compromised as pedestrians are often not patient enough to wait for the signal to change phase in the lengthy coordinated system cycle lengths. This results in pedestrians crossing the roadway when through traffic has a green indication. Pedestrian signals that should be considered for removal include:

- West Main Street at Butler Street
- West Main at Cook Avenue
- Perkins Street at Crown Street

These intersections have the potential to operate more safely and efficiently with high visibility painted crosswalks and advance retroreflective pedestrian warning signage. In pavement LED pedestrian crossing lights could also be considered to further highlight locations where pedestrians are crossing. These applications have gained popularity with several installations now operational in Connecticut. Pedestrians wishing to cross at a traffic signal would still have the option of crossing at Colony Street or Grove Street.

At Cook Avenue, it is recommended that the crosswalks be relocated to make use of the existing intersection island as a refuge for pedestrians, allowing all three crossings to cross a single lane at a time.

The existing pedestrian signal at the intersection of Perkins Street and Crown Street is in poor condition and is rarely used. During the site visit, it was observed that the pedestrians crossing the roadway at this location frequently do not use the push button, rather choosing to cross during a gap in through traffic. Therefore, the City could consider removing the aging traffic signal concurrent with making improvements to the existing pedestrian crossing. Consider expanding the pedestrian refuge island to the south, which would reduce the crosswalk length from 66 feet to approximately 26 feet and 15 feet.

Additional intersection locations were identified where side street vehicle volumes were minimal and MUTCD signal warrants are likely not satisfied. The following locations should be further reviewed for potential signal removal:

- Cook Avenue at Cooper Street
- Cook Avenue at Summer Street
- Pratt Street at Mill Street
- Westfield Shopping Center Driveway at Circuit City Driveway

Side street volumes appeared minimal at the two signalized intersections along Cook Avenue south of downtown and the signalized intersection of Pratt Street at Mill Street.

Existing volumes should be reviewed for signal warrants before any upgrades are made to the outdated signal equipment. While signal warrants may eventually be met at the Pratt Street at Mill Street signal should redevelopment of the adjacent development site move forward, it is recommended that the signal be considered for removal in the near term and any new signal installation be delayed until a future time when conditions may warrant it.

The signal at the intersection of the Westfield Shopping Center Driveway appears to be unwarranted due to the vacancy at Circuit City and the undeveloped parcels north of the intersection. It is recommended that the signal either be removed or set to flash until such time that the surrounding development parcels are fully occupied, thus necessitating the use of the signal.

5.3 Geometric Improvements

5.3.1 Short Term Improvements

Geometric improvements, pedestrian crosswalk improvements, and phasing modifications are recommended in the short term for several intersections with deficient geometry. These improvements are generally lower cost and higher priority in nature. Intersections where these improvements are recommended include:

- West Main Street at Cook Avenue
- Perkins Street at Crown Street
- Hanover Street at Colony Street
- Hanover Road at Coe Avenue/Highland Avenue
- West Main Street at Vale Ave/Centennial Plaza
- North Broad Street at Golden Street/Edison Magnet School Driveway

West Main Street at Cook Avenue
Fuss & O'Neill recommends that the existing crosswalks at the intersection of West Main Street at Cook Avenue be relocated to use the existing intersection island as a refuge island. This will allow pedestrians to cross a single lane at a time. This improvement will require the partial removal of the landscaping within the island, installation of four new pedestrian ramps, removal of two existing pedestrian ramps, and removal of the traffic signal.

Perkins Street at Crown Street
Similar pedestrian improvements should be considered at the intersection of Perkins Street at Crown Street. The existing intersection island should be expanded to the north and the existing crosswalk relocated to pass through the island. This would significantly reduce the pedestrian crossing distance to approximately 28 feet (2 lanes) while maintaining traffic flow through the intersection. This work would require the reconstruction of the existing island and the installation of two new pedestrian ramps.

Hanover Street at Colony Street

A crosswalk should be provided across the east leg of the intersection of Hanover Street at Colony Street. Under the existing condition, there is no pedestrian route between the sidewalk along the east side of Colony Street to the south side of Hanover Street if pedestrians do not cross at West Main Street. This would require the installation of two new pedestrian ramps, crosswalk striping, and signal timing modification.

Hanover Road at Coe Avenue/Highalnd Avenue
At the intersection of Hanover Road at Coe Avenue and Highland Avenue, the offset nature of the intersection leads to a long distance between the northbound and southbound stop bars. As a result, drivers making the northbound left turn must travel a significant distance through the intersection before completing their turn.

It is recommended that additional lane and arrow striping be installed through the intersection to guide drivers. The left turn signal indication should be relocated to the mast arm adjacent to Highland Avenue to ensure drivers can see the indication as they make their turn. This will also reduce the chance of wrong way drivers on the eastbound Coe Avenue approach. The signal timing should be modified to provide longer all-red clearance times for the northbound left turn and through phases.

West Main Street at Vale Ave/Centennial Plaza
The southbound entrance lane to the Centennial Plaza Shopping Center has a poor alignment for through drivers from Vale Avenue due to the excessive median width. It is recommended that the median be narrowed as much as possible without impacting the existing shopping center sign in order to improve the alignment for through vehicles.

North Broad Street at Golden Street/Edison Magnet School Driveway
Sight distance is poor for both side street approaches at the intersection of North Broad Street at Golden Street and the Magnet Middle School Driveway due to the horizontal and vertical curves on Golden Street. It is recommended that the signal phasing be revised to include split phasing on the side street approach, preventing potential collisions.

5.3.2 Long Term Improvements

Geometric improvements, including major shifts in alignment at various skewed and offset intersections, are recommended in several locations. As these are higher cost improvements that require significant planning and design, it is expected that these improvements will be completed within a five to ten year window. Most of the improvements may require partial or full property acquisitions and significant roadway reconstruction. Improvements are recommended for consideration at the following locations:

- East Main Street at Preston Avenue, Cone Avenue, & Pomeroy Avenue
- Paddock Avenue at Miller Avenue and Sandy Lane
- North Colony Road at Hicks Avenue and Nancy Lane
- Kensington Avenue at Lewis Avenue and Bailey Avenue

- West Main Street at Centennial Avenue and Home Avenue
- West Main Street at Johnson Avenue and Sylvan Avenue

East Main Street at Preston Avenue, Cone Avenue, & Pomeroy Avenue

The unusual five-leg configuration of the intersection of East Main Street at Preston Avenue, Cone Avenue, & Pomeroy Avenue results in confusion for drivers, excessive conflicts, and difficulty for pedestrians. The three side street approaches are all skewed at angles less than 60 degrees, resulting in poor sight distance and difficult turning maneuvers for large trucks.

It is recommended that the Preston Avenue and Cone Avenue approaches be shifted to the east with curvature on the approaches, forming a 90 degree, four-way intersection. The Pomeroy Avenue approach should remain in its existing location, forming a second intersection which would be controlled under a single controller. Appropriate pedestrian signals, ramps, sidewalk segments, and crosswalks should be installed. The project would involve the reconstruction of at least 300 feet of roadway on Preston Avenue, 300 feet of roadway on Cone Avenue, and the installation of two new traffic signals. The realignment will likely impact the property on the northeast corner of the intersection.

Paddock Avenue at Miller Avenue and Sandy Lane

The side street approaches to this intersection are offset by approximately 60 feet, resulting in poor geometry and conflicts between eastbound/westbound through drivers and northbound/southbound left turning vehicles. It is recommended that the Miller Avenue approach be shifted to the south in order to intersect Paddock Avenue opposite Sandy Lane. This will require the reconstruction of approximately 400 feet of Miller Avenue and the installation of a new traffic signal. This work is also likely to impact the property on the southwest corner of the intersection. It is recommended that split phasing be provided at the signal in the interim.

North Colony Road at Hicks Avenue and Nancy Lane

The eastbound Hicks Avenue approach to North Colony Road is curved and offset from the Nancy Lane approach due to the existing grading on the property at the northeast corner. It is recommended that the Hicks Avenue approach be reconstructed along a tangent alignment to the intersection, allowing for improved geometry at the intersection. Due to the grades on the adjacent property, this improvement is likely to require a full property acquisition and extensive grading.

Kensington Avenue at Lewis Avenue and Bailey Avenue

The side street approaches to Kensington Avenue are offset approximately 80 feet from each other, resulting in poor geometry for through movements and excessive lost time within the intersection. It is recommended that the southbound Bradley Avenue approach be realigned to intersect Kensington Avenue directly opposite Lewis Avenue. This will involve the reconstruction of at least 600 feet of Bailey Avenue as well as a full signal replacement. The property on the northeast corner will be heavily impacted by the realignment, requiring a partial acquisition within the adjacent parking lot or a full acquisition. In the interim condition, it is recommended that left turn arrows for the

northbound and southbound movements be provided under the existing split phasing. This will not require any modification to the existing phasing.

West Main Street at Centennial Avenue and Home Avenue

The side street approach of Centennial Avenue to West Main Street is skewed at a 45 degree angle and offset from the Home Avenue approach by approximately 40 feet. It is recommended that Centennial Avenue be realigned on a curved alignment to intersect West Main Street opposite Home Avenue. This will require the reconstruction of approximately 300 feet of Centennial Avenue and a full signal replacement. It will require a partial property acquisition of the retail property on the southwest corner, with a potentially small impact to the parking lot.

West Main Street at Johnson Avenue and Sylvan Avenue

This intersection has a poor alignment for all approaches, with West Main Street curving through the intersection, Johnson Avenue intersecting at an oblique angle, and Sylvan Avenue offset from the Johnson Avenue approach. It is recommended that the intersection be shifted to the west, with the Sylvan Avenue and Johnson Avenue approaches to intersect at closer to a 90 degree angle.

This improvement will require a partial property acquisition for the commercial property on the west corner and a full acquisition for the residential property on the northwest corner, as well as potential additional impacts to the adjacent property to the north along Sylvan Avenue. The project will require the reconstruction of approximately 300 feet of Johnson Avenue, 500 feet of West Main Street, and 500 feet of Sylvan Avenue.

6 Closed Loop Coordination Review

Coordination between nearby traffic signals is critical in providing efficient traffic flow and reduced vehicle emissions along the City's more heavily traveled corridors. The City of Meriden currently operates five coordinated closed loop signal systems:

- East Main Street in the vicinity of Interstate 91
- West Main Street through downtown
- Hanover Street through downtown
- West Main Street west of downtown
- Lewis Avenue from Interstate 691 to Kensington Avenue

The existing coordinated systems on West Main Street and Hanover Street in downtown Meriden have lengthy cycles that result in significant delay for pedestrians at the dedicated pedestrian signals, causing some pedestrians to violate the control rather than waiting for the walk signal. As noted in Section 5.2, some of the signals in this coordinated system should be considered for removal.

It is recommended that the existing coordinated signal system on East Main Street be extended east to Preston Avenue and west to Parker Avenue, adding three more intersections to the system and completing the corridor.

Installation of a coordinated signal system along Center Street between Liberty Street and Camp Street should be contemplated. This improvement would require the installation of new traffic signals at each intersection, as the existing equipment is outdated and already recommended for replacement.

7 Potential Funding Sources

Federal/State funding for traffic signal improvements can be achieved by placing signal projects on the Connecticut Traffic Improvement Program (TIP) listing. These projects can then be financed using funds from one or more of FHWA's funding programs:

- Surface Transportation Program (STP)
- Congestion Mitigation and Air Quality (CMAQ)
- National Highway System (NHS)

For more information on these funding sources, and examples of how other regional planning organizations have funded similar traffic signal operations and management programs, FHWA's publication *Regional Traffic Signal Operations Programs: An Overview* should be reviewed. This publication is available by accessing the following website:

http://ops.fhwa.dot.gov/publications/fhwahop09007/fhwahop09007.pdf

8 Summary

Fuss & O'Neill has completed a comprehensive inventory and review of the 64 City owned and maintained traffic signals in Meriden. Our review of the existing signal equipment, signage, pavement markings, and geometric elements at each intersection have yielded a number of recommendations to improve intersection safety, improve the efficiency of traffic operations, and achieve compliance of each traffic signal with current State and Federal MUTCD standards. Some of the recommendations for consideration by the City of Meriden and SCRCOG include the following:

- Full replacement at 14 signal locations (includes two already under design)
- Existing signal modifications/upgrades at 33 additional locations
- Signal warrant analysis/potential signal removal at 8 locations
- LED signal lens replacements at 20 locations
- Signage improvements at 19 intersections
- Pavement marking improvements at 46 intersections
- Geometric intersection improvements at 12 locations
- Coordination of additional traffic signals on West Main Street, East Main Street, and Center Street.

A complete listing of the recommended intersection improvements has been included in the Intersection Summary Reports provided in Appendix C and the summary matrix provided in Appendix D. Implementation of these improvements is critical not only to improve the safety and efficiency of intersection operations, but also to reduce vehicle greenhouse gas emissions and energy consumption by the City.

A second, unique component of this study included the development of a custom GIS database to greatly simplify the retrieval, storage, and maintenance of the signal inventory information collected. A field inventory database and a web-based GIS map was developed to work in concert with the City of Meriden's existing GIS mapping platform. The webpage will allow city personnel to view all data associated with a selected intersection simply by clicking on a map. This application will prove valuable to the City and SCRCOG as it will enable staff to interactively access, update, and maintain signal inventory data into the future, long after the completion of this study.

Appendix A

Project Map

ID #	Address
01	E. Main @ Preston/Pomeroy/Cone
02	E. Main @ Research
04	E. Main @ Maple
05	E. Main @ Bee/Pomeroy
06	E. Main @ 91Sb
07	E. Main @ Gravel/Paddock
08	Paddock @ Miller
09	Gravel @ Baldwin
10	E. Main @ Swain
11	E. Main @ Pearl/Carpenter
12	E. Main @ Parker
13	Broad @ Gale/Ann
14	Broad @ Liberty
15	Camp @ Center
16	Center @ Liberty
17	Colony @ Britannia/Kensington
18	Pratt @ Center
19	N. Colony @ Hicks/Nancy
20	Pratt @ Myrtle
21	Pratt@ Cedar/Twiss
22	Pratt @ Mill
23	Pratt @ Mfd2
24	E. Main @ Pratt
26	Olive @ Crown/S.Colony
27	E. Main @ State
28	Perkins @ Crown
29	Hanover @ S Colony
30	W. Main @ Colony
31	Colony @ Church
32	Colony @ Brooks
33	Colony @ Camp/Columbia
34	W. Main @ Barristers
35	W. Main @ Police/Court Complex
36	W. Main @ Grove
37	W. Main @ Butler
38	W. Main @ Cook
39	W. Main @ Lewis/Linsley
40	W. Main @ Windsor
41	W. Main @ Bradley
42	W. Main @ Centennial/Home
43	W. Main @ Vale
44	W. Main @ Johnson/Sylvan
45	W. Main @ Spruce
46	Hanover @ Senior Center
47	Hanover @ S. Grove
48	Hanover @ Butler
49	Hanover @ Cook
50	Cook @ Cooper
51	Cook @ Summer
52	Hanover @ Columbus
53	Lewis @ Springdale
54	Lewis @ Columbia
55	Lewis @ 691/Midstate Hosp
56	Lewis @ Meriden Sq/Midstate
57	Lewis@ Kensington/Bailey
58	Coe @ Hanover/Highland
59	Coe @ Bradley
60	Coe @ Centennial
61	Hanover @ Main
62	Main @ River
63	Chamberlain @ Lockwood
64	Meriden Square @ Circuit City
65	Broad @ Golden
66	Research Pkwy @ Murdock Av

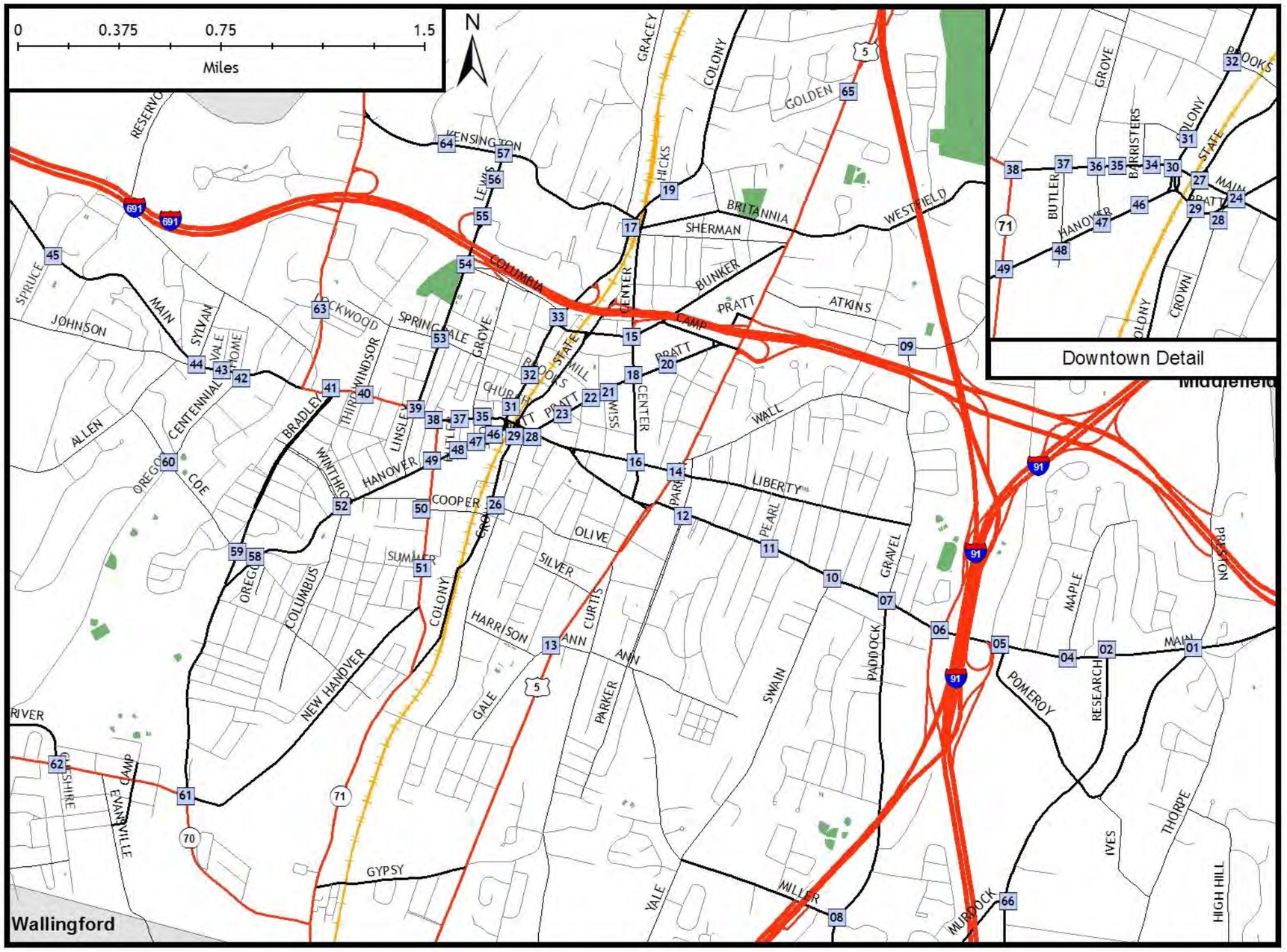
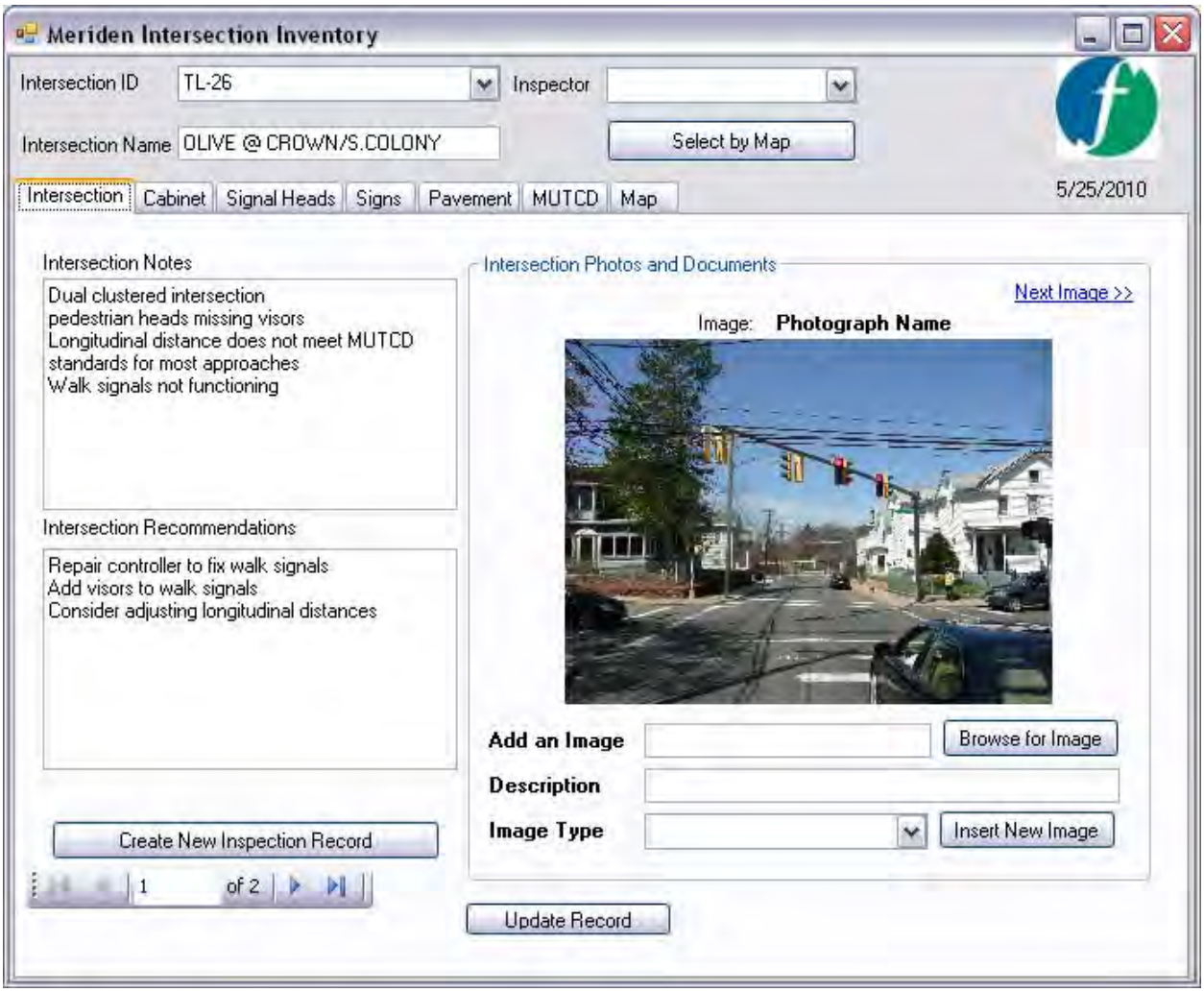


Figure A1. Map of Inventoried Intersections in Meriden, CT

Appendix B

GIS Database Application Screen Shots for Sample Intersection Inventory

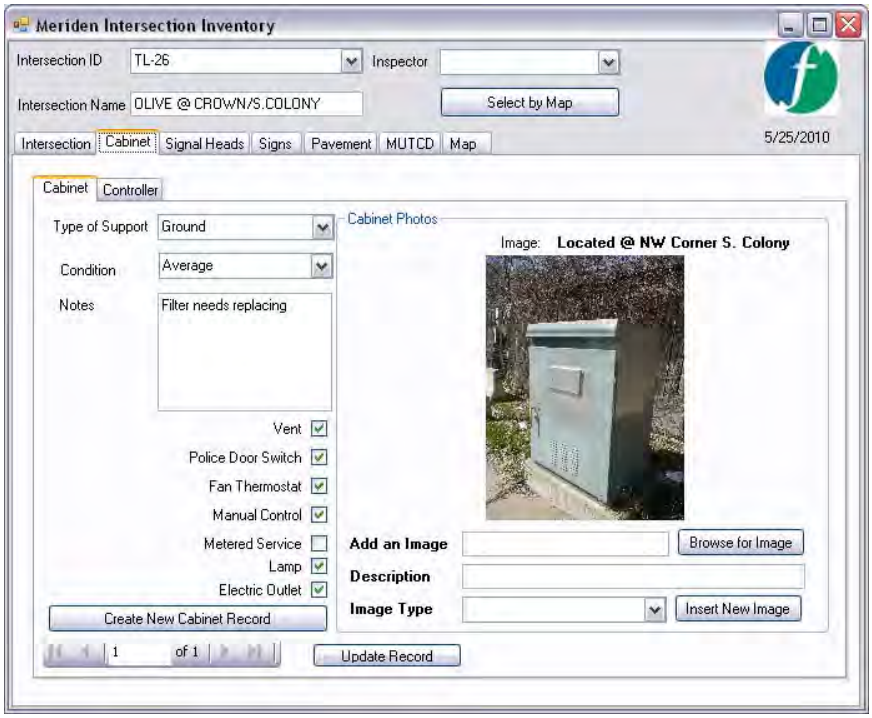
Intersection Tab

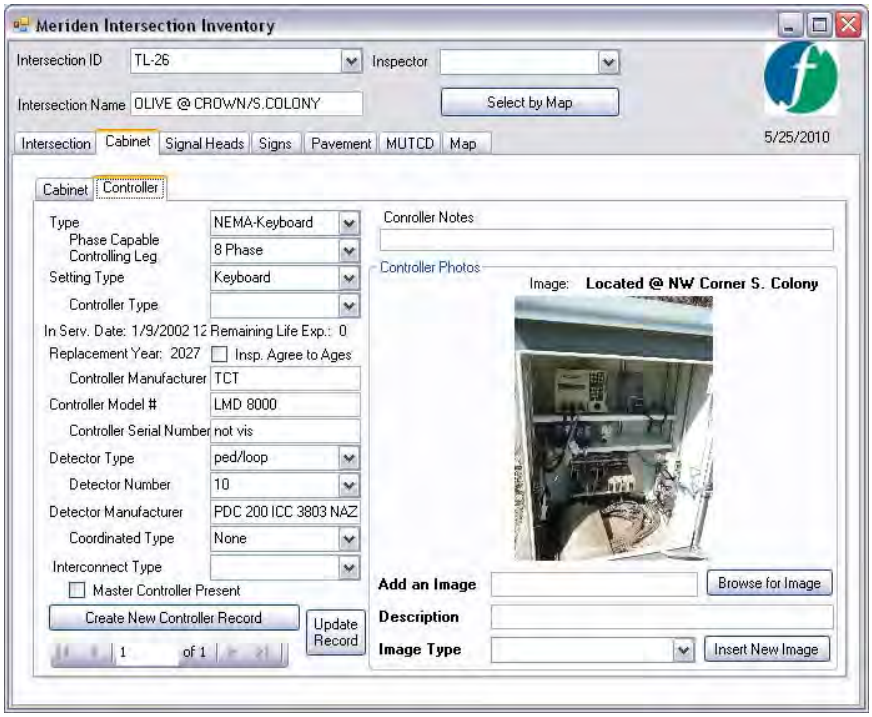


This tab allows the user to create detailed inspection records for any intersection that is stored in the GIS map accessed through the "Select by Map" button. The "Notes" and "Recommendations" fields should summarize all of the information entered into the more detailed sections including "Signs", "MUTCD", etc.

The Intersection tab is also used to link documents to a specific intersection, including photographs, signal plans, and accident data. These files can be located in any directory on the client server (preferably not a local computer) as they are not stored within the database; rather, the associated paths are collected for each file. This feature keeps the field application and database at a manageable size so that it can be copied easily between computers while maintaining appropriate linkages to associated pictures and documents.

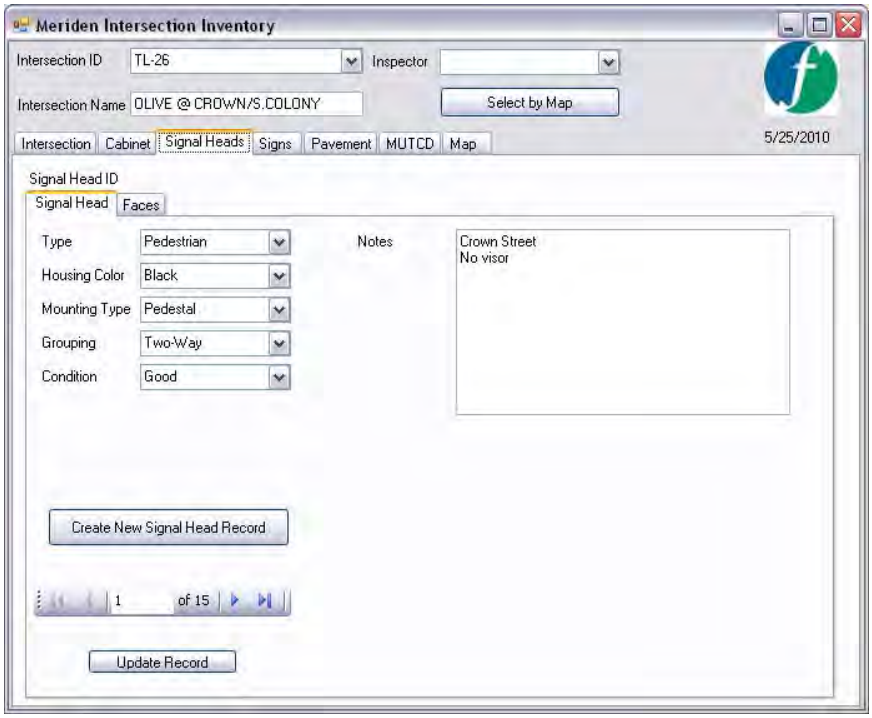
Cabinet Tab

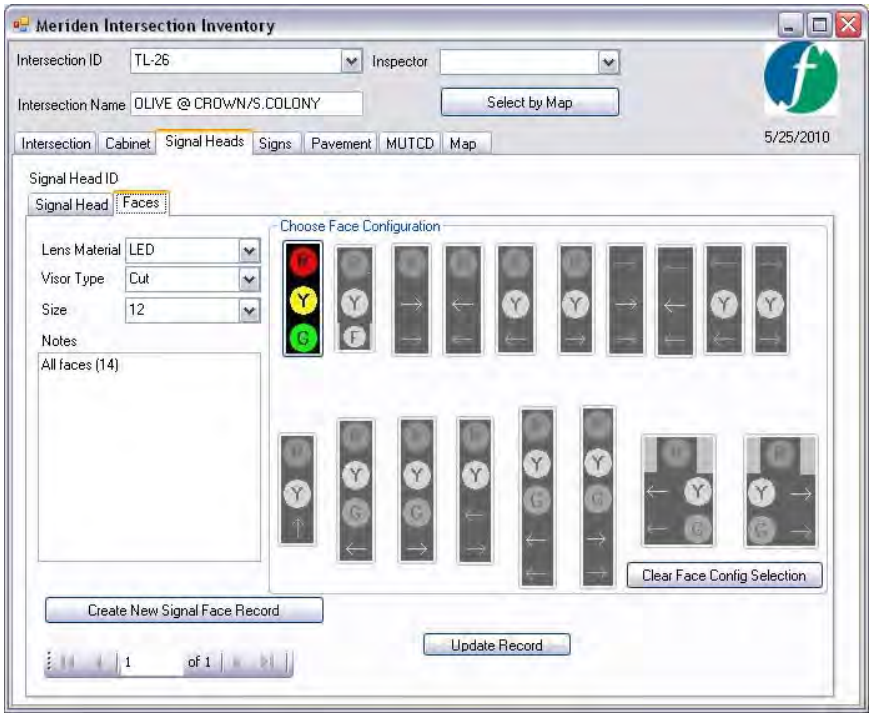




This tab stores data related to the traffic signal cabinet and included intersection control hardware. The "Cabinet" subsection stores physical attributes, while the "Controller" subsection contains information about traffic signal equipment manufacturers, loop presence and type, and operational capabilities. Exterior and interior images of cabinets can be associated with specific intersections.

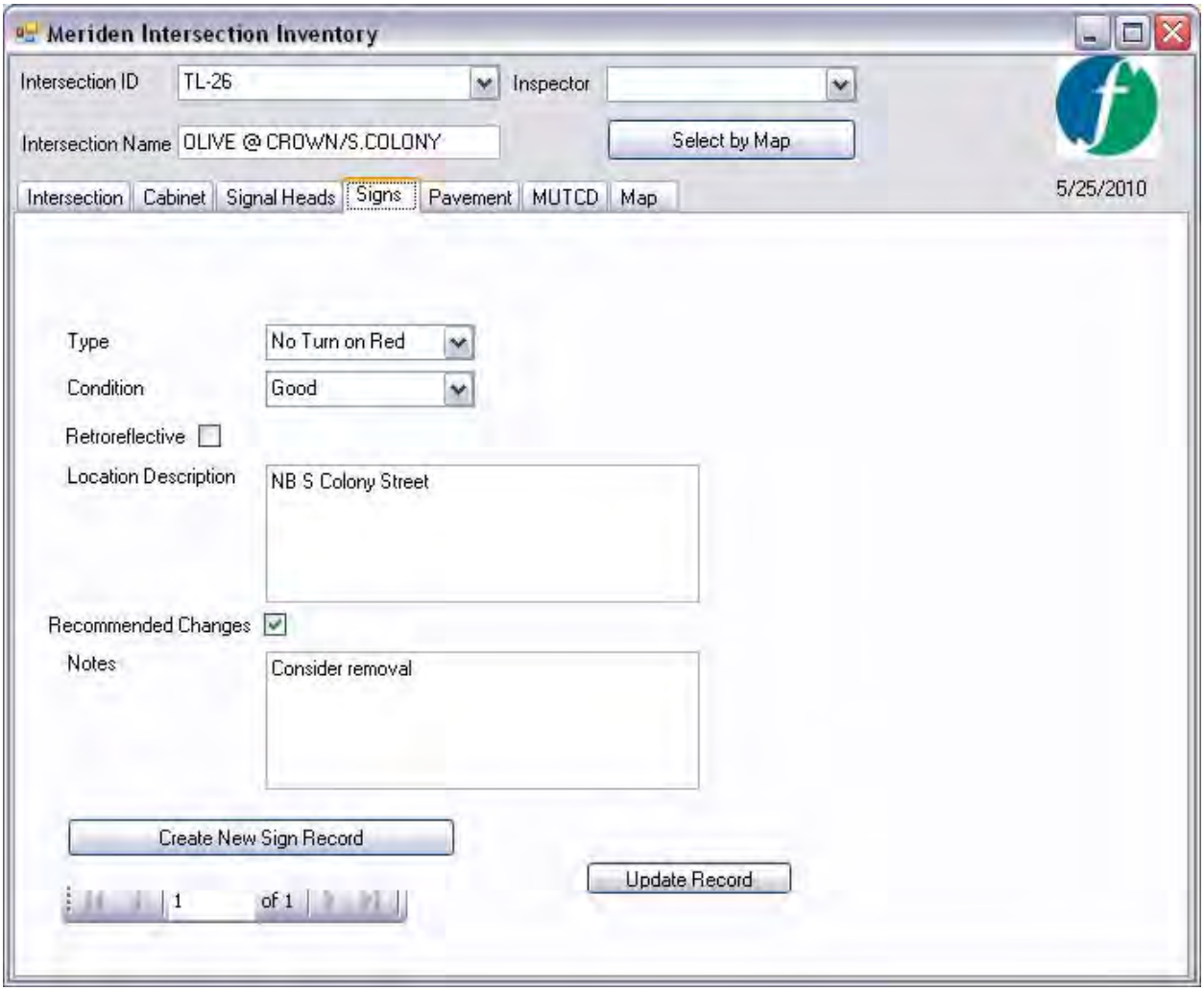
Signal Head Tab





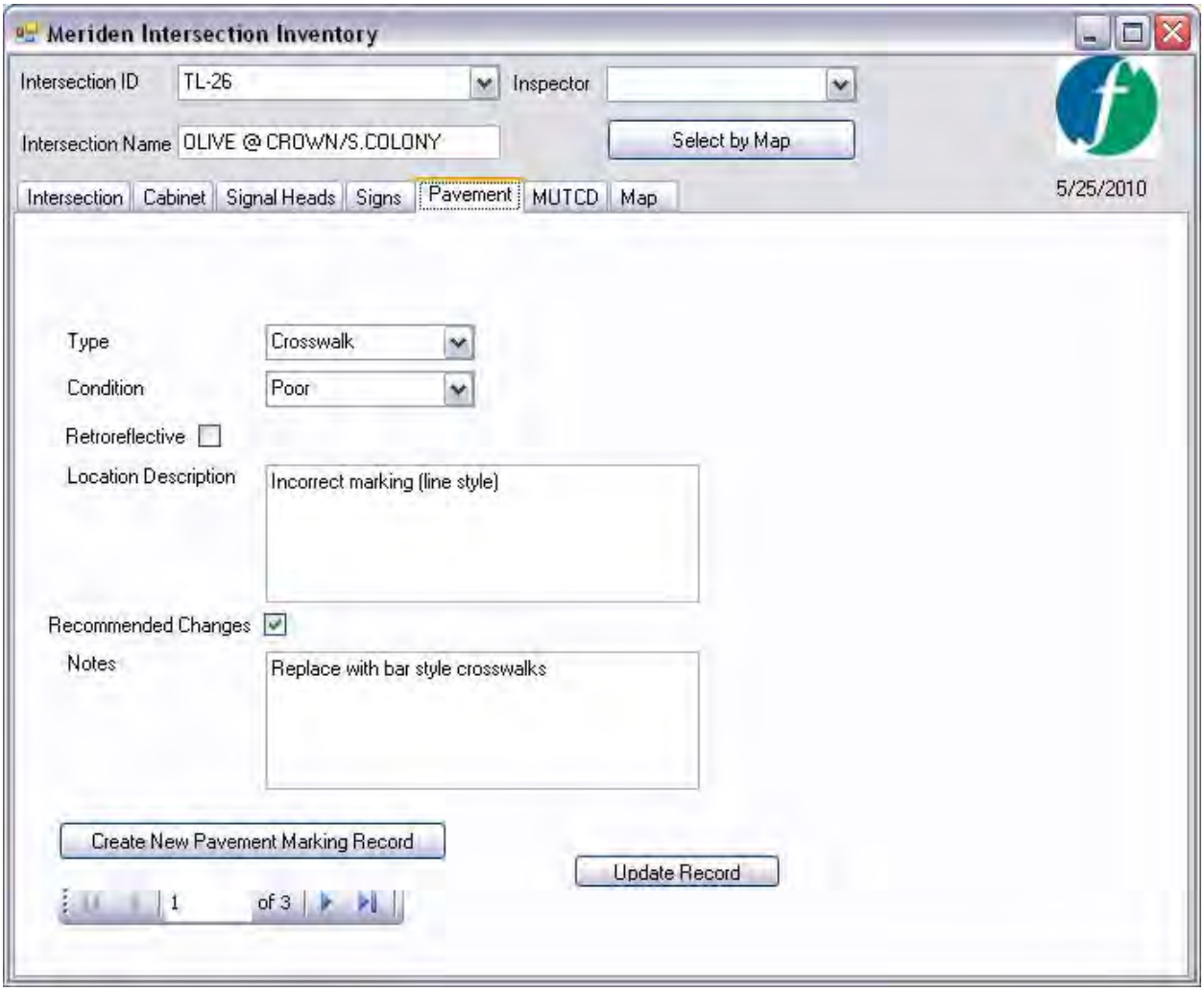
This tab stores data related to the traffic signal heads and faces. The "Signal Head" subsection stores external attributes such as mounting type and color, while the "Faces" subsection stores information about the size and type of lenses as well as the layout of the signal face. Users select the type of signal face for each entry using a visual diagram showing each possible face configuration.

Signs Tab



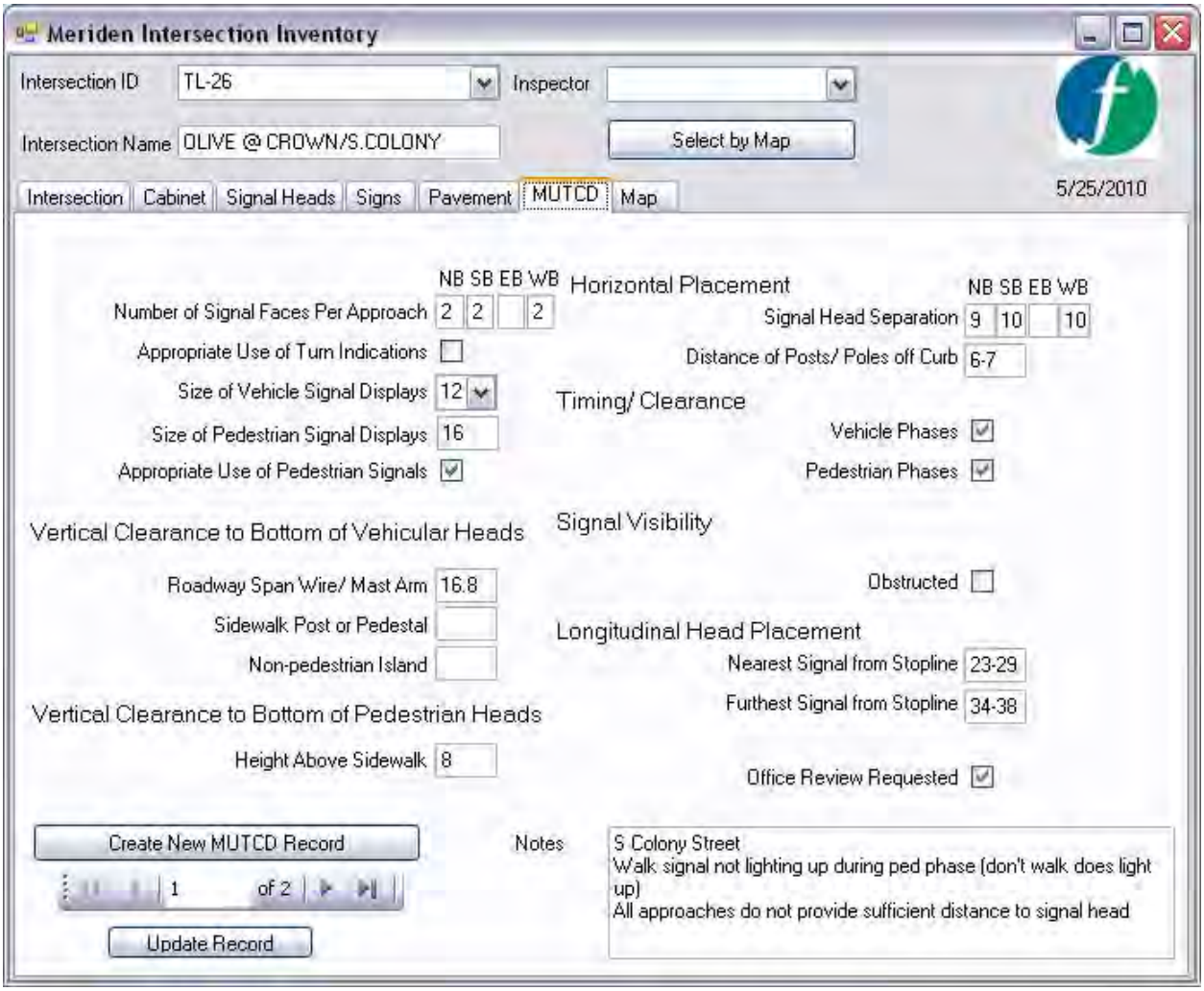
This tab allows the user to create a record for each individual sign located at the intersection. Fields are provided for sign type, condition, and location. If changes are recommended, a separate field is provided for recommendations along with a checkbox for improvements.

Pavement Tab



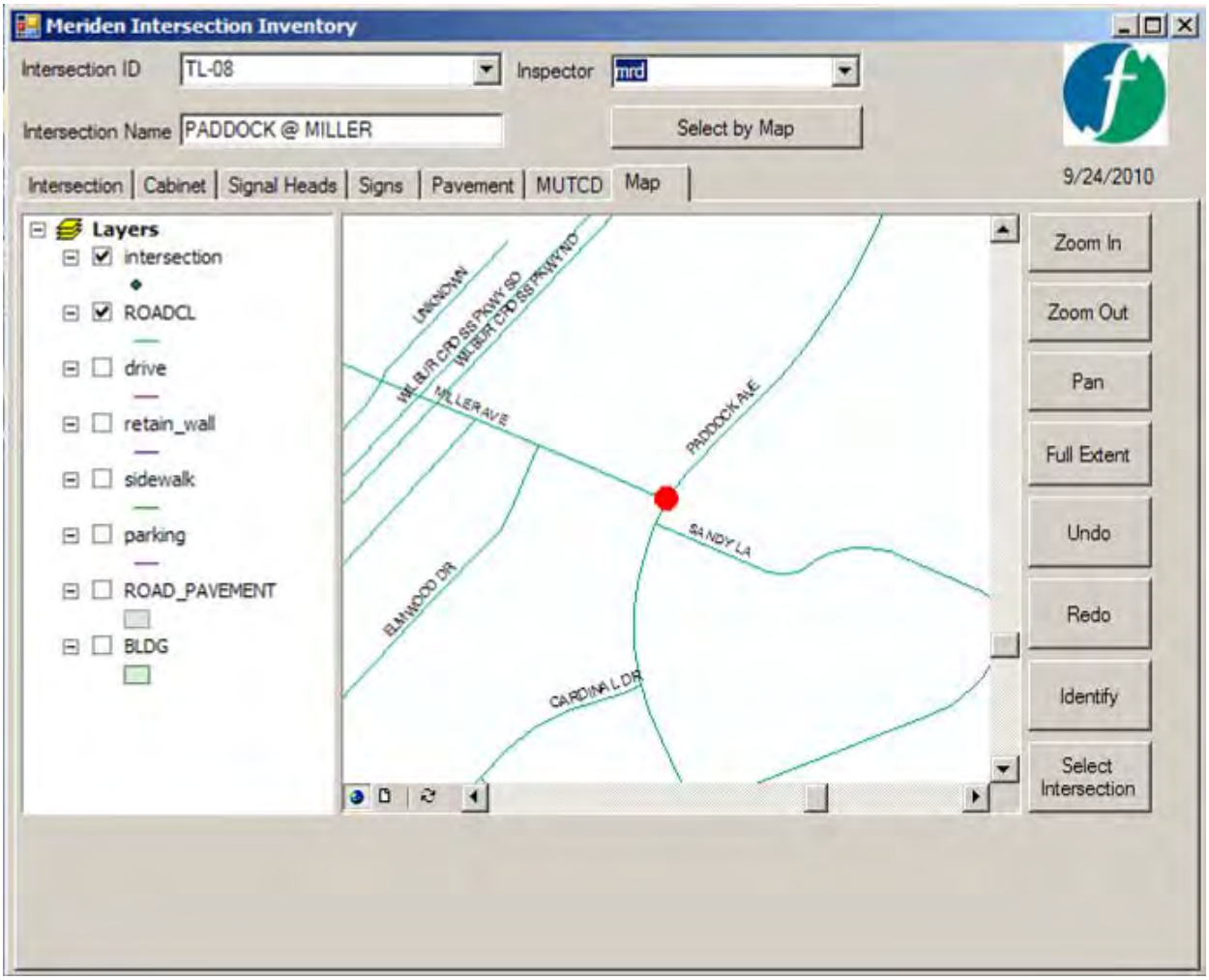
This tab allows the user to create a record for each pavement marking located at the intersection. Fields are provided for pavement marking type, condition, and location. If changes are recommended, a separate field is provided for recommendations along with a checkbox for improvements.

MUTCD Tab



This tab allows the user to document the compliance of the traffic signal with the standards set forth in the 2009 *Manual on Uniform Traffic Control Devices (MUTCD).* The tab includes measurements such as the spacing between signal heads, vertical clearance of the traffic signal equipment from the roadway, and distance between the stopline and the signal indication. It also includes checkboxes for the presence of pedestrian signals and clearance phases. Space is provided for detailed notes relating to the MUTCD compliance, and a checkbox is provided indicating that further review is requested.

Map Tab



The map tab allows the user to view a GIS map of the City of Meriden with each of the signalized intersections indicated by dots. Using the "Select Intersection" tool, the user can select an intersection from the map and move to the data entry tabs to view or enter information relative to the intersection.

Appendix C

Intersection Summary Reports

Summary Report for Intersection

Location: TL-01 - E. MAIN AND PRESTON

(left) WB on East Main

(right) NB on East Main

Notes	Five leg intersection 8" signal heads for side street Poor pavement condition on side streets Loops exposed on Northeastbound approach Low clearance to signal heads Signs & pavement markings in poor condition Crosswalk in poor location, no sidewalk access or pedestrian equipment
Recommendations	Full replacement Install no turn on red for NB approach

Summary Report for Intersection

Location: TL-01 - E. MAIN AND PRESTON

MUTCD Report #1

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	14	19	16	17

Size of Vehicle Signal Displays (in)		8/12	**Presence of Pedestrian Signals**	☐
Distance of Furthest Signal To Stopline (ft)		44-75	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)		15	**Obstructed Signals**	☐
In Service Date	7/9/1985	**Replacement Year** 2010	**Office Review Requested**	☑

MUTCD Report #2

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2			
Signal Head Separation (ft)	26			

Size of Vehicle Signal Displays (in)		8	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)			**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)		15.5	**Obstructed Signals**	☐
In Service Date	7/9/1985	**Replacement Year** 2010	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-02 - E. MAIN AND RESEARCH

(left) WB East Main and Research

(right) NB East Main and Research

Notes	Equipment requires painting Insufficient pedestrian clearance interval No indications provided for SB driveway approach Air filter, light bulb missing from controller cabinet, water found in bottom of cabinet NW pedestrian push button not functioning Vertical clearance insufficient
Recommendations	Extend pedestrian clearance interval Paint signal heads Provide signal indications for SB driveway approach Consider providing NB right turn overlap phase Repair controller cabinet Improve vertical clearance Repair pedestrian push button

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	0	2
Signal Head Separation (ft)	19	15		14

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	72-85	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	15.5	**Obstructed Signals**	☐
In Service Date 1/9/2002	**Replacement Year** 2027	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-04 - E. MAIN AND MAPLE

(left) WB East Main and Maple

(right) SB East Main and Maple

Notes	Signal heads need paint NB signal heads too close to stop bar SB signal heads horizontal seperation is insufficient
Recommendations	Consider shifting NB stop bar to increase distance to signal face Paint signal heads Shift SB signal heads to provide sufficient horizontal clearance

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	16	22	7	14

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	36-66	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	16.4	**Obstructed Signals**	☐
In Service Date 1/9/2002	**Replacement Year** 2027	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-05 - E. MAIN AND BEE

(left) EB East Main and Pomeroy

(right) NB East Main and Bee

Notes	Dual cluster intersection Signal heads need paint No control provided for SB driveway approach Pedestrian clearance time insufficient NB Pomeroy heads not aligned with left lane Pedestrian push button not functioning @ Bee St NB Pomeroy signal too close to stop bar Vertical clearance insufficient @ I-91 ramps
Recommendations	Paint signal heads Install signals for SB driveway approach Install a third signal face or relocate existing signal faces for NB Pomeroy Repair pedestrian push button Consider removing no turn on red sign WB @ Bee St Shift stop bar back on Pomeroy Ave Adjust vertical clearance at I-91 Ramps Consider changing phasing to allow ped phase to go after EB/WB through phase for reduced lost time

Summary Report for Intersection

Location: TL-05 - E. MAIN AND BEE

MUTCD Report #1

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2		2
Signal Head Separation (ft)	10	10		14

Size of Vehicle Signal Displays (in)		12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)		37-81	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)		16.4	**Obstructed Signals**	☐
In Service Date	1/9/2002	**Replacement Year** 2027	**Office Review Requested**	☑

MUTCD Report #2

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	12	16	15	16

Size of Vehicle Signal Displays (in)		12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)		48-62	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)		15.4	**Obstructed Signals**	☐
In Service Date	1/9/2002	**Replacement Year** 2027	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-06 - E.MAIN AND 91 SB

(left) EB East Main and 91SB

(right) SB East Main and 91SB

Notes Vertical clearance insufficient

Recommendations Increase vertical clearance

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach		2	2	2
Signal Head Separation (ft)		15	13	13

Size of Vehicle Signal Displays (in)		12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)		57-85	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)		14	**Obstructed Signals**	☐
In Service Date	1/9/2002	**Replacement Year** 2027	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-07 - E.MAIN AND PADDOCK

(left) WB East Main

(right) NB E. Main and Gravel

Notes	Pavement markings in poor condition on NB/SB approaches Vertical clearance slightly too low
Recommendations	Restripe NB/SB approaches

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	24	16	21	22

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	71-88	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	15.8	**Obstructed Signals**	☐
In Service Date 1/9/2002	**Replacement Year** 2027	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-08 - PADDOCK AND MILLER

(left) NB on Paddock

(right) EB on Miller

Notes

No ADA ramps at crosswalk on WB approach
No crosswalk provided across Paddock
No pedestrian signals provided
Limited sight distance for right turn on red from NB & WB approaches
Limited sight distance for EB/WB legs due to offset approaches
Utility lines obstruct view to signal indications from EB/WB/NB approaches

Signal heads on EB approach too close to stop bar

Recommendations

Consider full replacement
Consider geometry improvements to align Miller Avenue and Sandy Lane
Install ADA ramps for crosswalk across WB approach
Install crosswalk between Sandy La & Miller Ave
Install pedestrian signal equipment
Install no turn on red restrictions for NB & WB approaches
Provide split phasing for EB & WB approaches
Relocate overhead utilities to improve visibility of signal
Repair signal cabinet
Move stop bar back on EB approach to provide sufficient distance to signal indications

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	13	11	10	11

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☐
Distance of Furthest Signal To Stopline (ft)	30-70	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	15.5	**Obstructed Signals**	☑
In Service Date 7/9/1990	**Replacement Year** 2015	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-09 - GRAVEL AND BALDWIN

(left) Baldwin Ave and Gravel St NB

(right) Baldwin Ave and Gravel St EB

Notes
Some paint chipping on signal heads
Heavy pedestrian use
Non-compliant pedestrian ramps
NB signal heads too close to stop bar
Vertical clearance insufficient

Recommendations
Replace/repair ADA ramps
Paint signal equipment
Relocate stop bar on NB approach to provide sufficient clearance to signal
Raise span wire to provide sufficient vertical clearance
Replace light bulb in cabinet

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2		2
Signal Head Separation (ft)	9	13		10

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	33-55	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	15.9	**Obstructed Signals**	☐
In Service Date 1/9/2000	**Replacement Year** 2025	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-10 - E. MAIN AND SWAIN

(left) EB East Main and Swain

(right) WB East Main and Swain

Notes	Signal heads too close to SB driveway approach Signal heads need paint No one-way or exit signs on exiting driveway approach WB Lane Use sign knocked down SE ped push button does not work Screen on controller does not work
Recommendations	Remove no left turn sign from SB driveway approach Install one-way or exit sign on SB approach Install auxiliary head across intersection from driveway approach Repair lane use sign Paint signals & pedestrian equipment Repair broken push button Repair or replace controller

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	13	12	7	15

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	22-97	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	17.5	**Obstructed Signals**	☐
In Service Date 1/9/2002	**Replacement Year** 2027	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-11 - E. MAIN AND PEARL

(left) EB East Main

(right) NB East Main and Pearl

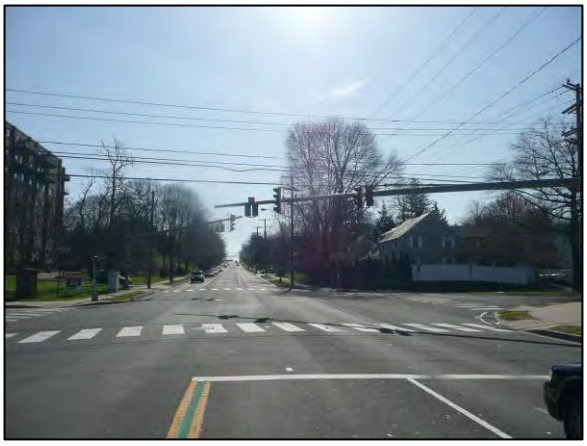
Notes	Utility lines in contact with mast arm Old span wire appears to still be in place NW pedestrian head turned incorrectly EB signal heads too close to stop bar
Recommendations	Adjust pedestrian head Adjust signal heads or relocate stop bar on EB approach Raise utility cables to prevent contact with mast arm Remove old span wire

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	12	15	13	15

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	27-56	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	16.4	**Obstructed Signals**	☐
In Service Date 6/9/1997 **Replacement Year**	2022	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-12 - E. MAIN AND PARKER



(left) EB East Main

(right) NB Parker

Notes Signal in overall good condition.

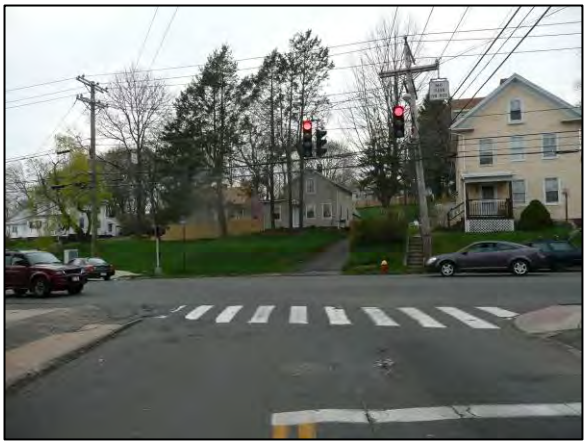
Recommendations None

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	18	18	9	14

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	61-67	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	16.2	**Obstructed Signals**	☐
In Service Date 8/9/2001	**Replacement Year** 2026	**Office Review Requested**	☐

Summary Report for Intersection

Location: TL-13 - BROAD AND GALE



(left) WB Broad and Gale

(right) EB Broad and Ann

Notes Pedestrian clearance time is excessive

Recommendations Consider reducing pedestrian clearance time

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	15	10	15	14

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	47-96	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	16.1	**Obstructed Signals**	☐
In Service Date 9/1/2005 **Replacement Year**	2030	**Office Review Requested**	☐

Summary Report for Intersection

Location: TL-15 - CAMP AND CENTER

(left) Center and Camp EB

(right) center and Camp NB

Notes	Ped Button on NE corner - not functioning Ped Signal on NE corner - pole needs replacing, missing pieces, electrical exposed SB Signal heads insufficient horizontal separation EB signal heads too close to stop bar Vertical clearance insufficient Graffiti on Cabinet
Recommendations	Consider full replacement Replace all pedestrian equipment Increase vertical clearance Move SB signal heads to provide sufficient horizontal separation Move EB stop bar to provide sufficient distance to signal Add centerlines and crosswalks Add pavement marking for vehicles and pedestrians

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	9	9	6	8

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☐
Distance of Furthest Signal To Stopline (ft)	30-58	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	14.5	**Obstructed Signals**	☐
In Service Date 1/9/1980	**Replacement Year** 2005	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-16 - CENTER AND LIBERTY

(left) Liberty St and Center St NB

(right) Liberty St and Center St EB

Notes Signal heads in poor condition
Signal heads too close to stop bar on NB approach
Vertical clearance insufficient

Recommendations Full replacement

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	12	9	9	10

Size of Vehicle Signal Displays (in)		12	**Presence of Pedestrian Signals**	☐
Distance of Furthest Signal To Stopline (ft)		35-45	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)		15.5	**Obstructed Signals**	☐
In Service Date	1/9/1973	**Replacement Year** 1998	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-17 - COLONY @ BRITANNIA/KENSINGTON

(left) WB Center and Britannia

(right) SB Colony and Kensington

Notes	Dual intersection cluster Mast arm on Colony Street, span wire on Center Street 8" heads for internal movements 14.9' clearance to signal head on Center Street Signal faces 27 & 37' from stop bar on SB Center Street
Recommendations	Move stop bar back on Center Street to provide sufficient distance to signal head Raise span wire on Center Street

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)				

Size of Vehicle Signal Displays (in)	8/12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	37-91	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	14.9	**Obstructed Signals**	☐
In Service Date 9/1/2005	**Replacement Year** 2030	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-18 - PRATT AND CENTER

(left) Pratt and Center WB

(right) Pratt and Center NB

Notes No pedestrian ramps at SW, SE, & NE corner
Vertical clearance insufficient
Signal scheduled for partial replacement 2010 (controller & equipment

Recommendations Full replacement
Increase vertical clearance
Install ADA ramps

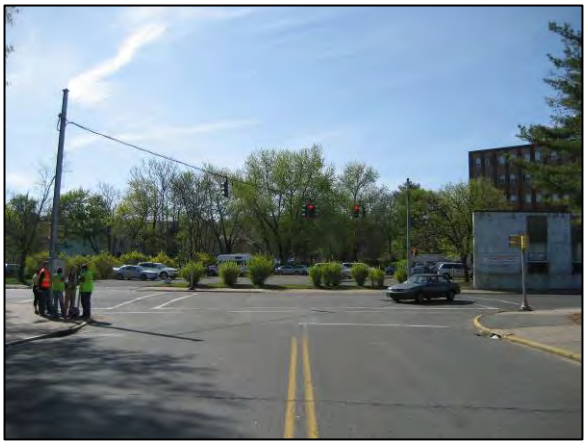
	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	9	11	12	10

Size of Vehicle Signal Displays (in)		8	**Presence of Pedestrian Signals**	☐
Distance of Furthest Signal To Stopline (ft)		38-53	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)		14	**Obstructed Signals**	☐
In Service Date	6/9/1967	**Replacement Year** 1992	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-22 - PRATT AND MILL

(left) Pratt and Mill WB



(right) Pratt and Mill SB

Notes Electrical wires are exposed in ped pedestal
Electrical wires exposed in above signal head
No ADA ramp on SE corner or NE corner

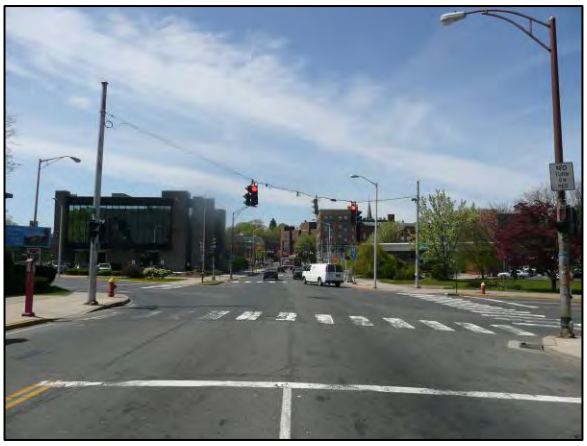
Recommendations Review warrants for possible removal

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach		2	2	2
Signal Head Separation (ft)		14	12	18

Size of Vehicle Signal Displays (in)	8	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	36-69	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	15.1	**Obstructed Signals**	☐
In Service Date 11/9/1967 **Replacement Year**	1992	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-24 - E. MAIN AND PRATT



(left) NWB on East Main

(right) SWB on Perkins

Notes	Outdated pedestrian equipment Vertical clearance insufficient Pedestrian clearance time insufficient Pavement markings on NB Through/Right in poor condition
Recommendations	Replace pedestrian equipment Increase vertical clearance Increase pedestrian clearance time Restripe NB approach Consider full replacement

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	14		2	2
Signal Head Separation (ft)	16		14	19

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	58-87	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	15.7	**Obstructed Signals**	☐
In Service Date 6/9/1989	**Replacement Year** 2014	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-26 - OLIVE AND S. COLONY

(left) NB Olive and South Colony

(right) SB Olive and Crown

Notes	Dual clustered intersection Pedestrian heads missing visors Distance from signal head to stop bar does not meet MUTCD standards for most approaches Walk signals not functioning Crosswalks are incorrect style (line type)
Recommendations	Repair controller to fix walk signals Add visors to walk signals Relocate stop bars or signal heads in order to provide sufficient viewing distance Replace crosswalks with bar type

Summary Report for Intersection

Location: TL-26 - OLIVE AND S. COLONY

MUTCD Report #1

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2		2	2
Signal Head Separation (ft)	9		10	10

Size of Vehicle Signal Displays (in)		12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)		34-38	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)		16.8	**Obstructed Signals**	☐
In Service Date	1/9/2002	**Replacement Year** 2027	**Office Review Requested**	☑

MUTCD Report #2

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	11	10	10	8

Size of Vehicle Signal Displays (in)		12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)		23-45	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)		16.6	**Obstructed Signals**	☐
In Service Date	1/9/2002	**Replacement Year** 2027	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-27 - E. MAIN AND STATE

(left) SB on State

(right) WB on East Main

Notes	RR crossing on west leg Mixed head size on SB traffic signals Outdated ped equipment Insufficient vertical clearance
Recommendations	Replace pedestrian equipment Replace 8" signal indications with 12" Increase vertical clearance

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach			2	3
Signal Head Separation (ft)			12	10

Size of Vehicle Signal Displays (in)	8/12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	54-64	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	15.3	**Obstructed Signals**	☐
In Service Date 1/9/1989	**Replacement Year** 2015	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-28 - PERKINS AND CROWN

(left) EB on Perkins

(right) NB on Crown at Perkins Intersection

Notes
Mast arm in poor condition.
Flashing strobe in red signal not compliant with MUTCD
Insufficient vertical clearance
Insufficient pedestrian time

Recommendations
Needs right turn pavement arrow to Crown St.
Consider removal of signal and improvements to crosswalk - does not appear to be warranted based on pedestrian volumes.
Improve channelized island to narrow crossing and provide refuge island.
If signal is retained, remove flashing strobes, increase pedestrian clearance time, and raise signal heads to 16 feet

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2			
Signal Head Separation (ft)	18			

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☐
Distance of Furthest Signal To Stopline (ft)	59	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	15.6	**Obstructed Signals**	☐
In Service Date 1/9/1989	**Replacement Year** 2014	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-29 - HANOVER AND S. COLONY

(left) EB on Hanover

(right) SB Perkins/Hanover

Notes Ped push button at NW corner is missing a mounting screw and has exposed wires.
No pedestrian crosswalk provided on east side

Recommendations Repair ped button (see above.)
Install crosswalk, ped ramps, ped signals on east side of intersection
Install span mounted no turn signs for SB

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach		3	2	
Signal Head Separation (ft)		8	10	

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	45-60	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	16.8	**Obstructed Signals**	☐
In Service Date 1/9/1989	**Replacement Year** 2014	**Office Review Requested**	☐

Summary Report for Intersection

Location: TL-30 - W. MAIN AND COLONY

(left) SB on Colony at West Main

(right) NB West Main and Colony

Notes Signal indications visible for cross street approach NB/WB
Pavement marking arrows needed for through approaches due to confusing layout
Need mast arm mounted no turn signs for NB
NB LT phase conflicts with SB right turn movement

Recommendations Install arrows for through approaches
Install cat tracks for NB LT, SB RT to prevent conflict
Install louvers on NB/WB signal faces

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	4		2	3
Signal Head Separation (ft)	9		11	8

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	46-73	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	16.2	**Obstructed Signals**	☐
In Service Date 1/9/1989	**Replacement Year** 2014	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-31 - COLONY AND CHURCH

(left) Colony and Church EB

(right) Colony and Church SB

Notes 8" signal indications on side street approach

Recommendations Repaint ped signal head north corners
Replace 8" signal heads with 12"
Repaint centerlines and SB Left Arrow

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach		2	2	2
Signal Head Separation (ft)		10	14	12

Size of Vehicle Signal Displays (in)		8/12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)		42-47	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)		16.5	**Obstructed Signals**	☐
In Service Date	1/9/1989	**Replacement Year** 2014	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-32 - COLONY AND BROOKS

(left) Colony and Brooks NB

(right) Colony and Brooks WB

Notes
Poles are in poor condition
Crosswalks not standard
Centerlines need epainting
No ADA ramps on NE and SE corners
Controller is out of date
Cap missing on the center signal head

Recommendations Full replacement

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2		2	2
Signal Head Separation (ft)	12		12	11

Size of Vehicle Signal Displays (in)	8	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	34 - 52	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	16.1	**Obstructed Signals**	☐
In Service Date 1/9/1976	**Replacement Year** 2001	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-33 - COLONY AND COLUMBIA

(left) SB Colony and Camp

(right) SB Colony and Columbia

Notes
Lane striping in poor condition
Unpaved driveway access opposite Columbia
Left turn arrows for SBLT movement incandescent, all other lenses LED
Pedestrian clearance time insufficient
Vehicle heads 14.5' clearance at Columbia Street

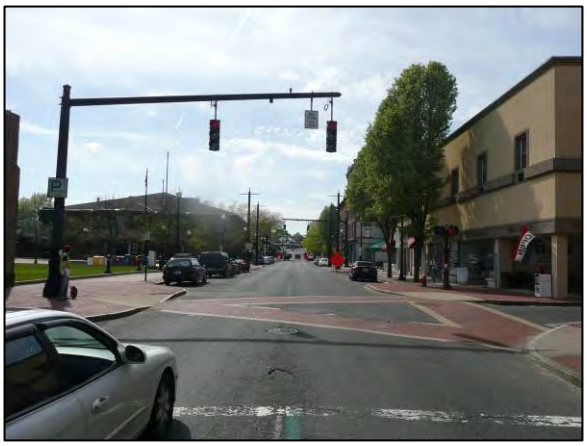
Recommendations
Restripe lane markings
Replace incandescent arrow indications with LED signals
Lengthen pedestrian clearance time
Increase clearance to vehicle heads at Columbia Street

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	13	13	12	20

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	40-63	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	14.5	**Obstructed Signals**	☐
In Service Date 1/9/1990	**Replacement Year** 2015	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-34 - W. MAIN AND BARRISTERS



(left) WB on West Main

(right) SB on Barristers

Notes	Pedestrian signal Barristers Ct one-way away from W Main Ped Countdown timers & audible signal WB Lane Line in poor condition WB signal heads too close to stop bar Signal does not appear to meet warrants for pedestrian volumes, very close to adjacent signals
Recommendations	Restripe lane line Consider relocating stop bar to provide sufficient distance to signal head.

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach				2
Signal Head Separation (ft)				15

Size of Vehicle Signal Displays (in)		12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)		36	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)		16.5	**Obstructed Signals**	☐
In Service Date	1/9/1989	**Replacement Year** 2014	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-35 - W. MAIN AND PD

(left) Located in SE Corner/Field

(right) Located in SE Corner/Field

Notes	Pedestrian only signal
Recommendations	None

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach				2
Signal Head Separation (ft)				12

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	44	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	16.8	**Obstructed Signals**	☐
In Service Date 1/9/1989	**Replacement Year** 2014	**Office Review Requested**	☐

Summary Report for Intersection

Location: TL-36 - W. MAIN AND GROVE

(left) NB on Grove St.

(right) WB on West Main

Notes	Mixed size signal faces, 8" on side street approaches Preemption for W Main Street No do not enter or one-way signs for West Main Street
Recommendations	Replace 8" signal faces with 12" Install Do not enter/one-way signs for West Main street

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2		2	2
Signal Head Separation (ft)	12		13	12

Size of Vehicle Signal Displays (in)	8/12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	40-54	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	16.6	**Obstructed Signals**	☐
In Service Date	1/9/1989	**Replacement Year**	2014	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-37 - W. MAIN AND BUTLER

(left) WB on West Main

(right) NB on Butler

Notes Signal for pedestrian use only
Diagonal crosswalk with no HC ramp
Poorly aligned pedestrian head on north side

Recommendations Review pedestrian signal warrants - consider removal
Realign west leg crosswalk, construct HC ramp
Add pedestrian head for west crosswalk

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach				2
Signal Head Separation (ft)				14

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☐
Distance of Furthest Signal To Stopline (ft)	55	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	16.7	**Obstructed Signals**	☐
In Service Date 1/9/1989	**Replacement Year** 2014	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-38 - W. MAIN AND COOK

(left) WB on West Main

(right) NB on Cook

Notes	Signal for pedestrian use only Signal heads have insufficient horizontal seperation on both approaches WB signal heads too close to stop bar Insufficient pedestrian clearance time Pedestrians violate control - do not wait for walk signal
Recommendations	Review pedestrian signal warrants, consider signal removal Relocate crosswalks to make use of center refuge island - results in all single lane crossings

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach		2		3
Signal Head Separation (ft)		7		7

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	32-65	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	17	**Obstructed Signals**	☐
In Service Date 1/9/1989 **Replacement Year**	2014	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-39 - W. MAIN AND LEWIS

(left) SB to Linsley

(right) NB to Lewis

Notes
Missing one pedestrian head
Outdated pedestrian heads
EB/WB advance phase with bi-color arrows
No advance clearance time provided
No lane lines or arrows on NB/SB approaches
EB/WB Left turn phases called together
NB vehicle heads too close to stop bar

Recommendations
Replace all ped equipment
Provide two lanes on NB/SB app
Provide clearance time for left turn advance
Seperate detection for EB/WB left turn phases
Install WB lane use sign
Relocate NB stop bar
Consider full replacement

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	14	12	14	14

Size of Vehicle Signal Displays (in)	8	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	31-80	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	16	**Obstructed Signals**	☐
In Service Date 1/9/1989	**Replacement Year** 2014	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-40 - W. MAIN AND WINDSOR

(left) West Main and Windsor WB

(right) West Main and Windsor NB

Notes	Signal equipment in fair condition Pedestrian heads out of date No pavement markings on North Third Street Only one pedestrian head per corner 8" signal faces Insufficient vertical clearance Unable to open cabinet
Recommendations	Full replacement

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	9	13	13	14

Size of Vehicle Signal Displays (in)	8	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	40-47	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	14.8	**Obstructed Signals**	☐
In Service Date 1/9/1973	**Replacement Year** 1998	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-41 - W. MAIN AND BRADLEY

(left) West Main and Bradley NB

(right) West Main and Bradley EB

Notes	Antiquated signal - all equipment in poor condition Scheduled for full replacement 2010 Ped signal head on SW corner facing north is not functioning Unable to activate ped phase with either ped button No evidence of detectors ADA ramps with textured surface on SW and SE corners, no ramp at NW corner
Recommendations	Full replacement already scheduled

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2		2
Signal Head Separation (ft)	16	8		11

Size of Vehicle Signal Displays (in)	8/12	**Presence of Pedestrian Signals**	☐
Distance of Furthest Signal To Stopline (ft)	42-115	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	15	**Obstructed Signals**	☐
In Service Date 1/9/1975	**Replacement Year** 2000	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-42 - W.MAIN AND CENTENNIAL

(left) West Main and Home SB

(right) West Main and Home EB

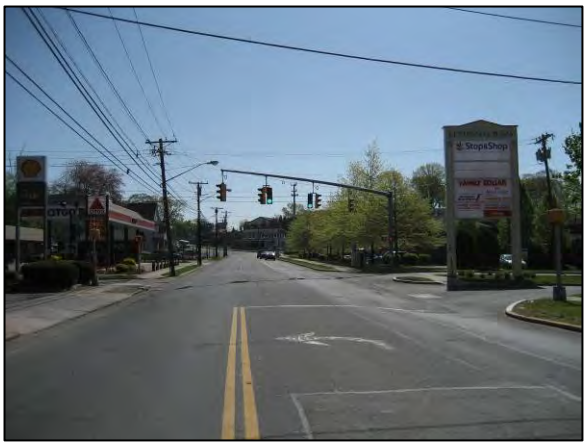
Notes	Ped signal at corners of Home and W. Main are in poor condition Signal heads too close to stop bar on NB approach Vertical clearance insufficient
Recommendations	Full replacement

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	12	10	10	11

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	32-74	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	13.4	**Obstructed Signals**	☐
In Service Date 1/9/1979 **Replacement Year**	2004	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-43 - W. MAIN AND VALE



(left) West Main and Vale EB

(right) West Main and Vale SB

Notes	Signal heads too close to stop bar on NB approach Vertical clearance insufficient ADA ramp at NW corner in poor condition
Recommendations	Relocate stop bar to provide sufficient distance to signal Raise signals to provide sufficient vertical clearance Install pedestrian push button on the median crossing NB leg Repaint pavement markings

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	10	12	10	11

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	29-82	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	15.1	**Obstructed Signals**	☐
In Service Date 1/9/2000 **Replacement Year**	2025	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-44 - W. MAIN AND JOHNSON

(left) West Main and Sylvan Ave WB

(right) West Main and Sylvan Ave NB

Notes	Signal in overall poor condition WB signal head malfunctioning No ADA ramp at NW corner, poor sightlines, SB approach Size of vehicle indications too small Inadequate vertical and horizontal clearances to signal heads Insufficient distance between stop bar and signal on NE approach
Recommendations	Full replacement

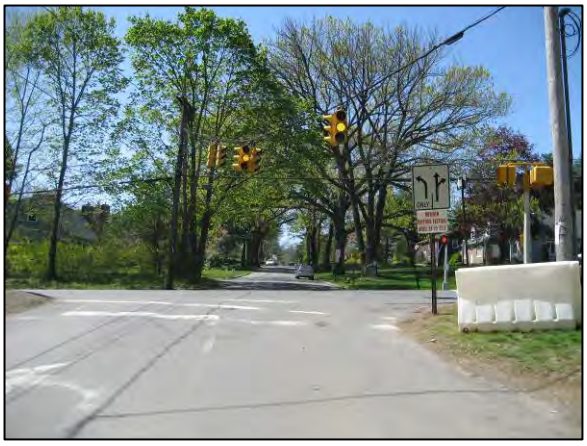
	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	9	14	10	7

Size of Vehicle Signal Displays (in)	8	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	25-64	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	14.5	**Obstructed Signals**	☑
In Service Date 1/9/1968	**Replacement Year** 1993	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-45 - W. MAIN AND SPRUCE

(left) West Main and Notch Rd WB



(right) West Main and Notch Rd SB

Notes Vertical clearance to signal heads insufficient
Pavement markings in poor condition

Recommendations Repaint pavement markings
Raise span wire to provide sufficient vertical clearance

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	9	10	15	15

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	39-53	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	15.4	**Obstructed Signals**	☐
In Service Date 6/9/1990	**Replacement Year** 2015	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-46 - HANOVER MID BLOCK SENIOR CENTER

(left) EB on Hanover Street

(right) Cabinet

Notes	Vehicle heads too close to stop bar
Recommendations	Relocate stop bar to provide sufficient distance to signal head

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach		3		
Signal Head Separation (ft)		10		

Size of Vehicle Signal Displays (in)		12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)		22	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)		16.8	**Obstructed Signals**	☐
In Service Date	1/9/2001	**Replacement Year** 2026	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-47 - HANOVER AND S. GROVE

(left) EB on Hanover

(right) SB on S. Grove

Notes	Eastbound approach heads too far left Side street 8" heads Pedestrian head on NW corner not working (side street) Pushbutton not working on SW & NE corners
Recommendations	Consider full replacement Install longer mast arm to center heads on EB approach Install 12" heads on side street approach Replace broken push buttons & ped heads

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2		
Signal Head Separation (ft)	8	9		

Size of Vehicle Signal Displays (in)	8	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	40-64	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	16.2	**Obstructed Signals**	☐
In Service Date 1/9/1989	**Replacement Year** 2014	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-48 - HANOVER AND BUTLER

(left) NB on Butler

(right) EB on Hanover

Notes Mixed size signal faces
Missing mast arm sign
Preemption for EB

Recommendations Replace missing mast arm sign or remove mount
Replace 8" faces with 12"

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	
Signal Head Separation (ft)	11	15	15	

Size of Vehicle Signal Displays (in)	8	**Presence of Pedestrian Signals**	☐
Distance of Furthest Signal To Stopline (ft)	40-63	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	16.5	**Obstructed Signals**	☐
In Service Date 1/9/1989	**Replacement Year** 2014	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-49 - HANOVER AND COOK

(left) WB Hanover/Cook

(right) NB Hanover/Cook

Notes
2 Pedestrian heads in refuge island non-functional
Ped clearance time insufficient
Water collecting in controller
Mismatched pedestal mounted signal
Fire preemption for SB approach
NTOR EB & SB
NB advance is called without actuation

Recommendations
Adjust ped clearance
Repair ped heads
Controller water seal
Check actuation/detection for NB advance

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	
Signal Head Separation (ft)	10	16	8	

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	46-83	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	17	**Obstructed Signals**	☐
In Service Date 1/9/1989	**Replacement Year** 2014	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-50 - COOK AND COOPER

(left) WB Cook/Cooper

(right) NB Cook and Cooper

Notes
8" heads
Missing pedestrian heads - pedestels on NE/SE corner
Incadescent signals
WB Signal head blocks visibility to SB signal head
Span poorly supported by leaning utility pole
Exposed service wiring at controller base
Truck turns entering opposing lanes

Recommendations
Complete replacement
Review warrants for possible removal

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2		2	2
Signal Head Separation (ft)	9		10	9

Size of Vehicle Signal Displays (in)	8	**Presence of Pedestrian Signals**	☐
Distance of Furthest Signal To Stopline (ft)	38-54	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	14	**Obstructed Signals**	☑
In Service Date	1/9/1969	**Replacement Year**	1994	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-51 - COOK AND SUMMER

(left) SB on Cook

(right) EB on Summer

Notes
No pushbutton on east side of Cook
No pushbutton on east side of Cook
No crosswalk on NB approach and EB approach
Insufficient vertical clearance
All signal equipment in poor condition

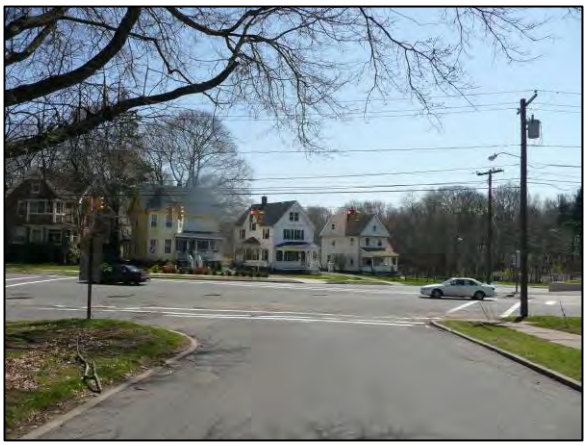
Recommendations
Full replacement
Review signal warrants for possible removal - low side street volumes

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	0
Signal Head Separation (ft)	8	11	7	

Size of Vehicle Signal Displays (in)	8	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	40-61	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	14	**Obstructed Signals**	☐
In Service Date 1/9/1972	**Replacement Year** 1997	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-52 - HANOVER AND COLUMBUS



(left) SB on Winthrop

(right) EB on Hanover

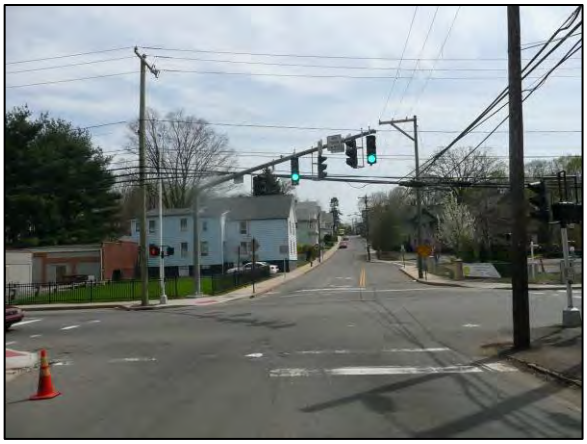
Notes	Missing Ped Ramp on SE corner, poor Ped Ramp s on NE/SW/NW. No Pedestrian Signals SB Detection not working Inadequate Vertical Clearance Incorrect crosswalk style
Recommendations	Full Replacement Replace Pedestrian Ramps Replace Crosswalks

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	15	12	19	9

Size of Vehicle Signal Displays (in)	8/12	**Presence of Pedestrian Signals**	☐
Distance of Furthest Signal To Stopline (ft)	50-68	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	14.8	**Obstructed Signals**	☐
In Service Date 1/9/1987	**Replacement Year** 2012	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-53 - LEWIS AND SPRINGDALE



(left) EB on Springdale

(right) NB on Lewis

Notes	New signal installation Missing lane lines on NB/SB approaches Overhead communication lines in contact with Mast Arm WB signal heads too close to stop bar
Recommendations	Adjust WB stop bar to provide adequate distance to signal Install lane lines on NB/SB approaches Raise communication lines to provide adequate clearance to mast arm

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	12	1212	18	8

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	33-56	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	17.5	**Obstructed Signals**	☐
In Service Date 1/9/1983	**Replacement Year** 1998	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-54 - LEWIS AND COLUMBIA

(left) NB on Lewis at Columbia

(right) WB on Columbia

Notes	Dual cluster intersection Signal equipment has poor paint Insufficient vertical clearance Pavement markings & signage in good condition Mixed LED/incadescent signal faces Detectors not aligned with lanes Missing lane lines on NB approach @ Columbia
Recommendations	Raise span wire Paint signal equipment Replace detectors Replace incandescent indications with LED Install lane lines for NB approach

Summary Report for Intersection

Location: TL-54 - LEWIS AND COLUMBIA

MUTCD Report #1

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2		2	2
Signal Head Separation (ft)	10		11	16

Size of Vehicle Signal Displays (in)		12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)		39-63	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)		15.2	**Obstructed Signals**	☐
In Service Date	1/9/1997	**Replacement Year** 2023	**Office Review Requested**	☑

MUTCD Report #2

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2		4	
Signal Head Separation (ft)	16		10	

Size of Vehicle Signal Displays (in)		12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)		69-72	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)		16.5	**Obstructed Signals**	☐
In Service Date	1/9/1997	**Replacement Year** 2023	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-55 - LEWIS AND 691

(left) WB Lewis

(right) NB Lewis

Notes Poor/limited pedestrian equipment, missing crosswalks on ramp approach
Mixed LED/polycarbonate indications
Base of SW pedestrian pedestal open

Recommendations Replace non-LED indications
Install pedestrian equipment and crosswalks
Repair pedestrian pedestal

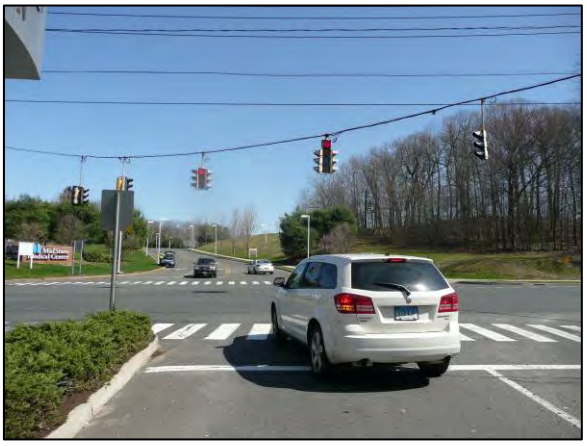
	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	21	22	13	20

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	55-102	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	17.3	**Obstructed Signals**	☐
In Service Date 1/9/1997 **Replacement Year**	2022	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-56 - LEWIS AND MERIDEN SQUARE

(left) NB Lewis and Mistate



(right) EB Lewis and Mistate

Notes	Dual cluster intersection No pedestrian equipment at mall intersection 8" faces at mall intersection
Recommendations	Upgrade to 12" faces on mall intersection Install ped equip on mall intersection

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	1	2	3	3
Signal Head Separation (ft)		18	28	12

Size of Vehicle Signal Displays (in)	8/12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	53-108	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	15.9	**Obstructed Signals**	☐
In Service Date 1/9/1997 **Replacement Year**	2022	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-57 - LEWIS AND KENSINGTON

(left) SB Kensington and Bailey

(right) WB Kensington/Lewis

Notes	Poor drainage on SB Approach Old equipment, 8" signal faces
Recommendations	Update signal heads for 12" LED indications Increase vertical clearance for east span Increase pedestrian clearance phase

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	15	11	10	13

Size of Vehicle Signal Displays (in)	8	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	38-77	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	15.9	**Obstructed Signals**	☐
In Service Date 1/9/1991	**Replacement Year** 2016	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-58 - COE AND HANOVER

(left) NB Coe and Hanover

(right) SB Coe/Hanover

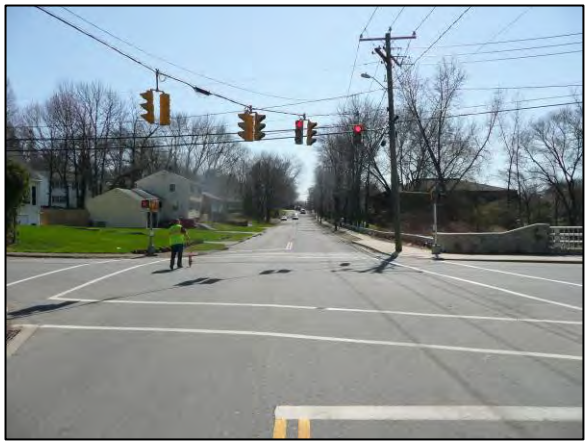
Notes	Large distance between mainline stop bars due to intersection layout Communication cables cross red signal for NB approach, in contact with mast arm Limited pedestrian access, no pedestrian ramps Missing lane striping for NB/SB approaches Missing do not enter sign on west leg Dead heads on WB approach, short distance from stop bar, insufficient horizontal seperation between heads
Recommendations	Raise communication cables across NB approach Install lane striping for NB/SB approaches in accordance with existing lane use signs Replace missing do not enter sign Combine heads on north mast arm to eliminate dead heads and increase distance from stop bar Install right turn on red for northbound approach

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	9	12	12	7

Size of Vehicle Signal Displays (in)		12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)		40-54	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)		16.2	**Obstructed Signals**	☐
In Service Date	1/9/1995	**Replacement Year** 2020	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-59 - COE AND BRADLEY



(left) SB on Bradley

(right) WB on Coe

Notes	Limited sight distance due to bridge abutment on EB approach Insufficient distance from stop bar to signal heads on WB approach Insufficient pedestrian clearance time
Recommendations	Needs NTOR sign on EB approach Extend centerline on NB approach Extend pedestrian clearance time

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	10	12	11	9

Size of Vehicle Signal Displays (in)		12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)		36-67	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)		16.3	**Obstructed Signals**	☐
In Service Date	1/9/1990	**Replacement Year** 2015	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-60 - COE AND CENTENNIAL

(left) Centennial Ave and Coe Ave WB

(right) Centennial Ave and Coe Ave SB

Notes Vertical clearance to signal heads insufficient

Recommendations Raise span wire to provide sufficient vertical clearance
Clean graffiti
Assess need for Pedestrian Button on SW corner
Repaint SB Left Arrow and all centerlines

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	22	2	2	2
Signal Head Separation (ft)	12	11	11	8

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☐
Distance of Furthest Signal To Stopline (ft)	40-51	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	15.2	**Obstructed Signals**	☐
In Service Date 1/9/1990	**Replacement Year** 2015	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-61 - MAIN AND HANOVER

(left) SB on Hanover

(right) EB on New Hanover

Notes	Missing pedestrian ramps on NW/SW corners Missing crosswalks on WB/SB approaches No centerline for WB approach NB approach stop bar too close to signal head Pedestrian pedestal on NE corner has loose foundation Insufficient vertical clearance Insufficient pedestrian clearance time
Recommendations	Add pedestrian ramps and crosswalks where missing Install centerline on WB approach Move NB stop bar back 4 feet Repair pedestal on NE corner Increase vertical clearance Increase pedestrian clearance time

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	11	15	12	9

Size of Vehicle Signal Displays (in)		12	**Presence of Pedestrian Signals**	☐
Distance of Furthest Signal To Stopline (ft)		36-75	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)		14.6	**Obstructed Signals**	☐
In Service Date	1/9/1992	**Replacement Year** 2017	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-62 - MAIN AND RIVER

(left) NB Main and River

(right) WB Main and River

Notes	Missing pavement markings on NB approach - Centerline, Crosswalk and Stop Line. No Crosswalk on EB approach. NB red obstructed by overhead wires. Insufficient horizontal distance between EB approach signal heads. Insufficient vertical clearance
Recommendations	Install pavement markings on NB approach Install crosswalk on EB approach Adjust NB heads to provide visibility Adjust signal heads for EB approach to improve horizontal clearance Adjust vertical clearance

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	8	7	14	12

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	56-70	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	14.5	**Obstructed Signals**	☑
In Service Date 9/1/1998	**Replacement Year** 2023	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-63 - CHAMBERLAIN AND LOCKWOOD

(left) NB on Chamberlain

(right) EB on Lockwood

Notes Signal in good condition
Pedestrian pedestal on SE corner too far from ramp for ADA standards
Fire preemption on SB approach
Vertical clearance insufficient

Recommendations Relocate SE pedestal
Increase vertical clearance

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	2	2	2
Signal Head Separation (ft)	12	8	10	10

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	44-60	**Presence of Turn Indications**	☐
Roadway Span Clearance (ft)	15.4	**Obstructed Signals**	☐
In Service Date 9/23/2004	**Replacement Year** 2029	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-64 - MERIDEN SQ AND CIRCUIT CITY

(left) NB Meriden Square and Circuit City

(right) WB Meriden Square and Circuit City

Notes NB Signal head damaged/broken (still functional)
Almost zero side street traffic due to closed Circuit City
EB Left Turn phase is unnecessary
Controller cabinet access is poor

Recommendations Consider review of warrants
Remove signal or set to 24 hour flash until Circuit City building is reoccupied

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	3	2	2
Signal Head Separation (ft)	12	16	12	16

Size of Vehicle Signal Displays (in)	8/12	**Presence of Pedestrian Signals**	☐
Distance of Furthest Signal To Stopline (ft)	47-76	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	16.8	**Obstructed Signals**	☐
In Service Date 1/9/1991	**Replacement Year** 2016	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-65 - THOMAS EDISON MAGNET SCHOOL

(left) WB on Golden

(right) SB on Broad

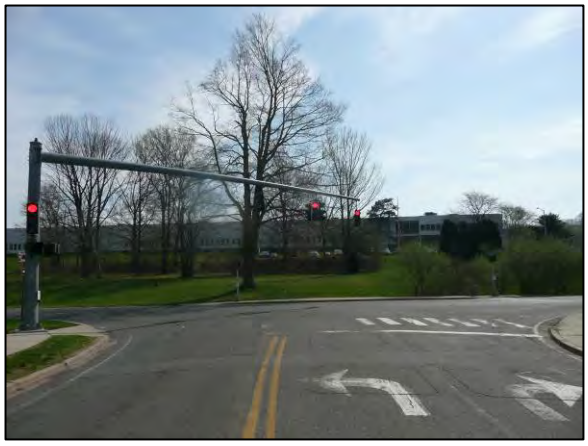
Notes	Poor sight distance for existing side street approaches Only one-way pedestrian head on SW corner Crosswalk in poor condition on EB approach Inadequate pedestrian crossing time on EB/WB approaches
Recommendations	Consider split phasing for side street approaches replace crosswalk on WB approach Install new pedestrian head on SW Corner facing SE corner Extend Pedestrian crossing time

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	2	3	2	2
Signal Head Separation (ft)	17	14	9	12

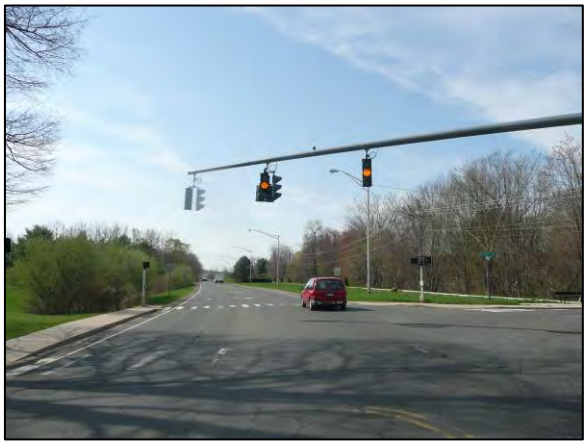
Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	40-87	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	17.0	**Obstructed Signals**	☐
In Service Date 1/9/2003	**Replacement Year** 2028	**Office Review Requested**	☑

Summary Report for Intersection

Location: TL-66 - RESEARCH PKWY AND MURDOCK AV



(left) EB on Murdock



(right) SB on Research Parkway

Notes	250' sight distance on eastbound approach - signal ahead sign with road curves sign All pavement markings in poor condition
Recommendations	Replace all pavement markings

	Northbound	Eastbound	Southbound	Westbound
Faces Per Approach	92	3	2	
Signal Head Separation (ft)	14	12	13	

Size of Vehicle Signal Displays (in)	12	**Presence of Pedestrian Signals**	☑
Distance of Furthest Signal To Stopline (ft)	49-53	**Presence of Turn Indications**	☑
Roadway Span Clearance (ft)	16	**Obstructed Signals**	☐
In Service Date 7/2/2003	**Replacement Year** 2028	**Office Review Requested**	☐

Appendix D

2009 Compliance Criteria Table

ID	Location of Signalized Intersection	Controller In Service Date	Controller Replacement Year	Controller Remaining Life (Years)	Intersection Signage Changes Recommended	Pavement Marking Changes Recommended	Roadway Vertical Span Clearance < 16 ft	Signal Head Separation < 8 ft	Furthest Signal from Stop Bar < 40 ft	Obstructed Signals	Distance of Posts from Curb < 2 ft	Size of Vehicle Signal Dispays < 12 in	Signal has Non-LED Lenses	Full Signal Replacement Recommended	Evaluate Signal Warrants	Office Review Requested
TL-01	E. Main @ Preston/Pomeroy/Cone	09-Jul-85	2010	0	X	X	X		X			X		X		X
TL-02	E. Main @ Research	09-Jan-02	2027	17	X	X	X				X					X
TL-04	E. Main @ Maple	09-Jan-02	2027	17		X		X	X							X
TL-05	E. Main @ Bee/Pomeroy	09-Jan-02	2027	17	X	X	X		X							X
TL-06	E. Main @ 91SB	09-Jan-02	2027	17	X	X	X				X					X
TL-07	E. Main @ Gravel/Paddock	09-Jan-02	2027	17		X	X									X
TL-08	Paddock @ Miller	09-Jul-90	2015	5		X	X		X	X			X	X		X
TL-09	Gravel @ Baldwin	09-Jan-00	2025	15		X	X		X				X			X
TL-10	E. Main @ Swain	09-Jan-02	2027	17	X	X		X	X							X
TL-11	E. Main @ Pearl/Carpenter	09-Jun-97	2022	12	X	X			X							X
TL-12	E. Main @ Parker	09-Aug-01	2026	16												
TL-13	Broad @ Gale/Ann	01-Sep-05	2030	20		X										
TL-14	Broad @ Liberty	Unknown	Unknown	-		X	X	X								X
TL-15	Camp @ Center	09-Jan-80	2005	0		X	X	X	X				X	X		X
TL-16	Center @ Liberty	09-Jan-73	1998	0			X		X		X		X	X		X
TL-17	Colony @ Britannia/Kensington	01-Sep-05	2030	20			X		X			X				X
TL-18	Pratt @ Center	09-Jun-67	1992	0		X	X		X		X	X	X	X		X
TL-22	Pratt @ Mill	09-Nov-67	1992	0		X	X		X			X	X		X	X
TL-24	E. Main @ Pratt	09-Jun-89	2014	4	X	X	X				X			X		X
TL-26	Olive @ Crown/S.Colony	09-Jan-02	2027	17	X	X			X							X
TL-27	E. Main @ State	09-Jan-89	2015	5		X	X				X	X				X
TL-28	Perkins @ Crown	09-Jan-89	2014	4	X	X	X				X				X	X
TL-29	Hanover @ S Colony	09-Jan-89	2014	4	X	X										
TL-30	W. Main @ Colony	09-Jan-89	2014	4	X	X										X
TL-31	Colony @ Church	09-Jan-89	2014	4		X						X	X			X
TL-32	Colony @ Brooks	09-Jan-76	2001	0		X			X		X	X	X	X		X
TL-33	Colony @ Camp/Columbia	09-Jan-90	2015	5		X	X									X
TL-34	W. Main @ Barristers	09-Jan-89	2014	4		X			X						X	X
TL-35	W. Main @ Police/Court Complex	09-Jan-89	2014	4		X										
TL-36	W. Main @ Grove	09-Jan-89	2014	4		X										X
TL-37	W. Main @ Butler	09-Jan-89	2014	4		X									X	X
TL-38	W. Main @ Cook	09-Jan-89	2014	4				X	X						X	X
TL-39	W. Main @ Lewis/Linsley	09-Jan-89	2014	4	X	X			X					X		X
TL-40	W. Main @ Windsor	09-Jan-73	1998	0		X	X				X	X		X		X
TL-41	W. Main @ Bradley	09-Jan-75	2000	0		X	X				X	X	X	X		X
TL-42	W. Main @ Centennial/Home	09-Jan-79	2004	0		X	X		X		X			X		X
TL-43	W. Main @ Vale	09-Jan-00	2025	15			X		X				X			X
TL-44	W. Main @ Johnson/Sylvan	09-Jan-68	1993	0		X	X	X	X	X		X	X	X		X
TL-45	W. Main @ Spruce	09-Jun-90	2015	5		X	X		X				X			X
TL-46	Hanover @ Senior Center	09-Jan-01	2026	16					X		X					X
TL-47	Hanover @ S. Grove	09-Jan-89	2014	4										X		X
TL-48	Hanover @ Butler	09-Jan-89	2014	4	X	X										X
TL-49	Hanover @ Cook	09-Jan-89	2014	4	X	X										X
TL-50	Cook @ Cooper	09-Jan-69	1994	0	X	X	X		X	X	X				X	X
TL-51	Cook @ Summer	09-Jan-72	1997	0			X	X			X	X	X		X	X
TL-52	Hanover @ Columbus	09-Jan-87	2012	2			X				X	X		X		X
TL-53	Lewis @ Springdale	09-Jan-83	1998	0		X			X		X	X				X
TL-54	Lewis @ Columbia	09-Jan-97	2023	13	X	X	X		X				X			X
TL-55	Lewis @ 691/Midstate Hosp	09-Jan-97	2022	12		X							X			X
TL-56	Lewis @ Meriden Sq/Midstate	09-Jan-97	2022	12	X		X					X	X			X
TL-57	Lewis@ Kensington/Bailey	09-Jan-91	2016	6			X		X			X	X			X
TL-58	Coe @ Hanover/Highland	09-Jan-95	2020	10	X	X		X								X
TL-59	Coe @ Bradley	09-Jan-90	2015	5		X			X							X
TL-60	Coe @ Centennial	09-Jan-90	2015	5		X	X						X			X
TL-61	Hanover @ Main	09-Jan-92	2017	7		X	X		X							X
TL-62	Main @ River	01-Sep-98	2023	13			X	X		X						X
TL-63	Chamberlain @ Lockwood	23-Sep-04	2029	19			X				X					X
TL-64	Meriden Square @ Circuit City	09-Jan-91	2016	6	X							X	X		X	X
TL-65	Broad @ Golden	09-Jan-03	2028	18		X										X
TL-66	Research Pkwy @ Murdock Av	02-Jul-03	2028	18		X							X			
60	Signalized Intersections	-	-	TOTALS	19	46	33	9	28	4	17	16	20	14	8	55

Table D1. Key MUTCD Compliance Criteria