COMMUNITY
connectivity program

# Montville

## Norwich-New London Turnpike (Route 32) – Road Safety Audit

November, 2016

CONNECTICUT DEPARTMENT OF TRANSPORTATION

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Acknowledgements:

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CONNECTICUT DEPARTMENT OF TRANSPORTATION

With assistance from AECOM Transportation Planning Group

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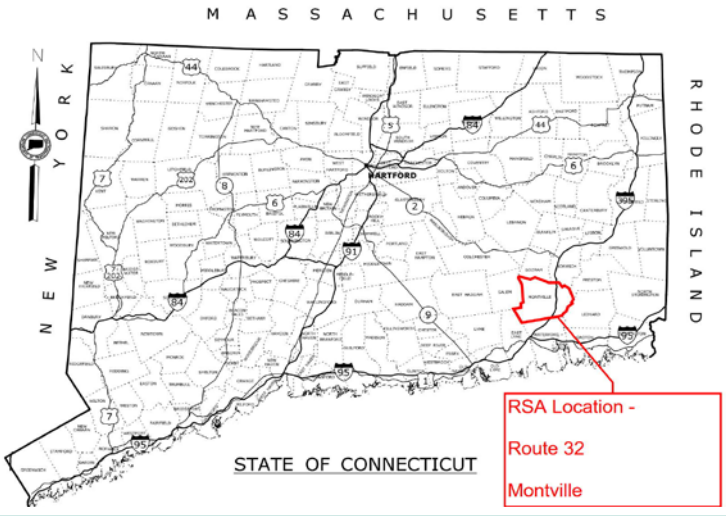
The Connecticut Department of Transportation (CTDOT) is undertaking a Community Connectivity Program that focuses on improving the state's transportation network for all users, with an emphasis on bicyclists and pedestrians. A major component of this program is conducting Road Safety Audits (RSA's) at selected locations. An RSA is a formal safety assessment of the existing conditions of walking and biking routes and is intended to identify the issues that may discourage or prevent walking and bicycling. It is a qualitative review by an independent team experienced in traffic, pedestrian, and bicycle operations and design that considers the safety of all road users and proactively assesses mitigation measures to improve the safe operation of the facility by reducing the potential crash risk frequency or severity.

The RSA team is made up of CTDOT staff, municipal officials and staff, enforcement agents, AECOM staff, and community leaders. An RSA Team is established for each municipality based on the requirements of the individual location. They assess and review factors that can promote or obstruct safe walking and bicycling routes. These factors include traffic volumes and speeds, topography, presence or absence of bicycle lanes or sidewalks, and social influences.

Each RSA was conducted using RSA protocols published by the Federal Highway Administration (FHWA). For details on this program, please refer to www.ctconnectivity.com. Prior to the site visit, area topography and land use characteristics are examined using available mapping and imagery. Potential sight distance issues, sidewalk locations, on-street and off-street parking, and bicycle facilities are also investigated using available resources. The site visit includes a "Pre-Audit" meeting, the "Field Audit" itself, and a "Post-Audit" meeting to discuss the field observations and formulate recommendations. This procedure is discussed in the following sections.



# 1 Introduction to Route 32, Montville RSA

The Town of Montville submitted an application to complete an RSA on Route 32 (Norwich-New London Turnpike) to improve safety for pedestrians and bicyclists travelling along the corridor. The Route 32 corridor contains commercial, retail, and residential uses, as well as a major access to Mohegan Sun Casino and Resort, which increases automobile usage and pedestrian activity in the RSA study area. Commercial and retail uses represent the majority of the land uses in the study area. A public transit bus route operated by Southeast Area Transit (SEAT) serves Route 32 in the RSA study corridor.

There have been 18 vehicle-pedestrian crashes on Route 32 since 2008. Fifteen of those are concentrated in a one-mile radius of the Casino, Shopping Center, and School area. Additionally, there have been two motorcycle fatalities within the same area. There are sidewalks and crosswalks in the area. However in 2015, a pedestrian was hit by a vehicle while in the crosswalk.

## 1.1 Location

The RSA site is the section of Route 32 between Red Cedar Avenue and Trading Cove Road/Fitch Hill Road (Figure 1). The Average Daily Traffic (ADT) on Route 32 is between 8,700 vehicles per day (vpd) near the intersection with Comstock Avenue and 19,600 vpd near the intersection with Avery Road. There are 14 signalized intersections along this study corridor. Route 32 contains driveways serving retail, commercial businesses, and residential properties adding complexity to walking and bicycling maneuvers through the area. Figure 2 shows the regional context of the study area.

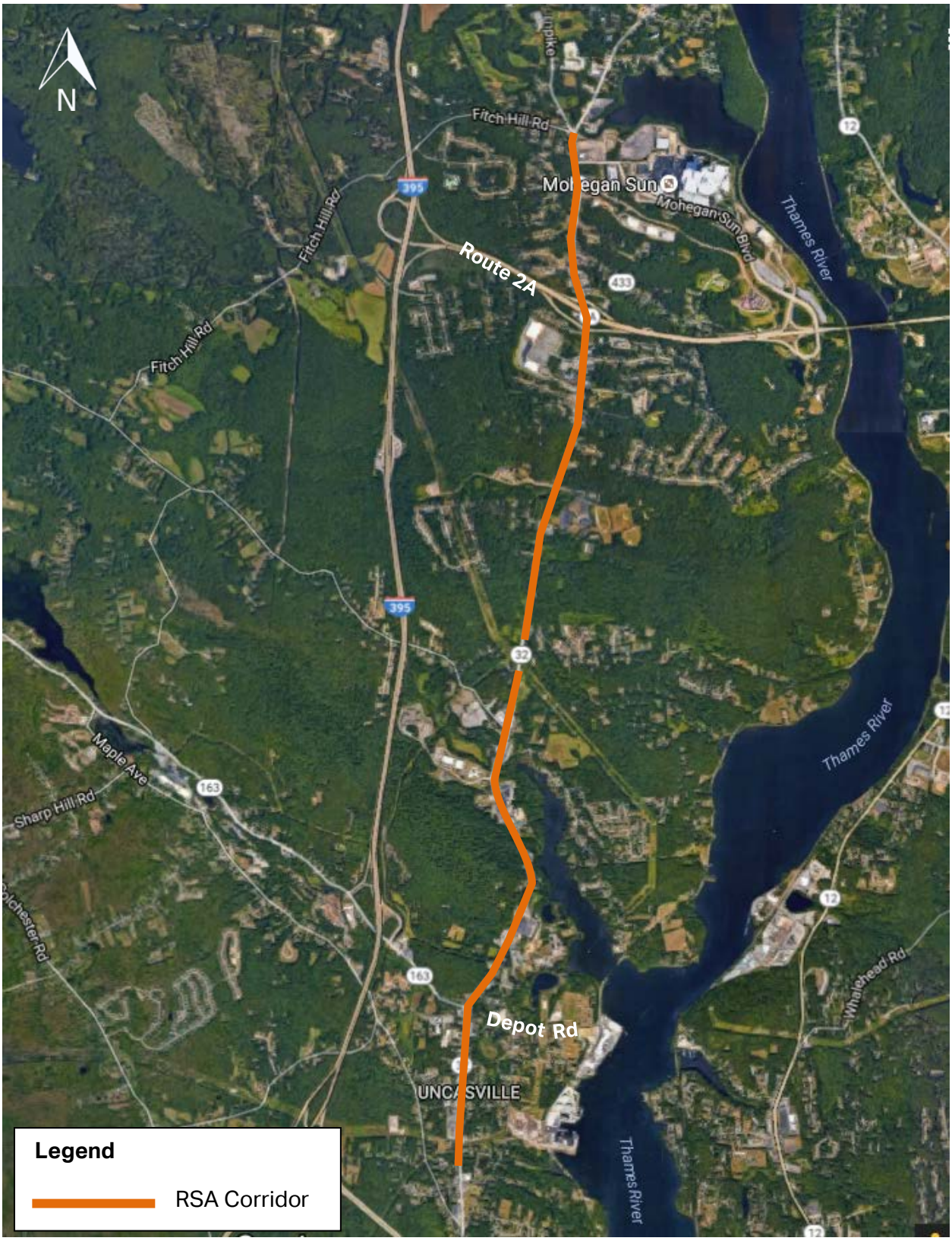



Figure 1. Route 32, Montville

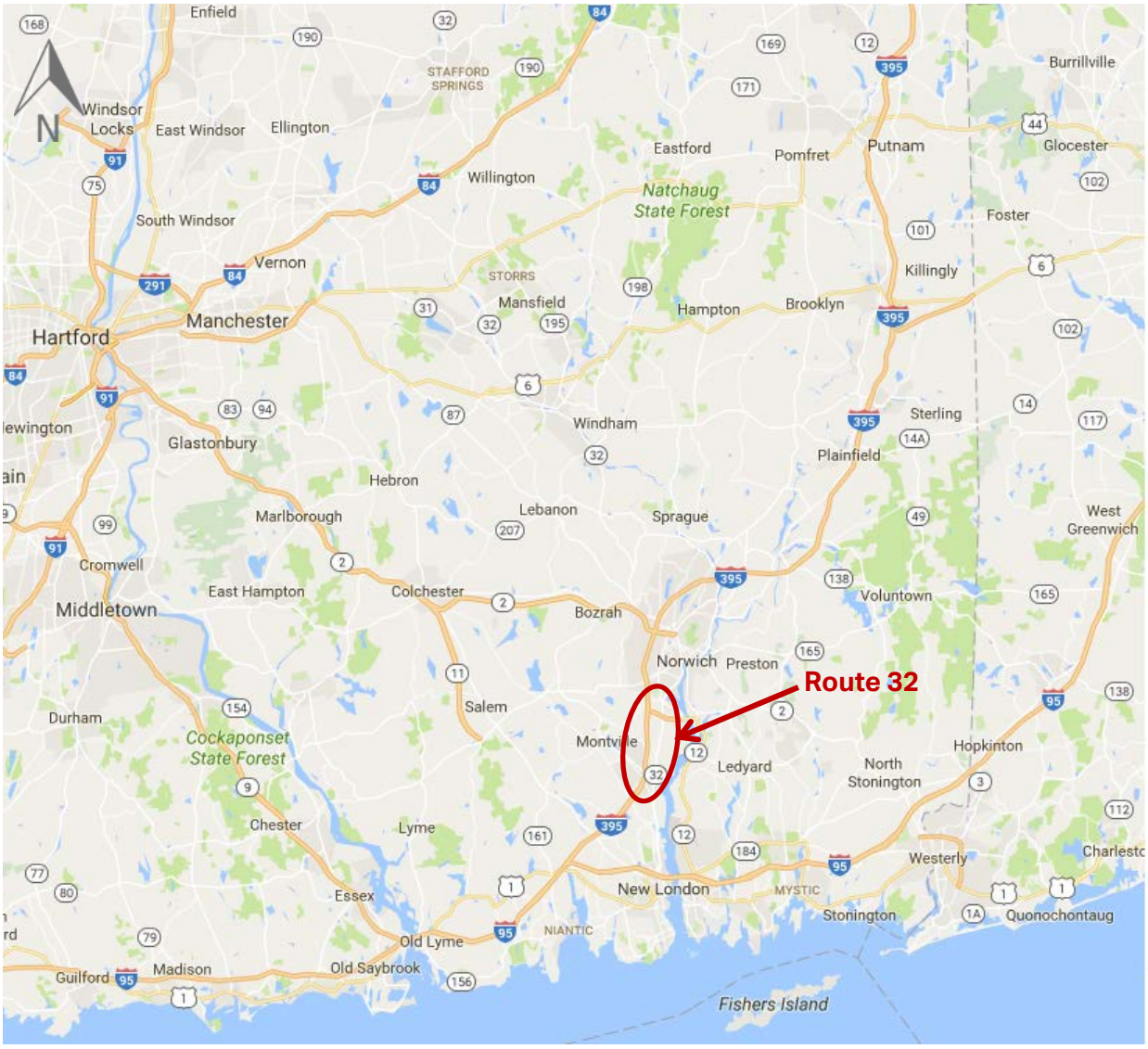



**Figure 2. Study Area – Regional Context**

# 2 Pre-audit Assessment

## 2.1 Pre-audit Information

Between 2012 and 2014, there were 324 crashes in the RSA corridor. The majority of crashes (77%) reported in this area resulted in property damage only; however, 76 crashes (23%) resulted in injury (Table 1). There were four crashes involving pedestrians and no crashes involving bicyclists. Rear-end crashes (46%) were the predominant crash type in the study area (Table 2), but fixed object and turning-intersecting paths were also a prevalent crash type.

Figure 3 displays crashes that occurred in this area during a single year (2015). As shown in the figure, crashes are evenly distributed along the corridor with significant cluster of crashes on Route 32 north and south of Route 2A and Route 163.

| Severity Type | Number of Accidents | |
|---|---|---|
| Property Damage Only | 248 | 76% |
| Injury (No fatality) | 76 | 24% |
| Fatality | 0 | 0% |
| Total | 324 | |

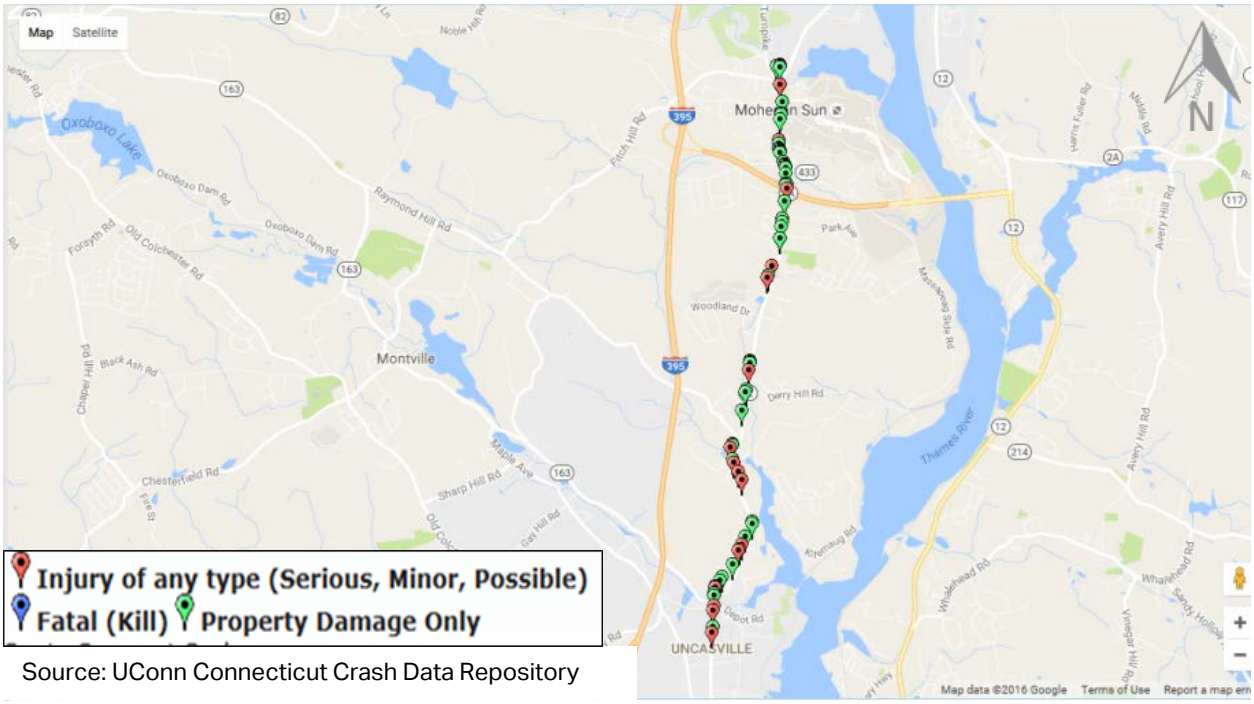
**Table 1. Crash Severity 2012-2014**

Source: UConn Connecticut Crash Data Repository

| Manner of Crash / Collision Impact | Number of Accidents | |
|---|---|---|
| Unknown | 0 | 0% |
| Sideswipe-Same Direction | 28 | 9% |
| Rear-end | 150 | 46% |
| Turning-Intersecting Paths | 32 | 10% |
| Turning-Opposite Direction | 26 | 8% |
| Fixed Object | 36 | 11% |
| Backing | 4 | 1% |
| Angle | 12 | 4% |
| Turning-Same Direction | 12 | 4% |
| Moving Object | 4 | 1% |
| Parking | 0 | 0% |
| Pedestrian | 4 | 1% |
| Overturn | 4 | 1% |
| Head-on | 5 | 2% |
| Sideswipe-Opposite Direction | 7 | 2% |
| Miscellaneous- Non Collision | 0 | 0% |
| Total | 324 | |

**Table 2. Crash Type 2012-2014**

Source: UConn Connecticut Crash Data Repository




Source: UConn Connecticut Crash Data Repository

**Figure 3. Crashes that Occurred in 2015 (Connecticut Crash Data Repository)**

There are 14 signalized intersections within the 4.9 mile long study corridor between Red Cedar Avenue and Trading Cove Road. Nine of these signalized intersections are closely spaced between Golden Road and Trading Cove Road, which is approximately 1.2-mile long. Generally, most of the signalized intersections in the study corridor have dedicated left-turn lanes. Left-turn lanes are not provided at the following signalized intersections on Route 32:

- Route 32 northbound and southbound approaches at Maple Avenue,
- Route 32 northbound and southbound approaches at Depot Road,
- Route 32 southbound approach at Massapeag Road,
- Route 32 northbound approach at St. Bernard School Drive, and
- Route 32 southbound approach at Sandy Desert Road.

**Route 32 between Red Cedar Ave and Depot Road** has one 11 foot wide travel lane in each direction. Shoulders are provided on both sides and vary from 2 feet to 5.5 feet wide in the southbound direction and 5 feet to 19 feet wide in the northbound direction. This section of the corridor does not have sidewalk on either side, except for a short length on the east side south of Maple Avenue Extension. There are three pedestrian crossings within this section, and two signalized intersections with no dedicated left-turn lanes provided. There are several government offices, commercial, retail uses and few residential properties. Several properties have 90 degree parking that pulls out directly onto Route 32. The posted speed limit is 30 mph along this section of the RSA corridor.

**Route 32 between Depot Road and Massapeag Road** has one travel lane in each direction that varies from 11 feet to 12 feet wide. Shoulders are provided on both sides and vary from 3 feet to 10 feet in width in northbound direction and 2 feet to 11.5 feet in southbound

direction. Sidewalks are generally not provided along this section of the corridor except at four disconnected locations on east side. There are also no crosswalks, but there are two signalized intersections. A dedicated left-turn lane is provided on the southbound approach to Belt Street. There are several commercial and retail uses along this section of the corridor, and the posted speed limit varies from 30 to 35 mph.

**Route 32 between Massapeag Road and Golden Road** has one travel lane in each direction, with a northbound auxiliary lane added between Derry Hill Road and Fort Hill Drive. Between PTA Lane and Golden Road, there are two travel lanes in the southbound direction. The width of each travel lane varies from 9 feet to 13 feet. Shoulders are provided on both sides and vary from 2 feet to 7 feet in width on northbound direction and 3 feet to 6 feet in southbound direction. There are no sidewalks or pedestrian crossings along this section of the corridor and the posted speed limit varies from 35 to 40 mph. There are two signalized intersections and dedicated left-turn lanes are provided at St. Bernard School Drive, PTA Lane, and Golden Road. There are several commercial and retail uses, as well as single family homes along this section of the corridor.

**Route 32 between Golden Road and Trading Cove Road** has two northbound travel lanes from Golden Road to the Route 2A interchange, and a single travel lane north of that point. There are 2 southbound lanes from Trading Cove Road to Crow Hill Road, a single travel lane from that point to Galvan Lane, and then 2 travel lanes south of that point. The width of the travel lanes vary from 10 feet to 12 feet each in both directions. Shoulders are provided on both sides and vary from 2 feet to 8 feet in width. Sidewalks are provided on the west side of Route 32 south of Galvin Lane and on the east side north of Galvin Lane. There are several short sections of paved driveway areas that are traversable, although technically not a defined sidewalk. There are also intermittent sections with sidewalk on both sides. Six pedestrian crossings are provided along this section of the corridor, which has a posted speed limit of 35 mph. This section of road includes eight signalized intersections, which are closely spaced (between 475 and 820 feet apart). Dedicated left-turn lanes are provided at all signals except the southbound approach at Sandy Desert Road. There are several commercial and retail uses, as well as single family homes along this section of the corridor.

Figure 4 and Table 3 summarize roadway geometrics for the study area.

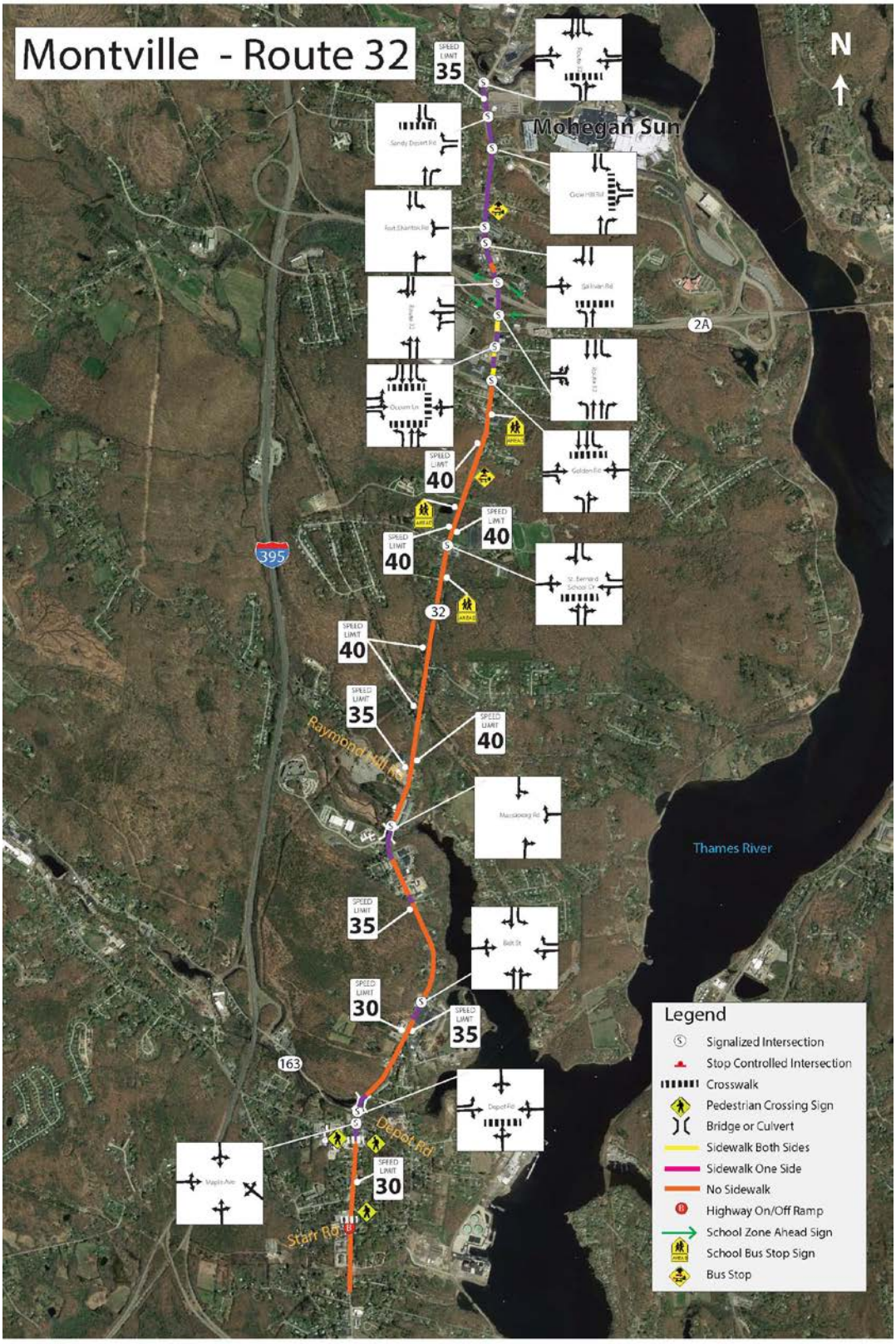



**Figure 4. Route 32 Roadway Geometrics**

# Montville – Route 32

## Street Inventory

| Street | Direction | Lanes | Ave. Lane Width | Sidewalk | | | Curb | Parking | Shoulder | Ramps | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Type | Width | Condition* | | | | Exist | Compliant |
| Route 32 from Red Cedar Ave to Depot Road (3,927 ft) | NB | 1 | 11′ | Asphalt | 4′ | Fair | Asphalt | No | 5′-19′ | Yes | No |
| | SB | 1 | 11′ | No | N/A | N/A | Asphalt | No | 2′-5.5′ | Yes | No |
| Route 32 from Depot Rd to Massapeag Rd (1.23 mi) | NB | 1 | 11′ | Asphalt | 3′-12′ | Fair | Asphalt | No | 3′-9.8′ | No | N/A |
| | SB | 1 | 11′-12′ | No | N/A | N/A | Asphalt | No | 2′-11.5′ | No | N/A |
| Route 32 from Massapeag Rd to Golden Rd (1.78 mi) | NB | 1-2 | 9′-11′ | No | N/A | N/A | Asphalt | No | 2′- 7′ | No | N/A |
| | SB | 1-2 | 10′-13′ | No | N/A | N/A | Asphalt | No | 3′- 6′ | No | N/A |
| Route 32 from Golden Rd to Trading Cove Rd (1.19 mi) | NB | 1-2 | 10′ – 12′ | Concrete | 5′ | Good | Asphalt | No | 2′- 6′ | Yes | No |
| | SB | 1-2 | 10′ – 12′ | Concrete | 5′ | Good | Asphalt | No | 2′ – 8′ | Yes | No |

*CONDITION – "Good" is Serviceable Condition that meets current design standards. "Fair" is generally serviceable, but may need minor repairs, or may not completely align with current design standards. "Poor" is not serviceable, and generally inadequate for continued long-term use.

Table 3. Street Inventory

## 2.2 Prior Successful Effort

The Town has had success in the past working with private developers to install pedestrian facilities in conjunction with new development. When the Mohegan Sun casino was constructed, numerous pedestrian facilities were installed as part of the construction. Similarly, several other new developments, such as the Stop and Shop and McDonald's properties, installed new pedestrian facilities. The Town has also worked with CTDOT to develop several sheltered bus stops along the RSA corridor. To continue this progress, the Town is in the process of formalizing a Complete Streets policy and adding it to their standards.

## 2.3 Pre-Audit Meeting

The RSA was conducted on October 4, 2016. The Pre-Audit meeting was held at 8:30 AM in the Town Hall located at 310 Norwich-New London Turnpike in Montville.

The RSA Team was comprised of staff from AECOM, staff from CTDOT, and representatives from several Montville departments including the Town Planner, Police Department, Town Engineer, Zoning and Wetlands, and the Mayor. The complete list of attendees can be found in Appendix B.

Several items were presented for general information prior to conducting the Audit in the field, and are listed below.

<u>Initial Areas of Concern:</u>

- Intersection of Route 32 and Route 163:
    - Cars back out into traffic in this area from on street parking in front of local businesses.
    - When vehicles are queued at the intersection it presents turning radius problems for trucks.
    - Alignment at the intersection is a challenge and presents an obstacle for adding turn lanes.
    - The traffic signal is currently a problem because loop detectors are not functioning.
    - Route 32 is wide through the intersection but narrows significantly on the north side of the intersection to pass between a building and dam.
    - Queuing leads to many problems especially in the morning and afternoon peaks.
    - A wide shoulder is used for bypass around queuing vehicles.
    - Motorists sometimes cut through the Town Hall parking lot area to avoid using this intersection.

- Route 32 at St. Bernard's School:
    - There is no left turn lane northbound at Woodland Drive, which leads to queuing.
    - Northbound motorists have limited sight distance due to the roadway geometry and retaining walls.
- Route 32 at Crow Hill Road and vicinity:
    - Speeding is an issue in this area.
    - There are turning issues, especially for buses.
    - Cars on the west side can't pull out of Crow Hill Road.

Traffic Trends and Considerations:

- Route 32 is classified as a minor arterial road with high volumes near Mohegan Sun Casino at the north end of Montville and lower volumes in the southern section of Montville.
- Speeding is a corridor-wide issue. Police indicated that speeds of 15 mph over the posted speed limit are common and significant enforcement has not deterred this pattern.
    - There is likely a need to consider contributing factors to the speeding problem.
    - It is easy for drivers to pick up speed travelling through the lightly developed section of the corridor and then carry that speed into the more densely developed sections.
- The southern section of the corridor is very busy around 3:30 to 4:00 PM when General Dynamics Electric Boat Division lets out. Traffic here is lower at other times.
- Many rear end collisions occur due to queuing with limited bypass areas. According to the UConn crash data repository 46% of all crashes on this corridor are rear end type.
    - Turning crashes are also a problem due to a lack of turning lanes. Data shows that 10% of all crashes are turning type and 9% are side swipe.
- The north and south ends of the corridor are more developed and have more overall traffic than the middle section.

Pedestrian/Bicyclist Trends and Considerations:

- There are not many bicyclists on this corridor currently. They are noted to typically prefer other roads in town.
- There are many recreational and daily walkers in the RSA corridor.
- The Town currently has no bike or pedestrian plan but is looking to incorporate a Complete Streets policy into its design standards.
- The casino at the northern end and the prison at the southern end both generate pedestrian traffic.
    - Many employees walk to work and many inmates at the prison walk during their work release.

- Holly Hill subdivision, which is west of both the casino and Route 32 houses many casino employees who walk to work using informal paths through the woods and a crossing at Crow Hill Rd.
- There are extensive sidewalks near the casino and at Montville Commons but they are not always used by pedestrians.
- There was a pedestrian hit in the crosswalk at Montville Commons Road.
    - This crash was likely a lighting/visibility problem. Data shows that 31% of crashes in this corridor occurred during dark lighted conditions. The pedestrian also had physical impairments that slowed their crossing of the road.
- The primary pedestrian traffic generator in the middle section of the corridor is Saint Bernard's School.
    - Saint Bernard's School is a private school and most students are bused there. Some of the students walk around in the area after school.
- There is a popular transit bus stop near Saint Bernard's School with a nearby apartment complex. This is a "flag down" bus meaning there people can wave for the bus to stop at any location.
- There are pedestrian safety concerns related to Casino employees along the corridor. The casino attempted to educate employees on safer walking habits, including providing lights and safety vests but the effort was viewed as having limited success in changing pedestrian behavior.

<u>Geometric Considerations:</u>

- The many curb cuts at the northern end of the RSA corridor create traffic circulation problems.
- The Trading Cove Road intersection is complicated; it has 5 legs and a weaving movement on the west approach.
- Striping changes may be possible to alleviate some problems caused by queuing, including at the Route 163 intersection where there are no turn lanes.
- There are many old retaining walls adjacent to the road, close to the edge of pavement, which are restricting pedestrian space.
- There are several sheltered bus stops in the corridor but not all of the bus stops are sheltered.

# 3 RSA Assessment

## 3.1 Field Audit Observations

**Intersection of Crow Hill Road and Route 32:**

- The crosswalk paint is faded (Figure 5).
- There are ADA compliant ramps and sidewalk on the east side of the crosswalk.
- One of the pedestrian green-light activating push buttons is located on a hill (Figure 6).
- There is no crosswalk on the north side of the intersection.
- There is a crosswalk on the eastern side.
- The wall and trees north of the intersection restrict southbound sight lines (Figure 7).
- Catch basin grates are not bike friendly type.
- There is a staircase that ends at the edge of road with a narrow shoulder.
- It may be possible to create a better crossing for pedestrians on the south side of the intersection.
    - Limited sight distance for motorists approaching from the north makes the north side less favorable for a crossing.

**Intersection of Trading Cove Road and Route 32:**

- Three roads converge immediately west of the intersection. Queues block movements between these approaches. This is especially difficult when nearby Three Rivers College lets out.

Figure 5. Crow Hill Rd. Crosswalk

Figure 6. Pedestrian Push Button

Figure 7. Limited Sight Lines

- The detectable warning strip in one spot is worn out (Figure 8).
- Sidewalks end north of this intersection.
- The crosswalk length is 96-feet with a 7 second walk phase and a 16 second flashing phase (23 seconds total) (Figure 9).
- Pedestrian facilities are not ADA compliant (no audible signals, not countdown type etc.).
- There is no landing, ramp or sidewalk on the west side of the crosswalk.
- There is limited queuing distance on the western approach to the intersection due to the three roads converging adjacent to Route 32.
- The curb radii are large leading to long crossing distance. This is most likely to accommodate buses to the casino.
- A roundabout has been discussed here but traffic volumes may be too high.
- Catch basin grates are the bike-friendly type.

Figure 8. Worn Detectable Warning Strip


Figure 9. Trading Cove Rd. Crosswalk

**Intersection of Golden Road and Stop and Shop Plaza with Route 32:**

- The drainage apron could be mistaken for a sidewalk by pedestrians (Figure 10).
- Catch basin grates are not the bike friendly type.
- There are ADA compliant ramps on the west side of the intersection.
- There was a pedestrian accident recorded at this location.
- There are no advance pedestrian warnings.
- The crosswalk length is 58-feet with a 16 second concurrent green phase time (Figure 11).

Figure 10. Drainage Apron

- There is intermittent sidewalk on the east side of Route 32 in this area and more consistent sidewalk on the west side.
- There is a residential driveway in the intersection.
- Vegetation overgrowth limits sight distance on the south side of Golden Road and Route 32.
- The intersection is on a northbound downgrade, and the alignment is straight, leading to high vehicle speeds.
- Route 32 consists of a single 11-foot lane with a 2-foot shoulder in each direction.

Figure 11. Golden Rd. Crosswalk

**Intersection of Woodland Drive/St. Bernard's School and Route 32:**

- The most recent retro-reflective pedestrian signs are not being used currently (Figure 12).
- There is a crosswalk but no sidewalks, ramps or landings.
- The crosswalk distance is 56-feet with a 7 second walk phase and 11 second flashing phase (18 seconds total).
- The crosswalk paint is faded.
- Sight distance is limited for drivers in the northbound direction coming around the corner just south of Woodland Drive.
- The pedestrian sign is not visible to drivers due to the tree directly in front of it (Figure 13).
- There is a retaining wall on the east side of Route 32 just south of the intersection, which limits pedestrian space and sight distance.

Figure 12. Pedestrian Sign

Figure 13. Route 32 Looking North

**Intersection of Route 163 and Route 32 and the intersection of Maple Ave. and Route 32:**

- The intersections are close together and the signals are interconnected.

- There is no detectable warning strip on the west side of the crosswalk at the Route 163 intersection (Figure 14), and there is no landing, sidewalk or ramp on the east side of the crosswalk.
- Cars were observed parked on Route 163 southbound.
- There is a pedestrian sign with no crosswalk at the Maple Ave. intersection.
- Numerous driveways adjacent to the intersection create circulation issues.
- Video detectors may help the intersection since the loop detectors are not functional (Figure 15).
- Some signs are damaged around the intersection.
- Roadway widths at the west leg of the Route 163 intersection are 28-feet for Route 163 eastbound (2 lanes), 22-feet for Route 163 westbound (single lane) and an 11-foot corner flare (north-west corner).
- Roadway widths at the north leg of the Route 163 intersection are 20-feet for Route 32 southbound, 20-feet for Route 32 northbound and a 4-foot gap between the road and building.
- Roadway widths at the east leg of the Route 163 intersection are 22-feet for Depot Road westbound, 18-feet for Route 163 eastbound and a 10-foot corner flare.
- Roadway widths at the south leg of the Route 163 intersection are 25-feet for Route 32 northbound, and 27-feet for Route 32 southbound.
- There are some alignment issues with the double yellow centerlines at the intersection.
- There is on street parking at a 90 degree angle on Route 32 northbound, south of the Maple Ave. intersection (Figure 17).

**Figure 14. Route 163 Crosswalk Looking East**

**Figure 15. Broken Loop Detectors**

**Figure 16. Route 32 Facing North**

- Vehicles back out of these parking spaces into an extra wide shoulder that is also used for bypass by northbound vehicles, creating a potential conflict and driver confusion.
- The distance between the shoulder line and sidewalk is 42-feet.

**Figure 17. On-street Parking and Wide Shoulder**

## 3.2 Post Audit Workshop - Key Issues

**Intersection of Crow Hill Road and Route 32:**

- There is a need to alert drivers that pedestrians cross Route 32 at this location.
- Locating the crosswalk on the south side of the intersection would improve sight distance (Figure 18).
  - This would require new signal heads, push buttons and possibly relocating the existing stop bar.
- People walk on the west side of Route 32 currently despite a lack of pedestrian facilities.

**Figure 18. South Side of Crow Hill Rd. Intersection**

**Intersection of Trading Cove Road and Route 32:**

- Pedestrian timing does not meet the minimum requirements.
- Need to investigate if it can be re-timed.
- There is currently only one crosswalk at this intersection although pedestrians cross all four approaches.
- Guiderail on some legs of this intersection force pedestrians to walk in the road. This is a problem in several places in the corridor where retaining walls and guiderails force pedestrians into the road (Figure 19).

**Figure 19. Guiderail Abutting Roadway; Lack of Ramp at Crosswalk**

- There is a desire for a crosswalk on the north side of Fitch Hill Road across from Holly Hill Road.
    - There is a need to further investigate this area to determine the best way to help pedestrians safely cross (Figure 20).
- A raised crosswalk was suggested as a possible way to force vehicles to slow down at the crossing.

Figure 20. Fitch Hill Rd./New London Tpke. Intersection

**Intersection of Golden Road and Stop and Shop Plaza with Route 32:**

- There is a need to make the crosswalk more visible (Figure 21).
- There are no advance signs warning of the crosswalk.
- There are no sidewalks on the east or west side of Route 32 south of the intersection.
- Additional sidewalk on the east side will be added as properties are developed.
- Pedestrians currently cross during the green light phase for Golden Road.
- School buses travelling northbound on Route 32 and turning right into Golden Road have problems with the curb radius and the tree on the corner, leading to buses crossing the double yellow (Figure 22).
    - Widening the radius and eliminating the trees that are within the state right of way could help in the short term.
    - The existing residential driveway may be in conflict with a widened radius and would need to be removed or relocated.
- As residential properties are bought by developers, the Town will be able to require changes to improve sidewalks, crosswalks etc., to fill in gaps in the pedestrian network.

Figure 21. Golden Road Crosswalk

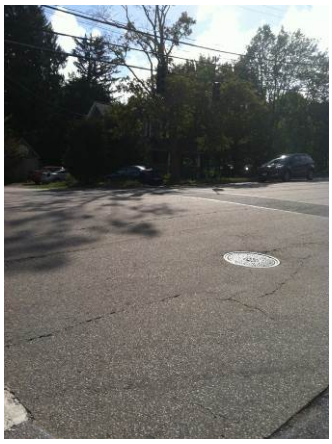


Figure 22. Golden Road Corner

**Intersection of Woodland Drive/St. Bernard's School and Route 32:**

- There is no left turn bay for Route 32 northbound.
- Vehicle speeds are high through this area.
- The Route 32 double yellow centerlines are currently lined up with a southbound left turn bay, such that a northbound left turn bay could be added across from the southbound one with striping only; however, this may require a change in the signal phases and would need to be coordinated with CTDOT.
- There is currently an exclusive pedestrian phase for the signal.
- School crossing signs should be updated to the new retro-reflective standards (Figure 24).
    - The sign may need to be an advanced sign and re-located since the crossing is at an intersection.
- Trees restrict sight lines, particularly on the northbound side approaching St. Bernard School, and should be trimmed.

Figure 23. Facing South from St. Bernard's Intersection

Figure 24. School Crossing Sign

**Intersection of Route 163 and Route 32 and the intersection of Maple Ave. and Route 32:**

- The loop detectors are not currently active and using video detectors was noted as a preferred detection method due to upcoming and on-going construction in the roadway.
- There is enough width to add a turning lane on Route 32, but the alignment may be a challenge.
    - Adding left turn lanes on Route 32 should be further investigated.
    - Eliminating wide shoulders to add turning lanes would remove space for pedestrians and parking.

    - The critical point is the northeast corner of the intersection, where northbound alignment is very close to the existing building (Figure 25).

Figure 25. Existing Building

- The two intersections are very close together and any changes to the signal operations should be investigated to ensure proper coordination of the signals.
- There are concerns with parked cars backing out on Route 32 northbound, south of Maple Ave.
    - The shoulder is very wide here: 42-feet from the shoulder line to the sidewalk.
    - A change to angled parking with a small median at the shoulder line so that bypassing traffic does not conflict with parked cars backing out could be a long term goal.
- It may be possible to target this area as a village center district with special zoning regulations.

**Intersections of Broadview Ave., Cedar Ln. and Webb Dr. with Route 32:**

- This area was not walked during the audit but concerns were raised about it during the post audit.
- Currently, exiting from these side streets can be a challenge, with limited sight distance and minimal gaps in traffic.
- Further investigation to establish a course of action to improve operations in this area is warranted, including the consideration of signal coordination between Crow Hill Road and Fort Shantock Road to create gaps and facilitate crossings.

**Entire Route 32 corridor:**

Pedestrian accommodations including handicap ramps, signal timing, pedestrian signals, signing etc. do not meet the latest requirements.

# 4 Recommendations

From the discussions during the Post-Audit meeting, the RSA team compiled a set of recommendations that are divided into short-term, mid-term, and long-term categories. For the purposes of the RSA, **Short-term** is understood to mean modifications that can be expected to be completed very quickly, perhaps within six months, and certainly in less than a year if funding is available. These include relatively low-cost alternatives, such as striping and signing, and items that do not require additional study, design, or investigation (such as right-of way acquisition). **Mid-term** recommendations may be more costly and require establishment of a funding source, or they may need some additional study or design in order to be accomplished. Nonetheless, they are relatively quick turn-around items, and should not require significant lengths of time before they can be implemented. Generally, they should be completed within a window of eighteen months to two years if funding is available. **Long-term** improvements are those that require substantial study and engineering, and may require significant funding mechanisms and/or right-of-way acquisition. These projects generally fall into a horizon of two or more years when funding is available.

## 4.1 Short Term

1. Town to coordinate with CTDOT to increase the length of the pedestrian phase at the Fitch Hill Road/Trading Cove Road intersection to meet current standards.
2. Town to coordinate with CTDOT to re-stripe the Golden Road intersection and crosswalk with reflective paint.
3. Town to coordinate with CTDOT to install advance pedestrian warning signs for the crosswalk at the Golden Road intersection.
4. Town to remove the tree on the corner of Golden Road and Route 32.
5. Town to coordinate with CTDOT to update all pedestrian signs to the latest retro-reflective standards.
6. Town to trim/remove trees restricting sight lines for northbound vehicles at the Woodland Drive/Saint Bernard's School intersection.
7. Town to investigate how the intersections at Route 163 and Maple Ave. are synchronized to determine if they can be improved.

Figure 26 depicts some of these recommendations.


Figure 26. Short-term Recommendations

## 4.2 Medium Term

1. Town to coordinate with CTDOT to add additional crosswalks, pedestrian signals, handicap ramps and detectable warning strips to the Fitch Hill Road/Trading Cove Road intersection.
2. Town to install crosswalks and ADA compliant landings on the north, south, and west sides of the Fitch Hill Road and Holly Hill Road intersection and to consider the option of a raised crosswalk to slow down vehicles.
3. Town to add sidewalk connecting Fitch Hill Rd to the Route 32/Trading Cove Rd. intersection.
4. Town to coordinate with CTDOT to investigate widening the curb radius at the corner of Golden Road and Route 32 and how to address the residential driveway that may be in conflict with a widened radius.
5. Town to coordinate with CTDOT to re-stripe the Woodland Drive/Saint Bernard's School intersection to include a left turn bay in the northbound direction and adjust the signal to concurrent north/south left-turn phases.
6. Town to coordinate with CTDOT to install video detectors at the Route 163 intersection.
7. Town to target the Route 163 and Maple Ave. intersection area as a Village Center area for future zoning.
8. Town to coordinate with CTDOT to investigate the possibility of adding a left turn bay to Route 32 northbound at the Route 163 intersection and reconstruct the intersection accordingly.
9. Town to coordinate with CTDOT to investigate synchronization of the signals at Crow Hill Road and Fort Shantock Road to determine revised timings can improve gaps for vehicles and pedestrians to exit the side streets in between the two intersections.

Figure 27 depicts some of the recommendations along Route 32.

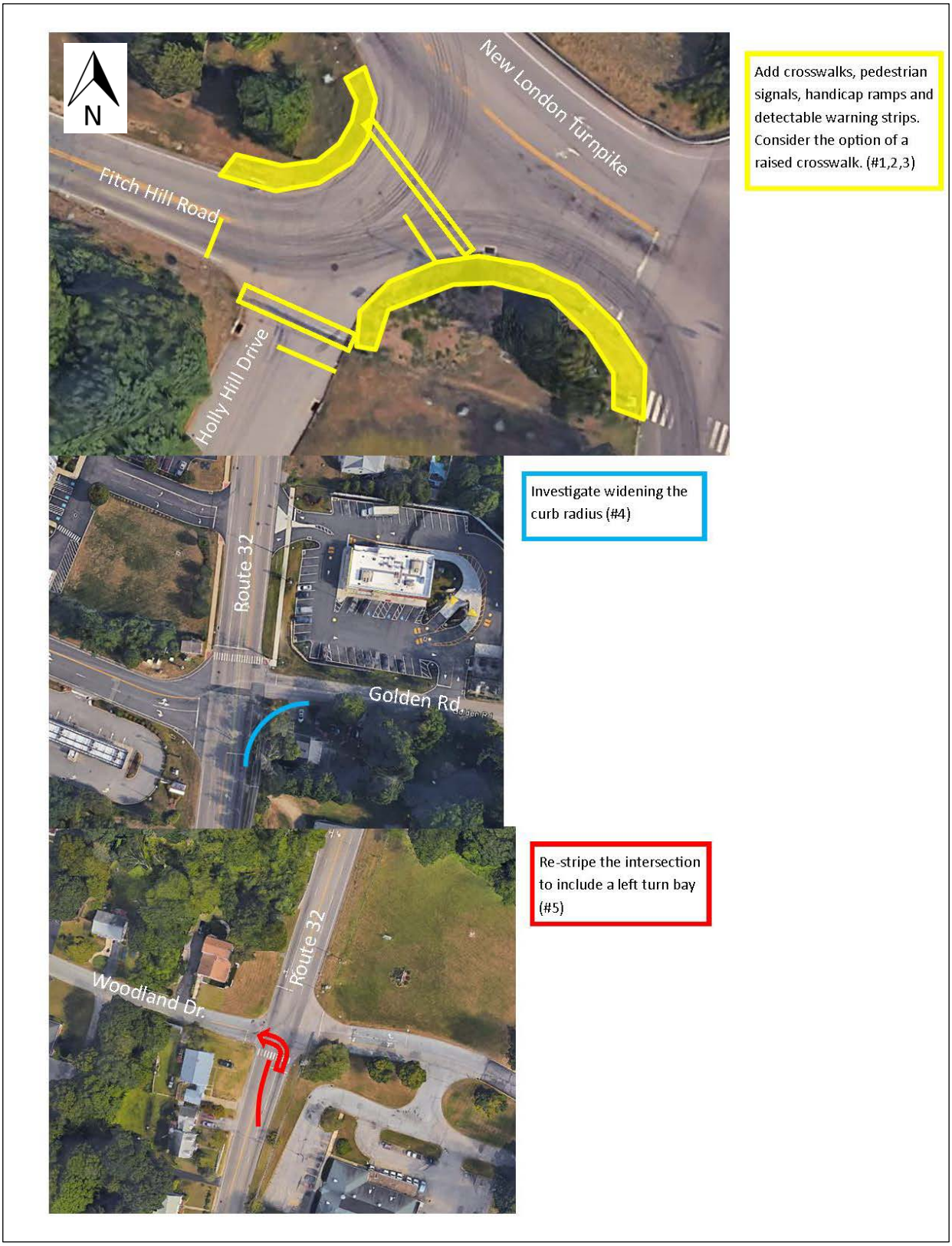



**Figure 27. Medium-term Recommendations**

## 4.3 Long Term

1. Town to coordinate with CTDOT to adjust the Crow Hill Road intersection so that the pedestrian crossing is on the south side of the intersection instead of the north side, including the construction of new pedestrian push buttons, signal heads and crosswalk striping.
2. Town to require developers along Route 32 to include pedestrian accommodations such as sidewalks, crosswalks, handicap ramps etc. as they purchase and develop properties that are currently residential properties.
3. Town to coordinate with CTDOT to design and construct a median island at the Route 32 shoulder line and angled parking spaces to improve on-street parking operations at the Maple Ave. intersection.

Figure 28 depicts some of these recommendations.

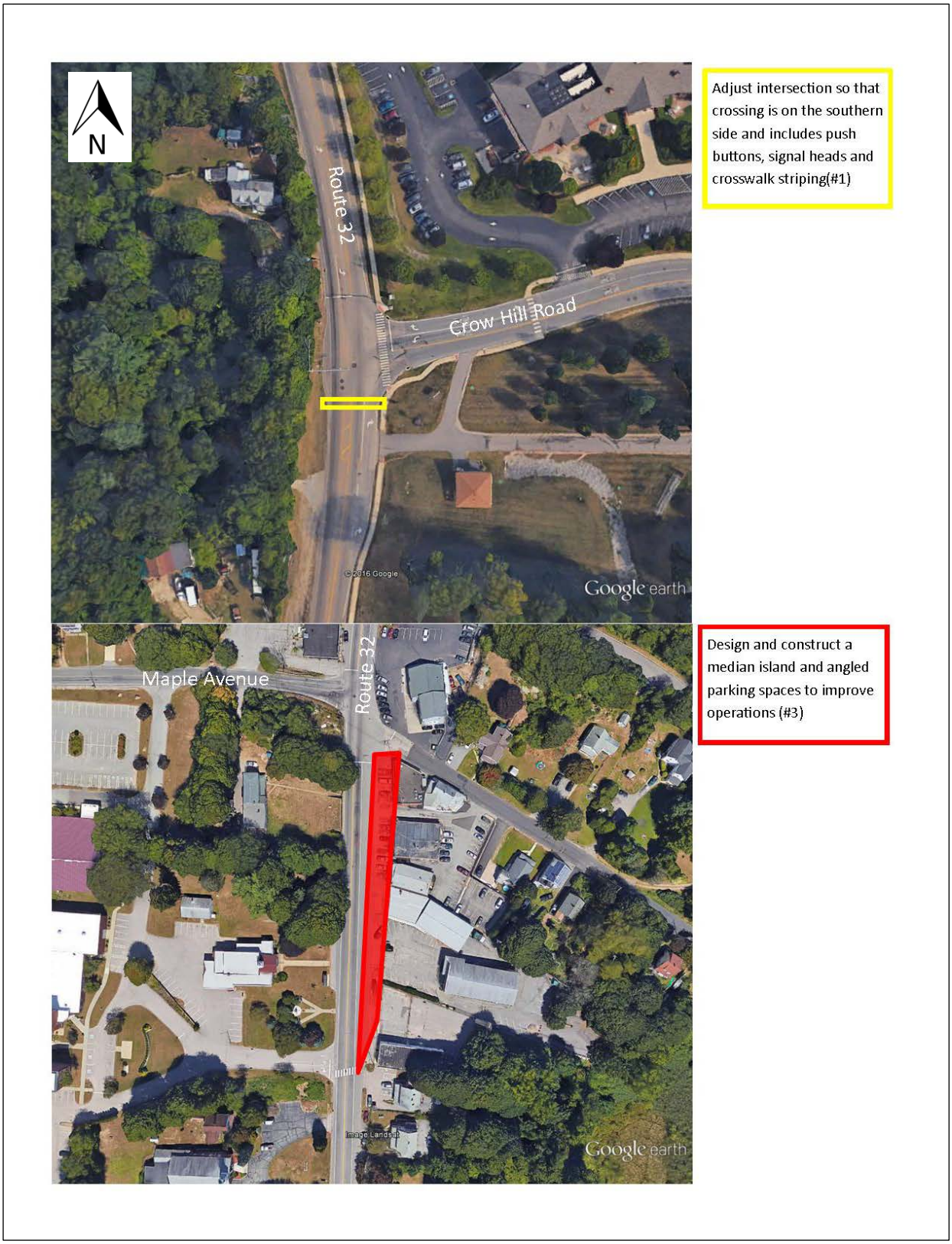



Figure 28. Long-term Recommendations

## 4.4 Summary

This report documents the observations, discussions and recommendations developed during the successful completion of the Town of Montville RSA. It provides Montville with an outlined strategy to improve the transportation network for all road users on Route 32, particularly focusing on pedestrians and cyclists. Moving forward, Montville may use this report to prepare strategies for funding and implementing the improvements, and as a tool to plan for including these recommendations into future development.

COMMUNITY
connectivity program

# Appendix A

CONNECTICUT DEPARTMENT OF TRANSPORTATION

AECOM
Built to deliver a better world

# Welcome to the Community Connectivity Program Application


**Please fill in the following information to provide the Audit team leaders with a comprehensive description of the area contained in this application.**

## 1. Applicant contact information

| | |
|---|---|
| **Name** | Marcia Vlaun |
| **Title** | Town Planner |
| **Email Address** | mvlaun@montville-ct.org |
| **Telephone Number** | (860) 848-6779 |

## 2. Location information

| | |
|---|---|
| **Address** | 310 Norwich New London Tpke. |
| **Description** | Town Hall |
| **City / Town** | Uncasville |

**3. Roadway type**
**(Please select all that apply)**

- [x] **State road**
- [ ] **Local road**
- [ ] **Private Road**
- [ ] **Other (please specify)**

**4. Zoning**
**(Please select all that apply)**

- [ ] **Industrial**
- [x] **Residential**
- [x] **Commercial**
- [ ] **Mixed Use**
- [x] **Retail**
- [ ] **N/A (not applicable)**
- [ ] **Other (please specify)**

Mohegan Sun Casino

**5. Approximate mile radius around the location**

Greater than a ½ mile

Other (Please Specify)

1 mile

**6. Community Sites**
**(Please select all that apply)**

- [ ] **Community Centers**
- [x] **Business Districts**
- [ ] **Restaurant/Bar Districts**
- [ ] **Churches**
- [ ] **Housing Complexes**
- [x] **Proximity to Schools**
- [x] **Tourist Locations (examples – Casino, Malls, Parks, Aquarium, etc...)**
- [ ] **N/A (not applicable)**
- [ ] **Other (please specify)**

Mohegan Sun Casino

**7. Employment Facilities**
**(Retail, Industrial, etc...)**

- [x] **Yes**
- [ ] **No**

**If Yes please describe (please specify)**

Mohegan Sun Casino; Montville Commons Shopping Center; Mohegan Elementary School; State Correctional Facility

**8. Educational facilities**
**(Please select all that apply)**

- [x] **Public, Parochial, Private Schools (more than 1 school within a ½ mile)**
- [ ] **University / Community Colleges**
- [ ] **N/A (not applicable)**
- [ ] **Other (please specify)**

**9. Transit facilities**
**(Please select all that apply)**

- [x] **Bus**
- [ ] **Rail**
- [ ] **Ferry**
- [ ] **Airport**
- [ ] **Park and Ride Lot**
- [ ] **N/A (not applicable)**
- [ ] **Other (please specify)**

**10. Safety Concerns**
**(Please select all that apply)**

- [ ] **Traffic (volumes & speed)**
- [x] **Collisions**
- [ ] **Sidewalks**
- [ ] **Traffic Signals**
- [ ] **Traffic Signs**
- [ ] **Parking Restrictions / Additions**
- [ ] **Drainage**
- [ ] **ADA Accommodations**
- [ ] **Agricultural & Live Stock crossing**
- [ ] **Maintenance issues (cutting grass, leaves, snow removal)**
- [ ] **N/A (not applicable)**
- [ ] **Other (please specify)**

Car vs Pedestrian Accidents

**11. Are there any past, current or future transportation/economic development projects near this location (i.e. Federal, State or local projects)?**

Yes

**If Yes please describe and list all projects.**

Expansion at Mohegan Sun Casino including Movieplex and Retail

**12. Environmental Concerns:**

N/A not applicable

**If Yes please describe and list.**

## 13. Please explain why this location should be considered for an RSA

There have been 18 vehicle vs pedestrian accidents on Rte 32 since 2008. Fifteen of those are concentrated within a one mile radius of the Casino, Shopping Center, School area.

There have been 2 motorcycle fatalities within the same area.

There are sidewalks and crosswalks in the area, however in 2015, a pedestrian was hit by a vehicle while in the crosswalk.

**14. Are there plans to expand the area?**
(Transportation Oriented Development, Economic Development, housing, etc...)

Yes

Mohegan Sun expansion
Multifamily housing project

**15. Any other pertinent information that is unique to this location?**

Yes

The worlds second largest Casino abuts a suburban Town

# Thank you for completing the Community Connectivity application.

**Please click on the "submit button" below and include the following attachments**

1. Location map (google, GIS) **(Required)**
2. Collision data (If available)
3. Traffic data (ADT or VMT) (If available)
4. Pedestrian/bicycle data (If available)

**Submit Application**

WIM COUNT: adt 3000, station number 4030, indicator

PORTABLE COUNT: adt 2500, station number 25, indicator

CONTINUOUS COUNT: adt 3000, station number 9030, indicator

TOWN LINE COUNT: indicator, number [118], station number 50, adt 2000

TMS COUNT: adt 3000, station number 8030, indicator

Legend

*Accident Locations*

Motorcycle Fatalities

Car vs Pedestrian

Mohegan Sun Casino

Shopping Center

School

MONTVILLE CORRECTIONAL FACILITY

SHOPPING CENTER

PETER PAUL SHOPPING CENTER

RAND WHITNEY CO.

Montville

Uncasville

Massapeag

MOHEGAN SUN CASINO

CRISTATA INN

BOUNDARY

THAMES RIVER

COMMUNITY
connectivity program

# Appendix B

Built to deliver a better world

# Road Safety Audit

**Town:** Montville
**RSA Location:** Route 32
**Meeting Location:** Montville Town Hall Room 203
**Address:** 310 Norwich-New London Turnpike, Montville, CT 06382
**Date:** 10/4/2016
**Time:** 8:30 AM

## Participating Audit Team Members

| Audit Team Member | Agency/Organization |
|---|---|
| Brad Sabean | Aecom |
| Mike Walforst | Aecom |
| Michael Cohen | CTDOT |
| Bridget Baucaud | VN Engineers |
| Anna Bergeron | CTDOT |
| Marcia Vlauin | Town |
| Liz Burdick | Town |
| Steve Mitchell | Aecom |
| Len Bunnell | Montville Police |
| Ron McDaniel | Mayor |
| Tom Cummings | Town Engineer |

COMMUNITY
connectivity program

# Appendix C

Built to deliver a better world

# Road Safety Audit – Montville

**Meeting Location:** Montville Town Hall Room 203
**Address:** 310 Norwich-New London Turnpike, Montville, CT 06382
**Date:** 10/4/16
**Time:** 8:30 AM

## Agenda

**Type of Meeting:** **Road Safety Audit – Pedestrian Safety**

**Attendees:** **Invited Participants to Comprise a Multidisciplinary Team**

**Please Bring:** **Thoughts and Enthusiasm!!**

**8:30 AM** **Welcome and Introductions**

- Purpose and Goals
- Agenda

**8:45 AM** **Pre-Audit**

- Definition of Study Area
- Review Site Specific Data:
  - Average Daily Traffic
  - Crash Data
  - Geometrics
- Issues
- Safety Procedures

**10:00 AM** **Audit**

- Visit Site
- As a group, identify areas for improvements

**12:00 PM** **Post-Audit Discussion / Completion of RSA**

- Discussion observations and finalize findings
- Discuss potential improvements and final recommendations
- Next Steps

**2:30 PM** **Adjourn for the Day – but the RSA has not ended**

Instruction for Participants:

- Before attending the RSA, participants are encouraged to observe the intersection and complete/consider elements on the RSA Prompt List with a focus on safety.
- All participants will be actively involved in the process throughout. Participants are encouraged to come with thoughts and ideas, but are reminded that the synergy that develops and respect for others' opinions are key elements to the success of the overall RSA process.
- After the RSA meeting, participants will be asked to comment and respond to the document materials to assure it is reflective of the RSA completed by the multidisciplinary team.

# Audit Checklist

| Pedestrians and Bicycles | Comment |
|---|---|
| **Pedestrian Crossings**<br>• Sufficient time to cross (signal)<br>• Signage<br>• Pavement Markings<br>• Detectable warning devices (signal)<br>• Adequate sight distance<br>• Wheelchair accessible ramps<br>  o Grades<br>  o Orientation<br>  o Tactile Warning Strips<br>• Pedestrian refuge at islands<br>• Other | |
| **Pedestrian Facilities**<br>• Sidewalk<br>  o Width<br>  o Grade<br>  o Materials/Condition<br>  o Drainage<br>  o Buffer<br>• Pedestrian lighting<br>• Pedestrian amenities (benches, trash receptacles)<br>• Other | |

| | |
|---|---|
| **Bicycles**<br>• Bicycle facilities/design<br>• Separation from traffic<br>• Conflicts with on-street parking<br>• Pedestrian Conflicts<br>• Bicycle signal detection<br>• Visibility<br>• Roadway speed limit<br>• Bicycle signage/markings<br>• Shared Lane Width<br>• Shoulder condition/width<br>• Traffic volume<br>• Heavy vehicles<br>• Pavement condition<br>• Other | |

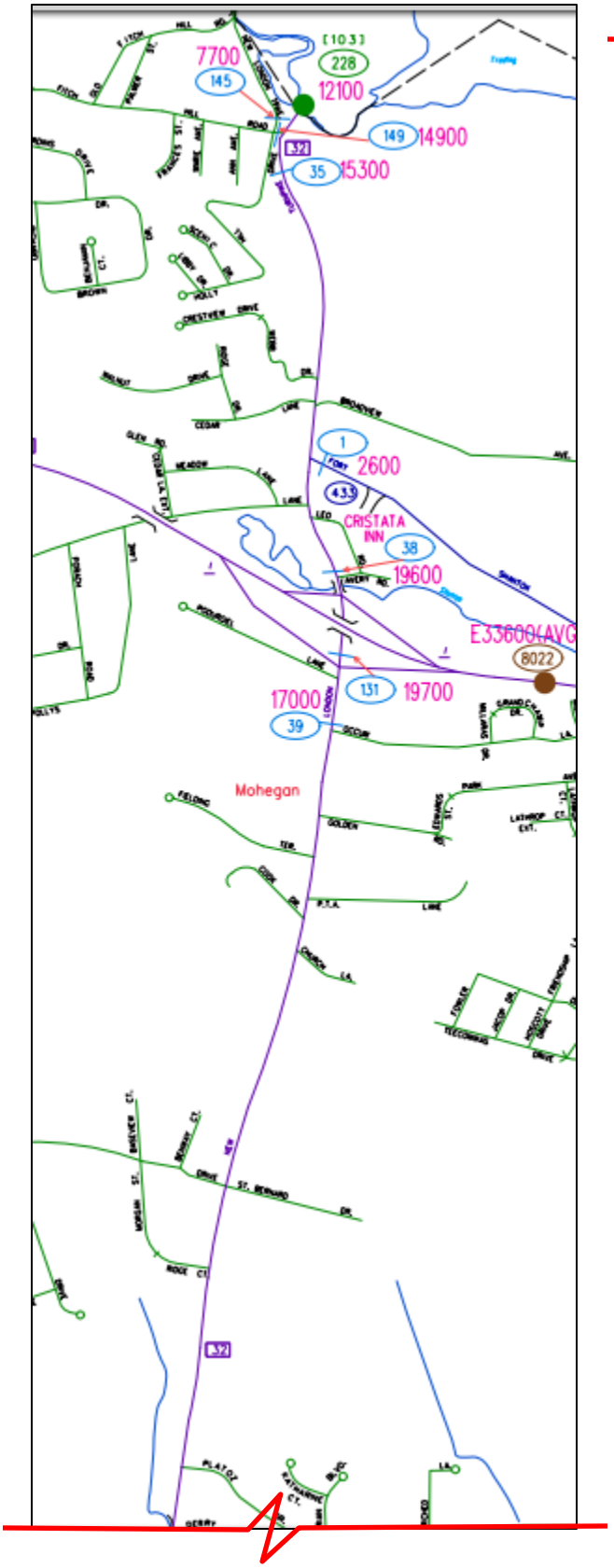
| **Roadway & Vehicles** | |
|---|---|
| • Speed-related issues<br>o Alignment;<br>o Driver compliance with speed limits<br>o Sight distance adequacy<br>o Safe passing opportunities | |
| • Geometry<br>o Road width (lanes, shoulders, medians);<br>o Access points;<br>o Drainage<br>o Tapers and lane shifts<br>o Roadside clear zone /slopes<br>o Guide rails / protection systems | |

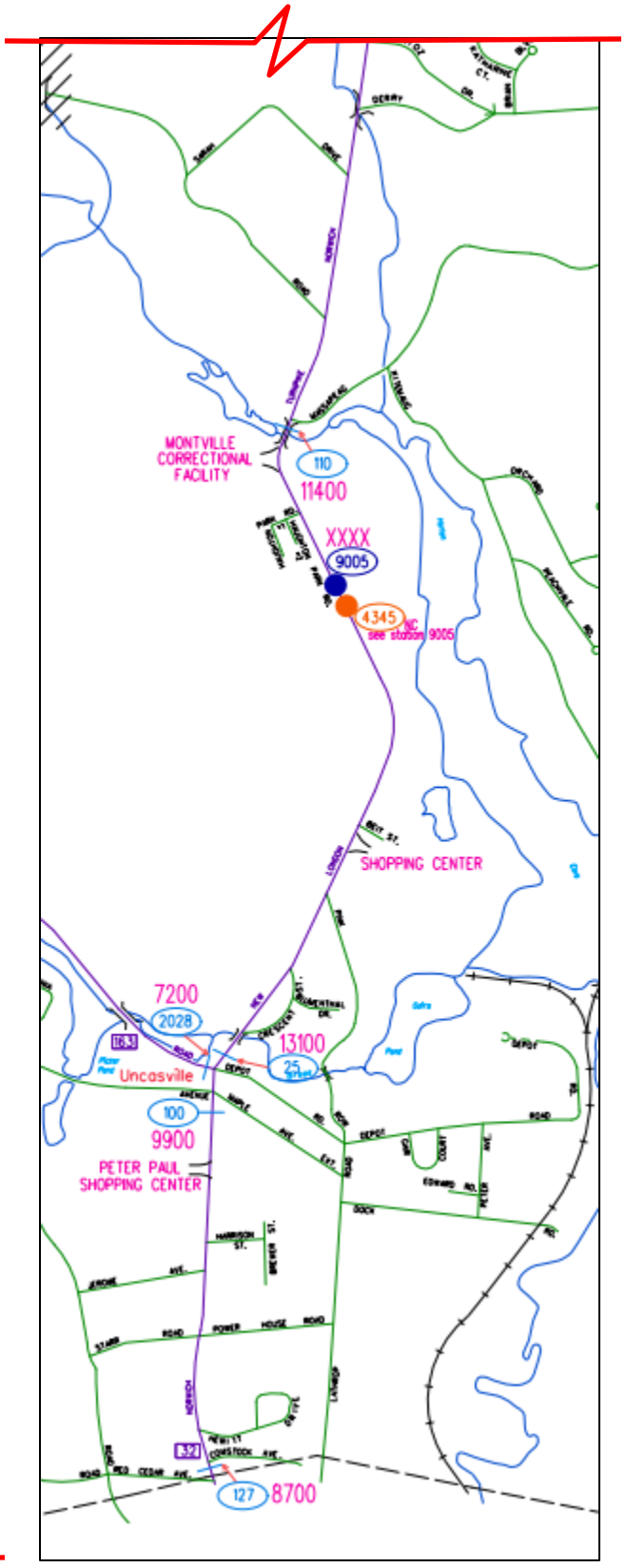
| | |
|---|---|
| • Intersections<br>o Geometrics<br>o Sight Distance<br>o Traffic control devices<br>o Safe storage for turning vehicles<br>o Capacity Issues | |

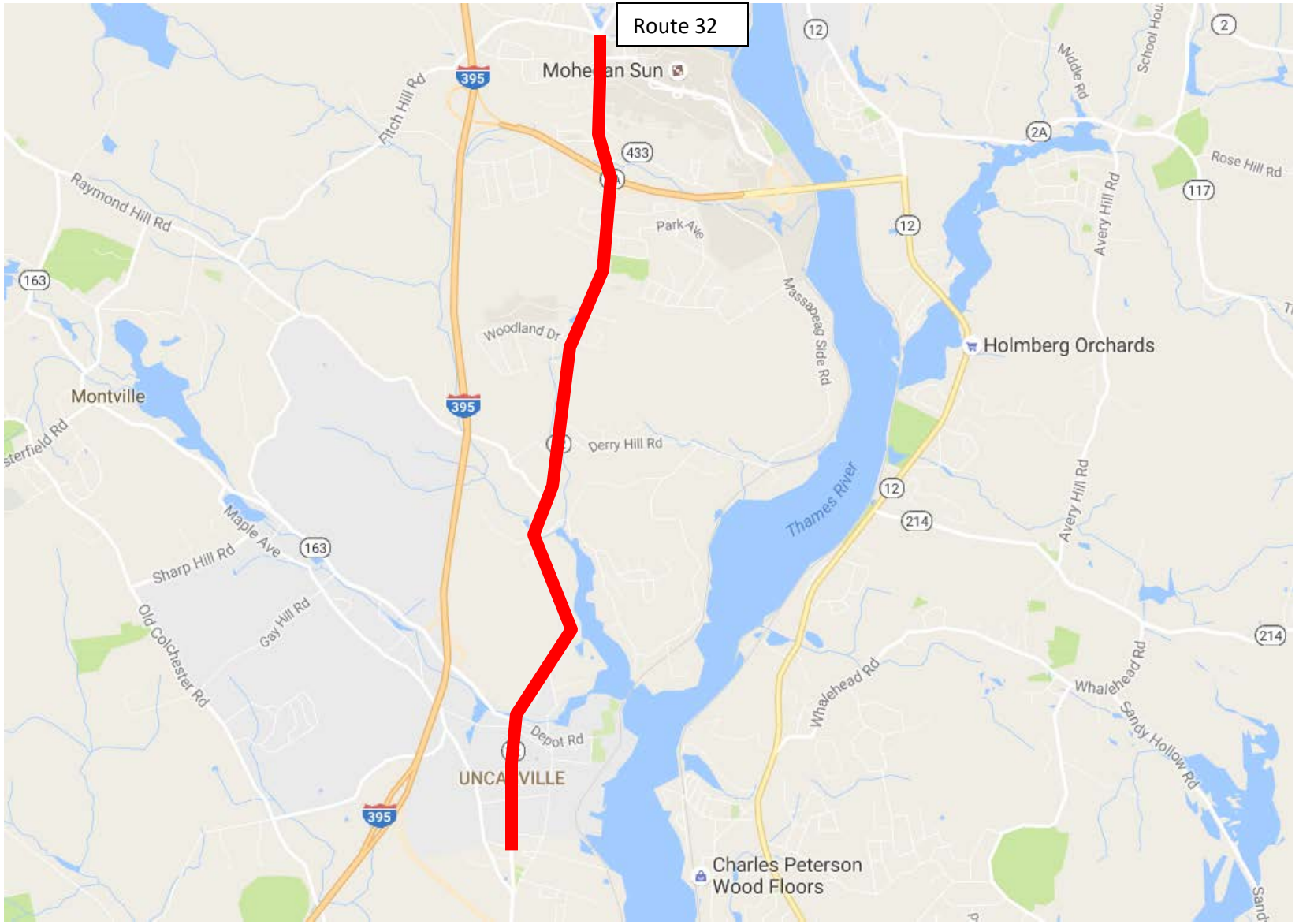
| | |
|---|---|
| • Pavement<br>  o Pavement Condition (excessive roughness or rutting, potholes, loose material)<br>  o Edge drop-offs<br>  o Drainage issues<br>• Lighting Adequacy | |
| • Signing<br>  • Correct use of signing<br>  • Clear Message<br>  • Good placement for visibility<br>  • Adequate retroreflectivity<br>  • Proper support | |
| • Signals<br>  o Proper visibility<br>  o Proper operation<br>  o Efficient operation<br>  o Safe placement of equipment<br>  o Proper sight distance<br>  o Adequate capacity | |
| • Pavement Markings<br>  o Correct and consistent with MUTCD<br>  o Adequate visibility<br>  o Condition<br>  o Edgelines provided | |

| | |
|---|---|
| • Miscellaneous<br>  o Weather conditions impact on design features.<br>  o Snow storage | |

# Average Daily Traffic (ADT)



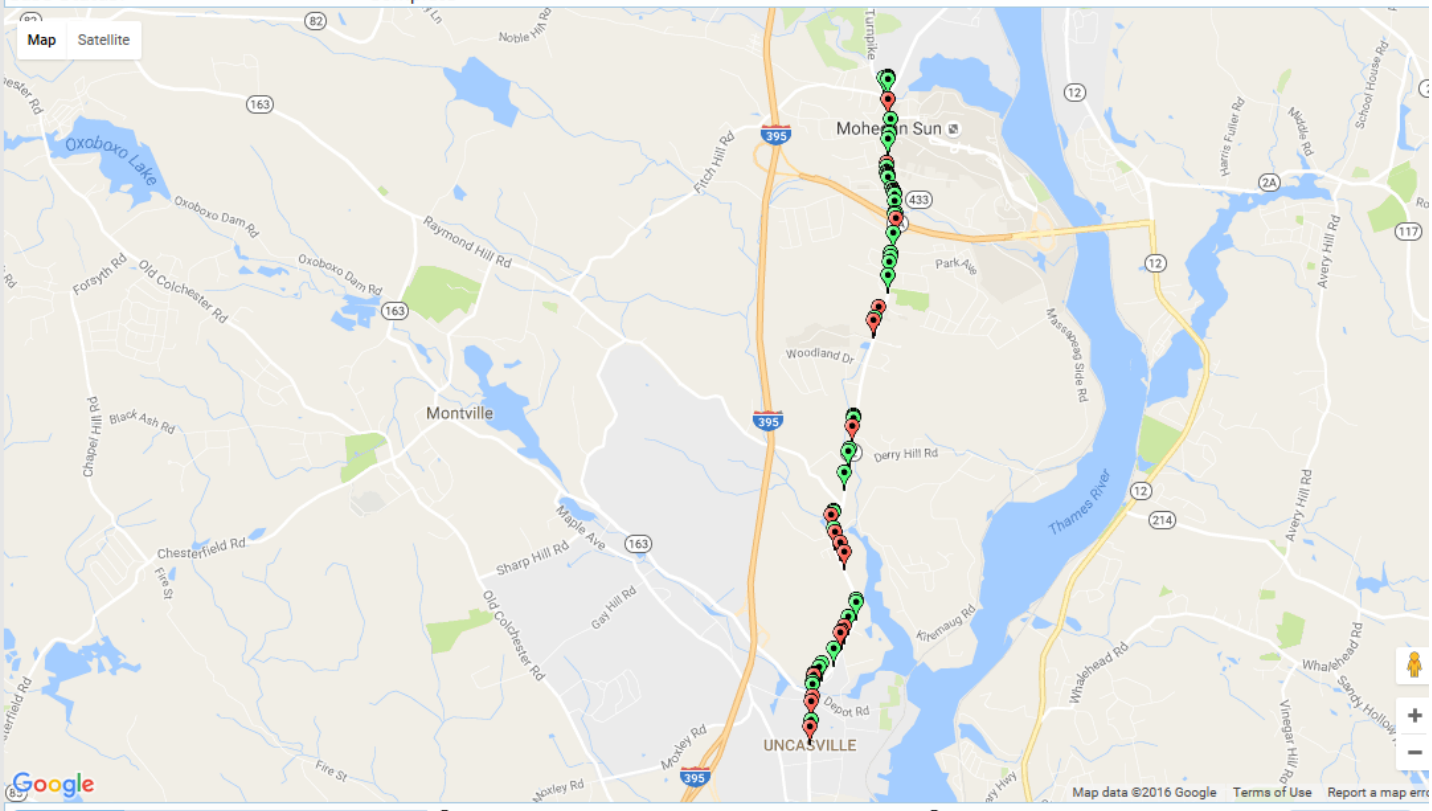

Route 32
Mohegan Sun
Fitch Hill Rd
395
433
12
2
2A
Middle Rd
School Hou
Rose Hill Rd
117
Raymond Hill Rd
163
Park Ave
Avery Hill Rd
Massapeag Side Rd
Woodland Dr
Holmberg Orchards
Montville
Derry Hill Rd
Thames River
214
Maple Ave
Sharp Hill Rd
Old Colchester Rd
Gay Hill Rd
Whalehead Rd
Sandy Hollow Rd
Depot Rd
UNCASVILLE
Charles Peterson
Wood Floors

# 2015 Crashes

UCONN Connecticut Crash Data Repository

**Search Criteria:**

| | |
|---|---|
| **Dataset:** | mmucc |
| **Date From:** | 01/01/2015 |
| **Date To:** | 12/31/2015 |
| **Towns:** | Montville |
| **Town & Route:** | Town:86 Route:32 Intersection:undefined Milepost:- |
| Crash Severity: | Injury of any type (Serious, Minor, Possible), Fatal (Kill), Property Damage Only |
| Case Status: | Complete |




Markers | Heatmap | Select & Query | Query Selection

Injury of any type (Serious, Minor, Possible) | Fatal (Kill) | Property Damage Only

Select All | Deselect All

# Road Safety Audit – Montville

## Crash Summary

Data: 3 years (2012-2014)

There were 4 crashes that involved pedestrians.

There were no crashes involving bicyclists.

| Severity Type | Number of Crashes | |
|---|---|---|
| Property Damage Only | 248 | 77% |
| Injury (No fatality) | 76 | 23% |
| Fatality | 0 | 0% |
| Total | 324 | |

| Manner of Crash / Collision Impact | Number of Crashes | |
|---|---|---|
| Unknown | 0 | 0% |
| Sideswipe-Same Direction | 28 | 9% |
| Rear-end | 150 | 46% |
| Turning-Intersecting Paths | 32 | 10% |
| Turning-Opposite Direction | 26 | 8% |
| Fixed Object | 36 | 11% |
| Backing | 4 | 1% |
| Angle | 12 | 4% |
| Turning-Same Direction | 12 | 4% |
| Moving Object | 4 | 1% |
| Parking | 0 | 0% |
| Pedestrian | 4 | 1% |
| Overturn | 4 | 1% |
| Head-on | 5 | 2% |
| Sideswipe-Opposite Direction | 7 | 2% |
| Miscellaneous- Non Collision | 0 | 0% |
| Total | 324 | |

| Weather Condition | Number of Crashes | |
|---|---|---|
| Snow | 23 | 7% |
| Rain | 47 | 15% |
| No Adverse Condition | 252 | 78% |
| Unknown | 1 | 0% |
| Blowing Sand, Soil, Dirt or Snow | 0 | 0% |
| Severe Crosswinds | 0 | 0% |
| Sleet, Hail | 1 | 0% |
| Total | 324 | |

| Light Condition | Number of Crashes | |
|---|---|---|
| Dark-Not Lighted | 5 | 2% |
| Dark-Lighted | 101 | 31% |
| Daylight | 212 | 65% |
| Dusk | 4 | 1% |
| Unknown | 1 | 0% |
| Dawn | 1 | 0% |
| Total | 324 | |

| Road Surface Condition | Number of Crashes | |
|---|---|---|
| Snow/Slush | 24 | 7% |
| Wet | 60 | 19% |
| Dry | 238 | 73% |
| Unknown | 1 | 0% |
| Ice | 1 | 0% |
| Other | 0 | 0.0% |
| Total | 324 | |

| Time | | Number of Crashes | |
|---|---|---|---|
| **0:00** | **0:59** | 9 | 3% |
| **1:00** | **1:59** | 2 | 1% |
| **2:00** | **2:59** | 2 | 1% |
| **3:00** | **3:59** | 1 | 0% |
| **4:00** | **4:59** | 4 | 1% |
| **5:00** | **5:59** | 2 | 1% |
| **6:00** | **6:59** | 5 | 2% |
| **7:00** | **7:59** | 9 | 3% |
| **8:00** | **8:59** | 18 | 6% |
| **9:00** | **9:59** | 15 | 5% |
| **10:00** | **10:59** | 11 | 3% |
| **11:00** | **11:59** | 9 | 3% |
| **12:00** | **12:59** | 24 | 7% |
| **13:00** | **13:59** | 18 | 6% |
| **14:00** | **14:59** | 23 | 7% |
| **15:00** | **15:59** | 32 | 10% |
| **16:00** | **16:59** | 37 | 11% |
| **17:00** | **17:59** | 32 | 10% |
| **18:00** | **18:59** | 19 | 6% |
| **19:00** | **19:59** | 8 | 2% |
| **20:00** | **20:59** | 16 | 5% |
| **21:00** | **21:59** | 11 | 3% |
| **22:00** | **22:59** | 9 | 3% |
| **23:00** | **23:59** | 8 | 2% |
| **Total** | | 324 | |

# Montville - Route 32

DRAFT

N

SPEED LIMIT 35

Route 32

Mohegan Sun

Sandy Desert Rd

Crow Hill Rd

Fort Shantok Rd

Gallivan Rd

Route 32

2A

Route 32

Occum Ln

AHEAD

SPEED LIMIT 40

Golden Rd

AHEAD

SPEED LIMIT 40

SPEED LIMIT 40

395

St. Bernard School Dr

32

AHEAD

SPEED LIMIT 40

SPEED LIMIT 35

Raymond Hill Rd

SPEED LIMIT 40

Massapeag Rd

Thames River

SPEED LIMIT 35

Beit St

SPEED LIMIT 30

SPEED LIMIT 35

163

Depot Rd

Depot Rd

Maple Ave

SPEED LIMIT 30

Starr Rd

## Legend

- Signalized Intersection
- Stop Controlled Intersection
- Crosswalk
- Pedestrian Crossing Sign
- Bridge or Culvert
- Sidewalk Both Sides
- Sidewalk One Side
- No Sidewalk
- Highway On/Off Ramp
- School Zone Ahead Sign
- School Bus Stop Sign
- Bus Stop

# Post-Audit Discussion Guide

**Safety Issues**

- Confirmation of safety issues identified during walking audit

**Potential Countermeasures**

- Short Term recommendations

- Medium Term recommendations

- Long Term recommendations

**Next Steps**

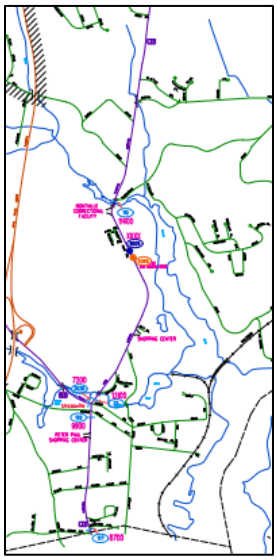
- Discussion regarding responsibilities for implementing the countermeasures (including funding)

# Road Safety Audit – Montville

## Fact Sheet

**Functional Classification:**

- Route 32 is classified as a Minor Arterial



**ADT**

- ADT on Route 32 is 8,700– 19,600

**Population and Employment Data (2014):**

- Population: 19,649
- Employment: 13,213

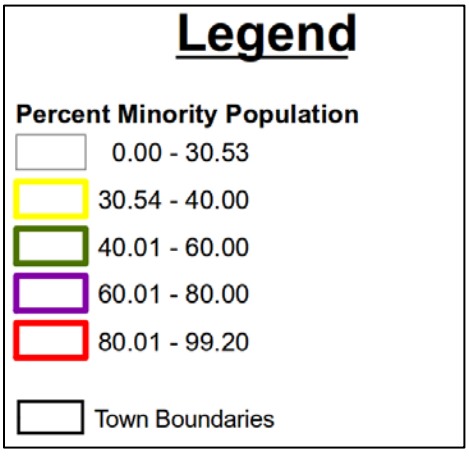
**Urbanized Area**

- Montville is in the Norwich-New London Urbanized Area

**Demographics**

- The statewide average percentage below the poverty line is 10.31%. There is no area in Montville exceeding the state's average.

- The statewide average percentage minority population is 30.53%. Within the vicinity of Route 32 up to 40% of residents are minorities.

**Air Quality**

- Montville's CIPP number 611
- Montville  is within the Greater CT Marginal Ozone Area
- Montville is within a CO Attainment Area