



Somerset County Roadway Safety Study  
Subregional Project

# ROAD SAFETY AUDIT REPORT

MAIN STREET IN MILLSTONE BOROUGH



November 2021

## Executive Summary

As part of the North Jersey Transportation Planning Authority (NJTPA)'s subregional studies grant program, Somerset County (the County) has conducted the Somerset County Roadway Corridor Safety Analysis study. The study will advance the County's efforts to address pedestrian, bicycle, and intersection safety. Five (5) County roadway corridors have been selected to go through a comprehensive safety analysis following the Federal Highway Administration's Road Safety Audit (RSA) process to identify vehicle, pedestrian, and bicyclist safety issues and to develop safety improvement recommendations. This RSA report has been prepared for the Main Street corridor (Somerset County Route 533, CR 533), from Yorktown Road at MP 25.14 to the Hillsborough Township municipal line at the Beardslee Terrace intersection at MP 25.81, in Millstone Borough. According to the compiled crash data, 35 crashes occurred on the 1-mile segment analysis area during the 3-year vehicle and 5-year pedestrian crash analysis period.

The pre-audit meeting was held at 10:00 AM via video conferencing on Tuesday, March 23<sup>rd</sup>, 2021, on the morning of the in-field review meeting to introduce the audit team, cover the activities to complete the RSA, define the RSA process, cover existing conditions data, present safety measures under consideration, summarize crash data collected for the corridor, and go over ground rules for conducting the in-field portion of the audit safely. The in-field component of the RSA was conducted at 2:00 PM on the same day as the pre-audit meeting. Participants were paired off with each other to walk halves of the corridor. Utilizing aerial mapping, prompt lists, photography, and video, participants recorded their observations of the corridor, as well as safety measures to address potential safety concerns. On the following day (Wednesday, March 24<sup>th</sup>, 2021), the RSA team reconvened via video conferencing to view photos gathered during the in-field audit to discuss each potential safety concern, elaborate on potential ideas to mitigate, cover questions on travel pertaining to the overall corridor, and summarize next steps for this study.

Discussions from the RSA process helped to form the basis of the Implementation Matrix in the **Identified Issues & Observations** section of this report, which serves as a record of items discussed during the post-audit meeting. Major findings (or recommendations) from these discussions included:

- Systematic maintenance of paver-style sidewalk along corridor;
- New or improved stop bar and stop sign placement on side street approaches to Main Street;
- Edge line revisions, or curb extensions, to slow turning movements at Amwell Road (CR 650);
- Speed humps on River Street to mitigate cut-through traffic around Amwell Road (CR 514) signal;
- Improvement of historic site wayfinding to mitigate driver confusion and circuitous travel; and,
- SafetyEdge paving equipment for future resurfacing projects near pavement drop-off areas.

A key recommendation from this RSA was to improve pedestrian infrastructure along Main Street. While this includes LPIs, curb extensions, and continued maintenance of sidewalk, a crucial component of pedestrian connectivity within the Borough would be bridging the gap in sidewalk that exists along Main Street between Amwell Road (CR 514) and North River Street. The Borough is currently seeking to acquire the needed right-of-way for this improvement via redevelopment or acquisition of a vacant residential property located off the east side of Main Street. The Borough commented that State intervention would likely be needed to obtain property, or an easement, to construct this new sidewalk along the east side of Main Street to connect existing sidewalk to the north and south due to municipality's need for additional funding. Currently, pedestrians either walk along the shoulder on Main Street, or utilize the sidewalks along North River Street and Amwell Road (CR 514) to make this connection.

Please note that recommendations cited in the Implementation Matrix are to reflect feedback received during the RSA process and are meant to be a record of ideas discussed. As these recommendations are considered for advancement into either a Concept Development (CD) study, or incorporation into an overlapping County or municipal project, the recommendations herein should be thoroughly evaluated for feasibility and practicability and designed as appropriate by the roadway owner and/or a professional engineer for conformance to all applicable codes, standards, and best practices.



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## I. Introduction

As part of the North Jersey Transportation Planning Authority (NJTPA)'s subregional studies grant program, Somerset County (the County) has conducted the Somerset County Roadway Corridor Safety Analysis study. The study will advance New Jersey's efforts to address pedestrian/bicycle and intersection safety. Five (5) County roadway corridors have been selected to go through a comprehensive safety analysis following the Federal Highway Administration's Road Safety Audit (RSA) process to identify vehicle, pedestrian, and bicyclist safety issues and to develop safety improvement recommendations. One of the locations that have been selected is the Main Street corridor (Somerset County Route 533, CR 533), from Yorktown Road at MP 25.14 to the Hillsborough Township municipal line at the Beardslee Terrace intersection at MP 25.81, in Millstone Borough.

The purpose of this RSA Report is to detail the site selection, road/multimodal inventory, land use investigation, crash data collection, crash analysis efforts, post/pre-audit meetings, and in-field RSA investigation conducted for the Main Street corridor. Flowing from this RSA is a list of potential recommendations proposed to improve safety. These recommendations were based on the investigated crash data, as well as recommendations made during the in-field RSA and post-audit meeting. This introduction serves to provide background on selection of the investigated corridor and covers the logistics of the RSA process that was performed. This RSA report also seeks to provide sample figures of improvements and crash countermeasures that could be considered as the County, or municipality, seeks to move forward on its Concept Development (CD) and/or Local Safety Program grant (or other funding) application. Please note, in applying these ideas to the corridor, design of such improvements, conceptual or otherwise, is the responsibility of the designated jurisdiction as is standard RSA practice.

### A. Site Selection

Selection of the Main Street corridor was based on a rigorous process which started with a list of top crash segments for the County from the NJTPA's Network Screening Lists (NSL)<sup>1</sup> and used supporting collision data, equity data, recommendations from prior studies, and public/stakeholder input to develop a shortlist of top crash segments. Segments with recently constructed safety improvements or locations undergoing study/design were identified through discussions with County Engineering and removed from this shortlist to target segments not currently being considered. The remaining locations were further prioritized and ranked with more recent crash severity and frequency data (old crash data from NSL superseded with more recent crash data from Safety Voyager), traffic volume data from the NJTPA's regional travel demand model (NJRTM-E), and environmental justice data from the NJTPA.

Input on these top crash locations was obtained through the Public Involvement Plan for this project, which included gathering information from the public via a virtual mapping tool and gathering information from a Technical Advisory Committee (TAC)<sup>2</sup> via an initial virtual meeting conducted in August 2020. Based upon public and stakeholder input, the following five segment locations (including the segment being studied in this report) were selected to be advanced for RSA review:

1. Finderne Avenue/Main Street (CR 533) in Bridgewater Township, MP 29.60-30.60
2. Franklin Boulevard (CR 617) in Franklin Township, MP 0.00-1.00
3. Somerset Street (CR 626) in Raritan Borough, MP 0.00-0.67
4. Greenbrook Road (CR 636) in North Plainfield Borough, MP 0.70-1.97
5. Main Street (CR 533) in Millstone Borough, MP 25.14-25.87

<sup>1</sup> <https://www.njtpa.org/Projects-Programs/Local-Programs/Local-Safety-Rural-Roads/Local-Safety-Program/Network-Screening-Lists.aspx> Top crash segment lists on this webpage are based upon a programmatic analysis of statewide locations utilizing 2014-2018 crash data.

<sup>2</sup> Stakeholders on the TAC include NJDOT, NJ TRANSIT, FHWA, RideWise, AARP, Voorhees Transportation Center, and various County advocates.

Main Street is included in this list primarily due to the relatively high crash frequency on this corridor and recommendations from previous studies. This corridor was identified within the *WalkBikeHike* (2019) and *Supporting Priority Investment in Somerset County, Phase III* (2017) studies that needs improved facilities for pedestrian and cyclist connectivity. **Table 1** shows the portions of the selected segment, or intersections, that qualified as one of the top 100 crash locations<sup>1</sup> in the County based on either overall crash data for the years of 2016 through 2018 or pedestrian/cyclist crash data for the years of 2014 through 2018 as listed on the NSLs.

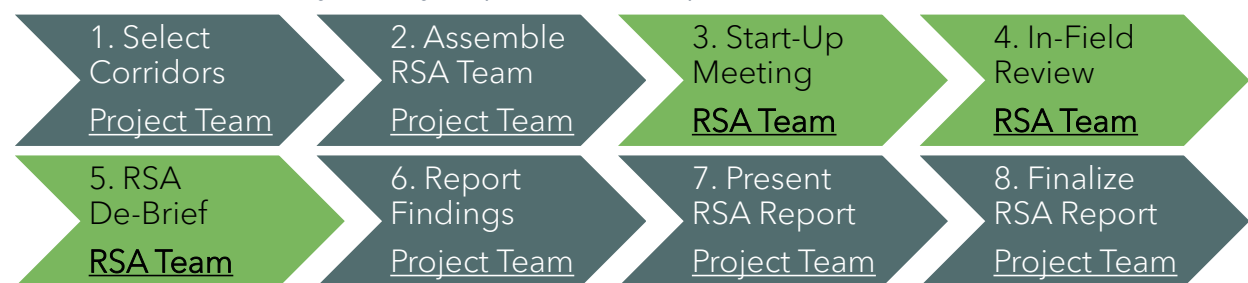
Table 1 – Main Street NJTPA 2019 NSL Rankings for Somerset County

Corridor Segments Overall Crash Data	Corridor Segments Ped/Bike Crash Data	Intersection Locations Overall Crash Data	Intersection Locations Ped/Bike Crash Data
None	None	Amwell Road (#80)	None

### B. What is a Road Safety Audit (RSA)?

An RSA is a formal safety performance examination of an existing or future road or intersection by a multi-disciplinary audit team, including public works, law enforcement, emergency medical services, engineering, planning, and advocacy staff. It qualitatively estimates and reports on existing and potential road safety issues and identifies opportunities for improvements in safety for all road users. RSAs can be used on any size project, from minor maintenance to mega-projects, and can be conducted on facilities with a history of crashes or during the design phase of a new roadway or planned upgrade. RSAs consider all road users, account for human factors and road user capabilities, are documented in a formal report, and require a formal response from the road owner. **Figure 1** shows the steps employed by the County to complete the RSA, as informed by the Federal Highway Administration's (FHWA's) RSA process. The steps that traditionally consist of an in-field review of conditions with an RSA team are highlighted in green in Figure 1.

Figure 1 – Eight-Step RSA Process as Adopted from FHWA RSA Process



The RSA program is conducted to identify potential countermeasures for roadway segments demonstrating a history of, or potential for, a high frequency of crashes or an identifiable pattern of crash types. Recommendations range from low-cost, quick-turnaround safety improvements to more complex strategies, which are all codified in this report within an Implementation Matrix, categorizing improvements by timeline, cost, and jurisdiction. Implementation of improvement strategies identified through this process may be eligible for Local Federal Aid Safety Funds. Because the RSA process is adaptable to local needs and conditions, recommendations can be implemented incrementally as time and resources permit. Please note that the RSA process does not include the design or thorough evaluation of improvements that are being considered, conceptual or otherwise. Following the eighth and final step of the RSA process, it will be incumbent for the designated jurisdiction to start to evaluate and design the potential improvements presented herein, as is standard RSA practice.

At the request of the NJTPA, RSAs originally planned for Fall 2020 were postponed to Spring 2021 due to the COVID-19 pandemic. In addition to postponement, the County took additional steps to safely conduct this RSA. Both the start-up meeting and RSA de-brief (steps #3 and #5 shown in **Figure 1**), which are

traditionally conducted in-person, were conducted virtually via video conferencing to reduce the exposure and potential risk of disease transmission. Furthermore, the essential step of in-field review was conducted in a socially-distanced manner with participants paired off in groups spaced more than six feet apart from each other. All in-field RSA participants were masked for the entire duration of the field visit to further reduce disease transmission. Through this process, the post-audit “de-brief” meeting benefitted from being held virtually after the day on which the in-field review was conducted.

Some notable benefits produced by a virtual post-audit included:

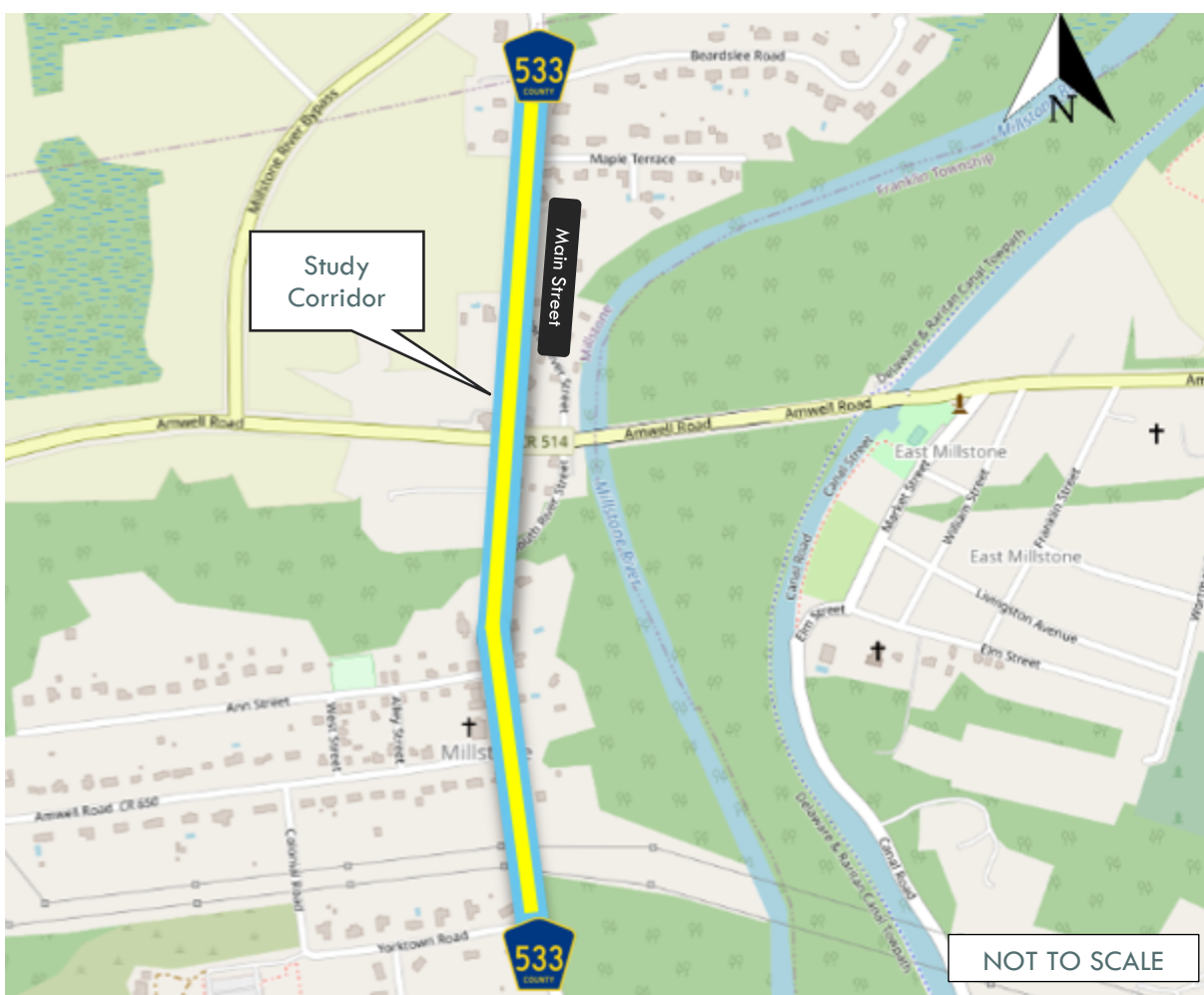
- Additional time for participants to share photos, videos, and scans of their observations;
- Available screensharing for quick review and consensus of RSA observations;
- An involved discussion of the observations and recommendations was well established by the wide audience of stakeholders;
- Additional time for participants to process their observations and organize their thoughts for discussion.

## II. Corridor Description & Analysis

### A. Study Location

The study area consists of 0.67 miles of Main Street (CR 533) extending from the intersection with Yorktown Road at MP 25.14 to the municipal border with Hillsborough Township at the intersection with Beardslee Terrace at MP 25.81 (Figure 2). A straight-line diagram of the corridor is provided in **Appendix A**. The identified segment is in the Borough of Millstone in the County of Somerset. Main Street travels through the Borough's Historic District at the center of the study corridor in the vicinity of its intersections with Amwell Road (CR 514 and CR 650). This district contains multiple 18<sup>th</sup>-century buildings and is listed on the National Register of Historic Places. There are also commercial uses within the historic district at the intersection of Amwell Road (CR 514) & Main Street. Land adjacent to Main Street on the northern and southern ends of the study corridor consists primarily of residential uses and open space. Primary vehicle and pedestrian trip generators on this corridor include the Hillsborough Reformed Church at the Amwell Road (CR 650) intersection and the commercial uses in the vicinity of the Amwell Road (CR 514) intersection. The area surrounding the corridor segment has been designated as the "Millstone Village Center" Local Priority Area (LPA) by the County in its 2017 *Supporting Priority Investment in Somerset County, Phase III* study.

Figure 2 – Study Area Location Map



### B. Roadway and Intersection Characteristics

Main Street is classified by the New Jersey Department of Transportation (NJDOT) as an urban minor arterial and urban collector north and south of the Amwell Road (CR 514) intersection, respectively, with a posted

speed of 35 mph. There is a horizontal curve at each end of the corridor segment with a posted advisory speed of 30 mph at the southern end and 25 mph at the northern end. The corridor consists of two 11'-12' travel lanes (one in each direction) undivided. Shoulder widths vary from one to eight feet on each side of the road with parking permitted where shoulder width allows, including on the southbound side of the roadway in the vicinity of intersections with Amwell Road (CR 650) and Yorktown Road and on the northbound side of the roadway in the vicinity of the Beardslee Terrace intersection. There are one signalized and seven unsignalized intersections along the corridor. Northbound and southbound left-turn bays are provided at the signalized intersection with Amwell Road (CR 514).

### C. Existing Bicycle/Pedestrian Accommodations

Sidewalks are generally provided on the northbound side of Main Street north of Amwell Road (CR 514) and on the southbound side south of Amwell Road (CR 514). Gaps in sidewalk coverage exist between the North River Street and Amwell Road (CR 514) intersections and between the Amwell Road (CR 650) and Yorktown Road intersections. Sidewalks mainly consist of pavers, apart from the concrete sidewalk provided south of Amwell Road (CR 650) and are five feet in width or less. At some locations, sidewalks have become overgrown, effectively narrowing the width of the sidewalk. No on-road provisions are made for cyclists within the study corridor. However, publicly-available biking activity data<sup>3</sup> suggest that Main Street is heavily utilized by cyclists due to biking facilities on the D&R Canal Towpath.

### D. Traffic Volumes

According to traffic data available from NJDOT<sup>4</sup> count station #091818, Average Annual Daily Traffic (AADT) on Main Street is approximately 8,000 vehicles per day. Supporting count data from NJDOT is provided in **Appendix B**. The NJTPA's NJRTM-E travel demand model provides an AADT estimate of 9,000 based upon 2020 pre-COVID-19 conditions.

### E. Transit Service

There are no transit services on this section of Main Street. The NJ TRANSIT Bridgewater Train Station with Raritan Valley Line service is approximately a 10-minute drive north of the study corridor. The County owns a parcel of land on the southwest quadrant of the Amwell Road (CR 514) intersection, noted in the *Millstone Borough Master Plan* (2017) as the "Somerset County Garage property," which appears to be either a park-and-ride lot or overflow parking for adjacent land use.

### F. Community Profile

Population and income characteristics from the American Community Survey (ACS), an update to the 2010 Census performed by the U.S. Census Bureau, were used to identify Environmental Justice populations. The latest ACS for this study area is a five-year estimate from 2015 through 2019 for County Census Tract 538.01. A summary of the demographics is listed in **Table 2**. Study area demographics show that there are fewer zero vehicle households and fewer people commuting to work via transit when compared to the County average, perhaps due to the lack of available nearby transit options.

Table 2 – Main Street RSA Study Area Demographics

Characteristic		Census Tract Average	County Average
Below Poverty Level <sup>5</sup>		4.8 percent	5.1 percent
Race/ Ethnicity <sup>6</sup>	White	91.0 percent	66.3 percent
	Asian American	3.6 percent	17.7 percent
	Black or African American	1.6 percent	9.7 percent

<sup>3</sup> Biking activity data from <https://www.strava.com/heatmap>.

<sup>4</sup> AADT data obtained from <https://www.njtrms.org/map/>.

<sup>5</sup> 2019: ACS 5-Year Estimates Data Profiles, TableID S1701, "Poverty Status in the Last 12 Months"

<sup>6</sup> 2019: ACS 5-Year Estimates Data Profiles, TableID DP05, "ACS Demographic and Housing Estimates"



Characteristic	Census Tract Average	County Average
American Indian/Alaskan	0.0 percent	0.3 percent
Other	3.8 percent	6.0 percent
Hispanic/Latino (Ethnicity)	8.0 percent	14.7 percent
<b>Limited English Proficiency (LEP)<sup>7</sup></b>	2.6 percent	4.4 percent
<b>Use Public Transportation<sup>8</sup></b>	2.8 percent	5.3 percent
<b>Zero Vehicle Households<sup>7</sup></b>	0.0 percent	2.1 percent

### G. Redevelopment

The area surrounding the corridor segment has been designated as a Local Priority Area (LPA) by the County in its 2017 *Supporting Priority Investment in Somerset County, Phase III* study. The Phase III study noted that this area is a very auto-centric environment and that multimodal mobility improvements can help to support tourism and recreation opportunities in the Borough. An overview of mobility improvements from the Phase III study is shown in **Figure 3**.

Figure 3 – Multimodal Recommendations from Phase III Study



<sup>7</sup> 2019: ACS 5-Year Estimates Data Profiles, TableID S1602, "Limited English-Speaking Households"

<sup>8</sup> 2019: ACS 5-Year Estimates Data Profiles, TableID S0802, "Means of Transportation to Work by Selected Characteristics"



Redevelopment applications on Main Street have mainly consisted of minor subdivisions, lot line adjustments, and changes to parking. There are no major applications currently pending along Main Street, according to data delivered by County Planning.

#### *H. Proposed Improvements from Previous Studies*

Previously-proposed transportation improvements on or near the Main Street corridor include the following from the Phase III study (some of which are depicted above in **Figure 3**):

- Investigate a potential multiuse path on Amwell Road (CR 514);
- Install a multiuse path connecting Ann Street Park to Amwell Road (CR 514);
- Install a multiuse path connecting the proposed path along the utility ROW to existing bicycle lanes on Amsterdam Road and County Classics Fields;
- Install a wayfinding signing system for all modes of traffic to support County tourism;
- Investigate opportunities to enhance bicycle and pedestrian mobility along Main Street/River Street;
- Investigate potential multiuse path on Hamilton Road and within County-owned tract located north of Amwell Road (CR 514) and east of the CR 533 Bypass;
- Investigate opportunities for a bicycle and pedestrian crossing of the Millstone River and D&R Canal parallel to Amwell Road (CR 514), reusing an existing bridge abutment on North River Street;
- Investigate opportunities to utilize pipeline ROW for multiuse path north of Millstone village; and,
- Investigate opportunities to utilize aerial utility ROW for off-road multiuse path, providing a connection to Hillsborough at the Promenade and a crossing of the Millstone River to the D&R Canal Towpath south of Millstone village.

Pertinent excerpts from these studies, and associated improvements, are provided in **Appendix C**.

#### *I. Public Meeting #1*

On Thursday, November 12, 2020, the first public meeting for this project was held via Zoom conferencing to obtain feedback for the five locations selected for RSA review. Email blasts, advertisements, and social media notifications were provided in advance of the meeting. This meeting introduced the project team, who provided an overview of the study, stating the purpose and need. Statistics of crashes on County jurisdiction roadways were reviewed, showing a steady increase of crashes over the past ten years. The Consultant Team explained the RSA process and the technical analysis used in the development of the shortlist of corridors. Due to the pandemic, virtual or socially distanced options for conducting the RSA process were discussed.

The Consultant Team then explained the study's Public Involvement Plan (PIP), an iterative process designed to collect feedback and input. The opportunities to collaborate on the PIP were virtual, including public meetings and comments received through the project website and project email. The Consultant Team then explained the process of selecting the five corridors, which was based on County roadway screenings for top crash locations, evaluation of equity data, and public/stakeholder input obtained from the initial virtual mapping outreach conducted in Fall 2020. The virtual mapping tool allowed users to pin comments on areas of concern on a virtual map.

As part of the PIP, the public meeting included an opportunity to hear from attendees on comments specific to each corridor selected for RSA review by splitting the overall meeting into breakout rooms. The group in the Main Street breakout room discussed various concerns and suggestions regarding pedestrian and cyclist safety and connectivity. Comments received were as follows:

- Add a speed bump in addition to reducing the speed limit
- Add a crosswalk as this is a residential neighborhood and is dangerous for pedestrians and animals
- There is heavy truck traffic on this roadway

- Areas of corridor may need additional lighting
- There is a blind curve or driveway that makes speeding cars dangerous

### J. Technical Advisory Committee Meeting #2

Following an August 2020 meeting with the TAC (Technical Advisory Committee) to select the five corridor locations for further review Somerset County held the second TAC meeting in February 2021. This meeting consisted of a 45-minute presentation followed by interactive breakout rooms with discussion centered around the corridors selected for further review. The presentation included the following topics: project background, summary of selected corridors, description of potential safety measures, and a discussion of demonstration projects.

A breakout room was dedicated solely to the discussion of potential safety measures to be implemented in response to potential safety issues on the Main Street corridor in Millstone Borough. Participants were asked to review the ten safety measures discussed during the presentation. They were then asked to rate the effectiveness and ease of implementation of each safety measure based on their own opinion/perspective. Participants were also asked to identify specific areas within each corridor that were areas of concern.

**Table 3** contains a summary of those ratings and discussions for each safety measure, along with additional comments made toward each safety measure.

Table 3 – Perceived Effectiveness and Ease of Implementation for Various Safety Measures

Safety Measure	Effectiveness (1= not effective; 10= very effective)	Ease of Implementation (1=easy; 10= hard)
Lighting	3	5
Curb Extensions/Bus Bulbs	5	5
Daylighting <sup>9</sup> and Crosswalks	5	5
Walkways for Sidewalk Gaps	8	5
Dedicated Turn Lanes	1	1
Leading Pedestrian Intervals (LPI)	2	1
High Visibility Crosswalks	6	-
Turn Restrictions	5	-
Bike Lanes	5	8
Lane Width Reduction/Road Diet	-	-

### Breakout Group Additional Comments:

- Lighting:
  - Sun glare is an issue in the PM heading west approaching the Main Street intersection on Amwell Road.
  - The Main Street/Amwell Road intersection is illuminated well, but the approaches need more illumination.
  - Tree canopies obstructing lighting. Millstone is working with PSEG to evaluate system upgrades.
  - CR 514 is missing lighting between Main Street and Somerset Courthouse Rd.
  - Illumination low on Main Street near Yorktown Road and the adjacent curve.
  - Lighting would likely only result in marginal safety improvements. The focus for Main Street should be to reduce speeds.
  - PSEG won't upgrade lighting unless there is a failure.

<sup>9</sup> Daylighting is the act of restricting parked or standing vehicles through striping or curbing to improve sight distance at crosswalks or intersections.

- Curb Extension/Bus Bulbs:
  - Curb extensions could be beneficial but not sure where it might fit because there are no shoulders in most areas.
  - Concern whether curb extensions would impact the ability to provide bike lanes. There is bicycle traffic especially on weekends and bike lanes would be good to have if they can fit within the ROW somehow.
- Walkways for Sidewalk Gaps:
  - Need to fill in gaps in sidewalk, including along CR 514 northbound after liquor store. However, sidewalks may pose ROW challenges.
  - Weekend church activity - significant increase because of temporary population in Millstone. Some people walk to church.
- Dedicated Turn Lanes:
  - Dedicated turn lanes were considered not applicable to this study area, but the County should evaluate signal timing and length of turn arrows. They are too short, and people extend the left-turns after the signal turns yellow and red.
- Leading Pedestrian Intervals (LPI):
  - There are only sporadic pedestrian volumes in the area; therefore, LPIs may not be as effective here.
  - NJDOT is providing LPIs at many locations. For intersections with protected/permissive left-turns, the LPI can be pedestrian activated.
  - Would need to evaluate LPI impact to vehicular movements.
- High Visibility Crosswalks:
  - A new midblock crosswalk should be considered at South River Street to provide a crossing for the proposed new trail. However, visibility of the crossing, as well as ways to encourage compliance, like rectangular rapid flashing beacons, should be considered.
  - Improve crosswalks wherever possible.
- Bike Lanes:
  - There are a lot of bikes on the weekends, but not a lot of bike crashes.
  - Bike lanes might be hard to implement due to narrow lanes and narrow or non-existing shoulders.
- Lane Width Reduction/ Road Diet:
  - This corridor was believed to have no road diet potential.
- Additional Comments:
  - Trucks should be directed around Millstone.

#### A. Technical Advisory Committee Meeting #3

Following the RSAs in Spring 2021 and authoring of the draft RSA reports and accompanying recommendations soon thereafter, the County held the third and final TAC meeting for the study in August 2021. The virtual meeting format consisted of a 45-minute presentation with interactive breakout rooms. The presentation included the following topics: project background, project status, identification of needs, and proposed safety measures by corridor.

The meeting was then divided into five breakout rooms, one for each of the selected corridors. Each breakout room discussed a specific set of recommendations pertaining to that corridor. Millstone Borough RSA breakout room participants were asked to provide their feedback on the general lack of pedestrian connectivity along Main Street. Potential improvements to accomplish Borough walkability were also discussed. Provided below is participant feedback received on this topic:

- A participant noted that when the realignment of Amwell Road (CR 514) Bypass was constructed a few decades ago, it felt like the Borough became divided (north side vs. south side), creating a barrier for walkability.

- It was mentioned that the Borough has a master plan that incorporates pedestrian safety improvements, such as maintenance of sidewalks.
- It was noted that residents of the Borough are typically in favor of safety improvement projects, such as the construction of the sidewalk gap between Amwell Road (CR 514) and North River Street. However, coordination to construct these improvements on their private property can be a challenge.

Additional comments were received during the breakout room (not pertaining to pedestrian connectivity):

- Funding for these types of improvements is a concern. The cost of desired projects is large when compared to the population and tax revenue of the Borough. Therefore, the Borough must seek other funding such as County, State, or Federal funds to offset these costs. Sometimes, just the permitting fees can cost as much as the rest of the project. The Borough is currently applying for one such grant.
- A participant noted that speeding along Main Street is a concern, especially through town.

### B. Public Meeting #2

On Wednesday, September 29, 2021, from 7:00 PM to 9:00 PM, Somerset County held the second and final public meeting for the study. The virtual meeting format consisted of a 45-minute presentation touching on the following topics: project background, project status, identification of needs, and proposed safety measures by corridor.

The meeting was then divided into seven breakout rooms, one for each of the selected corridors, one for county-wide general transportation comments and suggestions, and one for Spanish speakers. Participants in the Millstone Borough breakout room were asked to provide their general reactions to the proposed recommendations for pedestrian infrastructure, such as LPIs, curb extensions, continued maintenance of sidewalk, and (most importantly) bridging the gap in sidewalk that exists along Main Street between Amwell Road (CR 514) and North River Street. Potential barriers or other ways to accomplish study goals were also discussed. Provided below is participant feedback received on this during this breakout room session:

- Attendees were very concerned about speeding along the corridor and felt that, although traffic calming measures are recommended as part of this study, the proposed recommendations would not directly address these concerns, as speed limit reductions and speed humps would.
- Attendees expressed that they wanted to see improvements such as a decrease in the speed limit, speed humps, raised crosswalks, and/or a raised intersection at Amwell Road (CR 514) and Main Street instead.
- Attendee discussed possibility of advocating for truck traffic diversion in the future.

While County Engineering has determined that raised intersections or speed humps are not appropriate for roadway with the daily and hourly volume profile of Main Street, additional study will be undertaken as part of the upcoming *Somerset County Master Plan Circulation Element* to investigate alternate truck routes, such as the nearby completed Route 206 Bypass, to siphon truck traffic away from the Borough.

### III. Crash Findings

The analysis used to support the RSA process incorporated a data-driven effort to utilize reportable crash information resulting in any combination of fatality, injury, or property damage. The datasets used for this analysis are sourced from local law enforcement responses to reported vehicular crashes. These on-scene responses subsequently translate to official law enforcement generated reports. Concurrently, the individual reports are aggregated to render serviceable crash information. To be entirely inclusive in obtaining complete crash information, the data was accumulated using three distinct resources: NJDOT's Safety Voyager<sup>10</sup>, New Jersey Division of Highway Traffic Safety (NJDOTS) Numetrics<sup>11</sup>, and the NJDOT raw crash tables<sup>12</sup>. The three sources were compared against each of the other obtained sources to allow for duplicate records to be discarded and all distinct records to be included with the goal of producing a complete and comprehensive representation of the crashes within the boundaries of the corridor.

The datasets were obtained for a three-year analysis period from the beginning of January 2016 through the end of December 2018 for vehicle-vehicle crash incidents and from the beginning of January 2014 through the end of December 2018 for vehicle-pedestrian/cyclist crash incidents. According to the compiled crash data, 35 crashes occurred on the 0.67-mile segment analysis area during the analysis period. The following evaluation breaks down crash attributes as a percentage of the total crashes to achieve a stronger understanding of the localized trends compared to County roadway systems crash performance. Furthermore, all crashes along this segment were mapped onto collision diagrams, which can be found in **Appendix D**, providing a quick spatial overview of crash clustering patterns.

In reviewing the crash data, crash clusters and prevailing safety issues were mainly noted at the intersection with Amwell Road (CR 514) as follows:

- Clustering of rear end collisions on the NB, EB, and WB approaches to the intersection
- Struck fixed objects on the NW and SE corners of the intersection
- Two animal crashes occurring just south of the intersection

#### A. Temporal Trends

Sorting the crashes by month reveals that the study segment experienced the greatest crash frequency from January through February. The Spring/Summer months from April through September show lower frequencies. During the five (5) months of January, February, May, August, and October, the corridor experienced higher crash frequencies than the County-wide average. Notably, August experienced a higher share of crashes than the County-wide average (7.5 percent vs. 20.0 percent), as shown highlighted in yellow in **Figure 4**.

**Figure 5** highlights the crash percent distributions by day of the week. Corridor data shows crash frequencies were higher than the County average for five (5) days of the week. Sundays, highlighted in yellow in **Figure 5**, have a 14.3 percent corridor frequency rate compared to only 8.5 percent at the County-wide level, a 77 percent increase, perhaps related to weekend recreational travel. Mornings, between 7:00 AM and 9:00 AM, reveal higher crash frequencies than the County-wide average, as shown highlighted in yellow in **Figure 6**. More specifically, the 7:00 AM and 9:00 AM hours have crash frequencies more than double the County-wide.

<sup>10</sup> <https://www.njvoyager.org/App/>

<sup>11</sup> <https://www.numetric.com/>

<sup>12</sup> <https://www.state.nj.us/transportation/refdata/accident/rawdata01-current.shtm>

Figure 4 – Vehicular Crashes, Percent Distribution by Month

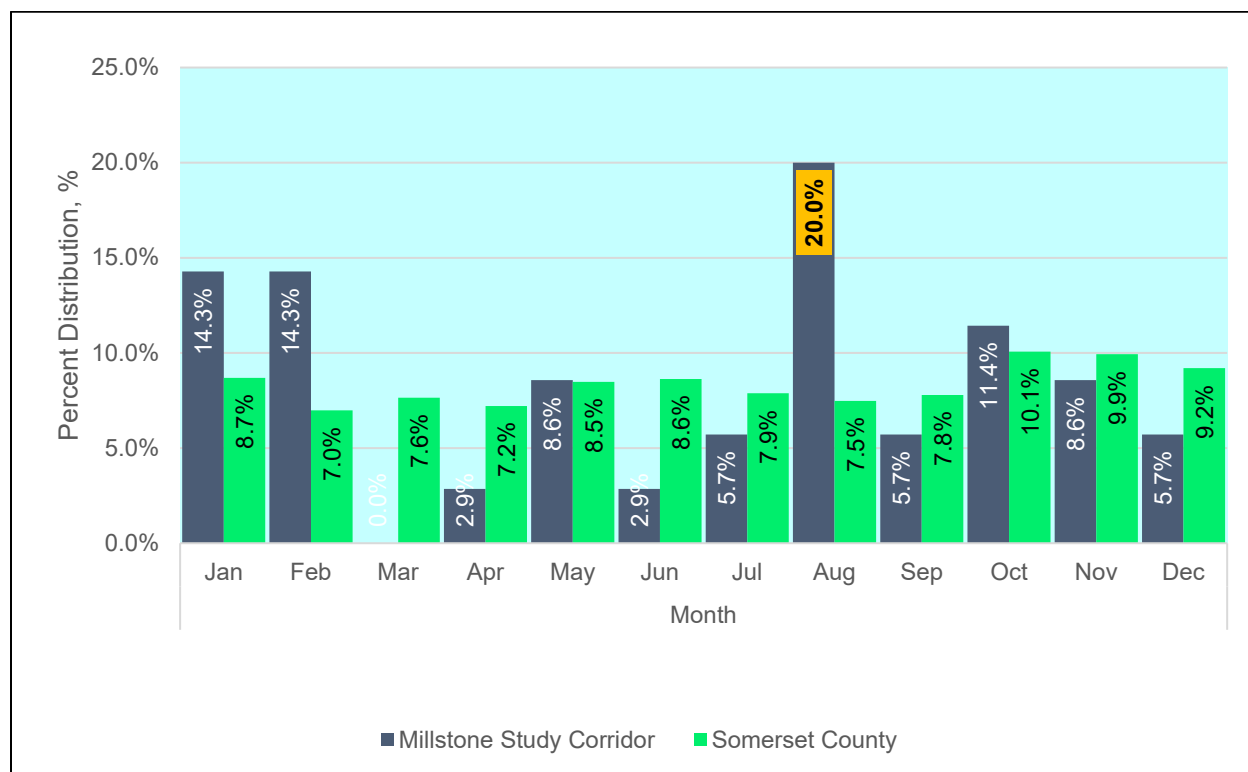


Figure 5 – Vehicular Crashes, Percent Distribution by Day

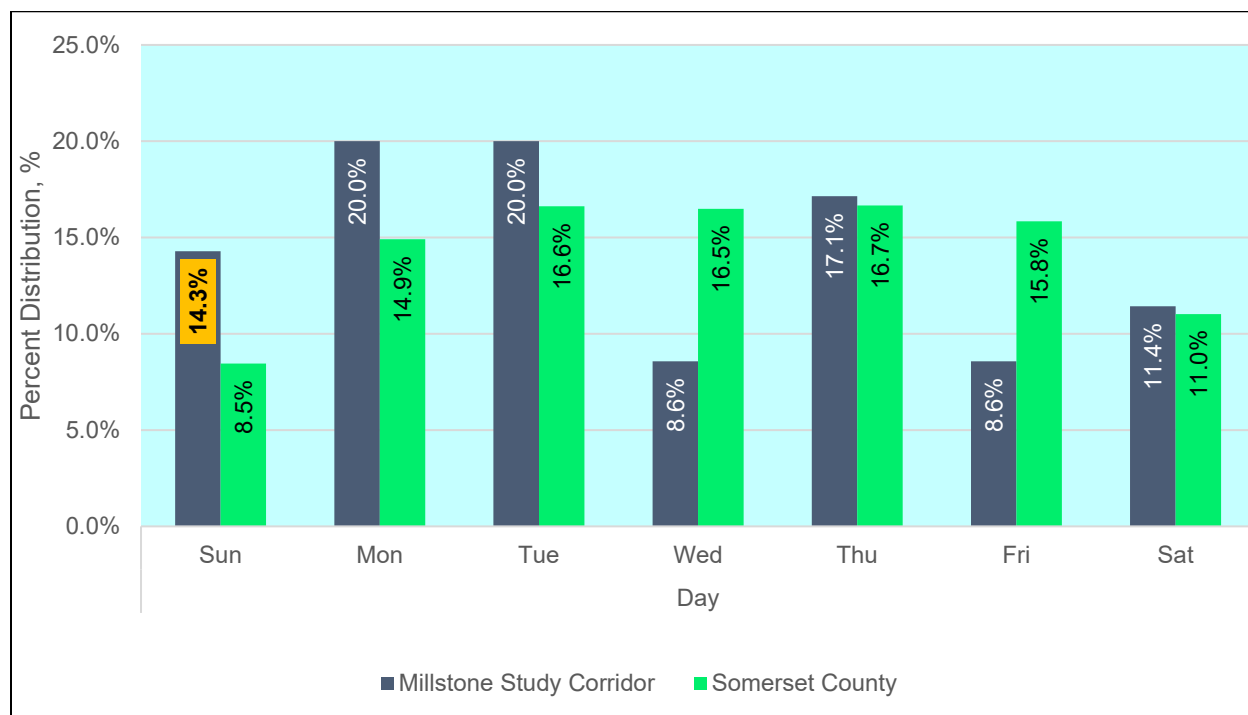
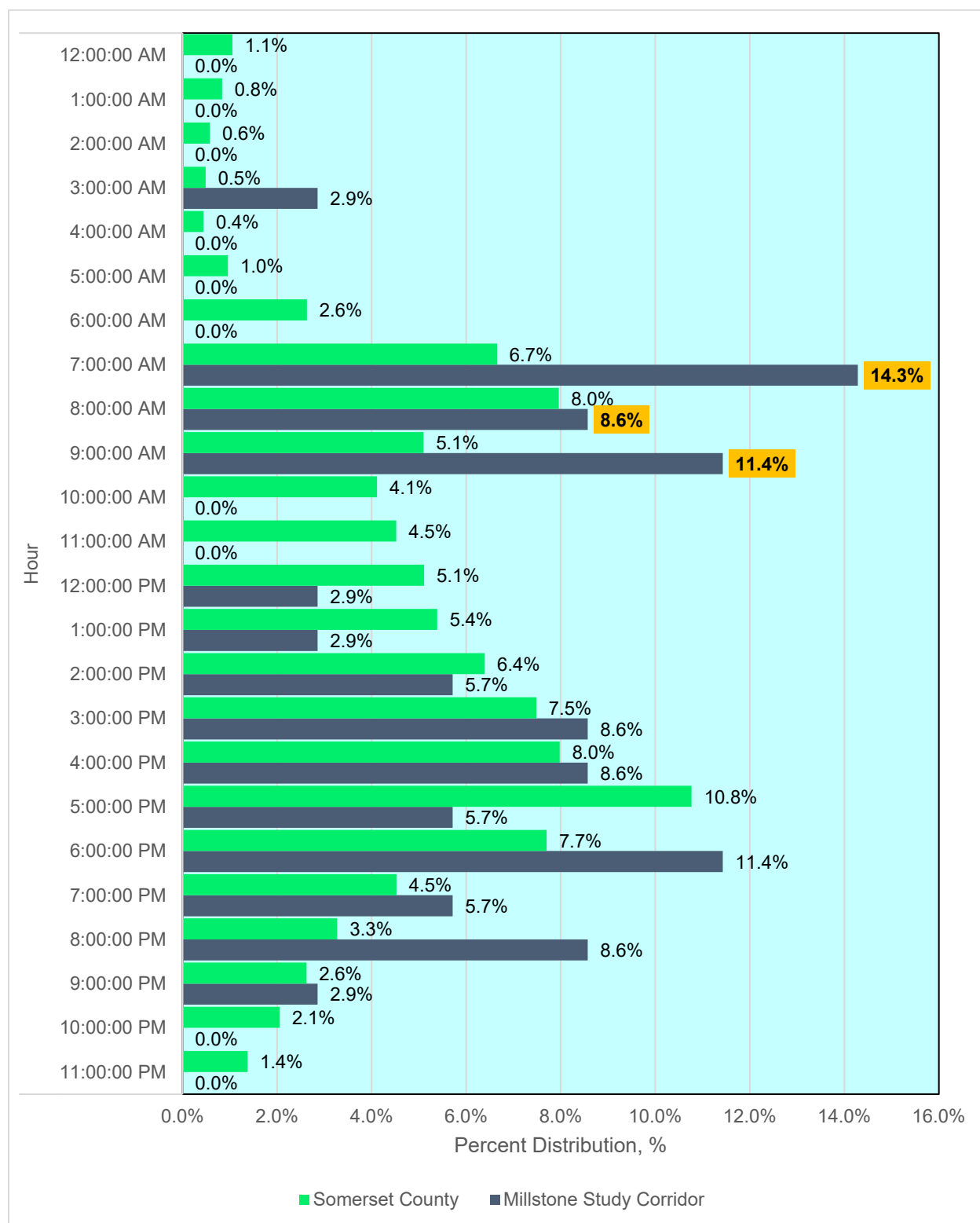


Figure 6 – Vehicular Crashes, Percent Distribution by Hour



### B. Collision Types

Seventeen rear end crashes make up approximately 49 percent of the crash distribution along the study segment, shown highlighted in yellow in **Figure 7**. Most rear end crashes are occurring at the intersection of Main Street and Amwell Road. These crashes can possibly be attributed to congestion approaching the signal or glare issues. Rear end crashes on the corridor occur approximately 11 percent more frequently than County-wide rear end crashes. The frequency of fixed object crashes is higher on the corridor than the County, representing 14.3 percent of crashes (highlighted in yellow in **Figure 7**). Number of crashes by type are shown in **Table 4**.

Figure 7 – Vehicular Crashes, Percent Distribution by Crash Type

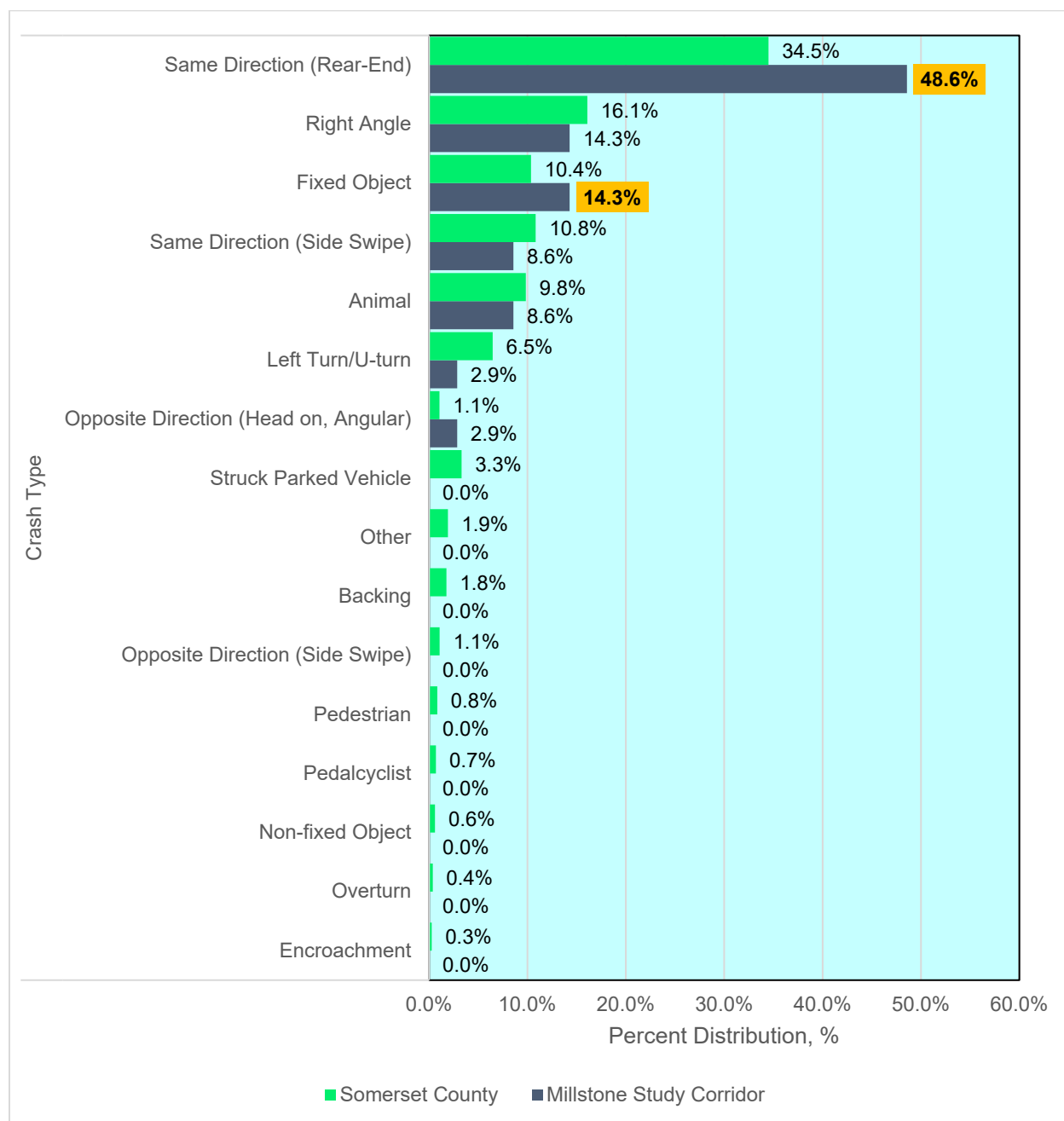




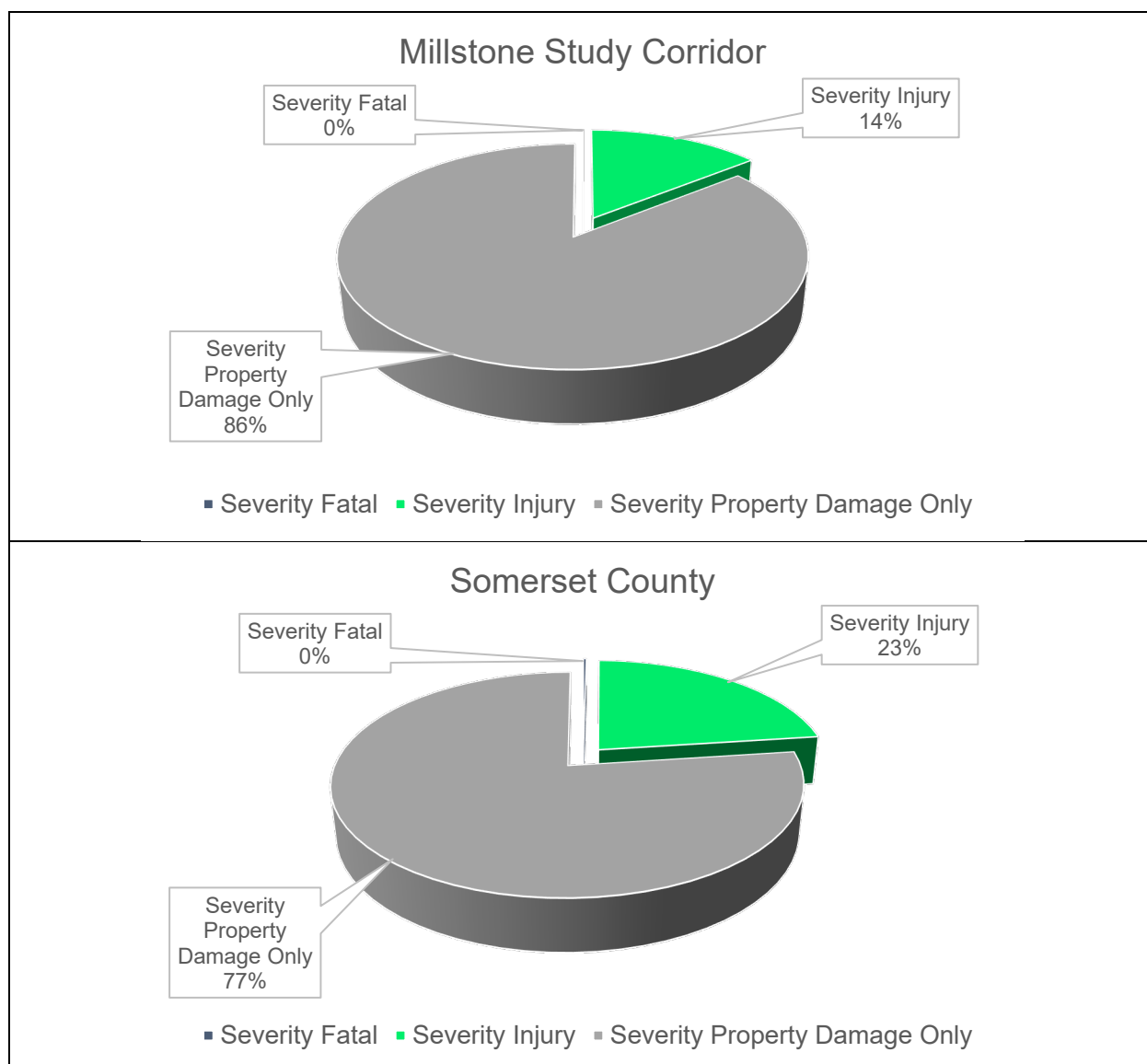
Table 4 – Vehicular Crashes by Type

Crash Type	Total
Animal	3
Fixed Object	5
Left Turn/U-turn	1
Opposite Direction (Head on, Angular)	1
Right Angle	5
Same Direction (Rear-End)	17
Same Direction (Side Swipe)	3
<b>Total</b>	<b>35</b>

### C. Crash Severity

Data in **Figure 8** shows a slight decrease in crashes resulting in injuries rather than property damage only when compared to the County. The analysis period saw no fatalities along the selected roadway segment.

Figure 8 – Vehicular Crashes, Percent Distribution by Severity



#### D. Roadway Surface & Light Condition

Crashes occurred more frequently during wet and dry driving conditions on the study corridor than County-wide. Wet road-related crashes are the second most overrepresented roadway surface condition during crashes at 17.2 percent, which is approximately 1 percent more frequent than the County-wide average at 16.1 percent (highlighted in yellow in **Figure 9**).

Figure 9 – Vehicular Crashes, Percent Distribution by Surface Condition

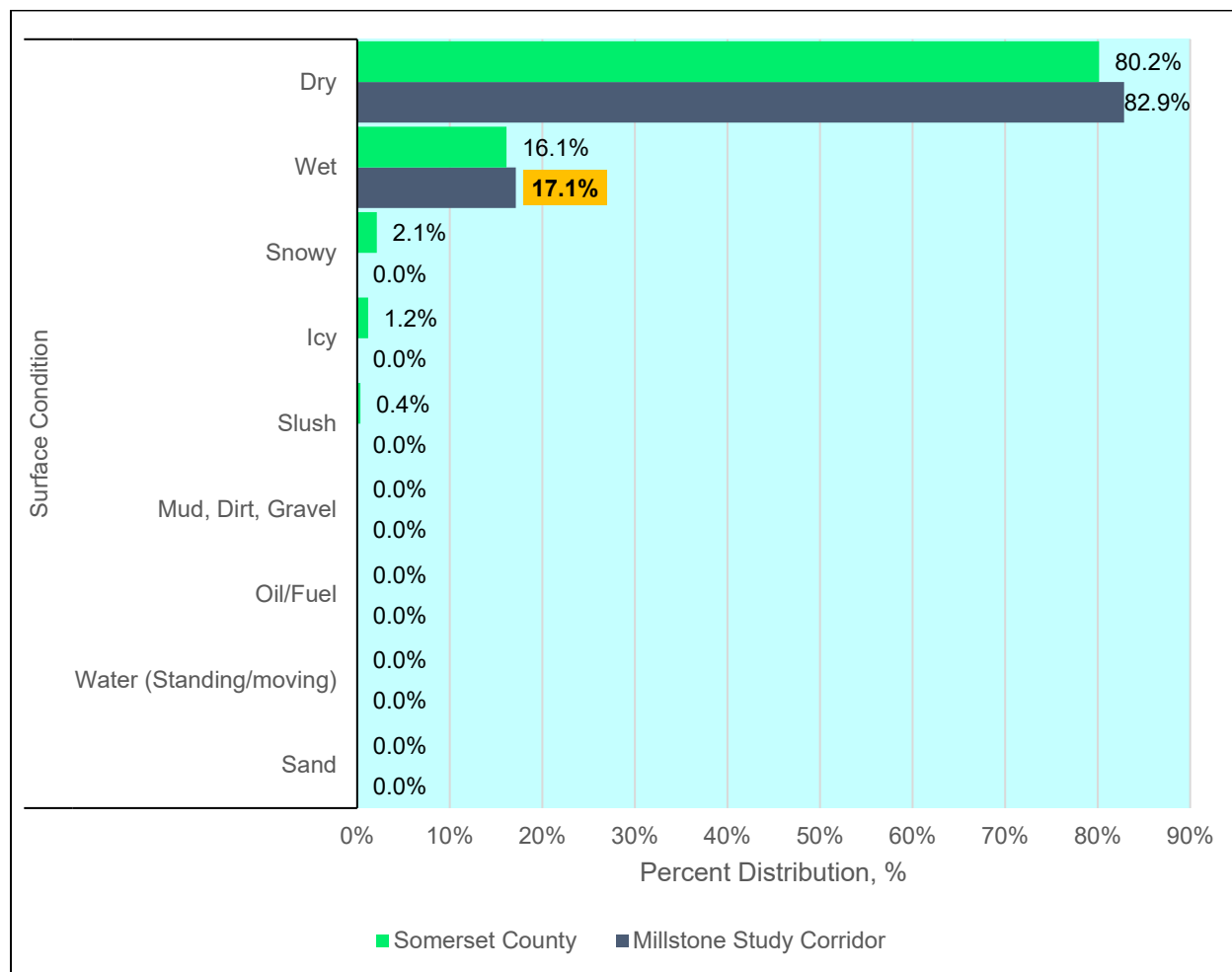
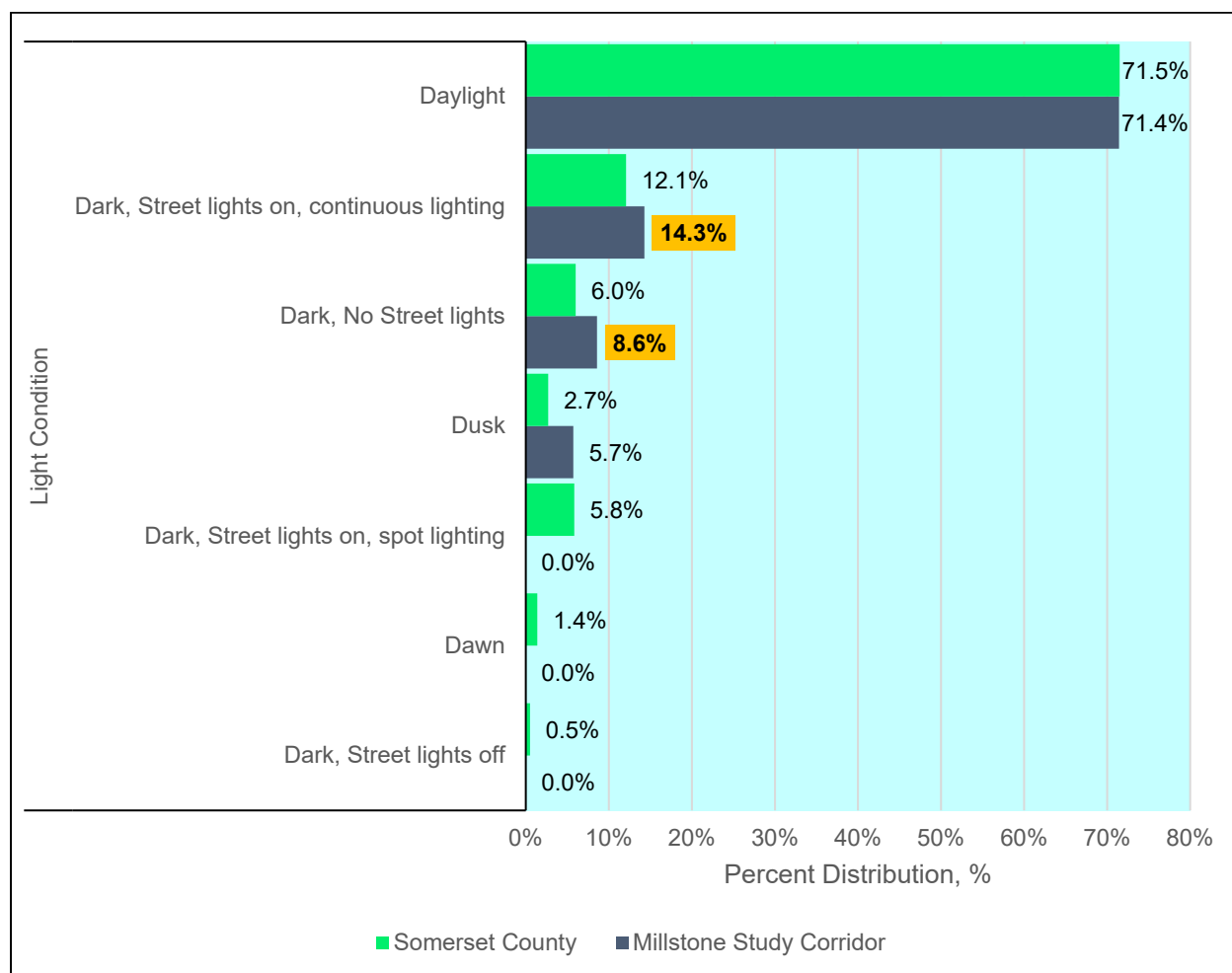


Figure 10 – Vehicular Crashes, Percent Distribution by Light Condition

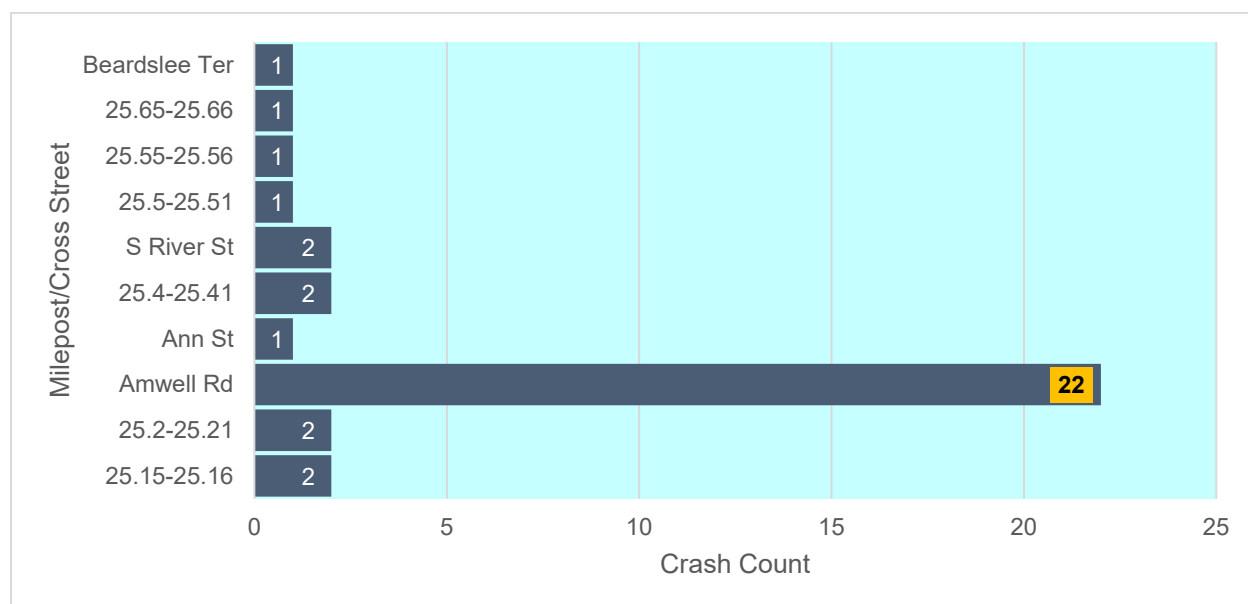
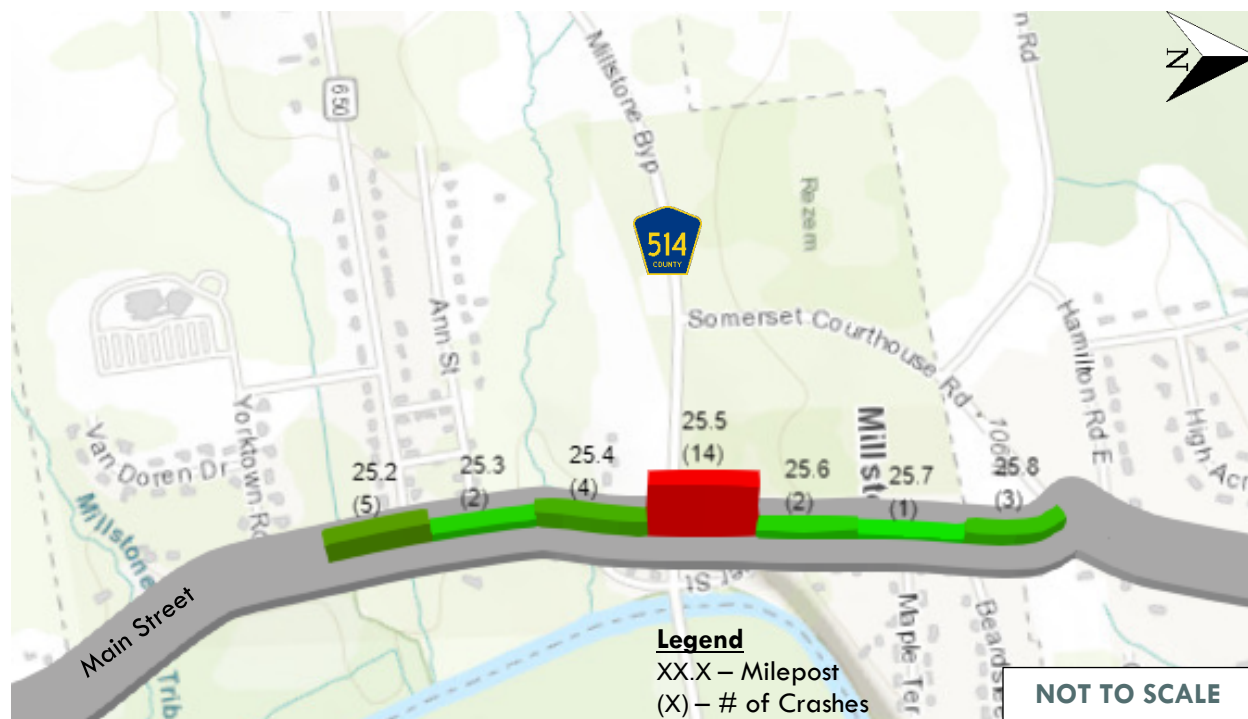


Approximately 71.4 percent of crashes on the study segment occurred during daylight conditions, similar to the County-wide average of 71.5 percent. Crashes occurring during “Dark, Street lights on, continuous lighting” and “Dark, No Street lights” are higher than the County averages (highlighted in yellow in **Figure 10**). Dusk crashes were also over twice the share of County-wide crashes, suggest an issue with sun glare for vehicles on the westbound and eastbound Amwell Road (CR 514) approaches to Main Street.

#### E. Location

Crash visualization using the histogram, grouped in 0.01-mile segments indicates that the signalized intersection of Amwell Road (CR 514), highlighted in yellow, experienced the highest occurrence rate of crashes along the study segment corridor (**Figure 11**). These crashes at this location account for 63 percent of all crashes. A three-dimensional representation of this crash histogram for the 2016 through 2020 timeframe, imposed onto a map of the study area, is shown on **Figure 12**.

Figure 11 – Vehicular Crash Totals by Milepost

Figure 12 – Visual Estimation of 5-Year (2016 - 2020) Crash History Obtained from Safety Voyager <sup>13</sup>

<sup>13</sup> Five-year crash totals shown on histogram from Safety Voyager may vary from crash report data obtained from municipality's police department and do not include crashes recorded as occurring on side street approaches, which are included in the record of analyzed collected crash data.

### F. Age of Those Involved

Driver-, occupant-, and pedestrian-involved data was also accessible from the NJDOT crash tables. A normal distribution table was developed (**Figure 13**) utilizing the age data provided by NJDOT. Amongst the twenty-eight crashes reported, the average person(s) involved age was determined to be approximately 39 years old. Approximately 68 percent of person(s) involved were between the ages of 24 and 54 years old. **Table 5** outlines the percent distribution of the age(s) of those involved in the vehicular crashes, grouped by ten years of age. Data from the table indicates that crashes with drivers between the ages of 46- and 55-years old account for the highest frequency of those involved at 26.3 percent, 10 percent more than the County average of 16.7 percent for the same age group.

Figure 13 – Histogram of Age(s) Involved

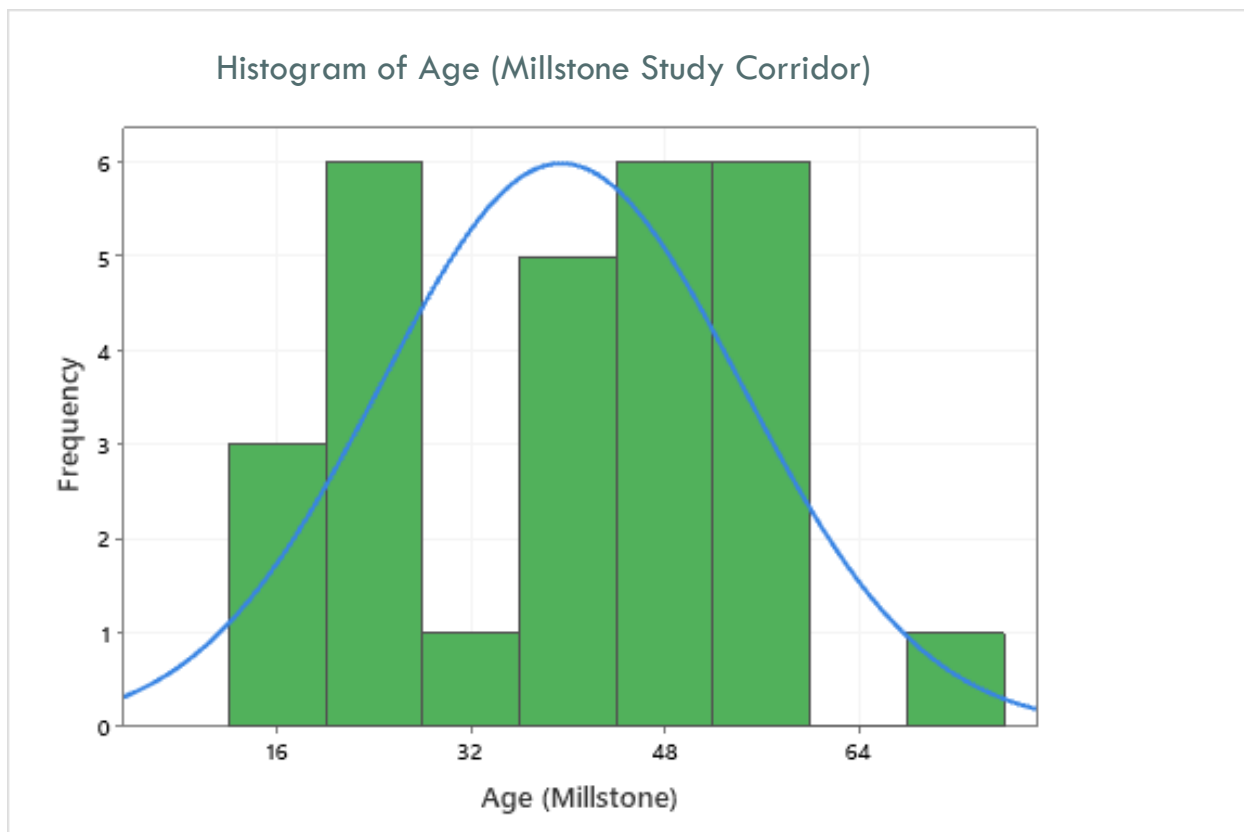


Table 5 – Age(s) Involved, percent distribution

Age Involved	Millstone Borough Study Corridor	Somerset County
Under 16	5.3%	7.9%
16-25	26.3%	23.1%
26-35	10.5%	16.9%
36-45	18.4%	15.8%
46-55	26.3%	16.7%
56-65	7.9%	11.3%
66-75	5.3%	5.1%
76-85	0.0%	2.5%
86-95	0.0%	0.7%
96-105	0.0%	0.0%
106-116	0.0%	0.0%

## IV. RSA Logistics

All data previously discussed in this report was used to inform the RSA conducted on this corridor. All participants involved in this RSA, whether in attendance during the pre-audit meeting, in-field review, and/or post-audit meeting, are listed in **Appendix E**. The pre-audit meeting was held at 10:00 AM via video conferencing on Tuesday, March 23<sup>rd</sup>, 2021, on the morning of the in-field review meeting to introduce the audit team, cover the activities to complete the RSA, define the RSA process, cover existing conditions data, present safety measures under consideration, summarize crash data collected for the corridor, and go over ground rules for conducting the in-field portion of the audit safely. The PowerPoint used to facilitate this discussion is provided in **Appendix F**.

The in-field component of the RSA was conducted at 2:00 PM on the same day as the pre-audit meeting. The audit team met in a social-distanced manner, while masked, in the parking lot of the Millstone Borough Hall for a flipbook RSA orientation presentation to reiterate the ground rules of the audit. Upon conclusion of the orientation, participants were paired off with each other to walk halves of the corridor, seeking to pair each Somerset County Roadway Safety Study project team member (whether with the County or Consultant team) with each of the stakeholders. Utilizing aerial mapping, prompt lists, photography, and video, participants recorded their observations of the corridor, as well as potential safety measures to address potential safety concerns. After walking the corridor, the RSA team met back in the parking lot to share overall thoughts on the corridor and fill out a survey on corridor identity, crossings, pedestrian-vehicle interactions, sidewalk and roadway conditions, and streetscape amenities, the answers of which were compiled and are averaged in **Appendix G**. Based on survey results, the corridor had the following perceived concerns:

- Overall pedestrian-vehicle interactions, particularly due to vehicle speed and noise level;
- Presence of trucks or large vehicles

On the following day (Wednesday, March 24<sup>th</sup>, 2021), the RSA team reconvened via video conferencing to view photos gathered during the in-field audit, some of which are presented in the following section, to discuss each observation, elaborate on potential ideas to mitigate, cover questions on travel pertaining to the overall corridor, and summarize next steps for this study. This discussion helped to form the basis of the Implementation Matrix in the **Identified Issues & Observations** section of this report. The PowerPoint used to facilitate this discussion is provided in **Appendix H**.



## V. Identified Issues & Observations

This section depicts a sampling of overall issues identified during the RSA. Please refer to the Implementation Matrix in the following section of the report for a comprehensive list of identified corridor issues.

Pedestrian & Cyclist	Pedestrian & Cyclist
	
<p>Intersection of Amwell Road and Main Street need ADA-compliance upgrade</p>	<p>Drainage grates should be replaced with bicycle-safe drainage grates</p>
	
<p>Wheelchair access point is overlooked due to faded signing and striping near Ann Street</p>	<p>Main Street lacks space to accommodate bike lanes. Therefore, cyclists share vehicle roadspace</p>
	
<p>Main Street north of Amwell road lacks sidewalk and safe pedestrian access. Roadway edge also has severe drop-offs</p>	<p>Sidewalk lacks continuity.</p>



Operations & Visibility	Maintenance
	
<p>Branches obstructing signage along Main Street</p>	<p>Brick paver sidewalks are in need of reset and repair</p>
	
<p>Yorktown Road lacks stop bar. Sight distance of vehicles heading Main Street NB can cause issues</p>	<p>Sidewalks along Main Street lacking maintenance and filled with debris</p>
	
<p>Older signals at Amwell and Main Street lacking countdown pedestrian countdown.</p>	<p>Old signage that requires removal or bagging to avoid motorists' confusion</p>



## VI. Findings & Recommendations

This section summarizes the site-specific and corridor-wide safety issues, potential strategies, and recommendations to improve safety. An Implementation Matrix is provided that summarizes the recommendations and provides qualitative information on time frame, cost, and responsible jurisdiction. Please note that recommendations cited in the Implementation Matrix are to reflect feedback received during the RSA process and are meant to be a record of ideas discussed. Symbols used in the Implementation Matrix are defined in **Table 6** as follows:

Table 6 – Legend of Symbols in Implementation Matrix

Symbol	Meaning	Definition
\$	Low cost	Could be accomplished through maintenance
\$\$	Medium cost	May require some engineering or design and funding may be readily available
\$\$\$	High cost	Longer term; may require full engineering, ROW acquisition, and new funding
🕒	Short term	Could be accomplished within 1 year
🕒🕒	Medium term	Could be accomplished in 1 to 3 years; may require some engineering
🕒🕒🕒	Long term	Could be accomplished in 3 years or more; may require full engineering

### A. Implementation Matrix

The following represents the specific findings and recommendations made by the interdisciplinary RSA team, which were subsequently evaluated via discussions with County Engineering on Wednesday, June 2<sup>nd</sup>, 2021, and Thursday, June 3<sup>rd</sup>, 2021. As these recommendations are considered for advancement into either a CD study, or incorporation into an overlapping County or municipal project, the recommendations herein should be thoroughly evaluated for feasibility and practicability and designed as appropriate by the roadway owner and/or a professional engineer for conformance to all applicable codes, standards, and best practices. Corridor-wide recommendations, requiring a review of all important applicable infrastructure along the corridor pertinent to these specific topics, are provided in **Table 7**. Further defined recommendations at specific intersection or mid-block locations are provided in **Table 8**. **Recommendations bolded within the Implementation Matrix below feature one of the twenty Proven Safety Countermeasures from the FHWA, which means that the recommendation is shown to have a significant safety benefit as proven by substantial traffic safety research.** These recommendations are tied to Crash Modification Factors (CMFs) showing a substantial reduction in crashes, as well as research documented on the Crash Modification Factor Clearinghouse website that has a high-quality ranking. This high ranking indicates the quality of study design, sample size, statistical methodology, statistical significance, etc. for the research backing each CMF. Mapping of proposed location-specific recommendations is provided in **Appendix I**.

Table 7 – Corridor-Wide Recommendations

No.	Recommendation	Cost	Time Frame	Jurisdiction
<b>Bicycle</b>				
<b>1</b>	Evaluate if existing inlets need bicycle-safe grates and replace as necessary.	\$	🕒🕒	County
<b>Education</b>				
<b>2</b>	Consider sidewalk, crosswalk, multimodal education campaign and code enforcement.	\$	🕒	Municipality
<b>3</b>	Improve wayfinding and signage for historic sites to reduce time vehicles circulate to find destinations.	\$\$	🕒🕒	County

No.	Recommendation	Cost	Time Frame	Jurisdiction
<b>Maintenance</b>				
4	Perform maintenance to clear overgrowth and debris on sidewalks and curb ramps.	\$	🕒	Municipality
5	Coordinate with utility company to schedule regular street light bulb replacement.	\$	🕒	Municipality
<b>Operations</b>				
6	Perform a speed study along the corridor to determine the specific segments experiencing excessive speeds to recommend targeted traffic calming strategies. Also, investigate signed truck routes directing traffic away from the Borough to further calm traffic along Main Street (to be further investigated as part of the Somerset County Master Plan Circulation Element).	\$	🕒🕒	County
7	Stripe (or restripe) crosswalks and stop bars on side streets to connect pedestrian ROW.	\$	🕒	County/ Municipality
8	Develop Borough-wide TMP <sup>14</sup> for yard sale event that's held the first week of June. Should be issued as a technical memo by the Borough.	\$\$	🕒	Municipality
9	Investigate installing a low-cost "shoe" on paving equipment to extrude new pavement to create a gentler pavement edge slope at existing pavement drop-off locations to assist vehicles in recovering after running off the right side of the road.	\$	🕒🕒🕒	County
<b>Pedestrian</b>				
10	Conduct a sidewalk assessment to determine the extent of sidewalk that needs to be replaced, repaired, and constructed.	\$\$	🕒🕒	County/ Municipality
11	Perform curb ramp assessment to determine the number of curb ramps that need to be replaced, repaired, and constructed.	\$\$	🕒🕒	County/ Municipality
12	Investigate pedestrian-scale lighting options along the corridor.	\$\$	🕒	Municipality

Table 8 – Location-Specific Recommendations

No.	Recommendation	Cost	Time Frame	Jurisdiction
<b>KEY STUDY RECOMMENDATION – Amwell Road (CR 514) to N River Street</b>				
13	Acquire property off east side of Main Street and install missing sidewalk link on east side of roadway.	\$\$\$	🕒🕒🕒	Municipality
<b>Curve South of Yorktown Road</b>				
14	Install chevron (W1-8) signage with reflective strips on each post in both directions around curve.	\$	🕒🕒	County
15	Install raised pavement markers in both directions around curve.	\$	🕒🕒	County
16	Consider applying a high friction surface treatment to pavement around curve.	\$\$	🕒🕒	County
<b>Yorktown Road</b>				
17	Install W1-7 (double arrow) warning sign facing the Yorktown Road approach.	\$	🕒	Municipality
18	Stripe a stop bar across Yorktown Road.	\$	🕒	Municipality
19	Explore solutions to mitigate limited intersection sight distance issues.	\$	🕒	Municipality

<sup>14</sup> TMP is a document that details the way activities in the road corridor will be carried out, so they minimize inconvenience and help ensure road users and workers remain as safe as possible.

No.	Recommendation	Cost	Time Frame	Jurisdiction
20	Keep construction signage bagged when not in use and remove signs when project is complete.	\$	🕒	Municipality
<b>Amwell Road (CR 650)</b>				
21	Install second pedestrian crossing sign (W11-2) with diagonal downward-pointing arrow for crosswalk on left side of roadway.	\$	🕒	County
22	Consider striping or hardscaping curb extensions to shorten crosswalk.	\$	🕒🕒	County
23	Revise edge line striping to encompass parking on WB approach.	\$	🕒🕒	County
24	Consider connecting the shoulder lines via a tighter radii striped curve to convey a lower speed turning movement to the driver	\$	🕒🕒	County
25	Consider installing curb extensions with planting beds that can act as a receptacle of stormwater runoff flowing down the hill from Amwell Road (CR 650) to filter the water before discharged to the Millstone River.	\$\$\$	🕒🕒🕒	County/ Municipality
<b>Ann Street</b>				
26	Stripe stop bar across Ann Street approach.	\$	🕒	Municipality
27	Install W1-7 (double arrow) warning sign facing the Ann St approach.	\$	🕒	County
<b>Between Ann Street and S River Street</b>				
28	Prune tree to unobstruct speed limit sign in NB direction.	\$	🕒	County
<b>S River Street</b>				
29	Consider implementing turn restrictions to limit bypass traffic down this side street.	\$	🕒	Municipality
<b>Amwell Road (CR 514)</b>				
30	Conduct a traffic study to determine capacity issues, especially for NB left turn, and evaluate if they can be mitigated through signal retiming and rephasing, including lead lefts.	\$\$	🕒🕒	County
31	Install new push buttons and relocate those that are higher than 48" from ground level.	\$	🕒🕒	County
32	Install new countdown pedestrian signal heads.	\$	🕒🕒	County
33	Consider full signal replacement at this intersection as existing signal equipment has reached the end of its useful service life. Include FD/EMS pre-emption and backplates if possible.	\$\$\$	🕒🕒	County
34	Consider expanding parking lot on SW corner and relocating access to Amwell Road to encourage pedestrians to use crosswalk at signal to access businesses.	\$\$	🕒	County
35	<b>Coordinate with gas station property owner to improve site circulation, parking, and width and location of access driveways to provide safer interaction with intersection operations. Will need planning board application.</b>	\$\$	🕒🕒🕒	<b>Municipality</b>
36	Coordinate with gas station property owner to relocate gas station sign to eliminate sign clutter.	\$\$	🕒🕒🕒	Municipality
37	Perform photometric analysis to provide better lighting for pedestrians.	\$\$	🕒🕒	County/ Municipality
38	<b>Consider implementing LPIs for some or all crosswalks.</b>	\$	🕒🕒	<b>County</b>
39	Consider enacting No Turn on Red (NTOR) restrictions to mitigate the occurrence of right-hook pedestrian collisions.	\$	🕒🕒	County

No.	Recommendation	Cost	Time Frame	Jurisdiction
<b>Between N River Street and Amwell Road (CR 514)</b>				
40	Refresh edge line striping.	\$	☹☹	County
41	Consider high friction surface treatment on roadway for downhill (SB) direction.	\$\$	☹☹☹	County
42	<b>Investigate techniques to address significant pavement edge drop-off by targeting soil erosion in the NB direction, including FHWA Safety Edge treatment.</b>	\$\$	☹☹	<b>County</b>
<b>N River St</b>				
43	Stripe stop bar on side street approach.	\$	☹	Municipality
44	<b>Consider implementing turn restrictions and/or constructing speed humps to limit bypass traffic down this side street, including no right turn in the NB direction and no left turn in the SB direction.</b>	\$	☹	<b>Municipality</b>
<b>Maple Terrace</b>				
45	Relocate DEAD END sign (behind STOP sign) to separate signpost on right side of roadway.	\$	☹	County
46	Stripe stop bar across Maple Terrace approach.	\$	☹	Municipality
47	Install W1-7 (double arrow) warning sign facing the side street.	\$	☹	County
<b>Between Maple Terrace and Beardslee Road</b>				
48	Coordinate with utility companies to relocate two utility poles close to roadway.	\$	☹☹☹	County/ Municipality
49	Realign sidewalk to provide grass buffer.	\$\$\$	☹☹	Municipality
<b>Beardslee Road</b>				
50	Stripe a stop bar across Beardslee Road and relocate STOP sign to the stop bar.	\$	☹	Municipality
51	Evaluate intersection sight distance from Beardslee Road and determine if mitigation is required.	\$\$	☹	Municipality
52	Consider striping curb extensions to shorten crossing across Beardslee Road.	\$	☹	Municipality

### B. Road Owner Response

An essential final step of the RSA process is a response from the roadway owner, which provides accountability between the funding body and the participating jurisdiction who acknowledges the findings within the RSA and their planned steps to address concerns. In responding to the RSA's findings, the road owner, in this case the County, must weigh the safety benefits posed by the recommendations within this report against the available resources to implement such improvements to make an informed decision. Because the audit process generated a long and wide-ranging list of improvements, the road owner is expected to implement these recommended improvements as time and funds allow in coordination with other projects and priorities.

Somerset County delivered their response following the finalization of the findings and recommendations table (see **Appendix J**). However, while the County has overseen this RSA process, by no means should this report be considered as a commitment to address some or all concerns and implement some or all improvements listed within this report. All potential recommendations must be fully studied. It is acknowledged that some recommendations may not be feasible.

### C. Potential External Funding Sources Transportation Alternatives Program

The County and the Borough are encouraged to apply for funding through the Transportation Alternatives Set-Aside Program (TA Set-Aside) federal grant program, especially since the relatively low safety score ranking for the corridor segment and corridor intersections on the NSL may make application competitiveness “out-of-reach” to procure funding through the NJTPA’s Local Safety Program (<https://www.njtpa.org/lsp.aspx>). The purpose of the TA Set-Aside federal grant initiative is to support the construction of “non-traditional” surface transportation projects, which typically involves the designing of infrastructure for active modes such as pedestrians, cyclists, and other non-motorized forms of travel. Supported projects can also have elements that bolster the recreational, historic, cultural, or environmental assets of the project area. Grant funding for a given project can range from \$150,000 to \$1,000,000. The amount of funding is determined on a project-by-project basis with award of prior grant money, and successful execution of prior funded projects, playing a factor. The County would not be prohibited from applying for both Safe Routes to School and TA Set-Aside funding at the same time.

TA Set-Aside lists the following activities that are eligible for funding under its “Pedestrian/Bicycle Facilities” and “Community Improvement” categories:

- New/reconstructed sidewalks/curb ramps;
- Bike lane striping;
- Wide paved shoulders;
- Bike parking and bus racks;
- New or reconstructed off-road trails;
- Bike/pedestrian bridges and underpasses;
- Lighting;
- Historic sidewalk paving;
- Benches;
- Planting containers;
- Decorative walls; and,
- Walkways.

The recommendations within the Implementation Matrix touch on many of the prior elements listed. To best position itself to attain approval for funding, the applying jurisdiction, whether County or municipal, should pass a resolution of support showing the commitment of maintenance of the proposed complete streets elements. Furthermore, the applicant should have data supporting that the implementation of similar improvements elsewhere within its jurisdiction has resulted in the increase of non-motorized transportation, the stimulus of economic activity, and the improvement in quality of life. A handbook summarizing the process of applying for these funds can be found at NJDOT Local Aid website<sup>15</sup>.

#### *D. Demonstration Project*

Demonstration projects are where an example improvement is completed for a selected corridor with foresight to prepare for larger rollouts. The improvement(s) should highlight the concept and illustrate the benefits of RSAs and how RSAs may improve the overall level of safety for the road users. The selected demonstration projects should be of strategic importance, and which is representative of the general safety theme suggested for the selected corridor.

A potential demonstration project in this corridor could work to improve the pedestrian wayfinding. As a historic community with several noteworthy destinations, wayfinding could help visitors find these historic buildings. Moreover, historical information signage could help educate passersby about the Revolutionary War events in Millstone and build an even stronger sense of place. **(Figure 14).**

<sup>15</sup> <https://njdotlocalaidrc.com/perch/resources/Uploads/2020-ta-set-aside-handbook-8-12-20.pdf>



Figure 14 – Temporary Wayfinding Signing in Jersey City



### E. Visualization of Potential Safety Measures

Provided in this section of the report are visualizations of some of the larger reaching proposed safety measures on the corridor in the Implementation Matrix (**Table 7** and **Table 8**). Visualizations of these safety measures, along with accompanying descriptions on how these ideas seek to improve safety for vehicular, pedestrian, and cyclist travel, are adapted from the following publications:

- New Jersey Pedestrian and Bicycle Resource Center video library, 2021<sup>16</sup>
- Cross County Connection TMA video library, 2021<sup>17</sup>
- NJDOT Technology Transfer video library, 2021<sup>18</sup>
- NJDOT Safe Routes to School video library, 2021<sup>19</sup>
- 2017 State of New Jersey Complete Streets Design Guide, NJDOT, 2017
- Proven Safety Countermeasures, FHWA, 2017
- Small Town and Rural Multimodal Networks, FHWA, 2016
- Separated Bike Lane Planning and Design Guide, FHWA, 2015
- New Jersey School Zone Design Guide, NJDOT, 2014
- Urban Bikeway Design Guide 2<sup>nd</sup> Edition, National Association of City Transportation Officials, 2014
- Urban Street Design Guide, National Association of City Transportation Officials, 2012

### Key Study Recommendation – Closing Gap in Sidewalk Connectivity, N River to Amwell (CR 514)

The Borough is currently seeking to close the gap in sidewalk coverage between Amwell Road (CR 514) and North River Street through the redevelopment or acquisition of a vacant residential property located off the east side of Main Street. The Borough commented that State intervention would likely be needed to obtain property, or an easement, to construct this new sidewalk along the east side of Main Street to connect existing

<sup>16</sup> [https://www.youtube.com/channel/UCMsSU487ZPfaOAjcC7K8\\_SQ](https://www.youtube.com/channel/UCMsSU487ZPfaOAjcC7K8_SQ)

<sup>17</sup> <https://www.youtube.com/channel/UC5C0fODzuDqT9ycKMYv0C3Q>

<sup>18</sup> <https://www.youtube.com/channel/UC-L3YfzFHcuDw6al7wDrJQ>

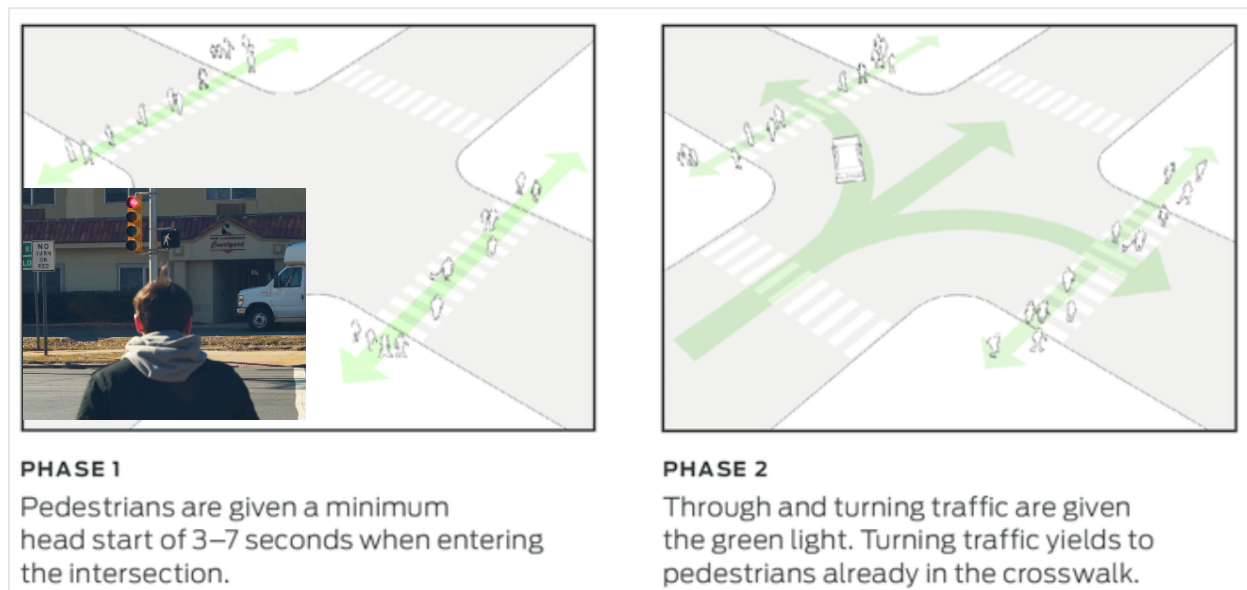
<sup>19</sup> <https://www.youtube.com/channel/UCjlvrrPjwNZ97MkX5IRol4ow>

sidewalk to the north and south. Currently, pedestrians either walk along the shoulder on Main Street, or utilize the sidewalks along North River Street and Amwell Road (CR 514) to make this connection.

### Leading Pedestrian Intervals (LPIs) & Signal Phasing at Amwell Road (CR 514) Intersection

LPIs are a low-cost, effective way to help pedestrians establish their presence at signalized crossing locations before conflicting vehicles have the right-of-way (**Figure 15**). This is one of FHWA's Proven Safety Countermeasures, boasting an approximate reduction of 13 percent<sup>20</sup> of pedestrian-vehicle crashes with proper implementation. Signal phasing and vehicular capacity are noted to be barriers to implementation. Currently, lead left phasing only allows LPI implementation on northern and western crosswalks.

Figure 15 – Leading Pedestrian Interval (from NACTO and Lakewood Township)<sup>21</sup>



By changing lead left to lag left phasing<sup>22</sup>, however, LPIs could be implemented for all crosswalks at the signalized intersection. However, lag left phasing may result in driver confusion and additional congestion. In addition to LPIs, No Turn on Red (NTOR) restrictions can be enacted at this intersection to mitigate the occurrence of right-hook pedestrian collisions. The County should perform a capacity analysis of the intersection to see if lag left phasing and LPIs could be accommodated within existing intersection capacity.

### Safety Edge, North of Amwell Road (CR 514) Intersection

During field observations, it was noted that both sides of Main Street on the section between Amwell Road (CR 514) and North River Street have abrupt pavement drop-offs due to stormwater runoff. These drop-off areas can result in severe run-off-road collisions where a vehicle's right set of tires can get caught in the rut created by the drop-off on the side of the road. When over-correcting to pull back onto the road, a driver may accelerate into the opposing lane of traffic, or off the other side of the road, resulting in high speed head-on or fixed object collisions. Although analyzed crash history has not substantiated the occurrence of such a crash, when re-paving Main Street, the County could investigate a low-cost "shoe" installed on paving equipment to extrude new pavement to create a gentler pavement edge slope at existing pavement drop-off locations to assist vehicles in recovering after running off the right side of the road (**Figure 16**).

<sup>20</sup> FHWA. (2017). Proven Safety Countermeasures. <https://safety.fhwa.dot.gov/provencountermeasures/>.

<sup>21</sup> Figure from National Association of City Transportation Officials. (2012). *Urban Street Design Guide*. Photo from NJDOT Technology Transfer. (2019). *What is an LPI?* YouTube. Civic Eye Collaborative. <https://www.youtube.com/watch?v=xk8hn7rdHds>.

<sup>22</sup> Left turn in one direction gets the green arrow before the opposing thru traffic gets the green ball, but the left turn in the other direction gets the green arrow afterwards.

*Figure 16 – Safety Edge Paving Example<sup>23</sup>***Speed Humps on River Street**

At the Township's discretion, either paved or raised speed humps could be installed on North and South River Street to discourage cut-through traffic looking to bypass brief periods of congestion at the Amwell Road (CR 514) intersection. Speed humps can be designed to slow an average vehicle's wheelbase width yet can also allow for bicyclists and larger emergency vehicles, such as firetrucks, to move along the street unimpeded (**Figure 17**).

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<sup>23</sup> From <https://www.forconstructionpros.com/asphalt/article/12143665/the-safety-edge-difference>.



Figure 17 – Sample Speed Humps from NACTO<sup>24</sup>

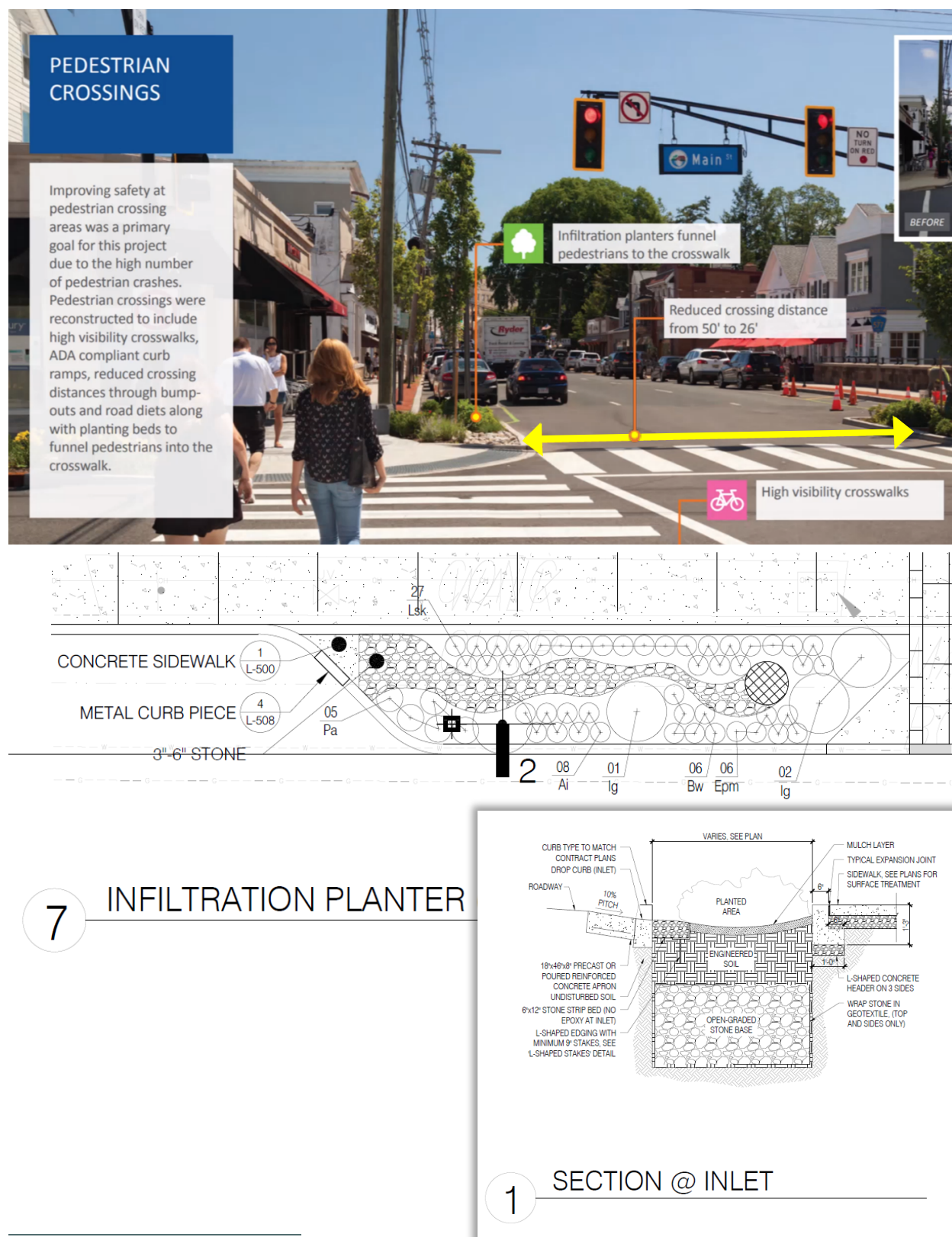
### Striping Modifications or Curb Extensions at Amwell Road (CR 650) Intersection

Before construction of the Amwell Road Bypass in the late 90's, CR 650 was the major east-west through route in the Borough serving both passenger car and heavy vehicle traffic. As such, the Amwell Road & Main Street intersection was designed to accommodate heavy vehicle movements. Today, however, this section of Amwell Road has been bypassed and primarily serves vehicles going to/from local residences. This intersection still accommodates large sweeping turning movements, particularly from southbound Main Street to westbound Amwell Road (CR 650) due to large curb radii and shoulders serving as parking areas. Cars can take advantage of these wide sweeping radii for high-speed turning movements. At this location, the County can implement traffic calming on the corners of this intersection, ranging from...

- Connecting the shoulder lines through the intersection between both roadways via a tighter radii striped curve to convey a lower speed turning movement to the driver; or,
- Constructing curb extensions on the northwest and southwest corners of the intersection to shorten crosswalk lengths and provide Green Stormwater Infrastructure (GSI) opportunities.

In addition to shortening crossing distances, curb extensions with planting beds can act as a receptacle of stormwater runoff flowing down the hill from Amwell Road (CR 650) to filter the water before discharged to the Millstone River. Details for a infiltration planter GSI treatment that could be done within a curb extension are included in **Figure 18** on the next page. It should be noted that such a feature would need to be maintained by the Borough. The County should coordinate with the Borough to determine if the needed resources are available to maintain any proposed GSI feature.

<sup>24</sup> Figure from National Association of City Transportation Officials. (2012). *Urban Street Design Guide*.

Figure 18 – Millburn Township Curb Extensions with Infiltration Planters, Details Included<sup>25</sup><sup>25</sup> NJDOT / FHWA. (2017). Millburn Township, 2017 CS. YouTube. Civic Eye Collaborative. <https://www.youtube.com/watch?v=XiRPx5YhwU>.

## VII. Conclusion

This RSA Report seeks to describe the process undertaken by the County to investigate potential traffic safety issues along the Main Street corridor, from the intersection with Yorktown Road at MP 25.14 to the municipal border with Hillsborough Township at the intersection with Beardslee Terrace at MP 25.81, located in Millstone Borough. From survey of prior County, municipal, or regional studies to public and stakeholder outreach conducted as part of this study to the crash data that was reviewed report-by-report to the observations made during in-field audits, potential concerns were observed and recorded, not only for corridor-wide issues, but for location-specific issues.

In order to address these potential concerns, discussions were held with the RSA team and County Engineering to develop a list of tasks to improve traffic safety on the corridor, which are codified in the Implementation Matrix (Chapter VI, Subsection A) in this report. To assist the responsible jurisdictions (whether municipal, County, or separate agency) to schedule and prioritize these improvements, such were classified by anticipated timeline and cost magnitude. It is encouraged that the improvement recommendations are shared with all responsible jurisdictions to increase the benefits to be seen from the recommendations in this report.

While the recommendations in the Implementation Matrix are centered around the engineering (and associated maintenance) of roadway features, changes to hard infrastructure alone will fall shy of the benefit that would be seen by implementing the 5E's of highway safety<sup>26</sup>:

- Engineering: highway design, traffic, maintenance, operations, and planning professionals;
- Enforcement: State and local law enforcement agencies;
- Education: communication professionals, educators, and citizen advocacy groups;
- Emergency response: first responders, paramedics, fire, and rescue; and,
- Equity: prioritizing the safety of vulnerable roadway users.

This approach recognizes a shared responsibility across numerous professions to see improved benefits in corridor crash performance, beyond the anticipated reduction in crashes with the implementation of proven crash countermeasures. RideWise (the County's TMA), law enforcement, and EMS are encouraged to continue their efforts in educating the local driving population, holding driving behaviors accountable to Title 39, improving the response times to severe crash incidents, and reaching underserved communities with these safety strategies.

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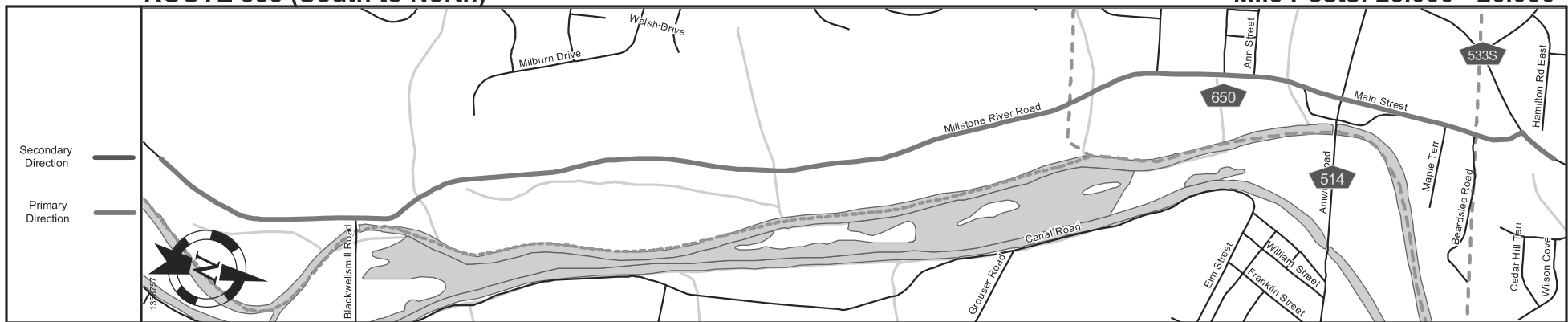
<sup>26</sup> Adapted from FHWA, [https://safety.fhwa.dot.gov/hsip/resources/fhwasa1102/flyr3\\_in.cfm](https://safety.fhwa.dot.gov/hsip/resources/fhwasa1102/flyr3_in.cfm)

# **Appendix A**

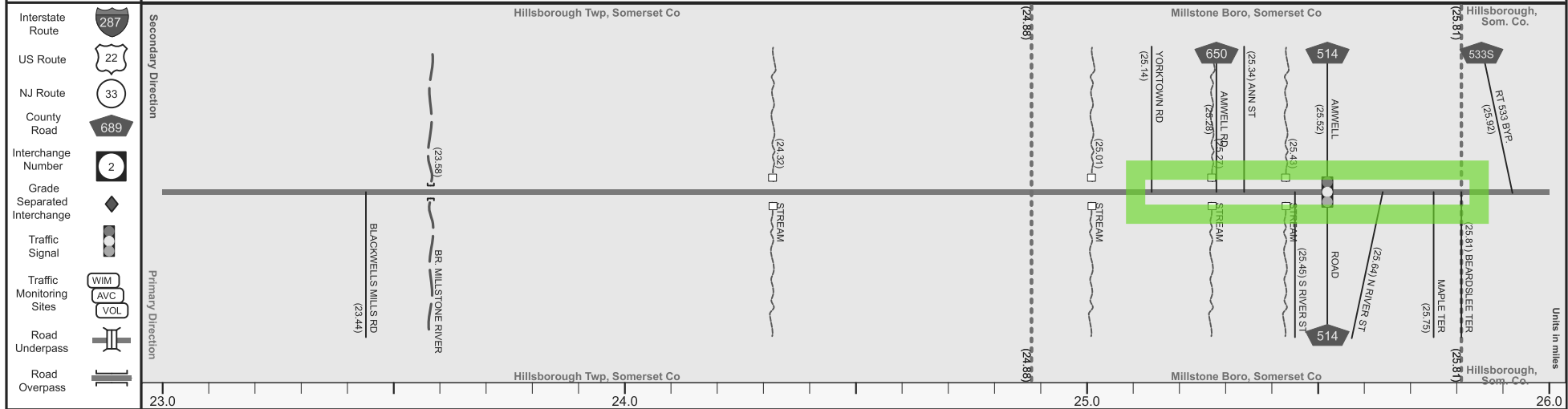
## **Straight Line Diagram**

# ROUTE 533 (South to North)

Mile Posts: 23.000 - 26.000



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	



Street Name	Millstone River Road				Main Street			
Jurisdiction	County							
Functional Class	Urban Major Collector						Urban Minor Arterial	
Federal Aid - NHS Sy	STP							
Control Section								
Speed Limit	45				35			
Number of Lanes	2							
Med. Type	None							
Med. Width	0							
Pavement	24							
Shoulder	1		2		4		6	
Traffic Volume	8,294 (2016)							
Traffic Sta. ID	91818							
Structure No.								
Enlarged Views								

SRI = 0000533\_\_

Date last inventoried: November 2012

# **Appendix B**

## **Traffic Data**



# New Jersey Department of Transportation

Short-term Hourly Traffic Volume for 08/14/2019 to 08/20/2019

Site names: 091818,Millstone River Road-25.02,00000533\_\_  
 County: SOMERSET  
 Funct Class: Urban Major Collector  
 Location: Between Blackswell Mills Road and Yorktown Road

Seasonal Factor Grp: rg3\_5U  
 Daily Factor Grp: rg3\_5U  
 Axle Factor Grp: rg3\_5U  
 Growth Factor Grp: rg3\_5U

	Sun, Aug 11, 2019			Mon, Aug 12, 2019			Tue, Aug 13, 2019			Wed, Aug 14, 2019			Thu, Aug 15, 2019			Fri, Aug 16, 2019			Sat, Aug 17, 2019		
	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S
00:00										39	20	19	29	18	11	41	16	25	65	22	43
01:00										12	6	6	15	6	9	20	11	9	34	18	16
02:00										9	4	5	8	2	6	12	7	5	28	16	12
03:00										16	6	10	12	6	6	16	7	9	8	4	4
04:00										26	16	10	23	11	12	22	11	11	24	9	15
05:00										104	58	46	118	66	52	130	69	61	46	24	22
06:00										375	204	171	360	202	158	326	174	152	122	70	52
07:00										778	477	301	790	476	314	687	391	296	181	103	78
08:00										781	447	334	851	491	360	663	380	283	270	151	119
09:00										543	340	203	565	346	219	492	285	207	346	174	172
10:00										358	187	171	395	229	166	416	227	189	363	187	176
11:00										354	194	160	370	195	175	382	214	168	362	204	158
12:00										394	201	193	400	193	207	414	201	213	376	201	175
13:00										392	208	184	424	224	200	439	203	236	425	206	219
14:00										445	213	232	477	246	231	513	272	241	403	220	183
15:00										607	275	332	580	283	297	632	310	322	400	201	199
16:00										934	414	520	853	406	447	819	409	410	404	205	199
17:00										1,038	407	631	938	391	547	797	334	463	405	205	200
18:00										680	256	424	721	317	404	580	266	314	358	184	174
19:00										393	172	221	386	171	215	334	176	158	280	143	137
20:00										274	115	159	266	113	153	275	131	144	257	112	145
21:00										184	81	103	210	76	134	209	99	110	186	87	99
22:00										102	54	48	132	53	79	154	77	77	166	86	80
23:00										61	24	37	67	34	33	119	60	59	113	54	59
Total										8,899	4,379	4,520	8,990	4,555	4,435	8,492	4,330	4,162	5,622	2,886	2,736
AM Peak Vol										781	477	334	851	491	360	687	391	296	363	204	176
AM Peak Fct										1	1	1	1	1	1	1	1	1	1	1	1
AM Peak Hr										8: 00	7: 00	8: 00	8: 00	8: 00	8: 00	7: 00	7: 00	7: 00	10: 00	11: 00	10: 00
PM Peak Vol										1,038	414	631	938	406	547	819	409	463	425	220	219
PM Peak Fct										1	1	1	1	1	1	1	1	1	1	1	1
PM Peak Hr										17: 00	16: 00	17: 00	17: 00	16: 00	17: 00	16: 00	16: 00	17: 00	13: 00	14: 00	13: 00
Seasonal Fct										1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018
Daily Fct										.904	.904	.904	.896	.896	.896	.925	.925	.925	1.227	1.227	1.227
Axle Fct										.495	.495	.495	.495	.495	.495	.495	.495	.495	.495	.495	.495
Pulse Fct										2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000

# New Jersey Department of Transportation

Short-term Hourly Traffic Volume for 08/14/2019 to 08/20/2019

Site names: 091818,Millstone River Road-25.02,00000533\_\_  
 County: SOMERSET  
 Funct Class: Urban Major Collector  
 Location: Between Blackswell Mills Road and Yorktown Road

Seasonal Factor Grp: rg3\_5U  
 Daily Factor Grp: rg3\_5U  
 Axle Factor Grp: rg3\_5U  
 Growth Factor Grp: rg3\_5U

	Sun, Aug 18, 2019			Mon, Aug 19, 2019			Tue, Aug 20, 2019			Wed, Aug 21, 2019			Thu, Aug 22, 2019			Fri, Aug 23, 2019			Sat, Aug 24, 2019		
	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S
00:00	42	18	24	34	14	20	24	17	7												
01:00	36	21	15	14	5	9	7	0	7												
02:00	26	12	14	5	2	3	5	4	1												
03:00	22	11	11	10	6	4	6	2	4												
04:00	12	7	5	24	12	12	29	15	14												
05:00	39	20	19	101	52	49	104	50	54												
06:00	78	46	32	373	216	157	364	208	156												
07:00	107	55	52	753	435	318	780	444	336												
08:00	197	109	88	752	444	308	791	463	328												
09:00	250	146	104	457	262	195	435	231	204												
10:00	320	154	166	262	99	163	238	89	149												
11:00	356	200	156	288	110	178	234	108	126												
12:00	433	205	228	266	93	173	282	102	180												
13:00	327	152	175	289	99	190	297	100	197												
14:00	367	196	171	405	170	235	325	107	218												
15:00	354	159	195	490	237	253	535	234	301												
16:00	299	160	139	752	353	399	846	404	442												
17:00	369	196	173	960	390	570	969	386	583												
18:00	304	153	151	608	242	366	691	280	411												
19:00	284	136	148	359	163	196	355	160	195												
20:00	193	102	91	206	93	113	251	115	136												
21:00	111	61	50	128	58	70	151	73	78												
22:00	82	41	41	96	47	49	105	59	46												
23:00	56	27	29	65	26	39	59	32	27												
Total	4,664	2,387	2,277	7,697	3,628	4,069	7,883	3,683	4,200												
AM Peak Vol	356	200	166	753	444	318	791	463	336												
AM Peak Fct	1	1	1	1	1	1	1	1	1												
AM Peak Hr	11: 00	11: 00	10: 00	7: 00	8: 00	7: 00	8: 00	8: 00	7: 00												
PM Peak Vol	433	205	228	960	390	570	969	404	583												
PM Peak Fct	1	1	1	1	1	1	1	1	1												
PM Peak Hr	12: 00	12: 00	12: 00	17: 00	17: 00	17: 00	17: 00	16: 00	17: 00												
Seasonal Fct	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018	1.018												
Daily Fct	1.500	1.500	1.500	.964	.964	.964	.915	.915	.915												
Axle Fct	.495	.495	.495	.495	.495	.495	.495	.495	.495												
Pulse Fct	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000												

# **Appendix C**

## **Excerpts from Prior Studies**

- Install pedestrian-scale lighting, extending the existing pedestrian scale lighting near the Tea Street intersection and farther east on the Main Street segment of CR 533. Lighting could be installed either on existing utility poles or as freestanding fixtures. If the latter option is pursued, attachments for planters would add opportunities to incorporate seasonal vegetation
- Integrate public access, seating, and other streetscape amenities into any future green infrastructure improvements along Talmadge Avenue between Tea Street and La Monte Avenue
- Introduce new street trees along Talmadge Avenue to enhance the streetscape
- Identify opportunities to incorporate green spaces and green infrastructure on the westbound side of Talmadge Avenue, east of Tea Street
- Investigate wayfinding and directional signing elements at key approaches and decision points from the west to divert regional and heavy truck traffic to more appropriate routes
- Investigate additional street design elements to discourage through travel by heavy trucks

## Main Street Pedestrian Improvements

Several strategies seek to improve pedestrian access and linkages between Bound Brook and South Bound Brook.

- Investigate installation of a speed table on Main Street at the intersection of Van Horne Plaza and Hamilton Street, improving pedestrian connectivity to the train station and calming traffic
- Investigate addition of a mid-block crossing of Main Street (CR 527) at Railroad Avenue, including continental striping and a rectangular rapid flashing beacon (RRFB) to improve visibility. The crossing would:
  - » Provide a more direct connection between the self-storage property and the Meridian Apartments, whose residents utilize the site for parking. Pedestrians traveling between the two locations are currently required to make three crossings around the Main Street/Bolmer Boulevard roundabout
- » Link the self-storage site (future Borough kayak/canoe storage area) to the historic stone bridge site and future kayak/canoe put-in area under the Queen's Bridge
- Collaborate with South Bound Brook Borough, Somerset County, NJDOT, the D&R Canal Commission, and other stakeholders to advance pedestrian improvements on the historic Queens Bridge and surrounding paths, better linking the downtowns of Bound Brook and South Bound Brook. Improvements include:
  - » New pedestrian path on the Canal Bridge
  - » New pedestrian lighting along the D&R Canal Towpath
  - » New historic signage and wayfinding
  - » Restoration of the historic Canal Bridge swing mechanism
  - » Pedestrian-activated rectangular rapid flashing (RRFB) beacon where the D&R Canal Towpath traverses Queens Bridge

Improvement	Order of Magnitude Cost (Est.)	Time Frame	Potential Partners
<b>Main Street / Queens Bridge Improvements</b>			
Investigate addition of a mid-block crossing of Main Street (CR 527) at the south side of Railroad Avenue, including continental striping and a rectangular rapid flashing beacon (RRFB)	Low	Med	Borough / County
Advance package of pedestrian improvements on the historic Queens Bridge and surrounding paths	High	Long	Borough / Bound Brook / Borough / County / NJDOT / D&R Canal Commission
Investigate installation of a speed table at the intersection of Main Street with Hamilton Street / Van Horne Plaza	Low	Long	Borough / County / NJ Transit
<b>Train Station Access Improvements</b>			
Address multimodal and ADA accessibility to train station from both Bound Brook and neighboring South Bound Brook	Low	Short	Borough / NJ TRANSIT
Investigate opportunities to implement a bike depot at the Bound Brook train station	Low	Short	Borough / NJ TRANSIT / NJ Bike and Walk Coalition
Integrate future station options with planned NJ Transit parking lot upgrades	High	Long	NJ TRANSIT / Borough
Rehabilitate the historic train station to serve rail commuters and serve as an anchor for transit oriented development in the downtown	High	Long	Borough / NJ TRANSIT / Developer
Investigate potential for West Main Street access to train station area including kiss-and-ride	Med	Long	Borough / NJ TRANSIT

**NOTE:**

Order of Magnitude Cost tiers:

- Low: <\$5M
- Medium: \$5M - \$25M
- High: >\$25M

Time Frame tiers:

- Short: <3 year
- Med: 3-8 years
- Long: >8 years



# **Appendix D**

## **Collision Diagrams**

Millstone Borough  
Somerset County



Yorktown Rd

Southern Limit  
of Segment



Main St

MATCH LINE  
A



LEGEND	SYMBOLS	TYPES OF COLLISIONS
CRASH NUMBER SEE EXHIBIT A6 FOR DETAILS	→ MOVING VEHICLE	→→ REAR END
# PDO	◇ PARKED VEHICLE	→→ SIDE SWIPE
# INJURY	△ CYCLIST	→→ LEFT TURN/RIGHT ANGLE
# FATAL	△ PEDESTRIAN	→→ HEAD ON/BACKING
EXISTING SIGNALIZED INTERSECTION	■ FIXED OBJECT	*→→ OUT OF CONTROL
	□ NON-FIXED OBJECT	
	● ANIMAL	



CRASH DIAGRAM (1 OF 6)

MAIN ST (CR 533) IN MILLSTONE BOROUGH  
Yorktown Rd to Beardslee Rd

SOMERSET COUNTY ROADWAY SAFETY STUDY



Scale: 1"=60'

Exhibit A1





Exhibit A2





MATCH LINE  
B

MATCH LINE  
C

LEGEND

CRASH NUMBER SEE EXHIBIT A6 FOR DETAILS

#

 PDO

#

 INJURY

#

 FATAL

EXISTING SIGNALIZED INTERSECTION

→

 MOVING VEHICLE

◆

 PARKED VEHICLE

▲

 CYCLIST

▲

 PEDESTRIAN

■

 FIXED OBJECT

□

 NON-FIXED OBJECT

●

 ANIMAL

→→

 REAR END

→→

 SIDE SWIPE

→→

 LEFT TURN/RIGHT ANGLE

→→

 HEAD ON/BACKING

\*→→

 OUT OF CONTROL

CRASH DIAGRAM (3 OF 6)

MAIN ST (CR 533) IN MILLSTONE BOROUGH  
Yorktown Rd to Beardslee Rd

SOMERSET COUNTY ROADWAY SAFETY STUDY

Stantec

Scale: 1"=60'

Exhibit A3









\\VA192510854\graphic\_design\CrashDiagrams\CR533\_Millstone\_mp25.14-25.87

Crash #	Date	Time	Severity	Total Injured	Crash Type	Light Condition	Surface Condition
1	01/03/2017	09:55 AM	Property Damage Only	0	Same Direction (Rear-End)	Daylight	Wet
2	02/04/2018	09:44 AM	Property Damage Only	0	Same Direction (Side Swipe)	Daylight	Dry
3	02/26/2017	08:12 PM	Property Damage Only	0	Animal	Dark, Street lights on, continuous lighting	Dry
4	01/05/2017	09:53 PM	Property Damage Only	0	Fixed Object	Dark, Street lights on, continuous lighting	Dry
5	01/03/2016	07:17 PM	Property Damage Only	0	Animal	Dark, No Street lights	Dry
6	01/30/2017	05:14 PM	Property Damage Only	0	Fixed Object	Dark, Street lights on, continuous lighting	Dry
7	12/27/2016	03:00 AM	Property Damage Only	0	Fixed Object	Dark, Street lights on, continuous lighting	Wet
8	09/10/2016	03:04 PM	Property Damage Only	0	Left Turn/U-turn	Daylight	Dry
9	10/12/2016	08:47 AM	Injury	1	Opposite Direction (Head on, Angular)	Daylight	Dry
10	02/12/2016	02:50 PM	Injury	2	Right Angle	Daylight	Dry
11	05/21/2017	01:02 PM	Property Damage Only	0	Right Angle	Daylight	Dry
12	09/28/2017	06:46 PM	Property Damage Only	0	Right Angle	Daylight	Dry
13	11/18/2016	03:35 PM	Property Damage Only	0	Right Angle	Daylight	Dry
14	08/13/2016	08:40 PM	Injury	2	Same Direction (Rear-End)	Dark, Street lights on, continuous lighting	Dry
15	04/04/2016	07:01 AM	Property Damage Only	0	Same Direction (Rear-End)	Daylight	Wet
16	05/01/2018	07:55 AM	Property Damage Only	0	Same Direction (Rear-End)	Daylight	Dry
17	10/01/2018	06:21 PM	Property Damage Only	0	Same Direction (Rear-End)	Dusk	Dry
18	10/29/2018	08:08 AM	Property Damage Only	0	Same Direction (Rear-End)	Daylight	Dry
19	08/30/2016	04:48 PM	Property Damage Only	0	Same Direction (Rear-End)	Daylight	Dry
20	02/24/2016	04:27 PM	Property Damage Only	0	Same Direction (Rear-End)	Dusk	Wet
21	07/27/2018	03:44 PM	Property Damage Only	0	Same Direction (Rear-End)	Daylight	Dry
22	01/16/2018	09:52 AM	Property Damage Only	0	Same Direction (Rear-End)	Daylight	Dry
23	12/04/2017	07:29 PM	Property Damage Only	0	Same Direction (Rear-End)	Dark, No Street lights	Dry
24	07/26/2018	02:43 PM	Property Damage Only	0	Same Direction (Rear-End)	Daylight	Dry
25	08/03/2017	06:16 PM	Property Damage Only	0	Same Direction (Rear-End)	Daylight	Wet
26	08/03/2017	07:31 AM	Property Damage Only	0	Same Direction (Side Swipe)	Daylight	Dry
27	08/02/2018	04:36 PM	Property Damage Only	0	Same Direction (Side Swipe)	Daylight	Dry
28	08/13/2017	06:05 PM	Injury	1	Fixed Object	Daylight	Dry
29	11/28/2016	07:11 AM	Property Damage Only	0	Same Direction (Rear-End)	Daylight	Dry
30	11/14/2018	08:37 AM	Property Damage Only	0	Same Direction (Rear-End)	Daylight	Dry
31	06/19/2018	05:59 PM	Injury	1	Same Direction (Rear-End)	Daylight	Dry
32	08/26/2017	08:46 PM	Property Damage Only	0	Animal	Dark, No Street lights	Dry
33	05/02/2016	09:25 AM	Property Damage Only	0	Same Direction (Rear-End)	Daylight	Dry
34	10/01/2016	12:05 PM	Property Damage Only	0	Fixed Object	Daylight	Wet
35	02/14/2017	07:10 AM	Property Damage Only	0	Right Angle	Daylight	Dry



**CRASH DIAGRAM (6 OF 6)**

MAIN ST (CR 533) IN MILLSTONE BOROUGH  
Yorktown Rd to Beardslee Rd

SOMERSET COUNTY ROADWAY SAFETY STUDY



Scale: N.T.S.

Exhibit A6

# **Appendix E**

## **Audit Team**

Millstone - March 23rd

Group 1 Pairs - Northern Section

Group 2 Pairs - Southern Section

Matthew Maher, Stantec  
Tim Medina, Stantec  
Jessica Ortiz, FHI  
Adam Bradford, Somerset County  
Matthew Loper, Somerset County

Raymond Heck, Mayor  
Marilynn Kampo, East Millstone First Aid Squad - President  
Pat Marotto, Somerset County  
Virgilio Tan, NJDOT

Kati DiRaimondo, Stantec  
Michael Ahillen, FHI  
Kenneth Wedeen, Somerset County  
Walter Lane, Somerset County

Christine Van Deursen, East Millstone First Aid Squad - Chief  
Jon Dugan, RideWise  
Pastor Fred Miller Hillsborough Reformed Church  
Portia Orton, Historic District Commission Chairperson

# **Appendix F**

## **Pre-Audit Presentation**



# SOMERSET COUNTY ROADWAY SAFETY STUDY



Roadway Safety Pre-Audit,  
Millstone Corridor  
March 23, 2021



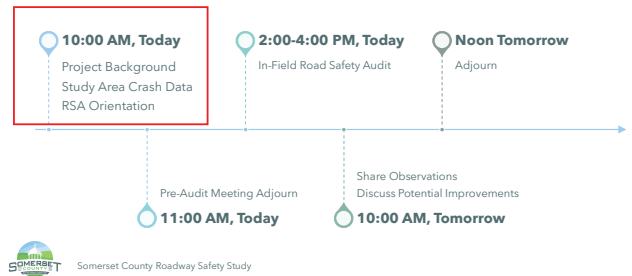
## Millstone Borough Pre-Audit Meeting

### Introduction – Audit Team

- **Funded by NJTPA**
- **SomerSet County**
  - Engineering and Planning
  - Board of County Commissioners
  - Ridewise
- **Millstone Borough**
  - Engineering and Planning
  - Police and Fire Prevention
  - HDC
  - HRC
- **NJDOT**
- **Stantec Consulting Services, Inc.**
- **FHI Studio**

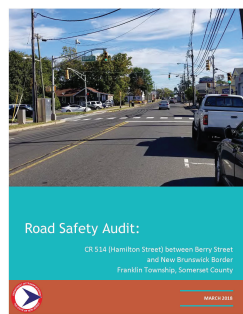


### Agenda: Schedule of Activities



### Project Background

- **County initiatives for traffic safety**
- **Recommendations from RSAs to inform future...**
  - Studies
  - Improvements
  - Applications for funding



### What is a Road Safety Audit (RSA)?



EVALUATION BY  
INDEPENDENT TEAM



IDENTIFIES CRASH  
TRENDS/CAUSES

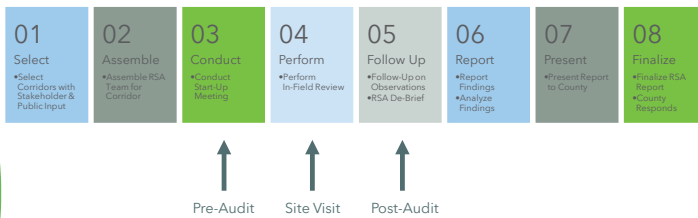


PROPOSES POTENTIAL  
SAFETY IMPROVEMENTS



SomerSet County Roadway Safety Study

## Steps of an RSA

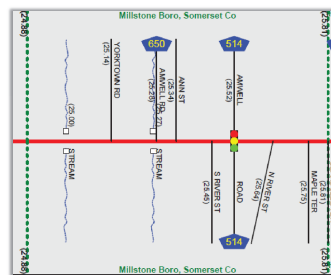


Somerset County Roadway Safety Study

## Safety Measures

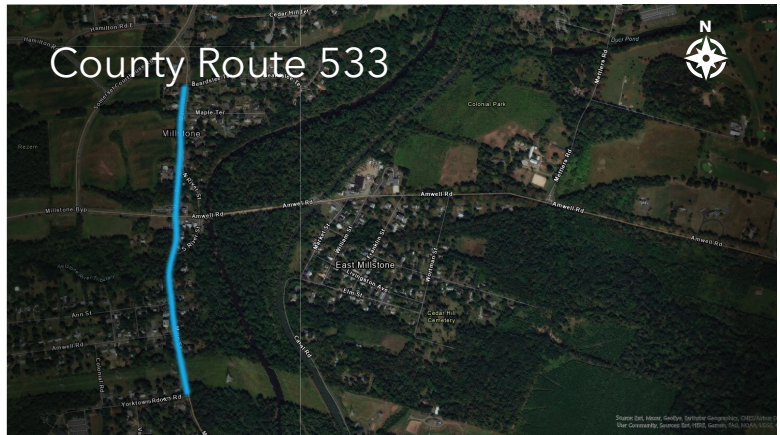
## Project Area

- Urban minor arterial
- Horizontal curves at each end of the corridor segment
- 11' - 12' undivided travel lanes
- ~8,000 AADT
- Posted 35 mph speed limit



Somerset County Roadway Safety Study

## County Route 533



## Land Use & Demographics

Residential & open spaces

Historic district; National Register 18<sup>th</sup> century buildings

Commercial zones

No transit services

Redevelopment

- Currently no major applications pending
- Minor subdivisions
- Lot line adjustments
- Parking changes



Somerset County Roadway Safety Study

## Existing Conditions Feedback

- Poor lighting on the corridor
- Perception of high truck traffic
- Perception of speeding on corridor
- Curvature/foliage inhibit sight distance
- Stripe crosswalks at additional locations



Somerset County Roadway Safety Study

## FHWA Proven Safety Measures

<b>ROADWAY DEPARTURE</b> <ol style="list-style-type: none"> <li>1. Enhanced Delineation and Friction for Horizontal Curves</li> <li>2. Longitudinal Rumble Strips and Stripes</li> <li>3. SafetyEdge<sub>SM</sub></li> <li>4. Roadside Design Improvements at Curves</li> <li>5. Median Barriers</li> </ol>	<b>INTERSECTIONS</b> <ol style="list-style-type: none"> <li>6. Backplates with Retroreflective Borders</li> <li>7. Corridor Access Management</li> <li>8. Left-and Right-Turn Lanes at Two-Way Stop-Controlled Intersections</li> <li>9. Reduced Left-Turn Conflict Intersections</li> <li>10. Roundabouts</li> <li>11. Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections</li> <li>12. Yellow Change Intervals</li> </ol>	<b>PEDESTRIANS/BICYCLES</b> <ol style="list-style-type: none"> <li>13. Leading Pedestrian Intervals</li> <li>14. Medians and Pedestrian Crossing Islands in Urban and Suburban Areas</li> <li>15. Pedestrian Hybrid Beacons</li> <li>16. Road Diets/Reconfigurations</li> <li>17. Walkways</li> </ol>
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Somerset County Roadway Safety Study

## Study-Focused Safety Measures

Lighting Curb Extensions/ Bus Bulbs Daylighting Crosswalks Walkways for Sidewalk Gaps Dedicated Turn Lanes	Leading Pedestrian Intervals (LPI) High Visibility Crosswalks Turn Restrictions Bike Lanes Lane Width Reduction/Road Diet
--	---



Somerset County Roadway Safety Study

## Safety Measures Feedback

- **Lighting:**
  - Sun glare is an issue in the PM heading west.
  - Approaches need more illumination.
  - Tree canopies obstruct lighting.
  - CR 514 missing lighting between Main St and Somerset Courthouse Rd
  - Illumination low near Yorktown Rd - adjacent curve.
  - PSEG only addresses equipment service failures.
- **Curb Extension/Bus Bulbs:**
  - Beneficial but space is an issue.
  - Impacts to bike lanes; increased bicycle traffic on weekends.
- **Walkways for Sidewalk Gaps:**
  - Sidewalk gaps NB. ROW challenges.
  - Weekend church activity.
- **Dedicated Turn Lanes:**
  - Considered not applicable.



Somerset County Roadway Safety Study

## Safety Measures Feedback, cont'd

- **Leading Pedestrian Intervals (LPI):**
  - LPIs may not be as effective due to irregular pedestrian traffic patterns.
  - Suggestion for pedestrian-activated LPI.
- **High Visibility Crosswalks:**
  - Considering crosswalk at South River.
  - Planned new trail.
- **Bike Lanes:**
  - Increased bicycle traffic on weekends.
  - Narrow lanes/shoulders make for difficult implementation.
- **Lane Width Reduction / Road Diet:**
  - Considered not applicable.
- **Additional Comments:**
  - Direct trucks outside of Millstone.



Somerset County Roadway Safety Study

## Public/ Stakeholder Improvement Feedback

Safety Measure	Effectiveness (1= not effective; 10= very effective)	Ease of Implementation (1=easy; 10= hard)
Lighting	3	5
Curb Extensions/Bus Bulbs	5	5
Daylighting and Crosswalks	5	5
Walkways for Sidewalk Gaps	8	5
Dedicated Turn Lanes	1	1
Leading Pedestrian Intervals (LPI)	2	1
High Visibility Crosswalks	6	-
Turn Restrictions	5	-
Bike Lanes	5	8
Lane Width Reduction/Road Diet	-	-



Somerset County Roadway Safety Study

## Crash Data

## Crash Data - Statistics

- All Crashes 2016-2018
- 35 Total Crashes
- Overrepresentations:
  - Same Direction (Rear-end)
  - AM peak period
- Pedestrian Crashes 2014-2018
- 0 Total Crashes

### NJTPA Network Screening List (NSL) Crash Ranking

#### Overall Crash Data

##### Intersections

#80<sup>th</sup> Amwell Road

##### Corridor Segments

Not ranked

##### Pedestrian/Bike Crash Data

##### Intersections

Not ranked

##### Corridor Segments

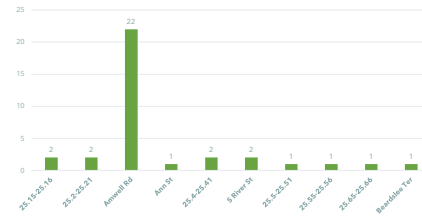
Not ranked



Somerset County Roadway Safety Study

## Millstone Borough - Histogram

### Total Vehicular Crashes by Milepost, 2014-2018



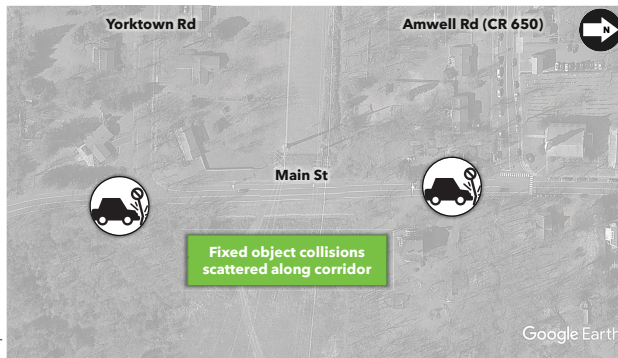
Somerset County Roadway Safety Study

- Rear-End collision types account for almost **half** of all crashes on the corridor (**48%**)
- AM peak period experiences **higher** crash frequency
- More than half (55%) of the crashes at Amwell Rd are Rear-End crashes



### Crash Trends

## Main Street in Millstone @ Amwell Road (CR 650) Intersection

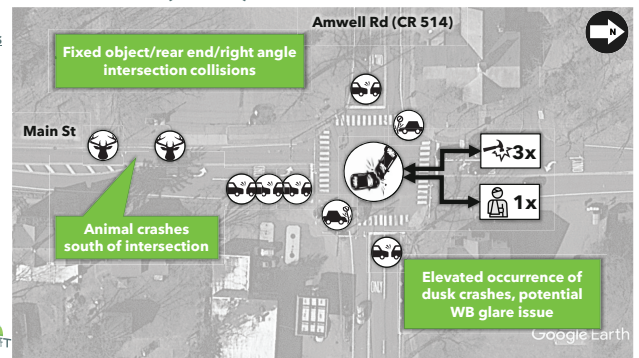


Google Earth



### Crash Trends

## Main Street in Millstone @ Amwell Road (CR 514) Intersection



Google Earth

## Conducting the Audit

## Guidelines & Safety

### Be Observant & Alert

- Vehicles
- Wet Surfaces

### Be Seen

- Face Traffic
- Avoid Sudden Movements
- Stick to Sidewalks

### Be Respectful

- Traffic (Vehicular, Pedestrian, Cyclist)
- Motorists
- Property

### PPE

- High Visibility Vest
- Proper Face Coverings
- Social Distancing (1 occupant/veh.)



Somerset County Roadway Safety Study



## What to Bring/Wear to the Field



COMFORTABLE  
CLOSED SHOES



WEATHER  
CONSCIOUS



## HIGH VISIBILITY VESTS

- Bring your own


## DOCUMENTING MATERIAL

- Smartphone
- Pen/Pencil
- Paper/notepad



Somerset County Roadway Safety Study

## What to Look for - Photos



**BOISHER COUNTY**  
**RUMPHULF SAFETY SERVICE**

Member Since: \_\_\_\_\_  
 Contributor: \_\_\_\_\_ Date: \_\_\_\_\_

## AUDIT FORM

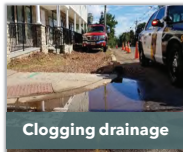
**As you near the end of the walk, note the following items (mark your level of concern):**  
 0 = Satisfactory condition/level of maintenance. You would not have any concern about this condition.

#	Item	0	1	2	3
<b>Place contrast between the existing conditions promote or discourage a safe and comfortable walking environment.</b>	1. Sidewalk conditions	1	2	3	N/A
	2. Sidewalk surface (cracking, potholes)	1	2	3	N/A
	3. Sidewalk edge (curbs) (height, slope)	1	2	3	N/A
	4. Sidewalk drainage	1	2	3	N/A
	5. Sidewalk lighting	1	2	3	N/A
	6. Sidewalk surface material	1	2	3	N/A
	7. Sidewalk width	1	2	3	N/A
	8. Sidewalk surface texture	1	2	3	N/A
	9. Sidewalk surface color	1	2	3	N/A
	10. Sidewalk surface material	1	2	3	N/A
<b>Condition of pedestrian infrastructure</b>	1. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	2. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	3. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	4. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	5. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	6. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	7. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	8. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	9. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	10. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
<b>Condition of pedestrian infrastructure</b>	1. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	2. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	3. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	4. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	5. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	6. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	7. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	8. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	9. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	10. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
<b>Condition of pedestrian infrastructure</b>	1. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	2. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	3. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	4. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	5. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	6. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	7. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	8. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	9. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	10. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
<b>Condition of pedestrian infrastructure</b>	1. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	2. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	3. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	4. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	5. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	6. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	7. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	8. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	9. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	10. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
<b>Condition of pedestrian infrastructure</b>	1. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	2. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	3. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	4. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	5. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	6. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	7. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	8. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	9. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	10. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
<b>Condition of pedestrian infrastructure</b>	1. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	2. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	3. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	4. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)	1	2	3	N/A
	5. Condition of pedestrian infrastructure (sidewalk, crosswalk, etc.)</				



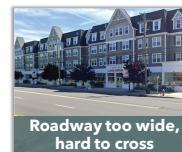
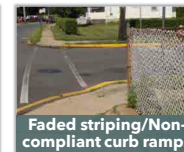
Somerset County Roadway Safety Study

## What to Look for - Photos



Somerset County Roadway Safety Study

## What to Look for - Photos



Somerset County Roadway Safety Study

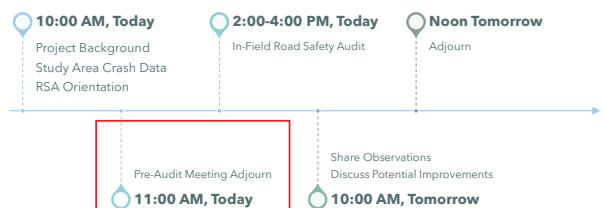
## How to Record Observations

- Photograph
- Pen/Pencil Paper
- Video
- Mobile Device
- Mental



## BE SPECIFIC!!!

## Agenda: Schedule of Activities



Somerset County Roadway Safety Study





# Questions?

Somerset County Roadway Safety Study

# Extra Slides

Somerset County Roadway Safety Study

**SOMERSET COUNTY 533**

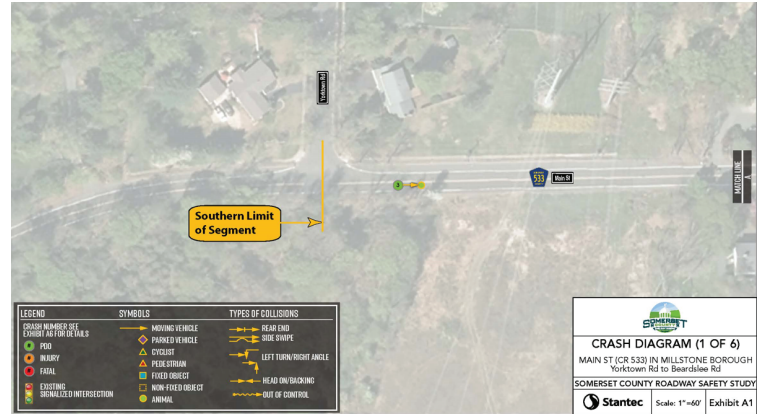
**Main St**  
Yorktown Rd to Beardslee Rd  
0.67 miles in Millstone Boro

**Summary of Feedback**

- Poor lighting on the corridor
- Perception of high truck traffic
- Perception of speeding on corridor
- Curvature/foliage inhibit sight distance
- Stripe crosswalks at additional locations

**POV**  
Amwell,  
Facing East at  
Main

Somerset County Roadway Safety Study







# **Appendix G**

## **Post-Audit Survey**

# Participant Survey - Average Scores

As you near the end of the audit, rate how the following items impact your level of comfort.  
(1: makes me uncomfortable; 4: makes me comfortable; N/A: issue does not exist along this corridor)

Category		Item	Bridgewater	Franklin	Millstone	North Plainfield	Raritan
Corridor Identity		Average	2.3	2.4	2.7	3.2	2.7
Corridor Identity	Activities and uses		2.3	2.6	3.0	3.2	2.5
Corridor Identity	Condition of buildings		2.6	2.3	3.0	3.3	2.5
Corridor Identity	Perception of personal safety		1.9	2.4	2.0	3.0	3.0
Crossings		Average	2.2	2.3	2.3	2.3	2.4
Crossings	Crossing guards		2.5	3.0	-	2.7	3.0
Crossings	Missing or inoperable pedestrian/audible signal		1.9	2.0	2.0	3.0	3.5
Crossings	Pedestrian signal crossing time		2.7	3.0	3.0	2.6	2.6
Crossings	Poorly marked or missing crosswalk		1.7	1.6	1.7	1.7	2.3
Crossings	Presence of curb ramps for strollers/wheelchairs		1.7	1.9	1.0	1.9	2.3
Crossings	View of traffic is blocked		2.0	2.6	2.3	2.1	1.6
Crossings	Wait time for pedestrian signal		2.9	2.8	3.0	2.8	2.4
Pedestrian-Vehicle Interactions		Average	1.6	2.1	1.9	2.8	2.5
Pedestrian-Vehicle Interactions	Amount of traffic		1.7	2.1	2.3	3.0	2.6
Pedestrian-Vehicle Interactions	Bicycling on the sidewalk		1.3	4.0	2.0	2.1	2.9
Pedestrian-Vehicle Interactions	Driver behavior (distracted, did not yield to pedestrians, etc.)		2.1	2.0	2.7	3.0	2.1
Pedestrian-Vehicle Interactions	Noise level due to auto traffic		1.2	2.0	1.3	2.9	2.1
Pedestrian-Vehicle Interactions	Presence of trucks or large vehicles		1.7	2.0	1.7	2.8	2.8
Pedestrian-Vehicle Interactions	Speed of traffic		1.4	2.1	1.3	2.5	2.5
Sidewalk/Roadway Condition		Average	2.3	2.7	2.6	2.6	2.9
Sidewalk/Roadway Condition	Areas on roadway with poor drainage		3.1	2.9	2.5	3.0	2.6
Sidewalk/Roadway Condition	Areas on sidewalk with poor drainage		3.0	2.8	2.0	2.9	2.6
Sidewalk/Roadway Condition	Buffer area between sidewalk and traffic		1.5	2.4	2.3	2.5	3.1
Sidewalk/Roadway Condition	Guide rails/protection systems		2.0	3.3	3.0	2.3	2.5
Sidewalk/Roadway Condition	Intersection configuration		2.1	2.7	3.0	2.8	2.7
Sidewalk/Roadway Condition	Obstacles blocking sidewalk (utilities/trees)		2.9	2.5	3.0	2.6	2.9
Sidewalk/Roadway Condition	Roadway condition		2.8	3.1	2.7	3.0	3.3
Sidewalk/Roadway Condition	Roadway width		2.2	2.8	3.0	3.0	3.3
Sidewalk/Roadway Condition	Sidewalk condition		1.9	2.3	1.7	1.8	2.9
Sidewalk/Roadway Condition	Sidewalk width		2.2	2.6	2.7	2.4	3.1
Streetscape Amenities		Average	2.0	2.5	3.2	2.5	3.2
Streetscape Amenities	Benches or places to rest, trash cans		1.5	2.8	N/A	1.1	3.8
Streetscape Amenities	Lighting (for pedestrians)		1.9	2.0	3.0	2.4	3.7
Streetscape Amenities	Lighting (for vehicles)		2.4	2.5	2.7	2.9	2.7
Streetscape Amenities	Presence of directional/regulatory signage		2.4	2.3	3.7	2.8	2.7
Streetscape Amenities	Street trees and landscaping		1.9	3.0	3.5	2.9	3.2

# **Appendix H**

## **Post-Audit Presentation**

# SOMERSET COUNTY ROADWAY SAFETY STUDY

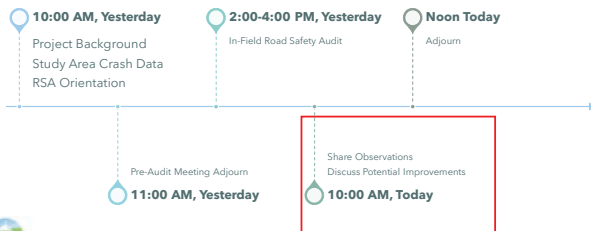


Roadway Safety Post-Audit,  
Millstone Corridor  
March 24, 2021



## Millstone Borough Post-Audit Meeting

## Agenda: Schedule of Activities



Somerset County Roadway Safety Study

## Field Photography



Somerset County Roadway Safety Study

## Field Photography



Somerset County Roadway Safety Study

## Field Photography



Somerset County Roadway Safety Study



## Field Photography



Somerset County Roadway Safety Study

## Field Photography



Somerset County Roadway Safety Study

## Field Photography



Somerset County Roadway Safety Study

## Field Photography



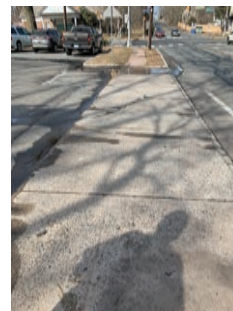
Somerset County Roadway Safety Study

## Field Photography



Somerset County Roadway Safety Study

## Field Photography



Somerset County Roadway Safety Study



## Field Photography



Somerset County Roadway Safety Study

## Field Photography



Somerset County Roadway Safety Study

## Field Photography



Somerset County Roadway Safety Study

## Field Photography



Somerset County Roadway Safety Study

## Field Photography



Somerset County Roadway Safety Study

## Prompt List Discussion

**SOMERSET COUNTY ROADWAY SAFETY STUDY**

**AUDIT FORM**

Location: \_\_\_\_\_ Date: \_\_\_\_\_

Please comment later for existing conditions provide or discourage a safe and comfortable way for all road users.

Category	Item	1	2	3	4	5
General Conditions	Overall condition					
	Speed of traffic					
	Overall condition, 100 feet					
	Overall condition, 200 feet					
	Overall condition, 300 feet					
	Overall condition, 400 feet					
	Overall condition, 500 feet					
	Overall condition, 600 feet					
	Overall condition, 700 feet					
	Overall condition, 800 feet					
Intersection	Intersection condition					
	Intersection condition, 100 feet					
	Intersection condition, 200 feet					
	Intersection condition, 300 feet					
	Intersection condition, 400 feet					
	Intersection condition, 500 feet					
	Intersection condition, 600 feet					
	Intersection condition, 700 feet					
	Intersection condition, 800 feet					
	Intersection condition, 900 feet					
Other	Other condition					
	Other condition, 100 feet					
	Other condition, 200 feet					
	Other condition, 300 feet					
	Other condition, 400 feet					
	Other condition, 500 feet					
	Other condition, 600 feet					
	Other condition, 700 feet					
	Other condition, 800 feet					
	Other condition, 900 feet					

As you view the end of the audit, note how the following items impact your level of comfort. (1 = lowest level of comfort; 5 = highest level of comfort; N/A = not applicable)

Category	Item	1	2	3	4	5
General Conditions	Overall condition					
	Speed of traffic					
	Overall condition, 100 feet					
	Overall condition, 200 feet					
	Overall condition, 300 feet					
	Overall condition, 400 feet					
	Overall condition, 500 feet					
	Overall condition, 600 feet					
	Overall condition, 700 feet					
	Overall condition, 800 feet					
Intersection	Intersection condition					
	Intersection condition, 100 feet					
	Intersection condition, 200 feet					
	Intersection condition, 300 feet					
	Intersection condition, 400 feet					
	Intersection condition, 500 feet					
	Intersection condition, 600 feet					
	Intersection condition, 700 feet					
	Intersection condition, 800 feet					
	Intersection condition, 900 feet					
Other	Other condition					
	Other condition, 100 feet					
	Other condition, 200 feet					
	Other condition, 300 feet					
	Other condition, 400 feet					
	Other condition, 500 feet					
	Other condition, 600 feet					
	Other condition, 700 feet					
	Other condition, 800 feet					
	Other condition, 900 feet					




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*"What operational/safety issues did you note on the corridor?"*

# *"What makes travel on the corridor difficult ?"*

- For drivers
- For non-drivers?
- For people with disabilities?
- For families with small children?
- For transit riders?




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For transit riders?


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*“What pedestrian/cyclist connectivity issues were observed?”*


# Recommendations Discussion



"WHAT SAFETY IMPROVEMENTS DO YOU PROPOSE FOR REDUCING CRASHES?"



"WHAT IS YOUR VISION FOR THE CORRIDOR? HOW SHOULD IT LOOK IN 10 YEARS?"



"WHAT ARE THE SHORT-TERM CHANGES THAT COULD BE MADE NOW?"



"WHAT ARE THE SHORT-TERM CHANGES THAT COULD BE MADE NOW?"

# Extra Slides

Somerset County Roadway Safety Study

The logo for Somerset County, featuring a stylized sun or moon rising over a horizon, with the word "SOMERSET" in a bold, sans-serif font below it.[illegible]

- # Extra Slides
- Somerset County Roadway Safety Study
- 
- The logo for Somerset County, featuring a stylized sun or moon rising over a landscape, with the word "SOMERSET" below it.

# Extra Slides

Somerset County Roadway Safety Study

The logo for Somerset County, featuring a stylized sun or moon rising over a landscape, with the word "SOMERSET" below it.





# Main St Yorktown Rd to Beardslee Rd 0.67 miles in Millstone Boro

## Summary of Feedback

- Poor lighting on the corridor
- Perception of high truck traffic
- Perception of speeding on corridor
- Curvature/foliage inhibit sight distance
- Stripe crosswalks at additional locations



Somerset County Roadway Safety Study



# **Appendix I**

## **Recommendations from Implementation Matrix**



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2021/07/14 10:47 AM By: Dikairamondo, Kati

ORIGINAL SHEET - ANSI B

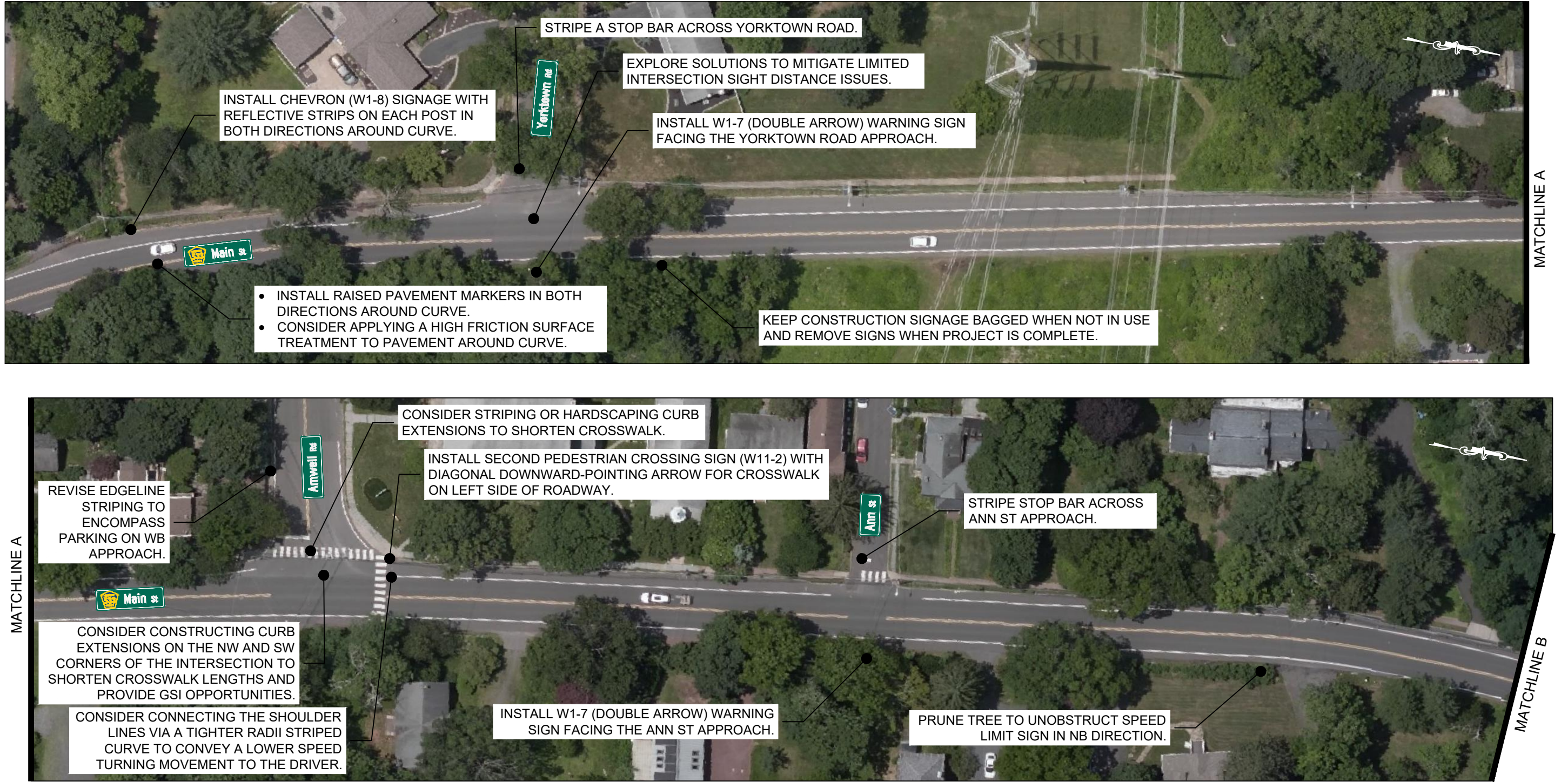
July, 2021  
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Somerset County/NJTPA  
Somerset County Roadway Safety Study  
Main Street (CR 533)  
Sheet No.  
1 of 3  
Title  
Millstone Borough RSA Recommendations  
Scale: 1" = 60'





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2021/07/14 10:47 AM By: Dikairamondo, Kaiti

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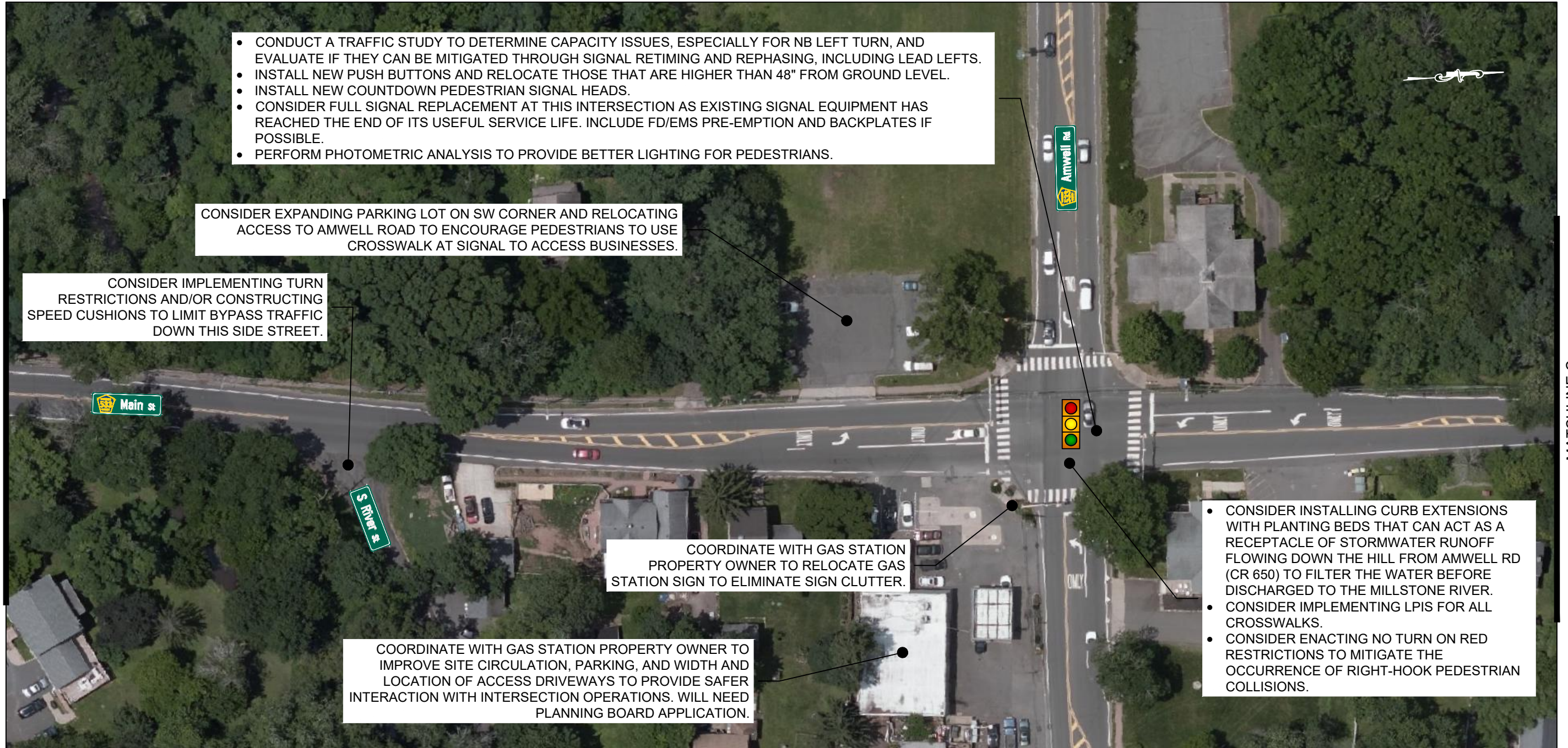
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Somerset County/NJTPA  
Somerset County Roadway Safety Study  
Main Street (CR 533)

Sheet No.  
2 of 3

Title  
Millstone Borough RSA Recommendations  
Scale: 1" = 60'

MATCHLINE B

MATCHLINE C





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2021/07/14 10:47 AM By: Dikairimondo, Kati

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July, 2021  
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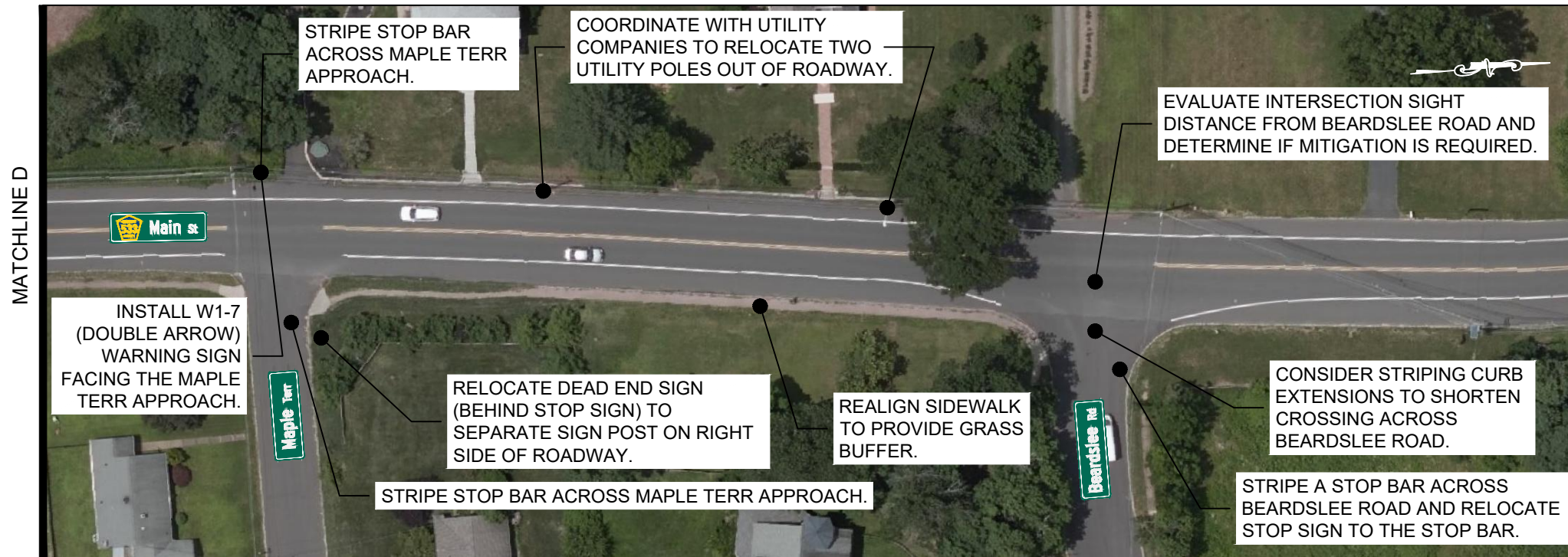
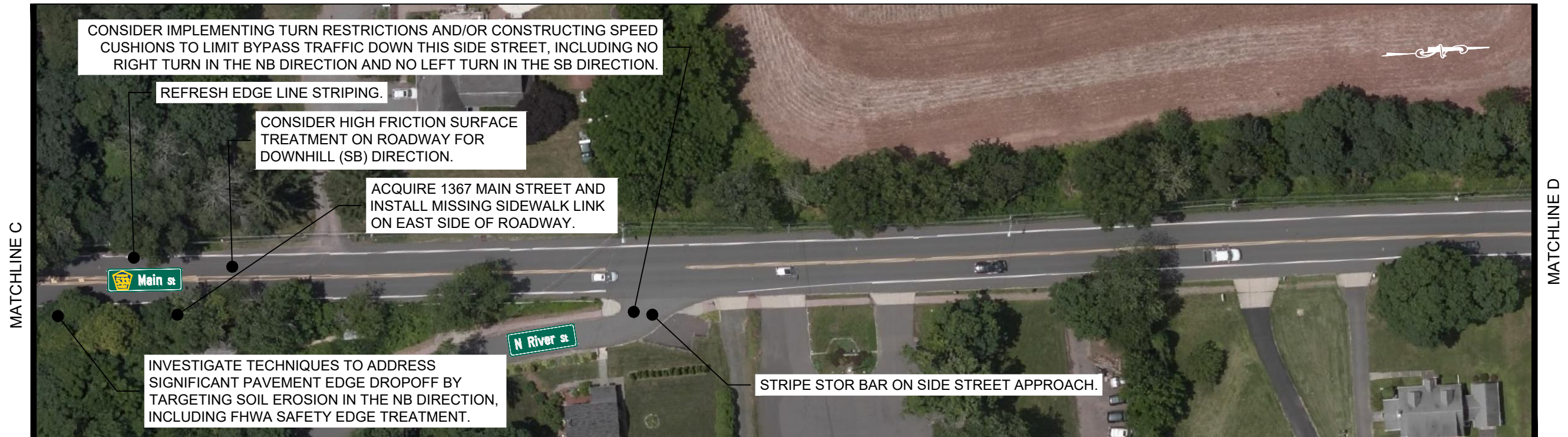
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Somerset County/NJTPA  
Somerset County Roadway Safety Study  
Main Street (CR 533)

Sheet No.  
3 of 3

Title  
Millstone Borough RSA Recommendations  
Scale: 1" = 60'



# **Appendix J**

## **Road Owner Response**

## Somerset County Response to the Main Street (CR 533) in Millstone Borough Road Safety Audit (owner's response)

Somerset County agrees with the recommendations of the Road Safety Audit. The County strives to make our roads safer for all users and is willing to investigate any recommendations that can assist in achieving that goal. Our agreement with the assessment should in no way be perceived as a commitment to the implementation of such suggestions. The following general points should be noted:

- Somerset County does not maintain or inspect sidewalks, street lighting, landscaping, or parking facilities along county roadways. That responsibility lies with the municipality or property owner.
- Some recommendations may not be warranted or feasible due to engineering or fiscal constraints. Additional analysis is necessary.



