

Garden City Road Safety Audit

Mary Street: Taylor Avenue/U.S. 83B to Kansas Avenue

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NOT FOR CONSTRUCTION—The Recommendations in this document are intended ONLY for the local agency to use in determining possible future changes at the RSA location.

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Introduction



Introduction

Garden City, Kansas, is part of the Multi-jurisdictional Safe Streets for All (SS4A) Safety Action Plan, a collaboration between twelve jurisdictions to improve roadway safety. Partner communities and counties include Garden City, Holcomb, Liberal, Scott City, Oakley, Oberlin, Finney County, Seward County, Haskell County, Scott County, Logan County, and Decatur County. The U.S. 83 Communities Roadway Safety Plan, Garden City Transportation Safety Action Plan and Road Safety Audits (RSA) are important initiatives for improving road safety and are a critical component of the plan.

RSAs are formal examinations of selected roadway facilities from a safety performance viewpoint. An independent multidisciplinary team made up of engineers, traffic specialists, and planners performs all RSAs. The end result of an RSA is qualitative estimates and reports on potential road safety issues and identified opportunities for safety improvements that will benefit all road users. By leveraging data, community input, and expert analysis, the city can implement targeted interventions to reduce traffic crashes and improve overall road safety. The RSA team reviewed local agency crash data and conducted field observations during different times of day, such as peak/non-peak hours. The Mary Street field visits took place from April 1st to April 3rd, 2024.

Mary Street is one of the busiest corridors in Garden City, providing connections to job centers, the high school, community assets such as the Talley Trail, and three highways. Mary Street is a priority corridor for Garden City and has been identified as being a gateway street for the city. The recent comprehensive plan reinforces this in several ways. Among other recommendations, Mary Street is identified as a prime candidate for a multimodal street conversion that would include improvements to better serve all modes and users.



Introduction

Figure 1 shows the study area. The study area includes 2.9 miles of Mary Street between Taylor Avenue/ U.S. 83B and Kansas Avenue in the northern portion of Garden City. Within the corridor, there are eight signalized and twenty-three non-signalized intersections. The RSA addresses the eight signalized intersections: Taylor Ave/ U.S. 83B, 8th St, 3rd St, Fleming St, Campus Dr, Buffalo Way Boulevard, the U.S. 83 Bypass, and Kansas Ave, as well as the roadway segments in between.

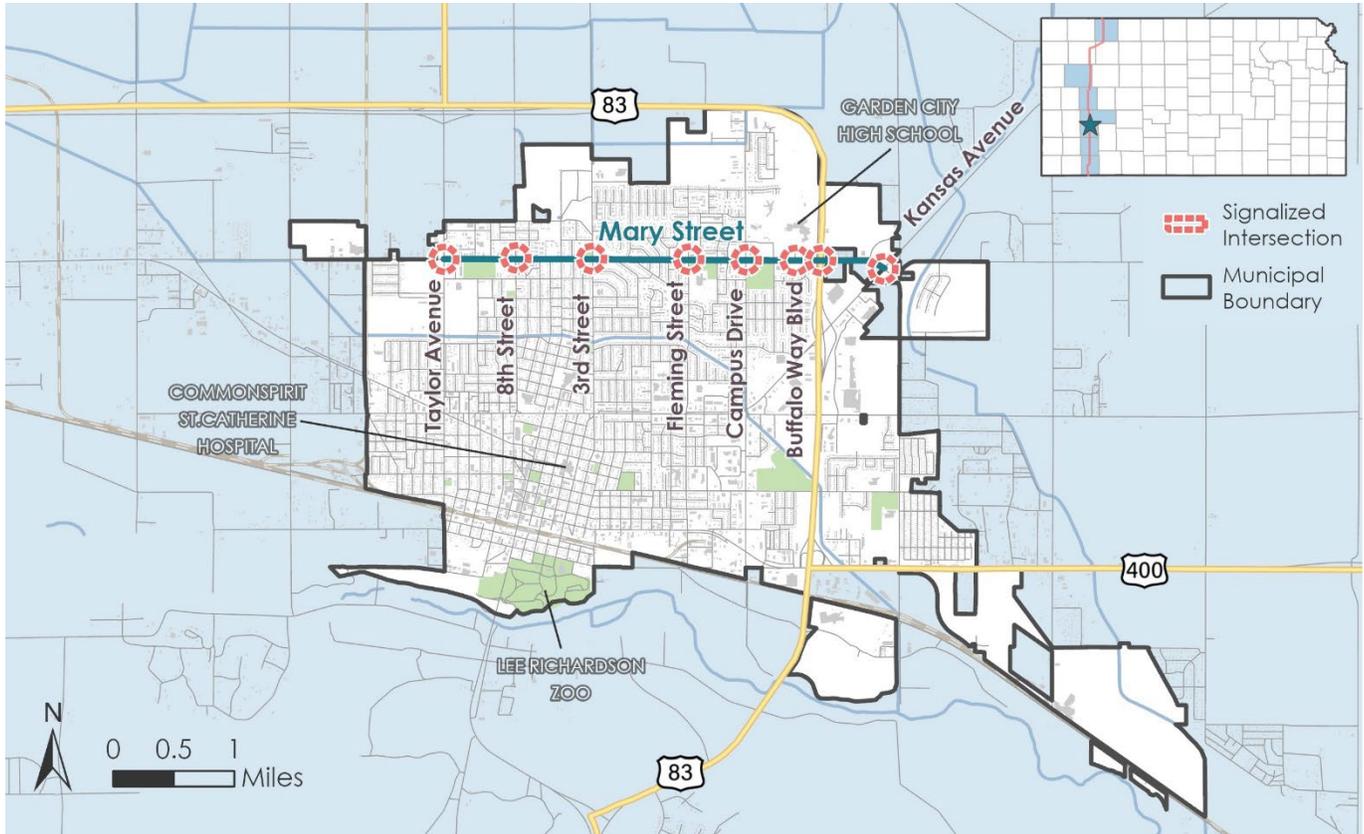


Figure 1 - Project Location Map

Report Overview

The following sections provide an overview, crash review, comments from the public, and observations from the field review.

Observation Process

To gain a better understanding of the corridor's traffic patterns, challenges, and needs, the team performed extended observations on three different occasions. Each time, different elements were analyzed and documented by members of the project team. Some of these trips involved walking reviews, others included driving the corridor, and others included a combination of walking and driving. Prior to performing the field review, team members met virtually in March 2024 to discuss the overview, RSA schedule, and plan for the field review. In Table 1 are summaries of each trip and the variables that were observed.

In the end, corridor-wide notes were created based on general observations made by the team during the visits. Observations included road user behavior, traffic signal operations, Americans with Disabilities Act (ADA) facility conditions, including ramps and sidewalks, sign visibility, roadside obstructions, design deficiencies, bicycle infrastructure, and spot speed measurements.

Table 1 - Observation Process Overview

Date and Time	Observation Action
April 2, 2024 1:00 PM to 6:00 PM	Driving the Mary Street corridor
April 3, 2024 7:00 AM to Noon	Evaluation of every signalized intersection in the corridor and observation of the general conditions of each roadway segment along the corridor.
April 4, 2024	Team members drove the Mary Street corridor in both directions in its entirety.



Recommendation Process

The recommendations in this plan are the result of extensive data analysis, field work and observations, community input, and reflects the education, training, and experience of our team members. Improving the safety and mobility of all road users was the team's primary objective and guided the process from the beginning. The recommendations have been organized by their projected timeframes, ranging from tasks to accomplish quickly, to others that will require additional planning or analysis.

Mary Street RSA Corridor



Goodland

Colby

Oakley

WaKeeney

Scott City

Garden City

Dodge City

Mary Street Corridor

The following section provides an overview and observations for the Mary Street corridor, including intersection geometry, user behavior, signal control, and multi-modal infrastructure.

Mary Street, highlighted in Figure 2, runs east-west through the northern half of Garden City, Kansas. Figure 3 shows a typical roadway section of Mary Street in between the intersections. It is a four-lane undivided street with no turn lanes throughout most of the corridor (other than at some of the signalized intersections). There are generally attached sidewalks throughout most of the corridor and no bike lanes.



Figure 2 - Project Area

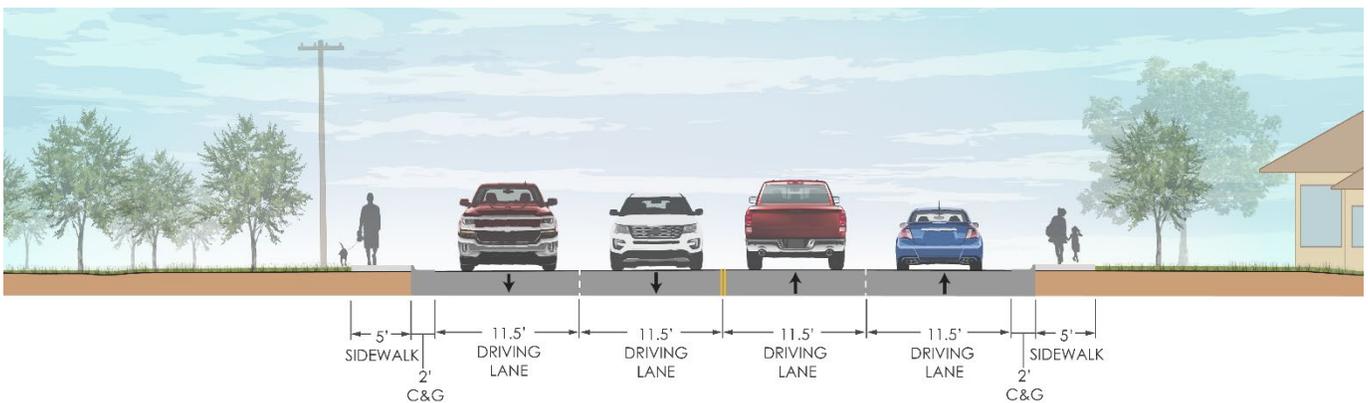


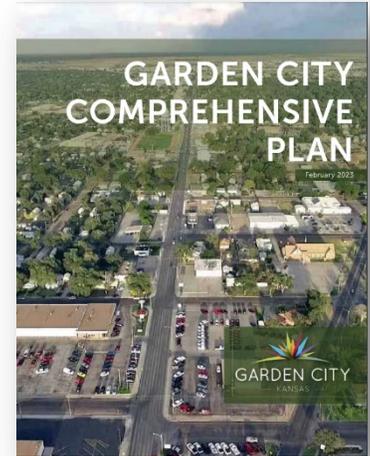
Figure 3 - Mary Street Corridor Typical Roadway Section

Plan Review

In the most recent Garden City Comprehensive Plan, adopted in 2023, Mary Street is identified as being a good candidate for a variety of improvements that would transform the corridor into more of a complete street. Garden City envisions a reimagined and revitalized Mary Street where a variety of trips can be accomplished by walking, biking, or public transportation in a more attractive environment that better contributes to the economic strength of surrounding neighborhoods and businesses.

Notable improvements include, but are not limited to:

- Completion of facilities, including bike lanes, sharrows, bike storage, bike signage, and bike stations, along or crossing Complete Streets corridors.
- Construction of sidewalks, promenades, plazas, crosswalks and other facilities to encourage walking and make the experience of walking enjoyable.
- Construction of transit stops and facilities as needed along corridors.
- Installation of crosswalks, pedestrian signals, bulbouts or other streetscape and traffic calming methods to slow traffic and increase safety for people walking and biking.
- Improved landscaping and street trees.
- Improved street lighting (for vehicular traffic) and lighting along sidewalks and walking areas (for pedestrians).
- Public art installations.
- Signage, monumentation and improved gateways.
- Installation of public seating areas and related street furnishings.
- Redevelopment along corridors geared to create walkable, bikeable, and more active corridors that promote community interaction and vitality similar to traditional Main Streets and related types of districts.



Other notable recommendations from the Comprehensive Plan include:

- Filling gaps in the sidewalk network
- Complete corridor plans, detailing improvements for all modes of traffic, for the Complete Streets corridors of Kansas, Taylor, Fulton, Main, Campus and **Mary**.
- Update the city's roadway and construction standards in keeping with Complete Streets policies and principles.
- Draft and adopt a Complete Streets policy, guiding the design of local and collector streets in the city, going forward.
- The city will encourage integration and connections between different neighborhoods and between different shopping or civic spaces around Garden City.

The LiveWell Finney County Community Health Design Summit was held in Garden City in 2015 with the goal of improving health in the community through urban design. The report resulting

Mary Street RSA Corridor

from the summit identified recommendations related to Mary Street including:

- Implement a road diet
- Install safer crossings
- Create a gateway at Mary Street and Taylor Avenue intersection
- Implement roundabouts where possible
- Connect Garden City with Garden City High School using signs, landscaping, and improved pedestrian and bicycle facilities.

The Mary Street corridor was studied in 2016 as part of the Traffic Study of Corridors & Intersections conducted by Professional Engineers Consultants (PEC, 2016) The study analyzed roadway and intersection condition, traffic data, crash data, bicycle and pedestrian infrastructure, and conducted a road diet assessment. Mary Street was found to be potentially viable for a road diet from Taylor Avenue to Fleming Street. The intersection of Buffalo Way and Mary Street, studied separately from the Mary Street corridor, received the recommendation to maintain it as a signalized intersection and the "signal timings should be regularly reviewed and modified as needed to limit queueing lengths at the intersection."

Adjacent Land Use

The Mary Street corridor contains a mix of land uses that are typical for an established, yet growing, city. Most of the corridor is comprised of low-density, single-family housing as well as concentrations of duplexes, townhomes, and a few small apartment buildings. The western portion of the corridor, north of the Forest Park Lake Wildlife Habitat, is characterized by industrial and warehouse buildings that are home to several government offices, industrial uses, and some commercial storefronts. Small pockets of commercial and retail uses can be found on the western portion as well as some clusters near Deane Wiley Park. Located south of the Mary Street and Kansas Avenue intersection is a commercial power center with retail, hotel, and drive-thru restaurants. The Garden City High School and Kenneth Henderson Middle School are less than one mile from each other near the intersection of Mary Street and Campus Drive. Small office uses are sporadically located throughout the corridor along with a few places of worship. Several recreational options are provided throughout the corridor such as the YMCA Dome, Martin Esquivel Soccer Complex, Deane Wiley Park, Lions Park, and Forest Park Lake, which is a Wildlife Habitat with a trail loop that connects to the Talley Trail network.

Mary Street RSA Corridor

The Garden City Comprehensive Plan outlines the preferred future land uses along the Mary Street corridor, which does not represent a major departure from the current pattern. Two notable changes are the inclusion of a mixed-use district around the Mary Street and W Taylor Avenue intersection and the inclusion of additional medium-density housing in the adjacent southern neighborhoods. The recommended future land use classifications are shown in Figure 4. In addition to land use recommendations, the Comprehensive Plan provides guidance and goals for neighborhood development and community design that would complement the safety improvements recommended for the Mary Street corridor.



Figure 4 - Future Land Use along Mary Street Corridor. Source: City of Garden City, Kansas

Traffic Volumes

Traffic volumes were collected along the corridor on Wednesday, April 24, 2024, which consisted of turning-movement counts at all eight signalized intersections for 13 hours (6:00 a.m. – 7:00 p.m) and full-day counts at four roadway segments. The AM and PM peak hour traffic volumes are shown in Figure 5 as well as the 24-hour traffic counts. The segment of Mary Street in between Fleming Street and Campus Drive saw the highest 24-hour traffic volume with approximately 12,500 vehicles. The segment between U.S. 83 and Kansas Avenue had the lowest volume compared to the rest of the corridor but is also in one of the fastest developing areas of Garden City. Located just north of Mary Street off of Buffalo Way Boulevard, Garden City High School contributes to heavy traffic volumes in the morning in its vicinity, largely due to school-related activity and parent/student drop-offs.

Mary Street RSA Corridor

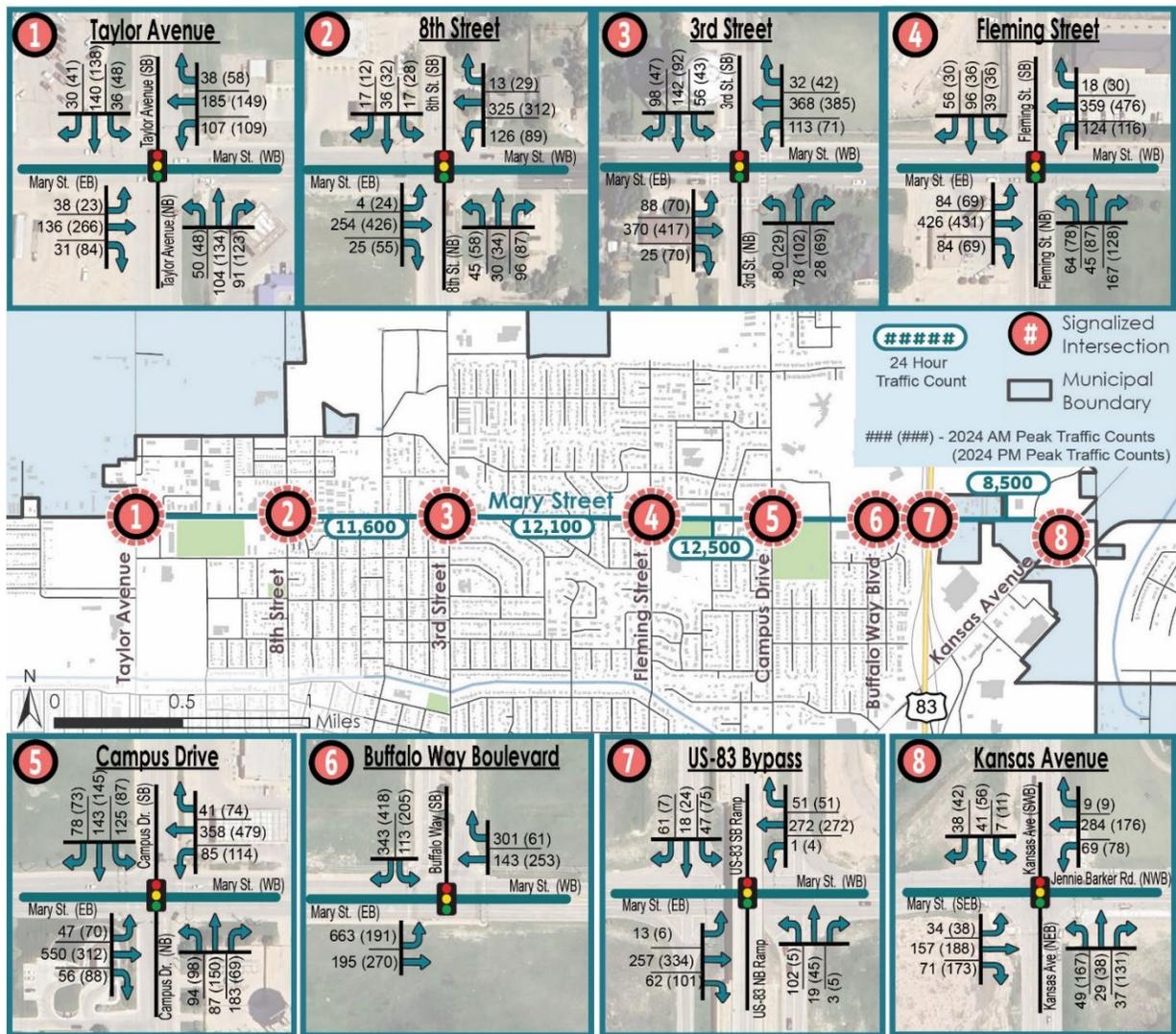


Figure 5 - Project Area Turning Movement Counts

Traffic data was also obtained from StreetLight, which is a mobility analytics platform that collects data from mobile devices, connected vehicles, and other sources to generate transportation insights based on its collection of Big Data. Figure 6 visually indicates the daily traffic volumes along the Mary Street corridor based on StreetLight data for the period of June 2022 – May 2023.

Mary Street RSA Corridor

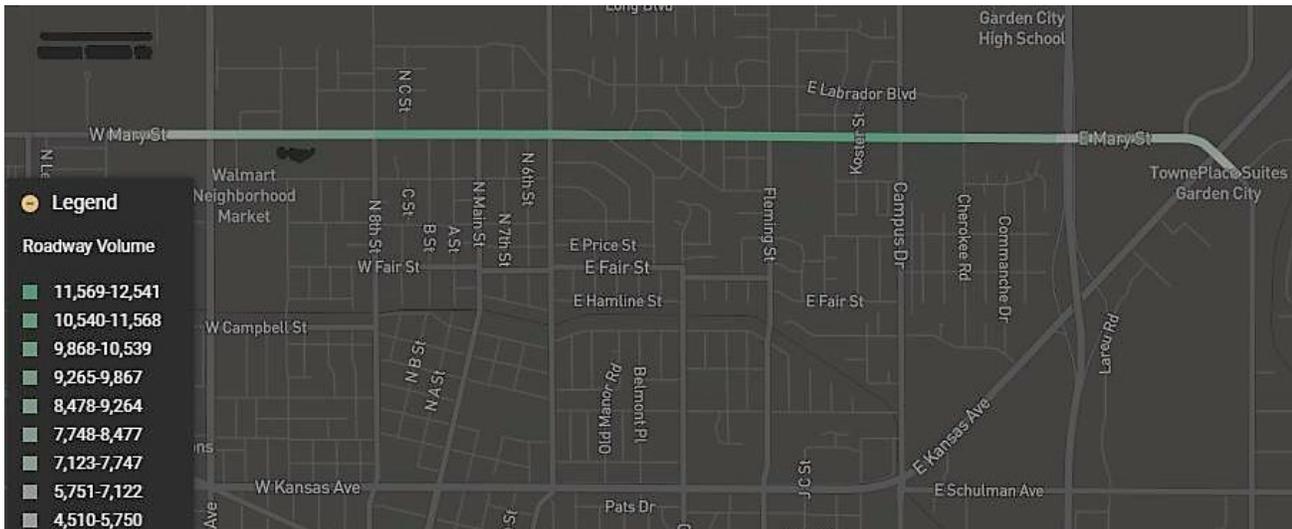


Figure 6 - Variation of daily traffic volume along Mary Street (StreetLight)

Traffic Operations Analysis

The Mary Street corridor was analyzed in Synchro software to provide an overview of current intersection level traffic operations. Operational conditions were graded in accordance with the criteria established in the Highway Capacity Manual (HCM) published by the Transportation Research Board. The HCM measures the operations of an intersection or movement based on the average delay experienced by drivers and assigns a level of service (LOS) using a letter grade scale. LOS A represents very little delay for drivers while LOS F represents significant congestion and delays. LOS D typically represents the operational capacity of an intersection or movement and was used as the lowest acceptable operations level for this analysis. Table 2 summarizes the LOS thresholds for signalized intersections.

Table 2 - HCM Delay LOS Criteria for Signalized Intersections

Level of Service (LOS)	Average Control Delay (sec)
LOS A	≤10
LOS B	>10-20
LOS C	>20-35
LOS D	>35-55
LOS E	>55-80
LOS F	>80

Signal timings were received from Garden City for each of the project corridor's signalized intersections. These signal timings are key in understanding the green time allocated to each signal phase, which affects the calculation of vehicle delay. The signal cycle makes up the total green, yellow, and red phases for all vehicle movements, as well as the pedestrian phases. All of the signalized intersections are actuated or semi-actuated, meaning that Mary Street is prioritized over the cross streets using vehicle detectors. The signals along Mary Street are not coordinated with each other.

The results of the traffic operations analysis of Mary Street during the AM and PM peak hours are displayed in Figure 7. All of the study intersections are reported to operate at LOS C or better, except for Mary St/Fleming St, which is reported to operate at LOS D during the AM peak hour. Additionally, all of the individual movements at the study intersections are reported to be operating at, or better than, LOS D. The intersections that experience LOS D level delay for individual movements include: 3rd Street, Fleming Street, Campus Drive, Buffalo Way Boulevard, and at the U.S. 83 off-ramps.

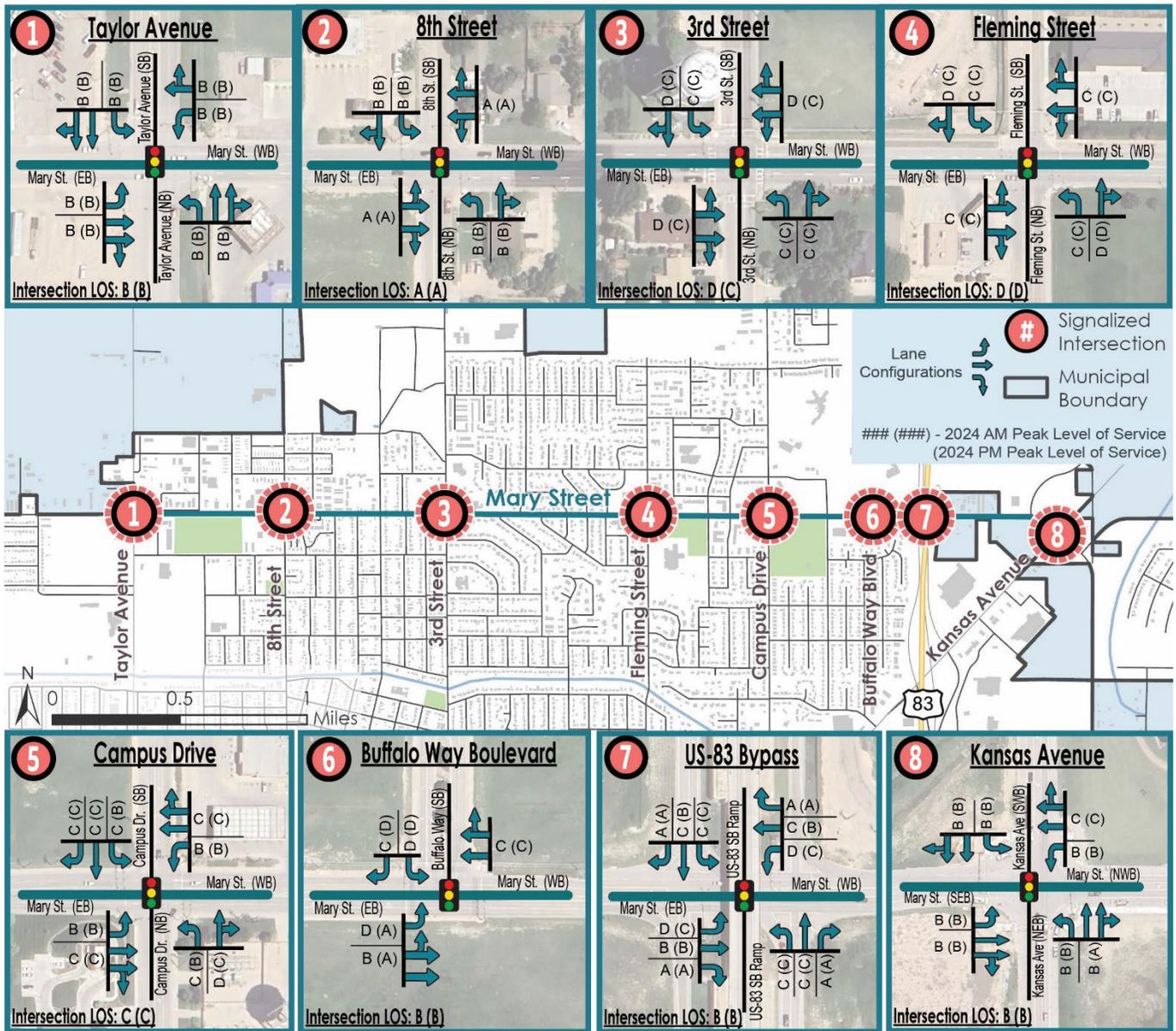


Figure 7 - Existing Peak Hour Traffic Operations on Mary Street

StreetLight data was also used to develop a picture of the delay and congestion experienced by drivers traveling along Mary Street. Figure 8 illustrates vehicle delay along the corridor, which indicates delay is greatest around the 3rd Street, Fleming Street, and Campus Drive intersections.

Mary Street RSA Corridor

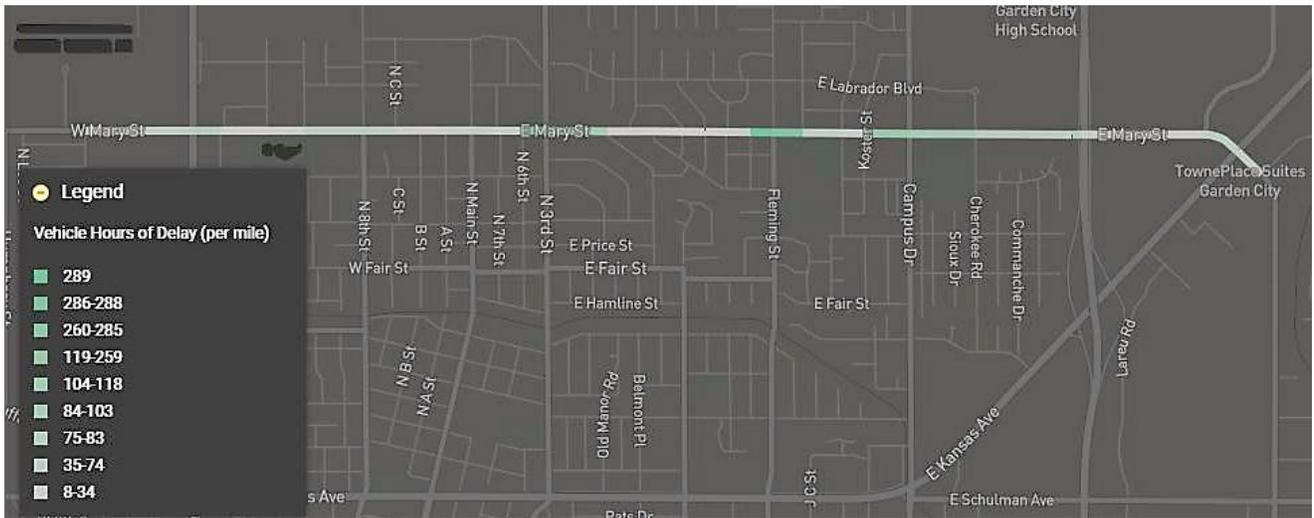


Figure 8 - Vehicle Delay along Mary Street (StreetLight)

Figure 9 illustrates the segments of Mary Street that are considered congested during the PM peak hour based on StreetLight analytics. As shown in the figure, nearly all segments approaching a traffic signal are considered congested. During the weekday PM peak, the StreetLight Congestion Factor for Mary Street is 29%, which is the percentage of vehicle miles traveled on the corridor that are in heavy congestion, where vehicles are traveling at or below 80% of the free-flow speed.

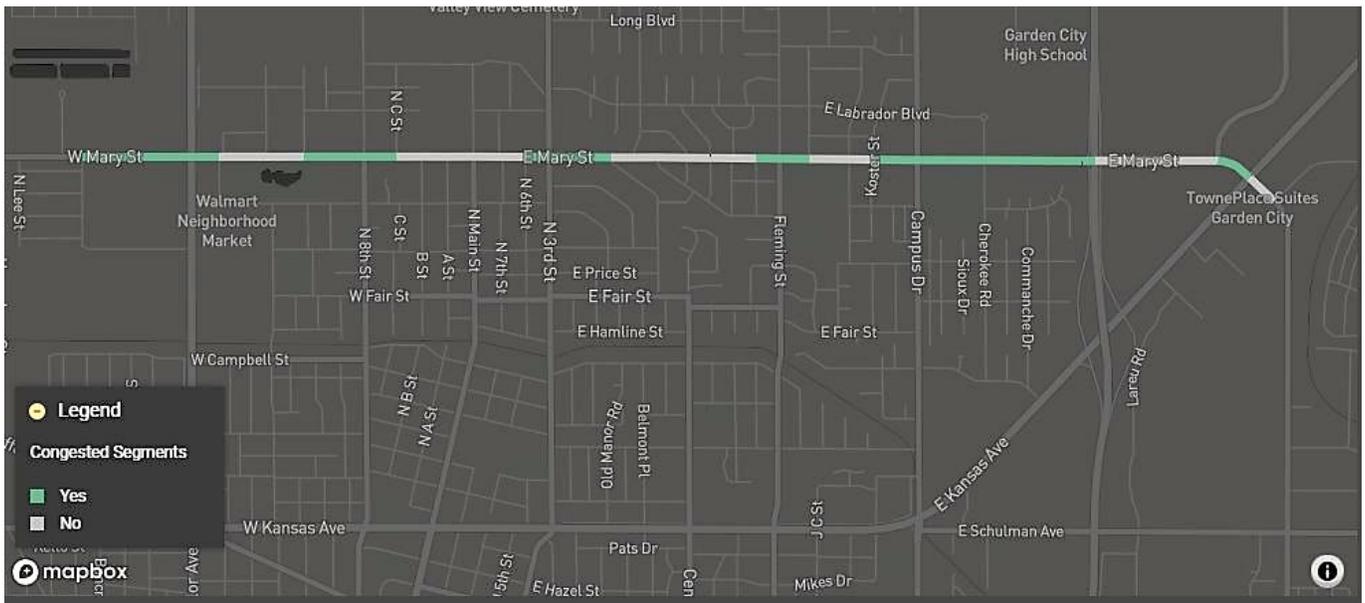


Figure 9 - Congested Segments of Mary Street – PM peak (StreetLight)

Speed Limits and Analysis

The posted speed limit along Mary Street is 40 mph across the study corridor. Vehicle speed data was collected at four locations, summarized in Figure 10 using the 85th percentile speed in both the westbound and eastbound directions on Mary Street. The 85th percentile vehicle speeds generally don't exceed 5 mph over the posted 40 mph except heading eastbound on Mary Street in between 3rd and Fleming Streets. The average 85th percentile speed across the corridor is about 44.9 mph.

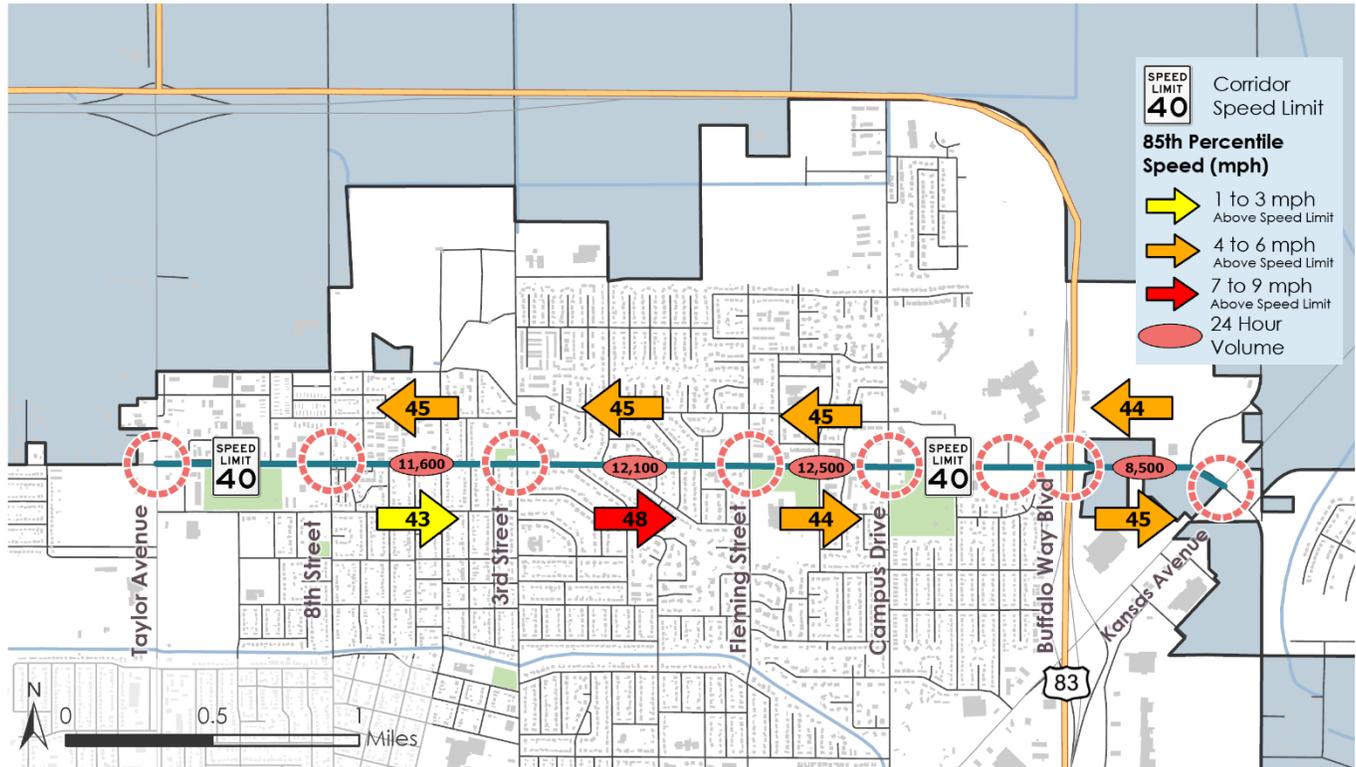


Figure 10 - Mary Street Speed Limits and Vehicle Speeds Summary

Bicycle and Pedestrian Connectivity

Data on existing and missing sidewalks, marked crosswalks, and pedestrian signal phasing were conducted using both desktop review and field observations. Pedestrian infrastructure such as crosswalks and sidewalk gaps along Mary Street are identified in Figure 11. Pedestrian signal phasing exists at most of the signalized intersections but are absent at the Taylor Avenue and U.S. 83 signals – U.S. 83 also doesn't have sidewalks in or around the intersection or any crosswalks. Of the intersections that have pedestrian signal phasing, there are no countdown timers at 8th Street, Fleming Street, and Campus Drive.

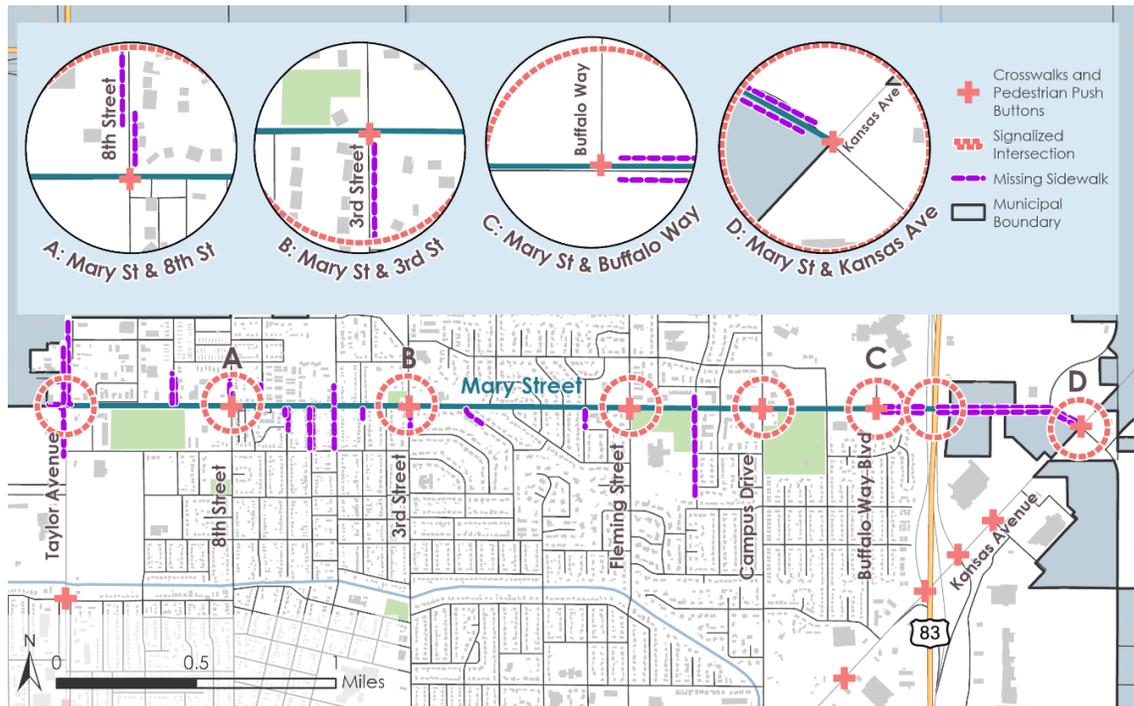


Figure 11 – Pedestrian Infrastructure along Mary Street

Existing sidewalks are mostly attached to the roadway curb (with some sections detached from the roadway), vary from about 3 to 5 feet in width and look generally like Figure 12. There are no sidewalks on Mary Street from Buffalo Way Boulevard east to Kansas Avenue. The Taylor and U.S. 83 intersections also lack marked crosswalks. The crosswalks that are marked include: standard, continental, and brick markings. There is one recently installed marked crosswalk with Rectangular Rapid Flashing Beacon (RRFB) pedestrian warning signage at the B Street intersection near 8th Street.



Figure 12 - Photos showing examples of attached (left) and detached (right) sidewalks along Mary Street

Mary Street RSA Corridor

Figure 13 shows trail and bicycle infrastructure that was sourced from the Garden City Comprehensive Plan (2021). Currently, there is one marked bike lane touching Mary Street – on Campus Drive south of Mary Street, shown in Figure 14. The comprehensive plan called for the installation of a similar bike lane on Main Street heading both north and south of Mary Street.

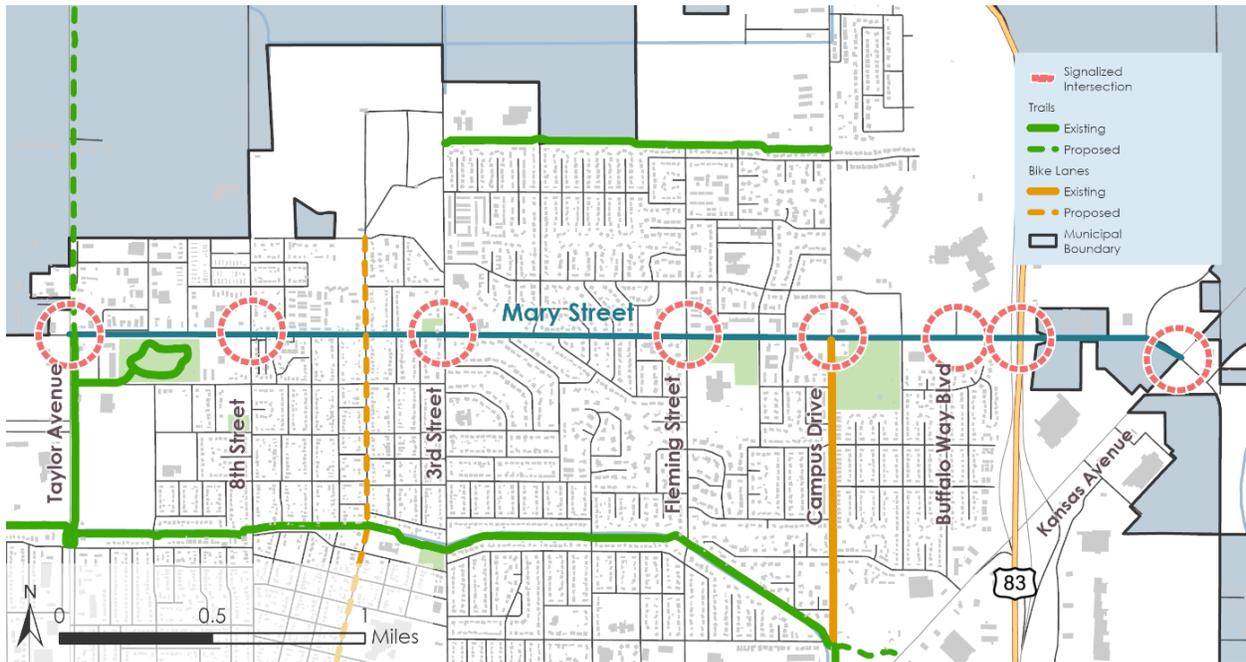


Figure 13 – Trail and Bike Lane Infrastructure near Mary Street

The Talley Trail connects to Mary Street at the Taylor Avenue intersection and is planned to be extended north to U.S. 400.



Figure 14 - Photo of bike lane on Campus Drive

Mary Street RSA Corridor

Pedestrian and cyclist count data were collected at the eight signalized intersections over a 13-hour period (6:00am to 7:00pm) during the same time the turning movement counts were captured, shown in Figure 15. The Mary Street and Fleming Street intersection saw the most pedestrian activity with 27 pedestrian crossings. The Buffalo Way Boulevard intersection saw 11 pedestrian movements most likely associated with Garden City High School. There were very few cyclist movements observed at any of the intersections - 8th Street saw the most with 3. Cyclists may be using alternative paths to traverse east-west across Garden City, or the study period may not have captured their movements

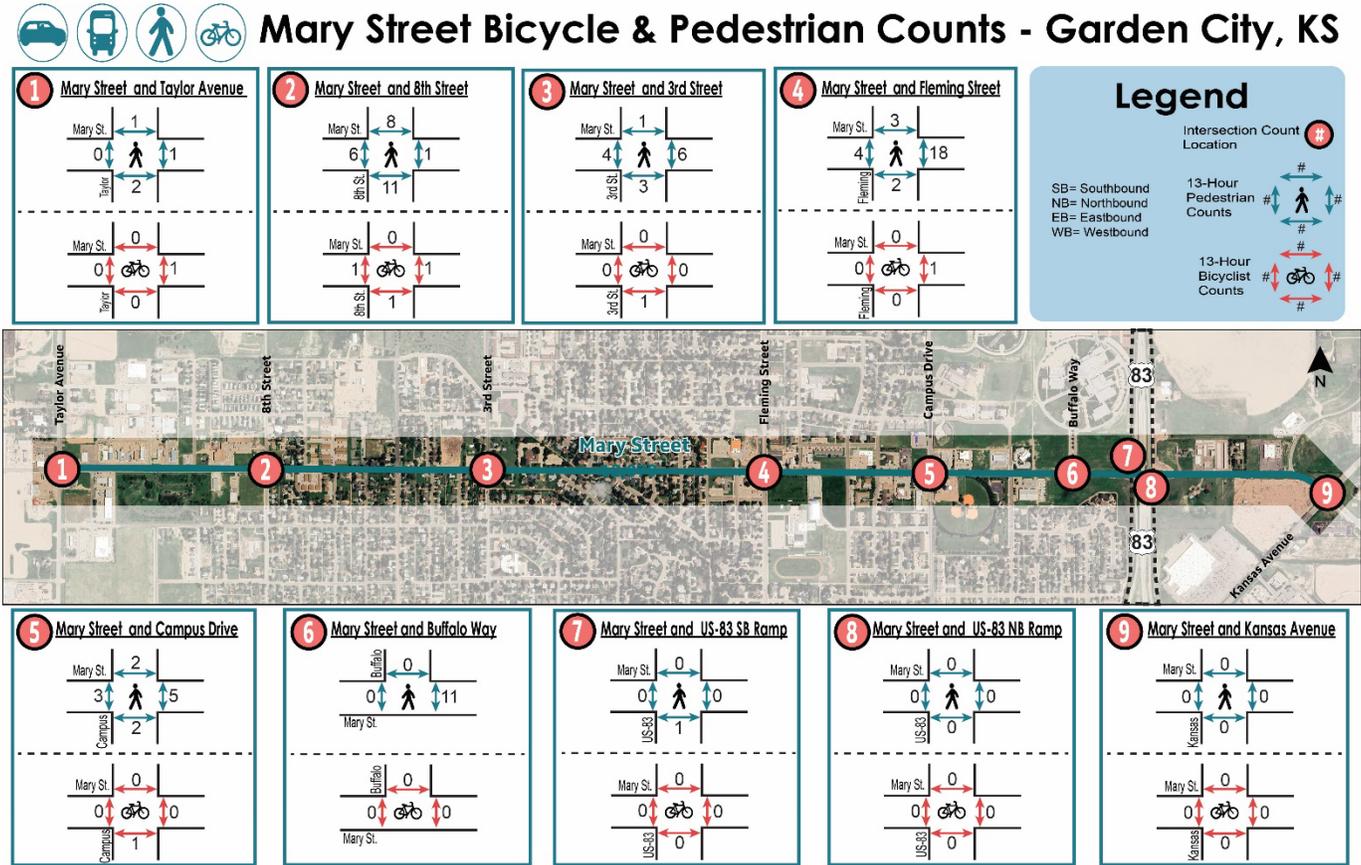


Figure 15 - 13-hour Bicycle and Pedestrian Counts

Transit Connections

Garden City provides public transportation services, Finney County – City Link, to over 35,000+ people. Their services include four fixed route bus service with 65 stops throughout the city, as well as paratransit services via their mini-bus program. Figure 16 displays the bus routes and stops nearest to the Mary Street corridor. There are about 7 stops within a block of Mary Street with the North Ridge Shopping Center stop fronting onto Mary Street just west of 8th Street. Three of the four fixed route loops touch Mary Street – Blue, Green, and Orange. These fixed routes make connections to important points of interest in the area like the Walmart Neighborhood Market, the Apple Garden Apartments, Garden City High School, and the Walmart Supercenter.

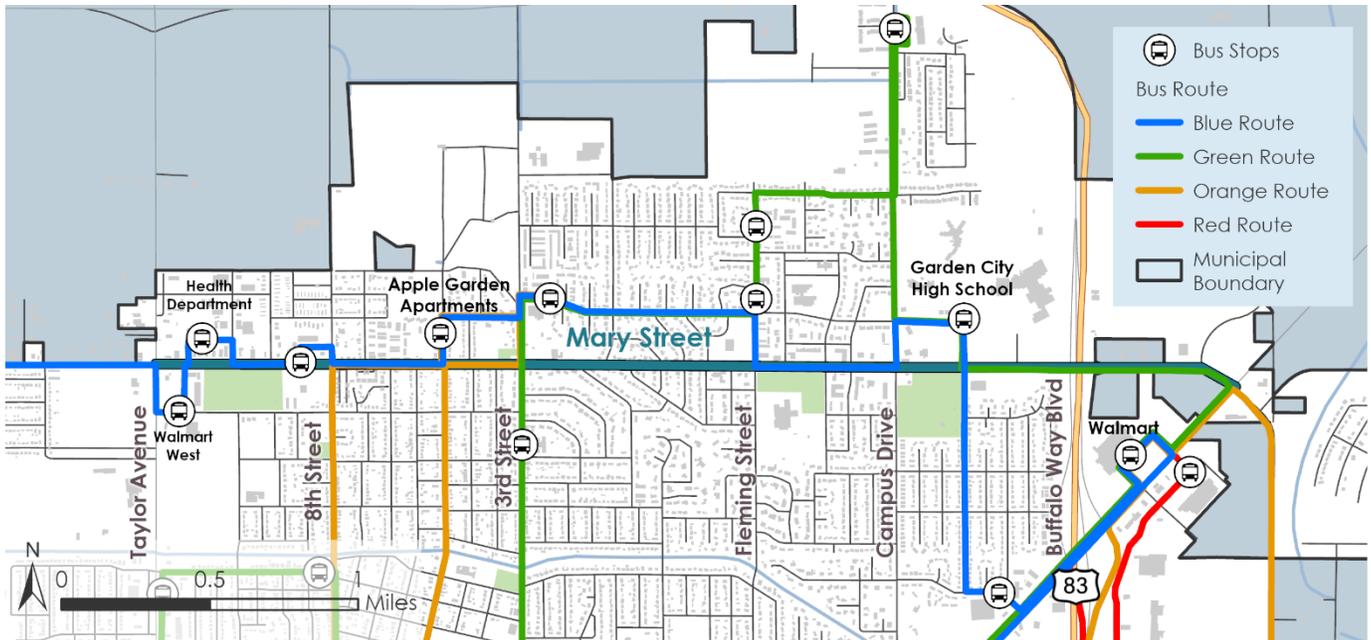


Figure 16 - Finney County City Link - transit stops and fixed routes around the Mary Street corridor area



Figure 17 - Image of City Link bus stop at North Ridge Shopping Center on Mary Street

Crash Analysis

Between 2018 and 2022, 283 crashes occurred along Mary Street within the RSA project limits. There was 1 Fatality, 3 Suspected Serious Injuries (SSI), 57 Injuries, and 222 Property Damage Only (PDO) crashes. Figure 18 summarizes the crash density on the corridor by 500-foot segments and show that most of the crashes are clustering at signalized and unsignalized intersections.



Figure 18 - Corridor crash map overview

Table 3 summarizes the crashes on Mary Street by year and crash severity. Crashes resulting in fatal, serious, and other injuries accounted for about 22% of all crashes on Mary Street, which is just above the 19% overall rate for Garden City. Crashes have also steadily increased over time on Mary Street since 2020, including crashes resulting in injuries. One fatal crash occurred on February 16, 2020, at the intersection with U.S. 83 in which an eastbound driver ran a red light and collided with a southbound vehicle. During the same period, there were three crashes involving pedestrians/cyclists.

Table 3 - Mary Street Corridor Wide Crash Summary

Corridor-wide Crash Summary					
Crash Year	Fatal	Serious Injury	Injury	PDO	Total
2018	0	2	12	58	72
2019	0	0	9	52	61
2020	1	0	8	37	46
2021	0	0	16	35	51
2022	0	1	12	40	53
TOTAL	1	3	57	222	283
PERCENTAGE	0.35%	1.06%	20.14%	78.45%	100%

Most of the crashes, as shown in Figure 20, were the result of rear end or angle crashes. The most common vehicle maneuvers leading up to an angle crash were straight/following road (55%)

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and a left turn (28%). Almost half of all fatal, serious injury, and injury crashes were angle crashes (42%) – most of which occurred when both vehicles were driving straight and crashed in a “T-bone” fashion, shown graphically in Figure 19.

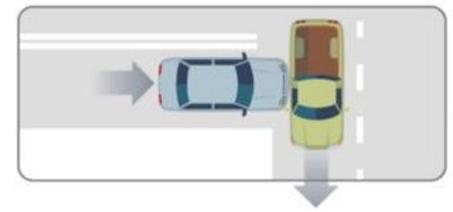


Figure 19 - Diagram of an Angle - Straight/Following the Road crash (Source: Massachusetts Crash Report Manual)

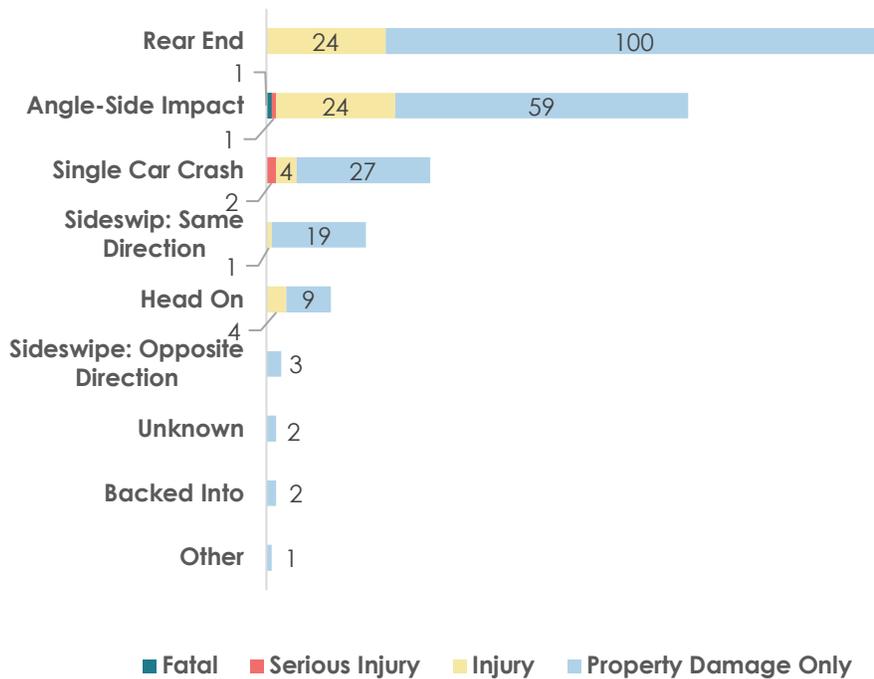


Figure 20 - Mary Street Crash Summary (2018 to 2022)

Figure 21 breaks down the type of single car crashes that occurred – accounting for two of the three serious injury crashes. The non-collision event was the result of an occupant protection issue in which a passenger fell out of a vehicle coming to a stop at the Fleming Street intersection.

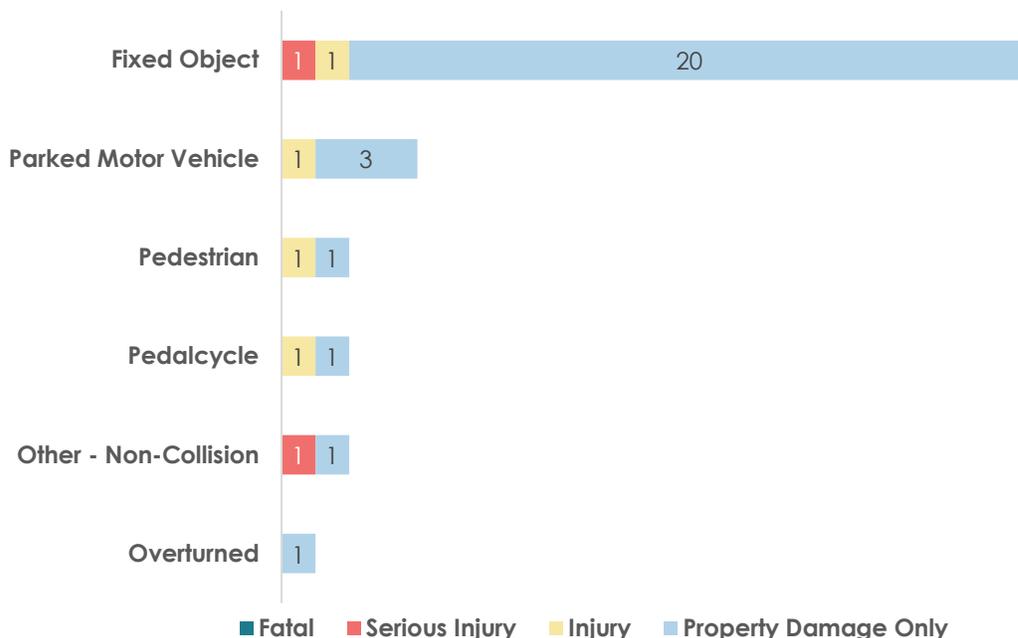


Figure 21 - Mary Street Single Car Crashes by Type

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Figure 22 summarizes the location of crashes on Mary Street with most of the crashes occurring at an intersection mostly at signalized intersections (148). Intersections typically have a higher risk for crashes with a higher number of conflict points and more turning vehicles. This is a higher percentage than the total crashes occurring at an intersection for Garden City (57%) in the same period.

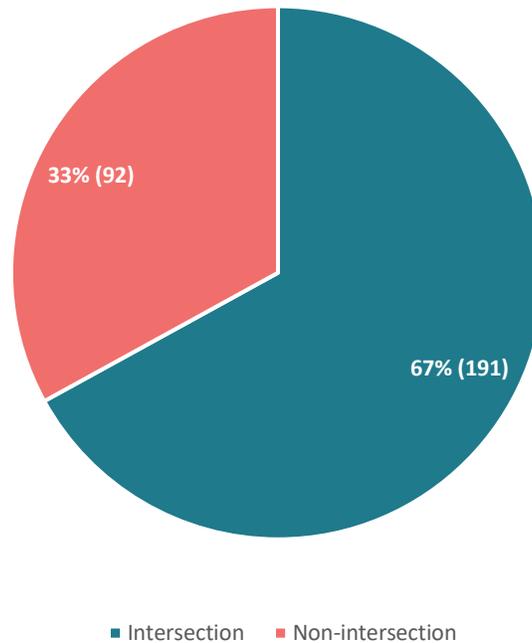


Figure 22 - Crashes by Location

Figure 23 summarizes the crashes on Mary Street by hour of the day and compares it to the average hourly traffic volumes on Mary Street. The number of hourly crashes generally follows the peaks of hourly traffic volumes, with the AM peak traffic hour (7am to 8am) matching the peak in hourly crashes in the morning. However, the peak for hourly crashes in the afternoon occurs from 3pm to 4pm while the hourly traffic peaks both at 3pm and 5pm. These crashes occurred from 2018 to 2022 during which traffic volumes fluctuated due to the COVID-19 pandemic and a portion of the population staying home more and driving less. The traffic volume shown on the graph was collected on a single day in Spring 2024 and does not necessarily reflect the average volumes over the time period of the crashes. Garden City High School also has access to Mary Street at the Buffalo Way Boulevard intersection. The school times are from 7:50 am to 3:20 pm, which are the times that parents also drop-off/pick-up their students. The peaks in crash frequency at these times could indicate traffic congestion issues due to school-related activity that increase crash risk during the morning/afternoon.

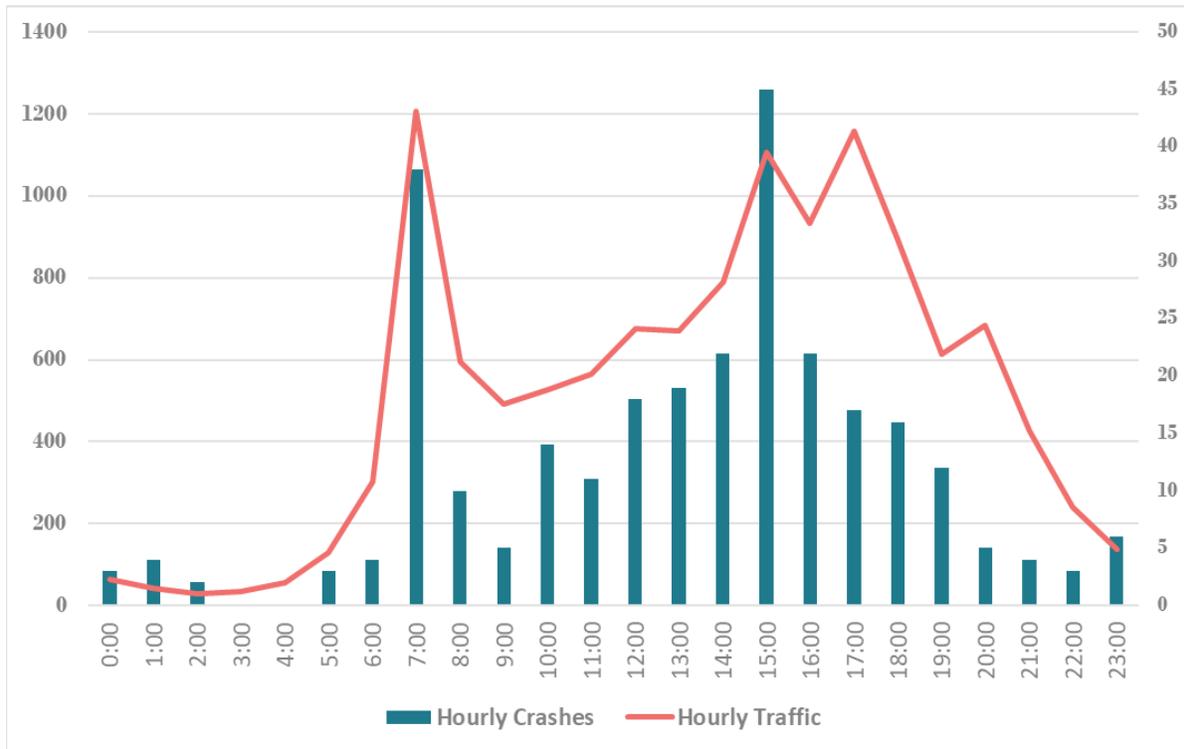


Figure 23 - Traffic Volumes and Crashes by Hour on Mary Street

Table 4 summarizes the number of crashes at each of the signalized intersections along Mary Street and gives the crash rate per 1 million entering vehicles at each of the intersections as well as the critical crash ratio. A value above 1 indicates a higher-than-expected crash rate in comparison to similar intersections in Kansas, which warrants further investigation. Four of the signalized intersections exceeded the critical crash rate: Taylor Avenue, 8th Street, Campus Drive, and U.S. 83.

Table 4 - Signalized Intersection Crash Summary on Mary Street

Signalized Intersection Crash Summary								
Intersection	Entering Volume (vpd)	Fatal	Serious Injury	Injury	PDO	Total	Crash Rate ¹	Critical Crash Ratio ²
Taylor	13900	0	0	4	17	21	0.83	1.27
8th	13300	0	0	9	16	25	1.03	1.58
3rd	16300	0	0	3	12	15	0.50	0.77
Fleming	17000	0	1	1	16	18	0.58	0.89
Campus	19000	0	0	4	24	28	0.81	1.24
Buffalo	12700	0	0	3	9	12	0.52	0.79
U.S. 83	10000	1	1	5	9	16	0.88	1.34
Kansas	11600	0	1	3	9	13	0.61	0.94

¹Crashes/1 million entering vehicles

²The critical crash ratio compares the actual crash rate to the critical crash rate for similar intersections in Kansas. A value above 1 suggests a higher-than-expected crash rate.

Table 5 breaks down the types of crashes that occurred at each signalized intersection. The two most common crash types at signalized intersections were rear-end (40.5%) and angle (33.8%) crashes. Rear end crashes were most common at the intersections with Campus and Fleming, which are also the intersections with the highest entering volume of vehicles per day. 8th Street had by far the most angle crashes – double the intersection with the second most. Both of the bicycle-involved crashes occurred at intersections, one at 3rd and Mary and the other at 8th and Mary, indicating the increased crash risk for vulnerable road users at signalized intersections.

Table 5 - Signalized Intersection Crash Types Summary

Signalized Intersection Crash Types					
Intersection	Angle	Rear End	Sideswipe	Head On	Other
Taylor	6	9	1	2	3
8th	18	2	1	3	1
3rd	2	8	3	0	2
Fleming	0	13	2	2	1
Campus	5	15	4	1	3
Buffalo	3	7	1	1	0
U.S. 83	9	3	1	2	1
Kansas	7	3	0	0	3
TOTAL	50	60	13	11	14
PERCENTAGE	33.8%	40.5%	8.8%	7.4%	9.5%

Table 6 summarizes the crashes on each street segment between the signalized intersections and includes the crash rate per 1 million vehicle miles traveled, which is based on the segment length and traffic volume. The roadway segment crashes occurred at both non-intersection and unsignalized intersection locations. All the segments were made up of mostly non-intersection crashes.

The average crash rate for the segments along Mary Street is **2.21**. Three of the segments were above the average crash rate for the corridor, 8th Street to 3rd Street, Fleming Street to Campus Drive, and Campus Drive to Buffalo Way Boulevard. For all three of these segments, the crash locations were split about halfway between occurring at an unsignalized intersection and occurring at a non-intersection location. The Mary Street intersection between Campus and Buffalo Way at Cherokee street was the unsignalized intersection with the most crashes with 18.

Table 6 - Roadway Segment Crash Summary

Roadway Segment Crash Summary							
Segments	Length (mi)	Volume (vpd)	Injury	PDO	Total	% Non-intersection	Crash Rate
Taylor to 8th	0.47	9050	1	13	14	50%	1.80
8th to 3rd	0.5	11400	5	27	32	50%	3.08
3rd to Fleming	0.63	11900	1	14	15	80%	1.10
Fleming to Campus	0.37	12800	3	27	30	56%	3.47
Campus to Buffalo	0.32	11350	11	20	31	52%	4.68
Buffalo to U.S. 83	0.16	8900	1	1	2	100%	0.77
U.S. 83 to Kansas	0.43	8150	0	4	4	75%	0.63
*Crashes/1 million vehicle-miles traveled							

Table 7 summarizes the crash types that occurred on each segment of Mary Street. The most common crash types on segments included rear end (47%), angle (24%), and fixed object (11%). The angle crashes mostly occurred with straight/following the road (52%), left turn (19%), and right turn (13%) vehicle maneuvers. The segment between Campus Drive and Buffalo Way Boulevard saw the most angle crashes - the two-way stop-controlled intersection at Cherokee Road accounted for over half of these angle crashes.

The only pedestrian involved crash occurred on the segment between Campus Drive and Buffalo Way Boulevard at the Cherokee Road intersection, near Garden City High School.

Table 7 - Roadway Segment Crash Types Summary

Roadway Segment Crash Types						
Segments	Angle	Rear End	Sideswipe	Head On	Fixed Object	Other
Taylor to 8th	6	5	0	0	3	0
8th to 3rd	6	13	2	1	7	4
3rd to Fleming	1	7	3	0	3	1
Fleming to Campus	7	16	2	2	1	2
Campus to Buffalo	9	17	2	0	1	2
Buffalo to U.S. 83	1	1	0	0	0	0
US83 to Kansas	1	2	1	0	0	0
Total	31	61	10	3	15	9

Percentage	24.0%	47.3%	7.8%	2.3%	11.6%	7.0%
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The results of the safety assessment of the corridor is presented later in the report.

Public Feedback

The Task Force and additional stakeholders met to provide input and perspectives about roadway safety concerns and issues for the overall U.S. 83 Communities Roadway Safety Plan study area. A moderator led participants through a visioning exercise.

At a pop-up at the Garden City Fall Fest, the public provided comments on Mary Street, which included:

- Intersection concerns at Mary Street and Buffalo Way Boulevard in the morning



Participants believed the Safety Action Plan could lead to improved safety, enhanced traffic flow, and better planning for the future. The top concerns were as follows.

- Safety
- Truck traffic
- Bike/Pedestrian accommodations
- Improved traffic flow
- Better Signage

Previous improvements to Mary Street to improve conditions have been considered and discussed by the City in public City Commission meetings and in the City's public Capital Improvement Planning (CIP) process. These include:

- Widening at Fleming Street to provide for left turn lanes at the intersection
 - The widening at Fleming was conceptualized and considered by the City Commission, but not carried to project development stage at this time.
- Addition of a mid-block crossing with RRFB treatment near B Street
 - Requested for crossing between apartments and Mosque and was completed in 2023.

Corridor-Wide Observations



Figure 24 - General observations on Mary Street

The following section summarizes general observations that apply to the project corridor.

Road Users

The following road users were observed along the corridor, Figure 25:

- Bicyclists/shared scooters
- Pedestrians
- Vehicles
- Buses
- Motorcycles
- Large Trucks



Figure 25 - Examples of road users

Observations and Issues

Pedestrian Infrastructure

- Most curb ramps lacked truncated domes.
- Several locations had non- ADA-compliant curb ramps
- The use of pedestrian countdown signals was inconsistent at intersections along the corridor.
- The sidewalks west of E Lamplighter Lane were narrow (approximately three feet) and blocked by objects such as mailboxes and power poles (Figure 26 and Figure 27).
- There were no sidewalks east of Buffalo Way Boulevard and most sidewalks were abutting curb.

Signing and Striping



Figure 27 - Narrow sidewalk with obstruction



Figure 26 - Non-ADA compliant pedestrian curb with pole obstruction

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- There were several locations at signalized intersections where crosswalk striping was not found or was faded at the time of the field visits (Figure 28).
- Most unsignalized intersections do not have stop lines at Mary Street.



Figure 28 - Faded crosswalk that needs to be repainted

- The 11th edition of the *Manual on Uniform Traffic Control Devices (MUTCD)* states: "Stop lines may be used to indicate the point behind which vehicles are required to stop in compliance with a STOP (R1-1) sign, ... or some other traffic control device that requires vehicles to stop, except YIELD signs that are not associated with passive grade crossings" (page 573). The guidance provided indicates: "Stop lines should be used to indicate the point behind which vehicles are required to stop in compliance with a traffic control signal (see Section 4D.08)." While stop lines are not required at stop-controlled intersections, they may be added to improve compliance with stop signs where yielding to them is a concern.
- There are no left turn lanes on Mary Street between Campus Drive and Taylor Ave. Left-turn lanes exist at Taylor Avenue/ U.S. 83B, Campus Drive, Buffalo Way Boulevard, and Kansas Avenue.

Corridor-Wide Recommendations

The recommendations in Table 8 are based on the collaborative effort of the RSA multidisciplinary team and stakeholder interviews, as well as on the team's experience driving and walking the corridor.

The time frame for each recommendation is based on time for plan, design, construction and funding of the project. It is broken down into three categories:

- Short-term: 0 to 3 years
- Medium-term: 3 to 5 years
- Long-term: 5 to 10 years

The cost estimates for each recommendation is given at a high level 10% planning phase and may fluctuate based on the final design. The total cost estimates are broken down into three categories:

- Low cost: Less than \$50,000
- Medium cost: Between \$50,000 and \$200,000
- High cost: Greater than \$200,000

Table 8 - Mary Street Corridor Wide Recommendations

ID	Corridor-Wide Recommendations	Time Frame	Cost Estimate ¹
1	Implement a Road Diet along the Mary Street Corridor	Medium	Low to High
2	Install flashing yellow arrows on signal heads at dedicated left turn lanes	Short	Medium
3	Implement traffic signal coordination along Mary Street	Short	Low
4	Install signal head backplates with retroreflective borders	Short	Low
5	Implement durable pavement markings along corridor when re-striping.	Short	Low
6	ADA Improvements	Long	Medium

¹Cost estimate shows high level costs at 10% planning phase. Cost may fluctuate based on design. For example, road diet implementation cost may higher if signals are rebuilt as a part of the project or lower if done in conjunction with scheduled roadway re-striping.

1. Road Diet Analysis

Road Diet Benefits and Feasibility

In the Garden City Comprehensive Plan (2021) and in the Traffic Study of Corridors and Intersections by Professional Engineering Consultants (PEC, 2016), Mary Street is identified as a candidate for a conversion to a complete street through a road diet process. A Road Diet, or roadway reconfiguration, can improve safety, calm traffic, provide better mobility and access for all road users, and enhance overall quality of life. A Road Diet typically involves converting an existing four-lane undivided roadway to a three-lane roadway consisting of two through lanes and a center two-way left-turn lane (TWLTL), as shown in Figure 29. The benefits of a Road Diet installation may include:

- Reduction of rear-end and left-turn crashes due to the dedicated left-turn lane.
- Reduced right-angle crashes as side street motorists cross three versus four travel lanes.
- Fewer lanes for pedestrians to cross.
- Opportunity to install pedestrian refuge islands, bicycle lanes, on-street parking, or transit stops.
- Traffic calming and more consistent speeds.
- A more community-focused, multimodal street environment that better accommodates the needs of all road users.

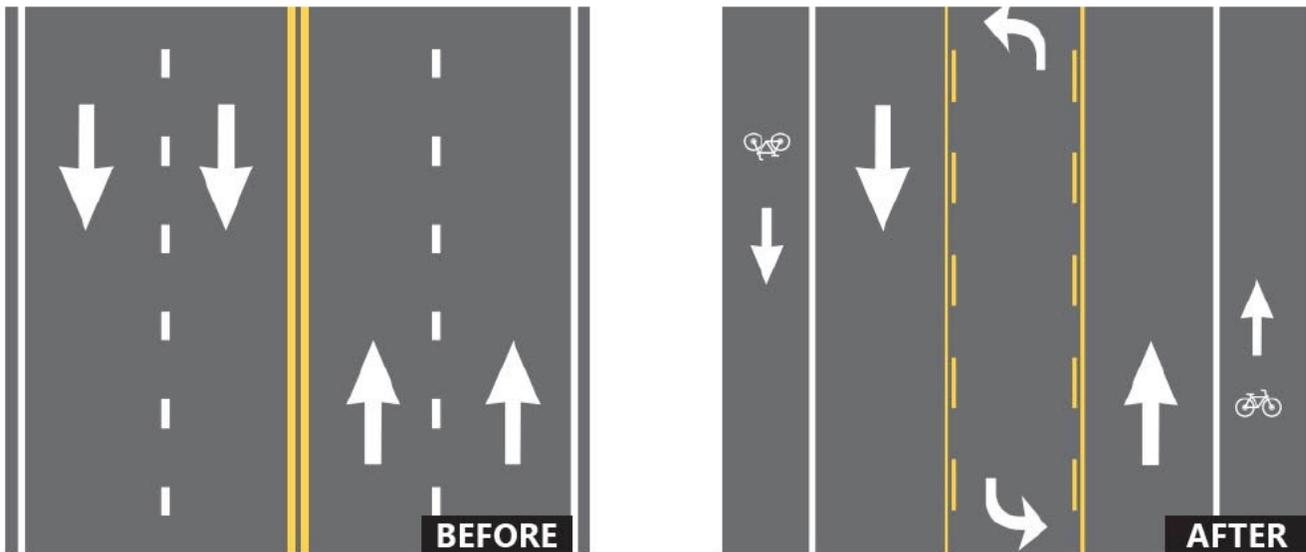


Figure 29 - Before and after example of a Road Diet. Source: FHWA

The Federal Highway Administration (FHWA) provides the following guidance on the feasibility of road diet conversions in relation to the volume of traffic carried by the roadway:

- Roadways with ADT of 20,000 vpd or less may be good candidates for a Road Diet and should be evaluated for feasibility
 - Daily traffic on Mary Street reaches a maximum of approximately 13,000 vpd east of Fleming St
- Feasibility based on hourly traffic volumes:

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- Probably feasible at or below 750 vehicles per hour per direction (vphpd) during the peak hour.
- Consider cautiously between 750 – 875 vphpd during the peak hour.
- Feasibility less likely above 875 vphpd during the peak hour and expect reduced arterial LOS during the peak period.
 - Hourly traffic on Mary Street reaches a maximum of approximately 665 vph in the EB direction between Fleming Street and Campus Drive during the 7:00-8:00 a.m. hour and 640 vph in the WB direction between Fleming Street and Campus Drive during the 3:00-4:00 p.m. hour.

The peak hour volume in the peak direction will be the measure of volume driving the analysis and can determine whether the Road Diet can be feasibly implemented. This is the traffic volume that would be used in calculating LOS analysis for intersections or the arterial corridor.

Mary Street Road Diet Analysis

Given its likely feasibility and the potential significant benefits it could have on roadway safety, a detailed analysis of the potential impacts of a road diet conversion of Mary Street was conducted for this RSA. The traffic modeling and analysis software Synchro was used to conduct the analysis, which was based on the AM and PM peak-hour traffic counts collected in April 2024. The analysis of existing conditions was based on the current signal timings, which are not coordinated between intersections. The analysis of the road diet was based on the assumption that the traffic signals would be re-timed and coordinated in association with a roadway reconfiguration.

Intersection Operations

A comparison of intersection level of service and vehicle queuing between existing conditions and a road diet is summarized in Table 9 and Table 10 respectively.

Table 9 - Mary Street Intersection LOS, Existing Conditions vs. Road Diet

Mary Street Corridor						
Intersection Level of Service, Existing Configuration vs. Road Diet						
Intersection	Existing Conditions		Road Diet*		Difference	
	LOS	Delay	LOS	Delay	LOS	Delay
AM Peak Hour						
Taylor	B	16.3	C	22.8	B -> C	6.5
8th	B	10.2	B	16.3	---	6.4
3rd	C	34.7	C	20.8	---	-13.9
Flemming	D	35.4	C	21.6	D -> C	-13.8
Campus	C	29.7	D	40.0	C -> D	10.3
Buffalo	C	28.1	B	14.7	C -> B	-13.4

Mary Street Corridor						
Intersection Level of Service, Existing Configuration vs. Road Diet						
Intersection	Existing Conditions		Road Diet*		Difference	
	LOS	Delay	LOS	Delay	LOS	Delay
U.S. 83	C	24.7	C	23.3	---	-1.4
Kansas	B	18.3	B	20.0	---	1.7
PM Peak Hour						
Taylor	B	16.3	C	24.8	B -> C	8.5
8th	A	9.8	B	14.5	A -> B	4.7
3rd	C	27.6	B	16.3	C -> B	-11.3
Flemming	C	33.0	B	17.7	C -> B	-15.3
Campus	C	23.0	C	27.1	---	4.1
Buffalo	C	27.8	C	25.5	---	-2.3
U.S. 83	B	19.7	B	19.2	---	-0.5
Kansas	C	21.0	B	19.0	C -> B	-2.0
*The analysis of the Road Diet also included traffic signal coordination						

Table 10 - Mary Street Vehicle Queuing, Existing Conditions vs. Road Diet

Mary Street Corridor									
Vehicle Queuing, Existing Configuration vs. Road Diet									
Intersection	Direction	AM Peak Hour				PM Peak Hour			
		Existing	Road Diet	Difference	%	Existing	Road Diet	Difference	%
Taylor	Eastbound	49	105	56	114%	97	223	126	130%
	Westbound	139	76	-63	-45%	124	165	41	33%
8th	Eastbound	50	165	115	230%	87	170	83	95%
	Westbound	90	188	98	109%	79	203	124	157%
3rd	Eastbound	244	153	-91	-37%	241	125	-116	-48%
	Westbound	261	130	-131	-50%	223	74	-149	-67%
	Eastbound	273	122	-151	-55%	266	135	-131	-49%

Mary Street Corridor										
Vehicle Queuing, Existing Configuration vs. Road Diet										
Intersection	Direction	AM Peak Hour				PM Peak Hour				
		Existing	Road Diet	Difference	%	Existing	Road Diet	Difference	%	
Fleming	Westbound	254	281	27	11%	301	375	74	25%	
Campus	Eastbound	240	435	195	81%	141	264	123	87%	
	Westbound	141	261	120	85%	194	330	136	70%	
Buffalo	Eastbound	99	35	-64	65%	60	77	17	28%	
	Westbound	27	88	61	226%	103	140	37	36%	
U.S. 83	Eastbound	100	177	77	77%	129	256	127	98%	
	Westbound	107	230	123	115%	106	143	37	35%	
Kansas	Eastbound	67	30	-37	-55%	96	61	-35	-36%	
	Westbound	97	195	98	101%	74	123	49	66%	

NOTE: Values shown in feet, as reported by Synchro as the 95th percentile queue lengths for the EB/WB through movements.

As shown in the preceding tables, the Taylor Street and 8th Street intersections could be expected to experience minor increases in vehicle delay following a road diet. The vehicle queue lengths on the eastbound and westbound approaches at these intersections can be expected to increase with a road diet over existing conditions, but would not be anything excessive, with 95th percentile queues of up to about 225 feet at Taylor Street and about 200 feet at 8th Street, or 11 and 10 vehicles respectively.

The 3rd Street and Fleming Street intersections could be expected to experience significant improvement to traffic operations following a road diet. Whereas the traffic signals at the 3rd Street and Fleming Street intersections are currently operated with inefficient split phasing (EB/WB approaches “take turns” rather than having a green light concurrently) due to the lack of exclusive left-turn lanes, the left-turn lanes afforded by a road diet would allow the signals to be operated with typical phasing, which would be much more efficient. Furthermore, for the most part, the vehicle queue lengths on the eastbound and westbound approaches at these intersections can be expected to significantly decrease with a road diet over existing conditions, with reductions of roughly 50% on both approaches at 3rd Street and the eastbound approach at Fleming Street. The queue length on the westbound approach at Fleming Street could be expected to increase by a minor amount (11-25%) following a road diet conversion.

The Campus Drive intersection is the critical node along the corridor, as it serves the highest volume of traffic. With a road diet, the level of service can be expected to degrade from LOS C to LOS D during the AM peak hour, but the projected increase in average vehicle delay is only about 10 seconds. During the PM peak hour, the increase in vehicle delay can be expected to

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be even less significant, at only about 4 seconds. Furthermore, the vehicle queue lengths on the eastbound and westbound approaches can be expected to increase with a road diet over existing conditions, with a projected 95th percentile queue length of approximately 435 feet on the eastbound approach during the AM peak hour and approximately 330 feet on the westbound approach during the PM peak hour. A queue of 435 feet on the eastbound approach would extend nearly to Koster Street (with three driveways on the south side of Mary Street and two driveways on the north side of Mary Street between Campus Drive and Koster Street) and a queue of 330 feet on the westbound approach would extend just beyond the western driveway of the medical office building on the north side of Mary Street (with two driveways on each side of Mary Street between Campus Drive and the eastern driveway of the medical office building).

Although the analysis of the Mary Street/Campus Drive intersection indicates that it may operate close to its capacity with a road diet during peak periods (volume-to-capacity ratio = 0.91), any congestion that occurs may be short lived. The daily traffic count collected on Mary Street just west of Campus Drive was plotted in 15-minute increments, as shown in Figure 30. The data indicates that the peak periods of traffic in the vicinity of the Mary Street/Campus Drive intersection are brief, with one 15-minute period in the morning (EB, 7:30-7:45) and two 15-minute periods in the afternoon (WB, 3:00-3:30) having a directional volume greater than 200 vehicles, which is likely due to the proximity of the high school. The traffic analysis conducted for this RSA is based on the heaviest 15-minute period in the AM and PM peak hours, by use of the peak-hour factors (PHF) as determined from the intersection counts (PHF = 0.70 in the AM, PHF = 0.78 in the PM). Thus, it is expected that there would be limited, if any, congestion at the intersection outside of these brief periods. Furthermore, any congestion that may occur during these brief periods would likely only develop on days during which school is in session, since the traffic generated by the high school is likely the cause of the spikes in traffic volumes.

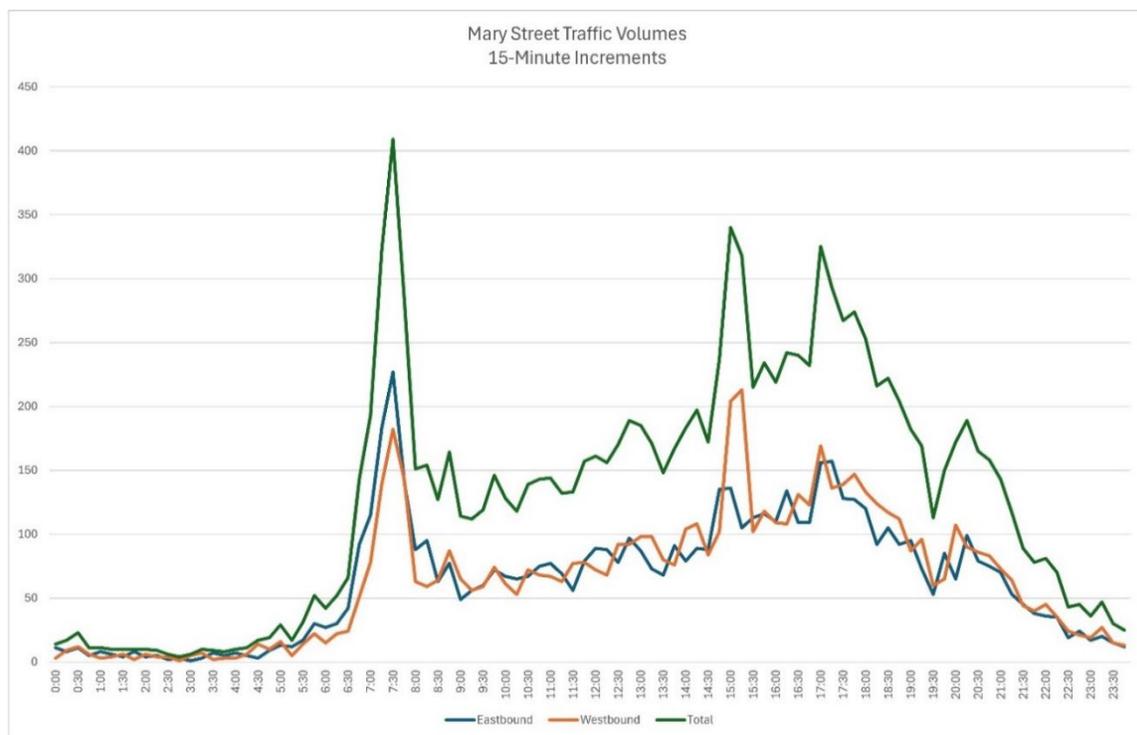


Figure 30 - Mary Street Traffic in 15-Minute Increments

The Buffalo Way Boulevard intersection could be expected to experience significant

improvement to traffic operations following a road diet, particularly during the AM peak hour. Whereas the very heavy eastbound left-turn traffic volume (during school peak periods) is currently served by one exclusive turn lane and a shared left-turn/through lane, with a road diet the eastbound left-turn movement could be served by two exclusive turn lanes. Furthermore, for the most part, the vehicle queue lengths on the eastbound and westbound approaches at these intersections can be expected to only slightly increase with a road diet over existing conditions. The queue length on the eastbound approach could be expected to slightly decrease in the AM peak hour.

The U.S. 83 and Kansas Avenue intersections could be expected to have essentially the same level of service following a road diet, with very slight decreases in vehicle delay predicted by the analysis. For the most part, the vehicle queue lengths on the eastbound and westbound approaches at these intersections can be expected to increase with a road diet over existing conditions, but would not be anything excessive, with 95th percentile queues of up to about 255 feet at U.S. 83 and about 200 feet at Kansas Avenue (12 and 10 vehicles respectively).

Arterial Operations

The Synchro traffic model was also used to evaluate the operations of the Mary Street corridor as a whole. The results of the arterial level of service analysis are summarized in Table 11, with a comparison of existing conditions with the conditions that could be expected following a road diet in conjunction with traffic signal coordination. Only the signalized intersections along Mary Street were included in the traffic model and thus, the analysis may underestimate the benefits of a road diet on traffic operations, since the lack of left-turn lanes at unsignalized intersections also impacts the flow of traffic along Mary Street.

Table 11 - Mary Street Arterial LOS, Existing Conditions vs. Road Diet

Mary Street Corridor						
Arterial Level of Service, Existing Configuration vs. Road Diet						
			Signal Delay (s)	Travel Time (s)	Arterial Speed ¹	Arterial LOS
AM Peak Hour	Eastbound	Existing	186.0	489.4	23.0	C
		Road Diet	123.1	426.5	26.4	C
		Difference	-62.9	-62.9	3.4	-
		%	-34%	-13%	15%	-
	Westbound	Existing	184.1	473.7	22.8	C
		Road Diet	103.0	392.6	27.5	C
		Difference	-81.1	-81.1	4.7	-
		%	-44%	-17%	21%	-
PM Peak Hour	Eastbound	Existing	163.4	466.8	24.1	C
		Road Diet	90.0	394.3	28.5	B
		Difference	-72.5	-72.5	4.4	C -> B
		%	-44%	-16%	18%	C -> B
	Westbound	Existing	183.7	473.3	22.8	C
		Road Diet	96.4	386.0	27.9	C
		Difference	-87.3	-87.3	5.1	-
		%	-48%	-18%	22%	-

¹ Arterial Speed is the average speed over the length of the corridor.

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As shown in the preceding table, delay experienced at traffic signals by drivers traveling along Mary Street could be expected to decrease in both directions and during both peak hours with a road diet, as compared to existing conditions. Decreases of between 63 and 87 seconds of signal delay over the three-mile-long corridor could be expected, representing a reduction in travel time from one end of the corridor to the other of 13-18%. The analysis indicates the corridor currently operates at LOS C and can be expected to remain at LOS C for both directions during both peak hours with a road diet, with the exception of the eastbound direction during the PM peak hour, which is predicted to improve to LOS B.

Safety

As one of FHWA's 28 Proven Safety Countermeasures, the road diet is a strategy with a demonstrated effectiveness in reducing roadway fatalities and serious injuries. Studies have shown that road diets can reduce the overall frequency of crashes by 19-47%. Table 12 shows the potential safety benefits of a road diet conversion of Mary Street.

Table 12 -Potential Safety Impact of Mary Street Road Diet

Mary Street Corridor-wide Average Annual Crashes							
Existing Conditions vs. Road Diet							
			Fatal	Serious Inj	Injury	PDO	Total
Existing Conditions (Actual)*			0.2	0.4	10.8	43.0	54.4
Road Diet Reduction	Min	19%	0.0	0.1	2.1	8.2	10.3
	Max	47%	0.1	0.2	5.1	20.2	25.6
Road Diet Conditions (Predicted)	Max		0.2	0.3	8.7	34.8	44.1
	Min		0.1	0.2	5.7	22.8	28.8
*Based on 2018-2022 data							

As shown in the table, a road diet could be expected to prevent 10-26 crashes per year along Mary Street between Taylor Street and Kansas Avenue.

Impact of Future Traffic Growth on Road Diet Feasibility

A previous study conducted for Garden City, the Traffic Study of Corridors & Intersections (July 2016), evaluated the feasibility of implementing road diets along four corridors within the city, including Mary Street. The study concluded that "Based on the accepted standards, Mary Street from Taylor Avenue to Fleming Street should be considered for a road diet. In addition, this corridor has a history of crashes that could be reduced with a road diet. The segment east of Fleming Street to U.S. 50/83/400 Bypass should not be converted due to the high peak hour directional volumes." The conclusions of the 2016 study were based on a high-level evaluation that was limited to comparing the existing, and predicted future, traffic volumes along the study corridors with the upper limit of traffic volumes generally considered as a measure for determining good candidates for road diet conversions. Furthermore, the study assumed a conservative traffic growth rate of 3.5%/year, resulting in nearly twice as much traffic over a 20-

Mary Street RSA Corridor

year period. However, the traffic counts collected for this RSA indicate that traffic volumes have been stagnant since the time of the 2016 study and therefore, the previous assumptions of traffic growth were likely overly aggressive.

It is expected that Mary Street would operate very well with a road diet conversion for the foreseeable future based on the following:

- The current daily traffic volume along Mary Street is well below the guidance of maximum volume generally considered as the threshold for road diet feasibility (13,000 vs. 20,000 vpd).
- The peak-hour intersection analysis indicates that all intersections can be expected to operate at LOS B or C following a road diet conversion, which indicates the intersections would have excess capacity even after a reduction in the number of travel lanes.
 - The one exception is the Campus Drive intersection, which can be expected to degrade to LOS D during the AM peak period. However, the peak period of traffic during the morning is very brief, lasting only about 30 minutes. Furthermore, this traffic peak likely only occurs on days in which school is in session.
- The traffic counts collected in April 2024 indicate a lack of traffic growth along Mary Street over the past eight years.

Recommendation

Convert the existing four-lane undivided roadway to a three-lane roadway consisting of two through lanes and a center two-way left-turn lane (TWLTL) – see Section: *Road Diet Analysis* for further discussion and analysis of the potential benefits of a road diet conversion of Mary Street. A Road Diet can be a low-cost safety solution when planned in conjunction with a simple pavement overlay, and the reconfiguration can be accomplished at no additional cost. However, the need for traffic signal modifications or reconstruction to accommodate a Road Diet on Mary Street would need to be evaluated. If required, traffic signal modifications or reconstruction, including flashing yellow arrows (FYA) on signal heads, could add significant cost to a Road Diet conversion of Mary Street. An example cross section of the roadway with a road diet implemented is shown in Figure 31, although the specific lane widths would be determined later.

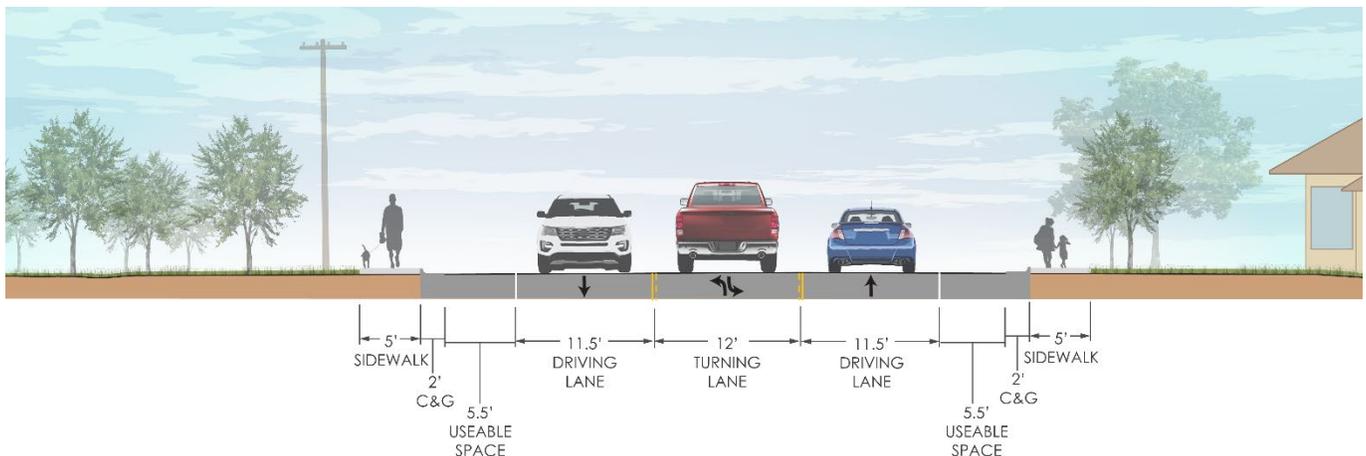


Figure 31 – Mary Street Alternative Roadway Typical Section for Road Diet

2. Install flashing yellow arrow signal heads

The corridor has a mixture of permitted (perm), protected/permissive (prot/perm), and protected-only (prot) left turn operations. Protected left turns give the right-of-way to left turning vehicles, allowing them to turn unimpeded. Permissive left turns allow left turning vehicles to turn, but while yielding to opposing traffic and pedestrians. Protected/permissive phasing utilizes both protected and permissive modes at different times in the signal cycle. Figure 32 shows the signal displays associated with left turn operations. Failure to yield right-of-way crashes resulting from left turns is common at some locations on the corridor. A flashing yellow arrow (FYA) for permissive left-turn movements at signalized intersections helps

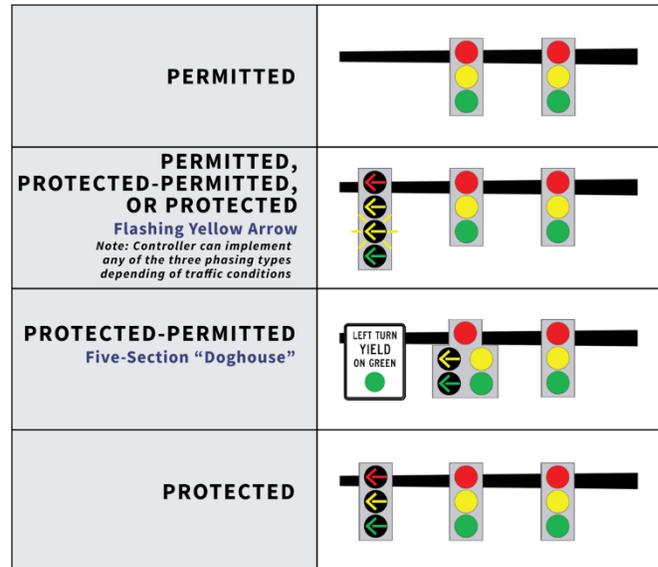


Figure 32 - Left-turn operations

drivers turning left avoid confusion. Confusion may arise from left-turning drivers who see a permissive circular green signal and mistakenly believe that the left turn has the right-of-way over opposing traffic. Furthermore, four-section FYA heads allow for the left turns to be operated differently by time of day (such as protected-only during peak periods and protected/permissive off peak), as well as permitting the safe operation of "lagging" left turns (the left-turn movement receives a green arrow following the green indication for the opposing through movement) by avoiding the "yellow trap" (when left-turning drivers receive a yellow indicator and erroneously believe that the opposing traffic has also received a yellow indication, when in fact, the opposing direction still has a green indication).

Recommendation: Consideration should be given to replacing the existing five-section protected/permissive left-turn signal heads with FYA signal heads where separate left-turn lanes are provided (such as what already exists at the Mary Street/Kansas Avenue intersection). Based on the *Safety Evaluation of Flashing Yellow Arrow at Signalized Intersections* published by FHWA in August 2020, reductions in left-turn crashes of 25% at intersections where FYA is implemented on one road (Table 38 of FHWA report) and of 38% at intersections where FYA is implemented on both roads (Table 39 of FHWA report) could be expected with such a replacement of signal heads.

3. Implement traffic signal coordination along Mary Street

With system coordination, instead of operating independently, the traffic signals along a roadway corridor operate as a group, thereby synchronizing movements and allowing for better progression in a manner that minimizes the number of stops drivers must make (Figure 33). The decision to use coordination should be influenced by a variety of factors, such as the operating environment, roadway users, and community priorities. While coordination can reduce travel time, stops, delay, and queues for the coordinated movements, there may be consequences for the uncoordinated movements. In addition to the enhancements to traffic operations, traffic signal coordination has also been shown to have the potential to improve safety. Findings have suggested that coordination can decrease total crashes along a corridor by 21 percent (CMF ID 9868).

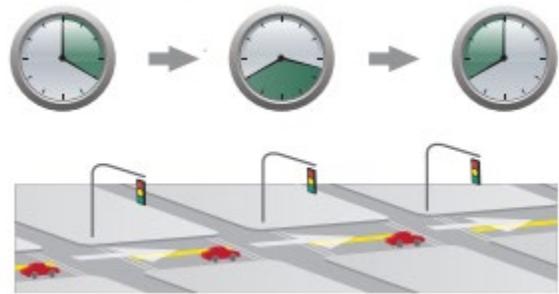


Figure 33 - Traffic Signal Coordination Graphic
(Source: UDOT)

Recommendation: Consider implementing traffic signal coordination along Mary Street.

4. Install signal head backplates with retroreflective borders

Backplates added to a traffic signal head improve the visibility of the illuminated face of the signal by introducing a controlled-contrast background. The improved visibility of a signal head with a backplate is made even more conspicuous by framing it with a 1- to 3-inch yellow retroreflective border. Signal heads that have backplates equipped with retroreflective borders are more visible and conspicuous in both daytime and nighttime conditions. A reduction in total crashes of 15% can be expected at intersections where backplates with retroreflective borders are implemented.

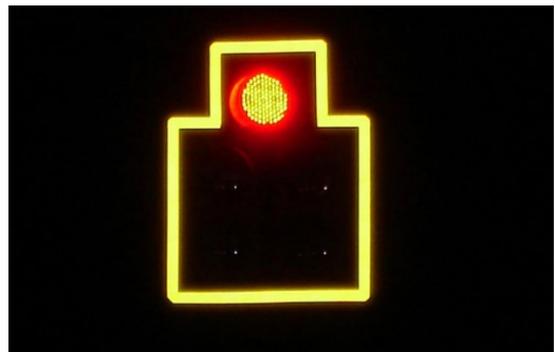


Figure 34 - Retroreflective borders on signal head backplates. (Source: South Carolina DOT)

Recommendation: Consideration should be given to replacing the signal head backplates with retro-reflective backplates (such as what already exists at the Mary Street/Kansas Avenue intersection).

5. Implement durable pavement markings along corridor when re-striping.

While a pavement condition analysis was not performed, the concrete portions of Mary Street are generally in "Good" or better condition as defined by the Pavement Surface Evaluation Rating (PASER) scale, with a few "Fair" areas with cracking and heaving. The asphalt portion and most of the lane striping are in good condition. However, the corridor's markings for crosswalks and stop lines were faded or no longer visible at the time of the field visits. Refer to the City's 2024 Street Inventory/Condition & Maintenance Plan for additional information on pavement conditions.

Recommendations: Evaluate existing pavement markings and as needed, restripe the corridor, including crosswalks and stop lines at signalized intersections. Use high durability pavement markings that last several years rather than traffic paint requiring annual application.

6. ADA Improvements

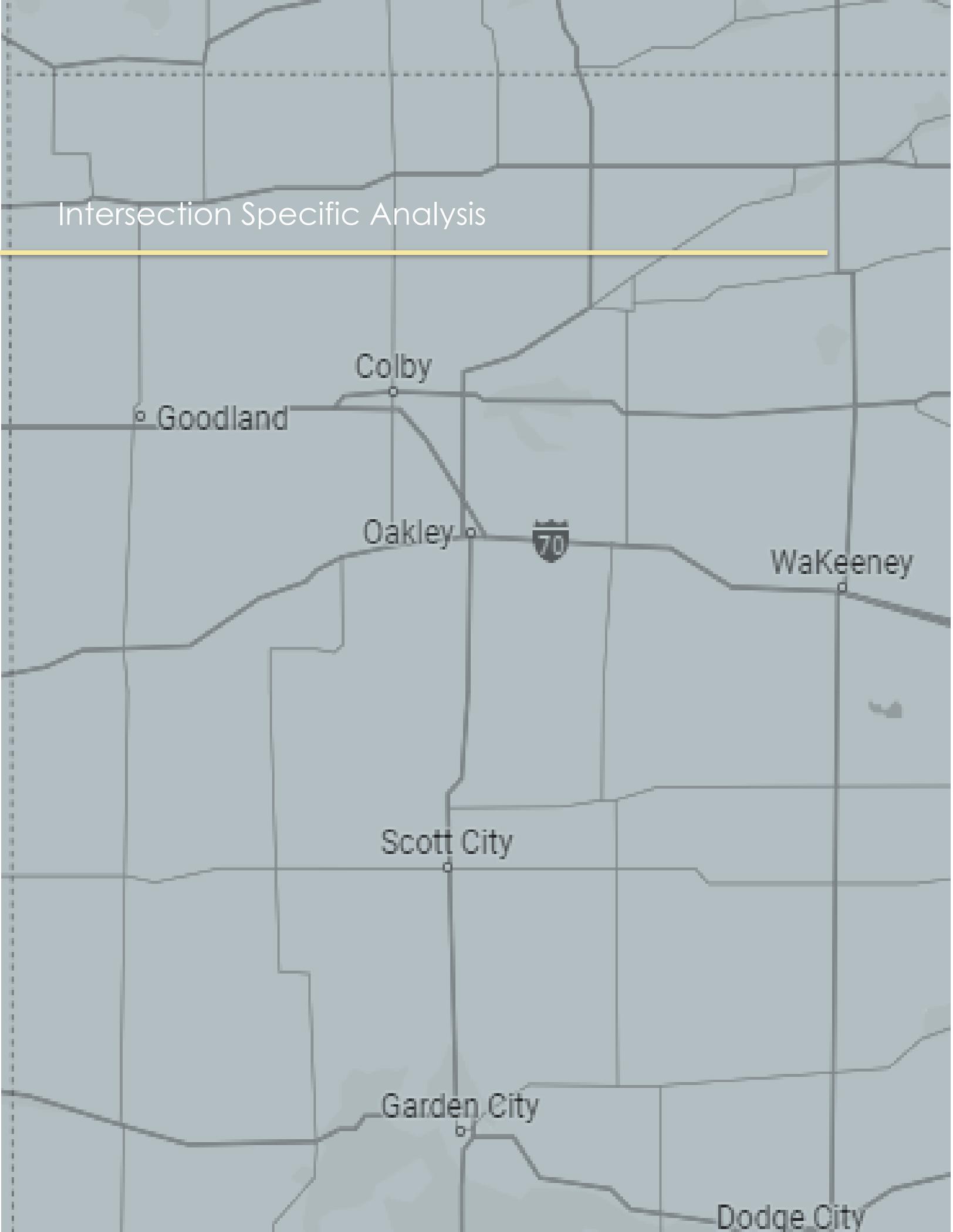
To be ADA-compliant, the Public Right-of-Way Accessibility Guidelines, published by the U.S. Access Board, has specific requirements sidewalks must meet. Requirements that include width, slope, surface texture, and maintenance.

The RSA team observed several factors related to ADA improvements, including curb ramps and landings, cracked or uneven sidewalks, obstructions along the sidewalks (utility or signal poles, mailboxes, etc.), as well as the condition of curbs, gutters, and signal equipment. The RSA team did not complete an ADA audit, and other ADA compliance issues may exist.

Recommendation: While installation of curb ramps at all locations along the corridor currently lacking and fixing non-compliant ramps and sidewalk infrastructure would be ideal, we recognize such a recommendation could be made for most any street corridor in the City. Therefore, we recommend installing or upgrading ramps with alterations of the street, curb, or sidewalk as already required by ADA regulations, as well as when identified as barriers by the public and as prioritized in a Transition Plan.

The City's ADA Transition Plan, currently in development at the time of this analysis, will provide more in-depth data on the status of curb ramps on the corridor and will prioritize curb ramp installations and repairs city-wide. Future phases of the Transition Plan should also focus on the remainder of the pedestrian environment. The RSA team recommends completing rehabilitation maintenance by upgrading existing sidewalks and adding sidewalks along with development to create consistency along the corridor. Expand the narrow sidewalk sections to a width of 5 feet for improved accessibility and safety. Expand connectivity under US-83 to connect with Kansas Avenue and Jennie Barker trail systems, and any upcoming development in the area. We recommend all new sidewalks be offset from the curb or be at least 6 feet wide at back of curb.

Intersection Specific Analysis



Intersection Specific Analysis

Intersection 1: Mary Street & Taylor Avenue

Overview

The Mary Street & Taylor Avenue/U.S. 83B intersection is signalized and represents the western boundary of the project study area, shown in Figure 35. The east leg of Mary Street consists of one westbound through lane, a dedicated left-turn lane, and two eastbound receiving lanes. The west leg of Mary Street includes a dedicated eastbound left-turn lane and two through lanes. The north and south legs of Taylor Avenue include a dedicated left-turn lane and two through lanes. Right-turns must be made from the shared through lane in all directions. There is protected/permissive left-turn phasing for every approach.



Figure 35 - Aerial Image of Taylor Avenue/U.S. 83B Intersection

Attached sidewalks are present on the east and west legs of Mary Street. There are no sidewalks along Taylor Avenue; however, the north leg of the Talley Trail begins on the east side of the intersection running south. The recent Garden City Comprehensive Plan proposed to extend the Talley Trail north of this intersection, indicating that pedestrian signals will be warranted at this intersection in the future (Refer to the Talley Trail RSA for further recommendations related to this development). There is also no pedestrian signal heads at this intersection.

Daily traffic at the intersection is approximately 6,100 VPD on the west leg, 8,200 VPD on the east leg, 5,800 VPD on the north leg, and 7,700 VPD on the south leg.

Crash Review

Table 13 summarizes the crashes that occurred at the Mary Street intersection with Taylor Avenue.

Total Crashes: 21 (4 injury crashes)

Significant Crash Pattern: Rear end, angle – left turn, and angle – straight/following road

Table 13 - Mary Street & Taylor Avenue Intersection Crash Summary

Mary Street & Taylor Avenue Intersection	Injury		PDO		Total	
	Crashes	%	Crashes	%	Crashes	%
Angle - Avoidance maneuver	0	0%	1	5%	1	5%
Angle - Left Turn	1	5%	1	5%	2	10%

Mary Street & Taylor Avenue Intersection	Injury		PDO		Total	
	Crashes	%	Crashes	%	Crashes	%
Angle - Straight/following road	1	5%	2	10%	3	14%
Rear End	2	10%	7	33%	9	43%
Head On	0	0%	2	10%	2	10%
Sideswipe	0	0%	1	5%	1	5%
Fixed Object	0	0%	1	5%	1	5%
Other	0	0%	2	10%	2	10%
Grand Total	4	19%	17	81%	21	100%

Note: Due to rounding for simplicity, percentages may not sum to 100%

Rear end Crash Analysis: There were 9 rear end crashes (2 injury crashes). They were evenly distributed among the approaches to the intersection with the westbound approach having the most (4), but had no injury crashes.

Angle – Left Turn Crash Analysis: There were 2 angle crashes where the vehicle maneuver before the crash was a left turn (1 injury crash). The injury crash occurred when one vehicle was turning left from Mary Street onto Taylor heading south, did not yield to a vehicle heading eastbound on Mary Street, and was hit.

Angle – Straight/following road Crash Analysis: There were 3 angle crashes where the vehicle maneuver before the crash was straight/following the road (1 injury crash). All of these crashes occurred with the first vehicle heading eastbound.

Comments Provided by City Staff and Stakeholders

City staff informed the team that a crash occurred in 2023 which destroyed the southbound signal pole. This crash occurred outside the window of our data set. The injury status of the crash is unknown.

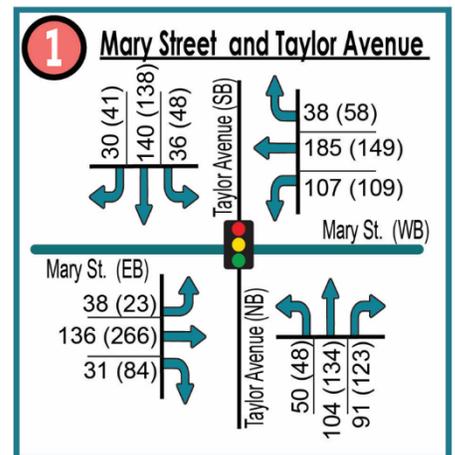


Figure 36 - Turning Movement Counts at Mary Street and Taylor Avenue

Observations

Overall, PM traffic is heavier than AM traffic. East/west traffic is slightly higher than north/south traffic. Other than the through movements, the predominant traffic flow at the intersection involves vehicles turning between the east and south legs (Figure 36). Traffic is operating at an LOS B in the morning and afternoon peak hours.

The RSA team made the following intersection observations during the field reviews:

Mary Street & Taylor Avenue

- No curb ramp is provided on the northeast corner to connect the sidewalk on the northeast side of the intersection to the trail system on the southeast side.
- There are no painted crosswalks or pedestrian signals at this intersection.
- The curb ramp on the southwest corner of the intersection is missing truncated domes.
- Except for the north leg, stop lines were missing or faded (Figure 37).



Figure 37 - Photo at Mary St. & Taylor Ave. intersection showing poor striping conditions

Recommendations

Specific recommendations at the Mary Street & Taylor Avenue Intersection include:

- Add/repaint stop lines
- Add/repaint crosswalks
- Add/repair curb ramps
- Install pedestrian signal heads with countdown timers

The Talley Trail currently terminates at this intersection, refer to the Talley Trail RSA report for any more information as it pertains to Taylor Avenue and the rest of the Talley Trail.

Intersection 2: Mary Street & 8th Street

Overview

Mary Street and 8th Street is a signalized intersection (Figure 38). The east and west legs of Mary Street consist of two through lanes, from which right and left turns are made. The north and south legs of 8th Street include a dedicated left-turn lane and a single through lane in each direction. Right-turns must be made from the shared through lane in all directions. There is protected/permissive left-turn phasing for the westbound, northbound, and southbound approaches. There is a dollar general to the southwest of the intersection that generates a lot of vehicle and pedestrian trips. A dirt path from 8th street to the dollar general is visible through the empty lot.



Figure 38 - Aerial Image of 8th Street Intersection

Attached sidewalks are present on the east and west legs of Mary Street. There are no sidewalks along north of the intersection. Brick crosswalks and pedestrian phasing are present. The 8th Street intersection saw some of the most pedestrian activity with 26 pedestrians crossing the intersection over a 13-hour period.

Daily traffic at the intersection is approximately 9,900 VPD on the west leg, 11,200 VPD on the east leg, 1,800 VPD on the north leg, and 3,800 VPD on the south leg.

Crash Review

Table 14 summarizes the crashes that occurred at the Mary Street intersection with 8th Street.

Total Crashes: 25 (9 injury crashes)

Significant Crash Pattern: Angle – Straight/following road and angle – left turn

Table 14 - Mary Street & 8th Street Intersection Crash Summary

Mary Street & 8th Street Intersection	Injury		PDO		Total	
	Total	%	Total	%	Total	%
Angle - Left Turn	1	4%	4	16%	5	20%
Angle - Stopped in traffic	1	4%	0	0%	1	4%
Angle - Straight/following road	5	20%	7	28%	12	48%
Head On	1	4%	2	8%	3	12%
Bicycle	0	0%	1	4%	1	4%

Rear End	1	4%	1	4%	2	8%
Sideswipe	0	0%	1	4%	1	4%
Grand Total	9	36%	16	64%	25	100%

Angle – Straight/following road Crash Analysis: There were 12 angle crashes where the vehicle maneuver was straight/following the road (5 injury crashes). Most of these crashes (10) occurred with the first vehicle heading either west (6) or east (4) on Mary Street and the second vehicle involved heading north/south on 8th Street.

Angle – Left turn Crash Analysis: There were 5 angle crashes where the vehicle maneuver was a left turn (1 injury crash). These crashes occurred with the first vehicle turning left while on Mary eastbound (2), westbound (1 injury), and while on 8th southbound (2).

Bicycle-involved Crash Analysis: There was 1 bicycle-involved at the intersection that resulted in no injuries. This crash occurred in 2019 when a vehicle was heading northbound on 8th street, went to turn right on red onto Mary Street, and struck a bicyclist. The bicyclist was in the crosswalk crossing 8th Street. The crash occurred just before dusk.

Comments Provided by City Staff and Stakeholders

No comments regarding this intersection were provided during the Task force meeting.

Observations

Overall, PM traffic is heavier than AM traffic. East/west traffic is significantly higher than north/south traffic. Other than the EB/WB through movements, the predominant traffic flow at the intersection involves vehicles turning between the east and south legs (Figure 39). Traffic is operating at LOS A in both the morning and afternoon peak hours.

The RSA team made the following intersection observations during the field reviews:

- The curb ramp on the NE corner of the intersection is damaged, creating a tripping hazard.
- All four curb ramps are missing truncated domes.

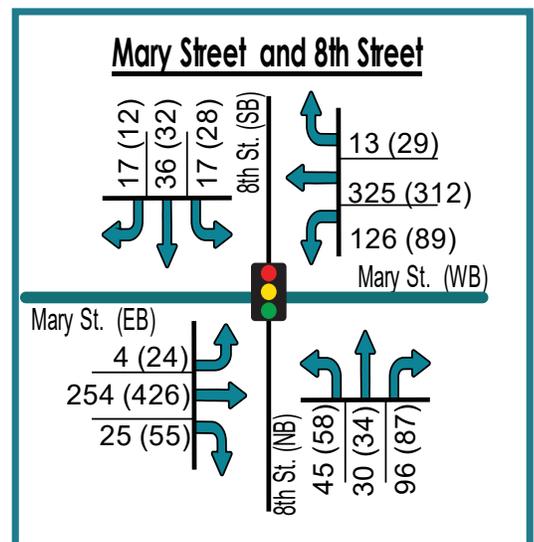


Figure 39 - Mary Street & 8th Street Turning Movement Counts

Mary Street & 8th Street

- The stop lines for all four legs were missing or faded.
- North of Mary Street, no sidewalk exists along the east side of 8th Street.
- The sidewalk on the north side of Mary Street and east of the intersection has a mailbox obstructing the path (Figure 40).



Figure 40 - Photo of a sidewalk on Mary Street obstructed by mailboxes

Recommendations

Specific recommendations at the Mary Street & 8th Street Intersection include:

- Add/repaint stop lines
- Add/repaint crosswalks
- Add/repair curb ramps
- Install pedestrian signal heads with countdown timers
- Widen Mary Street to add left turn lanes on east and west bound approaches (road diet would negate the need to widen road)

Intersection 3: Mary Street & 3rd Street

Overview

Mary Street & 3rd Street is a signalized intersection (Figure 41). The east and west legs of Mary Street consist of two through lanes, from which right and left turns are made. The north and south legs of 3rd Street include a dedicated left-turn lane and a single through lane in each direction. Right-turns must be made from the shared through lane in all directions. There is protected/permissive left-turn phasing for the northbound and southbound approaches.



Figure 41 - Mary Street & 3rd Street Aerial Map

Attached sidewalks are present on the east and west legs of Mary Street. There are no sidewalks along the east side of the south leg of 3rd Street. There are no bike lanes on Mary Street or 3rd Street. Daily traffic at the intersection is approximately 11,600 VPD on the west and east legs, and 4,700 VPD on the north and south legs. The 3rd Street intersection saw about 14 pedestrians crossing the intersection over a 13-hour period.

Crash Review

Table 15 summarizes the crashes that occurred at the Mary Street intersection with 3rd Street.

Total Crashes: 15 (3 injury crashes)

Significant Crash Pattern: Rear end.

Table 15 - Mary Street & 3rd Street Intersection Crash Summary

Mary Street & 3rd Street Intersection	Injury		PDO		Total	
	Crashes	%	Crashes	%	Crashes	%
Angle – Straight/following road	0	0%	2	13%	2	13%
Rear End	1	7%	7	47%	8	53%
Sideswipe	1	7%	2	13%	3	20%
Backed Into	0	0%	1	7%	1	7%
Bicycle	1	7%	0	0%	1	7%
Grand Total	3	20%	12	80%	15	100%

Mary Street & 3rd Street

Rear end Crash Analysis: There were 8 rear end crashes (1 injury crash). The rear end crashes were equally distributed across the four approaches to the intersection with 2 crashes at each approach. Two of the crashes occurred while it was snowing, but the rest occurred with no adverse conditions.

Bicycle-involved Crash Analysis: There was 1 bicycle-involved crash that resulted in an injury. A vehicle was traveling northbound on 3rd Street through the Mary Street intersection on a green light when it hit a bicyclist crossing on 3rd Street on the north side of the intersection, then fled the scene. The bicyclist was a 10-year old cycling to school just before 7:00 a.m.

Comments Provided by City Staff and Stakeholders

No comments regarding this intersection were provided during the Task force meeting.

Observations

Overall, traffic volumes are about equal between the AM and PM peak hours. East/west traffic is significantly higher than north/south traffic. The majority of turning movements are WB traffic turning left from Mary Street onto SB 3rd Street. Also significant is the turning traffic movement from the residential neighborhoods to the north and south. This traffic is turning right from their neighborhoods onto Mary Street (Figure 42). Traffic is operating at LOS D in the morning peak hour and LOS C in the afternoon.

Because of the lack of left-turn lanes and relatively significant left-turn traffic volumes, the eastbound and westbound approaches operate with 'split phasing', in which they take turns and do not receive green signal indications concurrently. Although the current signal phasing provides the safest operation given the existing intersection configuration, it is inefficient for traffic flow.

The RSA team made the following intersection observations during the field reviews:

- The curb ramps do not align with the crosswalk apart from the west leg.

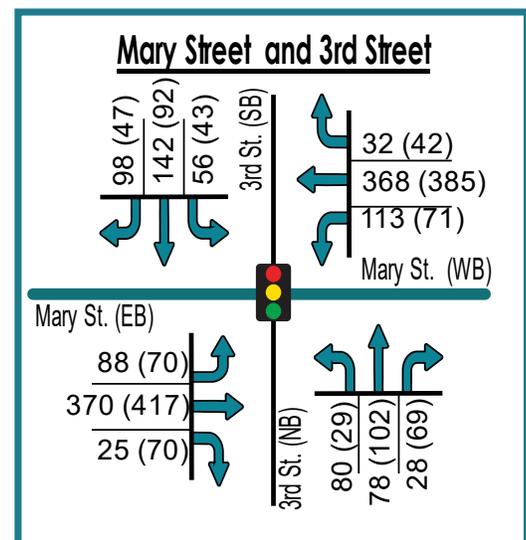


Figure 42 - Turning Movement Counts for Mary Street & 3rd Street

Mary Street & 3rd Street

- The painted crosswalks and stop lines were faded on all four legs of the intersection.
- The curb on the NW corner of the intersection is damaged with missing portions.
- All four curb ramps are missing truncated domes.
- South of Mary Street, no sidewalk is on the east side of 3rd Street.
- The sidewalk on the NE corner of the intersection does not meet ADA requirements due to a power pole and a post obstructing the path (Figure 43).



Figure 43 -- Sidewalk Obstructed by Pole and Post

Recommendations

Specific recommendations at the Mary Street & 3rd Street Intersection include:

- Add/repaint stop lines
- Add/repaint crosswalks
- Add/repair curb ramps
- Move or remove obstructions on sidewalks/curb ramps
- Widen Mary Street to add left turn lanes on east and west bound approaches (road diet would negate the need to widen the road)
- Add/repair sidewalks (south of intersection)

Intersection 4: Mary Street & Fleming Street

Overview

Mary Street and Fleming Street is a signalized intersection (Figure 44). The east and west legs of Mary Street consist of two through lanes, from which right and left turns are made. The north and south legs of Fleming Street include a dedicated left-turn lane and a single through lane in each direction. Right-turns must be made from the shared through lane in all directions. There is protected/permissive left-turn phasing for the northbound and southbound approaches.



Figure 44 - Aerial Image of Fleming Street Intersection

A mix of attached and detached sidewalks are present at this intersection. Daily traffic at the intersection is approximately 12,200 VPD on the west leg, 13,100 VPD on the east leg, 3,100 VPD on the north leg, and 5,700 VPD on the south leg. There were 27 pedestrian crossings observed over a 13-hour period at this intersection.

Crash Review

Table 16 summarizes the crashes that occurred at the Mary Street intersection with Fleming Street.

Total Crashes: 18 (1 SSI crash) (1 injury crash)

Significant Crash Pattern: Rear end.

Table 16 - Mary & Fleming Street Intersection Crash Summary

Mary Street & Fleming Street Intersection	Serious Injury		Injury		PDO		Total	
	Crashes	%	Crashes	%	Crashes	%	Crashes	%
Rear End	0	0%	1	6%	12	67%	13	72%
Head On	0	0%	0	0%	2	11%	2	11%
Sideswipe	0	0%	0	0%	2	11%	2	11%
Other - Non-Collision	1	6%	0	0%	0	0%	1	6%
Grand Total	1	6%	1	6%	16	89%	18	100%

Rear end Crash Analysis: There were 13 rear end crashes (1 injury crash). All of the rear end crashes occurred in the westbound approach (38%) and the eastbound approach (62%). About

Mary Street & Fleming Street

half of the rear end crashes occurred at night (46%) and about half of the crashes occurred with adverse roadway conditions like snow, ice, and rain (46%).

Non-collision Crash Analysis: There was one non-collision event that resulted in a suspected serious injury. The crash report description for this event was limited, but it occurred as a utility van came to a stop at the Mary & Fleming intersection, a passenger became unsecured, fell out of the vehicle, and sustained an injury. This event could be classified as an occupant protection issue.

Comments Provided by City Staff and Stakeholders

The widening of Fleming Street was considered by the City Commission, but was not carried forward to project development.

Observations

Overall, traffic volumes are about equal between the AM and PM peak hours. East/west traffic is significantly higher than north/south traffic. Other than the EB/WB through movements, the predominant traffic flow at the intersection involves vehicles turning between the east and south legs (Figure 45). Traffic is operating at LOS D in both the AM and PM peak hours.

Because of the lack of left-turn lanes and relatively significant left-turn traffic volumes, the eastbound and westbound approaches operate with 'split phasing', in which they take turns and do not receive green signal indications concurrently. Although the current signal phasing provides the safety operation given the existing intersection configuration, it is inefficient for traffic flow.

The RSA team made the following intersection observations during the field reviews:

- The painted stop lines were faded on all four legs of the intersection.
- All four curb ramps are missing truncated domes (Figure 46).

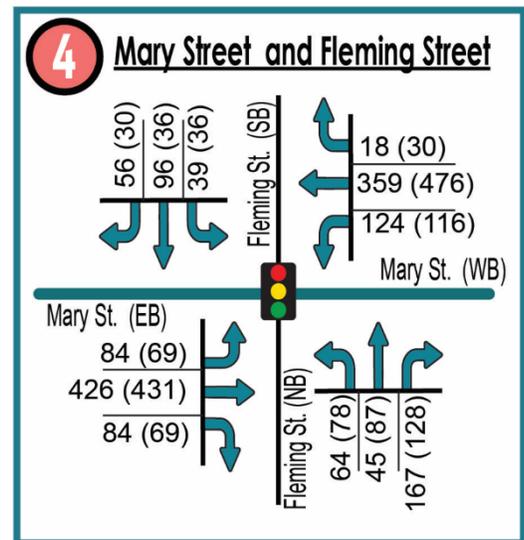


Figure 45 - Mary Street & Fleming Street Turning Movement Counts



Figure 46 - Missing Truncated Domes

Recommendations

Mary Street & Fleming Street

Specific recommendations at the Mary Street & Fleming Street Intersection include:

- Add/repaint stop lines
- Add/repaint crosswalks
- Install pedestrian signal heads with countdown timers
- Widen Mary Street to add left turn lanes on east and west bound approaches (road diet would negate the need to widen the road)

Intersection 5: Mary Street & Campus Drive

Overview

Mary Street and Campus Drive is a signalized intersection (Figure 47). The east and west legs of Mary Street consist of two through lanes and a dedicated left-turn lane. The north and south legs of Campus Drive include dedicated left-turn lanes and a single through lane in each direction. Right-turns must be made from the shared through lane in all directions except for the southbound approach, which has a dedicated right-turn lane. There is protected/permissive left-turn phasing for every approach.



Figure 47 - Aerial Image of Campus Drive Intersection

Attached sidewalks are present and there are bike lanes on Campus Drive south of the intersection. Daily traffic at the intersection is approximately 12,500 VPD on the west leg, 11,500 VPD on the east leg, 6,600 VPD on the north leg, and 7,600 VPD on the south leg. There were 12 pedestrian crossings observed over a 13-hour period at this intersection.

Crash Review

Table 17 summarizes the crashes that occurred at the Mary Street intersection with Campus Drive.

Total Crashes: 28 (4 injury crashes)

Significant Crash Pattern: Rear end and angle crashes.

Table 17 - Mary & Campus Drive Intersection Crash Summary

Mary Street & Campus Drive Intersection	Injury		PDO		Total	
	Crashes	%	Crashes	%	Crashes	%
Angle - Left Turn	1	4%	1	4%	2	7%
Angle - Straight/following road	1	4%	2	7%	3	11%
Rear End	1	4%	14	50%	15	54%
Head On	1	4%	0	0%	1	4%
Fixed Object	0	0%	3	11%	3	11%
Sideswipe	0	0%	4	14%	4	14%

Grand Total	4	14%	24	86%	28	100%
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Rear end Crash Analysis: There were 15 rear end crashes (1 injury crash). There were no adverse conditions involved in any of the crashes. Rear end crashes occurred from all 4 of the approaches to the intersection in the westbound (7%), eastbound (33%), southbound (20%), and northbound (40%, 1 injury crash).

Angle Crash Analysis: There were 5 angle crashes involving a side impact (2 injury crashes). Left turning vehicles were involved in 2 of the crashes and straight/following the road vehicles were involved in the other 3 crashes. Angle crashes occurred in the eastbound (40%, 2 injury crashes), southbound (20%), and northbound (40%) approaches. The eastbound approach injury crashes had one involving a left turn and another involving a straight/following the road vehicle maneuver leading up to the crash.

Comments Provided by City Staff and Stakeholders

No comments regarding this intersection were provided during the Task force meeting.

Observations

AM peak-hour traffic volumes are slightly higher than PM peak-hour traffic volumes due to the intersection's proximity to the high school. East/west traffic is significantly higher than north/south traffic. Other than the through movements, the predominant traffic flow at the intersection involves vehicles turning between the east and south legs (Figure 48). Traffic is operating at LOS C in both the morning and afternoon peak hours.

The RSA team made the following intersection observations during the field reviews:

- The painted crosswalks and stop lines were faded on all four legs of the intersection.
- All four curb ramps are missing truncated domes.
- The pedestrian call buttons on the northeast corner are in an obscure location and not aligned with the crosswalks.

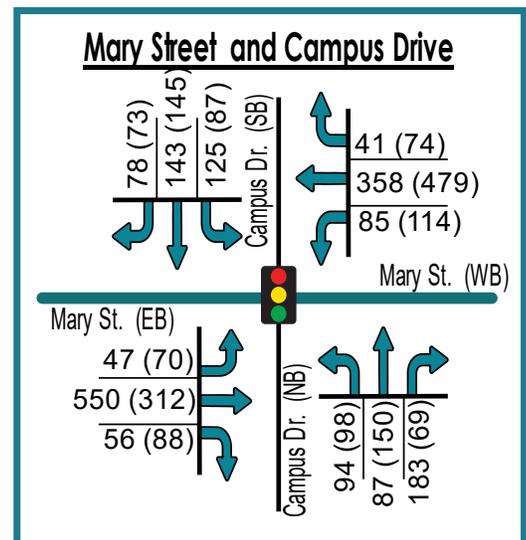


Figure 48 - Turning Movement Count at Mary Street & Campus Drive

Mary Street & Campus Drive

- The sidewalk on the northwest corner is cracked and heaving, creating a possible tripping hazard.
- There is a power pole and a post located in the middle of the NE and SW curb ramp areas (Figure 49).
- Eastbound to southbound right turning vehicles were observed turning into the former right lane, which is no longer striped for traffic.



Figure 49 - Power Pole and Post in the Curb Ramp

Recommendations

Specific recommendations at the Mary Street & Campus Drive Intersection include:

- Add/repaint stop lines
- Add/repaint crosswalks
- Add/repair curb ramps
- Install pedestrian signal heads with countdown timers
- Create a bump out with curb, delineators, or parking blocks
- Widen Mary Street to add left turn lanes on east and west bound approaches (road diet would negate the need to widen the road)

Intersection 6: Mary Street & Buffalo Way Boulevard

Overview

Mary Street and Buffalo Way Boulevard is a signalized T-intersection (Figure 50) with the north leg serving as the access for Garden City High School. The eastbound approach has a dedicated left-turn lane, a shared left-turn/through lane, and a dedicated through lane. The westbound approach has two lanes, with right turns being made from the outside through lane. The southbound approach has a left-turn lane and a right-turn lane. The eastbound approach has protected/permissive left-turn phasing.



Figure 50 - Aerial Image of Mary Street & Buffalo Way Boulevard

Attached sidewalks are present along Buffalo Way Boulevard and Mary Street west of Buffalo Way Boulevard, but there are no sidewalks to the east. Daily traffic at the intersection is approximately 11,200 VPD on the west leg, 8,900 VPD on the east leg, and 5,300 VPD on the north leg. There were 12 pedestrian crossings observed over a 13-hour period at this intersection.

Crash Review

Table 18 summarizes the crashes at the Mary Street intersection with Buffalo Way Boulevard.

Total Crashes: 12 (3 injury crashes).

Significant Crash Patterns: Rear end and angle – left turn.

Table 18 – Mary Street & Buffalo Way Boulevard Intersection Crash Summary

Mary Street & Buffalo Way Boulevard Intersection	Injury		PDO		Total	
	Crashes	%	Crashes	%	Crashes	%
Angle – Left Turn	1	8%	3	25%	4	33%
Head On	0	0%	1	8%	1	8%
Rear End	2	17%	5	42%	7	58%
Sideswipe	0	0%	1	8%	1	8%
Grand Total	3	25%	9	75%	12	100%

Rear end Crash Analysis: There were 7 rear end crashes (2 injury crashes). Rear end crashes occurred in the eastbound approach (57%, 1 injury), southbound approach (29%), and just north of the intersection on Buffalo Way (1 injury crash). Rear end crashes occurred with dry

Mary Street & Buffalo Way Blvd

roadway conditions most of the time (86%). About half of the rear end crashes occurred from 6 to 7 pm (42%, 2 injury crashes), with 1 rear end crash occurring just before 8 am.

Angle – left turn Crash Analysis: There were 4 angle – left turn crashes (1 injury crash). All of the angle – left turn crashes occurred with the first vehicle making a left turn from the eastbound approach and colliding with a vehicle moving westbound through the intersection. Most of the angle – left turn crashes occurred from 6pm to 7pm (75%, 1 injury crash) with one of the crashes occurring just before 7:00 a.m.

Comments Provided by City Staff and Stakeholders

The intersection received multiple comments during public engagement. Specifically, concerns were raised regarding the congestion in the morning. One commenter mentioned the shared left-thru lane essentially functions as a left turn lane in the morning during drop-off and a through lane the rest of day, sometimes catching them off-guard when a driver turns left from the lane during the off-peak.

Observations

Traffic volumes to/from the north leg are very heavy but concentrated during school peak periods. Roughly two-thirds to three-quarters of school traffic comes from/heads to the west of the intersection. Eastbound/westbound through traffic at the intersection is fairly light (Figure 51). Traffic analysis shows the intersection operating at LOS B in both the morning and afternoon peak hours. However, the intersection was observed during school peaks and found to have periods of worse operation. During the 7:30 to 7:45 a.m. timeframe, the east-bound left turn lanes were observed to queue approximately 1,200 feet. Westbound right turns also queued from Buffalo Way back into the US-83 intersection. It was observed that on-site traffic from the school was queuing from the school to Mary Street, preventing vehicles from turning even under a green light. This backup did not allow the signal to process traffic to its full capacity (Figure 52).



Figure 52 - Image capturing the vehicle queueing along Mary Street near the Buffalo Way Boulevard in the AM peak

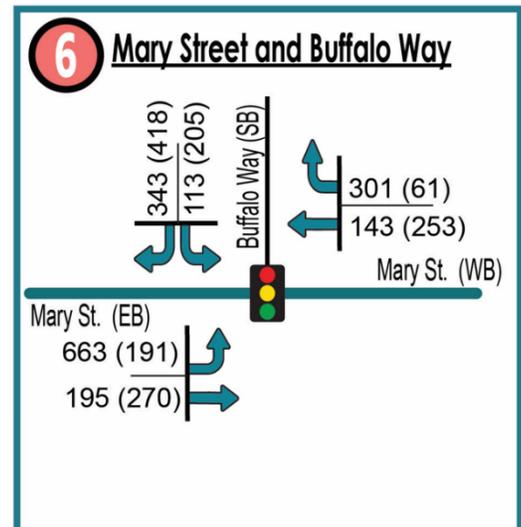


Figure 51 - Mary Street & Buffalo Way Boulevard Peak Hour Turning Movement Counts

Recommendations

The following improvements are recommended specifically for the intersection:

- Reconfigure the intersection such that there are two exclusive eastbound left-turn lanes, either through roadway widening in order to maintain two eastbound through lanes, or through re-striping to convert the shared through/left-turn lane to an exclusive left-turn lane, leaving a single eastbound through lane. The existing configuration with an exclusive left-turn lane and a shared through/left-turn lane, in combination with protected/permissive left-turn signal phasing, is awkward and violates the MUTCD requirement that a separate left-turn signal face operated in protected/permissive mode shall not display a circular green indication (MUTCD Section 4F.08(02)). In conjunction with such a lane reconfiguration, the existing five-section left-turn signal heads should be replaced with FYA heads.
- Perform a study of the school's drop-off, parking, and general traffic management procedures for possible modifications and/or optimizations to reduce the queuing down Buffalo Way.

Intersection 7: Mary Street & U.S. 83 Bypass

Overview

Mary Street is grade-separated with U.S. 83, passing underneath the mainline and with a single-point signalized intersection with its on-/off-ramps (Figure 53). Every approach has a dedicated left-turn lane with protected-only signal phasing and a channelized right-turn. The eastbound/westbound approaches have two through lanes and the northbound/southbound approaches have a single through lane.



Figure 53 - Aerial Image of U.S. 83 Bypass and Mary Street Intersection

There are no pedestrian or bicycle accommodations at this intersection. Daily traffic at the intersection is approximately 8,900 VPD on the west leg, 8,200 VPD on the east leg, and 1,600 VPD on each of the on-/off-ramps to/from U.S. 83.

Crash Review

Table 19 summarizes the crashes at the Mary Street intersection with the U.S. 83 bypass highway.

Total Crashes: 16 (1 fatal crash, 1 serious injury crash, and 5 injury crashes)

Significant Crash Pattern: Angle – Straight/following road, Angle – left turn, and rear end

Table 19 - Mary & U.S. 83 Highway Intersection Crash Summary

Mary Street & U.S. 83 Highway Intersection	Fatal		Serious Injury		Injury		PDO		Grand Total	
	Crashes	%	Crashes	%	Crashes	%	Crashes	%	Crashes	%
Angle - Left Turn	0	0%	0	0%	2	13%	1	6%	3	19%
Angle - Right Turn	0	0%	0	0%	0	0%	1	6%	1	6%
Angle - Straight/following road	1	6%	1	6%	1	6%	2	13%	5	31%
Rear End	0	0%	0	0%	2	13%	1	6%	3	19%
Head On	0	0%	0	0%	0	0%	2	13%	2	13%
Fixed Object	0	0%	0	0%	0	0%	1	6%	1	6%

				%						
Sideswipe	0	0%	0	0%	0	0%	1	6%	1	6%
Grand Total	1	6%	1	6%	5	31%	9	56%	16	100%

Angle – straight/following road Crash Analysis: There were 5 angle – straight/following road crashes (1 fatal, 1 serious injury, and 1 injury crash). At least one angle – straight/following road crash occurred in each of the 4 approaches to the intersection. One fatal crash occurred early on a Sunday morning (2am) in February 2020 – a vehicle was driving southbound on the U.S. 83 ramp entering the intersection with Mary Street when it struck the driver side door of a second vehicle heading eastbound that failed to yield to the red light. All 4 of the occupants of the eastbound vehicle were not wearing seat belts and there was evidence that its driver was under the influence of alcohol.

The serious injury crash occurred when a vehicle was making a northbound-to-westbound left turn and collided with a vehicle heading southbound on the U.S. 83 southbound ramp into the Mary Street intersection. The southbound vehicle was speeding down the U.S. 83 ramp and failed to yield to the red light. Most of the damage sustained occurred post-impact when the southbound vehicle overturned and its occupants sustained serious injuries.

Angle – left turn Crash Analysis: There were 3 angle – left turn crashes (2 injury crashes). Both of the injury angle left turn crashes occurred when a vehicle heading northbound on the U.S. 83 ramp and entering the intersection struck a vehicle making a left turn either from the U.S. 83 southbound ramp onto Mary Street and from Mary Street onto the U.S. 83 northbound ramp.

Rear end Crash Analysis: There were 3 rear end crashes (2 injury crashes). Two of them occurred when vehicles were traveling eastbound on Mary Street and the third occurred heading northbound on the U.S. 83 off-ramp. One of the crashes occurred with icy roadway conditions.

Comments Provided by City Staff and Stakeholders

No comments regarding this intersection were provided during the Task force meeting.

Observations

Traffic volumes at this intersection are fairly light, especially on the on-/off-ramps (Figure 54). Traffic is operating at LOS B in both the morning and afternoon peak hours.

The RSA team made the following intersection observations during the field reviews:

- The left-turn movements on every approach have protected-only signal phasing, but the left-turn signal heads have circular red signal indications, which is a violation of MUTCD requirements. Per MUTCD Section 4F.06(02A), if a separate left-turn

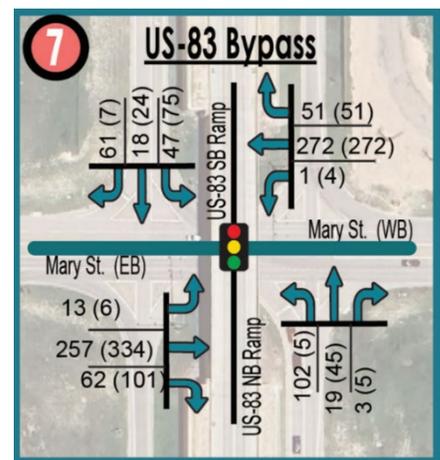


Figure 54 - Turning Movement Counts at Mary Street & U.S. 83 Bypass

Mary Street & U.S. 83 Bypass

signal face is provided for a protected only mode left turn, it shall be capable of displaying a left-turn red arrow.

Recommendations

Specific recommendations at the Mary Street & U.S. 83 Bypass Intersection include:

- Add/repair sidewalks as the area develops.
- Replace circular red signal indications in the left turn signal heads with red arrows

Intersection 8: Mary Street & Kansas Avenue

Overview

The Mary Street and Kansas Avenue intersection was recently signalized (Figure 55). Prior to June 2023, the intersection was unsignalized. Prior to 2022, the intersection was TWSC with stop control on Mary Street & Jennie Barker Road. From January 2022 to June 2023, the intersection was an all-way stop. Mary Street ends at the intersection and continues as Jennie Barker Road to the east. All four legs



Figure 55 - Aerial Image of Kansas Avenue Intersection

include a dedicated left-turn lane and two through lanes. Right-turns must be made from the shared through lane in all directions. There is protected/permissive left-turn phasing for every approach. The signal features the only flashing yellow arrows in the Garden City area.

There are no sidewalks or bike lanes on Mary Street or Kansas Avenue. However, there is an attached sidewalk along the south side of Jennie Barker Road. Trail improvements are slated for 2025 along the north side of Kansas Avenue southwest of the intersection, and along the south side of Kansas Avenue northeast of the intersection. Daily traffic at the intersection is approximately 8,100 VPD on the northwest leg, 5,900 VPD on the southeast leg, 2,400 VPD on the northeast leg, and 6,800 VPD on the southwest leg.

Crash Review

Table 20 summarizes the crashes that occurred at the Mary Street intersection with Kansas Avenue.

Total Crashes: 10 (1 serious injury and 3 injury crashes)

Significant Crash Pattern: Fixed Object

Table 20 - Mary & Kansas Avenue Intersection Crash Summary

Mary Street & Kansas Avenue Intersection	Serious Injury		Injury		PDO		Total	
	Crashes	%	Crashes	%	Crashes	%	Crashes	%
Angle – Straight/Following road	0	0%	3	30%	3	30%	6	60%
Fixed Object	1	10%	0	0%	1	10%	2	20%
Overturn	0	0%	0	0%	1	10%	1	10%

Mary Street & Kansas Avenue

Rear End	0	0%	0	0%	1	10%	1	10%
Grand Total	1	10%	3	30%	6	60%	10	100%

Note: All of these crashes occurred from 2018 to 2022 – before the intersection was signalized.

Fixed Object Crash Analysis: There were 2 fixed object involved crashes 1 of which resulted in a serious injury. The serious injury crash occurred just before 2:00 a.m. on a Saturday in January, 2018 when a vehicle was traveling southwestbound through the intersection when it left the roadway to its right and crashed head on into a drainage ditch. Both occupants were transported by an ambulance to the hospital with serious injuries.

Comments Provided by City Staff and Stakeholders

No comments regarding this intersection were provided during the Task force meeting. Several comments were received by the public at a public engagement event, all positive comments regarding the installation of the signal at this location.

Observations

Overall, PM traffic is heavier than AM traffic. Traffic volumes on Mary Street/Jennie Barker Road are heavier than traffic volumes on Kansas Avenue. The heaviest traffic flows at the intersection are the southeast-bound/northwest-bound through movements and movements between the northwest and southwest legs (Figure 56). Traffic is operating at LOS B in both the morning and afternoon peak hours.

The RSA team made the following intersection observations during the field reviews:

- Pedestrian infrastructure was recently constructed on the corners in conjunction with the traffic signal installation.
- Most NEB Kansas Avenue traffic turns at the intersection in one direction or the other.
- There are no sidewalks except SE of Kansas Avenue along the south side of Jennie Barker Road.

Recommendations

Specific recommendations at the Mary Street & Kansas Avenue Intersection include:

- Add sidewalks as the area develops.

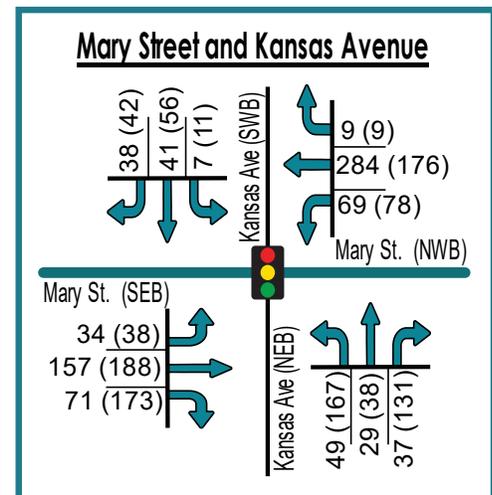


Figure 56 - Turning Movement Count at Mary Street & Kansas Avenue

Intersection-Specific Recommendations

The recommendations in Table 21 are based on the collaborative effort of the RSA multidisciplinary team and stakeholder interviews, the team's experience driving and walking the corridor, and traffic analysis and modeling. Each signalized intersection received a number of recommendations.

The time frame for each recommendation is based on time for plan, design, construction and funding of the project. It is broken down into three categories:

- Short-term: 0 to 3 years
- Medium-term: 3 to 5 years
- Long-term: 5 to 10 years

The cost estimates for each recommendation is given at a high level 10% planning phase and may fluctuate based on the final design. The total cost estimates are broken down into three categories:

- Low cost: Less than \$50,000
- Medium cost: Between \$50,000 and \$200,000
- High cost: Greater than \$200,000

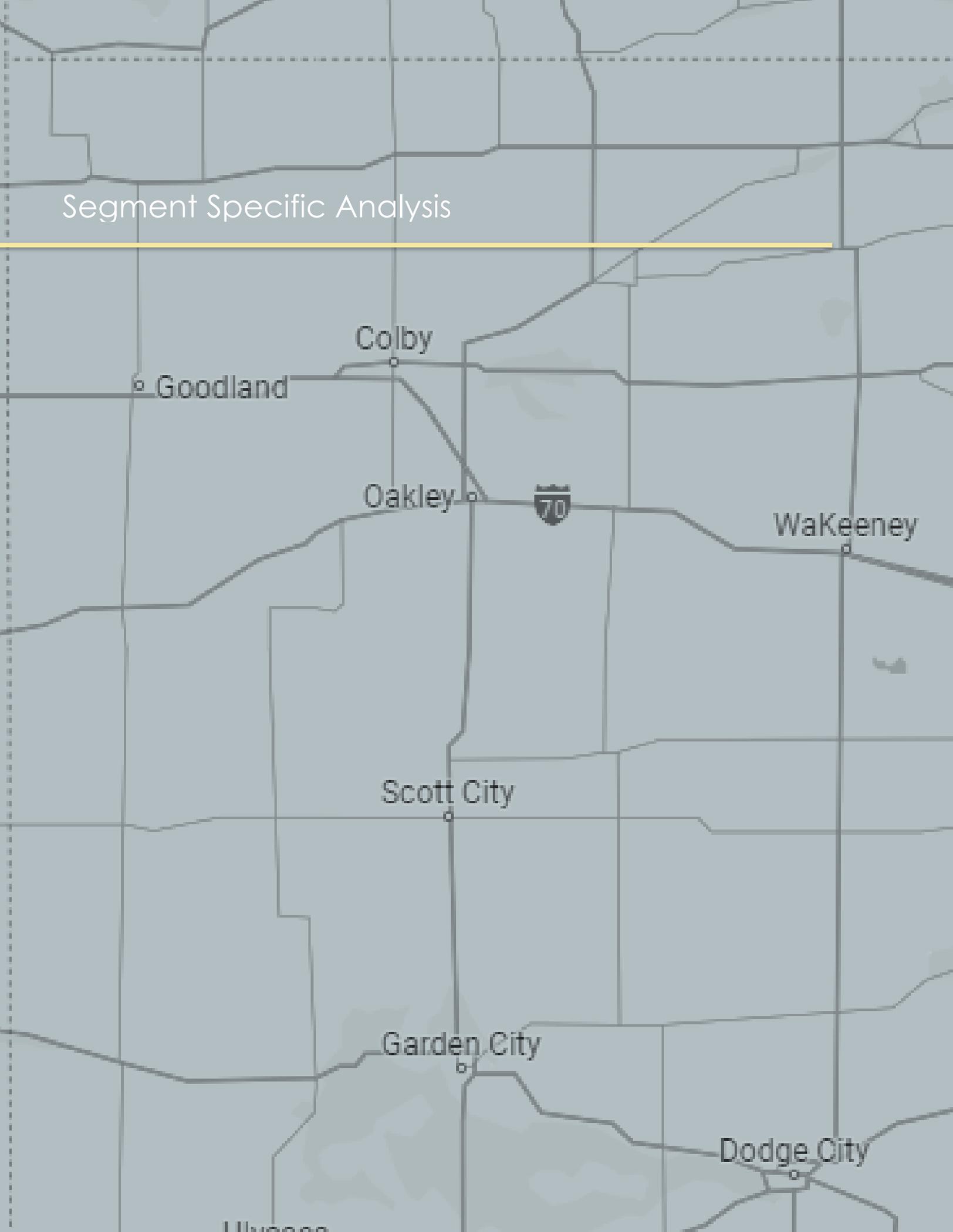
Table 21 - Specific Recommendations for Each Signalized Intersection

Recommendations	Time Frame	Cost Estimate	Taylor Ave	8 th St	3 rd St	Fleming St	Campus Dr	Buffalo Way Blvd	U.S. 83 Bypass	Kansas Ave
Add/repaint stop lines	Short	Low	X	X	X	X	X	-	-	-
Add/repaint crosswalks	Short	Low	X	X	X	X	X	-	-	-
Add/repair curb ramps	Short	Medium	X	X	X	-	X	-	-	-
Install pedestrian signal heads with countdown timers	Medium	Medium	X	X	-	X	X	-	-	-
Move or remove obstructions on sidewalks/curb ramps	Short to Medium	Low to Medium	-	-	X	-	-	-	-	-
Create a bump out with curb, delineators, or parking blocks	Short	Low to Medium	-	-	-	-	X	-	-	-
Widen Mary Street to add left turn lanes on east and west bound approaches (road diet would negate the need to widen road)	Long	High	-	X	X	X	X	-	-	-
Reconfigure the intersection to create two exclusive eastbound	Long	Medium	-	-	-	-	-	X	-	-

Intersection Specific Analysis

left turn lanes										
Add/repair sidewalks	Long	Medium to High	X	-	X	-	-	-	X	X
Replace circular red signal indications in the left turn signal heads with red arrows	Short	Low	-	-	-	-	-	-	X	-

Segment Specific Analysis



Segment Specific Analysis

Segment 1: Taylor Avenue/ U.S. 83B to 8th Street

Overview

The Mary Street segment from Taylor Avenue/ U.S. 83B to 8th Street is a four-lane road with no dedicated turn lanes (Figure 57) and is 0.47 miles long. The area comprises commercial and recreational land uses and one residential lot. Forest Park Lake Wildlife Habitat is to the south of the segment and offers a small lake and an extensive trail loop that connects to the Talley Trail system.



Figure 57 - Aerial Image of Taylor Avenue/ U.S. 83B to 8th Street

There are 3-foot attached sidewalks present, with power poles running along the outside edge of the sidewalks on both sides of Mary Street. The daily traffic volume for this section of Mary Street is 8,200 to 9,900 VPD.

Crash Review

Table 22 summarizes the crashes that occurred on Mary Street from Taylor Avenue to 8th Street. About 50% of crashes occurred at intersections and the other 50% occurred at non-intersection locations, with none of the crashes occurring at a driveway shown in Figure 58.

Total Crashes: 14 (1 injury crash)

Significant Crash Pattern: Rear end

Table 22 - Taylor Avenue to 8th Street Segment Crash Summary

Mary - Taylor Avenue to 8 th Street	Injury		PDO		Total	
	Crashes	%	Crashes	%	Crashes	%
Angle - Left Turn	0	0%	1	7%	1	7%
Angle - Right Turn	0	0%	1	7%	1	7%
Angle - Stopped awaiting turn	1	7%	0	0%	1	7%
Angle - Straight/following road	0	0%	3	21%	3	21%
Fixed Object	0	0%	3	21%	3	21%
Rear End	0	0%	5	36%	5	36%

Grand Total	1	7%	13	93%	14	100%
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Rear End Crash Analysis: There were 5 rear end crashes. All of the rear end crashes occurred in the westbound direction with no adverse weather conditions. All of the rear end crashes occurred in the afternoon from 12:00 p.m. to 4:00 p.m.

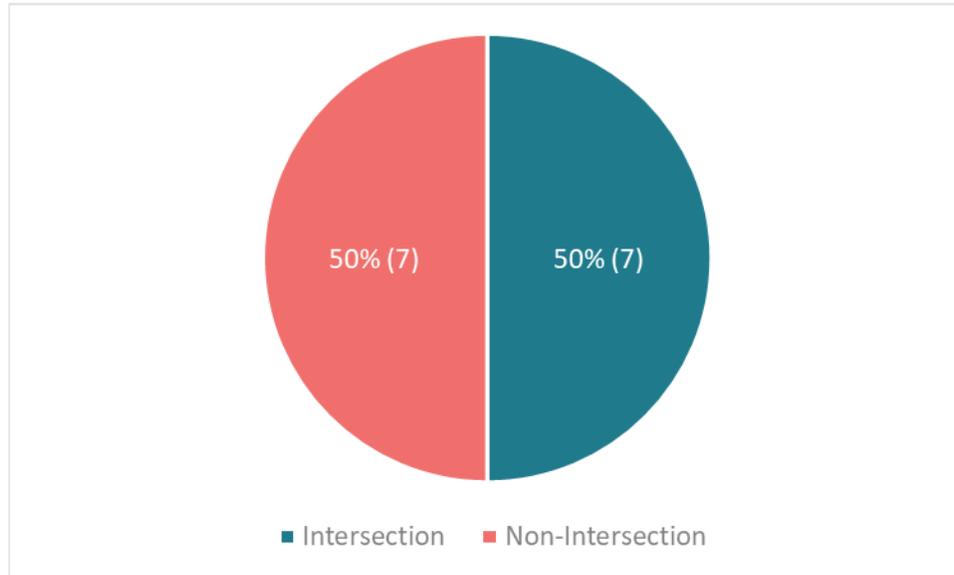


Figure 58 - Mary Street - Taylor Avenue to 8th Street Crash Location

Figure 59 summarizes the crashes at unsignalized intersections between Taylor Avenue and 8th Street. The Mary Street intersection with Zerr Road had the most intersection crashes on this segment (3) and is about 425 feet to the east of the Taylor Avenue intersection.

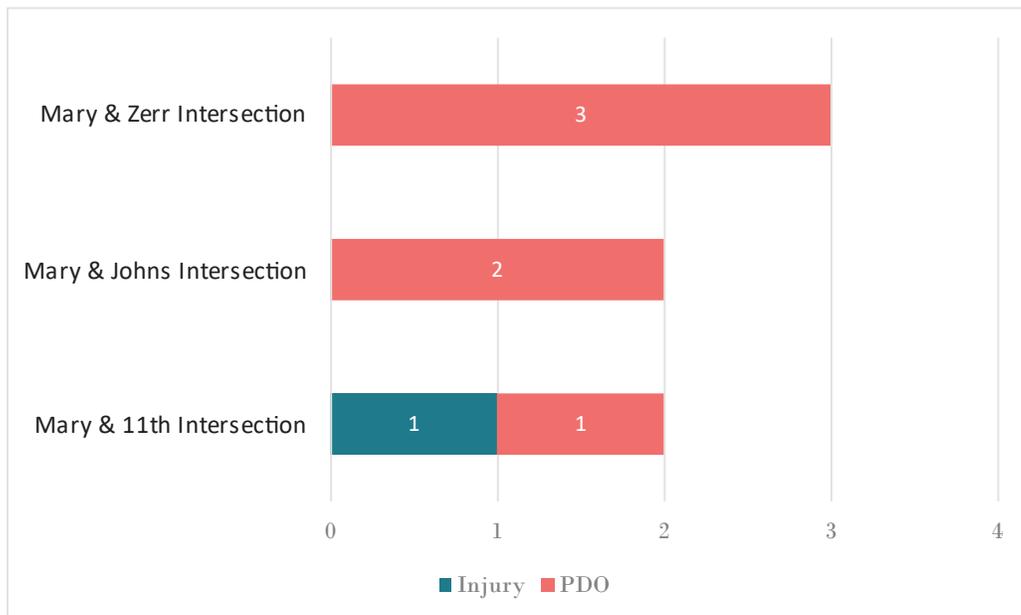


Figure 59 - Crashes at unsignalized intersections between Taylor Avenue and 8th street

Comments Provided by City Staff and Stakeholders

Mary Street: Taylor/U.S. 83B to 8th

No comments regarding this segment were provided.

Observations

Afternoon traffic is heavier than the morning or evening traffic, and westbound traffic crashes are significantly higher than eastbound traffic.

There are 13 driveways connecting to Mary Street on this segment with a driveway density of 2.62 per 500 feet. This is about average for the corridor. There are also about 4 unsignalized intersection locations on this segment with a density of about 0.81 unsignalized intersections per 500 feet.

The RSA team made the following intersection observations during the field reviews:

- There are no stop lines at side street intersections.
- Truncated domes are missing where curb ramps are present along the segment (Figure 58).



Figure 60 - Photo of Mary Street showing no truncated domes on curb ramp

Recommendations

Specific recommendations for the segment of Mary Street from Taylor Avenue/U.S. 83B to 8th Street include:

- Add/Repair stop lines on side streets

Segment 2: N. 8th Street to 3rd Street

Overview

The Mary Street segment from 8th Street to 3rd Street is a four-lane road with no dedicated turn lanes (Figure 61) and is 0.5 miles long. The area comprises low—and medium-density residential land uses. The west end of the segment consists of small one-story apartments on either side of Mary Street, while the rest are single-family homes. There is also a Sunni Islam Mosque on the south side of Mary Street.



Figure 61 - Aerial Image of 8th Street to 3rd Street

There are 3-foot attached sidewalks on the south side of the street and detached on the north side, with power poles running along the outside edge of the sidewalks on both sides of Mary Street. There are no bike lanes or paths along Mary Street. The daily traffic volume for this section of Mary Street is approximately 11,400 VPD.

There is a crosswalk across Mary Street on the west side of its intersection with B Street, which has pedestrian-activated Rectangular Rapid Flashing Beacons (RRFB). There is also a marked crosswalk on the east side of the Main Street intersection with school crossing signage.

Crash Review

Table 23 summarizes the crashes on Mary Street from 8th Street to 3rd Street. Figure 60 shows that half of the crashes on this segment of Mary occurred at an intersection (50%) and the rest occurred at a driveway (9%) and in between intersections (41%).

Total Crashes: 32 (5 injury crashes)

Significant Crash Pattern: Rear end and fixed object

Table 23 - Mary Street from 8th Street to 3rd Street Segment Crash Summary

Mary - 8th Street to 3rd Street	Injury		PDO		Total	
	Crashes	%	Crashes	%	Crashes	%
Fixed Object	0	0%	7	22%	7	22%
Angle - Left Turn	0	0%	1	3%	1	3%
Angle - Straight/Following Road	0	0%	5	16%	5	16%
Head On	1	3%	0	0%	1	3%
Rear End	3	9%	10	31%	13	41%

Mary Street: 8th to 3rd

Sideswipe	0	0%	2	6%	2	6%
Parked Vehicle	1	3%	1	3%	2	6%
Unknown	0	0%	1	3%	1	3%
Grand Total	5	16%	27	84%	32	100%

Rear end Crash Analysis: There were 13 rear end crashes (3 injury crashes). Most of the rear end crashes occurred while vehicles were driving westbound on Mary Street (67%). Most of the rear end crashes occurred with dry roadway conditions (92%).

Fixed Object Crash Analysis: There were 7 fixed object crashes. The fixed objects hit in these crashes include: a building, a guardrail, a curb, a mailbox, a tree, and utility devices (2). Most of the fixed object crashes occurred in the westbound direction (71%) with fewer in the eastbound direction (29%). Wet roadway conditions were involved in 14% of the crashes.

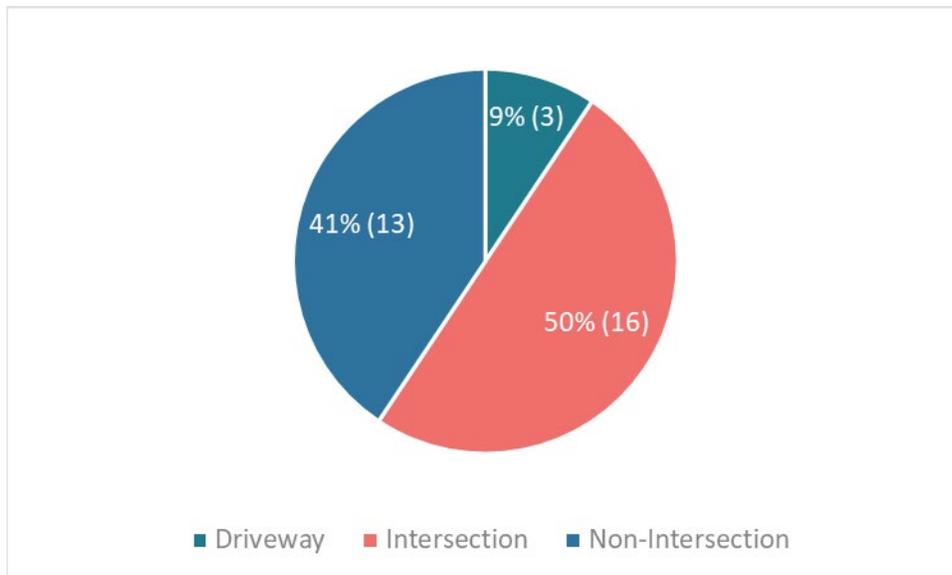


Figure 62 - Mary Street - 8th Street to 3rd Street Crash Location

Figure 63 summarizes crashes between 8th Street and 3rd Street at unsignalized intersections. The intersections with Main Street (8) and B Street (4) saw the most crashes in the segment. The Main Street is a four-way intersection and is the only one on this segment that is not offset on the other side of Mary Street. Rear end crashes are the most common crash type at the Main Street intersection and account for both of the injury crashes.



Figure 63 - Crashes at unsignalized intersections between 8th Street and 3rd Street

Comments Provided by City Staff and Stakeholders

No comments regarding this segment were provided.

Observations

Afternoon traffic is heavier than the morning or evening traffic, and westbound traffic crashes are significantly higher than eastbound traffic.

There are about 24 driveways onto Mary Street in this segment with a density of about 4.55 driveways per 500 feet. This is above average for the study corridor. Most of the driveways connect to single family homes. There are 7 unsignalized intersections in this segment with a density of about 1.33 intersections per 500 feet – the highest in the study corridor.

The RSA team made the following intersection observations during the field reviews:

- There are no stop lines at side street intersections.
- The curb ramp is missing at the crossing on the southwest corner of Mary Street and B Street (Figure 64).
- The crosswalk at B Street has stop lines for approaching traffic. However, per Kansas state law, drivers must yield to pedestrians in a crosswalk, not stop. Therefore, the stop lines should be replaced with yield lines.
- The crosswalk at B Street is lacking "Yield (Stop) Here for Pedestrian" (R1-5) signs, as



Figure 64 - Photo of Mary Street showing a lack of curb ramps & Yield Here for Pedestrian signs

Mary Street: 8th to 3rd

required when yield (stop) lines are used at a crosswalk that crosses an uncontrolled multi-lane approach (per MUTCD Section 3B.19(14)).

- The stop line on the eastbound approach to the crosswalk at B Street is about five feet or less from the near edge of the crosswalk. Per MUTCD Section 3B.19(15), the stop or yield line should be 20 to 50 feet in advance of the crosswalk.
- The pedestrian signs on the RRFB posts at the B Street crosswalk should be replaced with the latest version: R10-25 (per MUTCD Section 4L.02(14)).
- Truncated domes are missing where curb ramps are present along the segment (Figure 65).



Figure 65 - Photo of Mary St and Main St showing a lack of truncated domes at curb ramps

Recommendations

Specific recommendations for the segment of Mary Street from 8th Street to 3rd Street include:

- Add/repair stop lines on side streets
- Bring the B Street crosswalk into MUTCD compliance
- Repair and reconstruct sidewalks
- Install curb ramps
- Move or remove the obstructions in the sidewalk

Segment 3: N. 3rd Street to Fleming Street

Overview

The Mary Street segment from 3rd Street to Fleming Street is a four-lane road with no dedicated turn lanes (Figure 66) and is 0.63 miles long. It is mostly comprised of low-density residential land uses, with a few areas designated for neighborhood shopping districts.

There are 3-foot attached sidewalks present, with power poles running along the outside edge of the sidewalks on both sides of Mary Street. The daily traffic volume for this section of Mary Street is approximately 11,900 VPD.



Figure 66 - Aerial Image of 3rd Street to Fleming Street

Crash Review

Table 24 summarizes the crashes along Mary Street from 3rd Street to Fleming Street. Figure 64 summarizes the crashes by location and shows that the majority of crashes did not occur at an intersection (80%).

Total Crashes: 15 (1 injury crash)

Significant Crash Pattern: Rear end

Table 24 - Mary Street from 3rd Street to Fleming Street Crash Summary (2018 to 2022)

Mary - 3 rd Street to Fleming Street	Injury		PDO		Total	
	Crashes	%	Crashes	%	Crashes	%
Fixed Object	0	0%	3	20%	3	20%
Angle – Straight Following Road	0	0%	1	7%	1	7%
Rear End	1	7%	6	40%	7	47%
Sideswipe	0	0%	3	20%	3	20%
Parked Vehicle	0	0%	1	7%	1	7%
Grand Total	1	7%	14	93%	15	100%

Rear end Crash Analysis: There were 7 rear end crashes (1 injury crash). The crashes were pretty evenly split by westbound (43%, 1 injury crash) and eastbound (57%) directions. Only one rear end crash occurred with icy, non-dry roadway conditions.

Mary Street: 3rd to Fleming

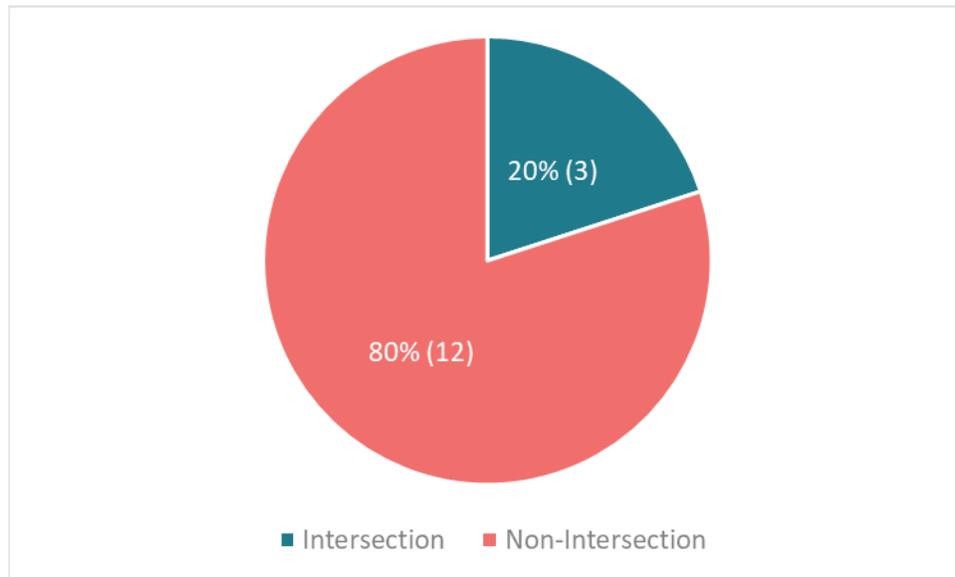


Figure 67 - Mary Street - 3rd Street to Fleming Street Crash Location

Figure 68 summarizes the crashes at unsignalized intersections

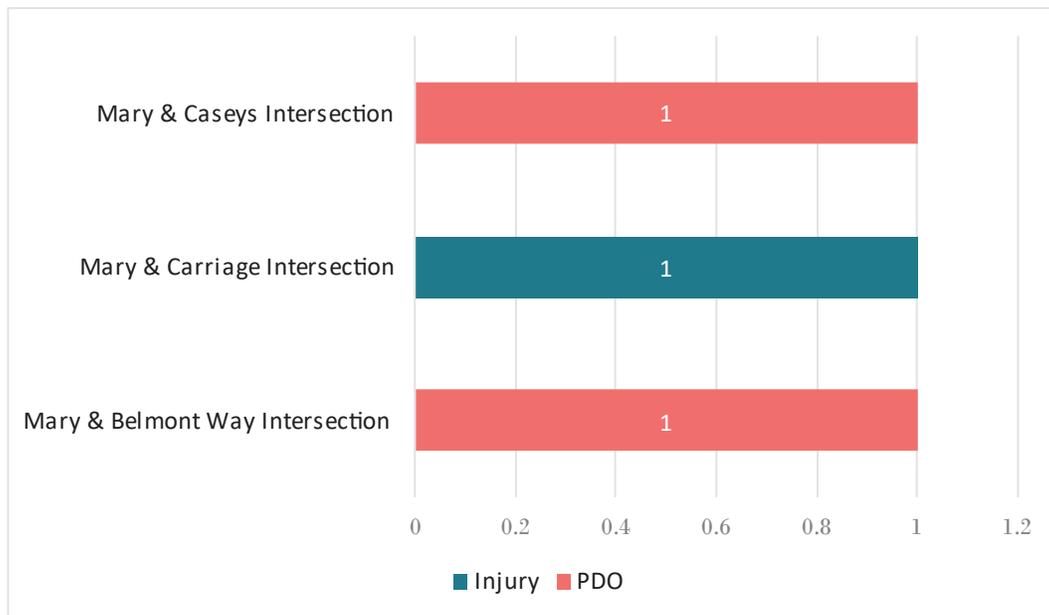


Figure 68 - Crashes at unsignalized intersections between 3rd Street and Fleming Street

Comments Provided by City Staff and Stakeholders

No comments regarding this segment were provided.

Observations

Mary Street: 3rd to Fleming

Afternoon traffic is heavier than the morning or evening traffic.

There are about 31 driveways onto Mary Street in this segment, with a density of about 4.66 driveways per 500 feet – the most in the study corridor. Most of the driveways are from single-family homes and some churches. There are 7 unsignalized intersections on this segment with a density of about 1.05 intersections per 500 feet – above average for the study corridor.

The RSA team made the following intersection observations during the field reviews:

- There are no stop lines at side street intersections.
- Truncated domes are missing where curb ramps are present along the segment (Figure 65).



Figure 69 - Photo of Mary Street showing a lack of truncated domes on curb ramps

Recommendations

Specific recommendations for the segment of Mary Street from 3rd Street to Fleming Street include:

- Add/repair stop lines on side streets
- Move or remove the obstructions in the sidewalk

Segment 4: Fleming Street to Campus Drive

Overview

The Mary Street segment between Fleming Street and Campus Drive is a four-lane road with no dedicated turn lanes (Figure 70) and is 0.37 miles long. It comprises commercial land uses, including strip malls and various types of offices. In the southeast corner of the Mary Street/Fleming Street intersection is the Martin Esquivel Soccer Complex.



Figure 70 - Aerial Image of Fleming Street to Campus Drive

Adjacent to it is "The Dome," operated by the YMCA. The Dome houses the YMCA's sports programs, leagues, tournaments, and special events.

There are 3-foot attached sidewalks present, with power poles running along the outside edge of the sidewalks on both sides of Mary Street. There are no bike lanes or paths along Mary Street. The daily traffic volume for this section of Mary Street is approximately 12,800 VPD.

Crash Review

Table 25 summarizes crashes along Mary Street from Fleming Street to Campus Drive. Figure 67 summarizes the crash locations and shows that just one crash occurred at a driveway (3%) and most of the crashes did not occur at an intersection (53%).

Total Crashes: 30 (3 injury crashes)

Significant Crash Pattern: Rear end

Table 25 - Mary Street from Fleming Street to Campus Drive Crash Summary

Mary - Fleming Street to Campus Drive	Injury		PDO		Total	
	Crashes	%	Crashes	%	Crashes	%
Fixed Object	1	3%	0	0%	1	3%
Angle – Changing Lanes	0	0%	1	3%	1	3%
Angle – Left Turn	0	0%	1	3%	1	3%
Angle – Right Turn	0	0%	2	3%	2	7%
Angle – Stopped Awaiting Turn	0	0%	1	3%	1	3%
Angle – Straight/following road	1	3%	1	3%	2	7%

Mary Street: Fleming to Campus

Head On	1	3%	1	3%	2	7%
Rear End	0	0%	16	53%	16	53%
Sideswipe	0	0%	2	7%	2	7%
Parked Vehicle	0	0%	1	3%	1	3%
Other	0	0%	1	3%	1	3%
Grand Total	3	10%	27	90%	30	100%

Rear End Crash Analysis: There were 16 rear end crashes, none of which resulted in an injury. Few of the crashes occurred with adverse weather road conditions (19%). Most of the crashes occurred in the eastbound direction (81%).

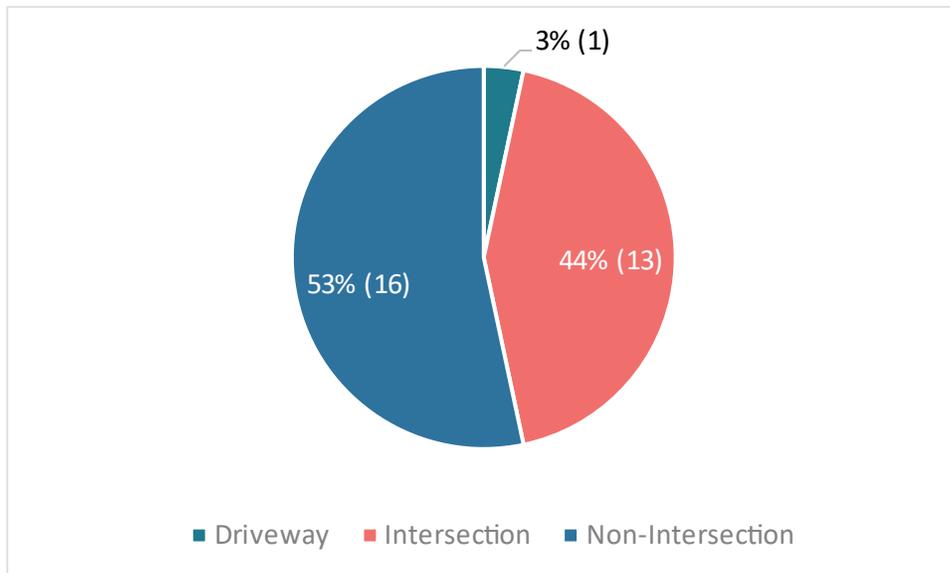


Figure 71 - Crash Locations on Mary Street from Fleming Street to Campus Drive

Figure 72 summarizes the unsignalized intersections between Fleming Street and Campus Drive. The intersection with Pearly Jane had the most crashes on this segment (6) and rear-ends were the most common crash type at this intersection (4). Pearly Jane Road is about 380 feet west of the Fleming Street intersection and is nearby the Garden City Fire Department Labrador Station on Mary Street.

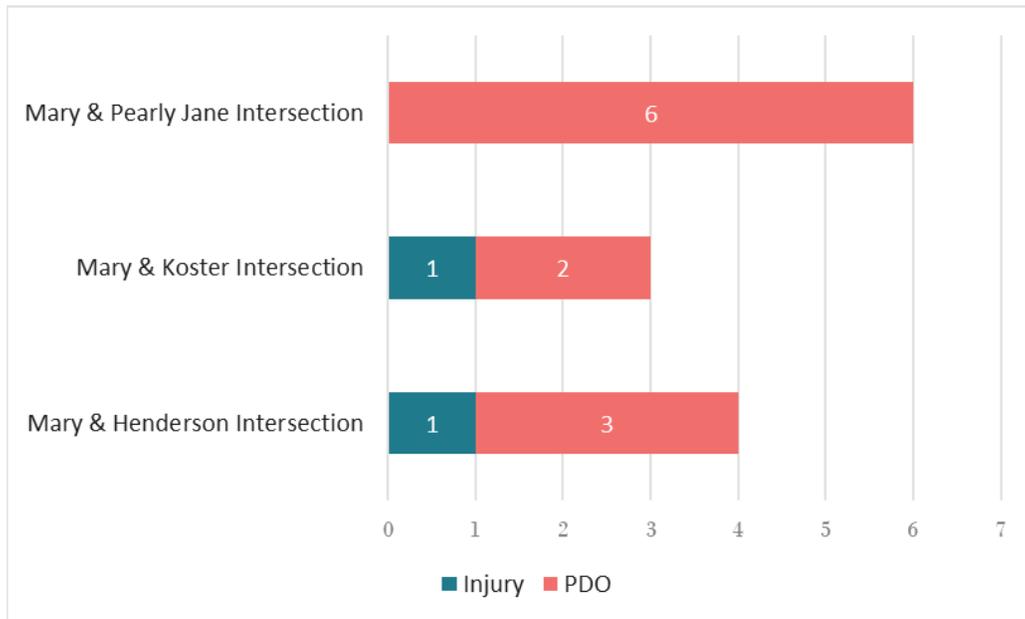


Figure 72 - Crashes at unsignalized intersections between Fleming Street to Campus Drive

Comments Provided by City Staff and Stakeholders

No comments regarding this segment were provided.

Observations

Afternoon traffic is heavier than the morning or evening traffic, and eastbound traffic crashes are significantly higher than westbound traffic.

There are 10 driveways on this segment with a density of 2.56 driveways per 500 feet. This is about average across the corridor. There are 3 unsignalized intersections on this segment with a density of about 0.77 intersections per 500 feet. Most of the driveways are connected to commercial uses. There is also a fire station with access to Mary Street on this segment.



Figure 73 - Photo of Mary Street showing a lack of truncated domes at curb ramps

The RSA team made the following intersection observations during the field reviews:

- There are no stop lines at side street intersections.
- Truncated domes are missing where curb ramps are present along the segment (Figure 68).

Recommendations

Mary Street: Fleming to Campus

Specific recommendations for the segment of Mary Street from Fleming Street to Campus Drive include:

- Add/repair stop lines on side streets

Segment 5: Campus Drive to Buffalo Way Boulevard

Overview

The Mary Street segment from Campus Drive to Buffalo Way Boulevard is a four-lane road with no dedicated turn lanes, other than at signalized intersections (Figure 74) and is 0.32 miles long. Along this segment are commercial, recreational, and residential land uses, with connection to the Garden City High School to the north.

There are 3-foot attached sidewalks present, with power poles running along the outside edge of the sidewalks on both sides of Mary Street. The daily volume for this section of Mary Street is approximately 11,350 vpd.



Figure 74 - Aerial image of Mary Street from Campus Drive to Buffalo Way Boulevard

Crash Review

Table 26 summarizes crashes on Mary Street from Campus Drive to Buffalo Way Boulevard. Figure 70 breaks down the location of these crashes on the road, with 3 occurring at a driveway (10%) and split between at an intersection (48%) and not at an intersection (43%). Most of the crashes occurred around the AM and PM peak hours shown in Figure 71, around the time of school pick-up and drop-off hours.

All of the unsignalized intersection crashes along the segment occurred at Cherokee Road, including 5 of the injury crashes. The most common crash type at the Cherokee Road intersection were rear ends (8) half of which resulted in injuries (4). The Cherokee Road intersection is about 950 feet east of Campus Drive and 750 feet west of Buffalo Way Boulevard.

Total Crashes: 31 (11 injury crashes)

Significant Crash Pattern: Rear end and angle – side impact

Table 26 - Mary Street - Campus Drive to Buffalo Way Boulevard

Mary - Campus Drive to Buffalo Way Blvd	Injury		PDO		Total	
	Crashes	%	Crashes	%	Crashes	%
Angle - Left Turn	2	6%	1	3%	3	10%
Angle - Right Turn	0	0%	1	3%	1	3%
Angle - Stopped in traffic	0	0%	1	3%	1	3%
Angle - Straight/following road	0	0%	4	13%	4	13%
Fixed Object	0	0%	1	3%	1	3%

Non-Collision	0	0%	1	3%	1	3%
Pedestrian	1	3%	0	0%	1	3%
Rear End	8	26%	9	29%	17	55%
Sideswipe	0	0%	2	6%	2	6%
Grand Total	11	35%	20	65%	31	100%

Rear end Crash Analysis: There were 17 rear end crashes (8 injury crashes). Most of the rear end crashes occurred in the eastbound direction (82%). A majority of the crashes occurred around the peak traffic hours for the area around the High School, in the morning between 7:00 a.m. to 9:00 a.m. (29%) and in the afternoon between 2:00 p.m. and 4:00 p.m. (41%).

Angle Crash Analysis: There were 9 angle – side impact crashes (2 injury crashes). Leading up to the angle impact crash, the vehicle was mostly either driving straight/following the road (44%) or making a left turn (33%). Both of the injury crashes were the result of angle – left turn crashes. Some of the crashes occurred between a vehicle driving on Mary Street colliding with a vehicle turning off of Cherokee Road (33%). Most of the crashes occurred around the peak traffic hours for the area around the High School, in the morning between 7:00 a.m. and 8:00 a.m. (44%) and in the afternoon between 2:00 p.m. and 4:00 p.m. (44%).

Pedestrian Crash Analysis: One pedestrian crash occurred that resulted in an injury. A pedestrian was crossing Mary Street heading south near the intersection with Cherokee Road after leaving school at GCHS. A vehicle was heading westbound on Mary Street when it failed to yield to the pedestrian crossing the roadway and struck them in the first lane. The crash occurred around 3:00 p.m. on a Friday in November.

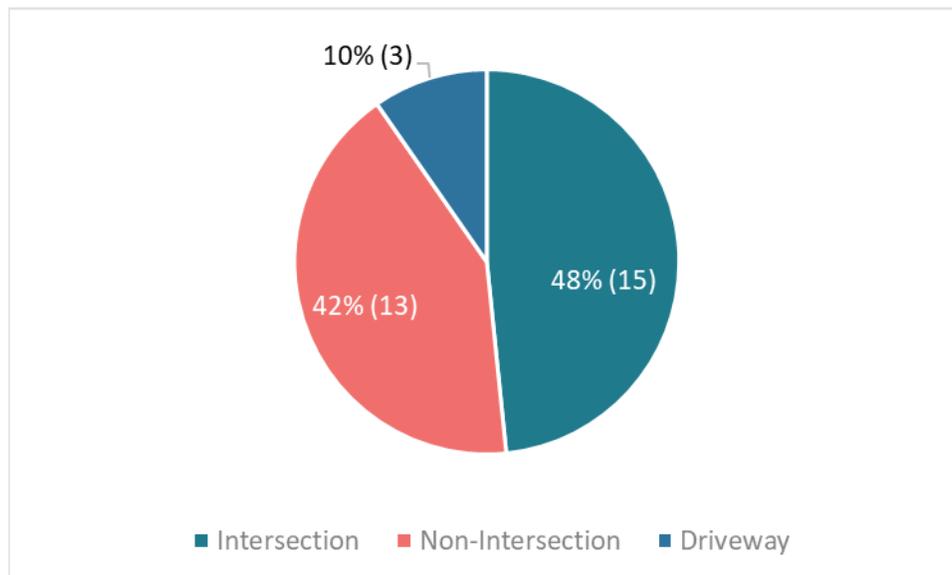


Figure 75 - Crash Location on Mary Street from Campus Drive to Buffalo Way Boulevard

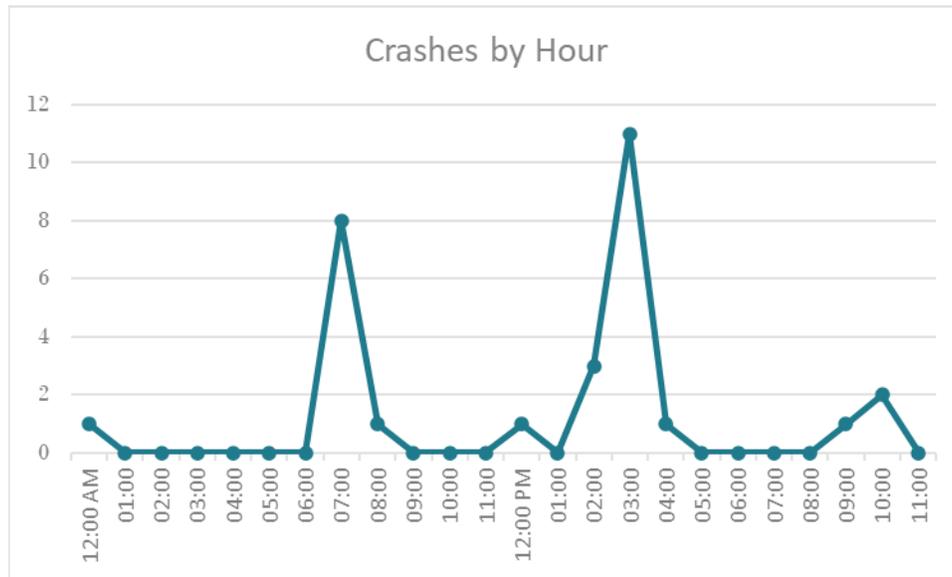


Figure 76 - Mary Street Crashes by Hour from Fleming Street to Campus Drive

Comments Provided by City Staff and Stakeholders

No comments regarding this segment were provided.

Observations

Morning traffic is heavier on this segment than at any other time of the day due to school related activities.

There are 9 driveways on Mary Street on this segment with a density of 2.66 driveways per 500 feet. All of these driveways connect to commercial uses. There is one unsignalized intersection on this segment – the intersection with Cherokee Road.

The RSA team made the following observations during the field reviews:

- There are no stop lines present at the Cherokee Road intersection.
- There are no truncated domes on curb ramps throughout this segment.

Recommendations

Specific recommendations for the segment of Mary Street from Campus Drive to Buffalo Way Boulevard include:

- Add/repair stop lines on side streets
- Install marked crosswalk and RRFB at Cherokee Road intersection

Segment 6: Buffalo Way Boulevard to U.S. 83

Overview

The Mary Street segment from Buffalo Way Boulevard to the U.S. 83 highway is a four-lane road with no dedicated turn lanes, other than at signalized intersections (Figure 77) and is 0.16 miles long. There are no developments along this short segment of Mary Street other than Garden City High School to the north, although a gas station has been proposed at the northeast corner of the Mary Street/Buffalo Way Boulevard intersection.

There are no sidewalks along this segment and the closest marked crosswalks are at Buffalo Way Boulevard. The daily traffic volume is about 8,900 vpd.

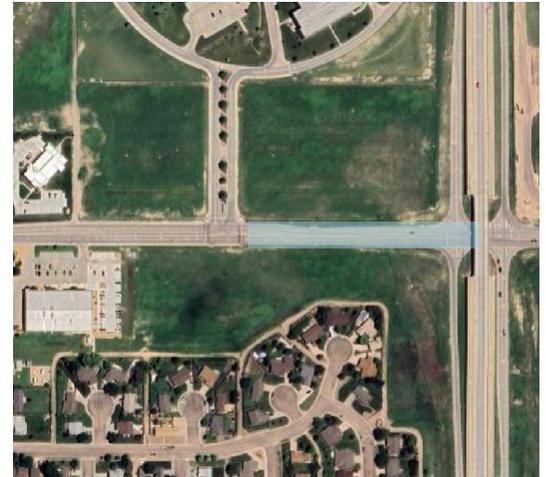


Figure 77 - Aerial of Buffalo Way Blvd to U.S. 83 Segment

Crash Review

Table 27 summarizes the crashes on Mary Street from Buffalo Way Boulevard to the U.S. 83 interchange.

Total Crashes: 2 (1 injury).

Significant Crash Pattern: None.

Table 27 - Mary Street from Buffalo Way Blvd to U.S. 83 Highway Crash Summary

Mary - Buffalo Way Blvd to U.S. 83	Injury		PDO		Total	
	Crashes	%	Crashes	%	Crashes	%
Angle - Changing lanes	0	0%	1	50%	1	50%
Rear End	1	50%	0	0%	1	50%
Grand Total	1	50%	1	50%	2	100%

Comments Provided by City Staff and Stakeholders

No comments regarding this segment were provided.

Observations

Morning traffic is heavier on this segment than at any other time of the day due to school related activities.

The RSA team made the following observations during the field reviews:

- There are no sidewalks along the segment
- Truncated domes are missing where curb ramps are present along the segment.

Recommendations

Specific recommendations for the segment of Mary Street from Buffalo Way Boulevard to U.S. 83 include:

- Add sidewalks on either side of Mary Street

Segment 7: U.S. 83 to E. Kansas Avenue

Overview

The Mary Street segment from 8th Street to 3rd Street is a four-lane road and is 0.43 miles long (Figure 78). The area comprises low-density residential land use with two commercial lots. The area around this section of Mary Street is one of the fastest growing in Garden City. The land immediately to the south is under various stages of development and major multi-use developments are planned to the north on Jennie Barker Road.



Figure 78 - Aerial image of U.S. 83 to Kansas Avenue segment of Mary Street

There are no sidewalks, bike lanes, or paths along this segment of Mary Street. The daily traffic volume for this section of Mary Street is approximately 8,200 VPD.

Crash Review

Table 28 summarizes the crashes that occurred on Mary Street from the U.S. 83 interchange to Kansas Avenue.

Total Crashes: 4.

Significant Crash Pattern: None.

Table 28 - Mary Street from U.S. 83 to Kansas Avenue Crash Summary

Mary - U.S. 83 to Kansas Avenue	PDO	
	Crashes	%
Angle - Straight/following road	1	25%
Rear End	2	50%
Sideswipe	1	25%
Grand Total	4	100%

Comments Provided by City Staff and Stakeholders

No comments regarding this segment were provided.

Observations

Afternoon traffic is heavier than the morning or evening traffic, and westbound traffic crashes are significantly higher than eastbound traffic. There is a fairly substantial hill east of U.S. 83 that limits sight distance.

There are 10 driveways along this segment of Mary Street with a density of about 2.2 driveways per 500 feet. There is one unsignalized intersection – Jennie Barker Road which heads north of Mary Street.

The RSA team made the following intersection observations during the field reviews:

- There are no sidewalks along the segment.
- The stop line at Jennie Barker Road is faded (Figure 79).

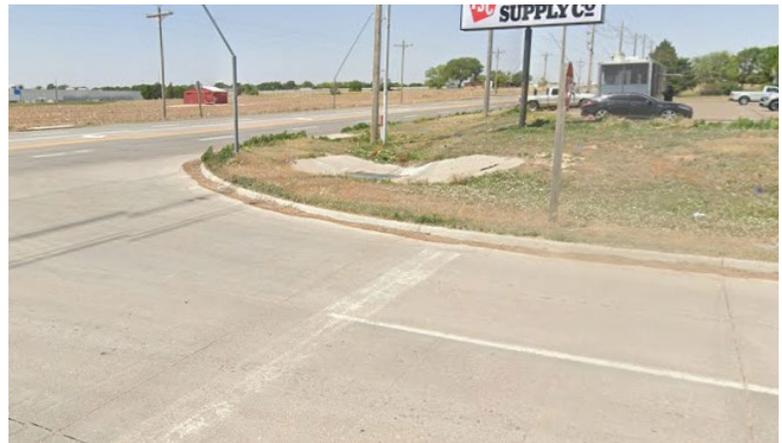


Figure 79 - Image of faded stop lines at Jennie Barker Road intersection

Recommendations

Specific recommendations for the segment of Mary Street from U.S. 83 to Kansas Avenue include:

- Add/repair stop lines on side streets
- Add sidewalks on either side of Mary Street

Segment-Specific Recommendations

The recommendations in Table 29 are based on the collaborative effort of the RSA multidisciplinary team and stakeholder interviews, as well as on the team's experience driving and walking the corridor. Each segment received a number of recommendations and are numbered the same as in the previous analysis from west to east:

- | | |
|---|--|
| 1. Taylor Avenue to 8 th Street | 5. Campus Drive to Buffalo Way Boulevard |
| 2. 8 th Street to 3 rd Street | 6. Buffalo Way Boulevard to U.S. 83 Bypass |
| 3. 3 rd Street to Fleming Street | 7. U.S. 83 Bypass to Kansas Avenue |
| 4. Fleming Street to Campus Drive | |

The time frame for each recommendation is broken down by into three categories:

- Short-term: 0 to 3 years
- Medium-term: 3 to 5 years
- Long-term: 5 to 10 years

The cost estimates for each recommendation is given at a high level 10% planning phase and may fluctuate based on the final design. The total cost estimates are broken down into three categories:

- Low cost: Less than \$50,000
- Medium cost: Between \$50,000 and \$200,000
- High cost: Greater than \$200,000

Table 29 - Specific Recommendations for Each Segment

Recommendations	Time Frame	Cost	Taylor Ave to 8 th St	8 th St to 3 rd St	3 rd St to Fleming St	Fleming St to Campus Dr	Campus Dr to Buffalo Way Blvd	Buffalo Way Blvd to U.S. 83 Bypass	U.S. 83 Bypass to Kansas Ave
Add/Repair stop lines at unsignalized intersections when warranted	Short	Low	X	X	X	X	X	-	X
Bring the B Street crosswalk into MUTCD compliance	Short	Low	-	X	-	-	-	-	-
Repair and reconstruct sidewalks	Medium	Medium	-	X	-	-	-	-	-

Segment Specific Analysis

Install curb ramps	Long	Medium	-	X	-	-	-	-	-
Move or remove the obstructions in the sidewalk	Long	Low	-	X	X	-	-	-	-
Add sidewalks on either side of Mary Street	Long	High	-	-	-	-	-	X	X
Work with Schools to increase awareness about roadway safety and safe roadway crossings Applicable with implementation of Road Diet - install marked crosswalk and RRFB at Cherokee Road intersection.	Medium	Low	-	-	-	-	X	-	-

Appendix A – Mary Street Crash Diagrams

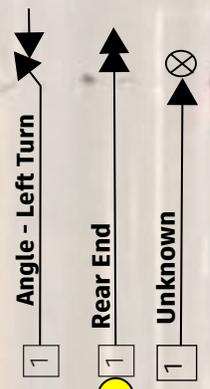
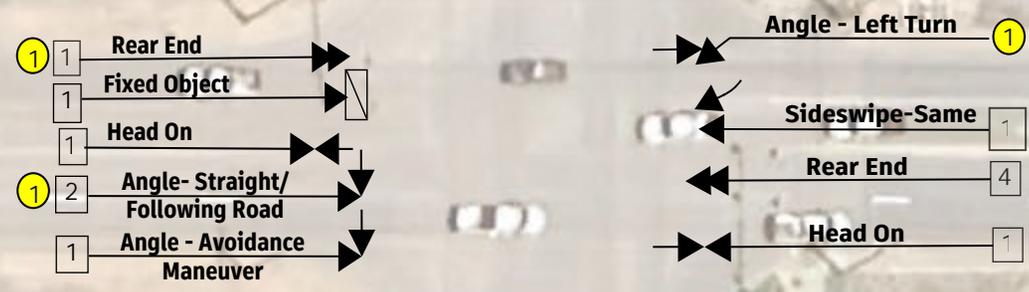


N Taylor Ave & W Mary St - Collision Diagram

Crash Data Collected : 2018 - 2022

N Taylor Ave

W Mary St



Legend

- Property Damage Only (PDO)
- Injury
- Fixed Object
- Pedestrian
- Animal
- Angle
- Rear End
- Sideswipe - Same Direction
- Sideswipe - Opposite Direction
- Head On
- Back into
- Unknown(NA)

Collision Types	Crash Severity		Total
	INJ	PDO	
Fixed Object	0	1	1
Angle - Avoidance Maneuver	0	1	1
Angle - Left Turn	1	1	2
Angle - Straight/ Following Road	1	2	3
Backed Into	0	1	1
Head On	0	2	2
Rear End	2	7	9
Sideswipe	0	1	1
Unknown	0	1	1
Total	4	17	21

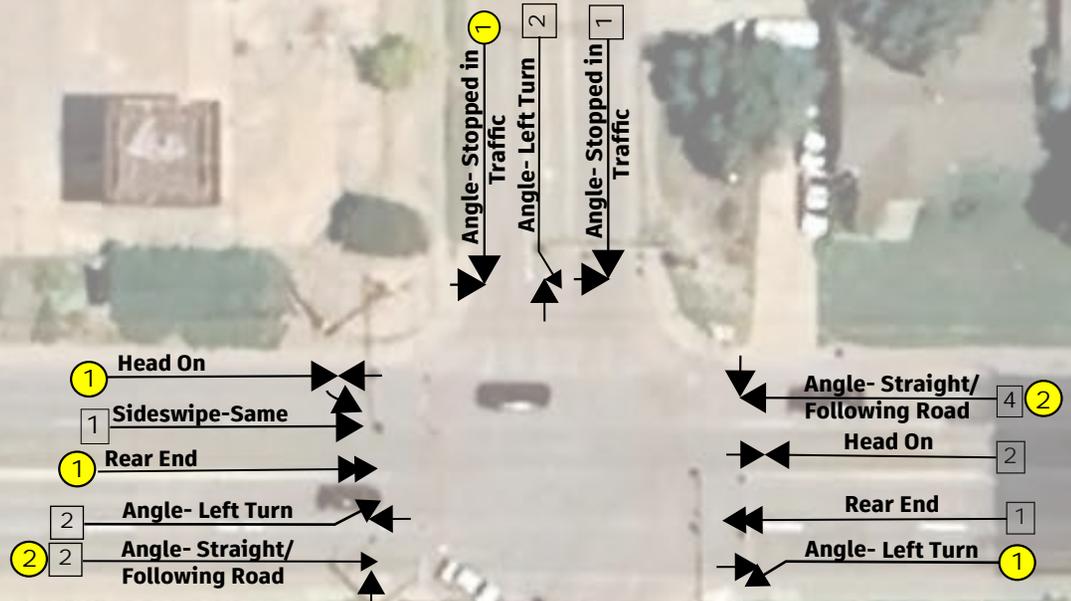


N 8th St & W Mary St - Collision Diagram

Crash Data Collected : 2018 - 2022

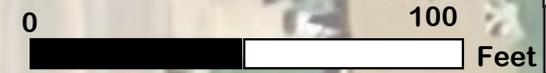
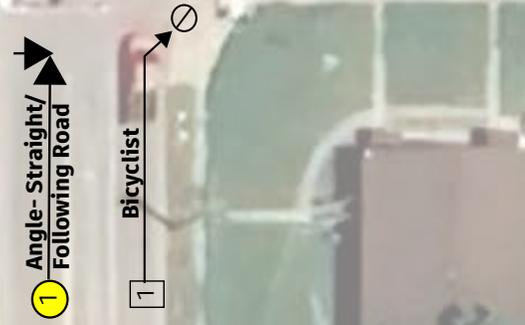
N 8th St

W Mary St



Legend

- Property Damage Only (PDO)
- Injury
- Fixed Object
- Pedestrian
- Animal
- Angle
- Rear End
- Sideswipe - Same Direction
- Sideswipe - Opposite Direction
- Head On
- Back into
- Unknown(NA)



Collision Types	Crash Severity		Total
	INJ	PDO	
Angle - Stopped in Traffic	1	0	1
Angle - Left Turn	1	4	5
Angle - Straight/ Following Road	5	7	12
Bicyclist	0	1	1
Head On	1	2	3
Rear End	1	1	2
Sideswipe	0	1	1
Total	9	16	25

N 3rd St & E Mary St - Collision Diagram

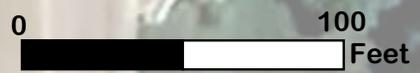
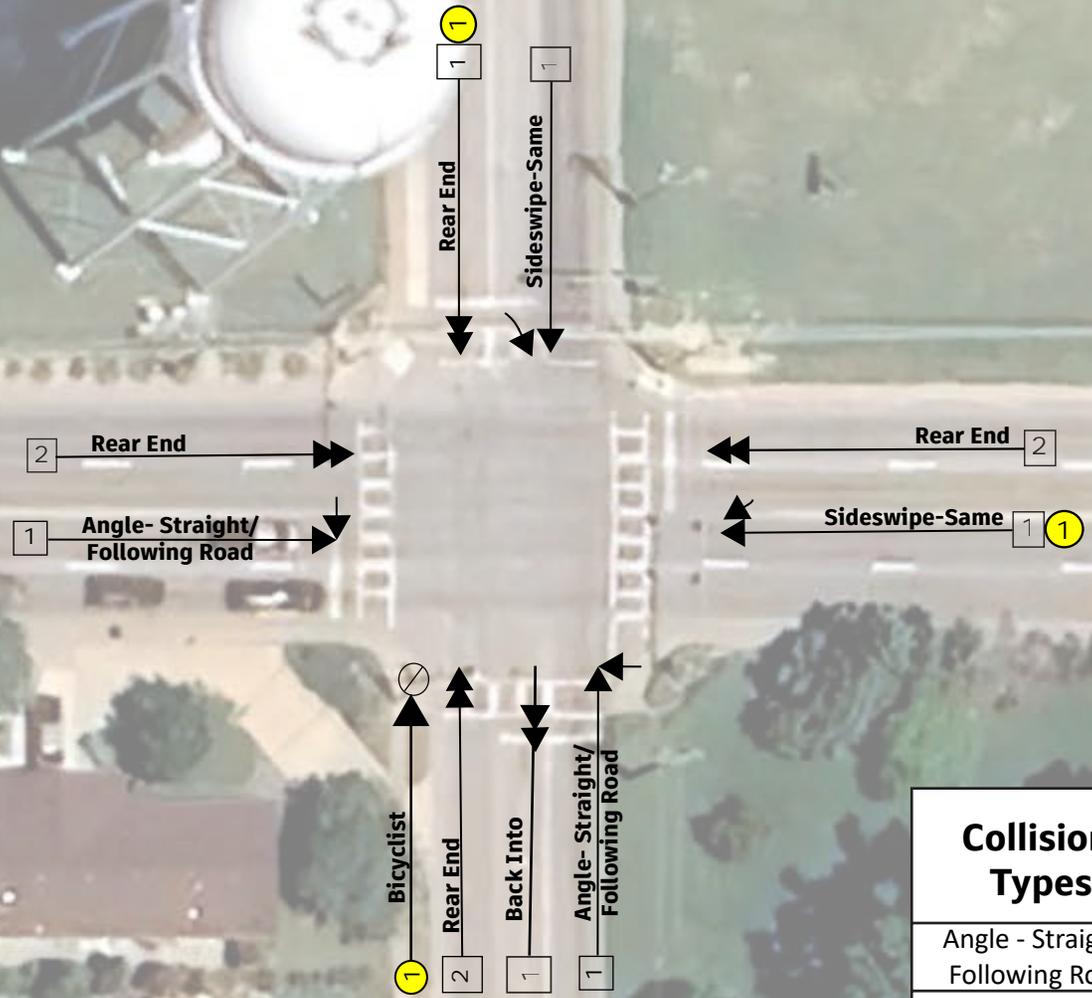
Crash Data Collected : 2018 - 2022

E Mary St

N 3rd St

Legend

- Property Damage Only (PDO)
- Injury
- Fixed Object
- Pedestrian
- Animal
- Angle
- Rear End
- Sideswipe - Same Direction
- Sideswipe - Opposite Direction
- Head On
- Back into
- Unknown(NA)



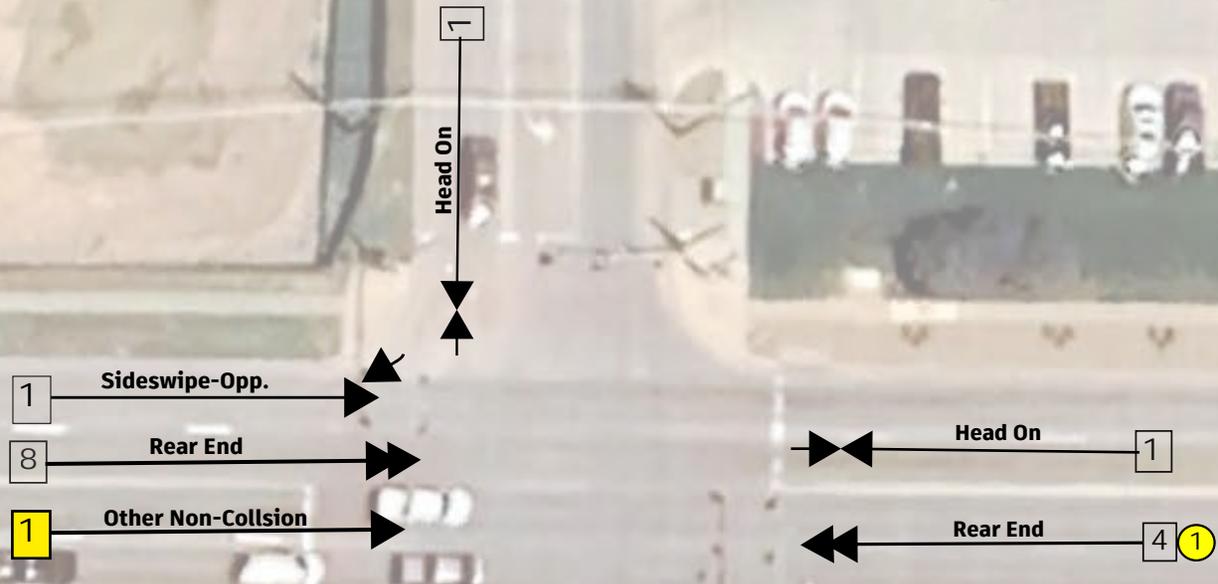
Collision Types	Crash Severity		Total
	INJ	PDO	
Angle - Straight/ Following Road	0	2	2
Backed Into	0	1	1
Rear End	1	7	8
Bicyclist	1	0	1
Sideswipe	1	2	3
Total	3	12	15

Fleming St & E Mary St - Collision Diagram

Crash Data Collected : 2018 - 2022

Fleming St

E Mary St



Legend

- Property Damage Only (PDO)
- Injury
- Suspected Serious Injury (SSI)
- Fixed Object
- Pedestrian
- Animal
- Angle-Side Impact
- Rear End
- Sideswipe - Same Direction
- Sideswipe - Opposite Direction
- Head On
- Back into
- Non-Collision

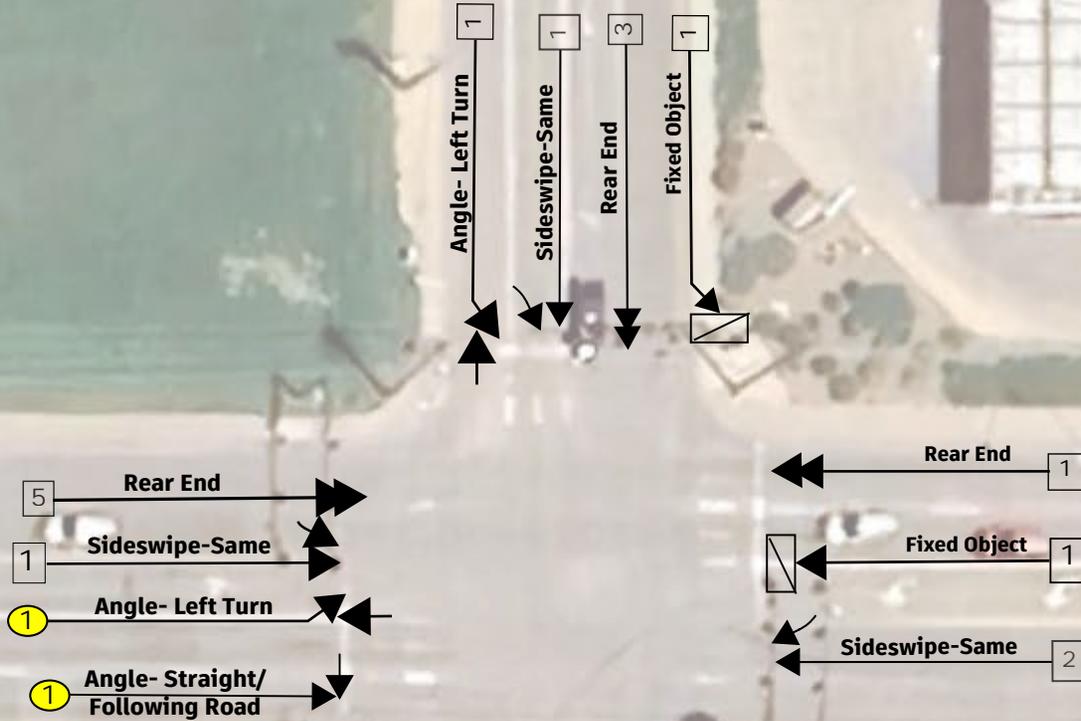
Collision Types	Crash Severity			Total
	SSI	INJ	PDO	
Head On	0	0	2	1
Rear End	0	1	12	5
Sideswipe	0	0	2	12
Other Non-Collision	1	0	1	1
Total	1	1	16	18



Campus Dr & E Mary St - Collision Diagram

Crash Data Collected : 2018 - 2022

E Mary St



Legend

- Property Damage Only (PDO)
- Injury
- Fixed Object
- Pedestrian
- Animal
- Angle
- Rear End
- Sideswipe - Same Direction
- Sideswipe - Opposite Direction
- Head On
- Back into
- Unknown(NA)



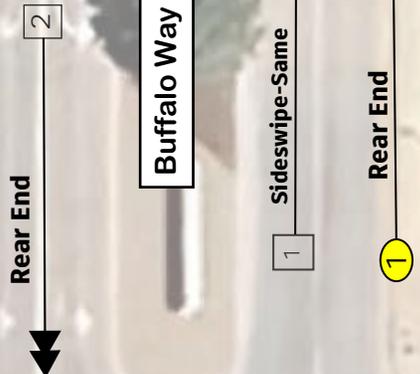
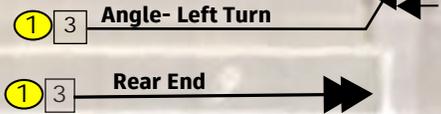
Collision Types	Crash Severity		Total
	INJ	PDO	
Fixed Object	0	3	3
Angle - Left Turn	1	1	2
Angle - Straight/ Following Road	1	2	3
Head On	1	0	1
Rear End	1	14	15
Sideswipe	0	4	4
Total	4	24	28

Buffalo Way Blvd & E Mary St - Collision Diagram

Crash Data Collected : 2018 - 2022

E Mary St

Buffalo Way Blvd



Legend

- Property Damage Only (PDO)
- Injury
- ▨ Fixed Object
- Pedestrian
- ⬠ Animal
- ↘ Angle
- Rear End
- ↘↘ Sideswipe - Same Direction
- ↘↗ Sideswipe - Opposite Direction
- ↔ Head On
- ↔ Back into
- ⊗ Unknown(NA)



Collision Types	Crash Severity		Total
	INJ	PDO	
Rear End	2	5	7
Angle - Left Turn	1	3	4
Sideswipe	0	1	3
Total	3	9	12

US-83 Ramps & E Mary St - Collision Diagram

Crash Data Collected : 2018 - 2022

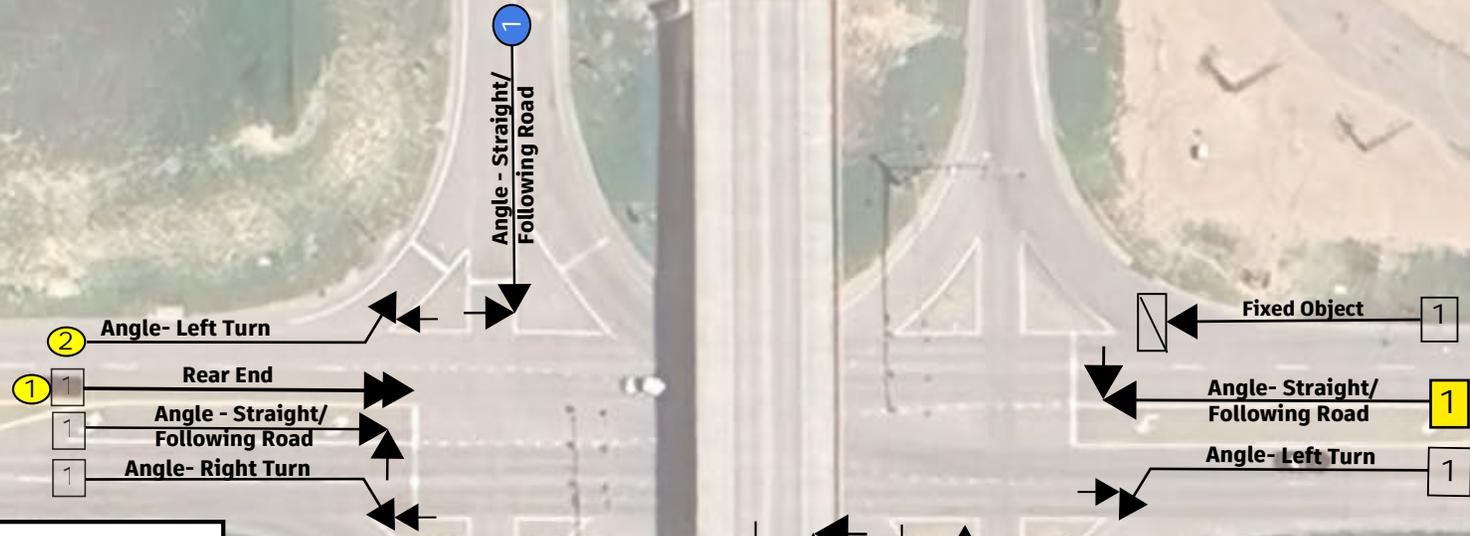
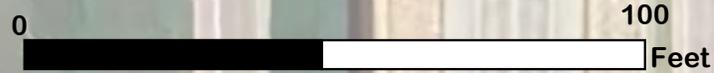
E Mary St

US-83 Ramps

US-83 Ramps

Legend

- Property Damage Only (PDO)
- Injury
- Suspected Serious Injury (SSI)
- Fatal
- Fixed Object
- Pedestrian
- Animal
- Angle-Side Impact (Broadside)
- Rear End
- Sideswipe - Same Direction
- Sideswipe - Opposite Direction
- Head On
- Back into
- Non-Collision



Collision Types	Crash Severity				Total
	Fatal	SSI	INJ	PDO	
Fixed Object	0	0	0	1	1
Angle - Left Turn	0	0	2	1	3
Angle - Right Turn	0	0	0	1	12
Angle - Straight/Following Road	1	1	1	2	5
Head On	0	0	0	2	2
Rear End	0	0	2	1	3
Sideswipe	0	0	0	1	1
Total	1	1	5	9	16

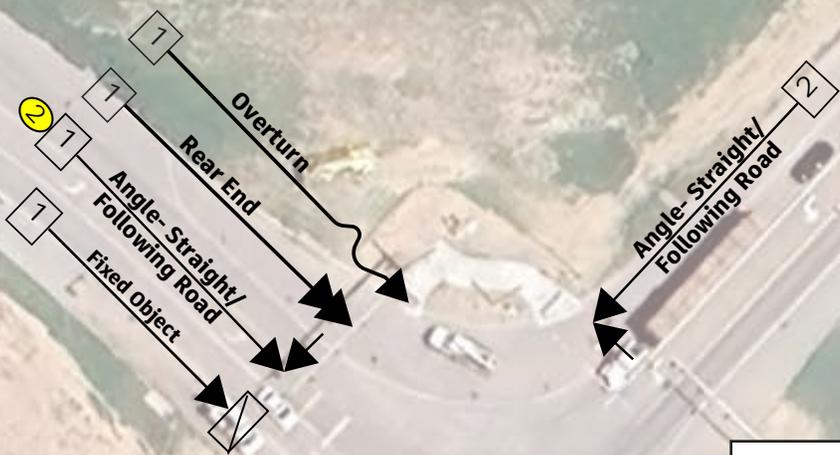
Jennie Barker Rd, Kansas Ave, & E Mary St - Collision Diagram

Crash Data Collected : 2018 - 2022

E Mary St

E Kansas Ave

Jennie Barker Rd



Collision Types	Crash Severity			Total
	SSI	INJ	PDO	
Fixed Object	1	0	1	2
Angle - Straight/ Following	0	3	3	6
Rear End	0	0	1	1
Overturned	1	0	0	1
Total	1	3	6	10

Legend

- Property Damage Only (PDO)
- Injury
- Suspected Serious Injury (SSI)
- Fixed Object
- Pedestrian
- Animal
- Angle-Side Impact
- Rear End
- Sideswipe - Same Direction
- Sideswipe - Opposite Direction
- Head On
- Back into
- Non-Collision

