TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS (TSM&O)

PEDESTRIAN SIGNAL UPGRADES
ASHLAND CITY, TENNESSEE

State Route State Route 12 (Main Street) Intersections at
State Route 49 (Cumberland Street) / State Route 49 (Frey Street)
& Elizabeth Street / Stratton Boulevard

PREPARED FOR: TOWN OF ASHLAND CITY
PREPARED BY: KCI TECHNOLOGIES, INC.

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1.0 Introduction

The Town of Ashland City was awarded a Community Transportation Planning Grant through the Tennessee Department of Transportation (TDOT) for a Transportation Systems Management and Operations (TSM&O) pedestrian signal upgrade project. The primary purpose of this project is to provide pedestrian signal and Americans with Disabilities Act (ADA) upgrades at signalized intersections to improve safety, operations, and accessibility. Improvements at all study intersections are compliant with ADA standards and Public Rights-of-Way Accessibility Guidelines (PROWAG) requirements. The intersections that were inventoried and recommended for improvements in conceptual plan form include the following:

- State Route 12 (Main Street) at State Route 49 (Cumberland Street)
- State Route 12 (Main Street) at State Route 49 (Frey Street)
- State Route 12 (Main Street) at Elizabeth Street / Stratton Boulevard

This report contains a summary of data collected during the kickoff meeting and the field review meeting conducted with members of KCI Technologies, Inc. (KCI), the Town of Ashland City, and TDOT. Conceptual plans and improvement cost estimates are provided for each intersection.

2.0 Kickoff Meeting

A kickoff meeting was conducted on Thursday, February 4, 2021 with KCI, the Town of Ashland City, and TDOT to identify specific goals, objectives, deliverables, and timeframes for each task. Details from this meeting include the following:

Attendees

Ian Preston (TDOT)
Brian Stinson (Town of Ashland City)
Clint Biggers (Town of Ashland City)
Jared Eden (Town of Ashland City)
Jonathan Cleghon (KCI)
Brandon Taylor (KCI)
John Houghton (KCI)

Project Information

State Route 12 (Main Street) at State Route 49 (Cumberland Street)
State Route 12 (Main Street) at State Route 49 (Frey Street)
State Route 12 (Main Street) at Elizabeth Street / Stratton Boulevard

The signalized, offset intersections on State Route 12 (Main Street) at State Route 49 (Cumberland Street) / State Route 49 (Frey Street) operate from a single traffic signal controller.

Existing pedestrian infrastructure and ADA deficiencies:

Town staff provided a history of previous projects. The Renaissance Ashland City project, which began in 2004, provided new sidewalks and full traffic signal rebuilds. However, sidewalks, curb ramps, and traffic signals do not meet current ADA standards. Minor updates to the traffic signals have been completed within the last 7 years, but they still require additional improvements for full ADA compliance.

Traffic signal equipment and capabilities, pedestrian requirements, and physical limitations:

The signalized, offset intersections on State Route 12 (Main Street) at State Route 49 (Cumberland Street) / State Route 49 (Frey Street) operate from a single traffic signal controller. Traffic signal controllers are Peek models, not newer Econolite models preferred by the Town. Capability of the signal cabinets to accept new phases is unknown at this time and will be evaluated during the field review meeting. The primary physical limitation will be determining how to meet ADA requirements given the existing position of sidewalks, curb ramps, and signal poles.

Typical signal equipment used by the Town of Ashland City:

The Town has or is upgrading all traffic signal controllers to Econolite models. KCI will evaluate other signal related components during the field review meeting.

Intersection design philosophy for accommodating nonmotorized traffic:

Pedestrians should be fully accommodated, and all ADA requirements must be met. Due to the operation of the two offset intersections on State Route 12 (Main Street) at State Route 49 (Cumberland Street) / State Route 49 (Frey Street), introduction of new pedestrian or vehicle phases may prove to be very difficult or even detrimental to existing signal operation.

Perceived problems and concerns at the above intersections:

The primary concern is bringing the intersections into compliance with ADA requirements.

Review process and deliverables:

All documents being submitted to the Town for review will be sent to Brian Stinson, who will distribute to other staff as needed. Ian Preston will be copied on all submittals.

The need for establishing a proprietary signal item list with TDOT:

The Town does not currently have a propriety signal item list on file with TDOT. KCI will evaluate traffic signal equipment during the field review meeting and determine which items may qualify. Establishing a proprietary signal item list with TDOT may prove beneficial during the future construction phase of the project or if modifications are undertaken on any of the seven (7) signals operated by the Town. The list would also apply to any new traffic signals constructed by TDOT.

Data Collection

- Historical count data, including turning movement counts (TMC) and average daily traffic (ADT) may exist. Brian Stinson will forward traffic data on file.
- Highest volume pedestrian crossings will be observed, and discussion will take place during the field review meeting to establish the best method of accommodating pedestrian movement at the intersections.
- Record design information for traffic signals and intersections may exist. Brian Stinson will forward design records on file, however, much of this information was in paper format and was lost during the 2010 flood. TDOT may have record designs, or they may be stored in the signal cabinets.
- Current signal timing sheets do not exist. KCI will collect existing signal timing during the field review meeting.
- Crash data will be obtained. The biggest concern at the intersections is property damage caused by large trucks that are unable to make turns due to the small curb radii. KCI will assemble crash data to determine if additional safety measures are needed.

For additional details on the kickoff meeting refer to Appendix A.

3.0 Data Collection

The Town of Ashland City provided and KCI collected numerous sources of information to support the completion of the objectives on this project. The documents used as references for previous assessments completed in the study area include the following:

- Ashland City ADA Transition Plan 2019
- Ashland City Community Mobility Plan
- Ashland City State Route 49 Realignment Memo and Layout
- Ashland City Zoning Map
- Northwest Corridor Transit Study 2017
- Transportation Planning Report State Route 49 2008

3.1 Intersection Deficiencies

During KCI's kickoff meeting and subsequent field review meeting there were multiple deficiencies acknowledged in adhering to ADA standards and PROWAG requirements as documented in the Town's ADA Transition Plan completed in 2019.

Deficiencies at the intersection of State Route 12 (Main Street) and State Route 49 (Cumberland Street) include the following:

- Traffic signal poles, decorative street light poles, and parking lot curbing block the pedestrian throughway zone in multiple locations.
- Noncompliant detectable warning surfaces exist in multiple curb ramps.
- Noncompliant pedestrian signal heads exist on multiple signal poles.
- Noncompliant pedestrian pushbutton locations exist on multiple signal poles.
- Lack of existing pedestrian signals or pushbuttons for some crossings.
- Curb ramp noncompliance based on orientation for dual crossings exist in multiple locations.

Deficiencies at the intersection of State Route 12 (Main Street) and State Route 49 (Frey Street) include the following:

- Pole mounted traffic signal cabinet blocks the pedestrian throughway zone.
- Westbound right-turn truck movements have damaged the steel strain traffic signal pole and pushbutton.
- Noncompliant pedestrian signal heads exist on multiple signal poles.
- Damaged pushbutton exists in a noncompliant location.
- Noncompliant detectable warning surfaces exist in multiple curb ramp locations.
- Noncompliant pedestrian pushbutton locations exist on multiple signal poles.
- Curb ramp noncompliance based on orientation for dual crossings exist.
- Pedestrian signal head and pushbutton not located appropriately at the State Route 12 (Main Street) crossing.

Deficiencies at the intersection of State Route 12 (Main Street) and Elizabeth Street / Stratton Boulevard include the following:

- Curb ramps are not present in all quadrants of the intersection.
- Crosswalk pavement markings are not present on multiple legs of the intersection.
- Curb ramp noncompliance based on orientation for single crossings exist.
- Noncompliant pedestrian signal heads exist on multiple signal poles.
- Noncompliant pedestrian pushbutton locations exist on multiple signal poles.
- Lack of pedestrian signals or pushbuttons exist for multiple crossings.
- Nonstandard detectable warning surfaces exist in curb ramps for multiple locations.
- Curb ramp noncompliance based on insufficient level landing area exist.

For a more detailed description of the intersection deficiencies along with photos refer to Appendix C.

3.2 Crash Analysis

Crash data and crash summaries between the year 2017 and 2020 were collected from TDOT's Enhanced Tennessee Roadway Information Management System (E-TRIMS) and Tennessee Integrated Traffic Analysis Network (TITAN) databases and analyzed along State Route 12 (Main Street) at the study intersections. The total number of motorized and nonmotorized crashes reported during this period was 40 crashes.

Major findings for the 23 total crashes reported at the intersection of State Route 12 (Main Street) at State Route 49 (Cumberland Street) / State Route 49 (Frey Street) include the following:

- Approximately 78% of the crashes (18) were classified as property damage crashes. An additional 18% of the crashes (4) resulted in non-incapacitating injuries.
- An incapacitating injury crash involving a pedestrian crossing the southern leg of the State Route 12 (Main Street) and State Route 49 (Frey Street) intersection resulted in the remaining 4% (1) of crashes.
- The dominant crash type is rear end collisions, which account for 48% (11) of the total number of crashes.
- Proportions of additional crash types include 21% for sideswipe collisions (5), 13% for angular collisions (3), 9% for single vehicle collisions (2), and 9% were reported as unknown (2).

Major findings for the 17 total crashes reported at the intersection of State Route 12 (Main Street) and Elizabeth Street / Stratton Boulevard include the following:

- Approximately 88% of the crashes (15) were classified as property damage crashes. The remaining 12% of the crashes (2) resulted in non-incapacitating injuries.
- The dominant crash type is rear end collisions which account for 47% (8) of the total number of crashes.
- Proportions of additional crash types include 18% for angular collisions (3), 18% for sideswipe collisions (3), 11% for single vehicle collisions (2), and 6% were reported as unknown (1).

For more details on crash analysis data refer to Appendix B.

TYPE	YEAR	COUNTY	FIGURE NO.
TSM&O	2021	CHEATHAM	1

06/03/19 12:00P C - D - D - 2
08/09/20 02:47P C - D - D - 2
12/26/20 01:11P C - D - D - 2
10/05/20 09:33P C - D -DKL- 2
SR 12 (MAIN ST.)
02/01/18 02:15P C - D - D - 2
09/25/18 02:00P R - W - D - 2
1 12/17/20 03:10P C - D - D - 2
SR 49 (FREY ST.)
08/24/19 06:05P C - D - D - 2
12/04/18 01:17P CLD- D - D - 2
05/02/20 11:22A C - D - D - 2
12/05/19 12:33P C - D - D - 2
08/13/18 01:10P C - D - D - 3
07/18/18 04:00P C - D - D - 2
12/12/18 10:02A CLD- D - D - 2
05/28/20 02:12P C - D - D - 2
SR 49 (CUMBERLAND ST.)
02/06/21 11:55A CLD- D - D - 2
02/25/20 03:00P C - D - D - 2
10/04/18 05:31A C - D -DKL- 2
1 08/25/19 09:27A C - D - D - 1 (PEDESTRIAN)
1 08/24/20 02:22P C - D - D - 2
1 07/02/20 02:45P C - D - D - 3
03/20/20 01:10P R - W - D - 2
1 06/18/20 08:12P C - D -DS - 2

CRASH LEGEND

- Vehicle Path (Direction of Travel)
- Backing Vehicle
- Rear End
- Head On
- Side Swipe (Same Direction)
- Side Swipe (Opposite Direction)
- Right Angle
- Left Turn
- Overturn
- Out of Control
- Pedestrian/Bicycle Pedestrian/Motorcycle (Specify Road User)
- Heavy Truck / Bus

CONDITION CODES LEGEND

X - X - X - # — NUMBER OF VEHICLES

WEATHER	ROAD SURFACE	LIGHTING
C=Clear	D=Dry	D=Daylight
R=Rain	W=Wet	DKN=Dark Not Lighted
CLD=Cloudy	I=Icy	DKL=Dark Lighted
F=Fog	O=Other	DN=Dawn
S=Snow	U=Unknown	DS=Dusk
U=Unknown		U=Unknown

TYPE OF CRASH

NUMBER OF FATALITIES OR INJURIES

- # FATAL CRASH
- # INCAPACITATING/SUSPECT SERIOUS INJURY CRASH
- # NON-INCAPACITATING/SUSPECTED MINOR INJURY CRASH
- # PROPERTY DAMAGE CRASH

Time: A=AM P=PM

☒ Parked Vehicle

☒ Object (Specify)

0 80' 160' 240'

N

TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS

CRASH DIAGRAM JANUARY 1, 2018 - FEBRUARY 17, 2021

INTERSECTION OF STATE ROUTE 12 (MAIN STREET) AND STATE ROUTE 49 (CUMBERLAND STREET / FREY STREET)

ASHLAND CITY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

FIGURE 1
STATE ROUTE 12
LOG MILE 6.57
TO
LOG MILE 6.68

6/18/2021 1:53:18 PM
M:\2020\2002055.01 (TDOT Ashland City TSMO)\Design\Working\Ashland City TSM&O Cumberland St_Frey St and Main St Crash Diagram.dgn

TYPE	YEAR	COUNTY	FIGURE NO.
TSM&O	2021	CHEATHAM	2

09/27/18 03:35P C - D - D - 2

12/06/20 03:03P C - D - D - 2

09/19/18 12:15P C - D - D - 2

11/19/18 12:42P C - D - D - 2

1 11/19/18 05:11P C - D -DKL- 3

1 07/28/18 12:00A C - D -DKL- 1

08/02/19 05:03P C - D - D - 2

07/15/18 03:25P R - W - D - 2

02/03/20 12:25P C - D - D - 2

06/29/18 02:30P C - D - D - 2

08/03/20 02:10P C - D - D - 2

12/11/18 03:45P C - D - D - 2

12/10/20 11:14A C - D - D - 2

10/24/18 01:59P C - D - D - 2

04/12/18 02:29P C - D - D - 2

02/06/19 07:35P R - W -DKL- 1

04/20/18 03:53P C - D - D - 2

STRATTON BLVD.

ELIZABETH ST.

SR 12 (MAIN ST.)

CRASH LEGEND

- Vehicle Path (Direction of Travel)
- Backing Vehicle
- Rear End
- Head On
- Side Swipe (Same Direction)
- Side Swipe (Opposite Direction)
- Right Angle
- Left Turn
- Overturn
- Out of Control
- Pedestrian/Bicycle
- Pedestrian/Motorcycle (Specify Road User)
- Heavy Truck / Bus

CONDITION CODES LEGEND

X - X - X - # — NUMBER OF VEHICLES

WEATHER	ROAD SURFACE	LIGHTING
C=Clear	D=Dry	D=Daylight
R=Rain	W=Wet	DKN=Dark Not Lighted
CLD=Cloudy	I=Icy	DKL=Dark Lighted
F=Fog	O=Other	DN=Dawn
S=Snow	U=Unknown	DS=Dusk
U=Unknown		U=Unknown

TYPE OF CRASH

NUMBER OF FATALITIES OR INJURIES

- # FATAL CRASH
- # INCAPACITATING/SUSPECT SERIOUS INJURY CRASH
- # NON-INCAPACITATING/SUSPECTED MINOR INJURY CRASH
- # PROPERTY DAMAGE CRASH

Time: A=AM P=PM

☒ Parked Vehicle

☒ Object (Specify)

0 80' 160' 240'

N

TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS

CRASH DIAGRAM JANUARY 1, 2018 - FEBRUARY 17, 2021

INTERSECTION OF STATE ROUTE 12 (MAIN STREET) AND ELIZABETH STREET / STRATTON BOULEVARD

ASHLAND CITY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

FIGURE 2
STATE ROUTE 12
LOG MILE 6.436
TO
LOG MILE 6.516

6/18/2021 1:51:06 PM
M:\2020\2002055.01 (TDOT Ashland City TSMO)\Design\Working\Ashland City TSM&O Elizabeth St_Stratton St and Main St Crash Diagram.dgn

4.0 Field Review Meeting

KCI conducted a field review of the subject project with local team members from the Town of Ashland City on Tuesday, March 2, 2021.

The purpose of the field review was to thoroughly investigate each intersection, determine the need for pedestrian infrastructure upgrades, identify challenges and opportunities to implementing infrastructure upgrades, and to reach a consensus on elements to be included within conceptual improvement plans and improvement cost estimates. Additional input from the Town of Ashland City was also welcome and recorded during the field review. All improvements provided comply with the state and local accessibility guidelines as well as the requirements set forth in TDOT's Roadway Design Guidelines, specifically Chapter 3 Multimodal Design, ADA, and PROWAG.

The field review findings provided will allow the Town of Ashland City to make specific decisions regarding the pedestrian improvements needed along the project's limits.

4.1 General Discussion Notes

KCI, along with the Town of Ashland City, discussed various improvements for each of the three intersections along the State Route 12 (Main Street) corridor at State Route 49 (Cumberland Street) / State Route 49 (Frey Street), and Elizabeth Street / Stratton Boulevard that would create a safe environment for pedestrians and improve ADA accessibility. The Town's long-term goals were taken into consideration when the team discussed pedestrian improvements needed along the corridor.

The primary purpose of this project is to provide pedestrian signal and ADA upgrades at signalized intersections to improve safety, operations, and accessibility. Improvements for pedestrian infrastructure considered during the field review include full traffic signal rebuilds, countdown pedestrian signals, pedestrian push buttons, leading pedestrian intervals, improved signage, high visibility crosswalk pavement markings, new pedestal poles, detectable warning mats, new ADA compliant curb ramps, pedestrian refuge islands, curb extensions, and other improvements consistent with TDOT's Multimodal Design Guidelines.

Sidewalks, curb ramps, pedestrian signals, and pedestrian pushbuttons exist at all three intersections, however, many of these features are either non-compliant or non-existent for all pedestrian crossings. Sidewalk widths were found to be deficient at multiple locations due to traffic signal or streetlight poles obstructing the pedestrian path of travel. Curb ramps are missing at several locations and those that exist are mostly non-compliant due to design or the lack of appropriate detectable warning surfaces. Pedestrian signals exist for most crossings, however, the pedestrian signals are not the required countdown display type and pedestrian pushbuttons are non-compliant due to type and/or placement inrelation to the level landings. Pedestrian infrastructure is not provided for two of the crossings at the Elizabeth Street / Stratton Boulevard intersection. In general, opportunities exist at all three intersections to make significant improvements to pedestrian safety and ADA accessibility.

Various curb ramp design elements within the limits of the project are generally non-compliant including the orientation of curb ramps for dual crossings and single crossings. It is preferred that the orientation of the curb ramps direct pedestrian travel into the crosswalk as opposed to the travel lanes within the intersection. Many locations were deemed to have a non-standard orientation based on TDOT's multimodal standard drawings (MM-CR-1 through MM-CR-9). Examples of the standard curb ramp orientation are provided based on TDOT Standard Drawings MM-CR-5 and MM-CR-6.

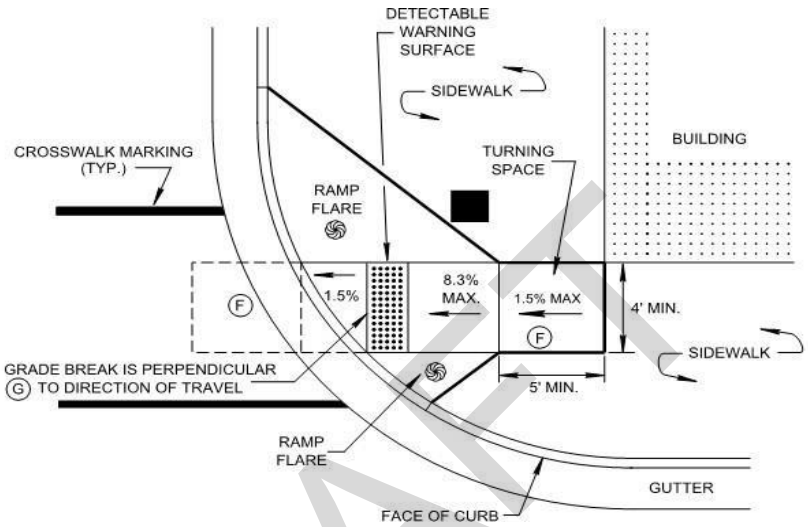


Figure 3. Example of Preferred Curb Ramp Orientation for Single Crossing
Source: TDOT Standard Drawing MM-CR-5

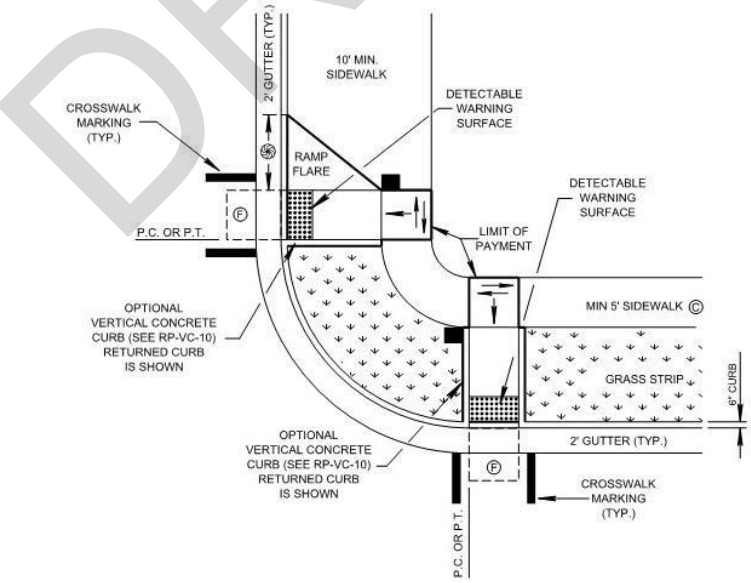


Figure 4. Example of Perpendicular Curb Ramp Outside Radius
Source: TDOT Standard Drawing MM-CR-6

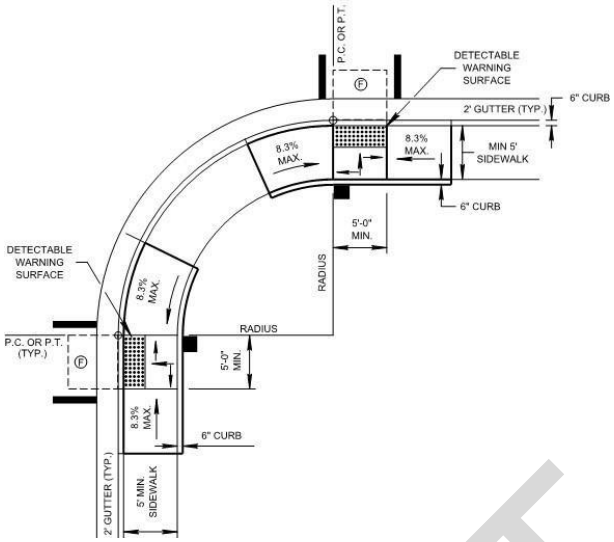


Figure 5. Example of Parallel Curb Ramp Outside Radius
Source: TDOT Standard Drawing MM-CR-6

Detectable warning surfaces were also missing and/or inconsistent. Varying colors and materials for truncated dome surfaces were evident throughout the corridor with some curb ramps having brick red truncated domes compared to other curb ramps having gray truncated domes that may not meet the ADA requirements for contrasting colors. TDOT requires detectable warning surfaces to be yellow in color.

Most curb ramps are too small or do not meet the design requirements for ADA compliance and will need to be replaced. In general, perpendicular ramps shall be provided at each intersection corner where geometric conditions allow. However, blended curb ramp transitions may be permitted where existing physical constraints prevent the alteration of the existing curb ramp.

The pedestrian signal accommodations along the corridor are generally non-compliant. At all three intersections, accessible pedestrian signals (APS) and countdown pedestrian signal displays are required to ensure ADA compliance, including the installation of pedestal poles and/or pedestrian pushbutton posts. The location of pedestrian pushbuttons in relation to curb ramps and level landings is important to ensure ADA compliance and all three intersections require modifications to meet the requirements. Furthermore, compliant APS installation includes audible and vibrotactile indications of the WALK interval.

In addition, the Town of Ashland City would like to consider Leading Pedestrian Interval (LPIs) for the pedestrian crossings at all three intersections to improve the safety of pedestrian crossings. LPIs provide an opportunity of 3 to 7 seconds for pedestrians to begin crossing before vehicles are given the green light. The benefits that LPIs provide for pedestrians are they increase the visibility of pedestrians, lower the conflicts with pedestrians and vehicles, increases the chance that permissive right turning vehicles will yield to pedestrians at a signalized crosswalk, and increases safety for pedestrians who travel slower through the intersection.

4.2 Intersection Improvement Review

KCI and the Town of Ashland City, evaluated various improvements for each of the three intersections along the State Route 12 (Main Street) corridor at State Route 49 (Cumberland Street) / State Route 49 (Frey Street), and Elizabeth Street / Stratton Boulevard. The following improvements, which are detailed by intersection, have been identified as priorities that will create a safe environment for pedestrians and improve ADA accessibility.These improvements comply with the state and local accessibility guidelines as well as the requirements set forth in TDOT's Roadway Design Guidelines, specifically Chapter 3 Multimodal Design, ADA, and PROWAG. Detailed description of the improvements, improvement cost estimates, and conceptual layouts of the improvements recommended for each intersection required to meet ADA compliance and improve pedestrian safety are provided as follows:

4.2.1 State Route 12 (Main Street) and State Route 49 (Cumberland Street) / State Route 49 (Frey Street)

The intersections of State Route 12 (Main Street) at State Route 49 (Cumberland Street) / State Route 49 (Frey Street) are offset by approximately 100 feet in the center of Ashland City. Since these two intersections are controlled with a traffic signal operated by one traffic signal controller, they are essentially considered one intersection for the purpose of the project. Traffic movements are coordinated between the intersections and any improvements to signal related pedestrian infrastructure at one intersection will have a direct effect on the other intersection. Therefore, identified improvements are being presented in a single group that includes both intersections.

It was determined that the intersections of State Route 12 (Main Street) at State Route 49 (Cumberland Street) / State Route 49 (Frey Street) will require significant modifications to bring the existing traffic signal into ADA compliance. Steel strain poles and streetlight poles would need to be relocated out of the sidewalk in order to achieve a 5-foot pedestrian path of travel. Three (3) existing steel strain traffic signal poles on the east side of State Route 12 (Main Street), including the pole supporting the signal cabinet, block the pedestrian path of travel narrowing the sidewalk to approximately 3-feet. Moving these poles, the addition of new pedestal poles required for pedestrian crossing compliance, traffic signal rewiring, and concrete repairs requires significant cost expenditure and construction.

Additionally, the traffic signal controlling these intersections is already approximately 20 years old and has been visibly damaged by vehicle strikes that may have compromised the ability to relocate signal poles. Due to the difficulties and cost associated with retrofitting ADA compliant pedestrian infrastructure at the intersections, a full traffic signal rebuild that eliminates several poles by combining traffic signal and streetlight infrastructure was identified as the most advantageous solution for improving pedestrian safety and bringing the intersections into ADA compliance.

Specific improvements associated with a full traffic signal rebuild include the following:

- The new traffic signal could consist of two (2) double mast arm poles on the northeast corner of State Route 49 (Cumberland Street) and southwest corner of State Route 49 (Frey Street), two (2) single mast arm poles on the southwest corner of State Route 49 (Cumberland Street) and northeast corner of State Route 49 (Frey Street), and three (3) pedestal poles on the northwest and southeast corners of State Route 49 (Cumberland Street) and southeast corner of State Route 49 (Frey Street). This will significantly reduce the amount of clutter along the sidewalk.
- A base mounted traffic signal cabinet could be located on the northeast corner of State Route 49 (Frey Street) where sidewalk space is available and where electrical service for the existing traffic signal exists,which will simplify construction.
- Pedestrian pushbuttons and new countdown pedestrian signal heads should be provided for three (3) pedestrian crossings across State Route 12 (Main Street). The two (2) pedestrian crossings across State Route 49 (Cumberland Street) / State Route 49 (Frey Street) should be provided with new countdown pedestrian signal heads. However, these crossings would not require pedestrian pushbuttons if those phases, which serves through traffic on State Route 12 (Main Street), were placed in pedestrian recall mode.
- Accessible pedestrian signals (APS) are required on state or federally funded projects where pedestrian signals are being replaced and should be installed for all five (5) pedestrian crossings. This includes audible and vibrotactile indications of the WALK interval.
- The Town of Ashland City has requested that the traffic signal poles, and signal cabinet be decorative black, similar to the existing streetlights at the intersection.
- Five (5) existing decorative streetlight poles could be removed from the sidewalk if the luminaires are consolidated onto new traffic signal poles or new pedestal poles.
- Phasing for a new traffic signal should remove some protected left and right turn movements that run concurrently with pedestrian crossings.
- No traffic signal interconnect or emergency vehicle preemption exists at these intersections.
- The Town of Ashland City prefers the following equipment be installed with the rebuilt traffic signal for consistency with other signals operated by the Town: Econolite signal controller, EDI conflict monitor, inductive loop detectors, GPS clock synch. A Proprietary Signal Item List for TDOT specifying these equipment types is provided.
- The Town of Ashland City has requested that decorative color concrete sidewalks and crosswalks be re-installed with construction of the traffic signal to match existing conditions.
- Noncompliant curb ramps (6 each) at the State Route 49 (Frey Street) intersection should be replaced per the Town of Ashland City ADA Transition Plan. Noncompliant curb ramps (5 each) at the State Route 49 (Cumberland Street) intersection should be replaced in conjunction with new signal pole installation along with replacement of the decorative colored concrete sidewalk on the east side of State Route 12 (Main Street). Additionally, detectable warning surfaces (2 each) should be upgraded to yellow in color at the intersection.

4.2.2 State Route 12 (Main Street) and Elizabeth Street / Stratton Boulevard

The intersection of State Route 12 (Main Street) at Elizabeth Street / Stratton Boulevard is a typical four-legged intersection controlled by a mast arm traffic signal with dual mast arm signal poles located in the southwest and northeast corners. Pedestrian signal equipment exists for the crossing movements across the northern and western legs of the intersection; however, a marked crosswalk is only provided for the northern leg. No curb ramp is provided in the southwest corner of the intersection. In order to improve pedestrian safety, provide pedestrian crossings for all legs of the intersection, and to bring the intersection into ADA compliance, retrofit improvements include the following:

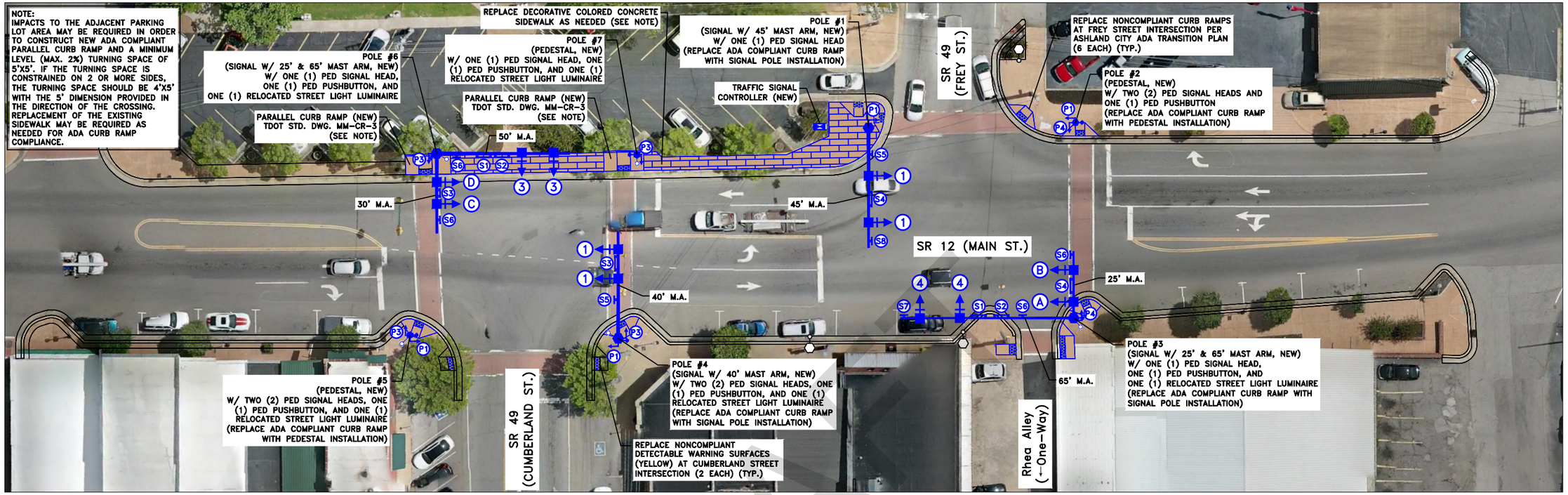
- The southeast corner of the intersection will require two (2) new ADA compliant curb ramps, one (1) new pedestrian push button located on one (1) new pedestal pole, and two (2) new countdown pedestrian signals.
- The northwest corner of the intersection will require two (2) new ADA compliant curb ramps, one (1) new pedestrian push button located on one (1) new pedestal pole, and two (2) new countdown pedestrian signals.
- The southwest corner of the intersection will require two (2) new ADA compliant curb ramps, one (1) new pedestrian push button located on one (1) new pedestal pole, and two (2) new countdown pedestrian signals.
- The northeast corner of the intersection will require two (2) new ADA compliant curb ramps, one new pedestrian pushbutton located on the existing signal pole next to the new curb ramp, and two (2) new countdown pedestrian signals.
- Pedestrian pushbuttons and new countdown pedestrian signal heads should be provided for two (2) crossings across State Route 12 (Main Street). The two (2) pedestrian crossings across Elizabeth Street / Stratton Boulevard should be provided with new countdown pedestrian signal heads. However, these crossings would not require pedestrian pushbuttons if those phases, which serves through traffic on State 12 (Main Street), were placed in pedestrian recall mode.
- Accessible pedestrian signals (APS) are required on state or federally funded projects where pedestrian signals are being replaced and should be installed for all four (4) pedestrian crossings. This includes audible and vibrotactile indications of the WALK interval.
- Four (4) new high-visibility longitudinal bar crosswalks should be installed between new ADA compliant curb ramps.
- The southwest corner of the intersection may require right-of-way acquisition and/or a bulb-out created by reducing the curb radius for installation of curb ramps. School bus turning movements should be accommodated if the curb radius is reduced. This would also likely require replacing vehicle detection loops for northbound approach and westbound left-turn lane.
- It would be preferrable to relocate existing AT&T wood pole in the northwest corner, however, itis not required for ADA compliance.

For additional details on the field review meeting refer to Appendix A.

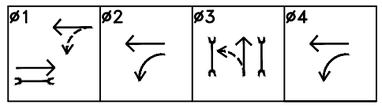
5.0 Conceptual Improvement Plans

Conceptual improvement plans are provided indicating extensive upgrades required to the existing traffic signal facilities at the study intersections, including a full signal rebuild at the offset intersections of State Route 12 (Main Street) at State Route 49 (Cumberland Street) / State Route 49 (Frey Street). These improvements comply with the state and local accessibility guidelines as well as the requirements set forth in TDOT's Roadway Design Guidelines, specifically Chapter 3 Multimodal Design, ADA, and PROWAG.

TYPE	YEAR	COUNTY	FIGURE NO.
TSM&O	2021	CHEATHAM	6



PHASING DIAGRAM
MAIN STREET (SR-12) & CUMBERLAND STREET

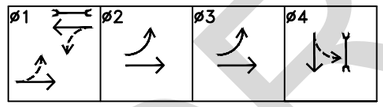


PERMITTED, BUT NOT PROTECTED

OLA = 1+2+3
OLB = 2+3
OLC = 2+4
OLD = 1+2+4

* A LEADING PEDESTRIAN INTERVAL (LPI) SHOULD BE USED FOR ALL PEDESTRIAN PHASES, IF POSSIBLE.

PHASING DIAGRAM
MAIN STREET (SR-12) & FREY STREET

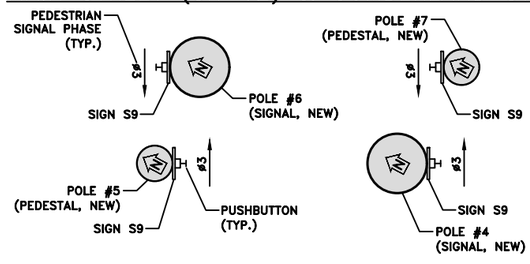


PERMITTED, BUT NOT PROTECTED

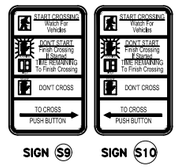
OLA = 1+2+3
OLB = 2+3
OLC = 2+4
OLD = 1+2+4

* A LEADING PEDESTRIAN INTERVAL (LPI) SHOULD BE USED FOR ALL PEDESTRIAN PHASES, IF POSSIBLE.

PEDESTRIAN PUSHBUTTON ORIENTATION
MAIN STREET (SR-12) & CUMBERLAND STREET

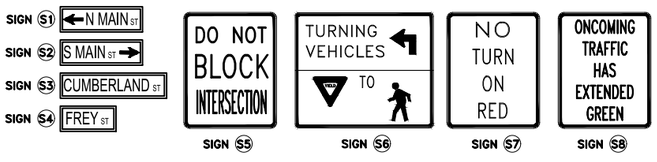


PEDESTRIAN PUSHBUTTON SIGNS

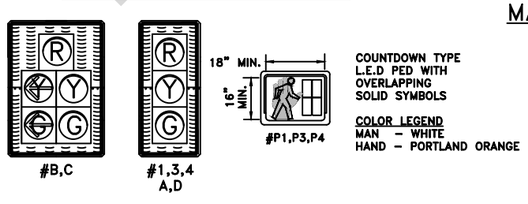


SIGN S9 SIGN S10

OVERHEAD TRAFFIC SIGNS



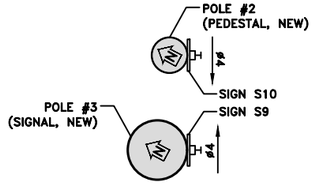
SIGNAL HEAD DISPLAYS



COUNTDOWN TYPE L.E.D PED WITH OVERLAPPING SOLID SYMBOLS

COLOR LEGEND
MAN - WHITE
HAND - PORTLAND ORANGE

PEDESTRIAN PUSHBUTTON ORIENTATION
MAIN STREET (SR-12) & FREY STREET



LEGEND	
	STREET LIGHT POLE (EXISTING)
	SIGNAL SUPPORT POLE W/ MAST ARM & RELOCATED STREET LIGHT LUMINAIRE (NEW)
	SIGNAL HEAD W/ NUMBER & BACK PLATE (NEW)
	PEDESTAL POLE (NEW)
	PEDESTRIAN SIGNAL HEAD W/ NUMBER (NEW)
	PEDESTRIAN PUSH BUTTON W/ SIGN (NEW)
	PAD MOUNTED TRAFFIC SIGNAL CONTROLLER (NEW)
	OVERHEAD SIGN W/ NUMBER (NEW)
	DETECTABLE WARNING MAT (YELLOW, NEW)
	DECORATIVE COLORED CONCRETE SIDEWALK (NEW)

0 40' 80' 120'

TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS

CONCEPTUAL IMPROVEMENTS

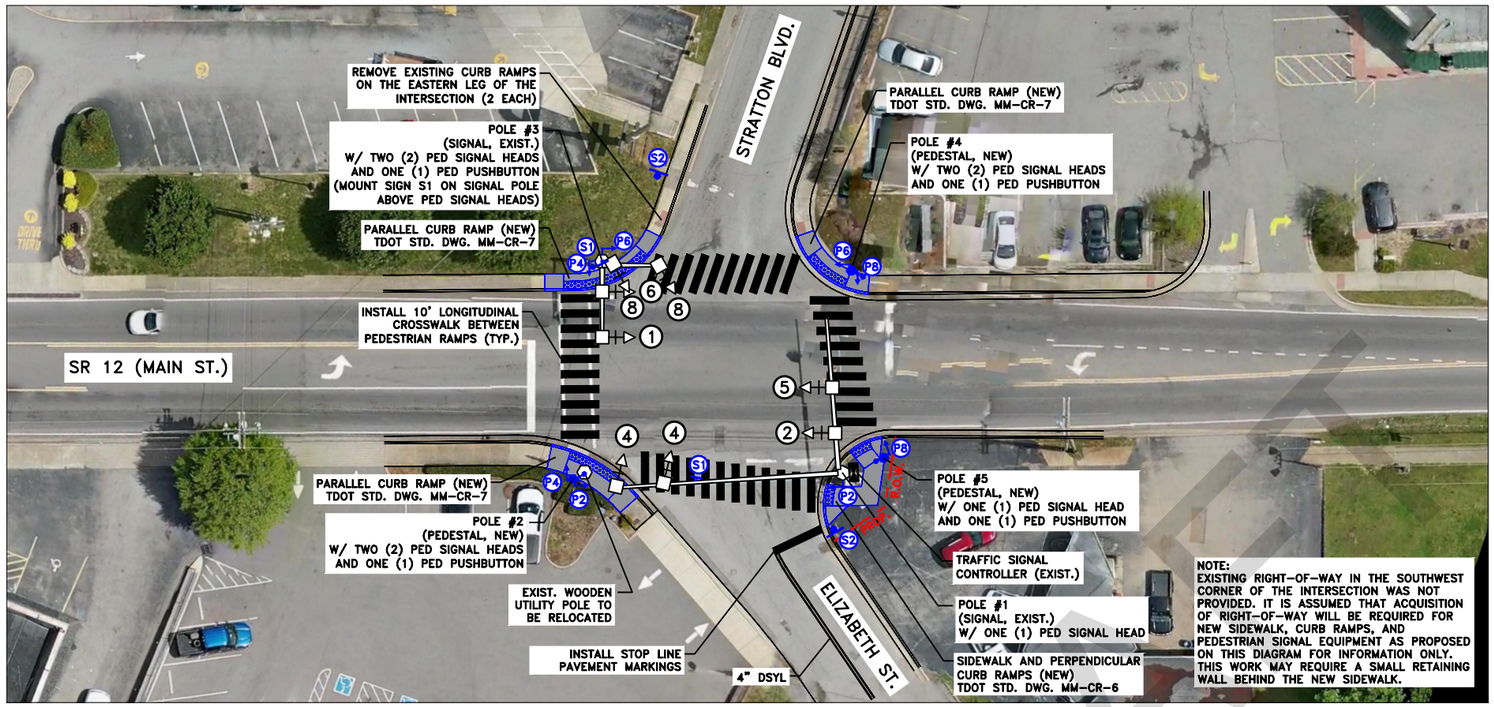
INTERSECTION OF STATE ROUTE 12 (MAIN STREET) AND STATE ROUTE 49 (CUMBERLAND STREET / FREY STREET)

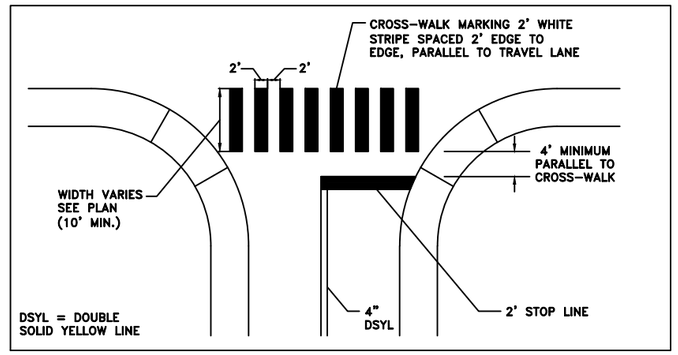
ASHLAND CITY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

FIGURE 6
STATE ROUTE 12
LOG MILE 6.57
TO
LOG MILE 6.68

TYPE	YEAR	COUNTY	FIGURE NO.
TSM&O	2021	CHEATHAM	7

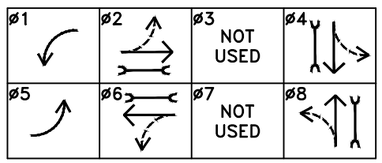




TYPICAL STOP LINE PLACEMENT AND CROSS-WALK MARKINGS

N.T.S.

PHASING DIAGRAM



PERMITTED, BUT NOT PROTECTED

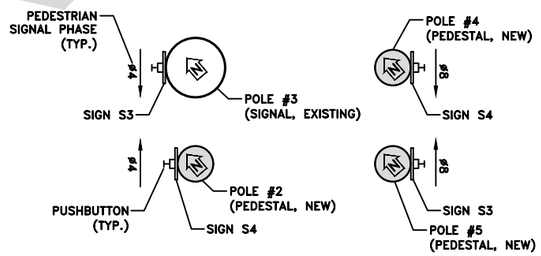
* NOTE THAT PHASING SHOWN ON THIS DIAGRAM IS FOR INFORMATION ONLY AND MAY NOT REFLECT FIELD CONDITIONS.
* A LEADING PEDESTRIAN INTERVAL (LPI) SHOULD BE USED FOR ALL PEDESTRIAN PHASES, IF POSSIBLE.

SIGNAL HEAD DISPLAYS

COUNTDOWN TYPE L.E.D PED WITH OVERLAPPING SOLID SYMBOLS

COLOR LEGEND
MAN – WHITE
HAND – PORTLAND ORANGE

PEDESTRIAN PUSHBUTTON ORIENTATION MAIN STREET (SR-12) & STRATTON BOULEVARD/ELIZABETH STREET



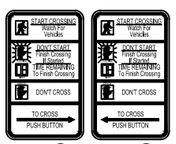
OVERHEAD TRAFFIC SIGNS

SIGN (S1)

GROUND MOUNTED TRAFFIC SIGNS

SIGN (S2)

PEDESTRIAN PUSHBUTTON SIGNS



SIGN (S3) SIGN (S4)

LEGEND	
	UTILITY POLE (EXISTING)
	POLE MOUNTED TRAFFIC SIGNAL CONTROLLER (EXISTING)
	SIGNAL SUPPORT POLE W/ MAST ARM (EXISTING)
#P	SIGNAL HEAD W/ NUMBER & BACK PLATE (EXISTING)
S#	OVERHEAD SIGN W/ NUMBER (NEW)
S#	GROUND MOUNTED SIGN W/ NUMBER (NEW)
	PEDESTAL POLE (NEW)
P#	PEDESTRIAN SIGNAL HEAD W/ NUMBER (NEW)
	PEDESTRIAN PUSH BUTTON W/ SIGN (NEW)
	DETECTABLE WARNING MAT (YELLOW, NEW)
	SIDEWALK, CURB RAMP (NEW)
	APPROX. LIMITS OF RIGHT-OF-WAY (NEW)

0 40' 80' 120'

N

TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS

CONCEPTUAL IMPROVEMENTS

INTERSECTION OF STATE ROUTE 12 (MAIN STREET) AND ELIZABETH STREET / STRATTON BOULEVARD

ASHLAND CITY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

FIGURE 7
STATE ROUTE 12
LOG MILE 6.436
TO
LOG MILE 6.516

6.0 Cost Estimate

The estimated cost of the improvements for the State Route 12 (Main Street) at State Route 49 (Cumberland Street) / State Route 49 (Frey Street) intersections are shown in Table 1 below. Additional details are provided in Appendix D.

DESCRIPTION OF IMPROVEMENT	ESTIMATED COST
Traffic Signal Rebuild	$248,500
Curb Ramp Installation (ADA Compliant)	$74,500
[1]Miscellaneous Improvements	$47,500
TOTAL	**$370,500**
[1] Miscellaneous improvement items include the relocation of the existing streetlight luminaires tothe new traffic signal poles and replacement of the existing decorative brick pattern sidewalk on the east side of State Route 12 (Main Street).	

Table 1. Estimated Cost of Improvements for State Route 12 (Main Street) and State Route 49 (Cumberland Street) / State Route 49 (Frey Street)

The estimated cost of the improvements for the State Route 12 (Main Street) and Elizabeth Street / Stratton Boulevard intersection is shown in Table 2 below. Additional details are provided in Appendix D.

DESCRIPTION OF IMPROVEMENT	ESTIMATED COST
Pedestrian Signal (ADA Compliant)	$59,500
Curb Ramp Installation (ADA Compliant)	$52,000
Crosswalk Pavement Markings	$24,000
[1]Miscellaneous Improvements	$47,500
TOTAL	**$183,000**
[1] Miscellaneous improvement items include the potential acquisition of R.O.W. in the southwestcorner of the intersection for curb ramp installation and the relocation of the utility pole in the northwest corner.	

Table 2. Estimated Cost of Improvements for State Route 12 (Main Street) and Elizabeth Street / Stratton Boulevard

The total estimated cost of the improvements for the study intersections, including mobilization, construction contingencies, and construction engineering and inspection is shown in Table 3 below. Additional details are provided in Appendix D.

DESCRIPTION	SR 12 (MAIN ST) & SR 49 (CUMBERLAND ST.) / SR 49 (FREY ST.)	SR 12 (MAIN ST.) & ELIZABETH ST. / STRATTON BLVD.	TOTAL
Improvements	$370,500	$183,000	$553,500
Maintenance of Traffic (10%)	$38,000	$19,000	$57,000
SUBTOTAL	**$408,500**	**$202,000**	**$610,500**
MOBILIZATION (5%)			$31,000
CONSTRUCTION CONTINGENCIES (10%)			$62,000
CONSTRUCTION ENGINEERING & INSPECTION (10%)			$62,000
GRAND TOTAL			**$765,500**

Table 3. Estimated Cost of Improvements for State Route 12 (Main Street) Corridor

7.0 Proprietary Traffic Signal Items

As a supplement to the conceptual improvement plans and associated cost estimates detailed in Sections 5.0 and 6.0, KCI prepared a Proprietary Item Request letter and traffic signal specifications for the Town of Ashland City. Having a Proprietary Item certification on file with TDOT will allow specific traffic signal equipment to be purchased where Federal and/or State funding are utilized. Establishing a Proprietary Item list with TDOT will allow for full traffic signal synchronization capabilities and ease of maintenance within the existing and future traffic signal system operated and maintained by the Town of Ashland City. In addition, the Proprietary Item list for traffic signal equipment will continue standardization of the signal system and ensure that the comprehensive maintenance and spare equipment programs established by the Town are managed efficiently. The following proprietary traffic signal components were included with the request.

- Signal Controller: Econolite Cobalt
- Signal Monitor: Reno A&E MMU2-1600GE
- Loop Detector: Reno A&E GT-200

The Proprietary Item Request was submitted to the TDOT Traffic Operations Division on May 10, 2021. The letter and traffic signal specifications can be found in Appendix E.

8.0 Conclusion

Based on the findings during the field review meeting, the conceptual improvement plans, and the improvement cost estimates provide the Town of Ashland City with the information required to satisfy all pedestrian safety needs at each of the signalized intersections within the study area. These improvements comply with the state and local accessibility guidelines as well as the requirements set forth in TDOT's Roadway Design Guidelines, specifically Chapter 3 Multimodal Design, ADA, and PROWAG.

Appendix A
KICKOFF AND FIELD REVIEW MEETINGS

ISO 9001:2015 CERTIFIED
ENGINEERS • PLANNERS • SCIENTISTS • CONSTRUCTION MANAGERS
500 11th Avenue North, Suite 290 • Nashville, TN 37203 • Phone 615.370.8410 • Fax 615.370.8455

TOWN OF ASHLAND CITY
TDOT COMMUNITY TRANSPORTATION PLANNING GRANT
TRANSPORTATION SYSTEMS MANGEMENT AND OPERATIONS (TSM&O)
PEDESTRIAN SIGNAL UPGRADES

PROJECT KICKOFF MEETING MINUTES
FEBRUARY 4, 2021

The following minutes represent our understanding of the subject matter covered during the February 4, 2021 kickoff meeting. If this differs from your understanding, please notify us. Action items are summarized at the end of the document.

Created by: Jonathan Cleghon (KCI)
Brandon Taylor (KCI)
John Houghton (KCI)

Distributed to: Ian Preston (TDOT)
Jonathan Russell (TDOT)
Brian Stinson (Town of Ashland City)

Attendees
Ian Preston (TDOT)
Brian Stinson (Town of Ashland City)
Clint Biggers (Town of Ashland City)
Jared Eden (Town of Ashland City)
Jonathan Cleghon (KCI)
Brandon Taylor (KCI)
John Houghton (KCI)

Agenda

1. **Project Team Introductions – Primary Points of Contact**
   - TDOT
     Ian Preston
     (615)532-0427
     ian.preston@tn.gov

     TDOT
     Jonathan Russell
     (615)306-8027
     jonathan.russell@tn.gov

     Town of Ashland City
     Brian Stinson
     (615)792-7553
     bstinson@ashlandcitytn.gov

     KCI
     Jonathan Cleghon
     (615)559-0153
     Jonathan.Cleghon@kci.com

     KCI
     Brandon Taylor
     (615)559-0158
     Brandon.Taylor@kci.com

     KCI
     John Houghton
     (615)559-0165
     John.Houghton@kci.com

   - *Ian Preston and Jonathan Cleghon will serve as primary points of contact for TDOT and KCI.*

2. Project Information

- Study intersections:
  Main Street (SR 12) at Cumberland Street (SR 49)
  Main Street (SR 12) at Frey Street (SR 49)
  South Main Street (SR 12) at Stratton Boulevard/Elizabeth Street
  The signalized, offset intersections on Main Street (SR 12) at Cumberland Street (SR 49) and Frey Street (SR 49) operate from a single traffic signal controller.

- Existing pedestrian infrastructure and ADA deficiencies:
  Town staff provided a history of previous projects. The Renaissance Ashland City project, which began in 2004, provided new sidewalks and full traffic signal rebuilds. However, sidewalks, curb ramps, and traffic signals do not meet current Americans with Disabilities Act (ADA) standards. Minor updates to the traffic signals have been completed within the last 7 years, but they still require additional improvements for full ADA compliance.

- Traffic signal equipment and capabilities, pedestrian requirements, and physical limitations:
  The signalized, offset intersections on Main Street (SR 12) at Cumberland Street (SR 49) and Frey Street (SR 49) operate from a single traffic signal controller. Traffic signal controllers are newer Econolite models, which are preferred by the Town. Capability of the signal cabinets to accept new phases is unknown at this time and will be evaluated during the field review meeting. The primary physical limitation will be determining how to meet ADA requirements given the existing position of sidewalks, curb ramps, and signal poles.

- Typical signal equipment used by the Town of Ashland City:
  The Town has or is upgrading all traffic signal controllers to Econolite models. KCI will evaluate other signal related components during the field review meeting.

- Intersection design philosophy for accommodating non-motorized traffic:
  Pedestrians should be accommodated to the fullest extent possible and all ADA requirements must be met. Due to the operation of the two offset intersections on Main Street (SR 12) at Cumberland Street (SR 49) and Frey Street (SR 49), introduction of new pedestrian or vehicle phases may prove to be very difficult or even detrimental to existing signal operation.

- Perceived problems and concerns at the above intersections:
  The primary concern is bringing the intersections into compliance with ADA requirements.

- Review process and deliverables:
  All documents being submitted to the Town for review will be sent to Brian Stinson, who will distribute to other staff as needed. Ian Preston will be copied on all submittals.

- The need for establishing a proprietary signal item list with TDOT:
  The Town does not currently have a propriety signal item list on file with TDOT. KCI will evaluate traffic signal equipment during the field review meeting and determine which items may qualify. Establishing a proprietary signal item list with TDOT may prove beneficial during the future construction phase of the project or if modifications are undertaken on any of the seven (7) signals operated by the Town. The list would also apply to any new traffic signals constructed by TDOT.

3. Data Collection

- Historical count data: turning movement counts (TMC) and average daily traffic (ADT):
  This data may exist. Brian Stinson will forward traffic data on file.

- Highest volume pedestrian crossings:
  Observations will be made and discussion will take place during the field review meeting to establish the best method of accommodating pedestrian movement at the intersections.

- Record design information for traffic signals and intersections:
  This data may exist. Brian Stinson will forward design records on file, however, much of this information was in paper format and was lost during the 2010 flood. TDOT may have record designs or they may be stored in the signal cabinets.

- Current signal timing:
  Signal timing sheets do not exist. KCI will collect existing signal timing during the field review meeting.

- Crash data:
  The biggest concern at the intersections is property damage caused by large trucks that are unable to make turns due to the small curb radii. KCI will assemble crash data to determine if additional safety measures are needed.

4. Schedule

Schedule												
Month	1				2				3			
Week	1	2	3	4	5	6	7	8	9	10	11	12
Task 1.0 - Project Management	A											
Task 2.0 - Data Collection												
Task 3.0 - Field Review Meeting and Memorandum			B									
Task 4.0 - Conceptual Plans										C		
Task 5.0 - Final Report												D

Meetings
A = Kickoff Meeting
B = Field Review Meeting
C = Conceptual Plan Review
D = Final Report

KCI does not foresee any issues meeting the required project schedule.

5. **Schedule Field Review Meeting**
   KCI will follow up to schedule the field review meeting the week of March 1st, avoiding Wednesday, during the 9AM to 2PM period. In addition, KCI would like to make a separate advance site visit to properly prepare for the field review meeting. Brian Stinson will be notified in advance of KCI's arrival so that signal cabinets can be accessed.

6. **Other topics**
   None were identified.

Action Items

- *KCI will schedule the field review meeting.*
  (Completed 2/4/2021 prior to completion of the meeting minutes. The field review meeting is scheduled for 3/2/2021 at 10AM.)
- *KCI will proceed with data collection as scheduled.*
- *KCI will schedule an advance site visit to properly prepare for the field review meeting. Brian Stinson will be notified in advance.*
- *The Town of Ashland City will provide traffic data and record design files if they are available. (Completed 2/4/2021 prior to completion of the meeting minutes.)*

FIELD REVIEW SIGN-IN SHEET

Tuesday, March 2, 2021

Main Street (SR 12) at Cumberland Street / Frey Street (SR 49)

Main Street (SR 12) at Stratton Boulevard / Elizabeth Street

Name	Title	Organization	Contact Information
Brian Stinson	ADA/Backflow Coordinator	Town of Ashland City	Bstinson@ashlandcitytn.gov
Clint Biggers	Public Works/Public Utilities Director	Town of Ashland City	CBiggers@ashlandcitytn.gov
Jared Eden	Street Maintenance Supervisor	Town of Ashland City	Jeden@ashlandcitytn.gov
Brandon Taylor	Project Manager, Consultant	KCI Technologies, Inc.	Brandon.taylor@kci.com
Jonathan Cleghon	Project Engineer, Consultant	KCI Technologies, Inc.	Jonathan.Cleghon@kci.com
Josh Green	Project Engineer, Consultant	KCI Technologies, Inc.	Josh.Green@kci.com

Ashland City TSM&O Pedestrian Signal Upgrades

Field Meeting Notes

3/2/2021

Attendees

Town of Ashland City:	Brian Stinson
	Clint Biggers
	Jared Eden
KCI:	Brandon Taylor, Josh Green, Jonathan Cleghon

Main St (SR 12) / Cumberland St (SR 49) / Frey St (SR 49)

- Due to scope of bringing the existing traffic signal (including pedestrian equipment) into ADA compliance, Town's preference is for a full signal rebuild.
- 3 existing steel strain poles on east side of Main St, including the pole supporting the traffic signal cabinet, block the pedestrian path of travel narrowing the sidewalk to approximately 3' (5' standard for ADA). Moving these poles, addition of new pedestal poles required for pedestrian crossing compliance, signal rewiring, and concrete repairs for signal poles justifies a full signal rebuild.
- New traffic signal to consist of 2 double mast arm poles (NE at Cumberland and SW at Frey), 2 single mast arm poles (SW at Cumberland and NE at Frey), and 3 pedestal poles (NW and SE at Cumberland and SE at Frey). This will significantly reduce the amount of clutter along the pedestrian path of travel.
- Phasing for new traffic signal should remove some protected left and right turn movements that run concurrently with pedestrian movements.
- Base mounted signal cabinet to be included in NE corner at Frey St.
- Pedestrian pushbuttons and new countdown pedestrian signal heads to be provided for 3 crossings across Main St. Pedestrian crossings across Cumberland St and Frey St will not require pushbuttons (ped recall). Additionally, accessible pedestrian signals (APS) are required on state or federally funded projects where pedestrian signals are being replaced. This includes audible and vibrotactile indications of the WALK interval.
- Signal poles and cabinet to be decorative black, similar to the existing street lighting at the intersection.
- Existing decorative streetlights to be consolidated onto new signal poles (4 total). New attachments may be required based on final location of new signal poles.
- No signal communication exists.
- No emergency vehicle preemption exists.
- Town preferred signal equipment: Econolite signal controller, EDI conflict monitor, inductive loop detectors, GPS clock synch.
- KCI to assist with preparation of a Proprietary Signal Item List for TDOT.
- Town preference to re-install decorative color concrete sidewalks and crosswalks.

South Main St (SR 12) / Stratton Blvd / Elizabeth St

- SE, NW, SW corners – 2 new ramps at each corner (6 total), 1 new pedestrian push button located on a new pedestal pole at each corner (3 total) with new countdown ped signals (6 total). APS ped signals are required.
- NE corner – 2 new ramps (2 total), 1 new PPBs on existing signal pole at ramp (1 total) with new countdown ped signals (2 total). APS ped signals are required.
- New high-visibility longitudinal bar crosswalks (4 total).
- SW corner may require ROW acquisition and/or curb radius reduction that accommodates school bus turning movements for installation of curb ramps. May require new detection loops for NB and WB LT
- KCI will utilize Austin Peay University (APSU) GIS system to determine approximate extents of existing ROW.
- NW corner would be preferrable to relocate existing AT&T wood pole, but not required.
- Pedestrian pushbuttons to be provided for 2 crossings across Main St. Pedestrian crossings across Stratton Blvd and Elizabeth St will not require pushbuttons (ped recall).
- Up-to-date aerial information will be provided to KCI by the Town.
- If this list of improvements is agreeable, KCI will prepare a detailed description of the improvements required, detailed cost estimates of the improvements, and conceptual layouts of the improvements recommended for each intersection in order to meet ADA compliance.

Appendix B
CRASH DATA

Query: Crashes on SR 12 near Elizabeth_Stratton
CR_CRASH.County = CHEATHAM
CR_CRASH.Route = SR012
CR_CRASH.Year Of Crash > 2017
CR_CRASH.Log Mile >= 6.436 And CR_CRASH.Log Mile <= 6.516

BLM	Relation to First Junctior	Case Number	Location	Year Of Crash	Date of Crash	Time of Crash	Type of Crash	Total Killed	Total Inj	Total Incap Inj	Total Other Inj	Total Veh	First Harmful Event	Manner of First Collision	Weather	Light Conditions
6.5	NON_JUNCTION	102229420	Along Roadway	2018	11/19/2018	1242	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	SIDESWIPE, SAME DIR	Clear	Daylight
6.44	NON_JUNCTION	102299057	Along Roadway	2019	2/6/2019	1935	Prop Damage (over)	0	0	0	0	1	Utility Pole	NO COLLISION W/ VEHICLE	Rain	Dark-Lighted
6.5	NON_JUNCTION	102089630	Along Roadway	2018	7/28/2018	0	Suspected Minor Inj	0	1	0	1	1	Utility Pole	NO COLLISION W/ VEHICLE	Clear	Dark-Lighted
6.45	NON_JUNCTION	102243008	Along Roadway	2018	12/11/2018	1545	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight
6.46	NON_JUNCTION	102643327	Along Roadway	2020	2/3/2020	1225	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight
6.48	NON_JUNCTION	102753305	At an Intersection	2020	8/3/2020	1410	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight
6.48	NON_JUNCTION	102856142	Along Roadway	2020	12/10/2020	1114	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	SIDESWIPE, OPP DIR	Clear	Daylight
6.51	NON_JUNCTION	102159328	Along Roadway	2018	9/27/2018	1535	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	ANGLE	Clear	Daylight
6.51	NON_JUNCTION	102150199	Along Roadway	2018	9/19/2018	1215	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR TO SIDE	Clear	Daylight
6.51	NON_JUNCTION	102057946	Along Roadway	2018	6/29/2018	1430	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	ANGLE	Clear	Daylight
6.51	NON_JUNCTION	102851684	Along Roadway	2020	12/6/2020	303	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight
6.48	INTERSECTION	102221973	At an Intersection	2018	11/19/2018	1711	Suspected Minor Inj	0	1	0	1	3	Vehicle in Transport	REAR-END	Clear	Dark-Lighted
6.48	INTERSECTION	102468000	At an Intersection	2019	8/2/2019	1703	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight
6.48	INTERSECTION	101975229	At an Intersection	2018	4/12/2018	1429	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight
6.48	INTERSECTION	102075800	At an Intersection	2018	7/15/2018	1525	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	ANGLE	Rain	Daylight
6.48	INTERSECTION	102188186	At an Intersection	2018	10/24/2018	159	Prop Damage (over)	0	0	0	0	2	Unknown Harmful Event	UNKNOWN	Clear	Daylight
6.48	INTERSECTION RELATED	101984194	At an Intersection	2018	4/20/2018	1553	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight

Query: Crashes on SR 12
CR_CRASH.County = CHEATHAM
CR_CRASH.Route = SR012
CR_CRASH.Year Of Crash > 2017
CR_CRASH.Log Mile >= 6.57 And CR_CRASH.Log Mile <= 6.68

BLM	Relation to First Junction	Case Number	Location	Year Of Crash	Date of Crash	Time of Crash	Type of Crash	Total Killed	Total Inj	Total Incap Inj	Total Other Inj	Total Veh	First Harmful Event	Manner of First Collision	Weather	Light Condition
6.57	NON_JUNCTION	102728692	Along Roadway	2020	6/18/2020	2012	Suspected Minor Inj	0	1	0	1	2	Vehicle in Transport	ANGLE	Clear	Dusk
6.59	NON_JUNCTION	102736239	Along Roadway	2020	7/2/2020	1445	Suspected Minor Inj	0	1	0	1	3	Vehicle in Transport	REAR-END	Clear	Daylight
6.61	NON_JUNCTION	102167397	At an Intersection	2018	10/4/2018	531	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport in other Roadway	OTHER	Clear	Dark-Lighted
6.57	NON_JUNCTION	102691438	Along Roadway	2020	3/20/2020	1310	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	SIDESWIPE, SAME DIR	Rain	Daylight
6.61	NON_JUNCTION	102109475	At an Intersection	2018	8/13/2018	1310	Prop Damage (over)	0	0	0	0	3	Luminaire/Light Support	NO COLLISION W/ VEHICLE	Clear	Daylight
6.61	NON_JUNCTION	102243680	At an Intersection	2018	12/12/2018	1002	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Cloudy	Daylight
6.64	NON_JUNCTION	102893744	Along Roadway	2021	2/6/2021	1155	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	SIDESWIPE, SAME DIR	Cloudy	Daylight
6.65	NON_JUNCTION	102866789	Along Roadway	2020	12/26/2020	111	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight
6.67	NON_JUNCTION	102409532	At an Intersection	2019	6/3/2019	0	Prop Damage (over)	0	0	0	0	2	Parked Motor Vehicle	UNKNOWN	Clear	Daylight
6.61	INTERSECTION	102495950	At an Intersection	2019	8/24/2019	1805	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight
6.64	INTERSECTION	102699125	At an Intersection	2020	5/2/2020	1122	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	ANGLE	Clear	Daylight
6.61	INTERSECTION	102079160	At an Intersection	2018	7/18/2018	1600	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight
6.61	INTERSECTION	102157084	At an Intersection	2018	9/25/2018	1400	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Rain	Daylight
6.61	INTERSECTION	102715847	At an Intersection	2020	5/28/2020	1412	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	SIDESWIPE, SAME DIR	Clear	Daylight
6.64	INTERSECTION	101903659	At an Intersection	2018	2/1/2018	1415	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight
6.64	INTERSECTION	102235996	At an Intersection	2018	12/4/2018	1317	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	SIDESWIPE, OPP DIR	Cloudy	Daylight
6.61	INTERSECTION RELATED	102488991	At an Intersection	2019	8/25/2019	927	Suspected Serious Inj	0	1	1	0	1	Pedestrian	NO COLLISION W/ VEHICLE	Clear	Daylight
6.61	INTERSECTION RELATED	102767320	At an Intersection	2020	8/24/2020	222	Suspected Minor Inj	0	1	0	1	2	Vehicle in Transport	REAR-END	Clear	Daylight
6.61	INTERSECTION RELATED	102667811	At an Intersection	2020	2/25/2020	0	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	SIDESWIPE, SAME DIR	Clear	Daylight
6.64	INTERSECTION RELATED	102757323	At an Intersection	2020	8/9/2020	1447	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight
6.64	INTERSECTION RELATED	102801928	At an Intersection	2020	10/5/2020	933	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	ANGLE	Clear	Dark-Lighted

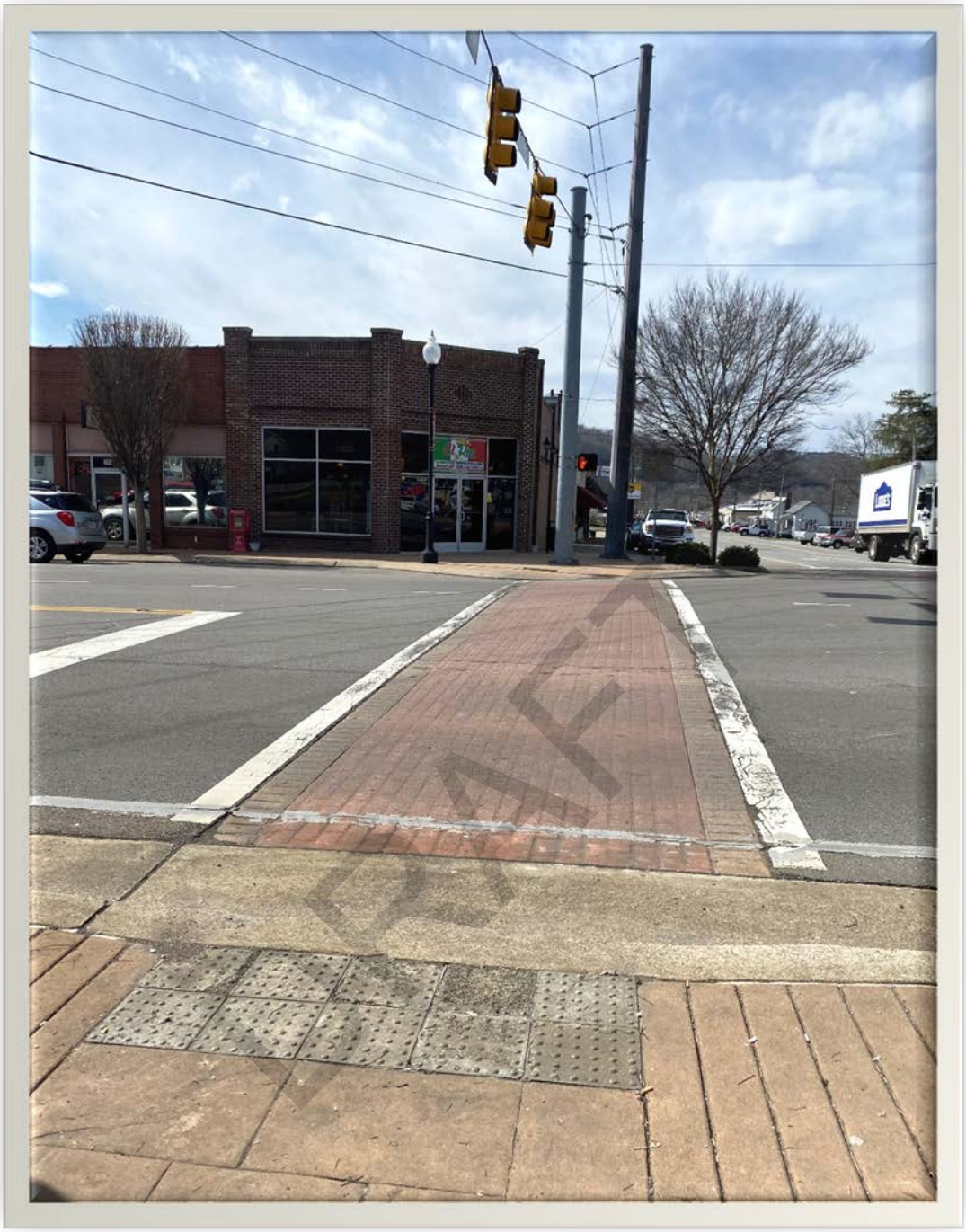
Query: Crashes on SR 49
CR_CRASH.County = CHEATHAM
CR_CRASH.Route = SR049
CR_CRASH.Year Of Crash > 2017
CR_CRASH.Log Mile >= 5.76 And CR_CRASH.Log Mile <= 5.84

BLM	Relation to First Junction	Case Number	Location	Year Of Crash	Date of Crash	Time of Crash	Type of Crash	Total Killed	Total Inj	Total Incap Inj	Total Other Inj	Total Veh	First Harmful Event	Manner of First Collision	Weather	Light Conditions
5.84	NON_JUNCTION	102860701	Along Roadway	2020	12/17/2020	310	Suspected Minor Injury	0	1	0	1	2	Vehicle in Transport	REAR-END	Clear	Daylight
5.794	NON_JUNCTION	102589768	Along Roadway	2019	12/5/2019	1233	Prop Damage (over)	0	0	0	0	2	Vehicle in Transport	REAR-END	Clear	Daylight

APPENDIX C
FIELD REVIEW PHOTOS AND INTERSECTION DEFICIENCIES

SOUTHEAST CORNER (LOOKING NORTH)

- **STEEL STRAIN TRAFFIC SIGNAL POLE AND DECORATIVE STREET LIGHT POLE BLOCKING PEDESTRIAN THROUGHWAY ZONE**



SOUTHEAST CORNER (LOOKING AT SOUTHWEST CORNER)

- **NONCOMPLIANT DETECTABLE WARNING SURFACE IN CURB RAMPS (BOTH CORNERS)**
- **NONCOMPLIANT PEDESTRIAN SIGNAL HEADS (SOUTHWEST CORNER)**
- **NONCOMPLIANT PEDESTRIAN PUSHBUTTON LOCATION (SOUTHWEST CORNER)**

NORTHEAST CORNER (LOOKING NORTH)

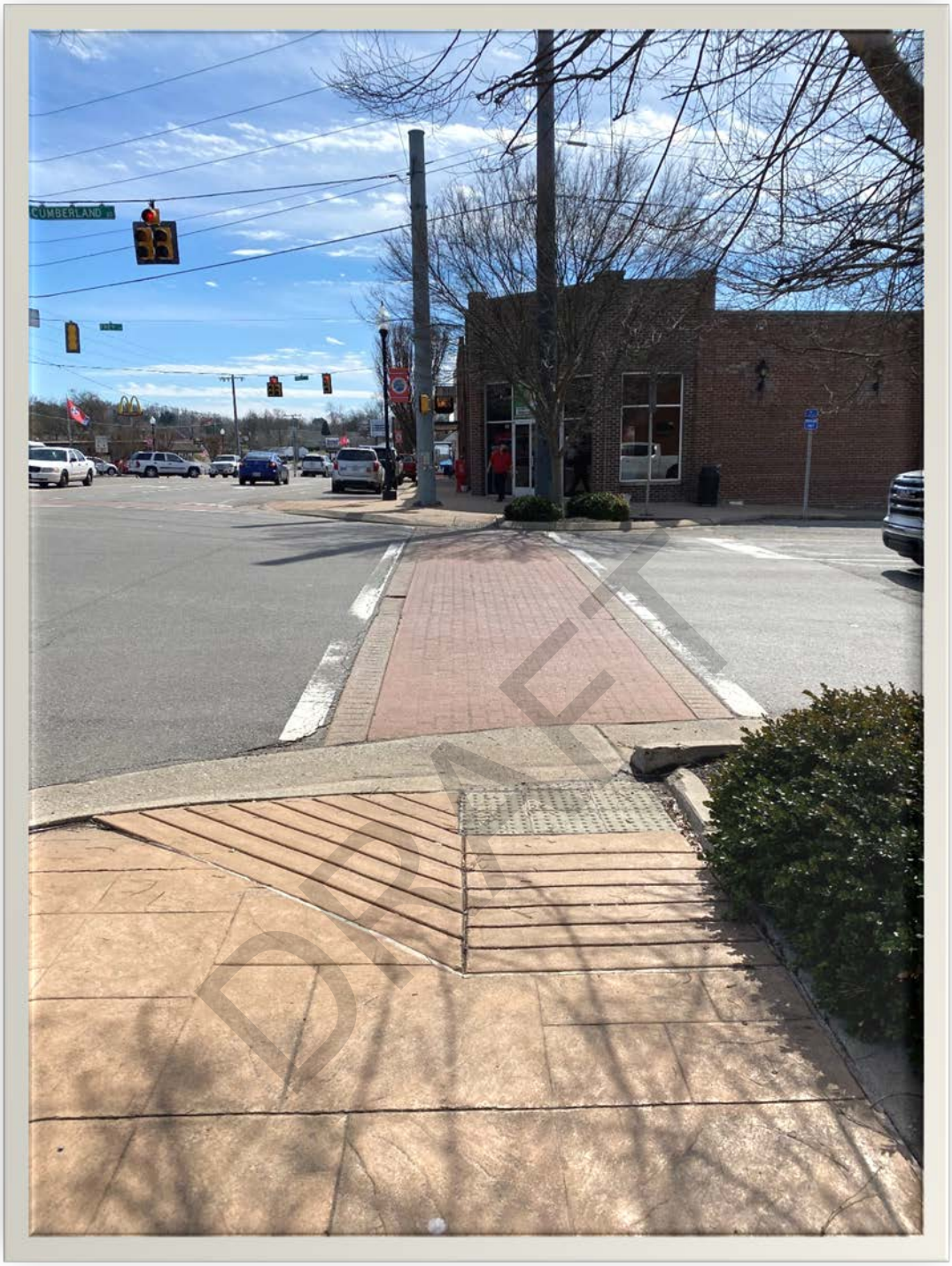
- **STEEL STRAIN TRAFFIC SIGNAL POLE, DECORATIVE STREET LIGHT POLE, AND PARKING LOT CURBING BLOCKING PEDESTRIAN THROUGHWAY ZONE**
- **NO PEDESTRIAN SIGNAL OR PUSHBUTTON**

NORTHEAST CORNER (LOOKING AT NORTHWEST CORNER)

- **NONCOMPLIANT DETECTABLE WARNING SURFACE IN CURB RAMPS (BOTH CORNERS)**
- **NO PEDESTRIAN SIGNAL OR PUSHBUTTON (NORTHWEST CORNER)**

NORTHWEST CORNER (LOOKING AT NORTHEAST CORNER)

- **NONCOMPLIANT DETECTABLE WARNING SURFACE IN CURB RAMPS (BOTH CORNERS)**
- **CURB RAMP NONCOMPLIANT BASED ON ORIENTATION FOR DUAL CROSSING LOCATION (NORTHWEST CORNER)**

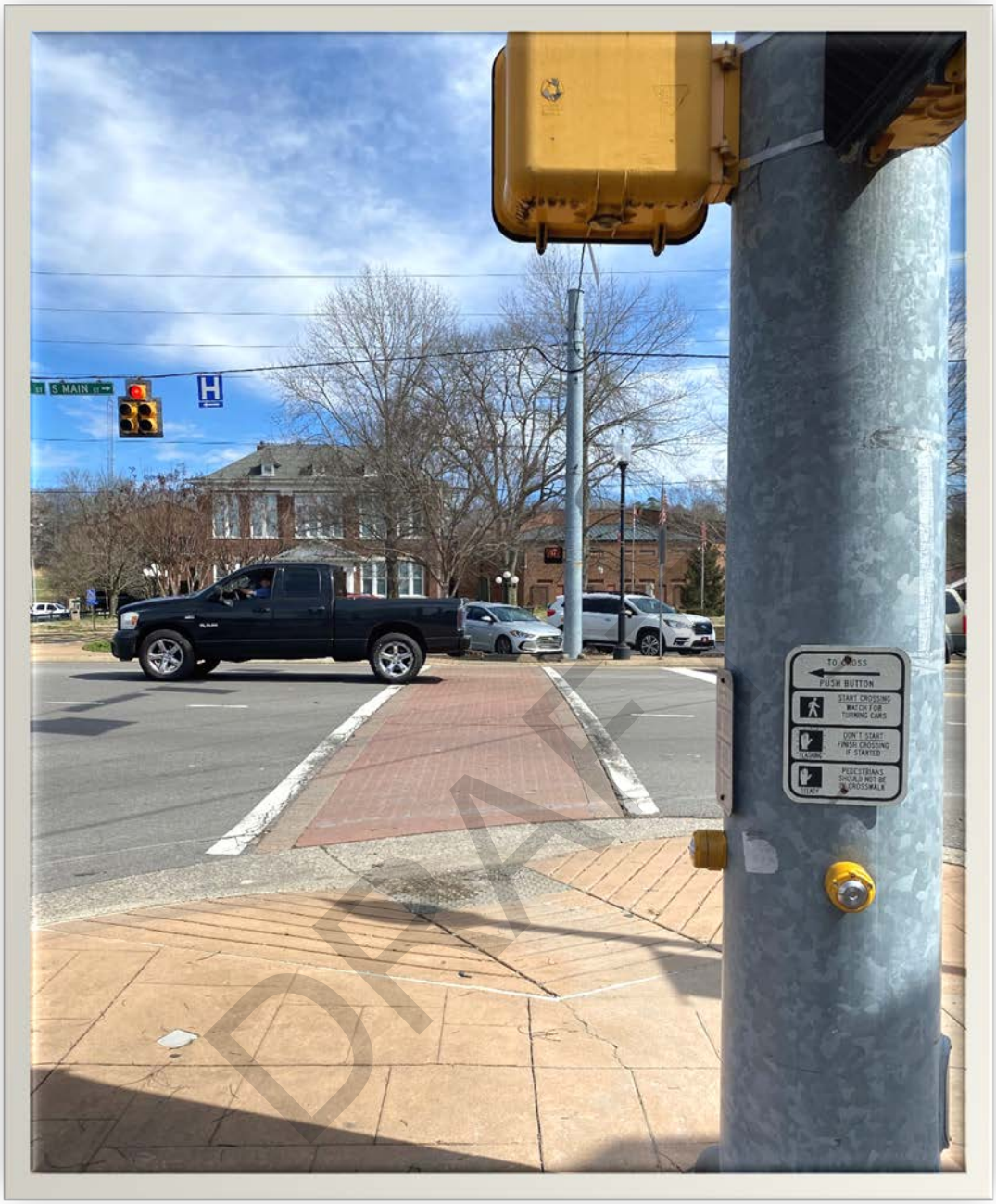


NORTHWEST CORNER (LOOKING AT SOUTHWEST CORNER)

- **NONCOMPLIANT DETECTABLE WARNING SURFACE IN CURB RAMPS (BOTH CORNERS)**
- **NONCOMPLIANT PEDESTRIAN SIGNAL HEADS (SOUTHWEST CORNER)**

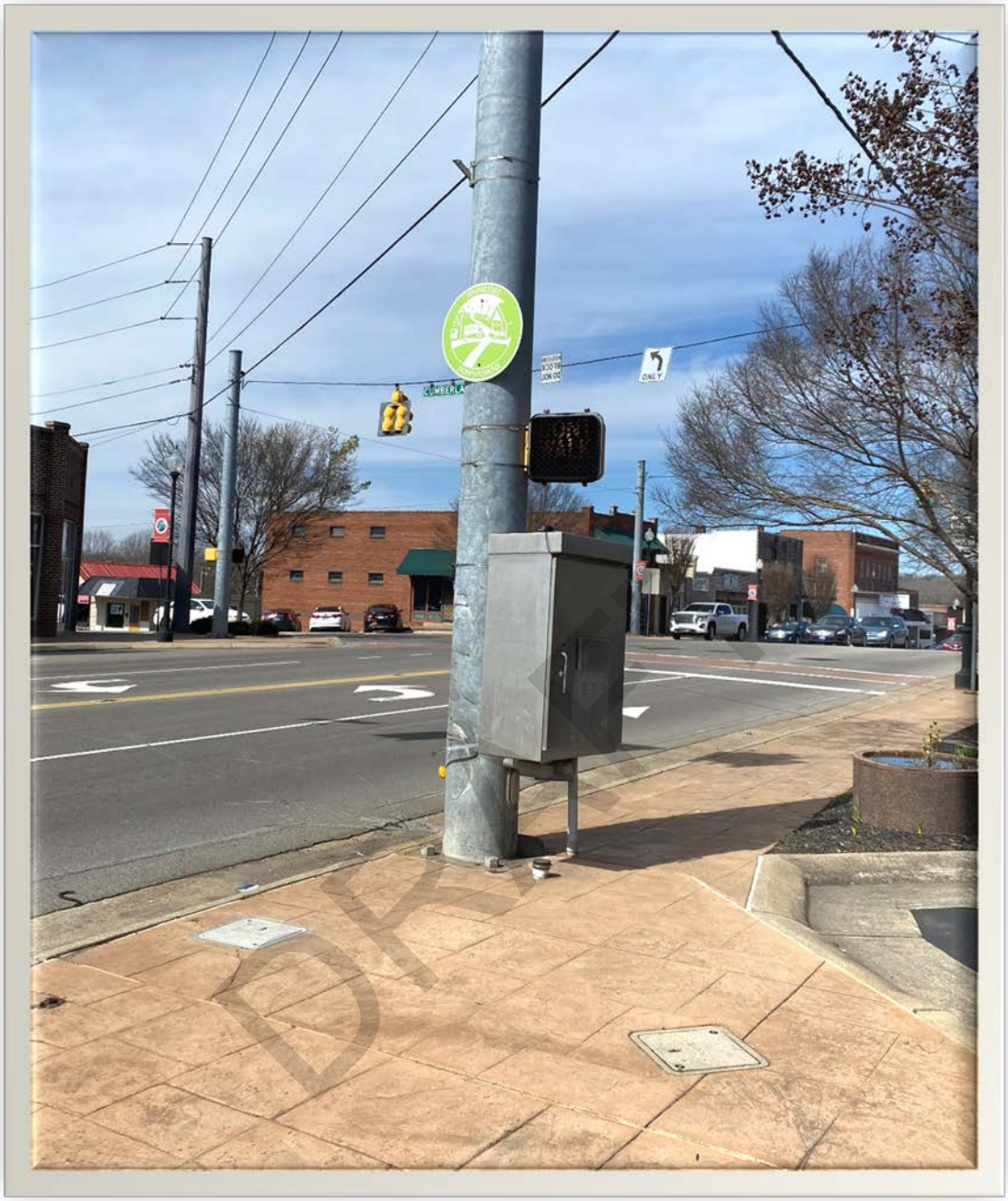
SOUTHWEST CORNER (LOOKING AT NORTHWEST CORNER)

- **NONCOMPLIANT DETECTABLE WARNING SURFACE IN CURB RAMPS (BOTH CORNERS)**
- **NONCOMPLIANT PEDESTRIAN SIGNAL HEADS (NORTHWEST CORNER)**
- **NONCOMPLIANT PEDESTRIAN PUSHBUTTON LOCATIONS (BOTH CORNERS)**



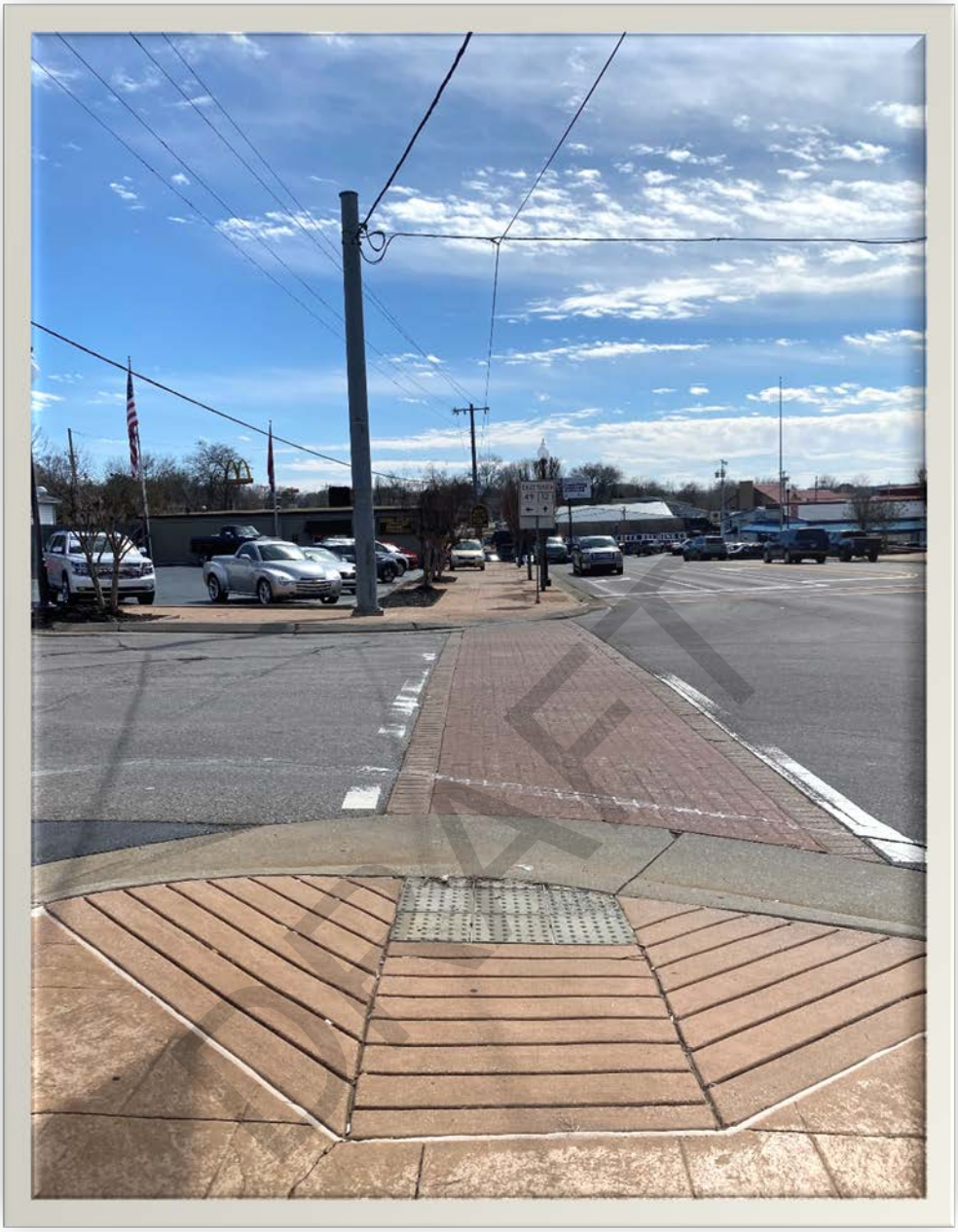
SOUTHWEST CORNER (LOOKING AT SOUTHEAST CORNER)

- **NONCOMPLIANT DETECTABLE WARNING SURFACE IN CURB RAMPS (BOTH CORNERS)**
- **NONCOMPLIANT PEDESTRIAN SIGNAL HEADS (SOUTHEAST CORNER)**
- **NONCOMPLIANT PEDESTRIAN PUSHBUTTON LOCATION (SOUTHWEST CORNER)**
- **CURB RAMP NONCOMPLIANT BASED ON ORIENTATION FOR DUAL CROSSING LOCATION (SOUTHWEST CORNER)**



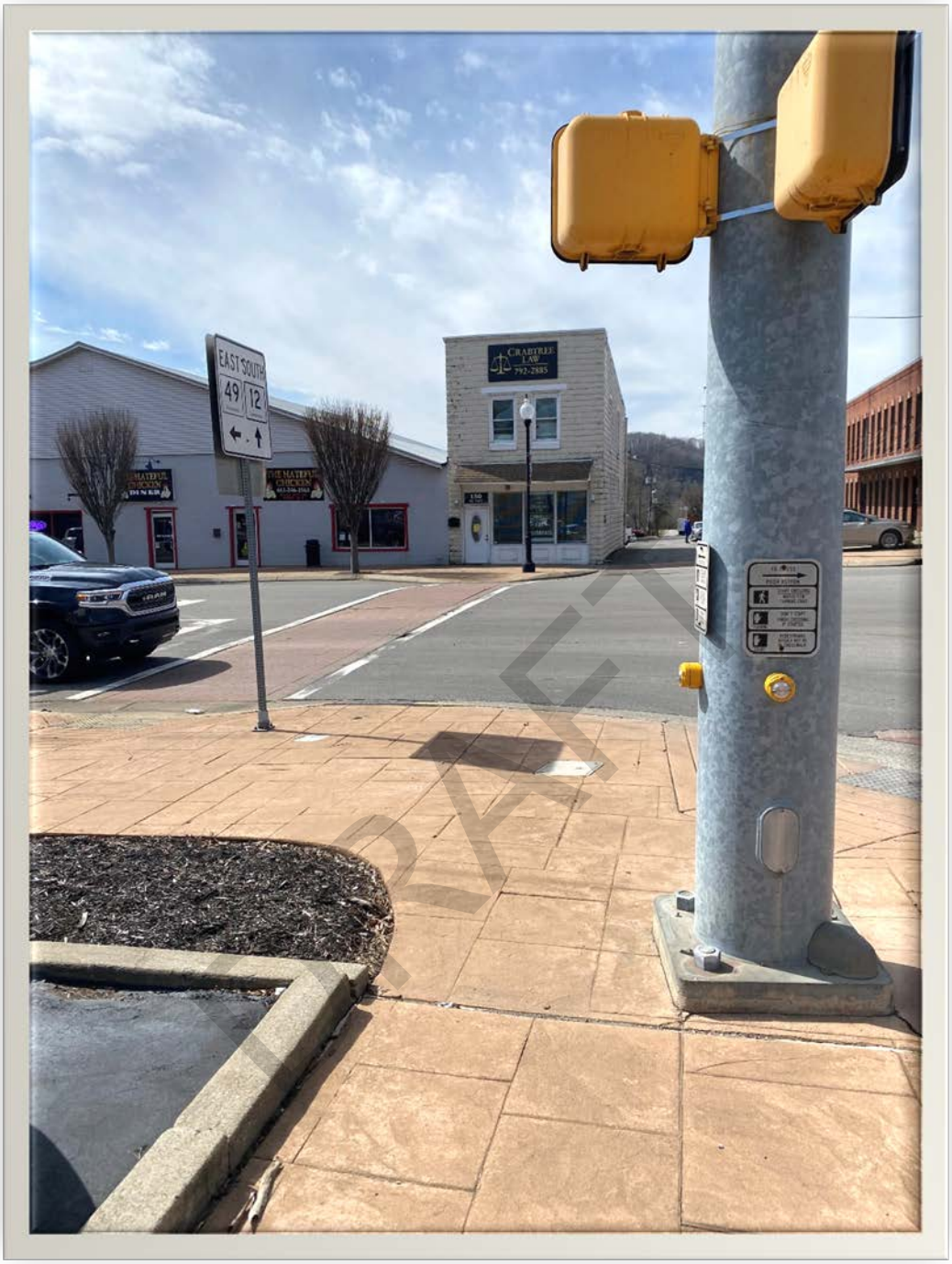
NORTHEAST CORNER (LOOKING NORTH)

- **POLE MOUNTED TRAFFIC SIGNAL CABINET BLOCKING PEDESTRIAN THROUGHWAY ZONE**
- **WESTBOUND RIGHT-TURN TRUCK MOVEMENTS HAVE DAMAGED STEEL STRAIN TRAFFIC SIGNAL POLE AND PUSHBUTTON**
- **NONCOMPLIANT PEDESTRIAN SIGNAL HEADS AND DAMAGED PUSHBUTTON IN NONCOMPLIANT LOCATION**



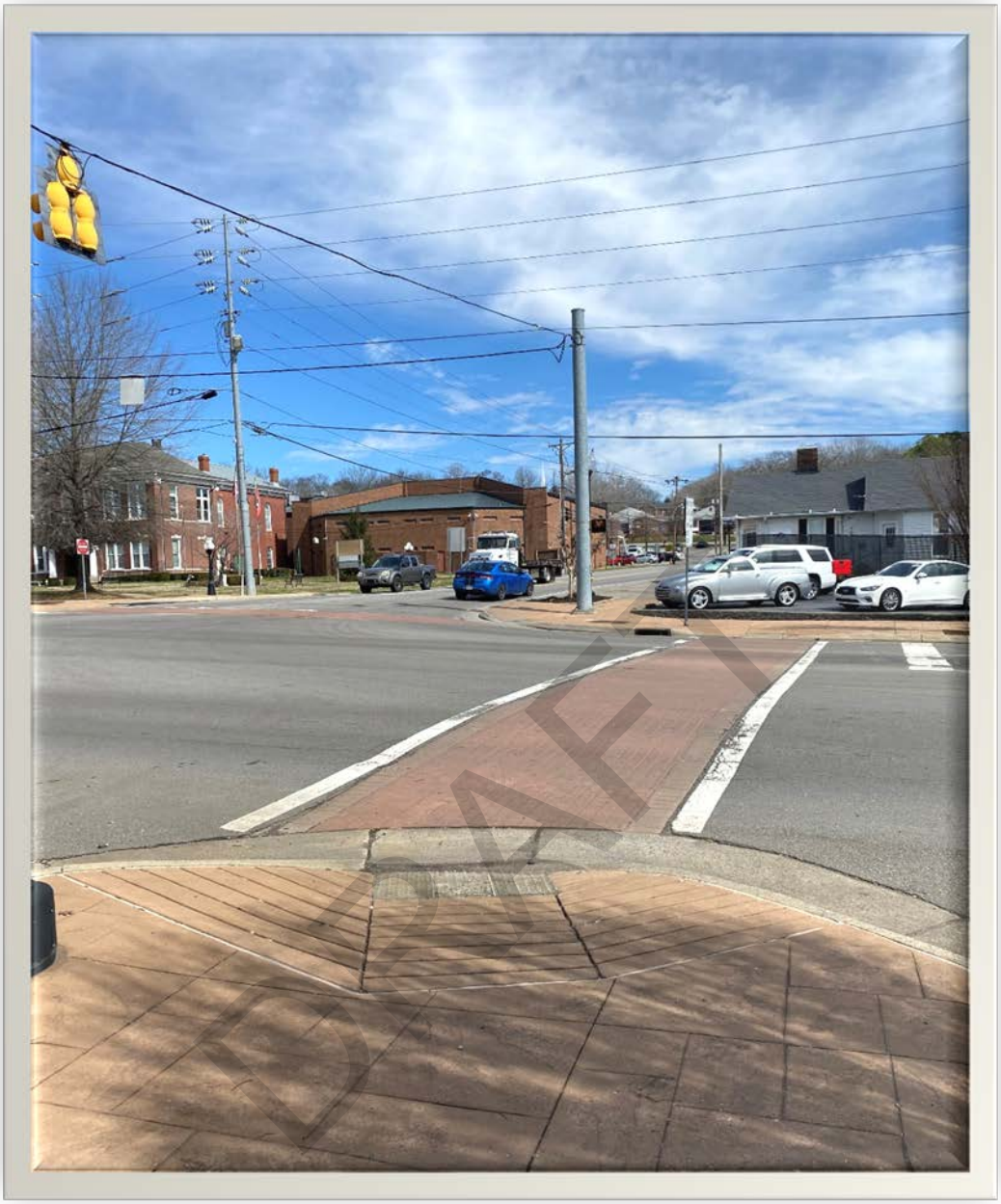
NORTHEAST CORNER (LOOKING AT SOUTHEAST CORNER)

- **NONCOMPLIANT DETECTABLE WARNING SURFACE IN CURB RAMPS (BOTH CORNERS)**
- **NONCOMPLIANT PEDESTRIAN SIGNAL HEADS (SOUTHEAST CORNER)**
- **NONCOMPLIANT PEDESTRIAN PUSHBUTTON LOCATION (SOUTHEAST CORNER)**
- **CURB RAMP NONCOMPLIANT BASED ON ORIENTATION FOR DUAL CROSSING LOCATION (SOUTHEAST CORNER)**



SOUTHEAST CORNER (LOOKING AT SOUTHWEST CORNER)

- **NONCOMPLIANT DETECTABLE WARNING SURFACE IN CURB RAMPS (BOTH CORNERS)**
- **NONCOMPLIANT PEDESTRIAN PUSHBUTTON LOCATION (SOUTHEAST CORNER)**



SOUTHWEST CORNER (LOOKING AT SOUTHEAST CORNER)

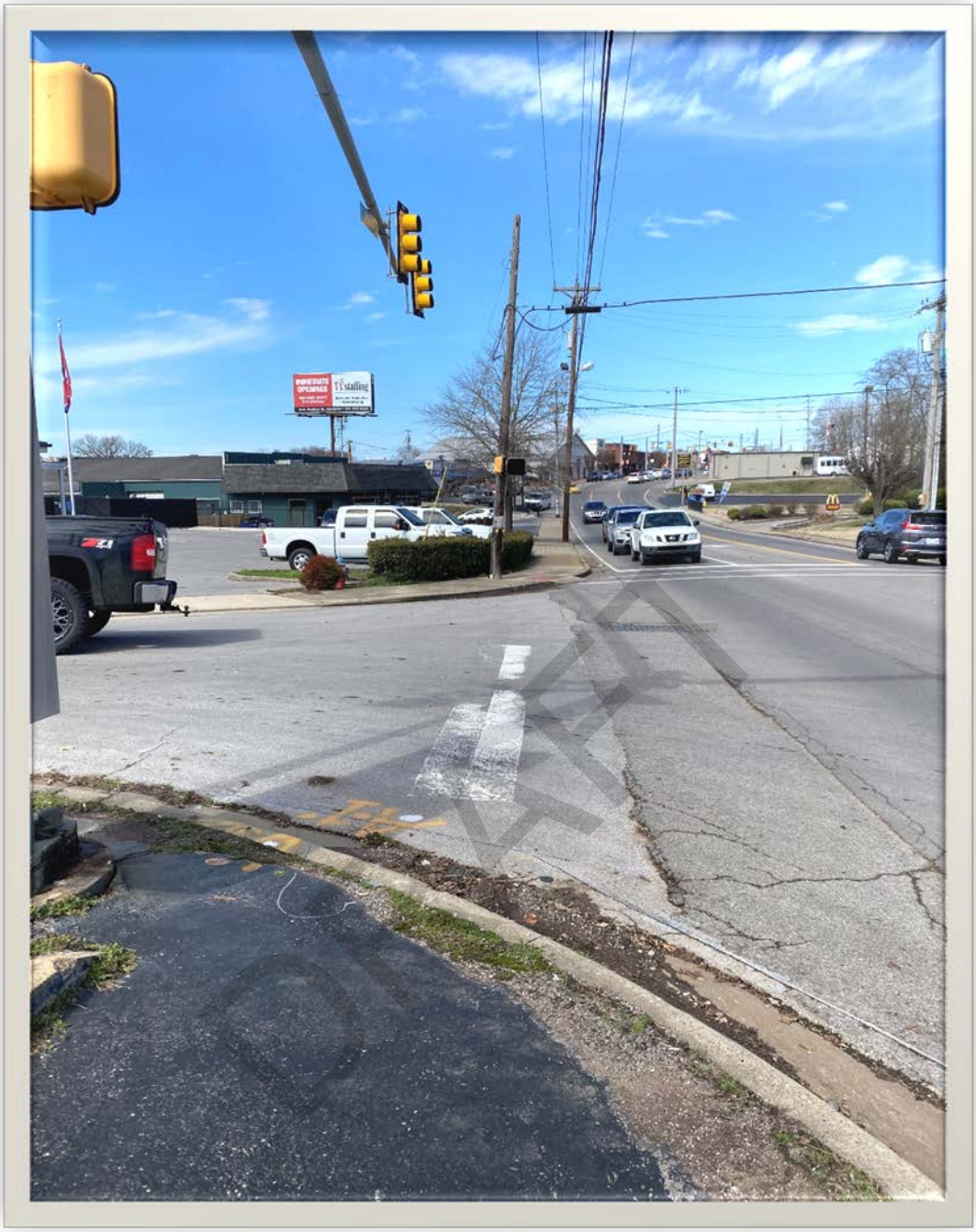
- **NONCOMPLIANT DETECTABLE WARNING SURFACE IN CURB RAMPS (BOTH CORNERS)**
- **NONCOMPLIANT PEDESTRIAN SIGNAL HEADS (SOUTHEAST CORNER)**
- **NONCOMPLIANT PEDESTRIAN PUSHBUTTON LOCATION (SOUTHEAST CORNER)**
- **CURB RAMP NONCOMPLIANT BASED ON ORIENTATION FOR DUAL CROSSING LOCATION (SOUTHWEST CORNER)**

SOUTHWEST DRIVEWAY CORNER (LOOKING NORTH)

- **NONCOMPLIANT DETECTABLE WARNING SURFACE IN CURB RAMPS (BOTH DRIVEWAY CORNERS)**
- **PEDESTRIAN SIGNAL HEAD AND PUSHBUTTON IS NOT LOCATED AT MAIN STREET (SR 12) CROSSING (NORTHWEST DRIVEWAY CORNER)**

NORTHWEST DRIVEWAY CORNER (LOOKING SOUTH)

- **NONCOMPLIANT DETECTABLE WARNING SURFACE IN CURB RAMPS (BOTH DRIVEWAY CORNERS)**
- **PEDESTRIAN SIGNAL HEAD AND PUSHBUTTON IS NOT LOCATED AT MAIN STREET (SR 12) CROSSING (NORTHWEST DRIVEWAY CORNER)**



SOUTHWEST CORNER (LOOKING AT NORTHWEST CORNER)

- **NO CURB RAMP (SOUTHWEST CORNER)**
- **NO CROSSWALK PAVEMENT MARKINGS ACROSS WESTERN LEG OF INTERSECTION**
- **CURB RAMP NONCOMPLIANT BASED ON ORIENTATION FOR SINGLE CROSSING LOCATION (NORTHWEST CORNER)**
- **NONCOMPLIANT PEDESTRIAN SIGNAL HEADS (NORTHWEST CORNER)**

SOUTHWEST CORNER

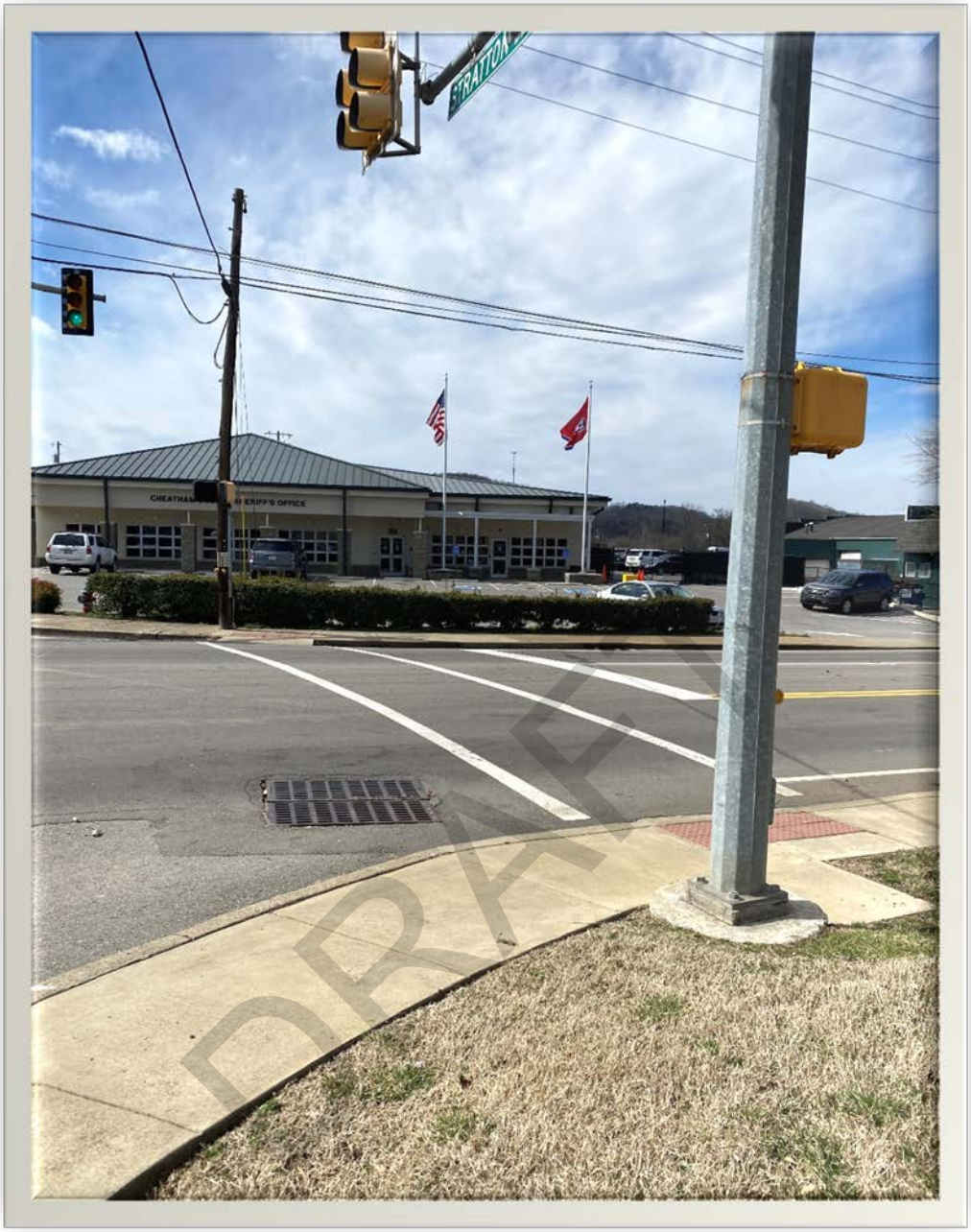
- **NONCOMPLIANT PEDESTRIAN PUSHBUTTON LOCATION BEHIND POLE MOUNTED TRAFFIC SIGNAL CABINET (NOT PICTURED)**

SOUTHWEST CORNER (LOOKING AT SOUTHEAST CORNER)

- **NO PEDESTRIAN SIGNAL OR PUSHBUTTON ACROSS SOUTHERN LEG OF INTERSECTION**
- **NO CROSSWALK PAVEMENT MARKINGS ACROSS SOUTHERN LEG OF INTERSECTION**

NORTHWEST CORNER (LOOKING AT SOUTHWEST CORNER)

- **NO CURB RAMP (SOUTHWEST CORNER)**
- **NO CROSSWALK PAVEMENT MARKINGS ACROSS WESTERN LEG OF INTERSECTION**
- **NONSTANDARD DETECTABLE WARNING SURFACE IN CURB RAMP (NORTHWEST CORNER)**
- **CURB RAMP NONCOMPLIANT BASED ON ORIENTATION FOR SINGLE CROSSING LOCATION (NORTHWEST CORNER)**
- **CURB RAMP DOES NOT INCLUDE LOWERED CURB AT BACK OF GUTTER (NORTHWEST CORNER)**
- **NONCOMPLIANT PEDESTRIAN SIGNAL HEADS (SOUTHWEST CORNER)**

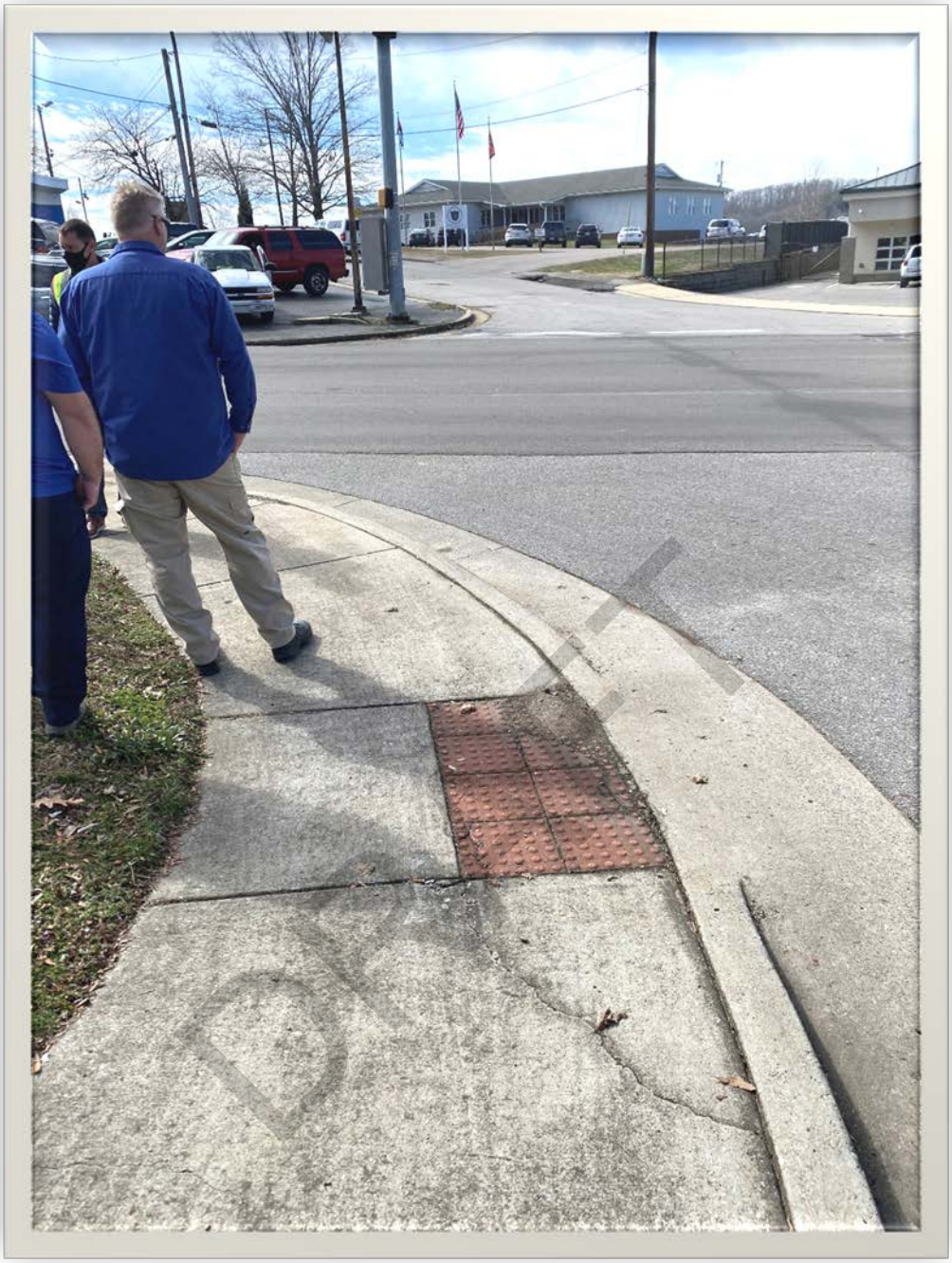


NORTHEAST CORNER (LOOKING AT NORTHWEST CORNER)

- **NONSTANDARD DETECTABLE WARNING SURFACE IN CURB RAMPS (BOTH CORNERS)**
- **CURB RAMP NONCOMPLIANT BASED ON INSUFFICIENT LEVEL LANDING AREA (NORTHEAST CORNER)**
- **NONCOMPLIANT PEDESTRIAN SIGNAL HEADS (NORTHWEST CORNER)**
- **NONCOMPLIANT PEDESTRIAN PUSHBUTTON LOCATION (NORTHEAST CORNER)**

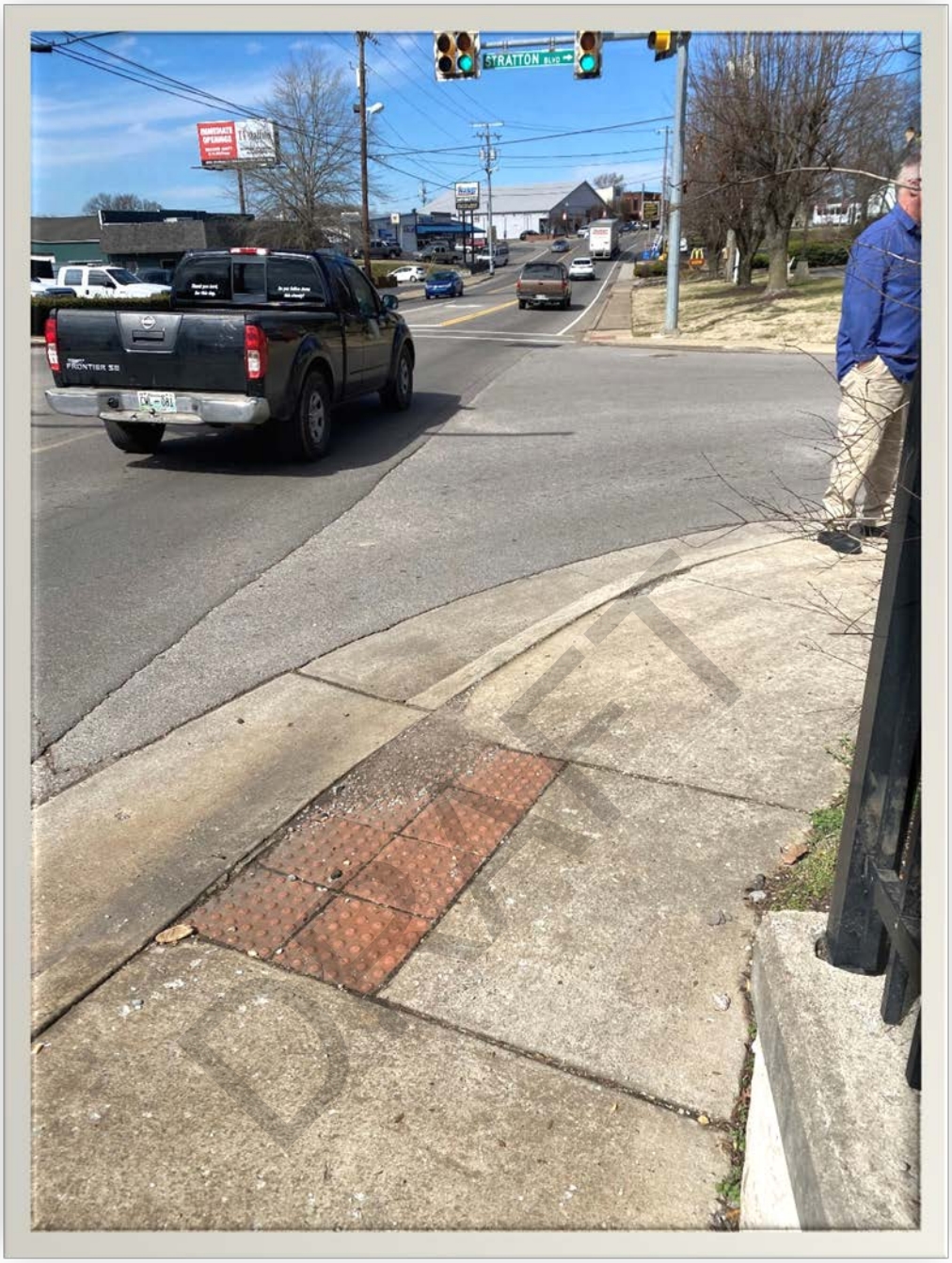
SOUTHEAST CORNER (LOOKING AT NORTHEAST CORNER)

- **NONSTANDARD DETECTABLE WARNING SURFACE IN CURB RAMP (NORTHEAST CORNER)**
- **NO PEDESTRIAN SIGNAL OR PUSHBUTTON ACROSS EASTERN LEG OF INTERSECTION**
- **NO CROSSWALK PAVEMENT MARKINGS ACROSS EASTERN LEG OF INTERSECTION**



SOUTHEAST CORNER (LOOKING WEST)

- **NONSTANDARD DETECTABLE WARNING SURFACE IN CURB RAMP (SOUTHEAST CORNER)**
- **NO PEDESTRIAN SIGNAL OR PUSHBUTTON ACROSS SOUTHERN LEG OF INTERSECTION**
- **NO CROSSWALK PAVEMENT MARKINGS ACROSS SOUTHERN LEG OF INTERSECTION**



SOUTHEAST CORNER (LOOKING NORTH)

- **NONSTANDARD DETECTABLE WARNING SURFACE IN CURB RAMP (SOUTHEAST CORNER)**
- **NO PEDESTRIAN SIGNAL OR PUSHBUTTON ACROSS EASTERN LEG OF INTERSECTION**
- **NO CROSSWALK PAVEMENT MARKINGS ACROSS EASTERN LEG OF INTERSECTION**

APPENDIX D
COST ESTIMATES

COST ESTIMATE SUMMARY

Route:	State Route 12 (Main Street) at State Route 49 (Cumberland Street) / State Route 49 (Frey Street) State Route 12 (Main Street) at Elizabeth Street / Stratton Boulevard
Description:	Recommended ADA Improvements Based on Field Review 03-02-2021
Project Type of Work:	Safety
County:	Cheatham
Length:	
Date:	June 18, 2021
Estimate Type:	Conceptual

DESCRIPTION CONSTRUCTION ITEMS (NOT TO INCLUDE ENGINEERING DESIGN)		ADA COMPLIANCE IMPROVEMENTS		TOTAL
		MAIN ST (SR 12) AT CUMBERLAND ST / FREY ST (SR 49)	MAIN ST (SR 12) AT STRATTON BLVD / ELIZABETH ST	
Traffic Signal Rebuild		$248,500	$0	$248,500
Curb Ramp Installation (ADA Required)		$74,500	$52,000	$126,500
Pedestrian Signal Improvements		$0	$59,500	$59,500
Crosswalk Pavement Markings		$0	$24,000	$24,000
Miscellaneous Improvements (See Note)		$47,500	$47,500	$95,000
Maintenance of Traffic	10%	$38,000	$19,000	$57,000
SUBTOTAL		**$408,500**	**$202,000**	**$610,500**
Mobilization	5%			$31,000
Const. Contingency	10%			$62,000
Const. Eng. & Inspec.	10%			$62,000
TOTAL CONSTRUCTION ESTIMATE				**$765,500**

Note: Construction items detailed in this cost estimate are based on the required ADA improvements outlined in the field review document. Miscellaneous intersection improvements include relocation of the existing streetlight luminaires replacement of the existing decorative brick pattern sidewalk (Cumberland/Frey intersection). Additionally, miscellaneous improvements include the acquisition of R.O.W and relocation of utilities (Stratton/Elizabeth).

ESTIMATED COST PER UNIT IMPROVEMENT CATEGORY

CATEGORY 1	TYPE SIGNAL			UNIT INSTALLATION 1	
ITEM	DESCRIPTION		#	$/UNIT	TOTAL
730-01.02	REMOVAL OF SIGNAL EQUIPMENT	EACH	3	$ 4,300.00	$ 12,900.00
730-02.07	SIGNAL HEAD ASSEMBLY (130)	EACH	4	$ 730.00	$ 2,920.00
730-02.17	SIGNAL HEAD ASSEMBLY (150 A2H WITH BACKPLATE)	EACH	8	$ 1,527.00	$ 12,216.00
730-03-N	PULL BOX (TYPE B TRAFFIC) 730-N TIER 22 LID	EACH	8	$ 575.00	$ 4,600.00
730-05.01	ELECTRICAL SERVICE CONNECTION	EACH	1	$ 2,366.00	$ 2,366.00
730-08.03	SIGNAL CABLE - 7 CONDUCTOR	L.F.	2000	$ 2.00	$ 4,000.00
730-08.05	SIGNAL CABLE - 12 CONDUCTOR	L.F.	2000	$ 2.00	$ 4,000.00
730-12.02	CONDUIT 2" DIAMETER (PVC)	L.F.	2000	$ 12.00	$ 24,000.00
730-12.13	CONDUIT 2" DIAMETER (JACK AND BORE)	L.F.	150	$ 23.64	$ 3,546.00
730-15.32	CABINET (EIGHT PHASE BASE MOUNTED)	EACH	1	$ 18,450.00	$ 18,450.00
730-16.02	EIGHT PHASE ACTUATED CONTROLLER	EACH	1	$ 3,800.00	$ 3,800.00
730-23.51	CANTILEVER SIGNAL SUPPORT (2 @ 20' & 25') CORE-CATEGORY 2	EACH	2	$ 17,000.00	$ 34,000.00
730-23.56	CANTILEVER SIGNAL SUPPORT (1 ARM @ 25') CORE-CATEGORY 2	EACH	1	$ 14,260.00	$ 14,260.00
730-23.72	CANTILEVER SIGNAL SUPPORT (1 ARM @ 35') CORE-CATEGORY 2	EACH	1	$ 18,788.00	$ 18,788.00
730-14.01	SHIELDED DETECTOR CABLE	L.F.	700	$ 2.00	$ 1,400.00
730-14.02	SAW SLOT	L.F.	2200	$ 5.00	$ 11,000.00
730-14.03	LOOP WIRE	L.F.	5500	$ 1.00	$ 5,500.00
	GRAND TOTAL				**$ 177,800.00**

CATEGORY 2	TYPE CURB RAMPS			UNIT INSTALLATION 1	
ITEM	DESCRIPTION		#	$/UNIT	TOTAL
202-03	REMOVAL OF RIGID PAVEMENT, SIDEWALK, ETC.	SY	22	$ 12.00	$ 266.67
202-08.15	REMOVAL OF CURB AND GUTTER	LF	50	$ 9.00	$ 450.00
303-01	MINERAL AGGREGATE, TYPE A BASE, GRADING D	TON	7	$ 24.00	$ 168.00
701-01.01	CONCRETE SIDEWALK (4 ")	SF	50	$ 7.00	$ 350.00
701-02.03	CONCRETE CURB RAMP	SF	100	$ 24.00	$ 2,400.00
702-03	CONCRETE COMBINED CURB & GUTTER	CY	4	$ 433.00	$ 1,533.90
PW-DW-001	TRUNCATED DOME WARNING MAT	SF	10	$ 60.00	$ 600.00
	GRAND TOTAL				**$ 5,800.00**

CATEGORY 3	TYPE # OF NEW PED POLE(S) NEW APS PUSHBUTTONS			UNIT INSTALLATION 1 1	
ITEM	DESCRIPTION		#	$/UNIT	TOTAL
730-03-N	PULL BOX (TYPE B TRAFFIC) 730-N TIER 22 LID	EACH	1	$ 575.00	$ 575.00
730-08.03	SIGNAL CABLE - 7 CONDUCTOR	L.F.	2000	$ 2.00	$ 4,000.00
730-08.04	SIGNAL CABLE - 9 CONDUCTOR	L.F.	500	$ 2.00	$ 1,000.00
730-12.02	CONDUIT 2" DIAMETER (PVC)	L.F.	500	$ 12.00	$ 6,000.00
730-23.31	PEDESTAL POLE (10'X4" ALUMINUM)	EACH	1	$ 4,504.00	$ 4,504.00
730-24.07	FOUNDATION (PEDESTRIAN POLE, 24"X3")	EACH	1	$ 600.00	$ 600.00
730-26.11	COUNTDOWN PED SGNL HEAD W/ AUDIBLE PUSH BUTTON & 15IN SIGN	EACH	2	$ 2,426.00	$ 4,852.00
730-26.02	PEDESTRIAN PUSHBUTTON WITH 15" SIGN	EACH	1	$ 650.00	$ 650.00
	APPROX. PED POLE TOTAL				**$ 15,700.00**
	APPROX. PUSHBUTTON TOTAL				**$ 5,900.00**

CATEGORY 4	TYPE LONGITUDINAL CROSSWALK			UNIT INSTALLATION 1	
ITEM	DESCRIPTION		#	$/UNIT	TOTAL
716-02.05	PLASTIC PAVEMENT MARKING (STOP LINE)	LF	72	$ 11.37	$ 900.00
716-08.03	REMOVAL OF PAVEMENT MARKING (CROSS WALK)	LF	40	$ 9.00	$ 400.00
716-08.05	REMOVAL OF PAVEMENT MARKING (STOP LINE)	LF	72	$ 3.49	$ 300.00
716-02.09	PLASTIC PAVEMENT MARKING (LONGITUDINAL X-WALK)	LF	190	$ 27.00	$ 5,200.00
	GRAND TOTAL				**$ 6,800.00**

MAIN ST	1	2A	2B	2C	3		4	5		
INTERSECTION	TRAFFIC SIGNAL REBUILD	CURB RAMP INSTALLATION			PEDESTRIAN SIGNAL IMPROVEMENTS		CROSSWALK PAVEMENT MARKINGS	MISCELLANEOUS ITEMS.	EST. COST	
		ADA	ORIENTATION	DOME	#	PPB ONLY	LONGITUDINAL			
CUMBERLAND ST/FREY ST	1	9	2	2	3	0	0	RE-INSTALL DECORATIVE COLOR CO	$ 45,000.00	
STRATTON BLVD/ELIZABETH ST	0	8	0	0	3	1	4	ROW, RELOCATE COMM POLE	$ 40,400.00	
TOTAL # INSTALLATIONS	1	17	2	2	6	1	4			
TOTAL COST ESTIMATE	**$ 178,000.00**	**$ 99,000.00**	**$ 11,600.00**	**$ 1,200.00**	**$ 95,000.00**	**$ 6,000.00**	**$ 21,000.00**	**$**	**86,000.00**	
10% CONTINGENCY	**$ 18,000.00**	**$ 11,500.00**	**$ 2,000.00**	**$ 120.00**	**$ 10,000.00**	**$ 1,000.00**	**$ 3,000.00**	**$**	**9,000.00**	**CHECK**
TOTAL	**$ 196,000.00**	**$ 110,500.00**	**$ 14,000.00**	**$ 2,000.00**	**$ 105,000.00**	**$ 7,000.00**	**$ 24,000.00**	**$**	**95,000.00**	**$ 553,500.00**

PER EACH INTERSECTION	$ 196,000.00	$ 6,500.00	$ 7,000.00	$ 1,000.00	$ 17,500.00	$ 7,000.00	$ 6,000.00			**TOTALS**
CUMBERLAND ST/FREY ST	$ 196,000.00	$ 58,500.00	$ 14,000.00	$ 2,000.00	$ 52,500.00	$ -	$ -		$ 47,500.00	**$ 370,500.00**
STRATTON BLVD/ELIZABETH ST	$ -	$ 52,000.00	$ -	$ -	$ 52,500.00	$ 7,000.00	$ 24,000.00		$ 47,500.00	**$ 183,000.00**

APPENDIX E
TDOT PROPRIETARY ITEM REQUEST LETTER AND SPECIFICATIONS

TOWN OF ASHLAND CITY
PUBLIC UTILITIES/PUBLIC WORKS

233 Tennessee Waltz Pkwy
Ashland City, Tennessee 37015
Phone 615-792-2655 Fax: 615-792-1464

May 10, 2021

Mr. Stephen K. Bryan, P.E., PTOE
Traffic Engineer/Section Manager – Signal & Lighting Design
Tennessee Department of Transportation
Traffic Operations Division
James K. Polk Building, 18th Floor
505 Deaderick Street
Nashville, TN 37243

Re: Propriety Item Request and Justification for Traffic Signal Products

Dear Mr. Bryan:

The Town of Ashland City, Tennessee would like to request proprietary product certification for the following traffic signal equipment over the next three (3) years where Federal and/or State funding are utilized. The use of specific items will allow for full synchronization capabilities and ease of maintenance within the existing and future traffic signal system operated and maintained by the Town of Ashland City.

1. Signal Controller: Econolite Cobalt
2. Signal Monitor: Reno A&E MMU2-1600GE
3. Loop Detector: Reno A&E GT-200

The Town of Ashland City maintains all traffic signals within the town limits. These proprietary items are necessary for maintenance and synchronization purposes. This request for proprietary signal equipment will also continue standardization of the traffic signal system and ensure that the comprehensive maintenance and spare equipment programs are managed efficiently. The Town of Ashland City currently operates six (6) signalized intersections and one (1) of the intersections has these traffic signal components currently installed. All new traffic signals will be constructed with these components and existing traffic signals without these components are planned for future upgrades.

Thank you in advance for your consideration of this request. Please contact me if you have questions or need additional information.

Sincerely,

Clint Biggers
Public Works / Public Utilities Director
Town of Ashland City

TOWN OF ASHLAND CITY
PUBLIC UTILITIES/PUBLIC WORKS

233 Tennessee Waltz Pkwy
Ashland City, Tennessee 37015
Phone 615-792-2655 Fax: 615-792-1464

TOWN OF ASHLAND CITY
TRAFFIC SIGNAL SPECIFICATIONS

- **Signal Controllers:** Signal controllers shall be Econolite Cobalt ATC capable of providing fully actuated and coordinated operation. Signal controllers shall contain, at minimum, two (2) integral Ethernet switches for communications to the town network, two (2) USB 2.0 ports providing upload and download capability, one (1) NEMA-ATC SDLC serial port 1, one (1) 25 pin serial port 2, and one (1) 9 pin serial port. Signal controllers shall come complete with all software, firmware, and cabinet connections to allow the signal to operate in the Town of Ashland City network.

- **Signal Monitors:** Signal monitors shall be 16 channel Reno A&E MMU2-1600GE models that meet or exceed NEMA TS 2 2003 Standards including Amendment 4-2012. Signal monitors shall contain, at minimum, one (1) SDLC serial port 1, one (1) Comm Port, and one (1) Ethernet Port.

- **Loop Detectors:** Loop detectors shall be two channel, card rack type Reno A&E GT-200 models with delay and extension timing that meet or exceed NEMA Standards TS 2-1998 for Type C detectors. Loop detectors shall contain, at a minimum, eight (8) front panel DIP switches for each channel capable of setting sensitivity, presence or pulse mode, frequency, Fail-Safe or Fail-Secure operation, and channel disable.