**ITEM#4B**

City of Fredericksburg, Virginia

# MEMORANDUM

**TO:** Timothy Baroody, City Manager
**FROM:** Josh Crump, Principal Planner
**DATE:** September 16, 2025 (for the September 23 City Council Meeting)
**RE:** Downtown Traffic Engineering Study- Draft Final Report

## ISSUE

Transmittal of the final draft of the Downtown Traffic Engineering Study for review and comment by City Council.

## BACKGROUND

This memo transmits the final report for the Downtown Traffic Engineering Study, which was prepared by Timmons Group at the request of the City of Fredericksburg. The purpose of this study was to evaluate the feasibility and potential impacts of converting several one-way streets in downtown to two-way streets, as identified in the Area 7 Downtown Small Area Plan. The study also included a comprehensive analysis of bicycle boulevards and pedestrian safety improvements to connect existing and planned shared-use paths.

## KEY FINDINGS AND RECOMMENDATIONS

The study concludes that a one-way to two-way conversion of key corridors is feasible with minimal impact on vehicle operations and Level of Service (LOS). As detailed in the report, downtown streets currently operate with excess capacity at a Level of Service of C or better. The proposed conversion redistributes traffic and the existing street network is well-equipped to absorb these changes without significant decline to the overall LOS. For example, the William Street/Amelia Street conversion is projected to maintain a Level of Service of C or better for all intersections, with many staying at a strong B or A, demonstrating the feasibility of the proposed changes. This positive outlook on the conversion's impact on traffic flow is further supported by the analysis of intersections along Princess Anne and Caroline Streets, which also showed minimal change in vehicular delays despite the new travel directions. The final recommendations focus on maintaining existing on-street parking while improving safety and accessibility for all modes of travel, including pedestrians and cyclists. The community engagement efforts showed broad support for the proposed pedestrian and traffic calming improvements, with a clear community interest in making downtown safer for all users.

Here are the main recommendations by study area:

- **North Princess Anne Street/Caroline Street:** It's recommended to convert both Princess Anne Street and Caroline Street to two-way travel between Herndon Street and Amelia Street. This conversion would involve restriping the roadways, replacing signs, and

constructing curb extensions. A two-way separated bicycle lane is also recommended along Sophia Street, Pitt Street, and Caroline Street to connect to the Rappahannock River Heritage Trail. To accommodate this, Sophia Street would be reduced to a single southbound travel lane, and the block of Pitt Street would become one-way eastbound traffic.

- **William Street/Amelia Street:** Both William Street and Amelia Street are recommended for a full two-way conversion. Signal upgrades, including Leading Pedestrian Intervals (LPI) and Audible Pedestrian Signals (APS), are recommended at all six signals in this sub-area to improve pedestrian safety and accessibility. Additionally, the intersection of Amelia Street and Washington Avenue should be converted to an all-way stop. The conversion would require additional loading zones to move loading activity out of the travelways.
- **South Princess Anne Street/Caroline Street:** It is recommended to convert Princess Anne Street and Dixon Street to two-way travel in this sub-area. Due to the narrowness of the roads, Frederick Street should be converted to a one-way eastbound lane, and Princess Elizabeth Street should be converted to a one-way westbound lane. Caroline Street is recommended to be reduced to a single one-way northbound lane to accommodate two-way bicycle lanes on the east side, connecting to the proposed Dixon Park Connector Trail.
- **Prince Edward Street:** This street is recommended to be converted into a bicycle boulevard. A bicycle boulevard is a low-stress shared roadway facility that helps manage both bicycle and vehicle traffic. These facilities use a combination of low speed limits and physical elements to discourage cut-through motor vehicle traffic while still allowing local vehicle access at low speeds. The proposed improvements include constructing curb extensions and high-visibility crosswalks, converting the intersection at Canal Street/Fall Hill Avenue to a mini-roundabout, and building a raised crosswalk at the Rappahannock River Heritage Trail crossing.

## COMMUNITY ENGAGEMENT

Community feedback was a key component of the study. Two City Council meetings were held in September and November 2024 to present preliminary findings. A public meeting was held in December 2024, and an online survey received 142 submissions. While 29% of comments opposed the two-way conversion due to concerns about delivery trucks and parking, there was broad support for proposed pedestrian improvements and general traffic calming measures. A meeting with downtown business stakeholders in August 2025 also showed support for making downtown safer for pedestrians and cyclists.

## NEXT STEPS

The final report provides a phased implementation plan for the recommended improvements. It suggests coordinating these changes with other planned construction activities to minimize disruption. The projects will be prioritized and considered for inclusion in the Capital Improvement Plan (CIP) in the coming years.

## ATTACHMENTS

1. Draft of Downtown Traffic Engineering Study

# Fredericksburg Downtown Engineering Study

City of Fredericksburg, Virginia

September 2025

*Prepared For:*

City of Fredericksburg Department of Community Planning and Building



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# Fredericksburg Downtown Engineering Study

## City of Fredericksburg, Virginia

Prepared For:

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September 2025

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## EXECUTIVE SUMMARY

At the request of the City of Fredericksburg, a transportation engineering study was conducted for the potential one-way to two-way conversion of key corridors in downtown Fredericksburg. The study area is generally bound by Washington Avenue to the west, the Rappahannock River to the east, Herndon Street to the north, and Dixon Street to the south.

The intent of the study was to evaluate the feasibility and potential impacts of converting select one-way streets to two-way streets in a downtown area. This involved comprehensive data collection, traffic modeling, and analysis to assess how such a conversion would affect traffic flow, congestion, parking, and safety. Additionally, the study explored the establishment of bicycle boulevards, bicycle lanes, other bicycle network connections, and pedestrian safety improvements to ensure safe and accessible infrastructure for people walking, biking, and rolling.

The project also emphasized community engagement, gathering public input, and incorporating stakeholder feedback to refine the recommendations and build support for the proposed changes.

The study recommended maintaining existing on-street parking, converting several streets to two-way operation, establishing a bicycle boulevard, and adding a two-way separated bicycle lane to connect existing and planned shared-use paths through downtown.

# 1 INTRODUCTION

At the request of the City of Fredericksburg, a transportation engineering study was conducted for the potential one-way to two-way conversion of key corridors in downtown Fredericksburg. This was identified in the Area 7 Downtown Small Area Plan as a key transportation initiative. The study area is generally bound by Washington Avenue to the west, the Rappahannock River to the east, Herndon Street to the north, and Dixon Street to the south. The study area was then broken down into four sub-areas:

- North Princess Anne Street/Caroline Street – between Amelia Street and Herndon Street, including Sophia Street north of Amelia Street and Pitt Street between Caroline Street and Sophia Street
- William Street/Amelia Street – between Washington Avenue and Sophia Street
- South Princess Anne Street/Caroline Street – between Lafayette Street and Dixon Street, including Charles Street between Lafayette Boulevard and Dixon Street
- Prince Edward Street – between Amelia Street and Canal Street, an existing two-way street, considered for traffic calming elements

A map of the study area is provided in Figure 1.

The segments of Princess Anne Street and Caroline Street between Lafayette Boulevard and William Street were not studied due to the designation as a Retail Priority Area and challenges with on-street loading.

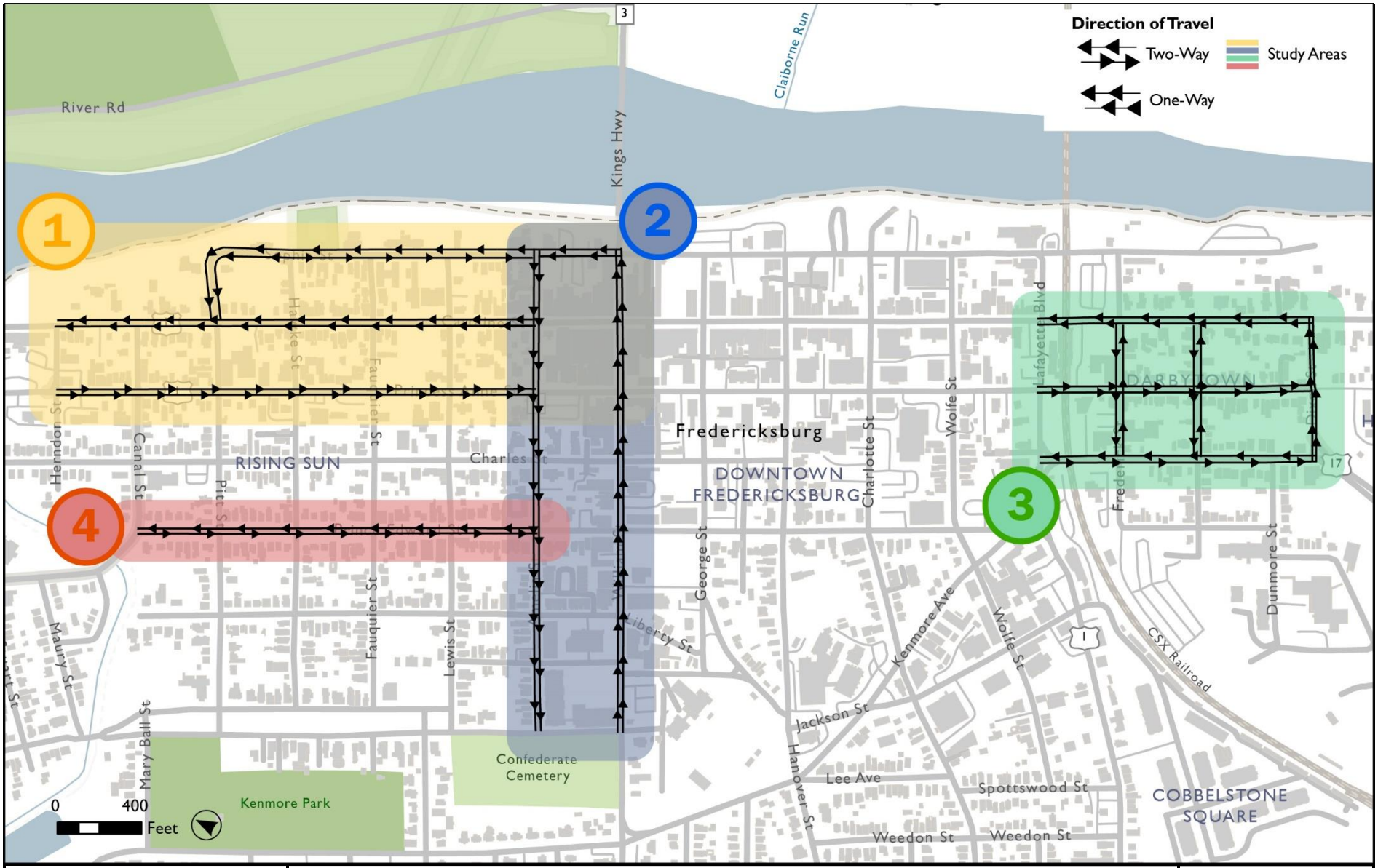
## 1.1 PROJECT SCOPE

Based on the scope of services, the following steps were taken to determine the existing conditions in the study area, analyze alternative circulation patterns, and provide findings and recommendations:

1. Data Collection – Peak hour (7-9 AM, 11-1 PM, and 5-7 PM) weekday directional turning movement counts performed at 24 intersections on April 23, 2024. 48-hour volume/class/speed tube counts were completed for six street segments in January, February and April in 2024.
2. Traffic Volume Projections – Traffic volumes were projected to future years using an agreed upon growth rate, incorporating approved developments, and accounting for re-routed traffic.
3. Operational Analysis – The existing roadway infrastructure was evaluated to understand the constraints for future improvements. Various roadway configurations and traffic patterns were then evaluated to understand their impact on future conditions.
4. Crash Analysis – Using publicly available crash data from VDOT, Timmons Group reviewed and compiled the relevant data within the study area for the period of 2020-2024.
5. Parking Analysis – Existing parking and loading areas were documented to understand the impact of future roadway configurations.
6. Bicycle & Pedestrian Analysis – Based on existing infrastructure and proposed improvements, additional bicycle and pedestrian improvements were evaluated to improve bicycle and pedestrian access and safety throughout the study area.

7. Conceptual Design – Concept drawings for various alternatives were provided to demonstrate the recommended corridor improvements.

8. Community Engagement – Materials were prepared for two Fredericksburg City Council meetings and two citizen information meetings to share the initial analysis results and the final recommendations. Feedback from the public was gathered through surveys.

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# Study Area
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Figure
1

# 2 EXISTING CONDITIONS

## 2.1 STUDY CORRIDORS

There were seven corridors that were part of this study. Princess Anne Street, Caroline Street, William Street, and Amelia Street were primarily studied for one-way to two-way conversion. Prince Edward Street was studied for traffic calming. Sophia Street and Charles Street were studied as incidental to analysis on Princess Anne Street and Caroline Street. Table 1 shows the functional classification from VDOT, the posted speed limit, the average daily traffic from VDOT in vehicles per day (VPD), the number of lanes and travel direction, and other notes about the use of the street.

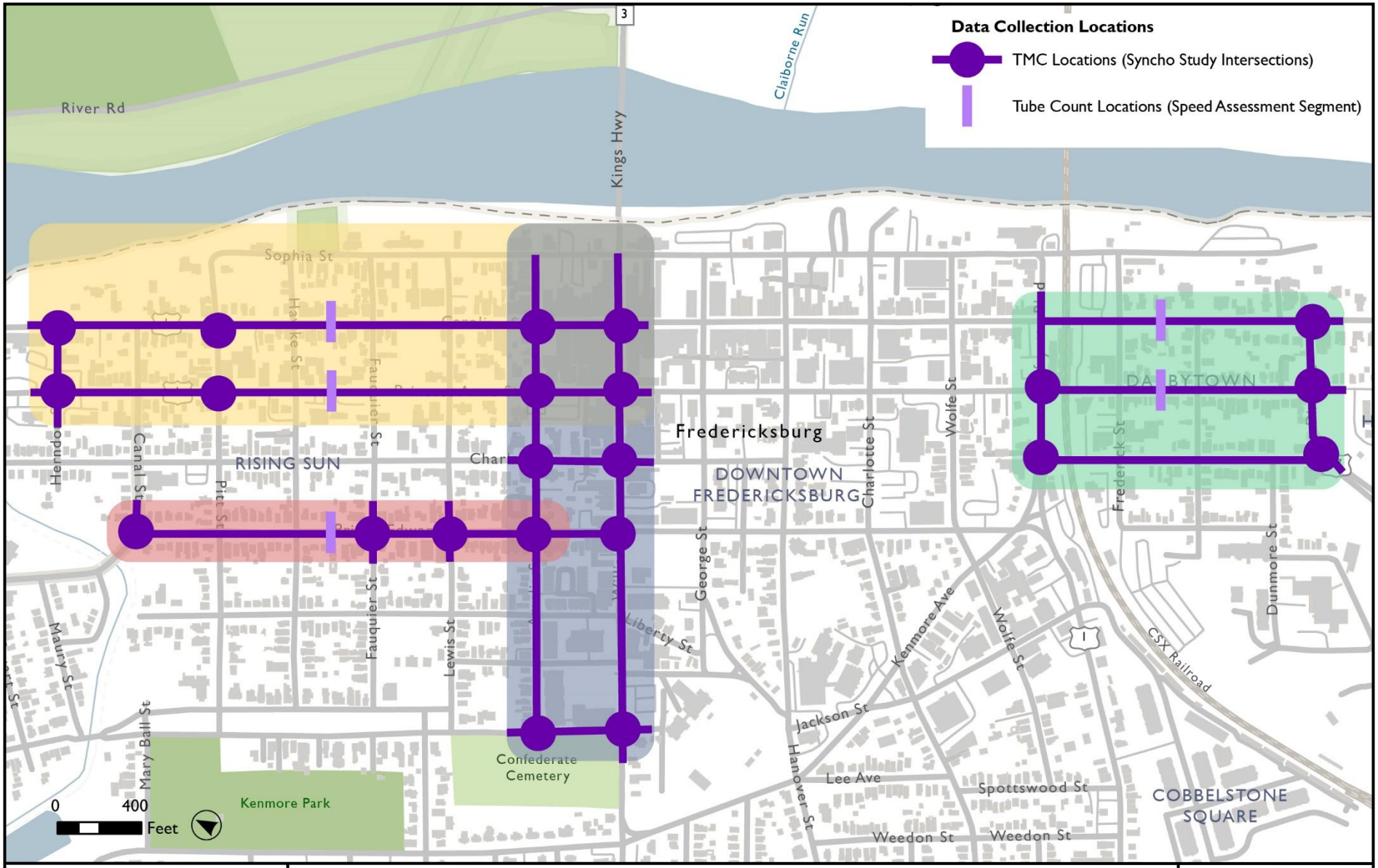
**Table 1 – Study Corridor Traffic Data**

| Street Name | Functional Classification | Speed Limit | Average Daily Traffic (ADT) | Lanes & Travel Direction | Other Notes |
|---|---|---|---|---|---|
| **Princess Anne Street** | Minor Arterial | 25 | North segment: 6,300 VPD<br>South segment: 3,200 VPD | Two lanes, one-way southbound | Street parking on both sides |
| **Caroline Street** | Minor Arterial | 20-25 | North segment: 5,100 VPD<br>South segment: 2,100 VPD | Two lanes, one-way northbound | Street parking on both sides |
| **William Street** | Minor Arterial | 20-25 | 5,400 VPD | Two lanes, one-way eastbound | Street parking on both sides, sharrows |
| **Amelia Street** | Minor Arterial | 25 | 4,400 VPD | Two lanes, one-way westbound | Street parking on both sides, sharrows |
| **Prince Edward Street** | Major Collector | 25 | 1,700 VPD | Two lanes, two-way north and south | Street parking on both sides, sharrows |
| **Sophia Street** | Local | 25 | 2,000 VPD | Mostly one lane, one-way northbound | Street parking on west side |
| **Charles Street** | Major Collector | 25 | 5,300 VPD | Two lanes, two-way north and south | Street parking on both sides |

## 2.2 DATA COLLECTION

### *2.2.1 48-Hour Volume/Class/Speed Tube Counts*

Traffic count tubes collected data for a 48-hour period at five locations during the weeks of January 29, February 13, and April 22. The collected data includes vehicle classification, direction, speed and volume. See Figure 2 for a map of these locations.

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# Data Collection Locations
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Figure
2

### *2.2.2 Peak-Hour Turning Movement Counts*

Directional turning movement traffic count data was collected at 23 locations during the morning (7:00 – 9:00 AM), Mid-day (11:00 AM – 1:00 PM) and evening (5:00 – 7:00 PM) peak hours in January, February and April. The collected data includes vehicle classification, turning movement (through, right, or left), pedestrians and bicycles. See Figure 2 for a map of these locations. The summarized turning movement count data can be found in Appendix A.

## 2.3 INTERSECTION CONTROL

Princess Anne Street and Caroline Street in both the northern and southern sections are uncontrolled, while the side-streets are stop-controlled. William Street and Amelia Street are a mix of signalized and uncontrolled intersections, with signals placed at intersections with other main corridors like Princess Anne Street and Prince Edward Street. Figure 3 shows the existing intersection control for all study intersections.

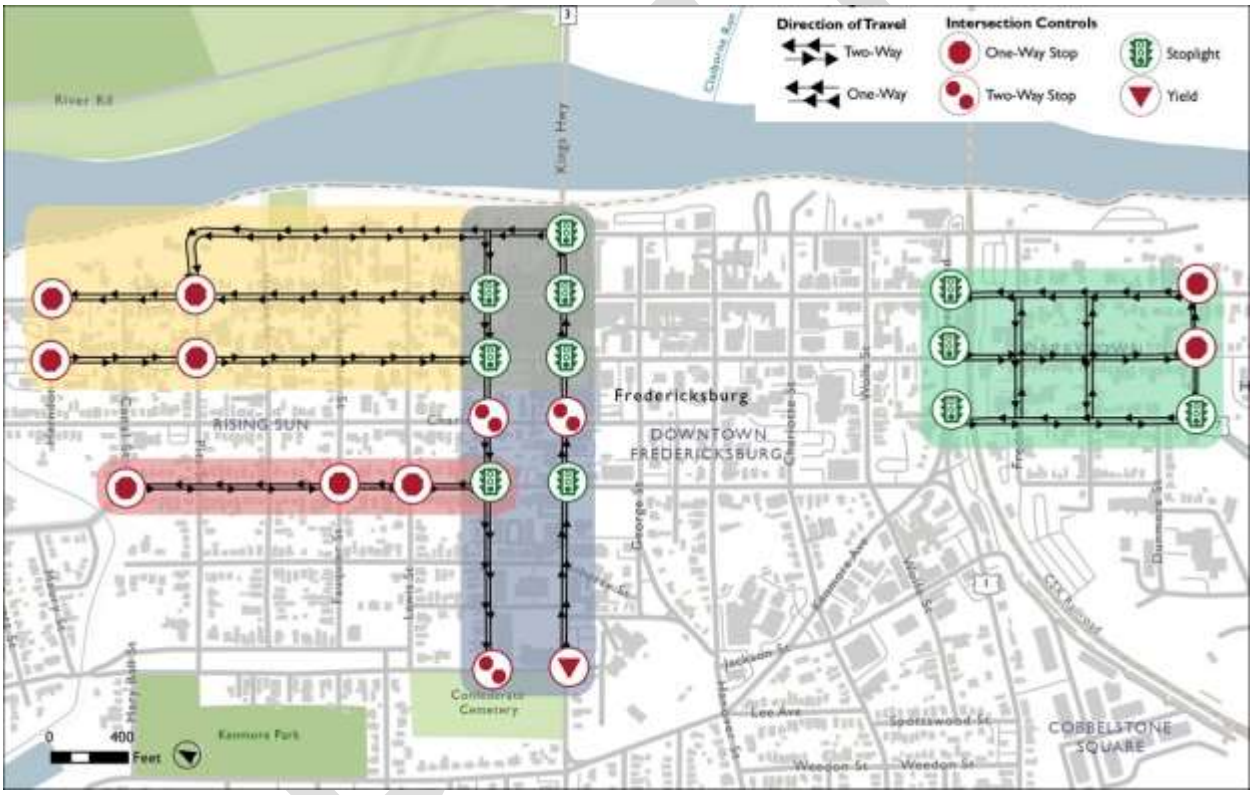



**Figure 3 – Existing Intersection Control at Study Intersections**

## 2.4 Street Cross-Section

Most of the streets in the study area are two-lane one-way roads with parking, curb and gutter, and sidewalks on both sides of the street. The travel lanes were typically 11 to 12 feet wide, the parking lanes were typically seven to eight feet wide, and the sidewalks were typically five to eight feet wide. Figure 4 shows this typical cross-section.

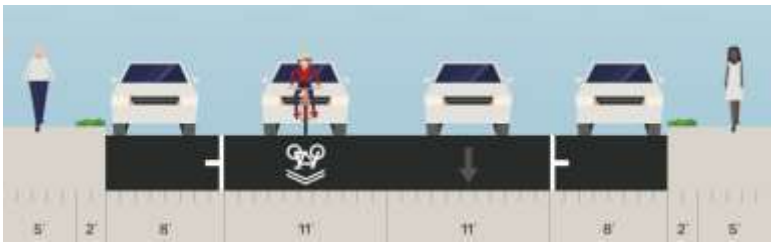



**Figure 4 – Typical Existing Cross-Section**

## 2.5 Bicycle and Pedestrian Infrastructure

Sidewalks and other pedestrian infrastructure are present throughout downtown Fredericksburg. Along the study corridors, there are sidewalks on both sides of the street, often with a grass or tree buffer as well. The sidewalk width is about five feet in most places.

Crosswalks are present on all legs at most signals and at several unsignalized intersections, too. To help reduce the exposure of a pedestrian in the road and increase pedestrian visibility at the corners, some bump-outs and chokers have been installed, particularly around the recently constructed William Square. See Figure 5 for a map of these locations.

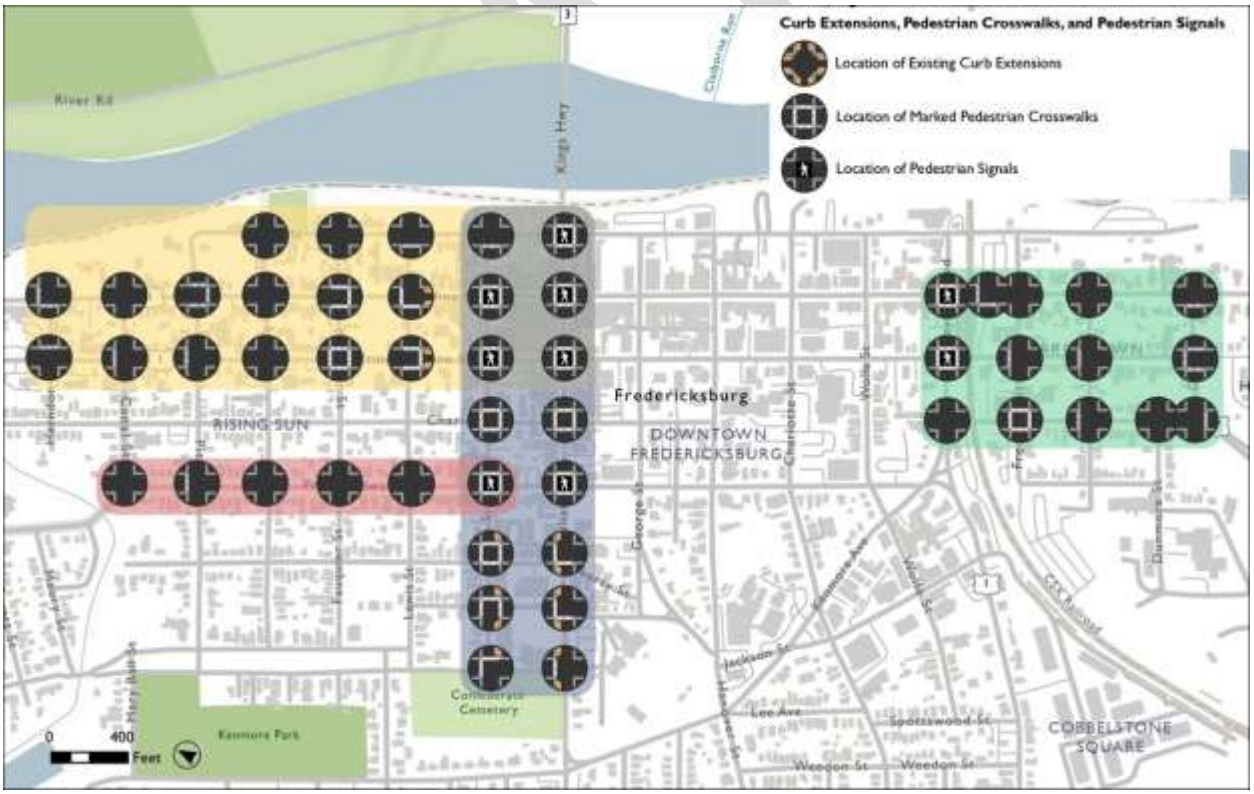



**Figure 5 – Existing Pedestrian Infrastructure at Intersections**

At the signalized intersections, there are pedestrian signal heads wherever there are crosswalks present. Some signals have pedestrian push buttons to actuate the pedestrian phase. Other signals, notably most of the signals along William Street, do not have push buttons, but are programmed to call the pedestrian phase automatically with each cycle, which is called pedestrian recall. The intersection of William Street and Sophia Street has audible pedestrian signals (APS) with buttons on three of the four corners. APS provides auditory, visual, and vibrotactile information about the walk and flashing don't walk intervals to pedestrians who are blind or low-vision.

The intersection of Amelia Street and Princess Anne Street has a leading pedestrian interval (LPI) when crossing Princess Anne Street, which gives pedestrians a 4-second "head-start" into the crosswalk while vehicle traffic is held at a red indication. The pushbutton at this intersection also actuates a dynamic "Turning Vehicles Yield to Pedestrians in Crosswalk" (R10-15) sign that reminds turning vehicles to yield to pedestrians in the crosswalk, shown in Figure 6.

**Figure 6 – Warning Sign at Amelia Street and Princess Anne Street**

Bicycle infrastructure is present in the form of shared-lane markings (also known as "sharrows") on Prince Edward Street, Amelia Street, and William Street, and nearby trails, like the Rappahannock River Trail. Several other trails around downtown are in the design or construction stages by both VDOT and the City, like the Virginia Central Railway (VCR) Trail Downtown Connector and the Dixon Park Connector Trail. See Figure 7 for a map of these trails.

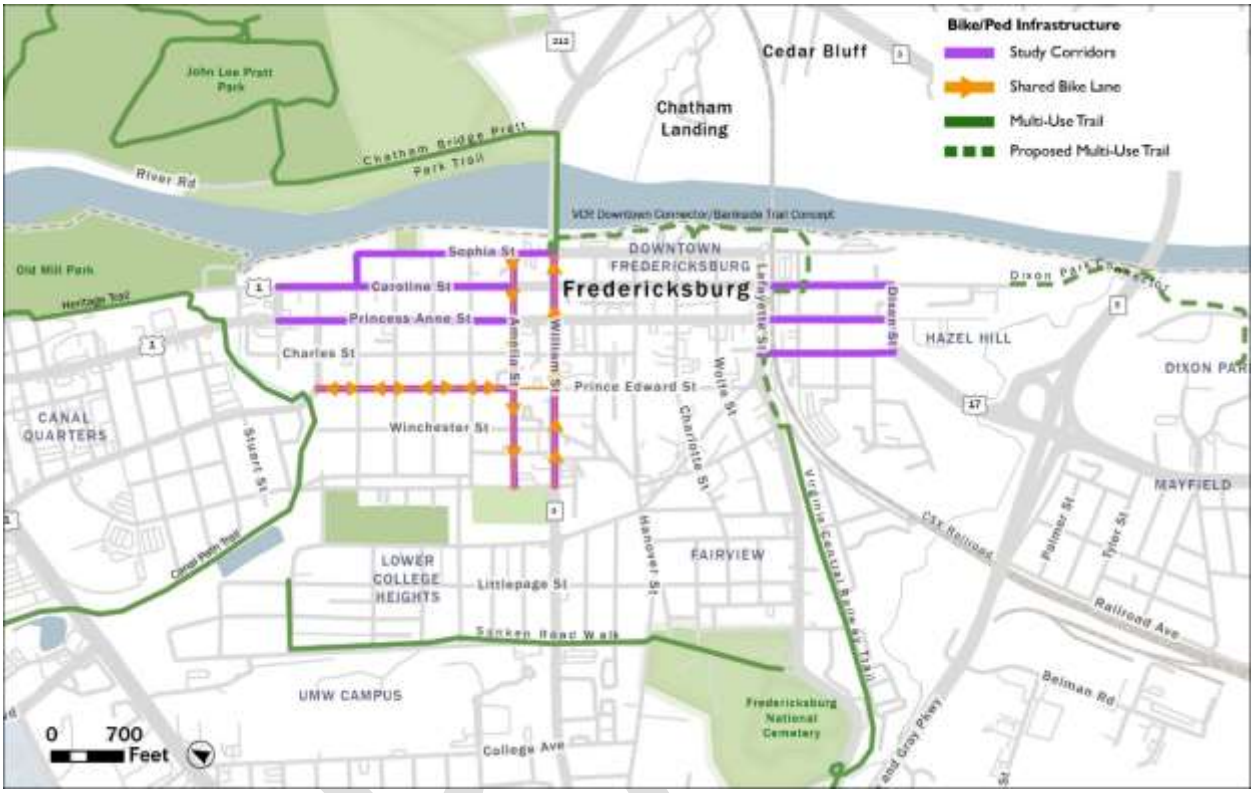



**Figure 7 – Existing & Planned Bicycle Infrastructure**

# 3 STUDY SCENARIOS

Using the data collected, multiple scenarios were developed to analyze the two-way conversions in a future build year of 2034. Traffic volumes were estimated based on a consistent annual growth rate applied over 10 years, the estimated volumes from planned development, and adjustments based on traffic re-routing due to the change in travel directions.

## 3.1 PLANNED DEVELOPMENT

William Square is a commercial development bounded by Washington Avenue, William Street, Douglas Street, and Amelia Street, containing the Amelia House and Publisher Hotel. It was completed in 2024 and outlined in a yellow dash in Figure 8.

The green square in Figure 8 is a development called William Plaza that is expected to be fully occupied by the year 2034. The estimated trips associated with William Plaza and their distribution throughout the study area can be found in Appendix B.


**Figure 8 – William Square and William Plaza Development Location**

## 3.2 NO-BUILD 2034

To estimate future traffic volumes, a 1.0% annual growth rate was applied to the existing 2024 traffic volumes for ten years. Then the William Square Trips were added to produce the 2034 No-Build traffic volumes. These volumes can be found for each sub-area in Appendix C.

## 3.3 ONE-WAY TO TWO-WAY CONVERSION ALTERNATIVE

For each sub-area in this scenario, each street is converted from one-way to two-way travel. The typical cross-section for this conversion can be seen in Figure 9. The two-way traffic volumes for 2034 were estimated by adding the 2034 No-Build traffic volumes and the re-routed traffic volumes for each scenario. These volumes, along with the re-routed traffic assumptions, can be found in Appendix D.

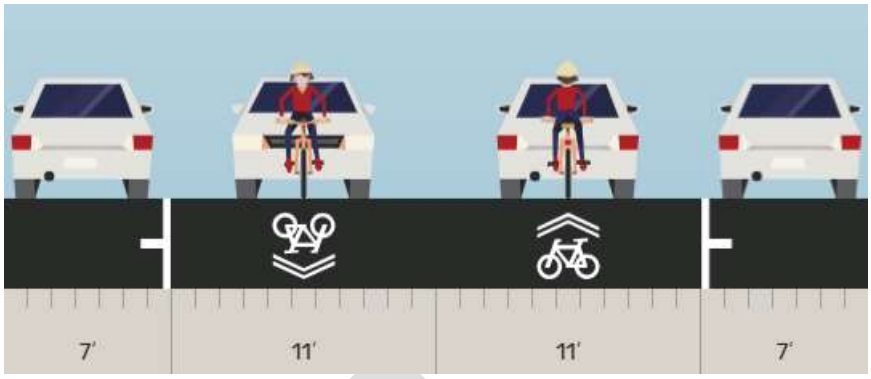



**Figure 9 – Typical Two-Way Cross-Section**

### *3.3.1 North Princess Anne Street / Caroline Street*

For Princess Anne Street and Caroline Street from Herndon Street to Amelia Street, one alternative was analyzed where each street is converted from one-way to two-way. Figure 10 shows the proposed travel directions for this alternative. Note that the adjustments for the conversion of Amelia Street are also incorporated in these values.

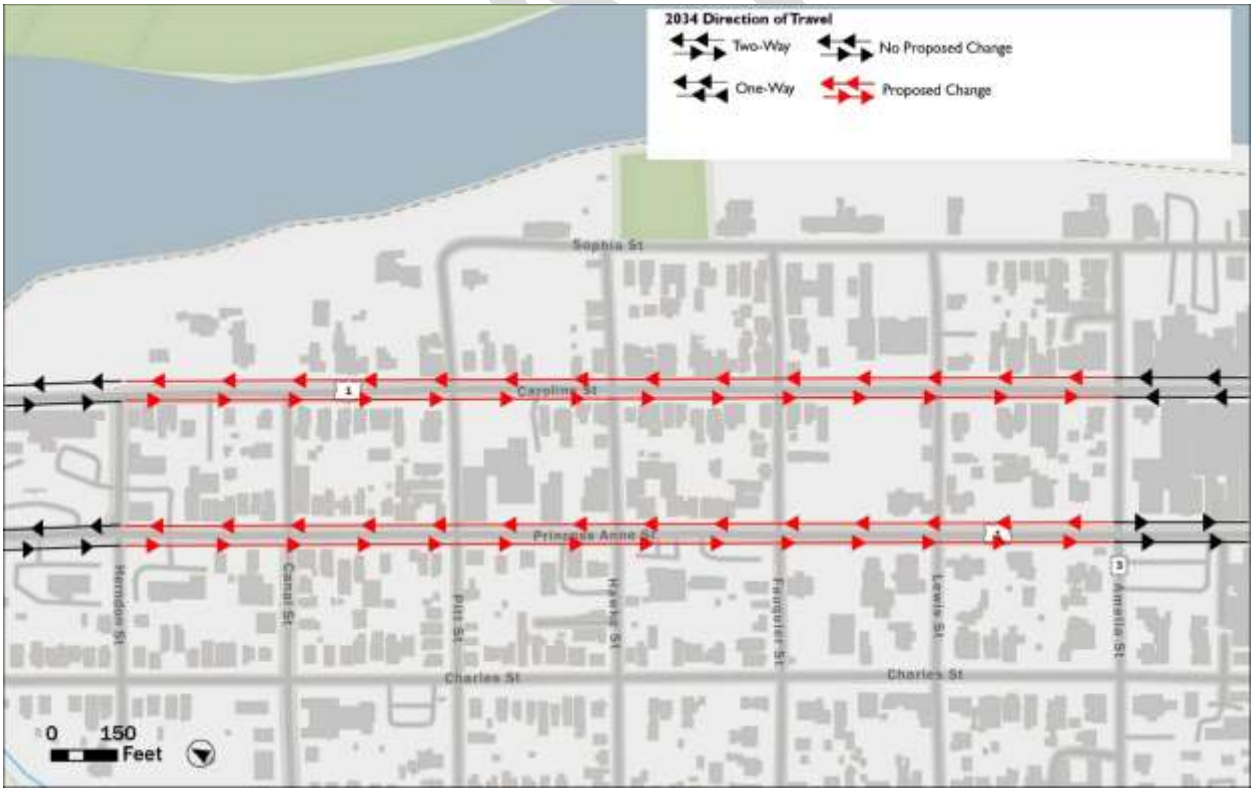



**Figure 10 – North Princess Anne / Caroline Two-Way Conversion Travel Directions**

### *3.3.2 William Street / Amelia Street – Alternatives 1 and 2*

For William Street and Amelia Street from Washington Avenue to Sophia Street, two alternatives were analyzed where each street is fully converted from one-way to two-way. Figure 11 shows the proposed travel directions for both alternatives. Note that the adjustments for the conversion of Princess Anne Street and Caroline Street are also incorporated in these values.

Alternative 1 keeps the existing signals on William Street and Amelia Street, with necessary modifications to accommodate the two-way travel conversion.

Alternative 2 converts the six signals (Amelia/Caroline, Amelia/Princess Anne, Amelia/Prince Edward, William/Caroline, William/Princess Anne, and William/Prince Edward) to all-way stop controlled intersections.

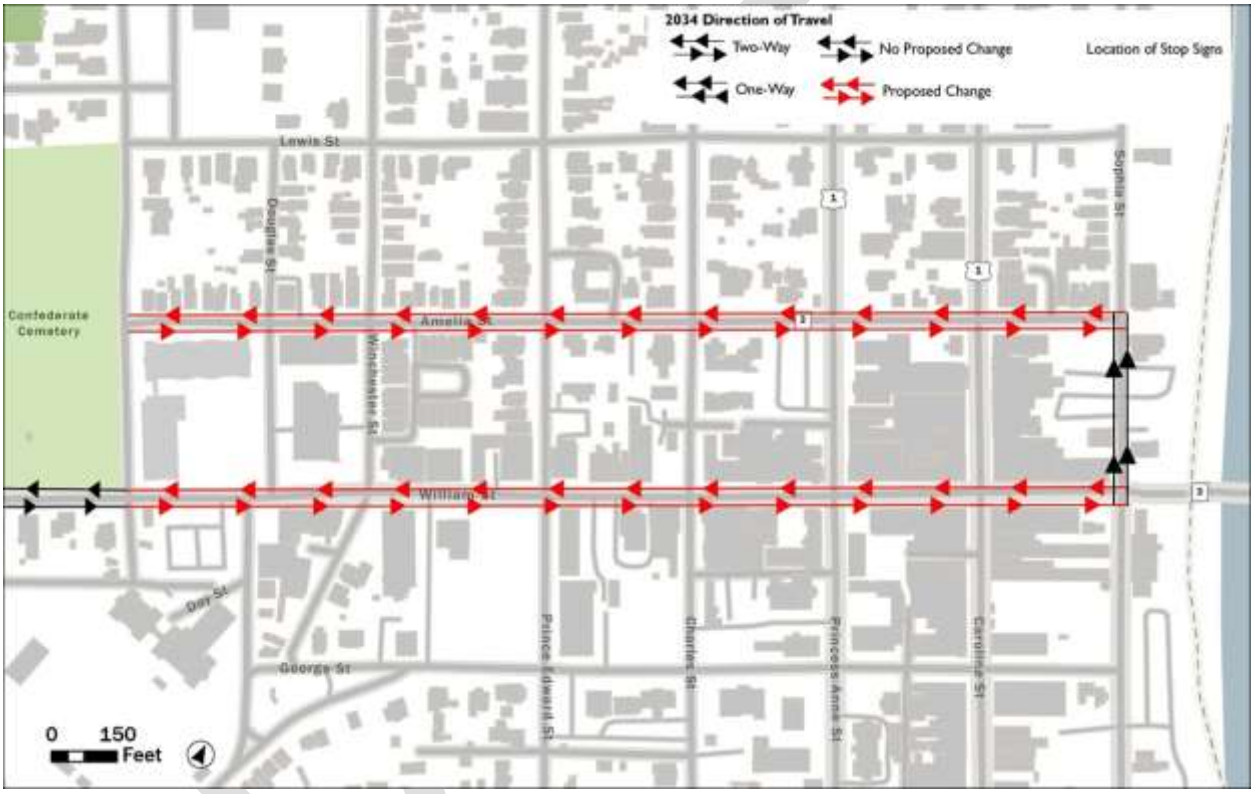



**Figure 11 – William / Amelia Two-Way Conversion Travel Directions**

### *3.3.3 South Princess Anne Street / Caroline Street – Alternatives 1, 2, and 3*

For Princess Anne Street, Caroline Street, and Charles Street from Lafayette Boulevard to Dixon Street, three alternatives were analyzed where Princess Anne Street and Caroline Street are either fully converted or partially converted from one-way to two-way.

Alternative 1 fully converts Princess Anne Street and Caroline Street from one-way to two-way from Lafayette Boulevard to Dixon Street. Figure 12 shows the proposed travel directions for Alternative 1.

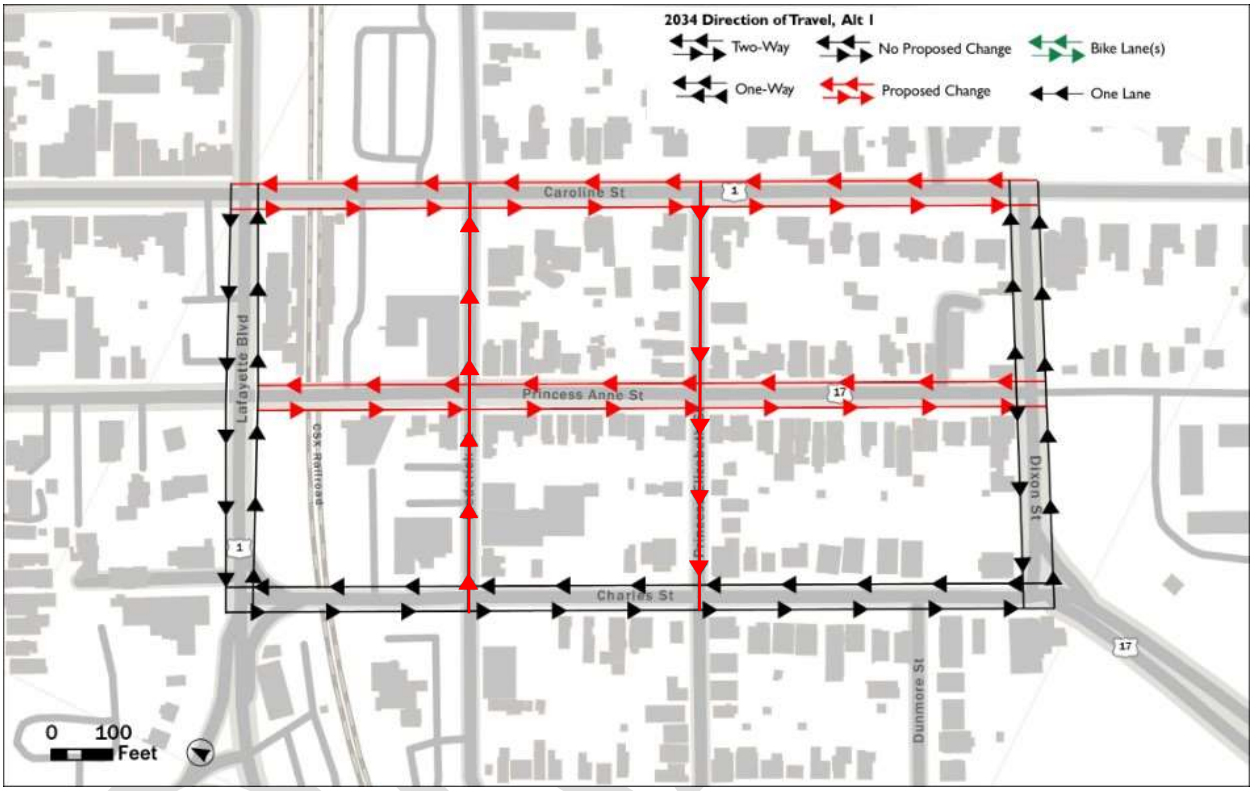



**Figure 12 – South Princess Anne / Caroline Two-Way Conversion Travel Directions, Alternative 1**

Alternative 2 converts portions of Princess Anne Street and Caroline Street from one-way to two-way from Frederick Street to Dixon Street. From Lafayette Boulevard to Frederick Street, Princess Anne Street and Caroline Street remain one-way. Figure 13 shows the proposed travel directions for Alternative 2.

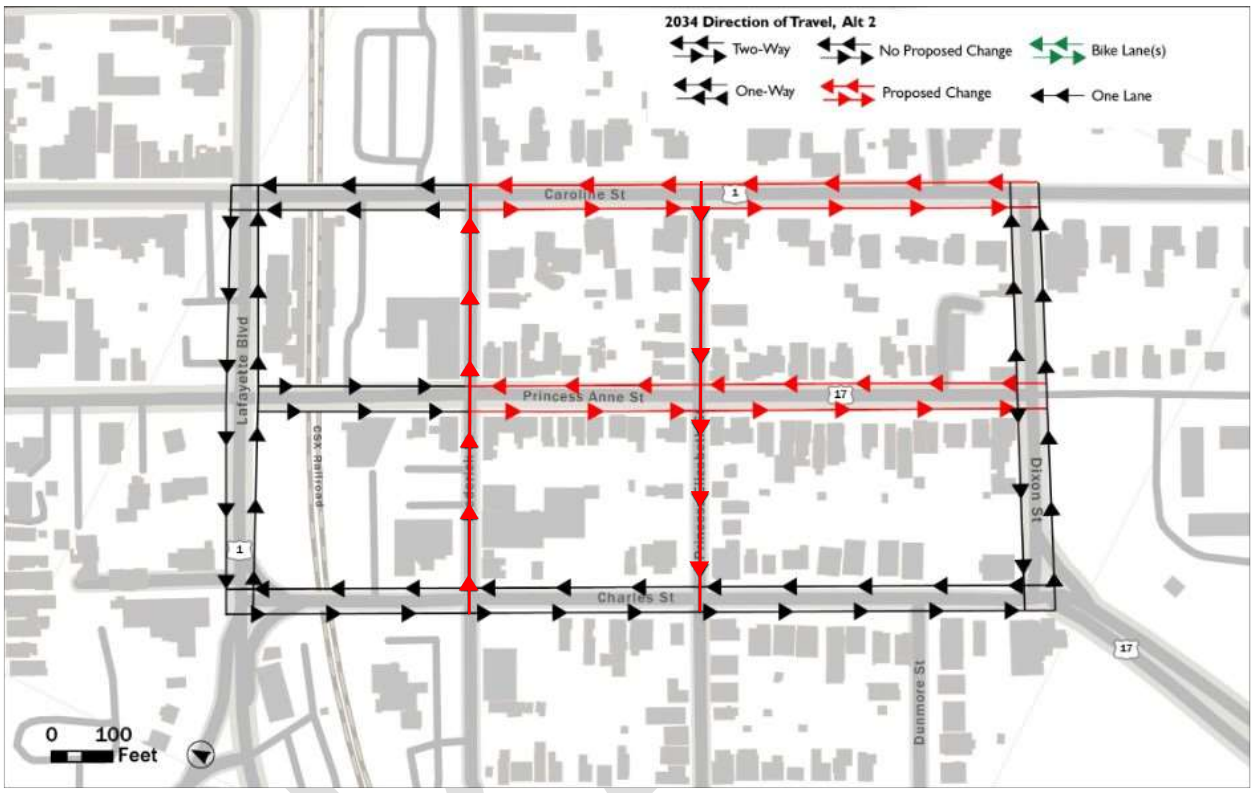



**Figure 13 – South Princess Anne / Caroline Two-Way Conversion Travel Directions, Alternative 2**

Alternative 3 converts Princess Anne Street and Caroline Street from one-way to two-way from Frederick Street to Dixon Street. From Lafayette Boulevard to Frederick Street, Caroline Street remains one-way, and Princess Anne Street is converted to two-way, allowing access to the train station for northbound Princess Anne Street. Figure 14 shows the proposed travel directions for Alternative 3.

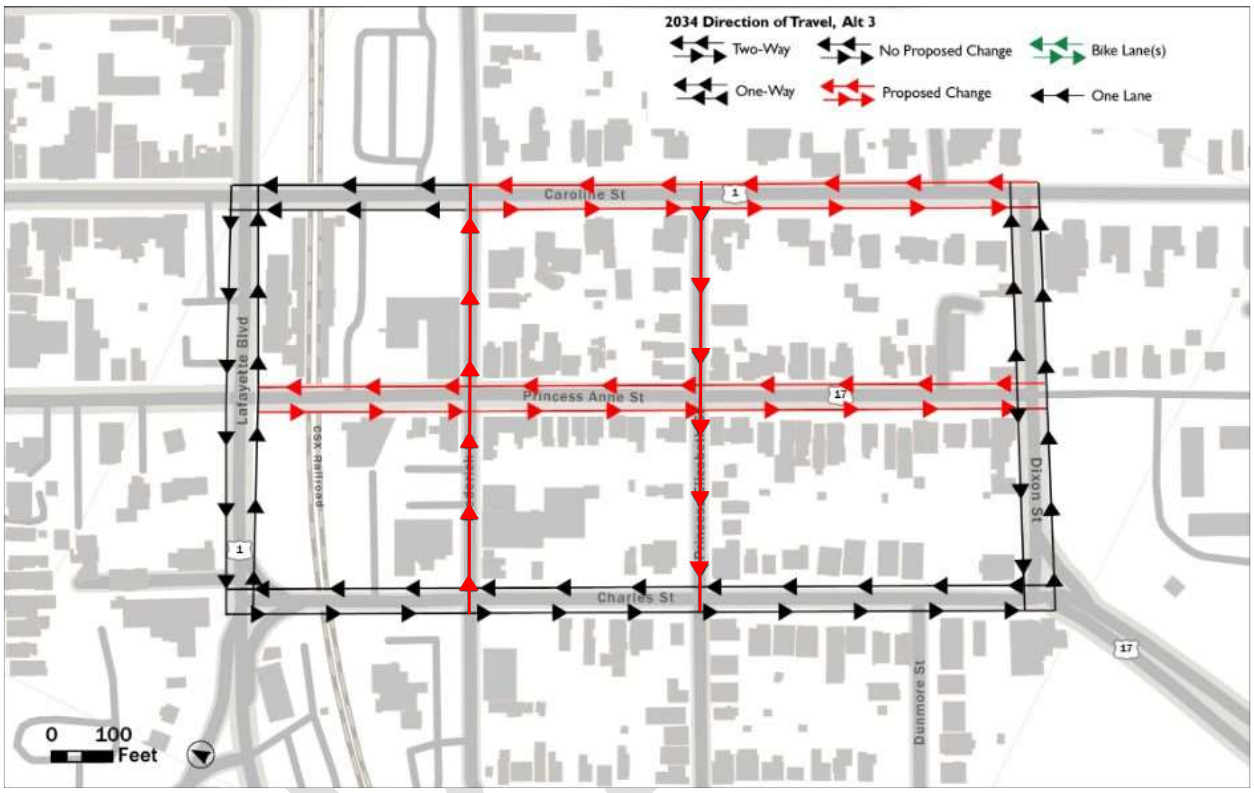



**Figure 14 – South Princess Anne / Caroline Two-Way Conversion Travel Directions, Alternative 3**

## 3.4 ROADWAY RECONFIGURATION ALTERNATIVE

For each sub-area in this scenario, each street maintains one-way travel and is reduced from two vehicle lanes to one vehicle lane. This would allow the excess space to be converted into a buffered bicycle lane. The typical cross-section for this conversion can be seen in Figure 15. The roadway reconfiguration traffic volumes for 2034 used the 2034 No-Build traffic volumes as there was no assumption of re-routing traffic. These volumes can be found in Appendix C.

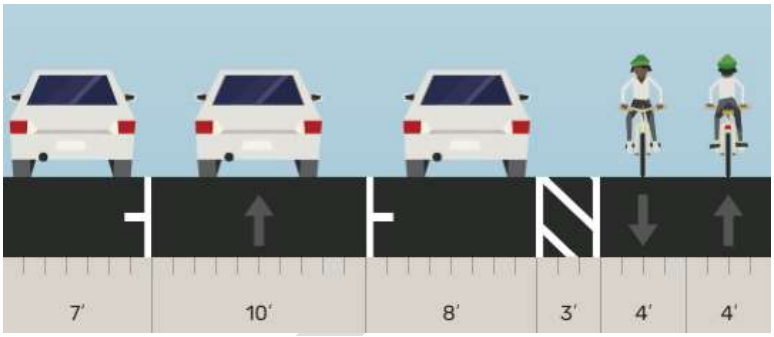



**Figure 15 – Typical Roadway Reconfiguration Cross-Section**

## 3.5 BICYCLE BOULEVARDS

In the Federal Highway Administration's *Small Town and Rural Multimodal Networks* (2016), bicycle boulevards are described as "a low-stress shared roadway bicycle facility, designed to offer priority for bicyclists operating within a roadway shared with motor vehicle traffic." Through appropriate pavement markings, signs, and traffic calming tools, local roadways can be used to connect other bicycle facilities to create a comprehensive bicycle network, reduce serious injury or fatal crashes through speed reduction, and increase the comfort level bicyclists of all ages and abilities.

Bicycle boulevards utilize shared lane markings (or "sharrows") to indicate the shared operations of a roadway. Wayfinding signs direct bicyclists to other connecting bicycle facilities within the network or other key destinations in the area. Bicycle boulevards typically combine vehicular speed management and vehicular volume management strategies. Speed management may include traffic-calming elements, such as curb extensions, median islands and raised crosswalks. Volume management may include diverters and partial closures to restrict through traffic along the bicycle boulevard.

In Virginia, there are two key examples of bicycle boulevards that have been implemented. The City of Richmond developed Floyd Avenue as a "bike-walk boulevard". It passes through three major neighborhoods from I-195 towards downtown. It includes traffic calming elements such as curb extensions and mini roundabouts ("neighborhood circles") at key intersections and uses green pavement-backed sharrows to indicate the shared operations of the street. (As of the 11th editions of the Manual on Uniform Traffic Control, green pavement-backed sharrows are no longer permitted.) The city also reduced the speed limit to 20 mph. This project was completed in 2015.

Arlington County identified parallel routes north and south of Columbia Pike, a key transportation corridor, to develop into bicycle boulevards. These parallel routes were identified through the County's Master Transportation Plan and the Columbia Pike Multimodal Street Improvements study. The County has been making improvements to 8th St and 9th St north of Columbia Pike and 11th St and 12th St south of Columbia Pike since 2011, including installing streetlighting, street trees, and street furniture to increase bicyclist comfort, adding wayfinding signs to improve connectivity, and identifying challenges for future improvements.

As part of this study, Prince Edward was identified by city staff as a potential bicycle boulevard. Traffic volumes and speeds are relatively low, and it connects major downtown destinations to the south and the Rappahannock Heritage River Trail to the north.

# 4 TRAFFIC ANALYSIS

## 4.1 CAPACITY ANALYSIS

### *4.1.1 Analysis Procedure*

Capacity analyses allow traffic engineers to determine the impact of traffic on the surrounding roadway network. The Transportation Research Board's (TRB) Highway Capacity Manual (HCM) methodologies govern how the capacity analyses are conducted and how the results are interpreted. There are six letter grades of Levels of Service (LOS) from A to F, with LOS A representing lower delays with excess capacity available and LOS F representing higher delays without excess capacity.

For both unsignalized and signalized intersections, LOS is defined in terms of delay, a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Table 2 summarizes the delay associated with each LOS category.

**Table 2 – Unsignalized and Signalized Intersection Level of Service Criteria**

| Signalized Intersections | | Unsignalized Intersections | |
|---|---|---|---|
| **Level of Service** | **Average Delay per Vehicle (sec/veh)** | **Level of Service** | **Average Delay per Vehicle (sec/veh)** |
| A | ≤ 10 | A | ≤ 10 |
| B | > 10 to ≤ 20 | B | > 10 to ≤ 15 |
| C | > 20 to ≤ 35 | C | > 15 to ≤ 25 |
| D | > 35 to ≤ 55 | D | > 25 to ≤ 35 |
| E | > 55 to ≤ 80 | E | > 35 to ≤ 50 |
| F | > 80 | F | > 50 |

*Source: Highway Capacity Manual, Sixth Edition*

In a multimodal system, LOS D is typically the target Level of Service for an overall intersection, while LOS D or E is acceptable for an individual traffic movement, e.g. northbound lefts. A higher LOS of E or F may be acceptable in certain circumstances where heavy traffic is expected and/or other travel modes are prioritized but generally is not considered acceptable delay for vehicles. A lower LOS of A, B or C means there is excess capacity which may contribute to speeding.

Capacity analyses were performed to assess operational conditions for the Existing (2024) scenario, the No-Build (2034) scenario, and each Build scenario. The study intersections were analyzed using SYNCHRO software per VDOT Traffic Operations and Safety Analysis Manual (TOSAM) requirements for signalized and stop-controlled intersections. Capacity analysis was performed with the following assumptions:

- Level terrain;
- No parking activity or bus stops;
- Existing peak hour factor as determined by the traffic counts (by intersection) for existing scenario;
- The higher of the existing peak hour factor (0.94 for AM and 0.93 for PM) as determined by traffic counts or a peak hour factor of 0.92 for future scenarios; and
- Heavy vehicle percentage as determined by the traffic counts (by movement).
- Reports used included HCM 2000 (Signalized and Unsignalized) and HCM 6th (TWSC and AWSC)

### *4.1.2 2024 Existing Analysis Results*

Figure 16 summarizes the 2024 Existing intersection LOS based on existing intersection geometry, signal timings and peak hour traffic volumes.

All intersections within the study area operate at LOS C or better, which indicates there is vehicular capacity available. The stop-controlled intersections along Princess Anne Street, Caroline Street, and Prince Edward Street operate at LOS A. The signalized intersections along William Street and Amelia Street operate at LOS B or C.

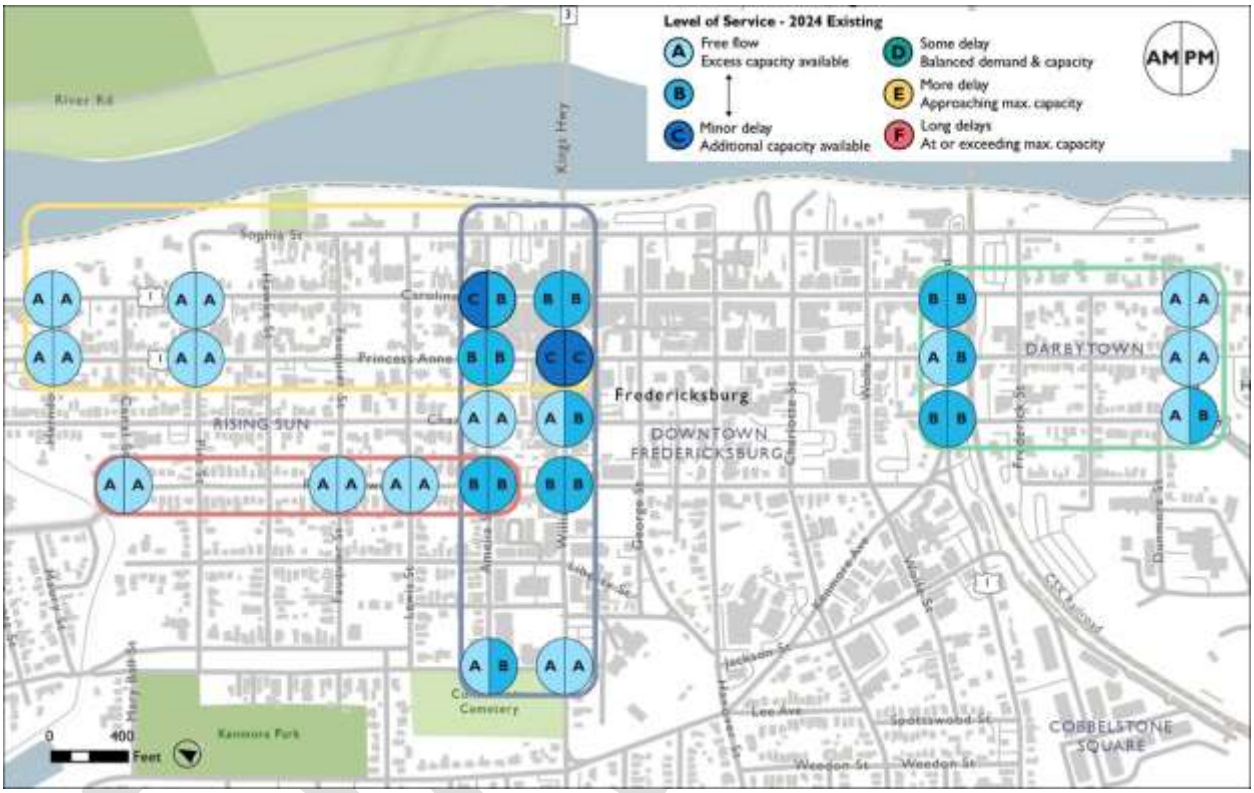



**Figure 16 – 2024 Existing LOS**

### *4.1.3 2034 No-Build Analysis Results*

Figure 17 summarizes the 2034 No-Build scenario intersection LOS based on existing intersection geometry, optimized signal timings, and future peak hour traffic volumes.

All intersections within the study area still operate at LOS C or better. The stop-controlled intersections along Princess Anne Street, Caroline Street, and Prince Edward Street still operate at LOS A. The signalized intersections along William Street and Amelia Street operate at LOS A or B, indicating a decrease in delay compared to existing conditions. This is partly due to optimizing the signal timings at those signals for the new volumes.

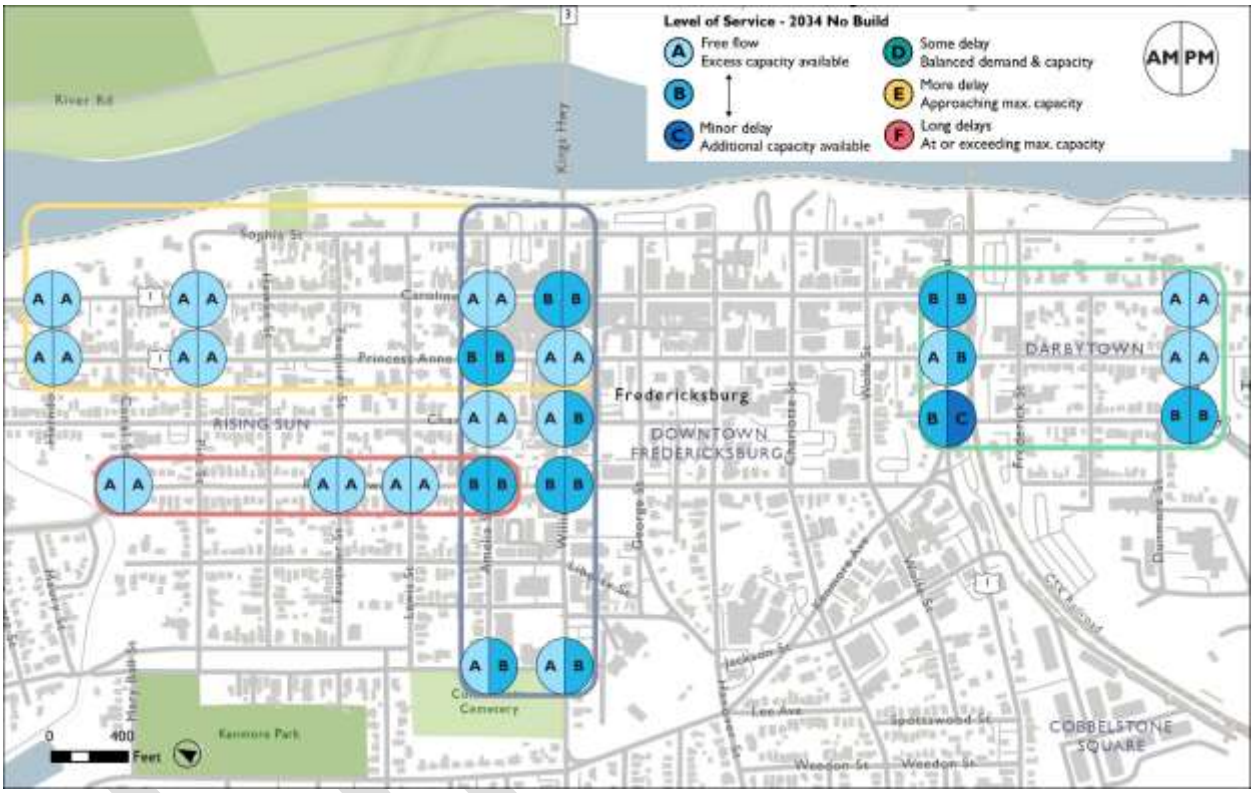



**Figure 17 – 2034 No-Build LOS**

### *4.1.4 One-way to Two-way Conversion Build 2034 Analysis Results*

#### 4.1.4.1 North Princess Anne Street / Caroline Street

All the study intersections in this sub-area remain at LOS A because they are unsignalized and overall have low traffic volumes. Table 3 summarizes the intersection LOS based on existing intersection geometry and future peak hour traffic volumes.

**Table 3 – North Princess Anne / Caroline Two-Way Conversion (2034) Capacity Analysis**

| Intersection | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Existing 2024 | No Build 2034 | Two-Way Build 2034 | Existing 2024 | No Build 2034 | Two-Way Build 2034 |
| **Princess Anne & Herndon** | A | A | A | A | A | A |
| **Princess Anne & Pitt** | A | A | A | A | A | A |
| **Caroline & Herndon** | A | A | A | A | A | A |
| **Caroline & Pitt** | A | A | A | A | A | A |

#### 4.1.4.2 William Street / Amelia Street – Alternatives 1 and 2

Across both alternatives, all the study intersections operate at LOS C or better. In Alternative 1, most intersections operate similarly compared to the No-Build scenario, with only two intersections showing increased delay.

In the AM peak hour for Alternative 2, some intersections show less delay as all-way stops than as signals. In the PM peak hour, the higher volume intersections on William Street at Princess Anne Street and Caroline Street show an increase in delay compared to the No-Build scenario.

Table 4 summarizes Alternative 1 intersection LOS and Table 5 summarizes Alternative 2 intersection LOS.

**Table 4 – William / Amelia Two-Way Conversion (2034) Alt. 1 Capacity Analysis**

| Intersection | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Existing 2024 | No Build 2034 | Two-Way Alt 1 Build 2034 | Existing 2024 | No Build 2034 | Two-Way Alt 1 Build 2034 |
| **Amelia & Caroline** | C | A | B | B | A | B |
| **Amelia & Princess Anne** | B | B | B | B | B | B |
| **Amelia & Charles** | A | A | A | A | A | A |
| **Amelia & Prince Edward** | B | B | B | B | B | B |
| **Amelia & Washington** | A | A | B | B | B | B |
| **William & Washington** | A | A | A | A | B | A |
| **William & Prince Edward** | B | B | B | B | B | B |
| **William & Charles** | A | A | A | B | B | B |
| **William & Princess Anne** | C | A | A | C | A | A |
| **William & Caroline** | B | B | B | B | B | B |

**Table 5 – William / Amelia Two-Way Conversion (2034) Alt. 2 Capacity Analysis**

| Intersection | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Existing 2024 | No Build 2034 | Two-Way Alt 2 Build 2034 | Existing 2024 | No Build 2034 | Two-Way Alt 2 Build 2034 |
| **Amelia & Caroline** | C | A | A | B | A | B |
| **Amelia & Princess Anne** | B | B | A | B | B | B |
| **Amelia & Charles** | A | A | A | A | A | A |
| **Amelia & Prince Edward** | B | B | A | B | B | A |
| **Amelia & Washington** | A | A | A | B | B | A |
| **William & Washington** | A | A | A | A | B | A |
| **William & Prince Edward** | B | B | A | B | B | B |
| **William & Charles** | A | A | A | B | B | B |
| **William & Princess Anne** | C | A | A | C | A | C |
| **William & Caroline** | B | B | A | B | B | C |

#### 4.1.4.3 South Princess Anne Street / Caroline Street – Alternatives 1, 2, and 3

Across all three alternatives, the study intersections operate at LOS C or better. In the PM peak hour for Alternative 1, the increase in delay at Princess Anne Street and Lafayette Boulevard is largely due to adding the new northbound approach to the signal. The decrease in delay at Caroline Street and Lafayette Boulevard is likely due to the rerouting assumptions moving some northbound traffic from Caroline Street to Princess Anne Street.

Alternatives 2 and 3 show the same intersection LOS, with little change from the No-Build scenario and the only difference being access to the train station on Princess Anne Street.

Table 6 summarizes Alternative 1 intersection LOS, Table 7 summarizes Alternative 2 intersection LOS, and Table 8 summarizes Alternative 3 intersection LOS.

**Table 6 – South Princess Anne / Caroline Two-Way Conversion (2034) Alt. 1 Capacity Analysis**

| Intersection | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Existing 2024 | No Build 2034 | Two-Way Alt 1 Build 2034 | Existing 2024 | No Build 2034 | Two-Way Alt 1 Build 2034 |
| **Lafayette & Charles** | B | B | B | B | C | C |
| **Lafayette & Princess Anne** | A | A | B | B | B | C |
| **Lafayette & Caroline** | B | B | A | B | B | A |
| **Dixon & Charles** | A | B | A | B | B | B |
| **Dixon & Princess Anne** | A | A | A | A | A | A |
| **Dixon & Caroline** | A | A | B | A | A | B |

**Table 7 – South Princess Anne / Caroline Two-Way Conversion (2034) Alt. 2 Capacity Analysis**

| Intersection | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Existing 2024 | No Build 2034 | Two-Way Alt 2 Build 2034 | Existing 2024 | No Build 2034 | Two-Way Alt 2 Build 2034 |
| **Lafayette & Charles** | B | B | B | B | C | C |
| **Lafayette & Princess Anne** | A | A | A | B | B | B |
| **Lafayette & Caroline** | B | B | B | B | B | B |
| **Dixon & Charles** | A | B | B | B | B | B |
| **Dixon & Princess Anne** | A | A | A | A | A | A |
| **Dixon & Caroline** | A | A | B | A | A | B |

**Table 8 – South Princess Anne / Caroline Two-Way Conversion (2034) Alt. 3 Capacity Analysis**

| Intersection | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Existing 2024 | No Build 2034 | Two-Way Alt 3 Build 2034 | Existing 2024 | No Build 2034 | Two-Way Alt 3 Build 2034 |
| **Lafayette & Charles** | B | B | B | B | C | C |
| **Lafayette & Princess Anne** | A | A | A | B | B | B |
| **Lafayette & Caroline** | B | B | B | B | B | B |
| **Dixon & Charles** | A | B | B | B | B | B |
| **Dixon & Princess Anne** | A | A | A | A | A | A |
| **Dixon & Caroline** | A | A | B | A | A | B |

### *4.1.5 Roadway Reconfiguration Alternative*

#### 4.1.5.1 North Princess Anne Street / Caroline Street

With only one lane for traffic on Princess Anne Street and Caroline Street, all the study intersections in this sub-area remain at LOS A because they are unsignalized and overall have low traffic volumes. Table 9 summarizes the intersection LOS based on a single one-way lane and future peak hour traffic volumes.

**Table 9 – North Princess Anne / Caroline Roadway Reconfiguration (2034) Capacity Analysis**

| Intersection | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Existing 2024 | No Build 2034 | Roadway Reconfig. Build 2034 | Existing 2024 | No Build 2034 | Roadway Reconfig. Build 2034 |
| **Princess Anne & Herndon** | A | A | A | A | A | A |
| **Princess Anne & Pitt** | A | A | A | A | A | A |
| **Caroline & Herndon** | A | A | A | A | A | A |
| **Caroline & Pitt** | A | A | A | A | A | A |

#### 4.1.5.2 William Street / Amelia Street

All the study intersections operate at LOS C or better with one lane of traffic. Most of the intersections operate with similar or even slightly less delay than the No-Build scenario, with only three that operate with an increase in delay in the PM peak hour. Table 10 summarizes the intersection LOS based on a single one-way lane and future peak hour traffic volumes.

**Table 10 – William / Amelia Roadway Reconfiguration (2034) Capacity Analysis**

| Intersection | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Existing 2024 | No Build 2034 | Roadway Reconfig. Build 2034 | Existing 2024 | No Build 2034 | Roadway Reconfig. Build 2034 |
| **Amelia & Caroline** | C | A | A | B | A | B |
| **Amelia & Princess Anne** | B | B | B | B | B | C |
| **Amelia & Charles** | A | A | A | A | A | A |
| **Amelia & Prince Edward** | B | B | A | B | B | B |
| **Amelia & Washington** | A | A | A | B | B | A |
| **William & Washington** | A | A | A | A | B | A |
| **William & Prince Edward** | B | B | A | B | B | B |
| **William & Charles** | A | A | A | B | B | A |
| **William & Princess Anne** | C | A | A | C | A | B |
| **William & Caroline** | B | B | B | B | B | B |

#### 4.1.5.3 South Princess Anne Street / Caroline Street

These intersections still operate at LOS A or B, except for Lafayette Boulevard at Charles Street in the PM peak hour. Table 11 summarizes the intersection LOS based on a single one-way lane and future peak hour traffic volumes.

**Table 11 – South Princess Anne / Caroline Roadway Reconfiguration (2034) Capacity Analysis**

| Intersection | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Existing 2024 | No Build 2034 | Roadway Reconfig. Build 2034 | Existing 2024 | No Build 2034 | Roadway Reconfig. Build 2034 |
| **Lafayette & Charles** | B | B | B | B | C | C |
| **Lafayette & Princess Anne** | A | A | A | B | B | B |
| **Lafayette & Caroline** | B | B | B | B | B | B |
| **Dixon & Charles** | A | B | A | B | B | B |
| **Dixon & Princess Anne** | A | A | A | A | A | A |
| **Dixon & Caroline** | A | A | A | A | A | B |

## 4.2 Intersection Control Analysis

The Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD) outlines multiple warrants, or conditions, that must be met to justify installing either a signal or an all-way stop at an intersection. The typical warrants considered are based on the crash history or traffic volumes over a 4-hour or 8-hour period. Other factors, such as pedestrian volume, proximity to a school, or user expectation, may be considered if the volume-based warrants are not met. The six signals along William Street and Amelia Street were analyzed to determine if any changes should be made to the intersection control.

Based on the existing and future volumes and the crash history (see next section for the crash analysis), none of the existing signalized intersections meet the recommended signal warrants. Most of them meet the crash history warrant for the all-way stop. Princess Anne Street, due to its higher volume, meets the all-way stop volume warrant for both existing and future volumes at Amelia Street and William Street.

Table 12 summarizes the signal and all-way stop warrant analyses based on existing and future volume and on crash history.

**Table 12 – Intersection Control Analysis Comparison**

| Intersection | Signal Warrants | | | All-Way Stop Volume Warrants | | |
|---|---|---|---|---|---|---|
| | 2024 Volumes | 2034 Volumes | Crash History | 2024 Volumes | 2034 Volumes | Crash History |
| **Amelia & Caroline** | N | N | N | N | N | **Y** |
| **Amelia & Princess Anne** | N | N | N | **Y** | **Y** | **Y** |
| **Amelia & Prince Edward** | N | N | N | N | N | **Y** |
| **William & Prince Edward** | N | N | N | N | N | N |
| **William & Princess Anne** | N | N | N | **Y** | **Y** | **Y** |
| **William & Caroline** | N | N | N | N | **Y** | **Y** |

## 4.3 CRASH ANALYSIS

A crash analysis of the study area was completed using publicly available VDOT crash data for a five-year period from January 2020 to December 2024. There were 328 crashes across the study area during this time. Since this analysis period, there have continued to be safety issues throughout downtown, including pedestrian crashes and trucks becoming stuck in the corner turning from Sophia Street to Pitt Street.

### *4.3.1 Full Area Crash Summary and Conclusions*

Angle (52%) crashes were the top crash type, followed by Sideswipe (14%) and Fixed Object (13%) crashes. There were no fatalities and nine serious injury crashes. See Figure 18 for a heat map of all crashes by location and Table 13 below for a summary of the crash data by type and severity.

Signalized intersections, which typically see higher numbers of crashes, stood out as hotspots throughout the study area, particularly for Angle crashes. The Pedestrian crashes, which only made up 4% of total crashes, made up 22% of the serious injury crashes.

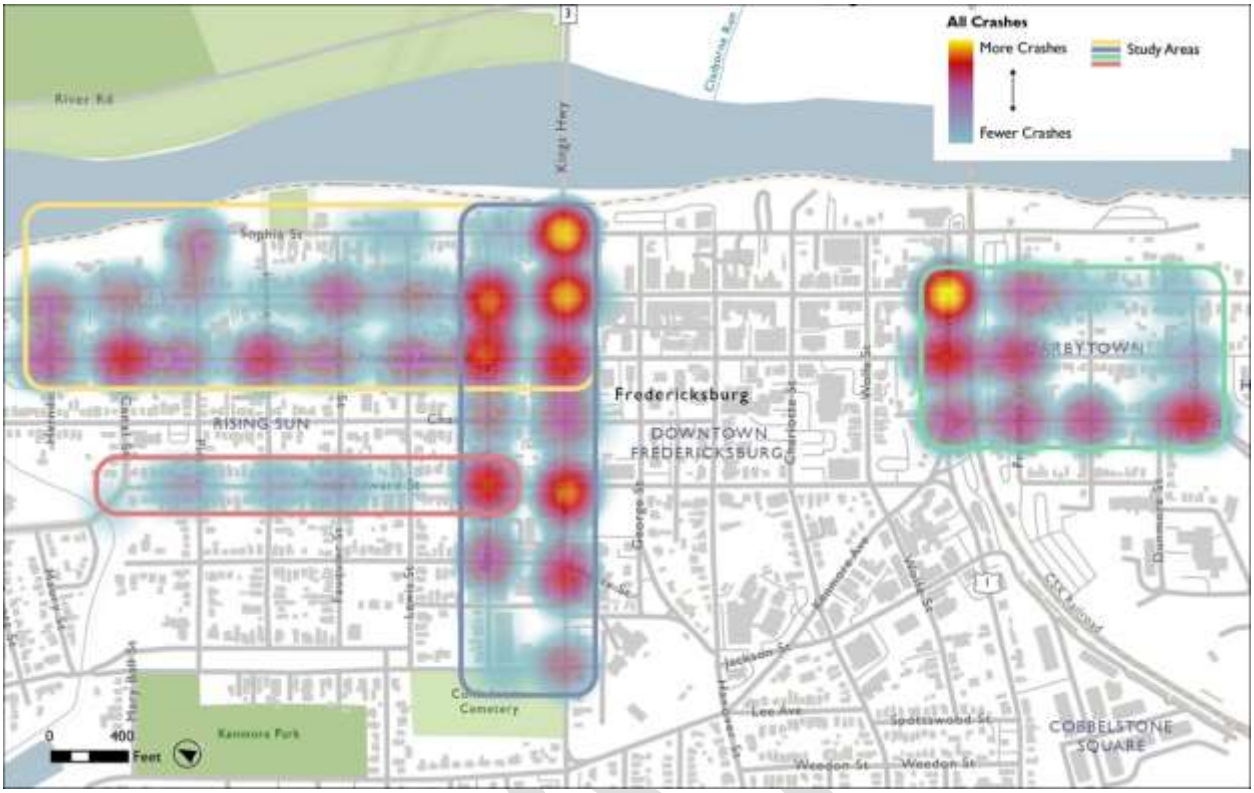



**Figure 18 – Crash Heat Map of Study Area**

**Table 13 – Summary of All Crashes**

| | Angle | Head On | Side-swipe | Rear End | Fixed Object | Pedestrian | Other | Total |
|---|---|---|---|---|---|---|---|---|
| **A: Suspected Serious Injury** | 3 | - | - | - | 1 | 2 | 3 | 9 |
| **B: Suspected Minor Injury** | 36 | 2 | 4 | 5 | 10 | 12 | 5 | 74 |
| **C: Possible Injury** | 50 | 2 | 17 | 10 | 14 | - | 13 | 106 |
| **PDO: Property Damage Only** | 81 | 1 | 26 | 13 | 17 | - | 1 | 139 |
| **Total** | 170 | 5 | 47 | 28 | 42 | 14 | 22 | 328 |

### *4.3.2 North Princess Anne Street / Caroline Street Crash Summary and Conclusions*

Angle (41%) crashes were the top crash type, followed by Sideswipe (20%) and Fixed Object (16%) crashes. Most crashes are clustered around the intersections. There is also a pattern of Fixed Object crashes around the corner from Sophia Street to Pitt Street, such as large trucks getting stuck in the curve. See Figure 19 for a crash map of this sub-area and Table 14 below for a summary of the crash data by type and severity.

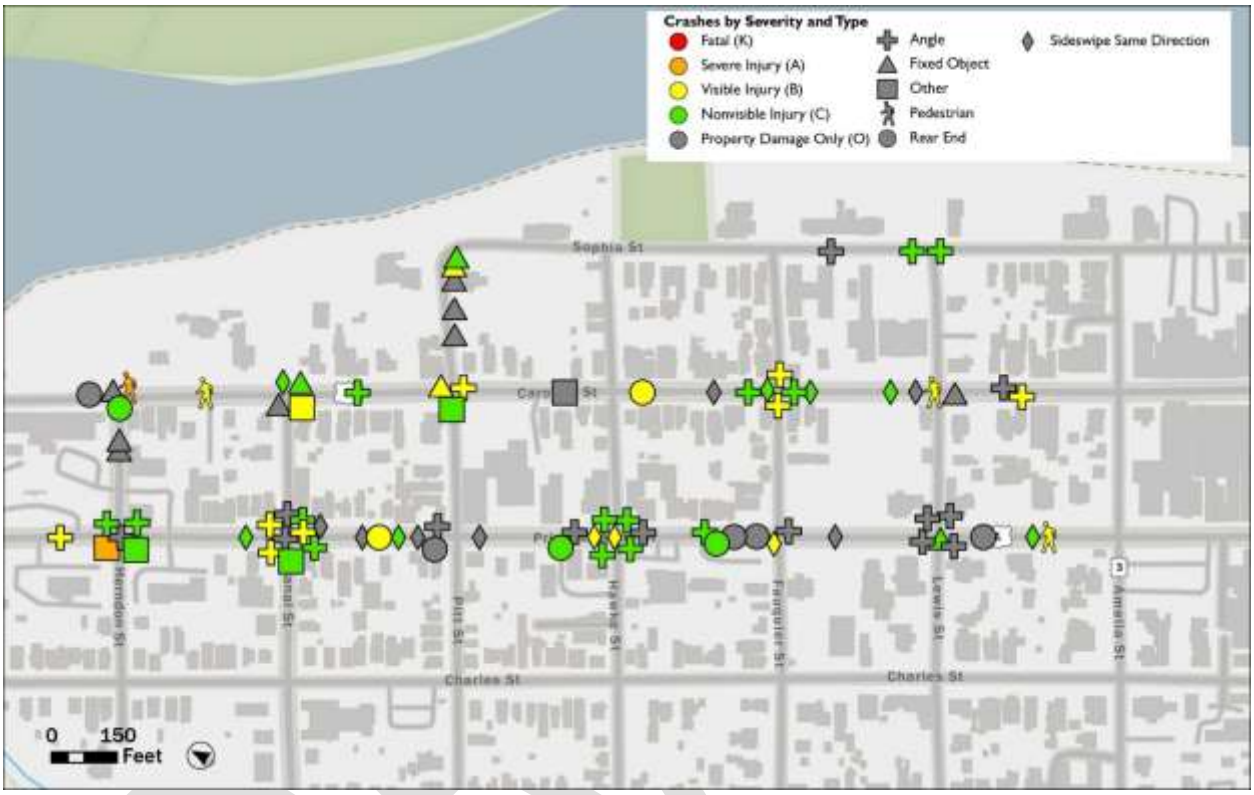



**Figure 19 – Crash Map of North Princess Anne / Caroline**

**Table 14 – Summary of Crashes in North Princess Anne / Caroline**

| | Angle | Head On | Side-swipe | Rear End | Fixed Object | Pedestrian | Other | Total |
|---|---|---|---|---|---|---|---|---|
| **A: Suspected Serious Injury** | - | - | - | - | - | 1 | 1 | 2 |
| **B: Suspected Minor Injury** | 8 | - | 3 | 2 | 2 | 3 | 1 | 19 |
| **C: Possible Injury** | 14 | - | 7 | 3 | 4 | - | 3 | 31 |
| **PDO: Property Damage Only** | 14 | - | 7 | 5 | 8 | - | 1 | 35 |
| **Total** | 36 | - | 17 | 10 | 14 | 4 | 6 | 87 |

### *4.3.1 William Street / Amelia Street Crash Summary and Conclusions*

Angle (57%) crashes were the top crash type, followed by Sideswipe (14%) crashes. Most crashes are clustered around the signalized intersections. Half of the pedestrian crashes in the study area occurred in this sub-area. This is likely due to higher exposure rates from higher pedestrian and traffic volumes. See Figure 20 for a crash map of this sub-area and Table 15 below for a summary of the crash data by type and severity.

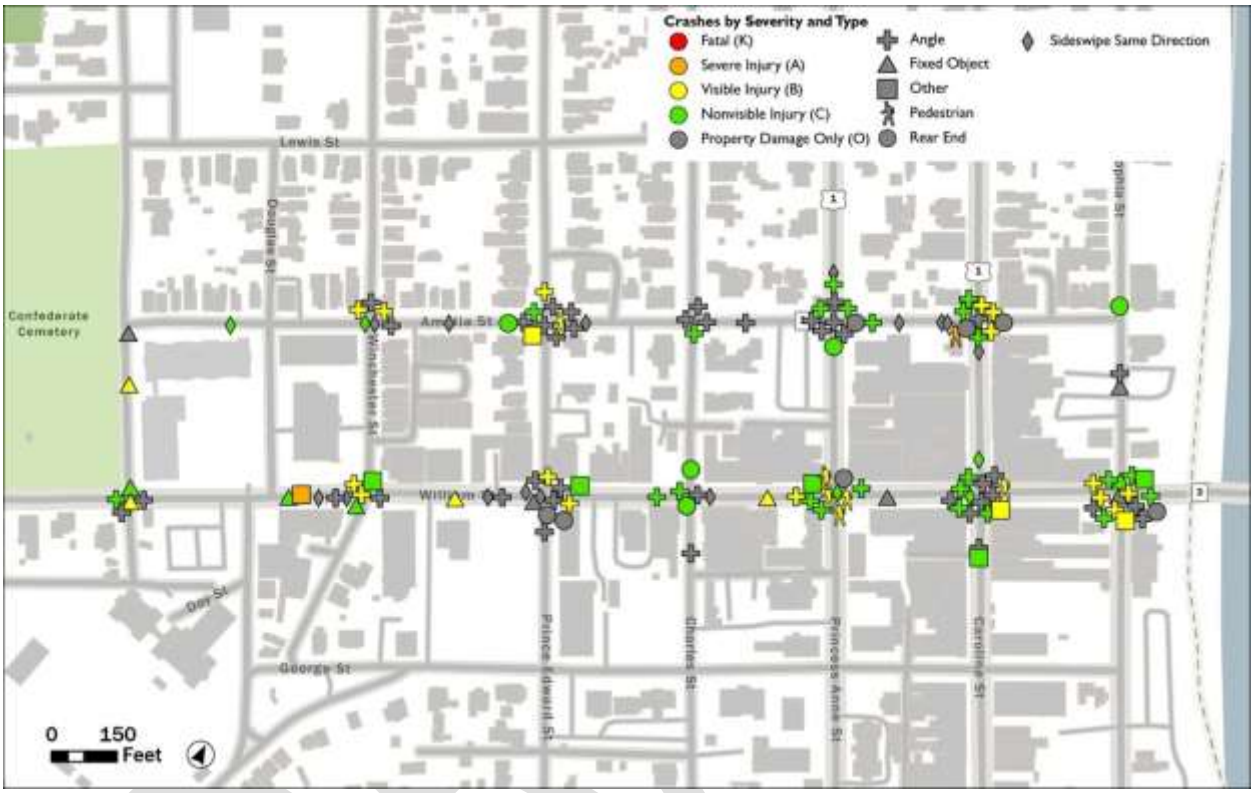



**Figure 20 – Crash Map of William / Amelia**

**Table 15 – Summary of Crashes in William / Amelia**

| | Angle | Head On | Side-swipe | Rear End | Fixed Object | Pedestrian | Other | Total |
|---|---|---|---|---|---|---|---|---|
| **A: Suspected Serious Injury** | - | - | - | - | - | 1 | 1 | 2 |
| **B: Suspected Minor Injury** | 15 | - | - | - | 4 | 6 | 3 | 28 |
| **C: Possible Injury** | 23 | - | 5 | 5 | 4 | - | 5 | 42 |
| **PDO: Property Damage Only** | 40 | - | 14 | 7 | 5 | - | - | 66 |
| **Total** | 78 | - | 19 | 12 | 13 | 7 | 9 | 138 |

### *4.3.2 South Princess Anne Street / Caroline Street Crash Summary and Conclusions*

Angle (51%) crashes were the top crash type, followed by Fixed Object (16%) and Sideswipe (12%) crashes. Most crashes are clustered around the signalized intersections, particularly Lafayette Boulevard. See Figure 21 for a crash map of this sub-area and Table 16 below for a summary of the crash data by type and severity.


**Figure 21 – Crash Map of South Princess Anne / Caroline**

**Table 16 – Summary of Crashes in South Princess Anne / Caroline**

| | Angle | Head On | Side-swipe | Rear End | Fixed Object | Pedestrian | Other | Total |
|---|---|---|---|---|---|---|---|---|
| **A: Suspected Serious Injury** | 2 | - | - | - | 1 | - | 1 | 4 |
| **B: Suspected Minor Injury** | 12 | 1 | 1 | 3 | 4 | 2 | 1 | 24 |
| **C: Possible Injury** | 12 | 2 | 5 | 2 | 6 | - | 5 | 32 |
| **PDO: Property Damage Only** | 20 | 1 | 5 | 1 | 4 | - | - | 31 |
| **Total** | 46 | 4 | 11 | 6 | 15 | 2 | 7 | 91 |

### *4.3.3 Prince Edward Street Crash Summary and Conclusions*

Angle (83%) crashes were the main crash type. Most crashes are clustered around the intersections, with some at driveways along the street. There is also one pedestrian crash at the Rappahannock River Heritage Trail crossing on Fall Line Avenue. See Figure 22 for a crash map of this sub-area and Table 17 below for a summary of the crash data by type and severity.


**Figure 22 – Crash Map of Prince Edward**

**Table 17 – Summary of Crashes in Prince Edward**

| | Angle | Head On | Side-swipe | Rear End | Fixed Object | Pedestrian | Other | Total |
|---|---|---|---|---|---|---|---|---|
| **A: Suspected Serious Injury** | 1 | - | - | - | - | - | - | 1 |
| **B: Suspected Minor Injury** | 1 | 1 | - | - | - | 1 | - | 3 |
| **C: Possible Injury** | 1 | - | - | - | - | - | - | 1 |
| **PDO: Property Damage Only** | 7 | - | - | - | - | - | - | 7 |
| **Total** | 10 | 1 | - | - | - | 1 | - | 12 |

## 4.4 Speed Analysis

Analysis of the speed data does not show an obvious pattern of speeding in the study area. The average speed (50th percentile speed) is mostly within 1-2 mph of the posted speed limit. The 85th percentile speed is at most 5 mph above the posted speed limit. Table 18 shows a summary of the 48-hour speed data collected on Caroline Street, Prince Edward Street, and Princess Anne Street.

**Table 18 – Travel Speed Summary**

| Street | Segment Between: | | Posted Speed (mph) | 50th %ile Speed (mph) | 85th %ile Speed (mph) |
|---|---|---|---|---|---|
| **Caroline Street** | Hawke Street | Fauquier Street | 25 | 22 | 26 |
| **Princess Anne Street** | Hawke Street | Fauquier Street | 25 | 26 | 30 |
| **Prince Edward Street** | Hawke Street | Fauquier Street | 25 | 25 | 29 |
| **Caroline Street** | Frederick Street | Princess Elizabeth Street | 25 | 23 | 27 |
| **Princess Anne Street** | Frederick Street | Princess Elizabeth Street | 25 | 24 | 28 |

## 4.5 Parking Analysis

A priority of this study is to maintain as much on-street parking as possible to continue supporting the local businesses and residents within the study area. Because most of the parking in the study area is not marked per individual spot, the number of existing spaces is estimated based on a standard parking stall length of 22 feet and city code that prohibits parking within 20 feet of an uncontrolled intersection and 30 feet of a stop sign or signal. This is a maximum estimation that doesn't consider driveways or other parking restrictions such as loading zones and fire hydrants.

**Table 19 – Existing Parking Spaces**

| Sub-Area | Approximate # of Existing Parking Spaces |
|---|---|
| **North Princess Anne / Caroline** | 166 |
| **William / Amelia** | 178 |
| **South Princess Anne / Caroline** | 104 |
| **Prince Edward** | 70 |

In any of the future scenarios, there is a minimal change in the number of parking spaces as the proposed improvements will not have an impact on parking. There may only be a perceived change due to recommended curb extensions that physically limit parking at intersection approaches.

## 4.6 Bicycle and Pedestrian Analysis

### *4.6.1 Signalized Intersection Improvements*

Several signal improvements would have no effect on operations and may only require equipment upgrades to implement. All the signalized intersections can operate with pedestrian recall, where the pedestrian phase is automatically called with each cycle, because the time needed to accommodate the full pedestrian phase is less than the programmed green time for each vehicle phase. This is illustrated in Table 20. Most of the signals along William Street already implement pedestrian recall.

**Table 20 – Signal Timing Example for Pedestrian Recall**

| | | | | | |
|---|---|---|---|---|---|
| Vehicle phase | GREEN TIME (35 s) | | | YELLOW | RED |
| Pedestrian phase | WALK (8 s) | FLASHING DON'T WALK (15 s) | STEADY DON'T WALK (12 s OF PEDESTRIAN "DOWN TIME") | STEADY DON'T WALK | |

Adding audible pedestrian signals (APS), like the ones at William Street and Sophia Street, for each approach also does not affect operations but greatly improves accessibility and is required for new and altered signal heads per the Public Right-of-Way Accessibility Guidelines (PROWAG). Finally, adding "Turning Vehicles Yield to Pedestrians in Crosswalk" (R10-15) signs reminds turning vehicles to yield to pedestrians in the crosswalk. These signs can be permanent metallic signs or dynamic electronic signs, like the one at Amelia Street and Princess Anne Street.

Leading pedestrian intervals (LPI) may affect vehicle operations due to holding vehicles for an additional three to five seconds on an all-red indication. However, based on the results of the Capacity Analysis, all the signalized intersections have enough capacity to accommodate the additional delay introduced from the LPI without significantly degrading the Level of Service. To get the most safety benefit from LPI, "No Turn on Red" (R10-11) signs should also be added to the mast arms on approaches where LPI has been implemented.

### *4.6.2 Traffic Calming Improvements*

Traffic calming infrastructure is largely focused on slowing vehicles to reduce the crash risk and improving the visibility of conflict areas with vulnerable road users or other vehicles. A geometric assessment of the roadways within the study area was done to determine the appropriateness of specific traffic calming infrastructure, such as mini roundabouts, curb extensions, and speed tables or raised crosswalks.

For the recommended improvements, stopping sight distance over intersection sight distance was used to confirm that traveling vehicles could be able to recognize a conflict, react, and safely come to a complete stop in enough time. This is per VDOT's Road Design Manual that allows the use of stopping sight distance over intersection sight distance for mixed-use urban centers, like downtown areas. Intersection sight distance is measured at 14.5' from the edge of the travel lane, which becomes difficult to meet with buildings, street trees, and on-street parking. Stopping sight distance is instead measured at the edge of the roadway, which reduces the impact of buildings

With the presence of on-street parking along all the study corridors, curb extensions can be installed to reduce the crossing distance for pedestrians and limit parking at intersections to increase pedestrian visibility. However, they may not be appropriate at specific intersections due to larger turning vehicles, like trucks and buses, or storm water infrastructure. The turning radius of large vehicles was checked at key intersections. These diagrams can be found in Appendix E.

Speed tables and raised crosswalks can reduce vehicle speed, leading to improved yielding rates of pedestrians and reduced frequency and severity of all crashes. Speed tables should be located mid-block on long stretches of uncontrolled streets where speeding is a concern. Raised crosswalks are best placed at high-volume crosswalks where drivers can expect to encounter people walking, biking, or rolling more frequently.

Policy and messaging from local government can also affect traffic calming. After infrastructure has been installed to reduce speeds, speed limits can be lowered to match the new driving speed. Strategic messaging can encourage drivers to use other streets designated to handle higher volumes of vehicle traffic so other streets can be a more comfortable experience for vulnerable road users.

### *4.6.3 Other General Multimodal Improvements*

Pedestrian-focused lighting at intersections provides a safety benefit for all roadway users by increasing the visibility of pedestrians and vehicles. It may also improve personal security in high-traffic areas.

Curb ramps should be updated to the most recent accessibility standard per the Americans with Disabilities Act (ADA) and Public Right-of-Way Accessibility Guidelines (PROWAG). This may include reconstructing some corners to provide two perpendicular curb ramps instead of a single diagonal curb ramp. This will improve the accessibility of the crosswalks and sidewalks for people using mobility devices and the usability for anyone with a wheeled device, such as a stroller or hand truck.

### *4.6.4 Bicycle Connectivity Improvements*

With the planned Bankside Trail connecting the Virginia Central Railway Trail to the Chatham Bridge Trail around the southeast of downtown, there is an opportunity to also connect to the Rappahannock River Heritage Trail to the north. The Capacity Analysis and geometric analysis suggests that a separated on-road bicycle facility can be constructed via Sophia Street, Pitt Street, and Caroline Street. This would still maintain on-street parking, except for Pitt Street between Caroline Street and Sophia Street. North of Herndon Street, Caroline Street would need to be widened or an off-road facility constructed for approximately 835 feet to connect to the Rappahannock Heritage River Trail.

# 5 COMMUNITY ENGAGEMENT

## 5.1 CITY COUNCIL MEETINGS

In September 2024, preliminary findings from the two-way conversion analysis were presented to City Council. The presentation can be found in Appendix F. In November 2024, bicycle and pedestrian data and analysis were presented. The presentation can be found in Appendix G.

## 5.2 DECEMBER COMMUNITY MEETING

A community meeting was held on Wednesday, December 18, 2024 at the Fredericksburg Visitor Center from 6 pm – 8 pm. Representatives from the City and Timmons Group were present to answer questions from the community. More than 75 people attended over the two-hour period. Materials shown during the meeting can be found in Appendix H.

The meeting started with a brief introduction from Mike Craig, the director of Fredericksburg's Community Planning & Building department, followed by more details about the study from Timmons Group, the engineering consulting firm leading the study, and then a period of open question and comment from citizens in attendance. After completing the formal presentation and Q&A portion, attendees were able to view poster boards with data collected during the study and proposed recommendations, fill out paper surveys with comments on the study, and talk to additional City and consultant representatives.

## 5.3 PUBLIC SURVEY

Paper surveys were available at the Community Meeting and an online survey was available to the public from December 18, 2024, to January 2, 2025. The public submitted comments and additional questions via 30 paper surveys and over 100 online surveys. In total, the survey received 142 submissions, including 20 without comments, only demographic information, and 29 without a zip code or with a zip code from outside the Fredericksburg city limits. The public survey responses, with identifying information removed, can be found in Appendix I.

29% of the submitted comments specifically mentioned not supporting the conversion of downtown streets from one-way to two-way traffic, citing concerns over delivery trucks, on-street parking, and traffic operations. William Street and the more commercial areas of Princess Anne Street and Caroline Street were specifically named with concerns about delivery trucks. The residential areas of Princess Anne Street and Caroline Street were noted for concerns with backing out of driveways and increased difficulty in crossing the street with two-way traffic. Only 18% explicitly supported the two-way conversion. The remaining 53% did not mention or were unclear in their support or opposition of the two-way conversion.

Of the comments related to the bicycle facility scenarios, there was mixed support for Scenario 1, which would remove a travel lane and install a separated bicycle lane. Several responses did not believe that it would be feasible to remove a travel lane and still maintain adequate traffic flow, again citing concerns over delivery trucks and on-street parking. For Scenario 2, which would require converting the one-way streets to two-way travel and installing various traffic calming measures, there was more support in favor than there was against.

There was broad support for the proposed pedestrian improvements, such as increased signage, lighting, and updated pedestrian signal timing at all signals in the study area. There was also broad support for general traffic calming throughout the study area, whether the streets are converted to two-way or maintained in the existing configuration.

Other more specific comments included suggestions to convert Sophia Street to one-way southbound from Pitt Street to William Street, concerns regarding how delivery trucks would navigate downtown, and concerns regarding traffic flow around the train station.

Comments from people outside of the city limits showed more opposition to the conversion of downtown streets from one-way to two-way traffic, citing similar concerns as city residents, but similar levels of support for the pedestrian improvements and traffic calming elements.

### 5.4 Fredericksburg Main Street Business Stakeholders

On August 15, 2025, Community Planning and Timmons Group participated in a meeting of downtown business stakeholders and owners put on by Fredericksburg Main Street. Many of those present supported making downtown Fredericksburg safer for pedestrians and cyclists and trying to improve traffic. There were questions about changes to parking and the effect on loading zones. The presentation shown can be found in Appendix J.

# 6 RECOMMENDATIONS & PROPOSED IMPROVEMENTS

The final recommendations include maintaining existing on-street parking, converting several streets to two-way operation, establishing a bicycle boulevard, and adding a two-way separated bicycle lane to connect existing and planned shared-use paths through downtown. These changes can be seen in Figure 23. Other recommendations are detailed in each sub-area and on the conceptual layouts in Figure 24, Figure 25, and Figure 26. Cost estimates for all the proposed improvements can be found in Appendix K.

## 6.1 STUDY AREA-WIDE RECOMMENDATIONS

The signalized intersection improvements, traffic calming improvements, and other multimodal improvements considered in the Bicycle and Pedestrian Analysis should be implemented throughout the study area. This includes:

- LPI, APS, Pedestrian Recall, and regulatory signs at signalized intersections
- High visibility crosswalks, curb extensions, speed limit changes, and re-routing messaging to support traffic calming efforts
    - Mini roundabouts and speed tables/raised crosswalks are recommended at specific locations
- Pedestrian lighting and curb ramp accessibility improvements at all crosswalks

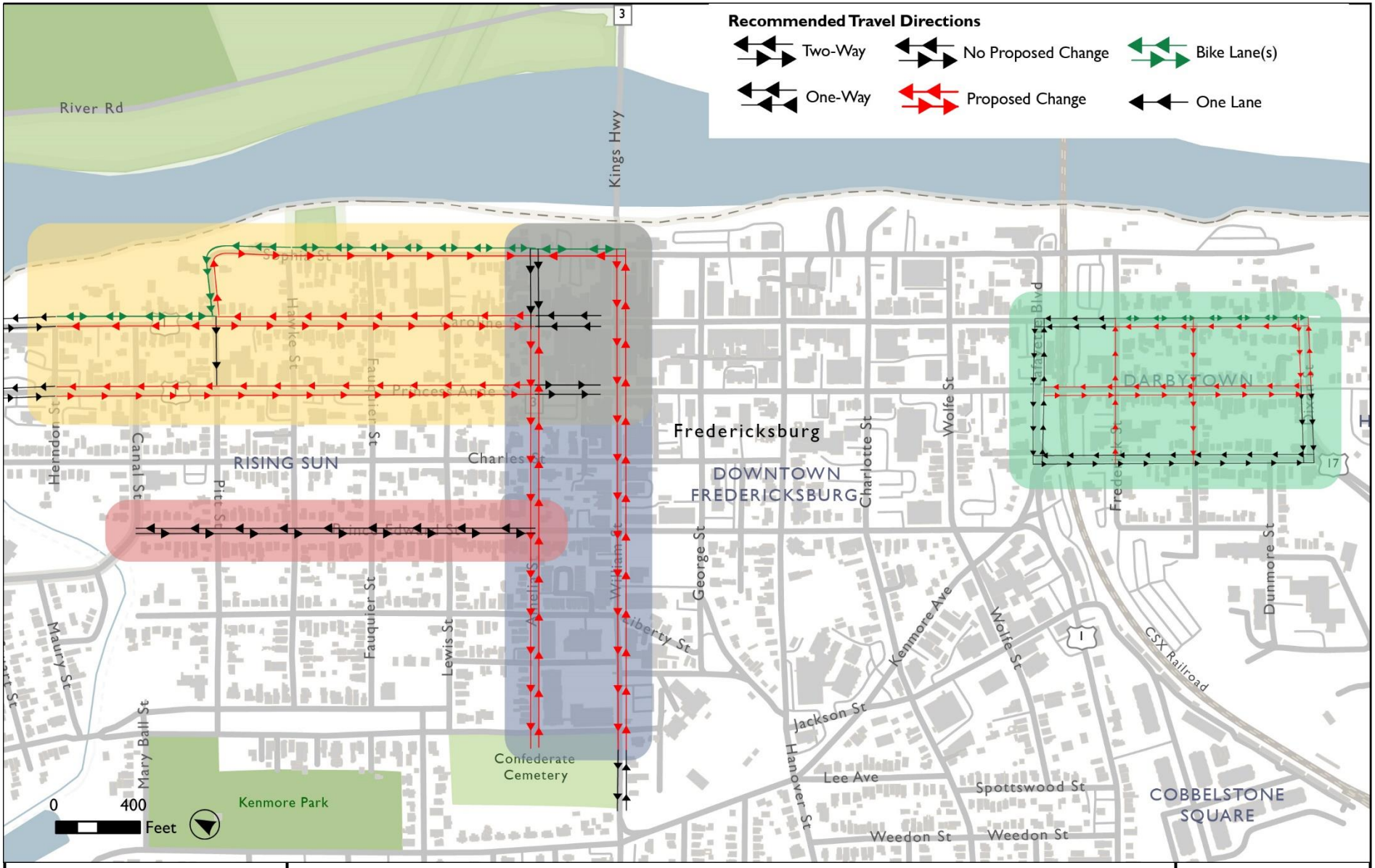
## 6.2 NORTH PRINCESS ANNE STREET / CAROLINE STREET

In this sub-area, Princess Anne Street and Caroline Street are both recommended for two-way conversion. Princess Anne Street should be converted to two-way travel from Herndon Street to Amelia Street. Caroline Street should be converted to two-way travel from Pitt Street to Amelia Street, including signal upgrades at Amelia Street to accommodate the new travel direction. Curb extensions are also recommended along Princess Anne Street and Caroline Street.

To connect the Rappahannock River Heritage Trail to the Chatham Bridge path and future Bankside Trail Extension, two-way separated bicycle lanes are recommended along:

- East side of Sophia Street from William Street to Pitt Street
- North side of Pitt Street from Sophia Street to Caroline Street
- East side of Caroline Street from Pitt Street to approximately 500 feet north of Ford Street, where the Rappahannock River Heritage Trail turns to parallel Caroline Street

The means of physical separation remains to be determined by the City. Other improvements are recommended to accommodate these bicycle lanes while maintaining on-street parking. Sophia Street between Pitt Street and Amelia Street should be reduced to a single one-way southbound travel lane while preserving both sides of on-street parking. In addition to facilitating the two-way separated bicycle lane, this change should also improve safety at the intersection of Sophia Street and Pitt Street. The block of Pitt Street between Caroline Street and Sophia Street should be converted to one-way eastbound traffic. This will allow for continuous vehicle travel from Caroline Street to Sophia Street towards downtown. Finally, Caroline Street between Pitt Street and Herndon Street should be reduced to a single one-way northbound travel lane while preserving both sides of on-street parking.

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# Proposed Intersection Control
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Figure
23

### 6.3 William Street / Amelia Street

William Street and Amelia Street are both recommended for two-way conversion. William Street should be converted to two-way travel from Washington Avenue to Sophia Street, including a roadway reconfiguration on the Chatham Bridge to accommodate the new travel direction. Amelia Street should be converted to two-way travel from Washington Avenue to Caroline Street. The block of Amelia Street between Sophia Street and Caroline Street should remain as two one-way westbound lanes. The block of Sophia Street from William Street to Amelia Street should also remain as one-way northbound but reduced to one travel lane to accommodate the two-way separated bicycle lanes.

Additional improvements in this sub-area include:

- Signal upgrades at all six signals in the sub-area to accommodate the new travel directions
- Adding LPI and APS to all six signals in the sub-area to improve pedestrian safety and accessibility
- Converting Amelia Street at Washington Avenue to an all-way stop
- Curb extensions along Amelia Street and William Street

### 6.4 South Princess Anne Street / Caroline Street

To match VDOT's proposed plans for the Dixon Park Connector Trail, Caroline Street in this sub-area should be reduced to a single one-way northbound travel lane while preserving both sides of on-street parking. This will allow for two-way bicycle lanes on the east side of Caroline Street from Dixon Street to Frederick Street, connecting to the proposed Dixon Park Connector Trail at the south end of Caroline Street and the Virginia Central Railway (VCR) Downtown Connector/Bankside Trail at Frederick Street. The block of Caroline Street from Frederick Street to Lafayette Boulevard should remain as two one-way northbound lanes.

Princess Anne Street in this sub-area should be converted to two-way travel from Lafayette Boulevard to Dixon Street. Dixon Street between Princess Anne Street and Caroline Street should also be converted to two-way travel. Due to the narrowness of the roads in this sub-area, Frederick Street should be converted to a single one-way eastbound travel lane and Princess Elizabeth Street should be converted to a single one-way westbound travel lane. Curb extensions are also recommended along Princess Anne Street, Caroline Street, and Charles Street.

### 6.5 Prince Edward Street

Prince Edward Street is recommended for conversion to a bicycle boulevard. This should include:

- Constructing curb extensions and high-visibility crosswalks at key intersections
- Converting the intersection of Prince Edward Street at Canal Street/Fall Hill Avenue to a mini roundabout
- Building a raised crosswalk at the trail crossing on Fall Hill Avenue

## 6.6 RECOMMENDED IMPLEMENTATION PLAN

Recommendations should be implemented in conjunction with other planned construction activities, such as roadway repaving, utility work, VDOT work, etc., when possible, to limit the impact on citizens and businesses. For example, and

### *6.6.1 Phase 1 – Traffic Signal Operations*

Traffic signal operations can be improved throughout the study area without any construction. These improvements would include adjusting the green time for vehicles to minimize delay and implementing Leading Pedestrian Intervals (LPI) for improved pedestrian safety.

### *6.6.2 Phase 2 – William Street / Amelia Street*

The William Street/Amelia Street two-way conversion should be completed before the North Princess Anne Street/Caroline Street two-way conversion due to the signal upgrades needed on William Street and Amelia Street. The intersection of Amelia Street and Caroline Street should be reconstructed in anticipation of the two-way conversion of Caroline Street. This should also be done in conjunction with, or shortly after, the construction of the raised intersection at Charles Street and William Street.

### *6.6.3 Phase 3 – Sophia / Pitt / Caroline Bike Lanes*

The conversion of Sophia Street from northbound travel to southbound travel can be completed with repaving only. This can be programmed into the City's regular repaving schedule.

The Sophia Street, Pitt Street, and Caroline Street (from Pitt Street to Hanover Street) bicycle lanes should be done in conjunction with the construction of the Bankside Trail, providing an appropriate terminus for the trail at Chatham Bridge. This trail will connect the Chatham Bridge trail, the Virginia Central Railway trail, and the future Dixon Park connector trail. The estimated construction schedule for the trail project starts in 2028 and finishes in 2029.

### *6.6.4 Phase 4 – South Princess Anne Street / Caroline Street*

The South Princess Anne Street/Caroline Street improvements and two-way conversion should be done in conjunction with VDOT's planned Dixon Park Connector Trail improvements and Lafayette Boulevard/Kenmore Avenue/Charles Street intersection improvements. The Dixon Park Connector Trail includes the recommended Caroline Street bicycle lanes. The Lafayette Boulevard/Kenmore Avenue/Charles Street intersection improvements include geometric and operational changes to these intersection which may impact the final design for the recommended changes in this sub-area.. The estimated construction schedule for both projects starts in 2028 and finishes in 2029.

### *6.6.5 Phase 5 – North Princess Anne Street / Caroline Street*

With the signal upgrades completed during Phase 1, the two-way conversion on North Princess Anne Street and Caroline Street will mostly involve restriping the roadways, removing and replacing signs, and constructing curb extensions.

### *6.6.6 Phase 6 – Prince Edward Street*

The Prince Edward Street traffic calming improvements can be completed as one large project or as smaller individual projects. Although listed as Phase 5, these could be completed at any time as funds are available or if there are connected projects adjacent.

# CITY OF FREDERICKSBURG DOWNTOWN ENGINEERING STUDY

## PRINCESS ANNE STREET / CAROLINE STREET / PRINCE EDWARD STREET RECOMMENDED IMPROVEMENTS

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**LEGEND**

- PROP. 4" SOLID WHITE LINE
- PROP. 4" DOUBLE YELLOW LINE
- PROP. 24" SOLID WHITE LINE
- PROP. DOUBLE TURN ARROW (LEFT/THROUGH OR RIGHT/THROUGH)
- PROP. SINGLE TURN ARROW (LEFT)
- PROP. MESSAGE MARKING (ONLY)
- PROP. SINGLE TURN ARROW (RIGHT)
- PROP. STRAIGHT ARROW
- PROP. LEFT/THROUGH/RIGHT ARROW
- PROP. SHARROW MARKING
- PROP. BICYCLE LANE MARKING
- PROP. LOADING ZONE
- PROP. RAISED CROSSING
- EXIST. FX/GO STOP
- EXIST. SIGNAL
- EXIST. DIRECTION OF TRAVEL
- PROP. STOP SIGN
- PROP. CURB BUMP OUT
- PROP. CHOKER

NOTE: PROPOSED BUMP OUTS AND CHOKERS ARE CONCEPTUAL ONLY. FINAL DESIGN WILL BE BASED ON SURVEY AND CONSTRUCTABILITY.

SCALE 1"=200'
0 200' 400'

# CITY OF FREDERICKSBURG DOWNTOWN ENGINEERING STUDY

## WILLIAM STREET / AMEILIA STREET RECOMMENDED IMPROVEMENTS

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

LEGEND

- PROP. 4" SOLID WHITE LINE
- PROP. 4" DOUBLE YELLOW LINE
- PROP. 24" SOLID WHITE LINE
- PROP. DOUBLE TURN ARROW (LEFT/THROUGH OR RIGHT/THROUGH)
- PROP. SINGLE TURN ARROW (LEFT)
- PROP. MESSAGE MARKING (ONLY)
- PROP. SINGLE TURN ARROW (RIGHT)
- PROP. STRAIGHT ARROW
- PROP. LEFT/THROUGH/RIGHT ARROW
- PROP. SHARROW MARKING
- PROP. BICYCLE LANE MARKING
- PROP. LOADING ZONE
- PROP. RAISED CROSSING
- EXIST. FXBGO STOP
- EXIST. SIGNAL
- EXIST. DIRECTION OF TRAVEL
- PROP. STOP SIGN
- PROP. CURB BUMP OUT
- PROP. CHOKER

NOTE: PROPOSED BUMP OUTS AND CHOKERS ARE CONCEPTUAL ONLY. FINAL DESIGN WILL BE BASED ON SURVEY AND CONSTRUCTABILITY.

SCALE 1"=150'
0 150' 300'

# CITY OF FREDERICKSBURG DOWNTOWN ENGINEERING STUDY

## PRINCESS ANNE STREET / CAROLINE STREET / CHARLES STREET RECOMMENDED IMPROVEMENTS

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

**LEGEND**

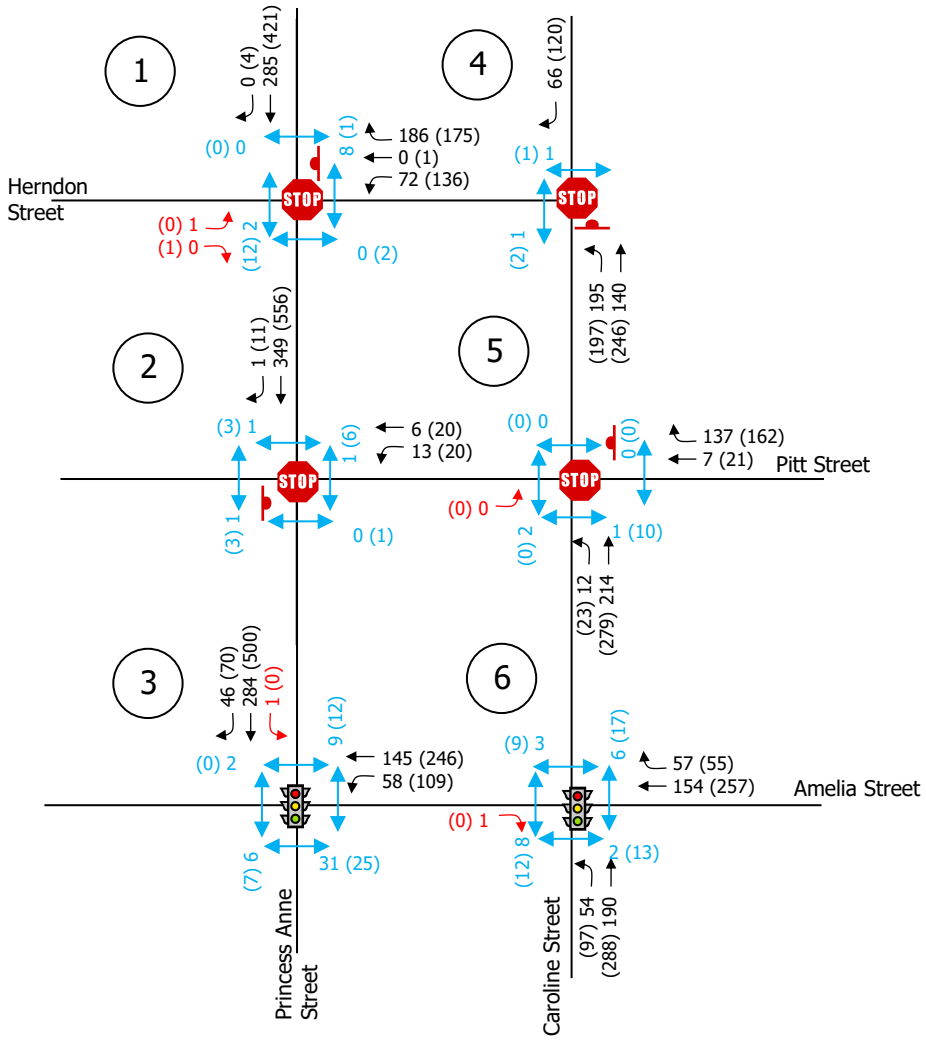
- PROP. 4" SOLID WHITE LINE
- PROP. 4" DOUBLE YELLOW LINE
- PROP. 24" SOLID WHITE LINE
- PROP. DOUBLE TURN ARROW (LEFT/THROUGH OR RIGHT/THROUGH)
- PROP. SINGLE TURN ARROW (LEFT)
- PROP. MESSAGE MARKING (ONLY)
- PROP. SINGLE TURN ARROW (RIGHT)
- PROP. STRAIGHT ARROW
- PROP. LEFT/THROUGH/RIGHT ARROW
- PROP. SHARROW MARKING
- PROP. BICYCLE LANE MARKING
- PROP. LOADING ZONE
- PROP. RAISED CROSSING
- EXIST. FXBGO STOP
- EXIST. SIGNAL
- EXIST. DIRECTION OF TRAVEL
- PROP. STOP SIGN
- PROP. CURB BUMP OUT
- PROP. CHOKER

NOTE: PROPOSED BUMP OUTS AND CHOKERS ARE CONCEPTUAL ONLY. FINAL DESIGN WILL BE BASED ON SURVEY AND CONSTRUCTABILITY.

SCALE 1"=100'
0 100' 200'

# APPENDIX A

2024 Peak Hour Turning Movement Counts




NOT TO SCALE

LEGEND:

- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Sign Location
- Yield
- Lane Configuration
- 00 AM Peak Hour Volumes
- (00) PM Peak Hour Volumes
- 00 Bike Volumes
- 00 Pedestrian Volumes

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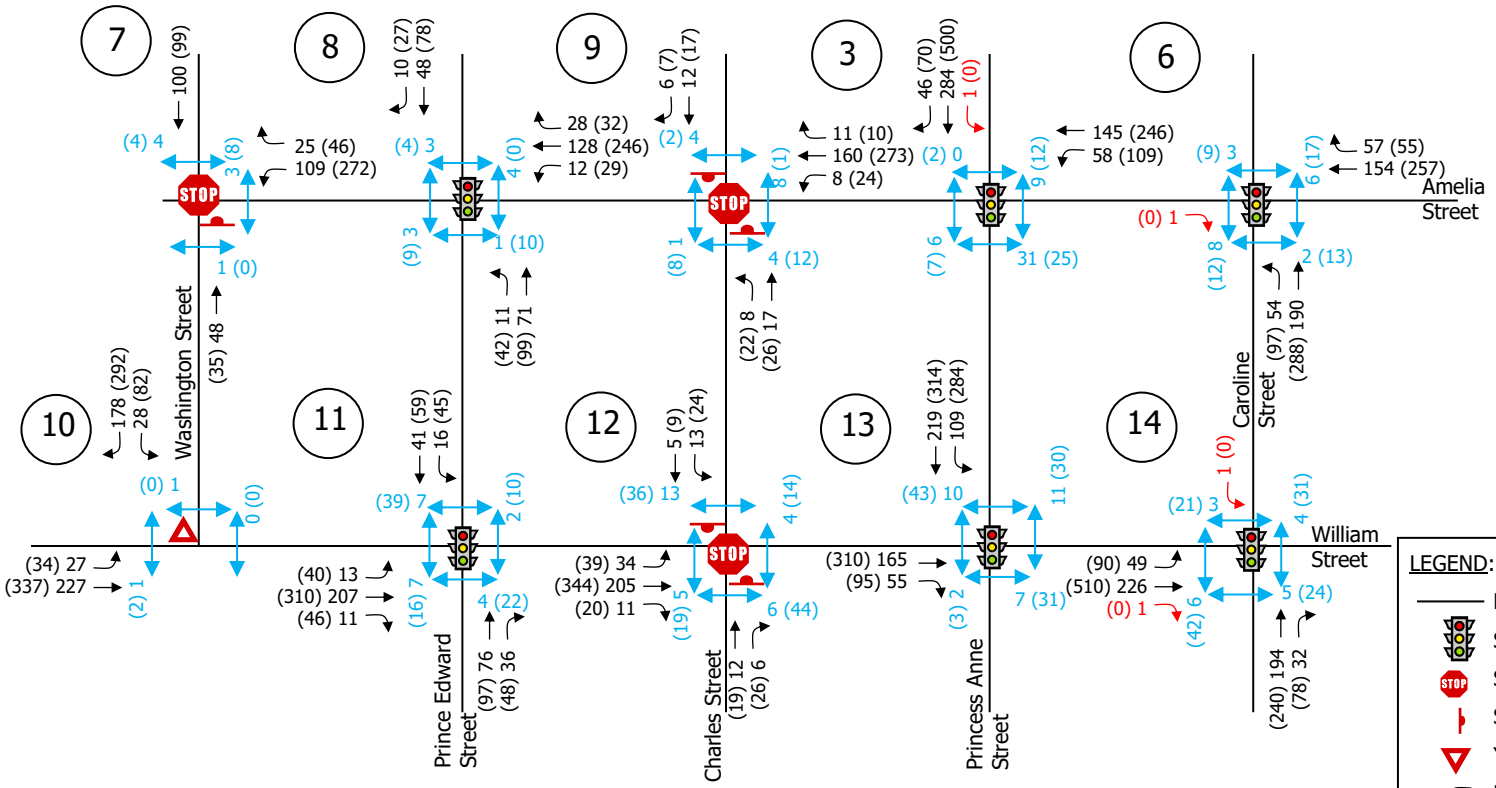
# North Princess Anne/Caroline Fredericksburg Downtown Engineering Study City of Fredericksburg, Virginia

Appendix B




NOT TO SCALE

LEGEND:

- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Sign Location
- Yield
- Lane Configuration
- 00 AM Peak Hour Volumes
- (00) PM Peak Hour Volumes
- 00 Bike Volumes
- 00 Pedestrian Volumes

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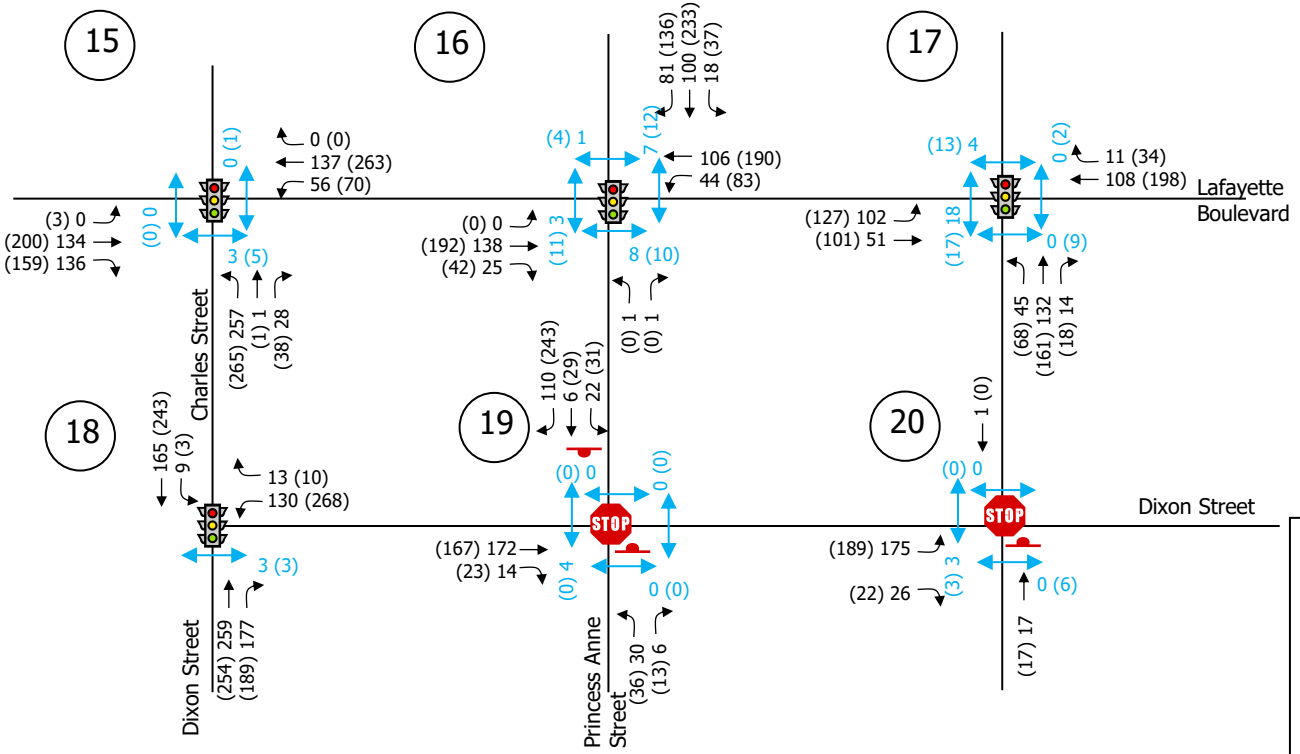
# Amelia/William
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Appendix B




NOT TO SCALE

LEGEND:

- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Sign Location
- Yield
- Lane Configuration
- 00 AM Peak Hour Volumes
- (00) PM Peak Hour Volumes
- 00 Bike Volumes
- 00 Pedestrian Volumes

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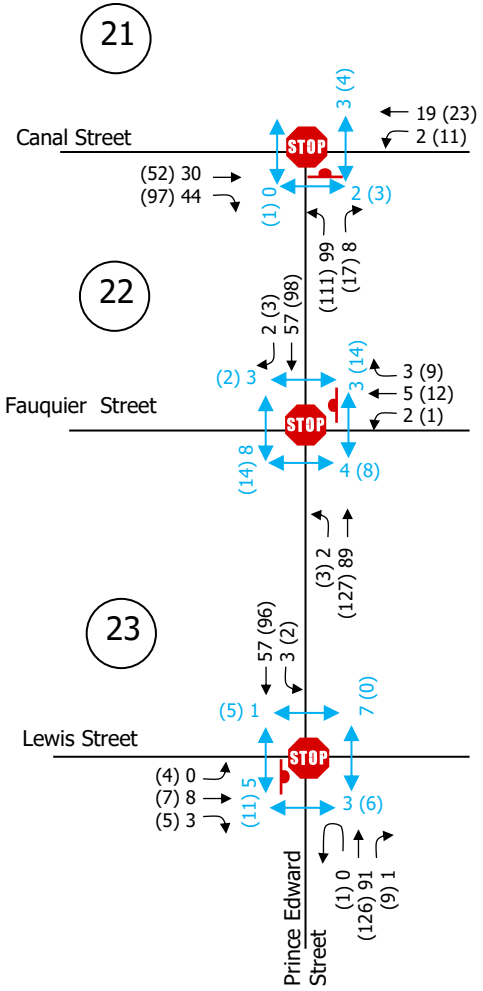
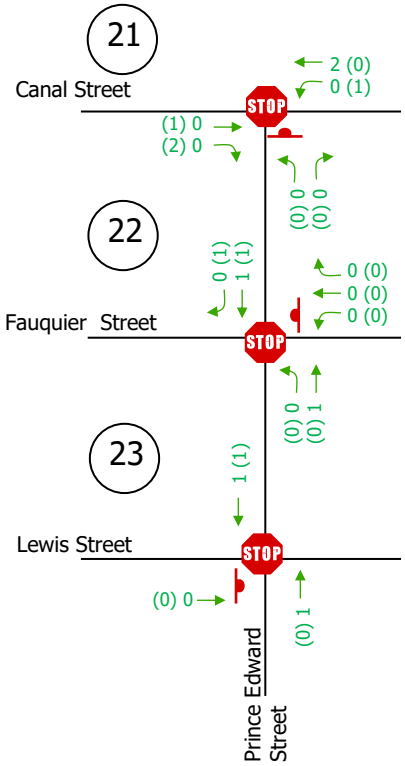
# South Princess Anne/Caroline
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Appendix B





LEGEND:

- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Sign Location
- Yield
- Lane Configuration
- 00 AM Peak Hour Volumes
- (00) PM Peak Hour Volumes
- 00 Bike Volumes
- 00 Pedestrian Volumes

NOT TO SCALE

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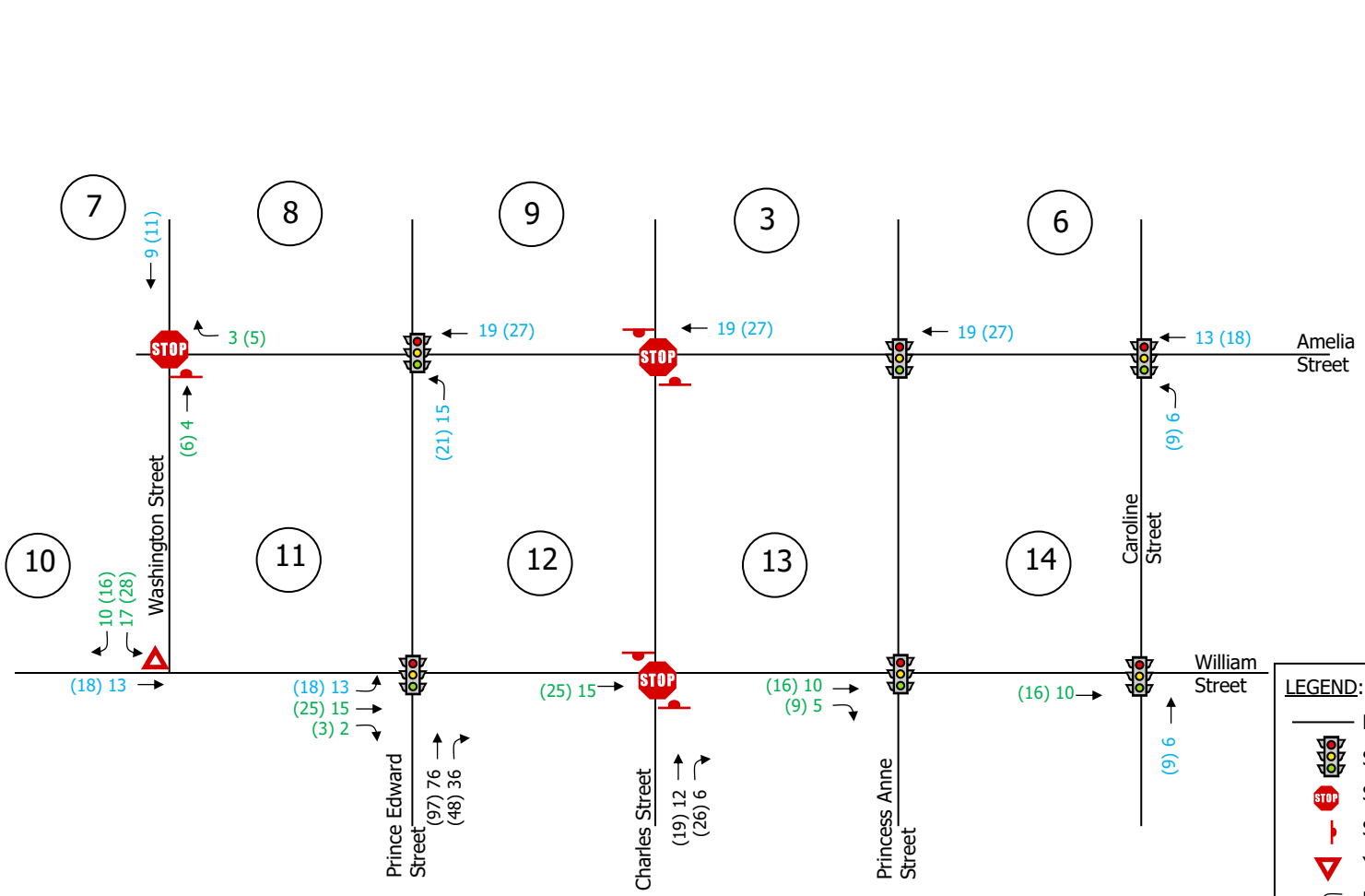
# Prince Edward
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Appendix B

# APPENDIX B

2034 William Plaza Trip Distribution




NOT TO SCALE

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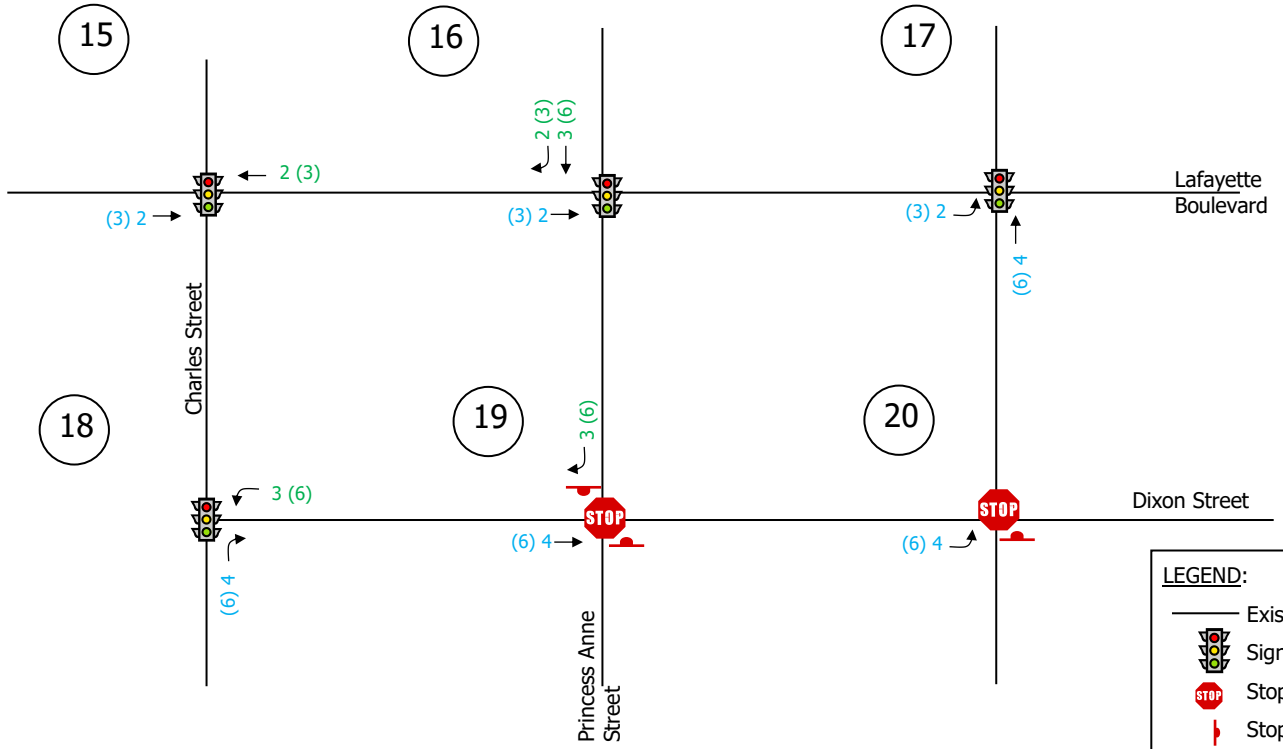
# William/Amelia
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Appendix B




NOT TO SCALE

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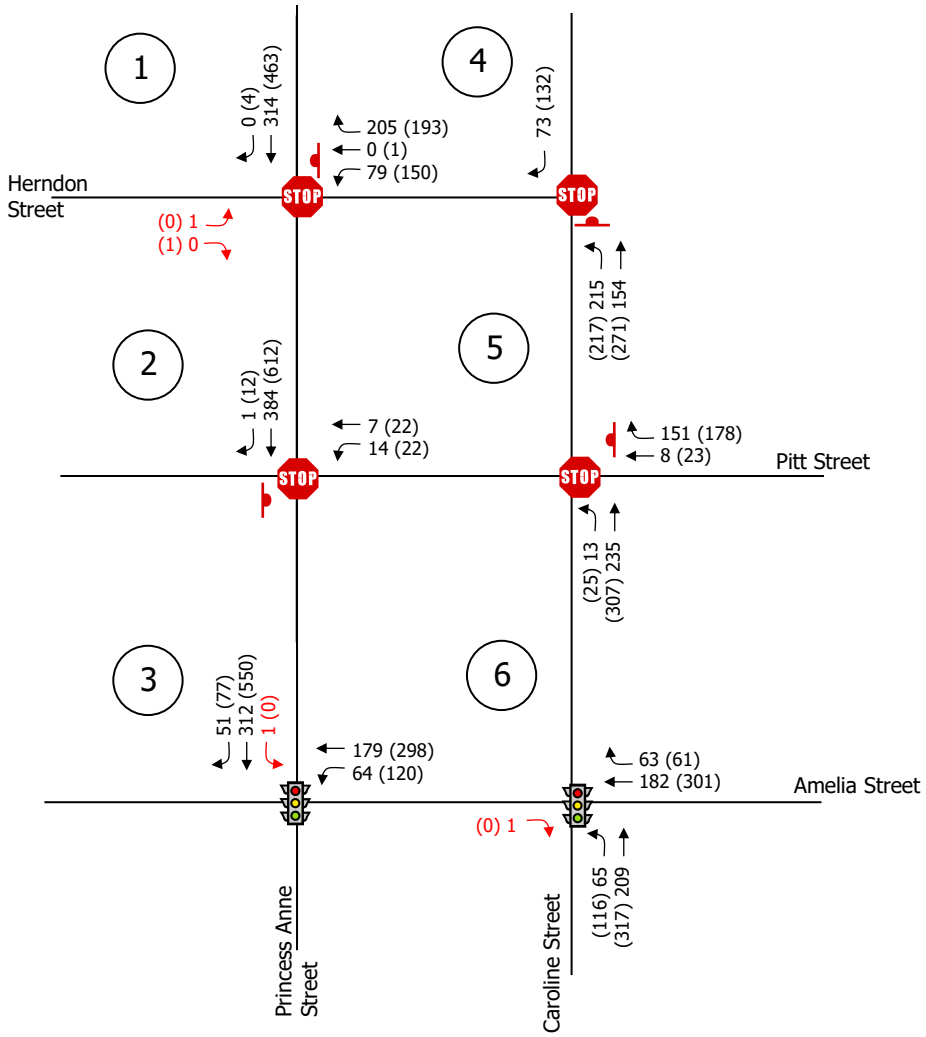
# South Princess Anne/Caroline Fredericksburg Downtown Engineering Study City of Fredericksburg, Virginia

Appendix B

# APPENDIX C

2034 No-Build Traffic Volumes





LEGEND:

- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Sign Location
- Yield
- Lane Configuration
- 00 AM Peak Hour Volumes
- (00) PM Peak Hour Volumes
- 00 Prohibited Movement Volumes

NOT TO SCALE

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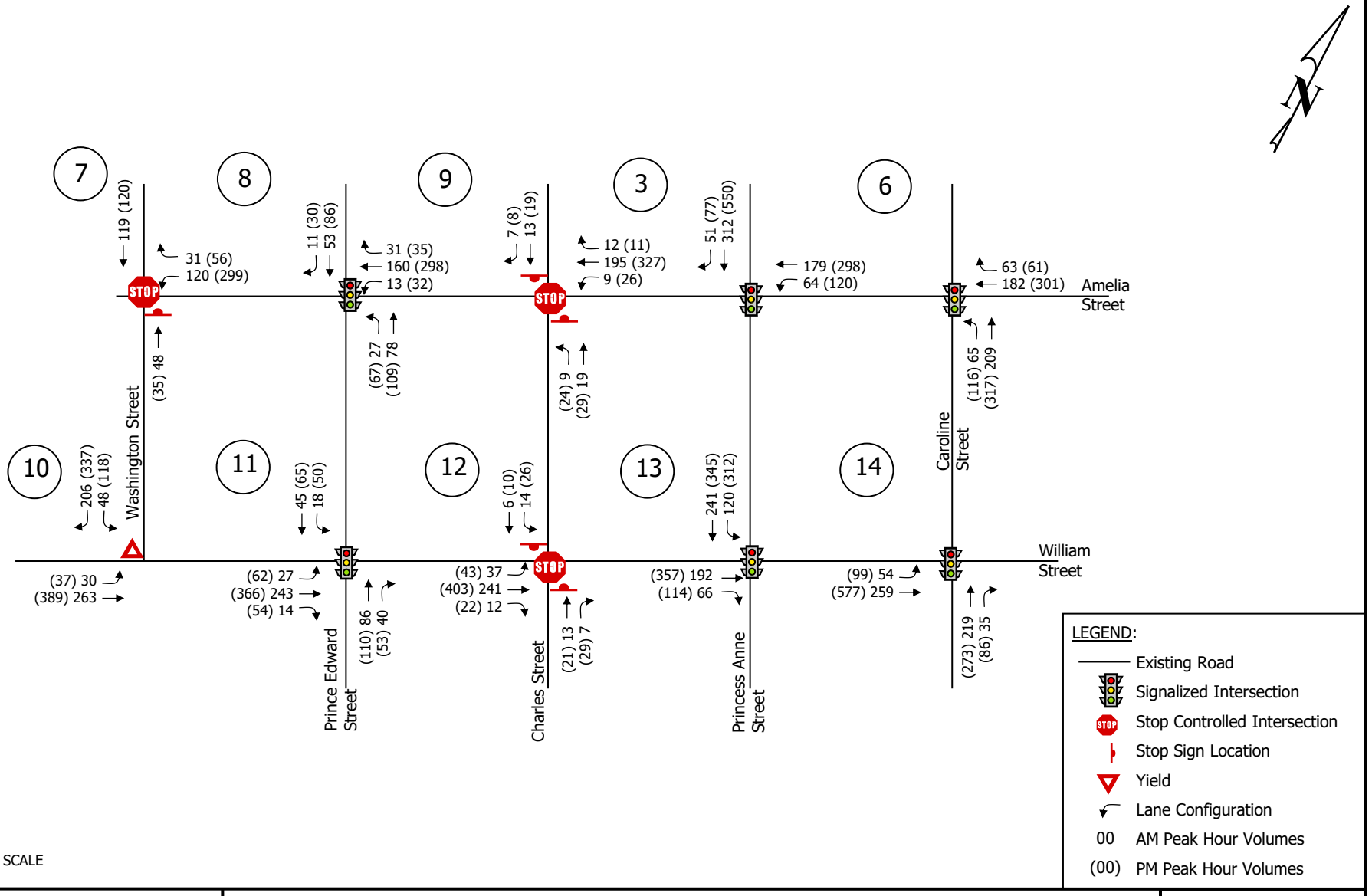
# North Princess Anne/Caroline Fredericksburg Downtown Engineering Study City of Fredericksburg, Virginia

Appendix D




NOT TO SCALE

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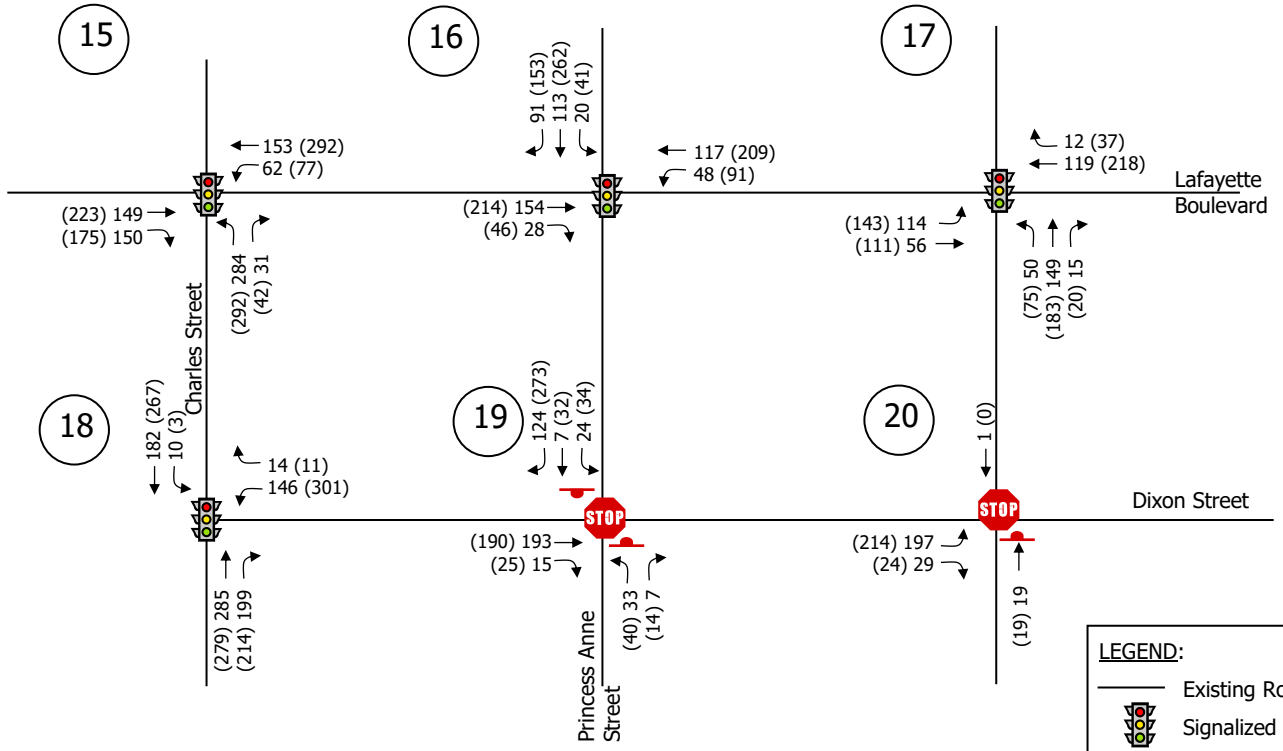
YOUR VISION ACHIEVED THROUGH OURS.

# William/Amelia
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Appendix D




LEGEND:

- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Sign Location
- Lane Configuration
- 00 AM Peak Hour Volumes
- (00) PM Peak Hour Volumes

NOT TO SCALE

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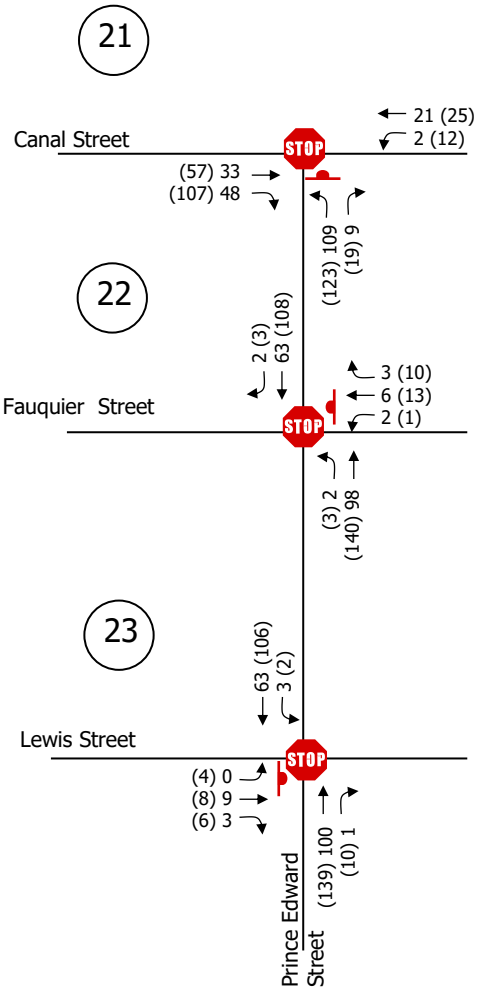
YOUR VISION ACHIEVED THROUGH OURS.

# South Princess Anne/Caroline Fredericksburg Downtown Engineering Study City of Fredericksburg, Virginia

Appendix D




NOT TO SCALE

LEGEND:

- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Sign Location
- Lane Configuration
- 00 AM Peak Hour Volumes
- (00) PM Peak Hour Volumes

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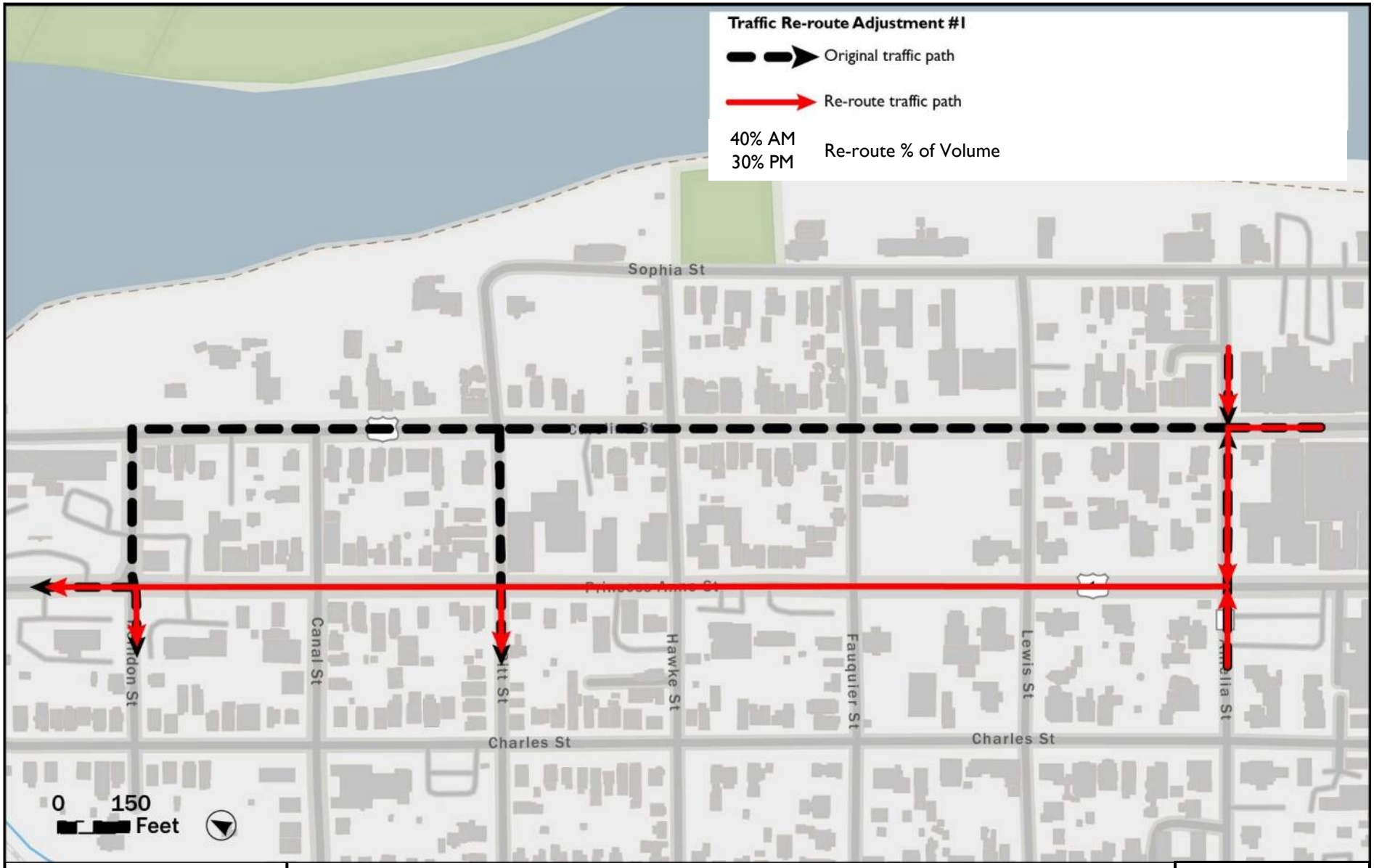
# Prince Edward
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Appendix D

# APPENDIX D

2034 Two-Way Conversion Traffic Volumes and Re-Routing Assumptions

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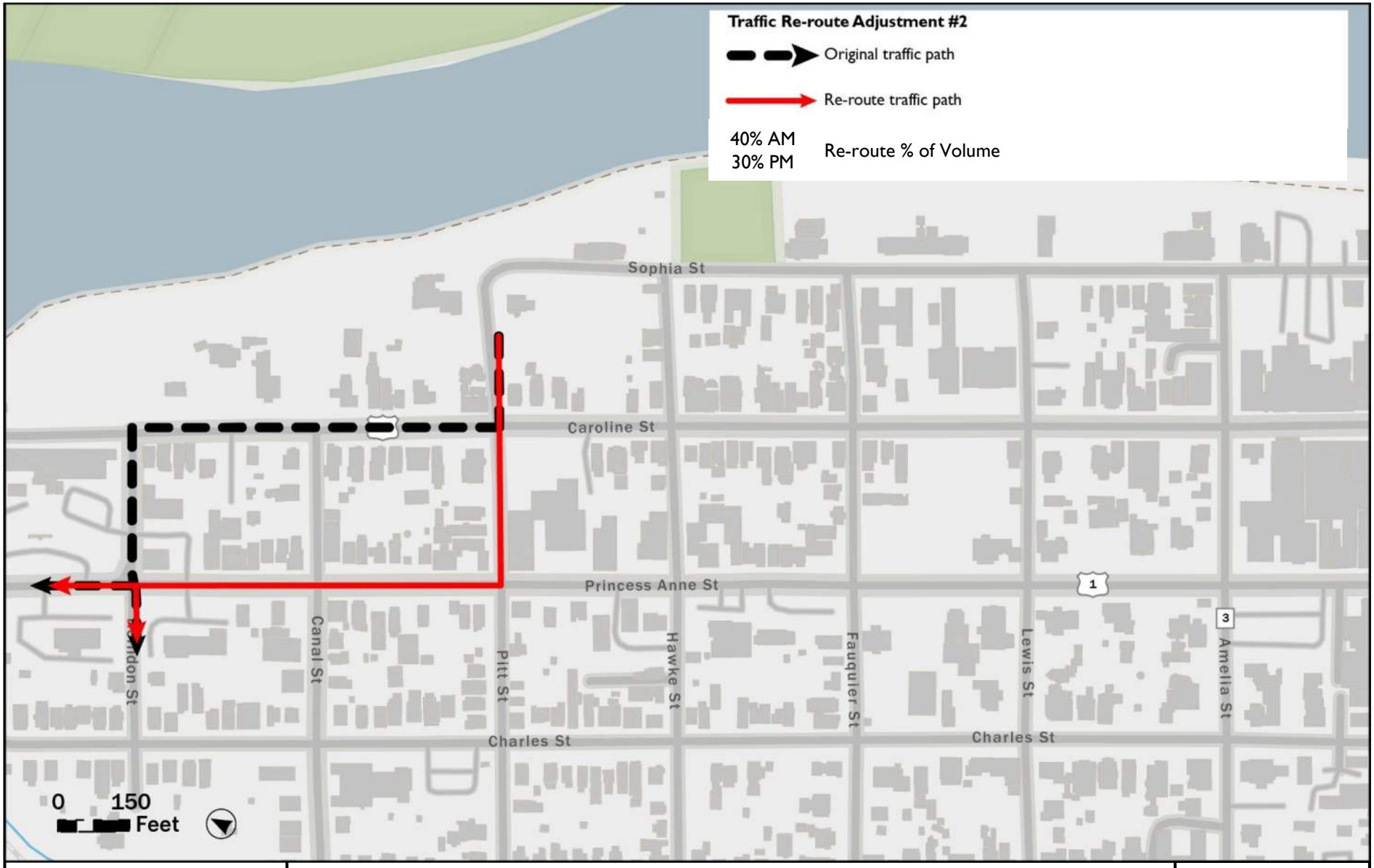
North Princess Anne/Caroline Traffic Re-route Adjustment #1
Fredericksburg Downtown Engineering Study
City of Fredericksburg, Virginia

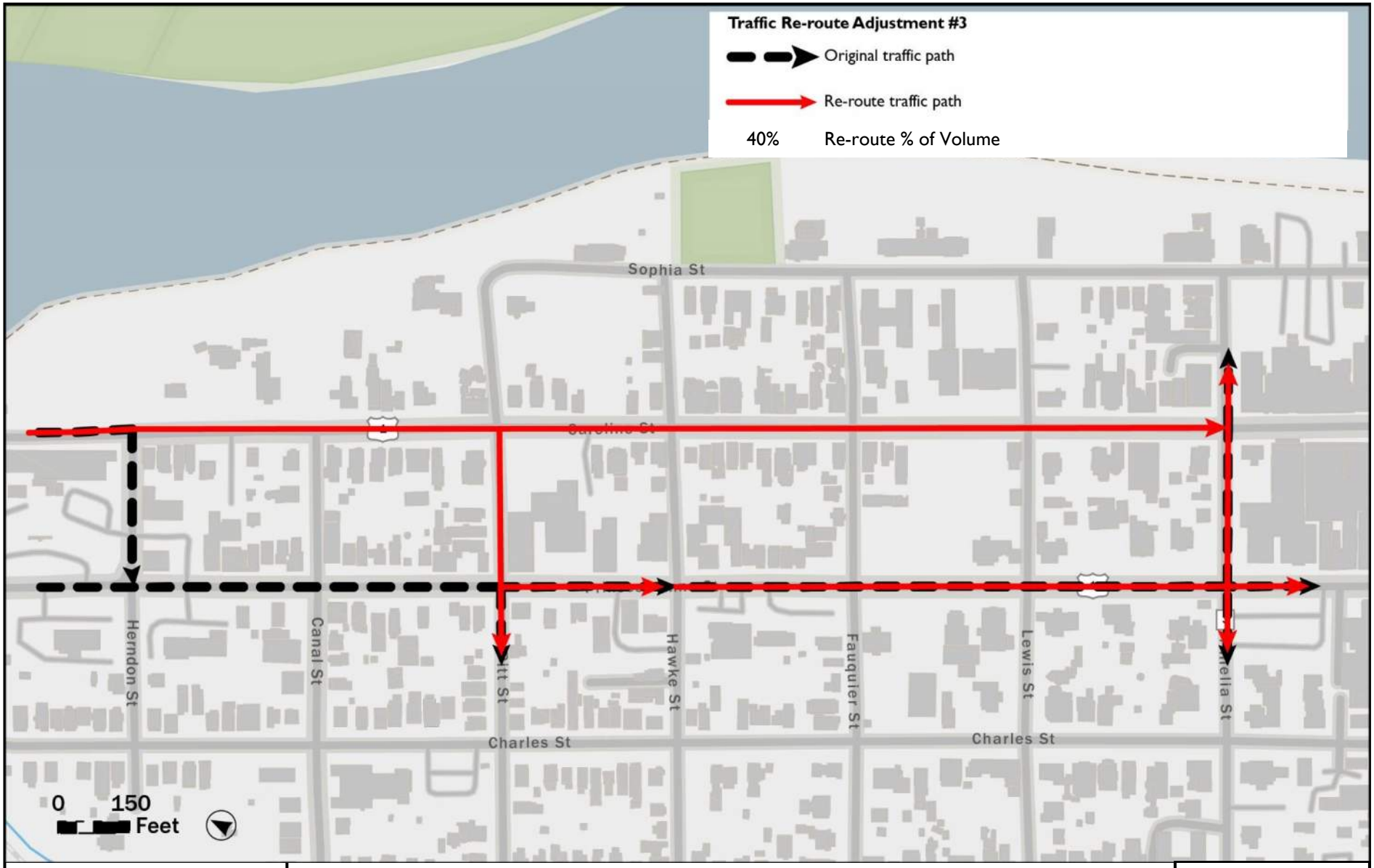
Appendix E




TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

North Princess Anne/Caroline Traffic Re-route Adjustment #2
Fredericksburg Downtown Engineering Study
City of Fredericksburg, Virginia

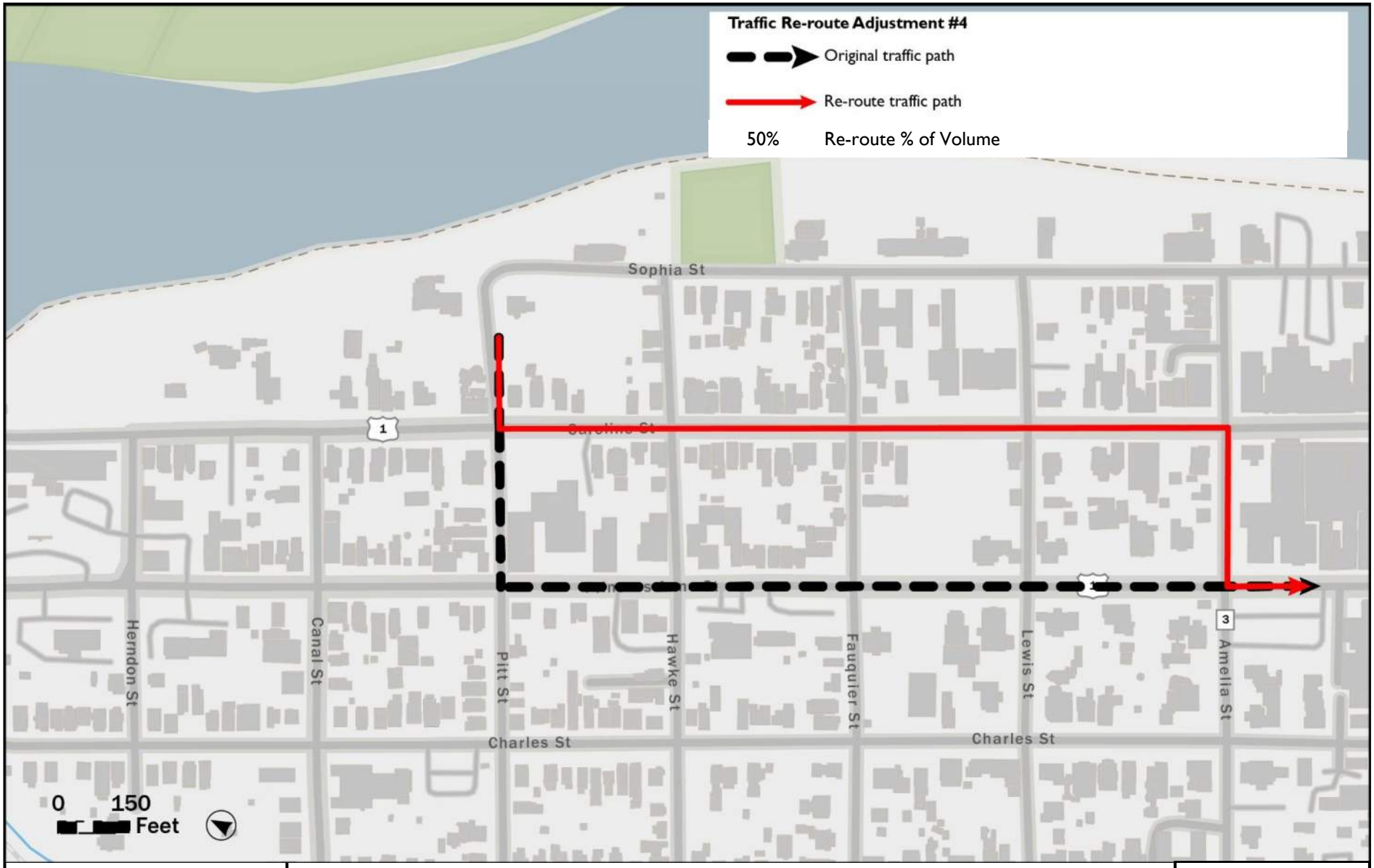
Appendix E




TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

North Princess Anne/Caroline Traffic Re-route Adjustment #3
Fredericksburg Downtown Engineering Study
City of Fredericksburg, Virginia

Appendix E

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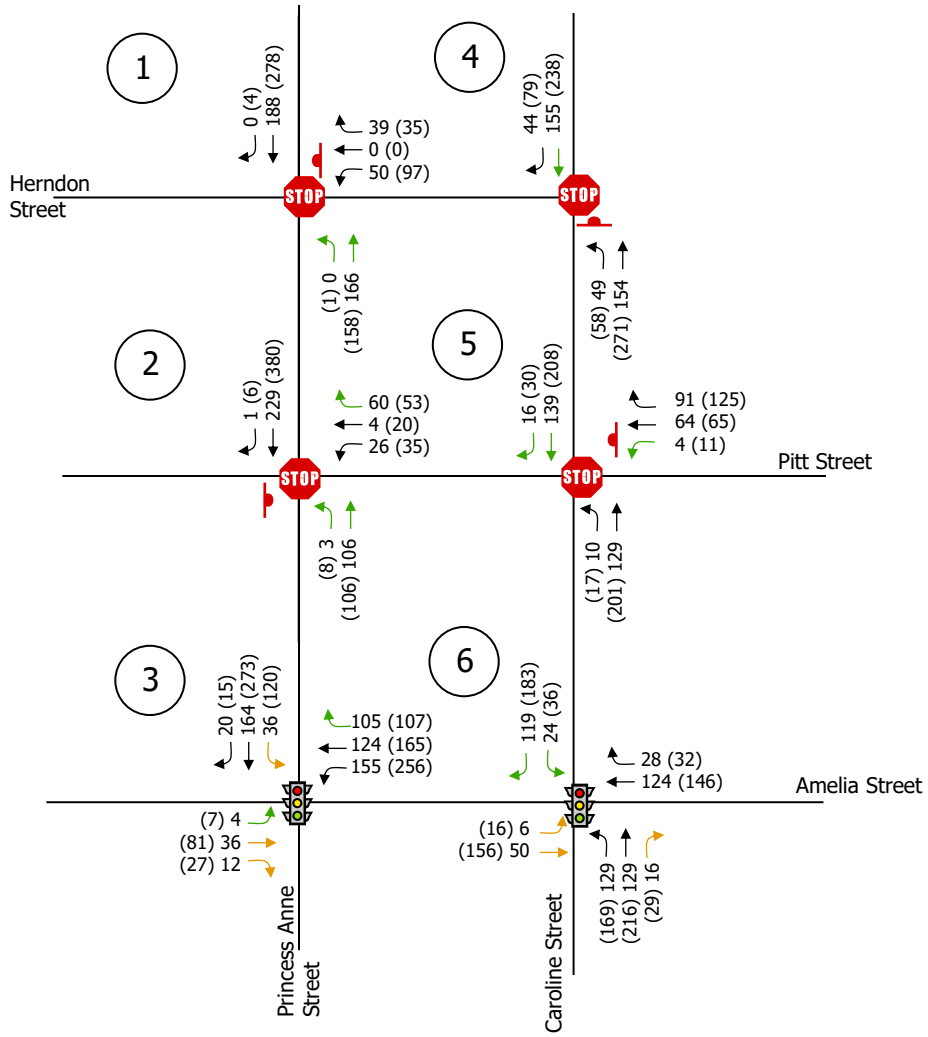
North Princess Anne/Caroline Traffic Re-route Adjustment #4
Fredericksburg Downtown Engineering Study
City of Fredericksburg, Virginia

Appendix E




NOT TO SCALE

LEGEND:

- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Sign Location
- Yield
- Lane Configuration
- 00 AM Peak Hour Volumes
- (00) PM Peak Hour Volumes
- 00 Amelia + William Conversion Re-Route Volumes
- 00 New Movement Volumes

TIMMONS GROUP
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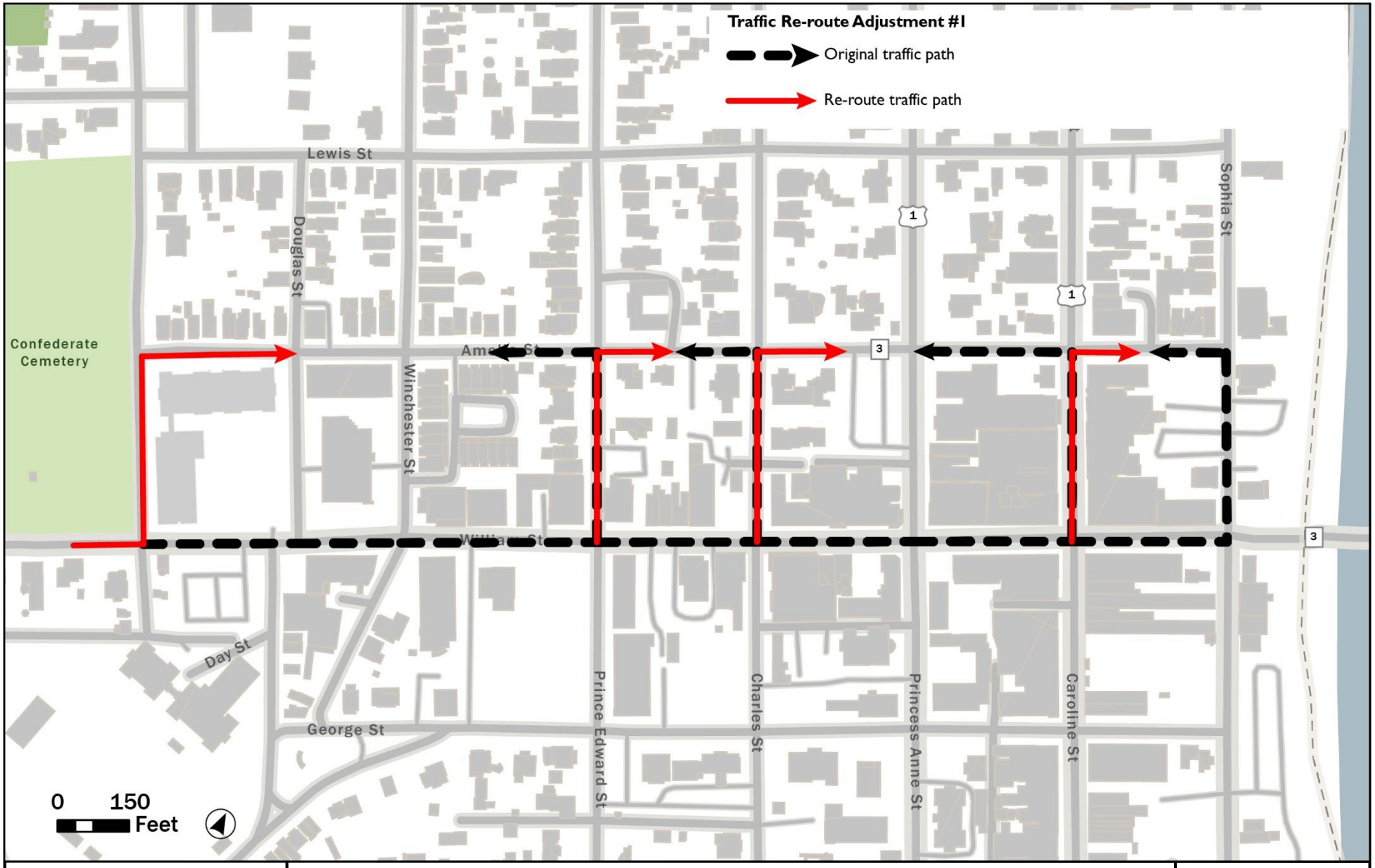
# North Princess Anne/Caroline 2034 TWC Volumes
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

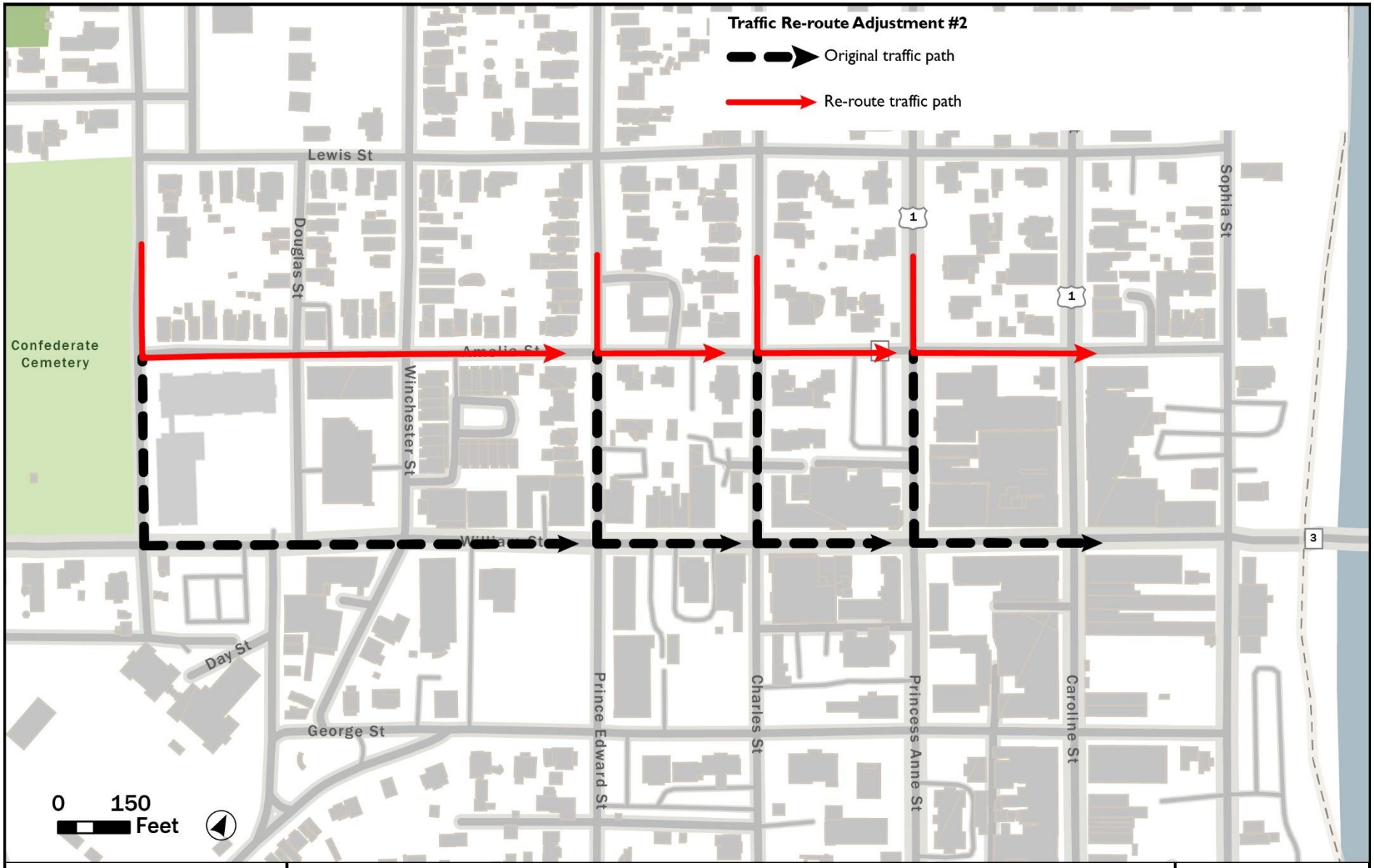
Appendix E




TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

# William/Amelia Traffic Re-route Adjustment #1
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Appendix E

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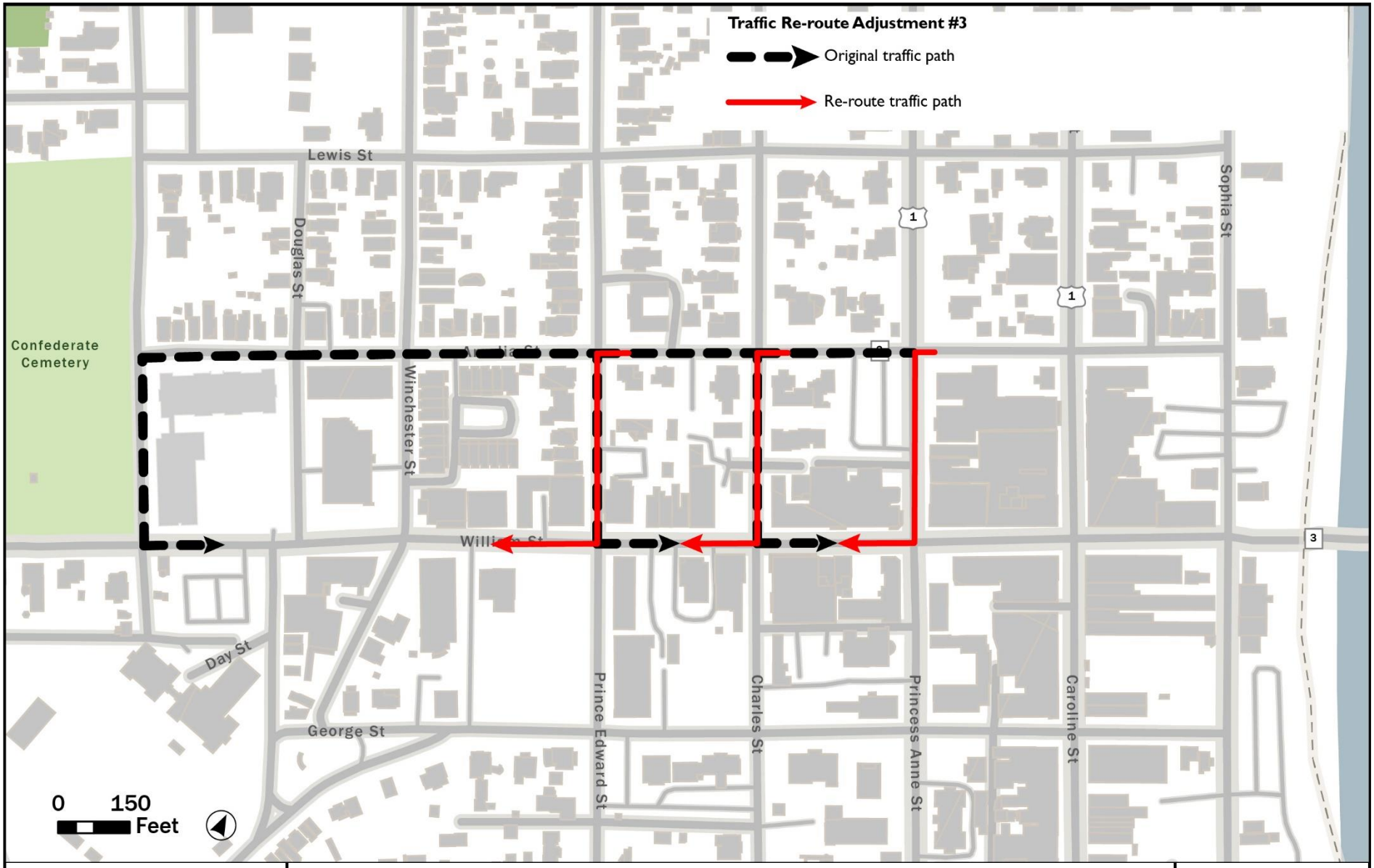
YOUR VISION ACHIEVED THROUGH OURS.

# William/Amelia Traffic Re-route Adjustment #2
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Appendix
E

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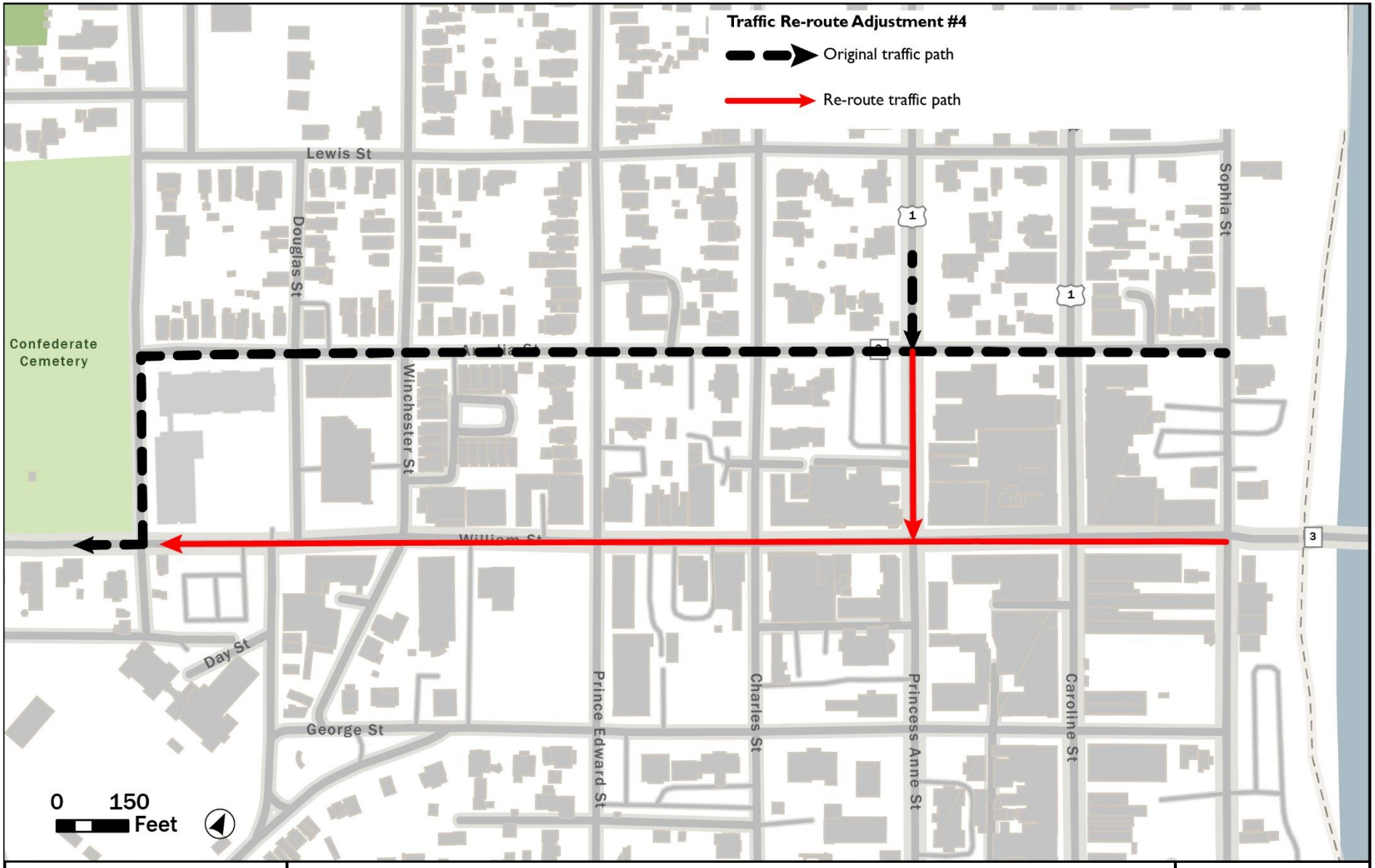
# William/Amelia Traffic Re-route Adjustment #3
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Appendix
E

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# William/Amelia Traffic Re-route Adjustment #4
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Appendix
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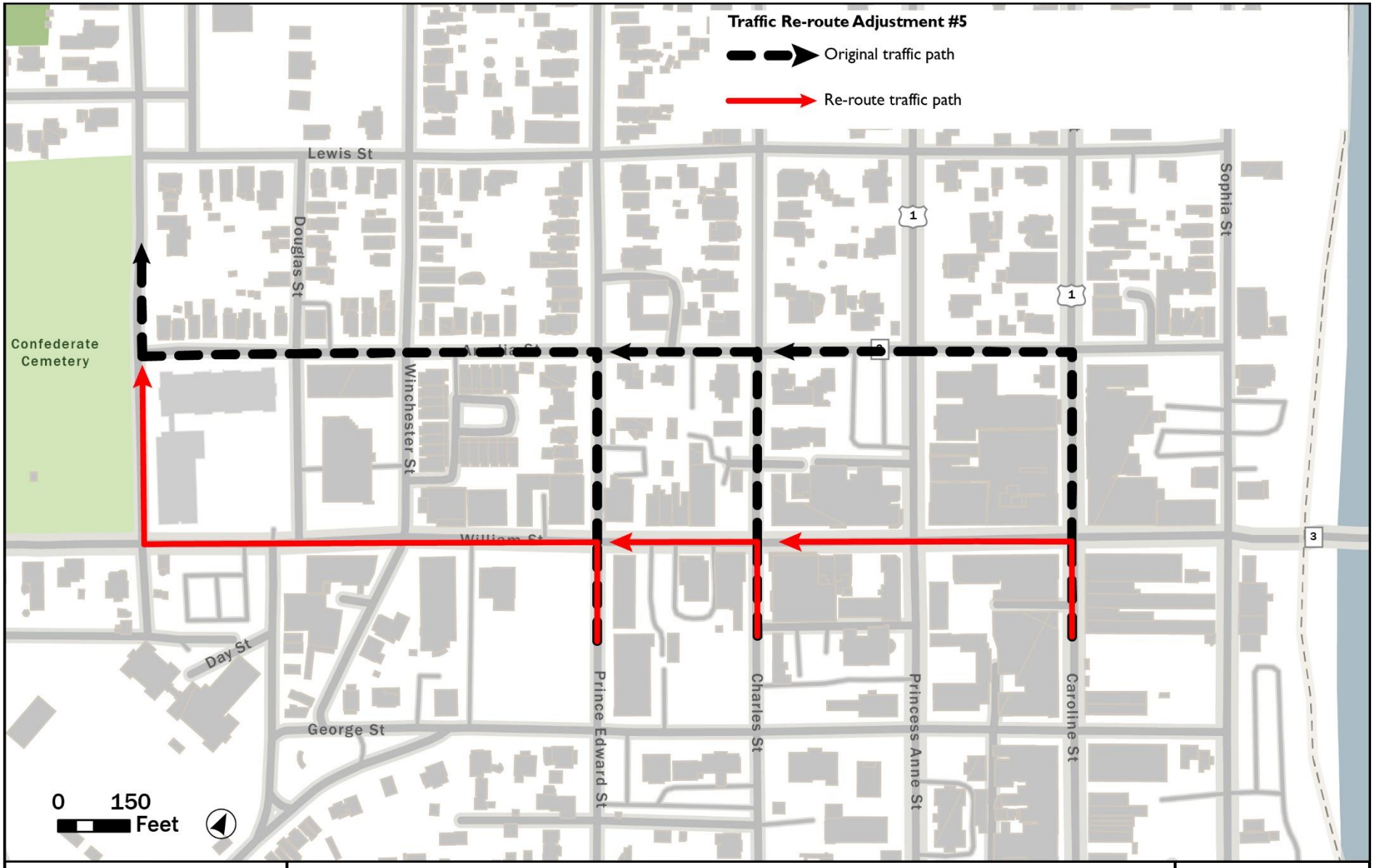


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# William/Amelia Traffic Re-route Adjustment #5
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Appendix
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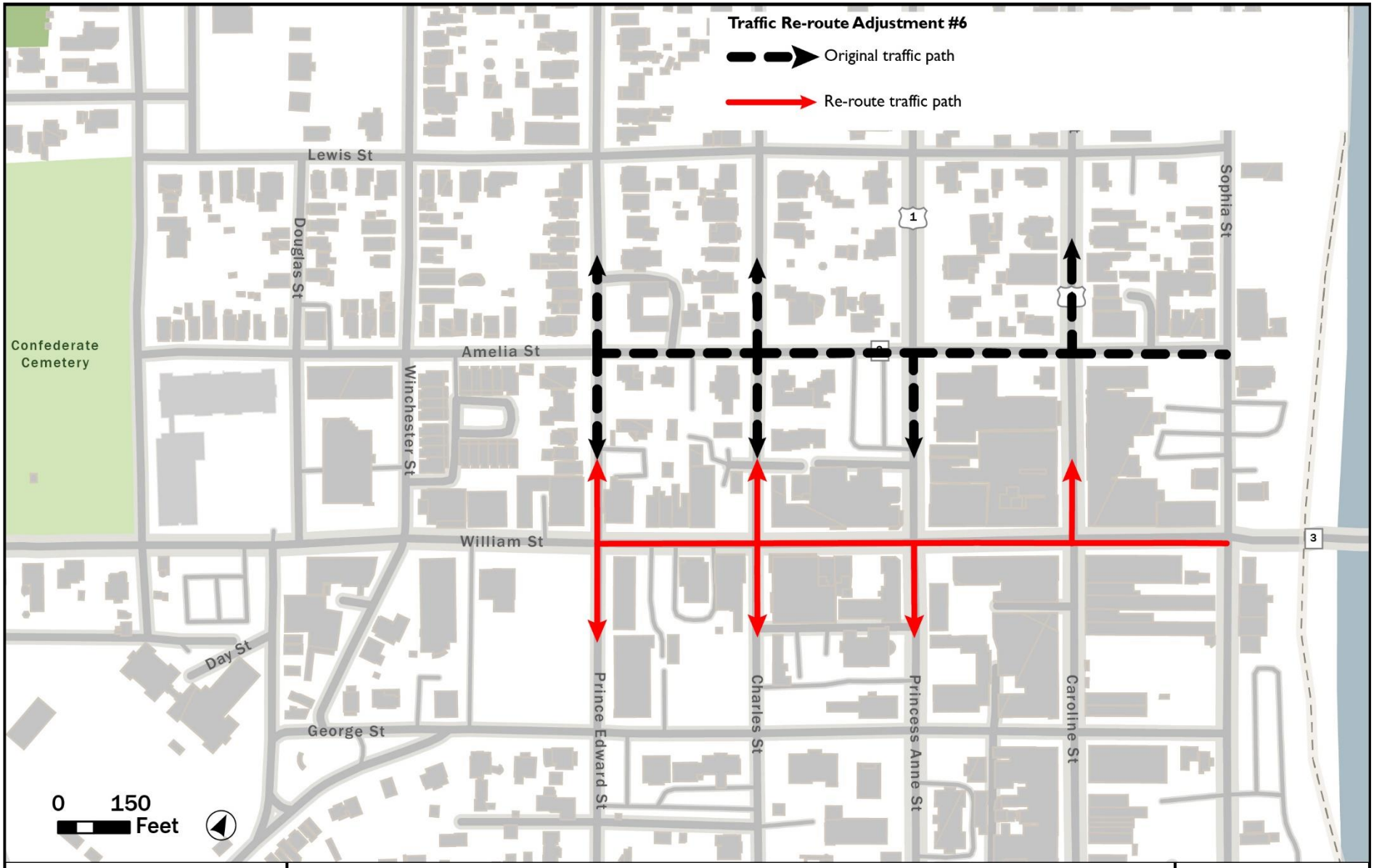


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# William/Amelia Traffic Re-route Adjustment #6
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Appendix
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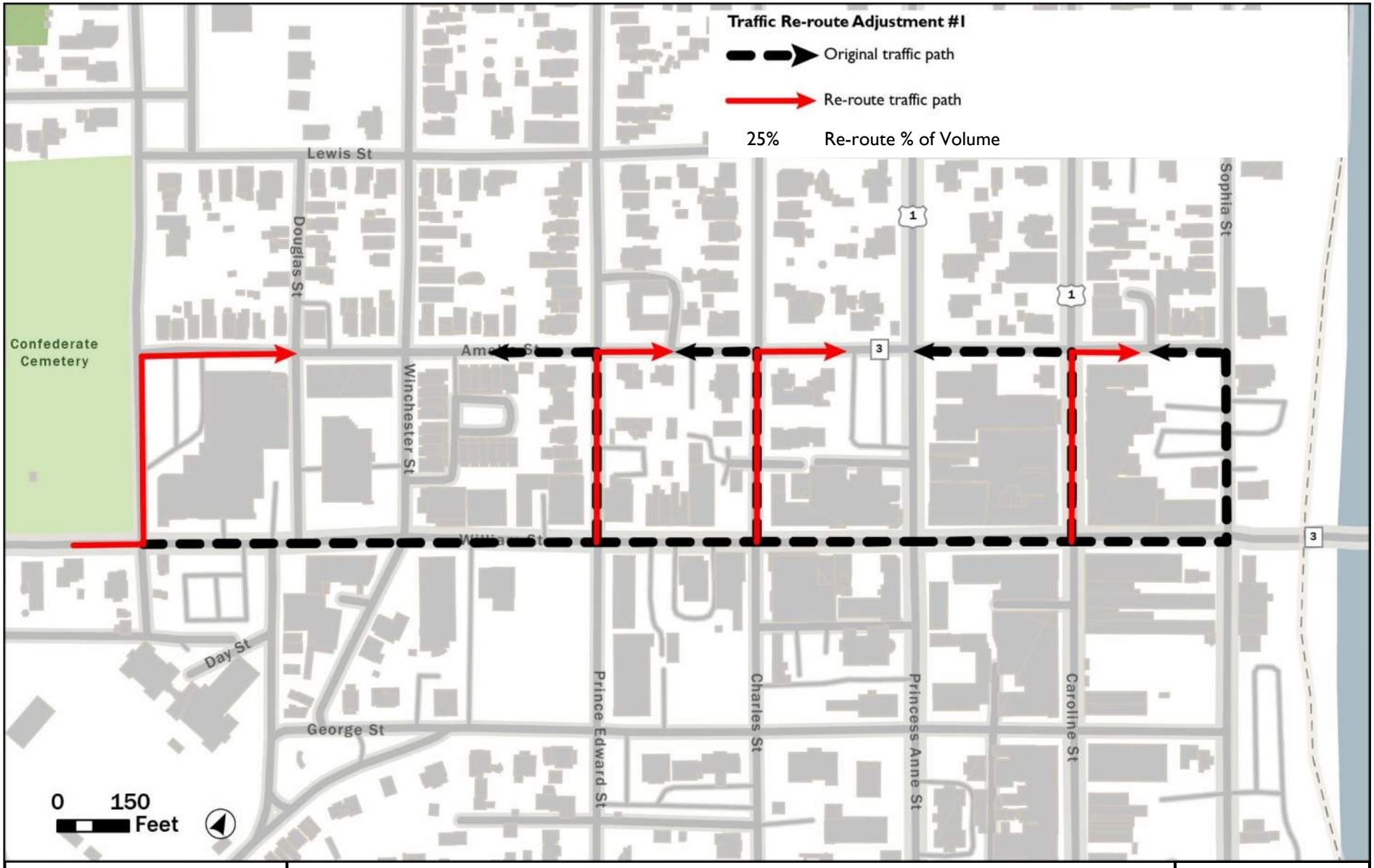


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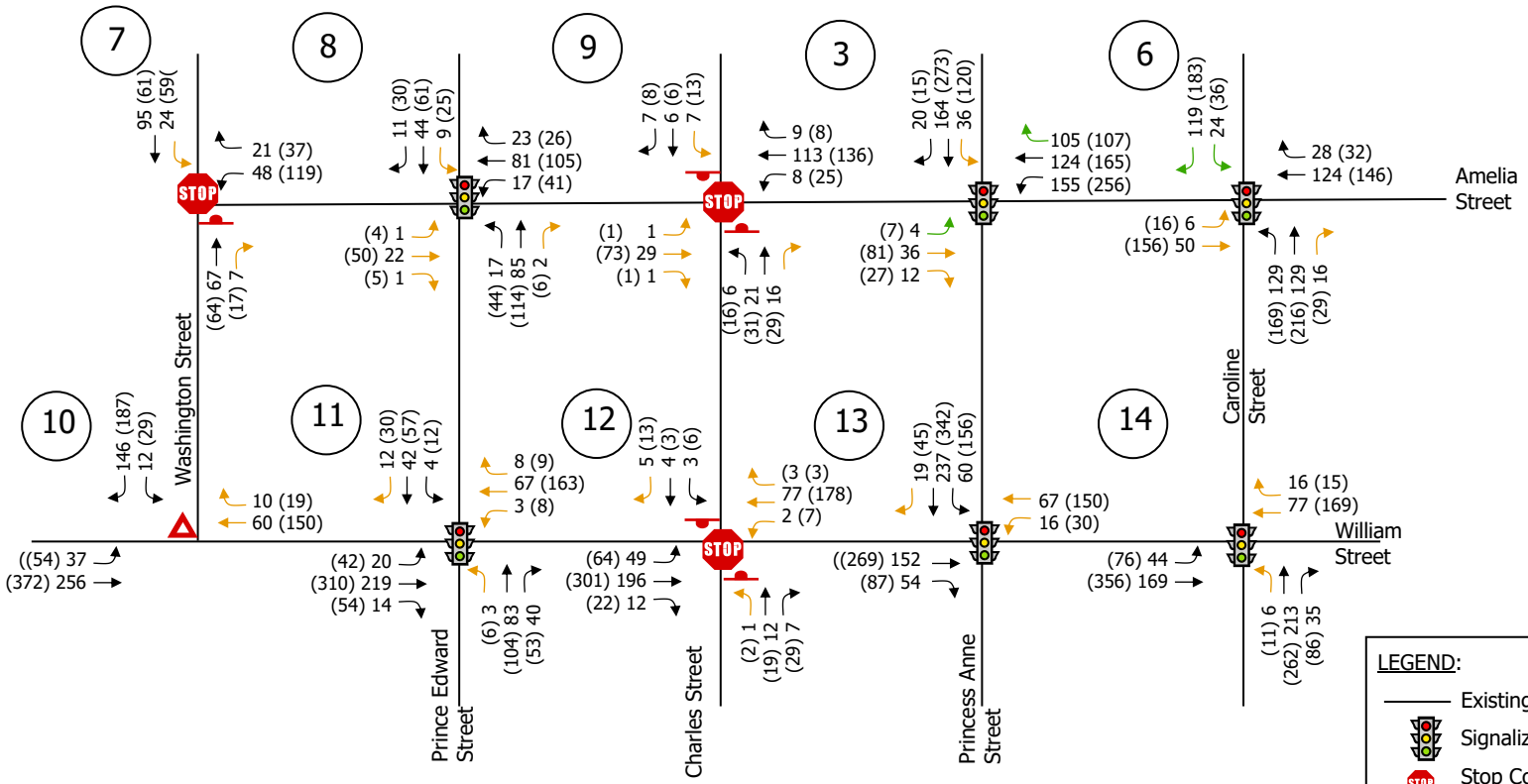
# William/Amelia Traffic Re-route Adjustment #1
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Appendix E




LEGEND:

- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Sign Location
- Yield
- Lane Configuration
- 00 AM Peak Hour Volumes
- (00) PM Peak Hour Volumes
- 00 Amelia + William Conversion Re-Route Volumes
- 00 New Movement Volumes

NOT TO SCALE

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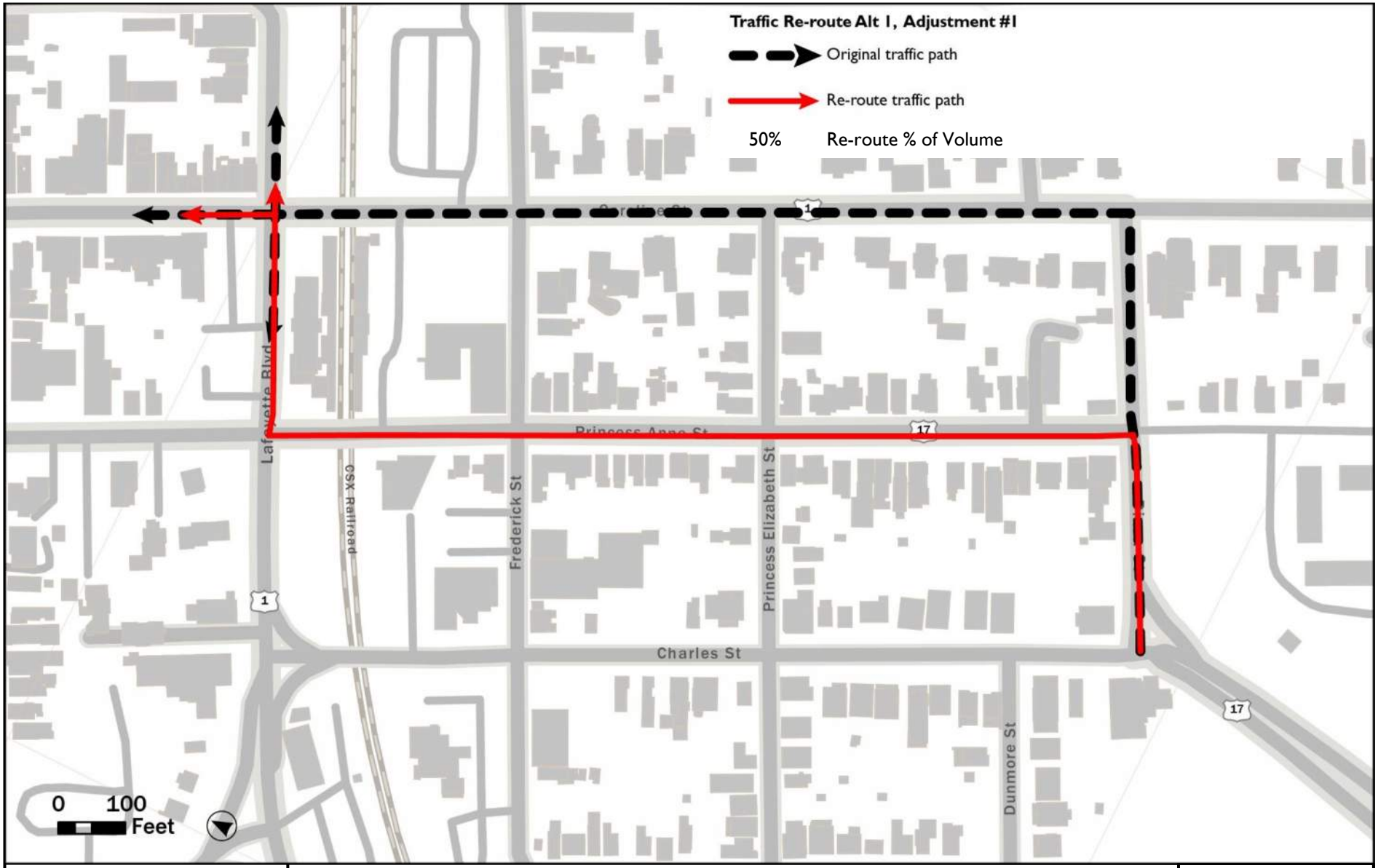
# William/Amelia 2034 TWC Volumes
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Appendix E

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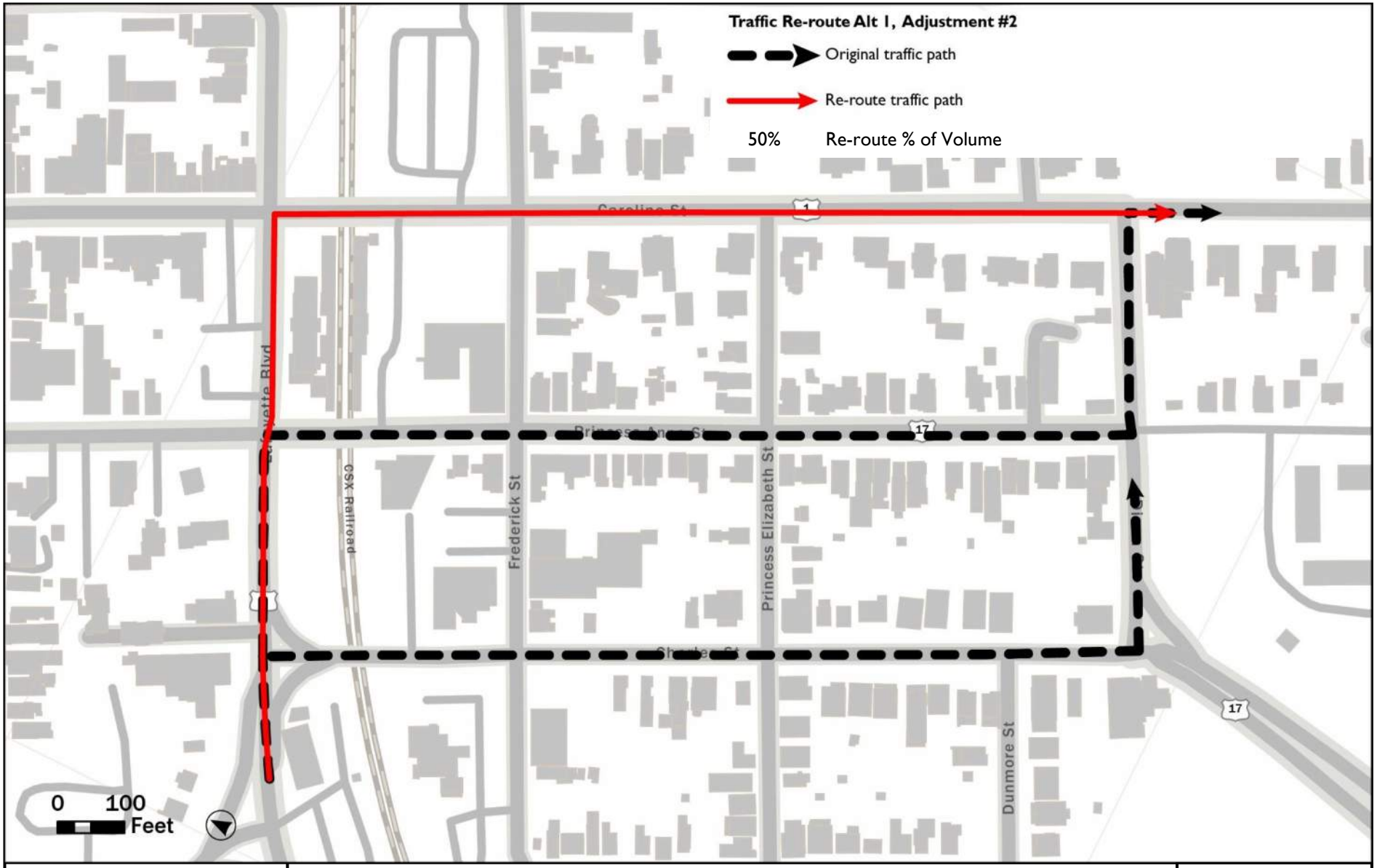
YOUR VISION ACHIEVED THROUGH OURS.

South Princess Anne/Caroline Traffic Re-route Adjustment #1, Alt 1
Fredericksburg Downtown Engineering Study
City of Fredericksburg, Virginia

Appendix E

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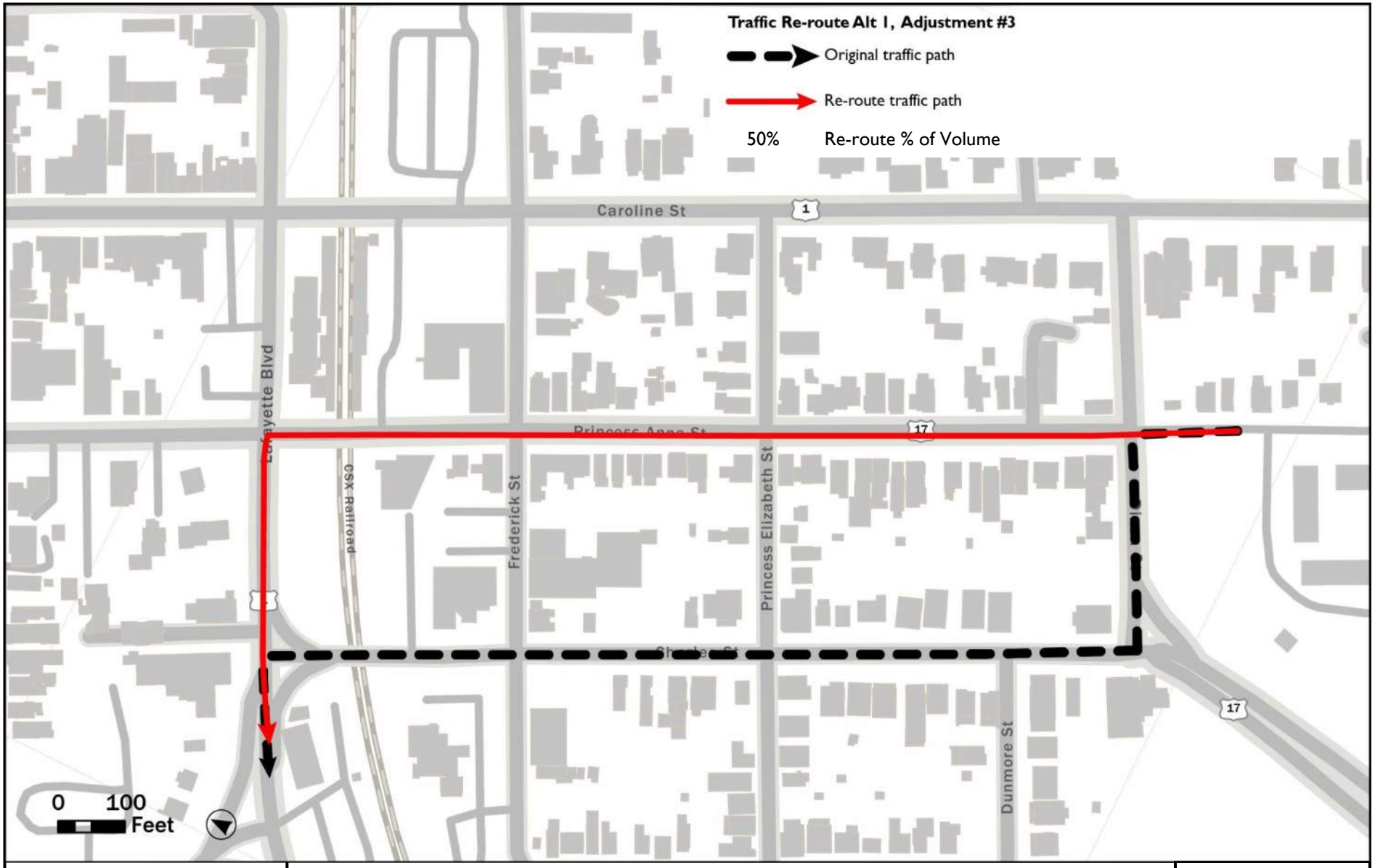
South Princess Anne/Caroline Traffic Re-route Adjustment #2, Alt 1
Fredericksburg Downtown Engineering Study
City of Fredericksburg, Virginia

Appendix E

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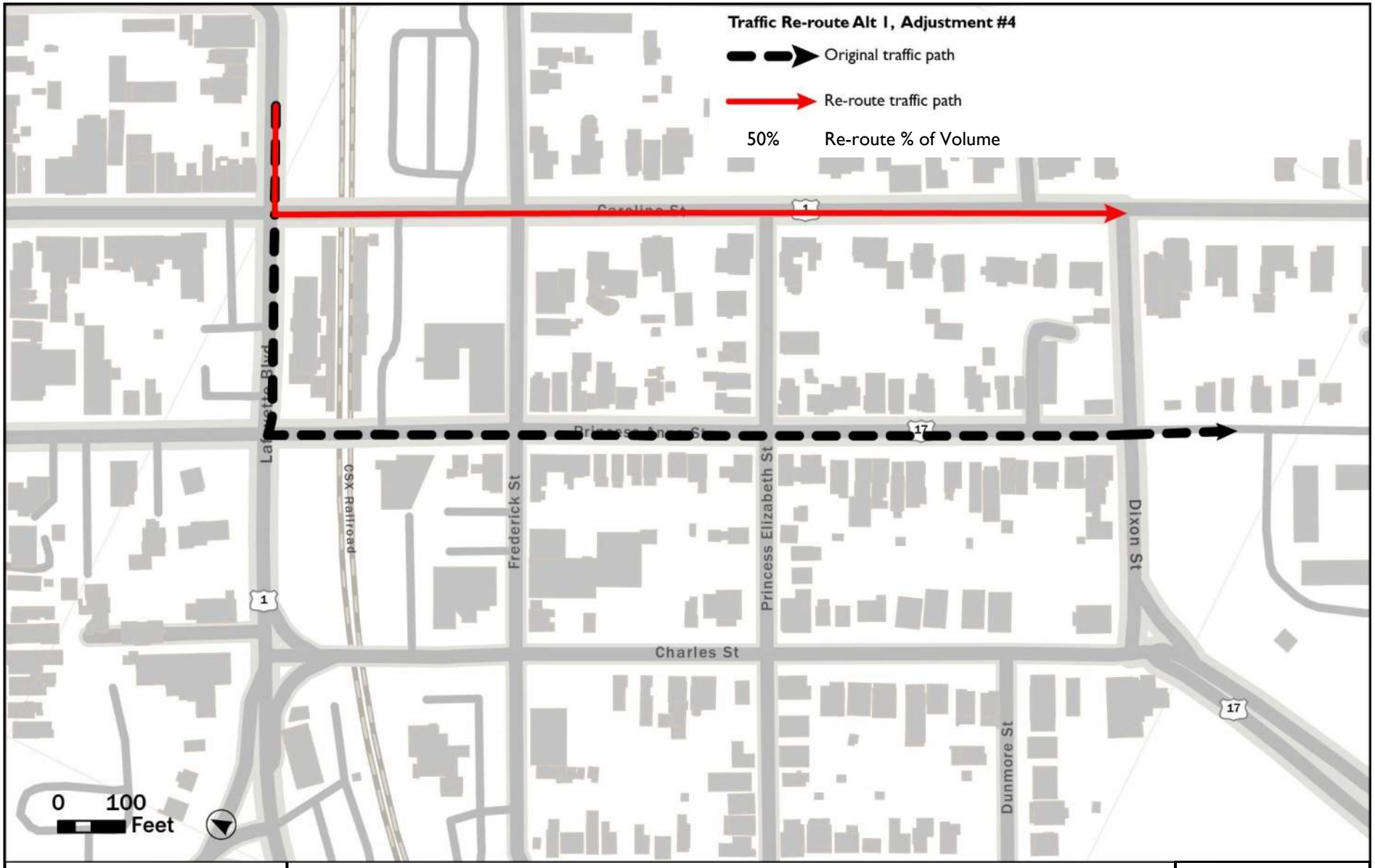
South Princess Anne/Caroline Traffic Re-route Adjustment #3, Alt 1
Fredericksburg Downtown Engineering Study
City of Fredericksburg, Virginia

Appendix E

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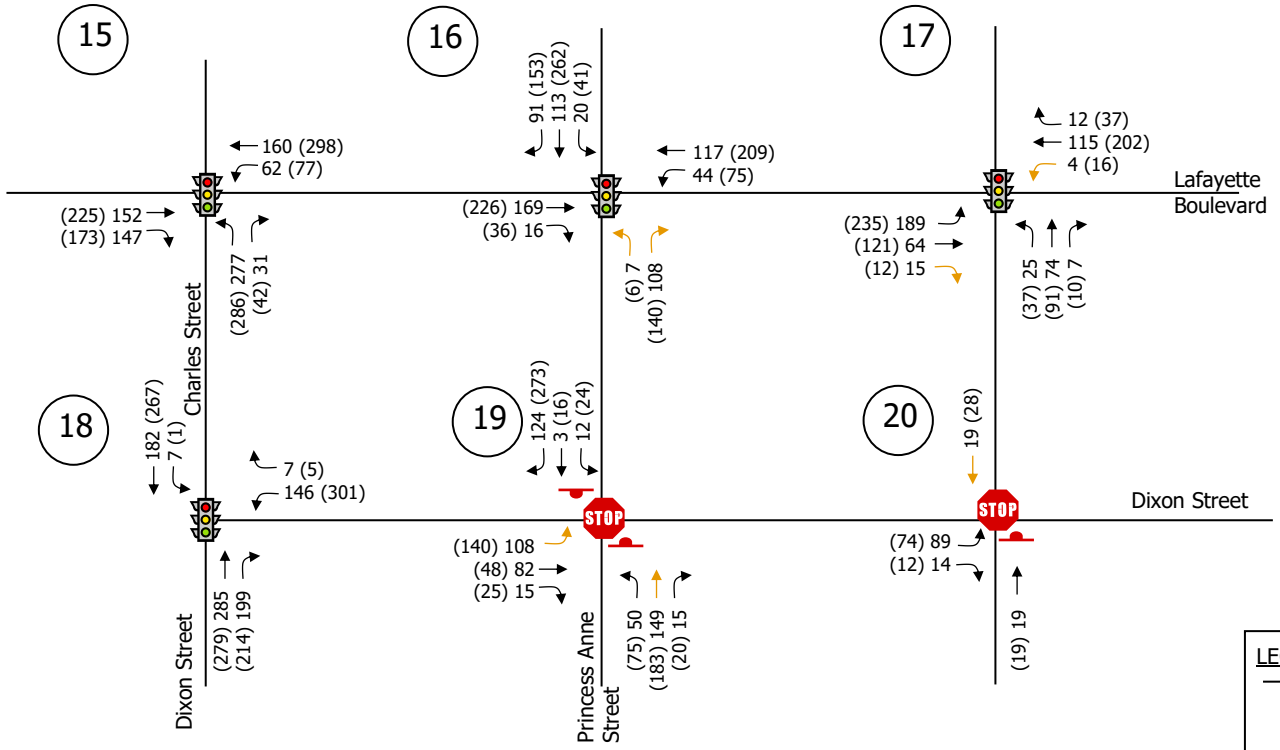
South Princess Anne/Caroline Traffic Re-route Adjustment #4, Alt 1
Fredericksburg Downtown Engineering Study
City of Fredericksburg, Virginia

Appendix E




LEGEND:

- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Sign Location
- Yield
- Lane Configuration
- 00 AM Peak Hour Volumes
- (00) PM Peak Hour Volumes
- 00 Re-Route Volumes

NOT TO SCALE

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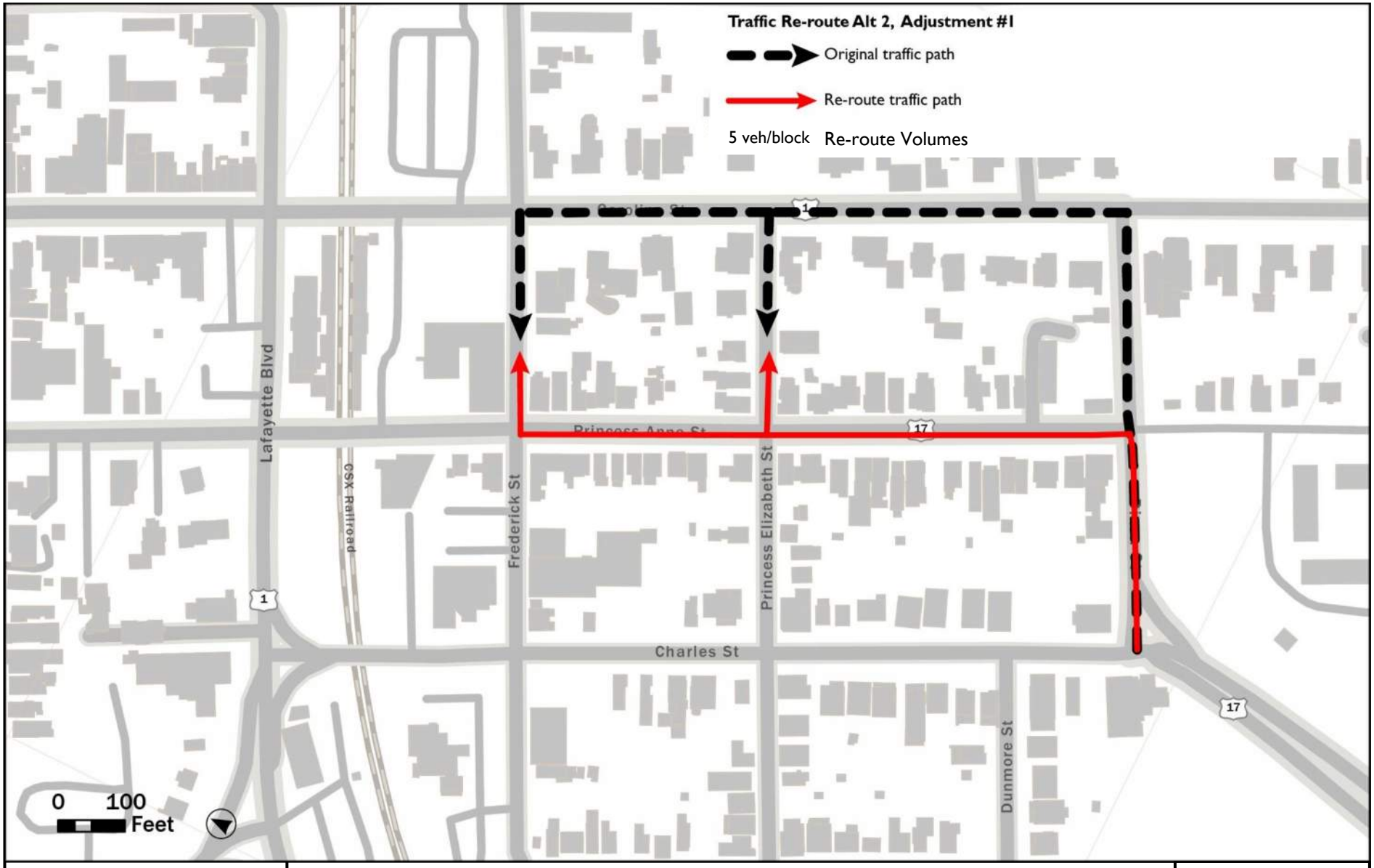
# South Princess Anne/Caroline, Alt 1 2034 TWC Volumes
## Fredericksburg Downtown Engineering Study
## City of Fredericksburg, Virginia

Appendix E

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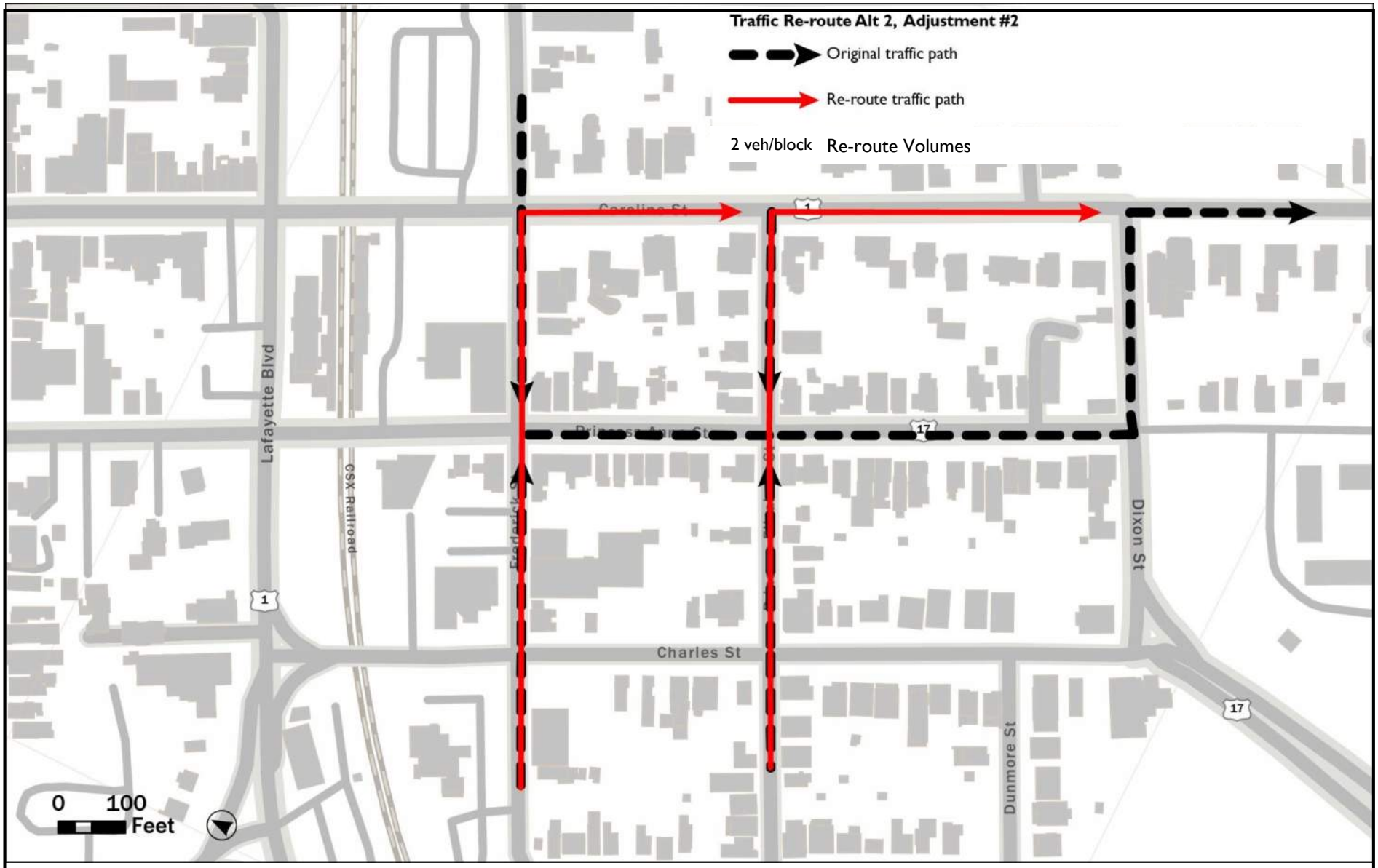
YOUR VISION ACHIEVED THROUGH OURS.

Princess Anne/Caroline South Traffic Re-route Adjustment #1, Alt 2
Fredericksburg Downtown Engineering Study
City of Fredericksburg, Virginia

Appendix E

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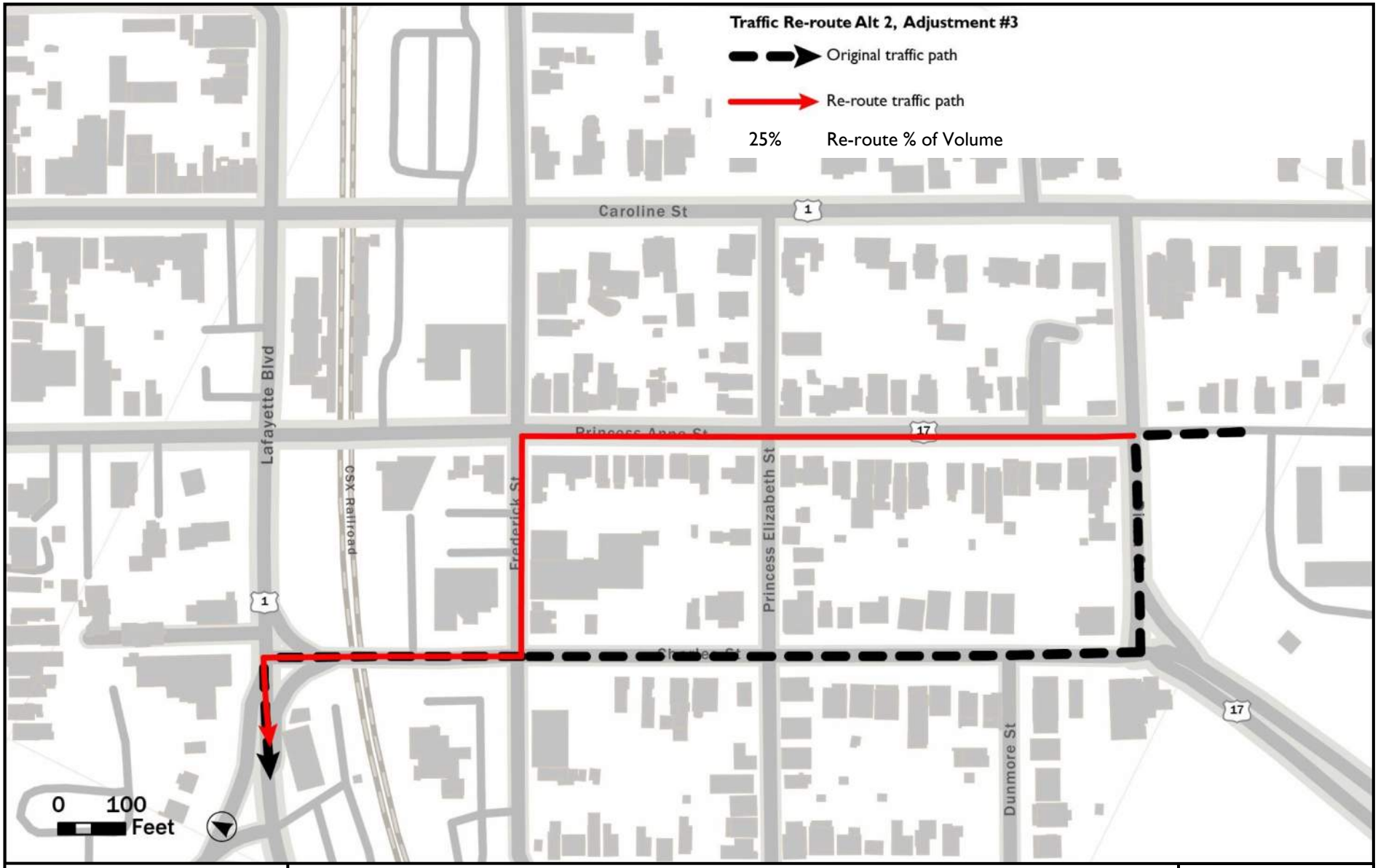
YOUR VISION ACHIEVED THROUGH OURS.

Princess Anne/Caroline South Traffic Re-route Adjustment #2, Alt 2
Fredericksburg Downtown Engineering Study
City of Fredericksburg, Virginia

Appendix E

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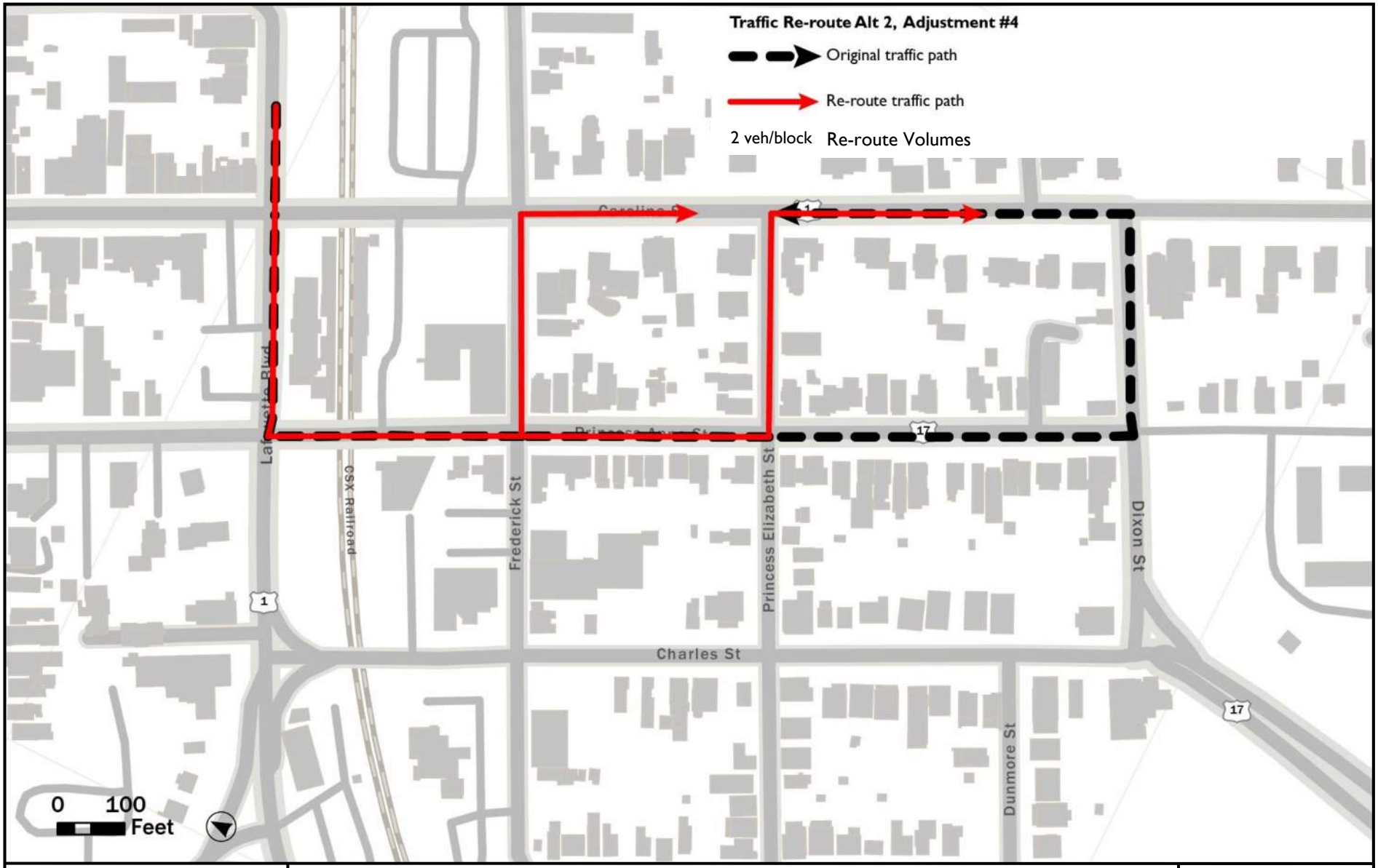
Princess Anne/Caroline South Traffic Re-route Adjustment #3, Alt 2
Fredericksburg Downtown Engineering Study
City of Fredericksburg, Virginia

Appendix E

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Princess Anne/Caroline South Traffic Re-route Adjustment #4, Alt 2
Fredericksburg Downtown Engineering Study
City of Fredericksburg, Virginia

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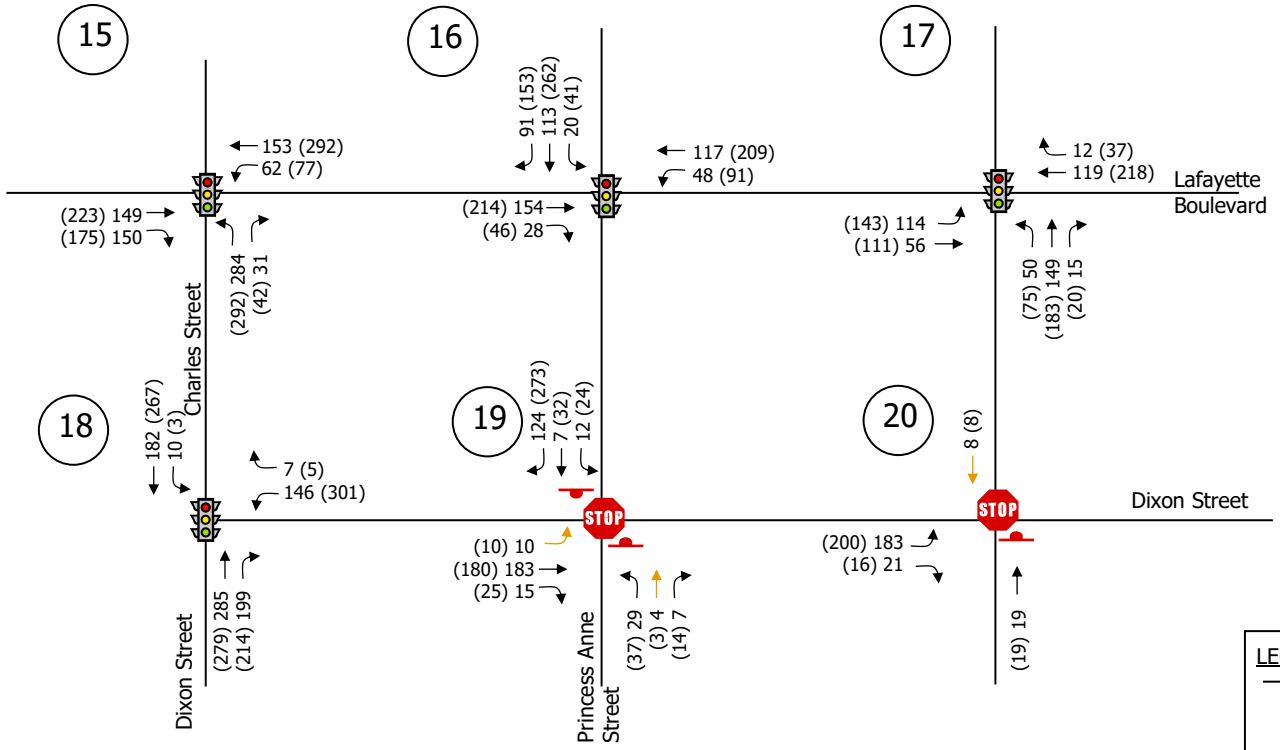


NOT TO SCALE

LEGEND:

- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Sign Location
- Yield
- Lane Configuration
- 00 AM Peak Hour Volumes
- (00) PM Peak Hour Volumes
- 00 Re-Route Volumes

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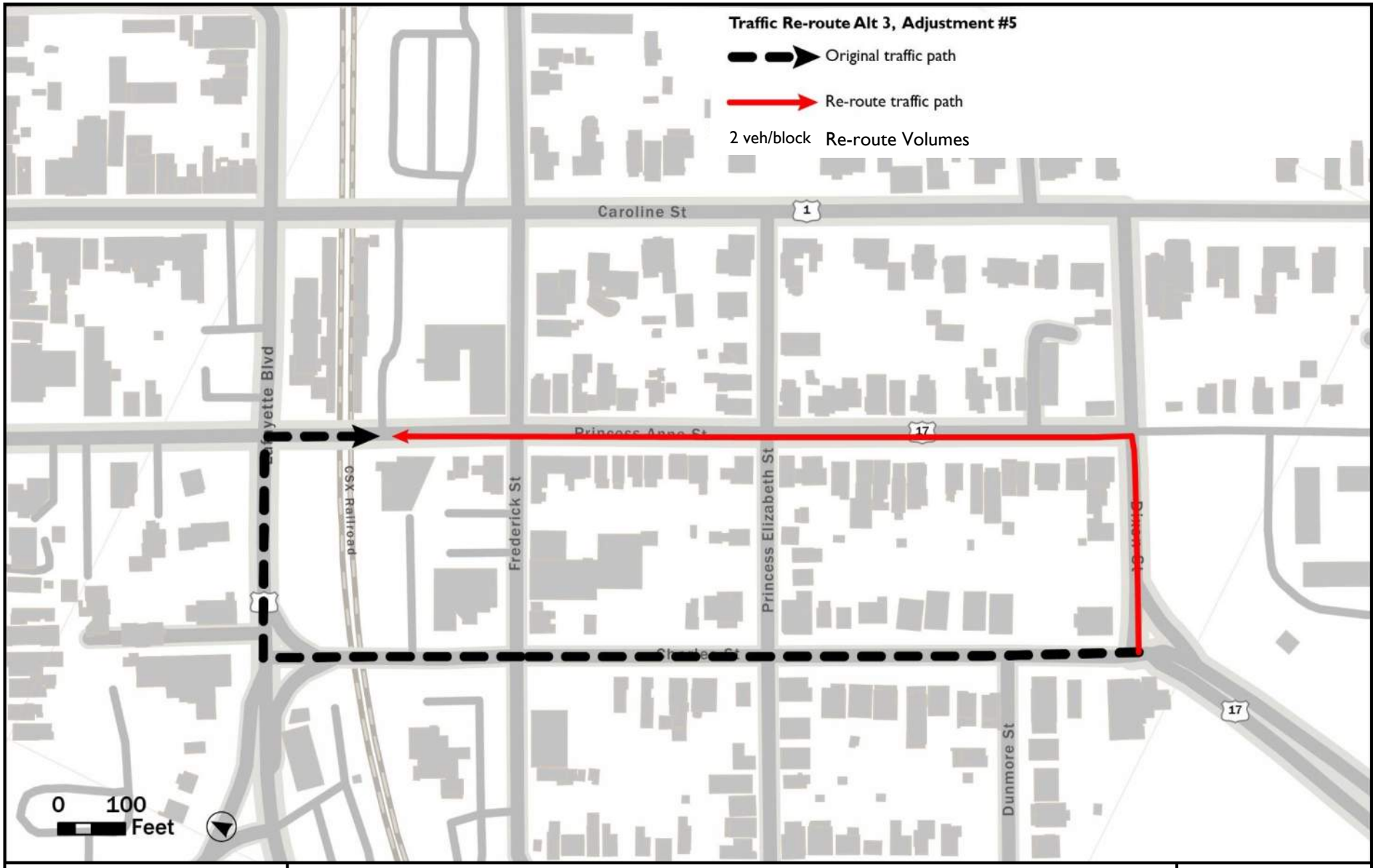
# South Princess Anne/Caroline, Alt 2 2034 TWC Volumes
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Appendix E

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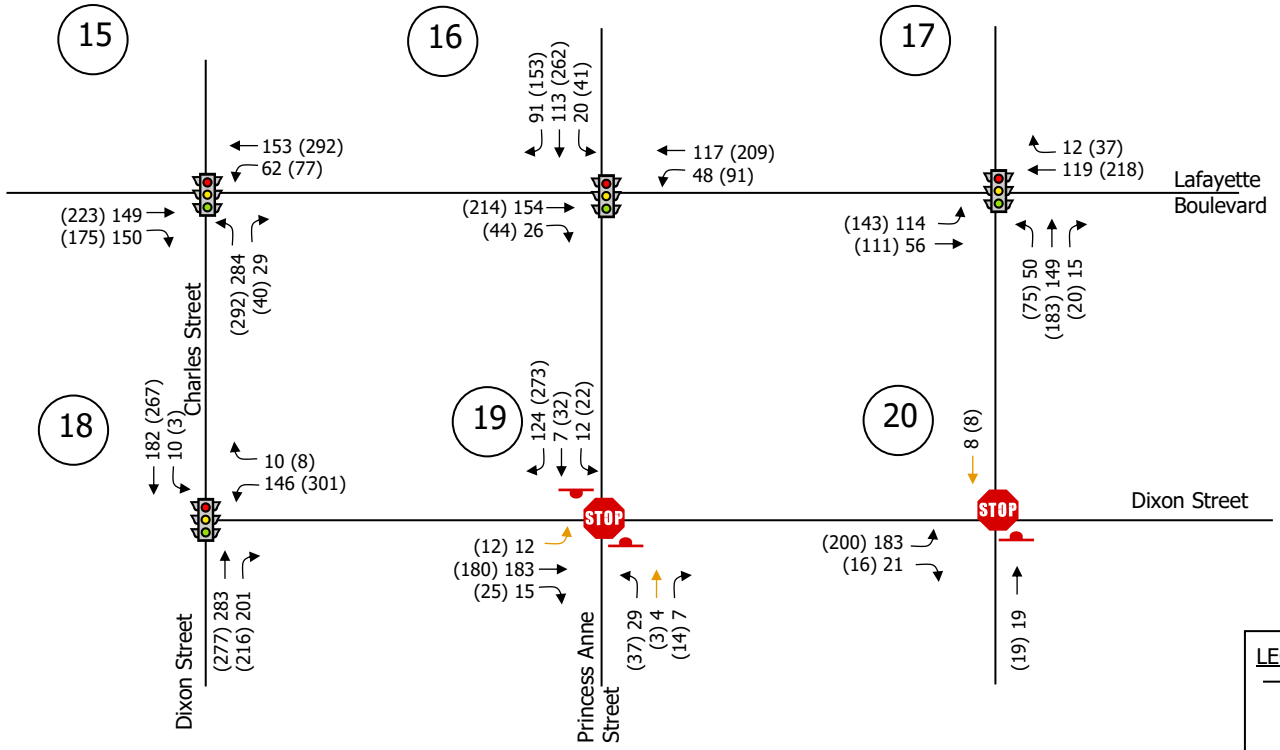
Princess Anne/Caroline South Traffic Re-route Adjustment #5, Alt 3
Fredericksburg Downtown Engineering Study
City of Fredericksburg, Virginia

Appendix E




LEGEND:

- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Sign Location
- Yield
- Lane Configuration
- 00 AM Peak Hour Volumes
- (00) PM Peak Hour Volumes
- 00 Re-Route Volumes

NOT TO SCALE

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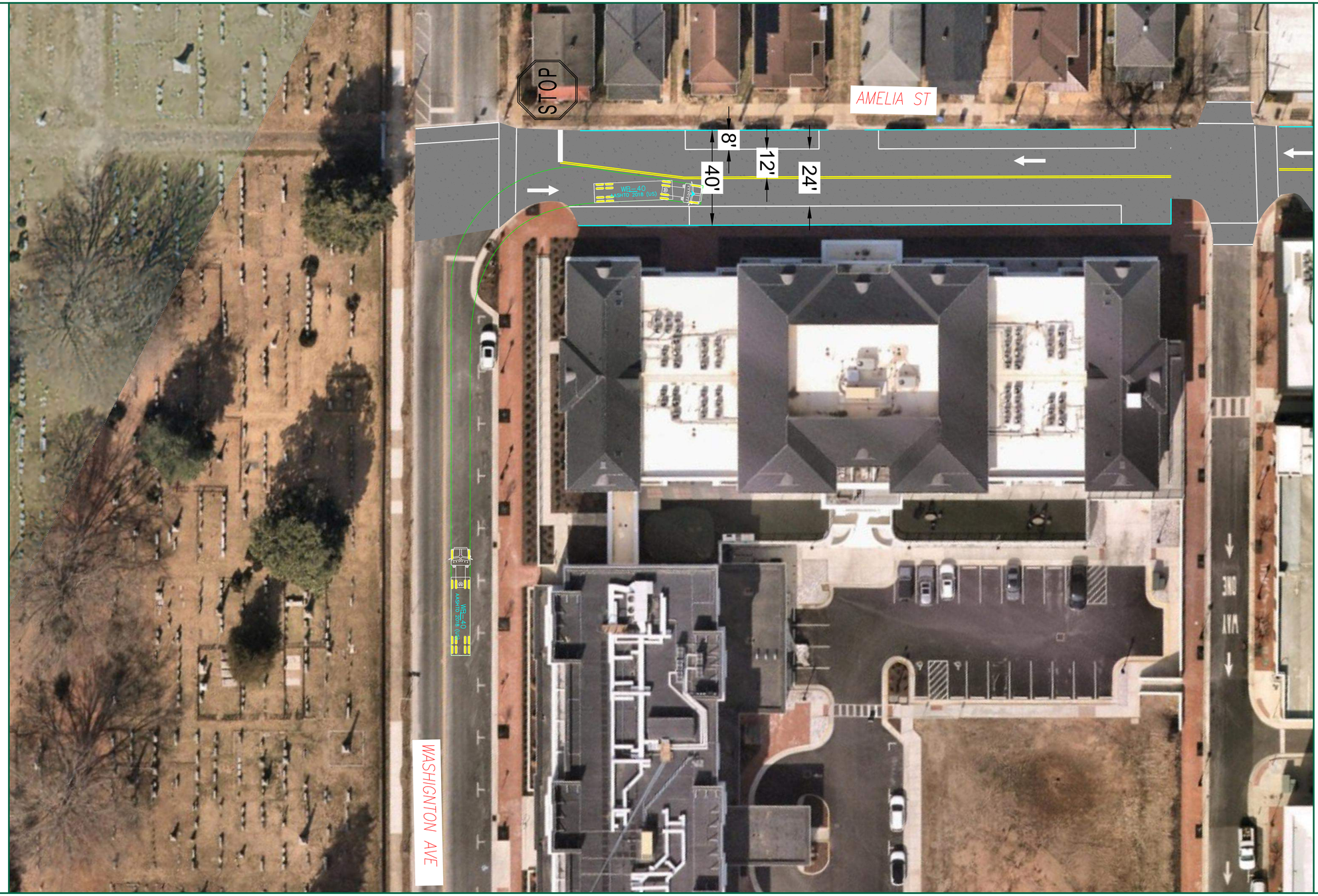
# South Princess Anne/Caroline, Alt 3 2034 TWC Volumes
# Fredericksburg Downtown Engineering Study
# City of Fredericksburg, Virginia

Appendix E

# APPENDIX E

Turning Radius Diagrams

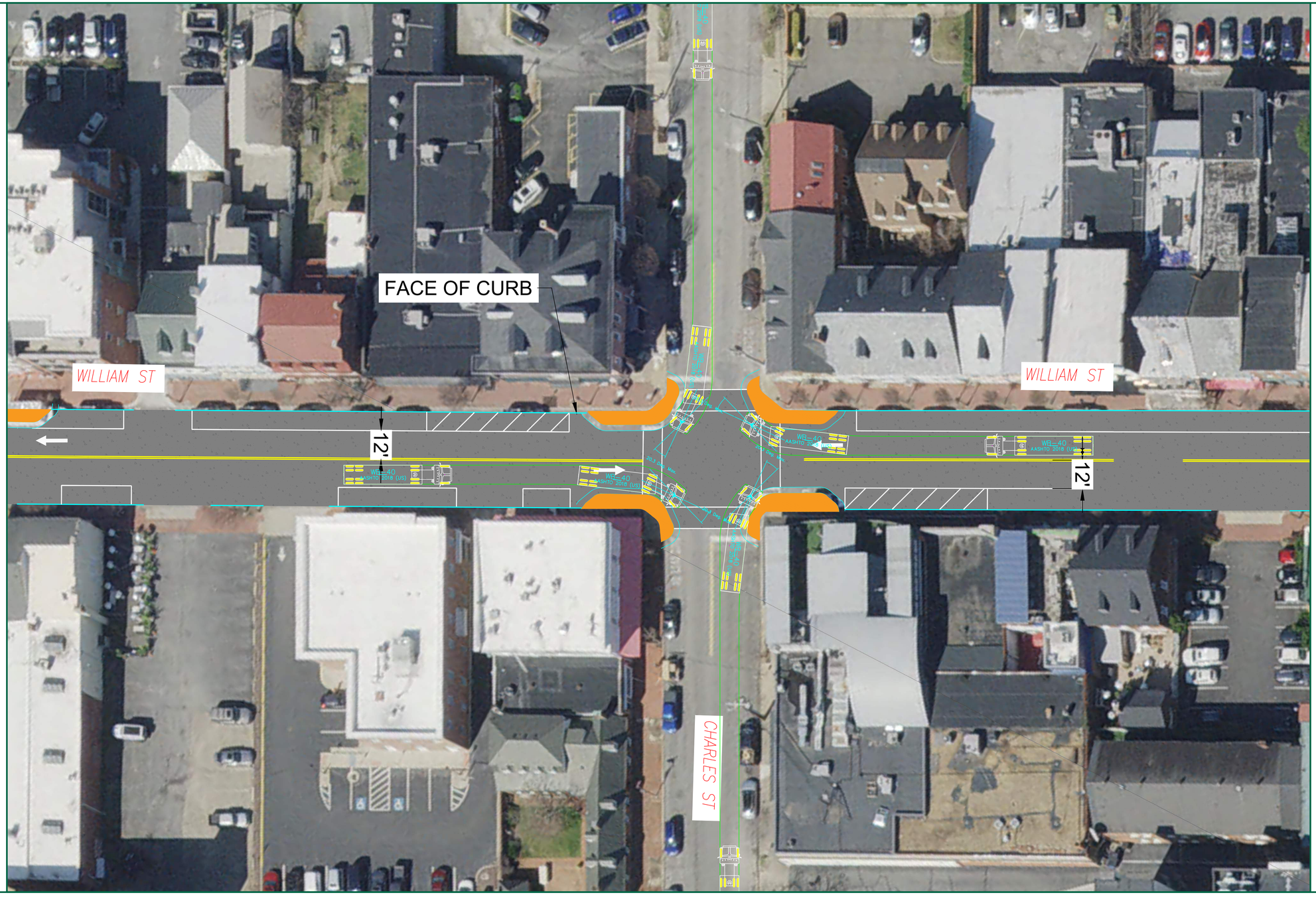



# WASHINGTON AVE & AMELIA ST - AUTOTURN MOVEMENTS
# EB RIGHT TURN

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

NAD 83

SCALE 1"=25'
0 25' 50'




# WILLIAM ST & CHARLES ST - AUTOTURN MOVEMENTS
# 4 WAY RIGHT TURN

TIMMONS GROUP
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NAD 83

SCALE 1"=25'
0 25' 50'

# APPENDIX F

September 2024 City Council Presentation

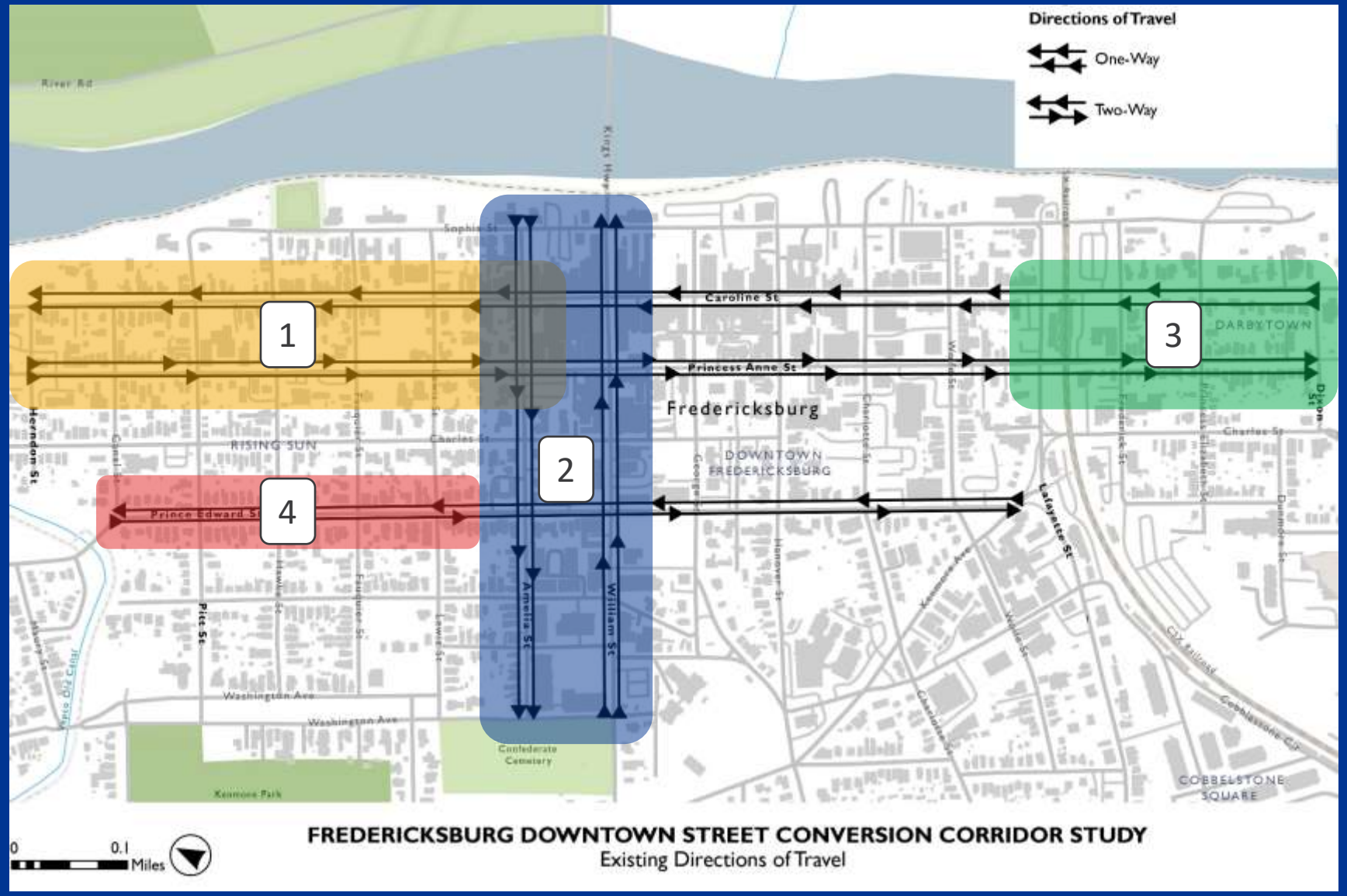
FXBG

# Downtown Fredericksburg Two-Way Conversion Study

September 2024

# Outline

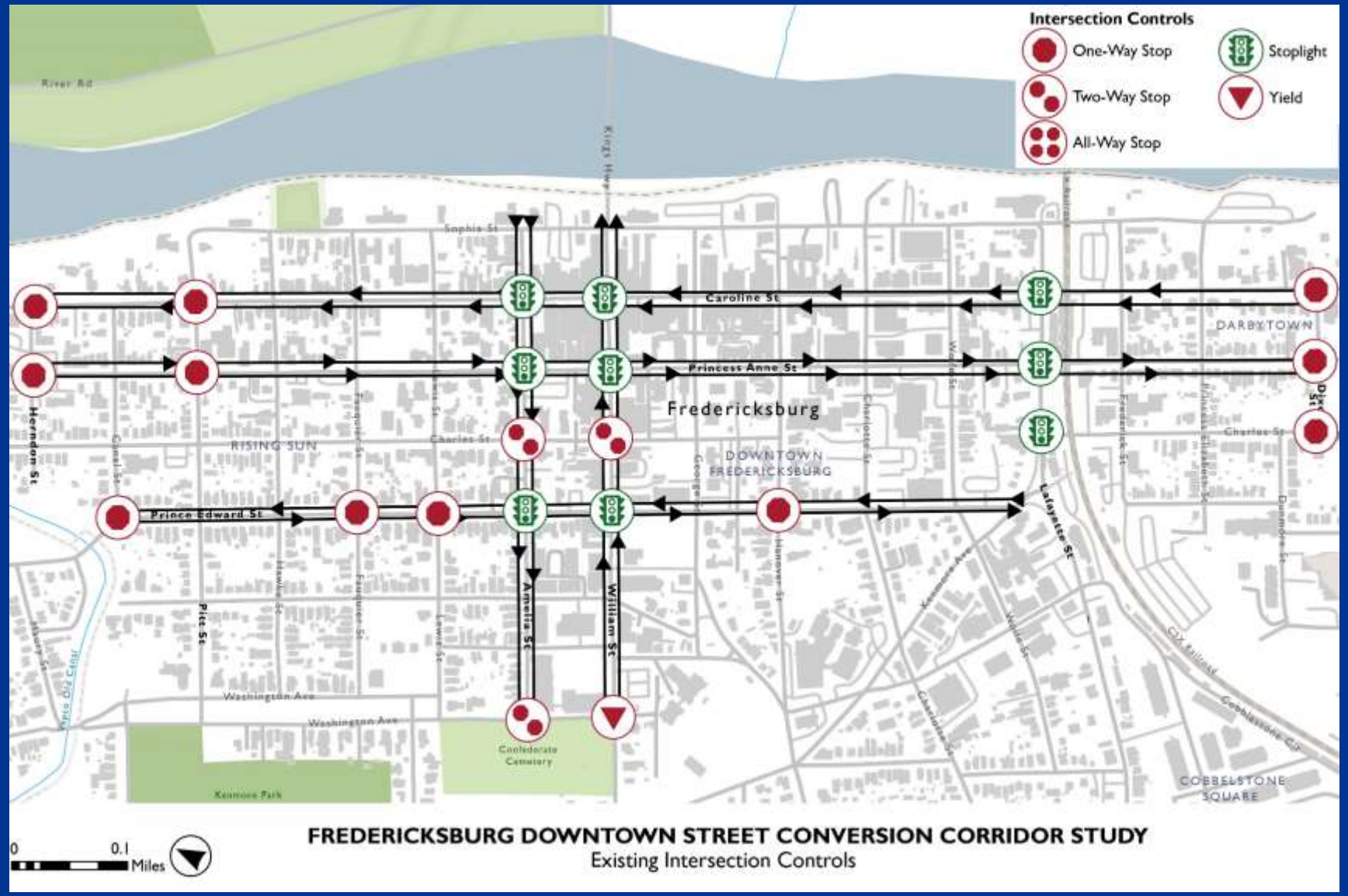
- Existing conditions
  - Study area w/ existing travel directions
  - Existing intersection control
  - LOS
  - Speed
  - Crash history
  - Intersection control analysis
- No build comparison
  - LOS
- Build comparison
  - Proposed travel directions
  - LOS w/ existing intersection control
  - Proposed intersection control
  - LOS w/ recommended AWS
  - Proposed loading zones

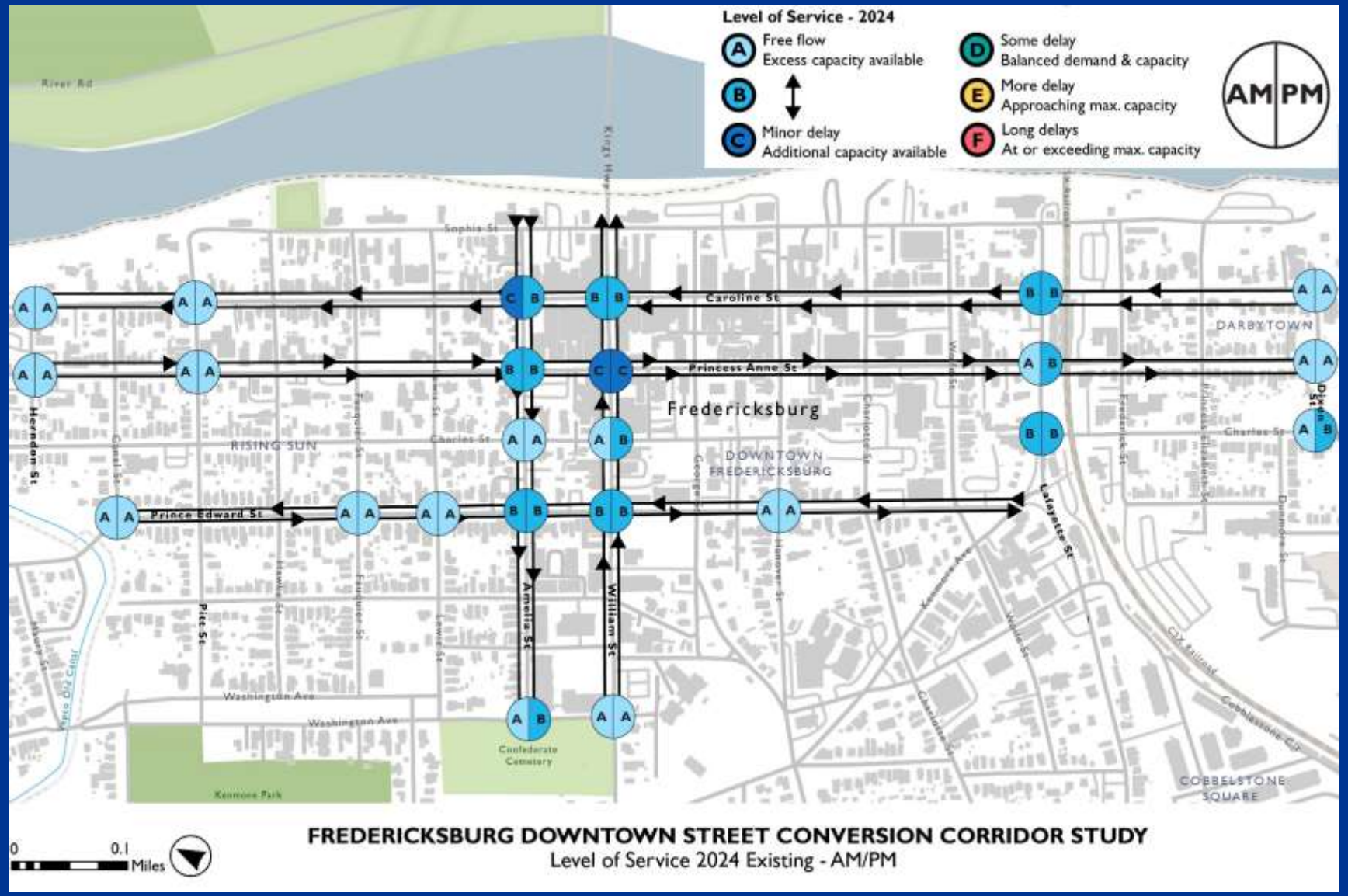



# Four Study Areas

1. Princess Anne Street / Caroline Street North
2. Amelia Street / William Street
3. Princess Anne Street / Caroline Street South
4. Prince Edward Street (traffic calming)

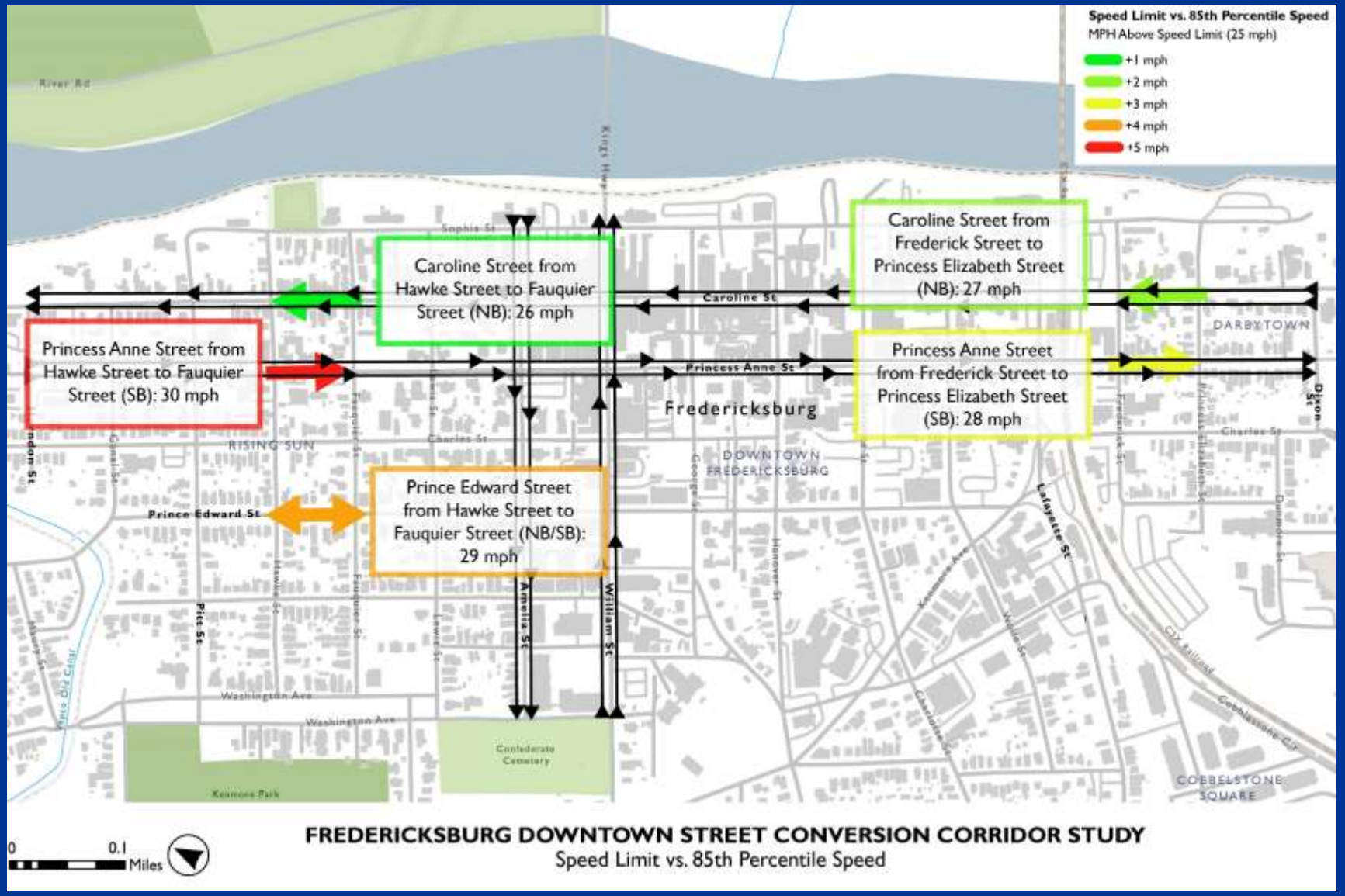
# 2024 Existing Intersection Control

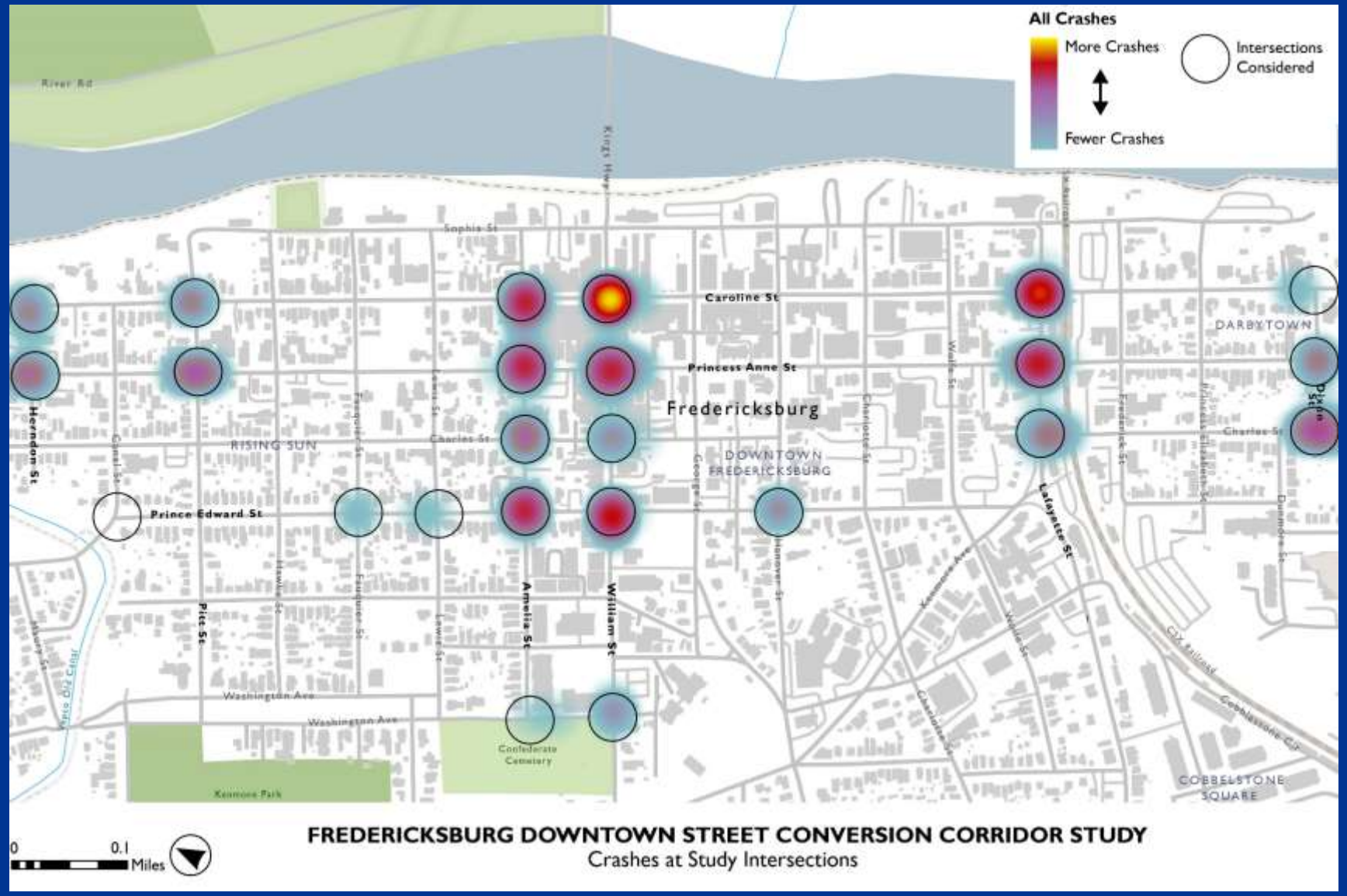





# 2024 Existing Levels of Service

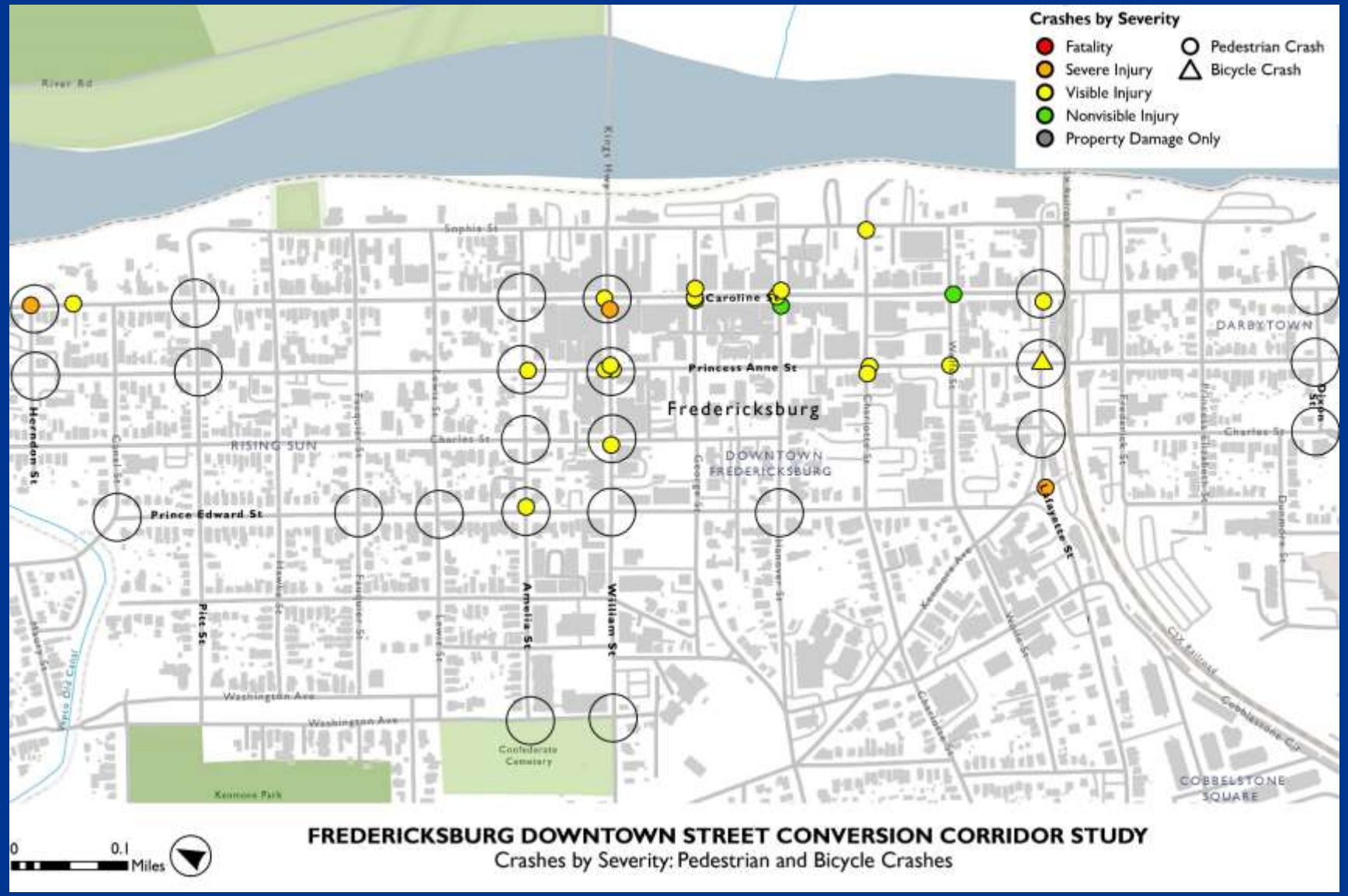
# 2024 Existing Speed Data





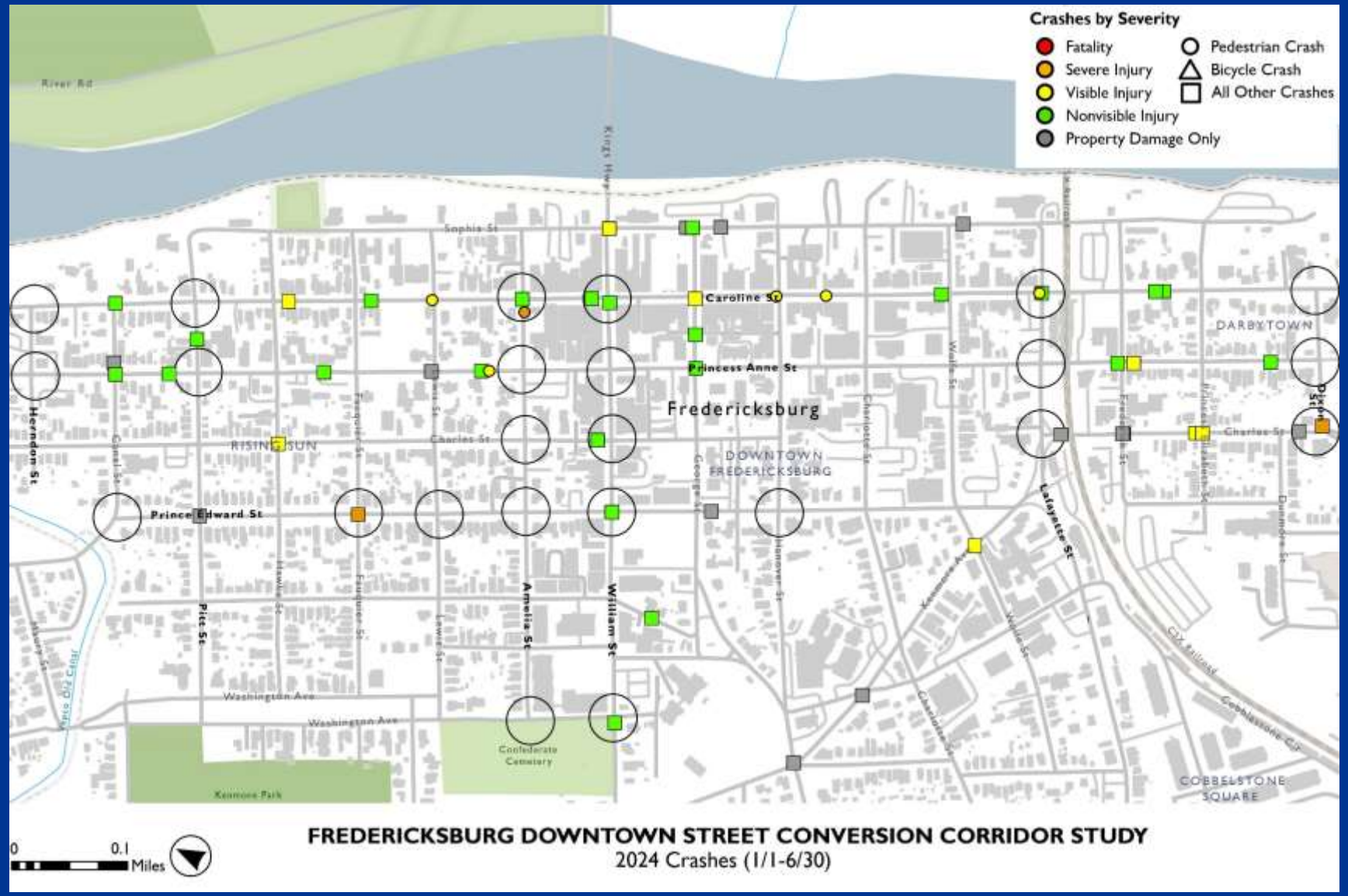

# Crash Analysis 2019-2023

- Heat map of all crashes within 150 ft of study intersections
- Signalized intersections see higher number of crashes, mostly angle
- Total number of crashes: 199
  - 105 angle
  - 25 sideswipe
  - 19 rear end
  - 23 bike/ped
  - 27 other




# Crash Analysis 2019-2023

- Bicycle and pedestrian crashes only
  - 23 pedestrian
  - 1 bicycle
- Almost exclusively at intersections




# Crash Analysis 2024 (Jan – Jun)

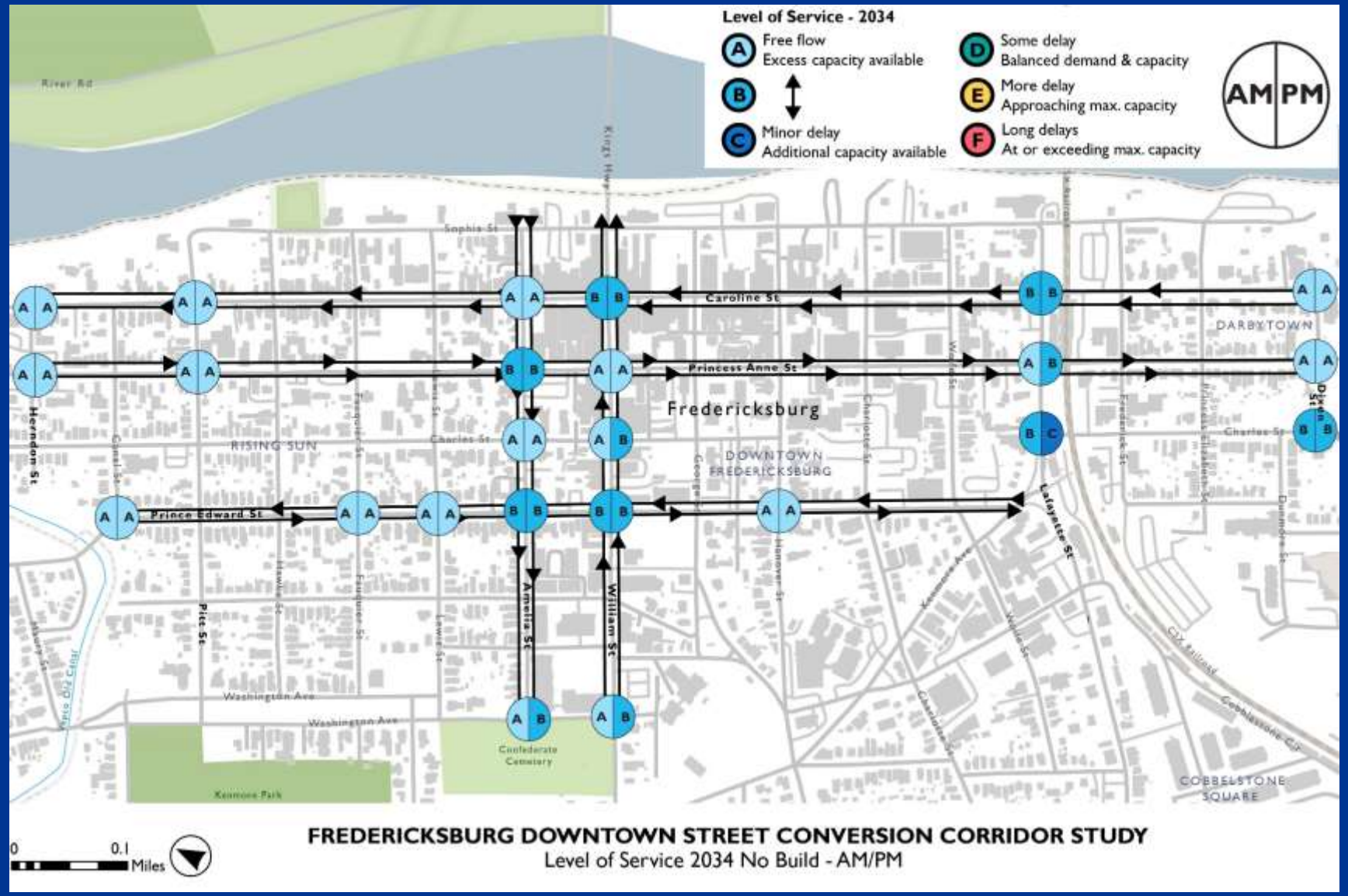
- Total Crashes – 54
  - 6 pedestrian
  - 0 bicycle
- Other Crash Types
  - 21 angle
  - 16 sideswipe
  - 2 rear end
  - 9 other

# Intersection Control Analysis

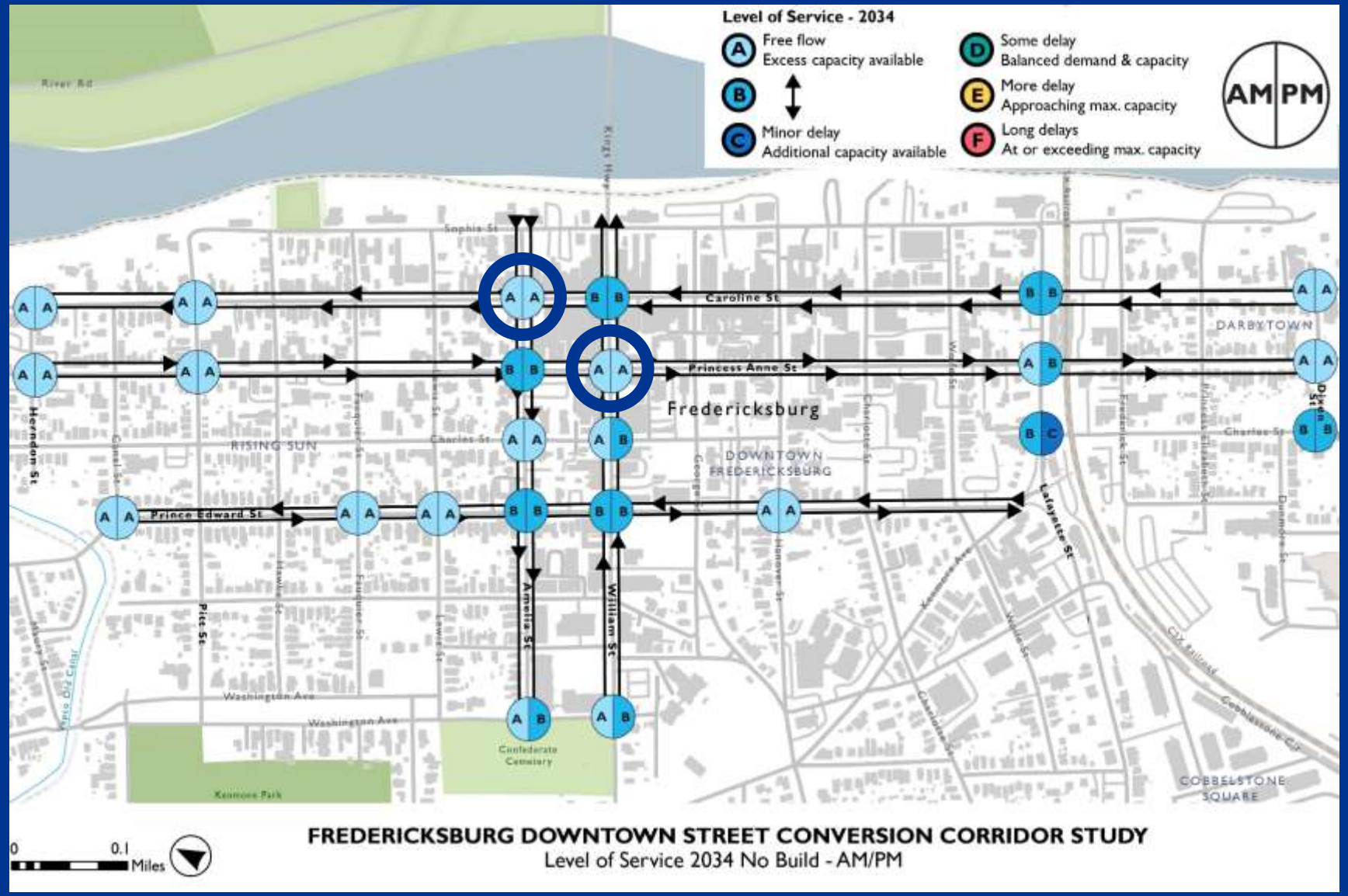
| Intersection | Signal Volume Warrants | | | All-Way Stop Volume Warrants | | |
|---|---|---|---|---|---|---|
| | Existing 2024 | No Build 2034 | Build 2034 | Existing 2024 | No Build 2034 | Build 2034 |
| Princess Anne & Amelia | N | N | Y (Pk Hr) | Y | Y | Y |
| Caroline & Amelia | N | N | N | N | N | Y |
| Amelia & Prince Edward | N | N | N | N | N | N |
| William & Prince Edward | N | N | N | N | N | N |
| William & Princess Anne | N | N | N | Y | Y | Y |
| William & Caroline | N | N | Y (Pk Hr) | N | Y | Y |

- Existing signalized intersections do not have enough volume to meet signal warrants
- Some intersections can be converted to all-way stops with little to no impact to operations

Note: There are other considerations besides traffic volumes when deciding on intersection traffic control.

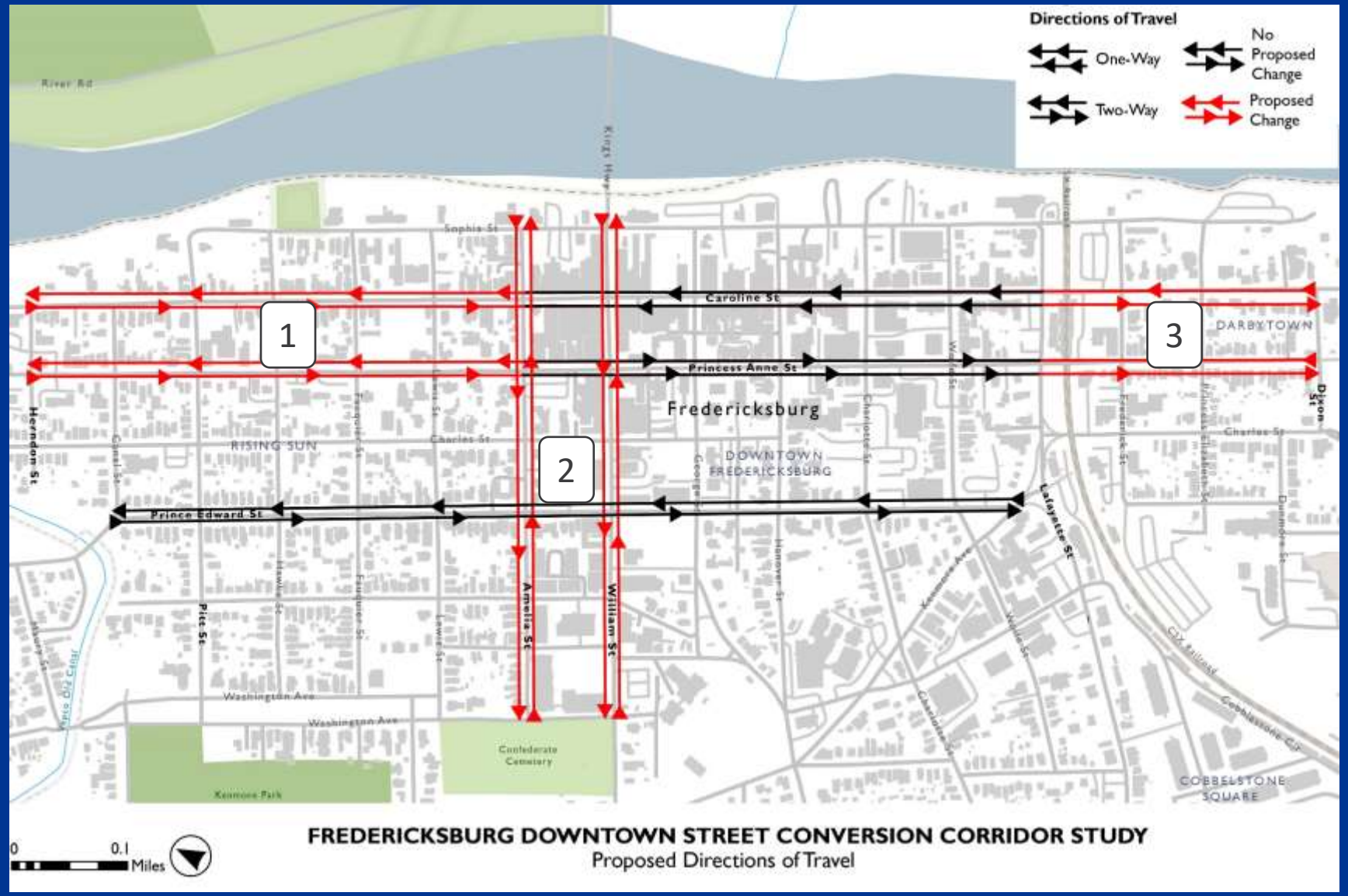



# 2034 No-Build Levels of Service



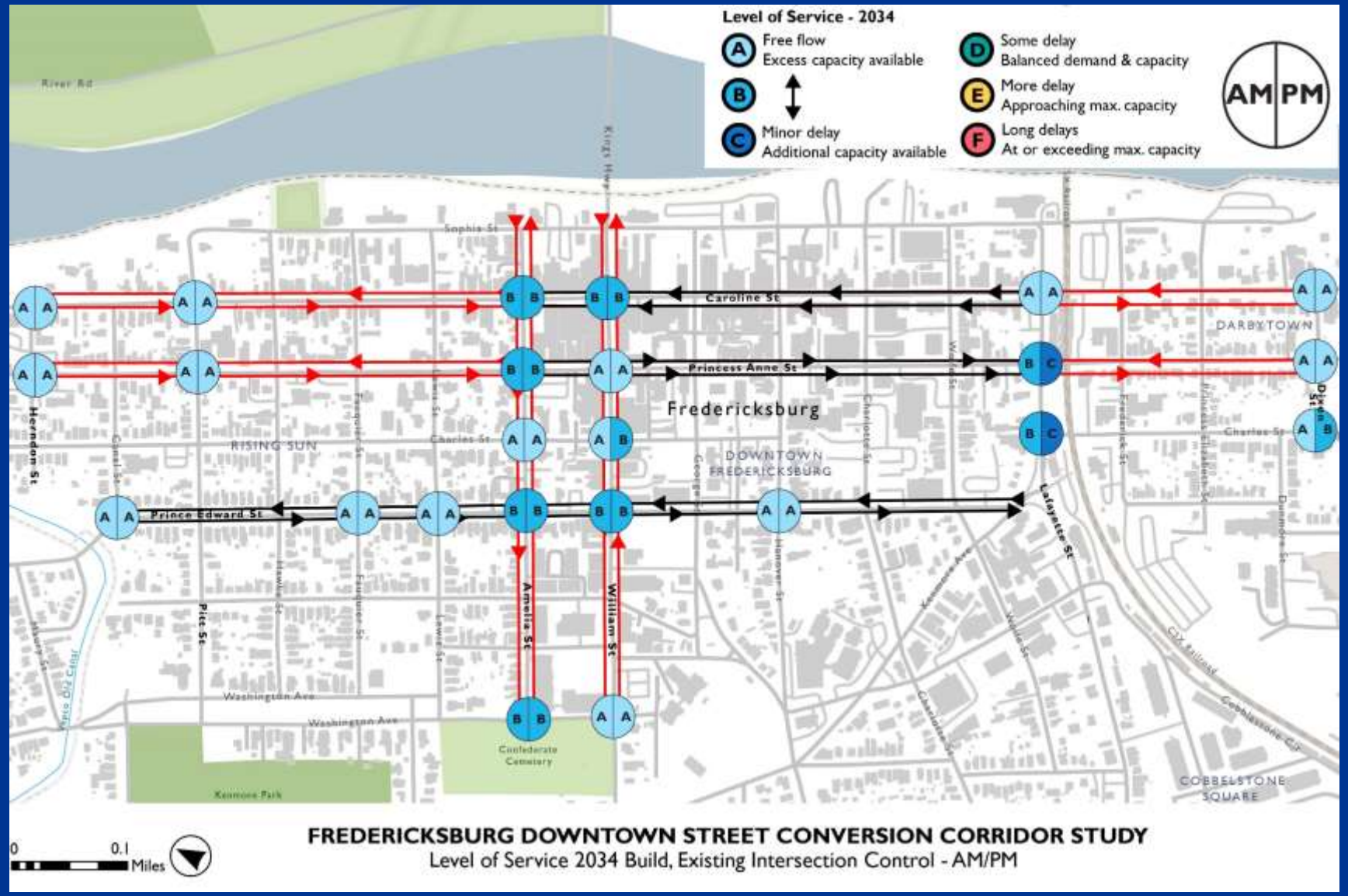

# 2034 No-Build Levels of Service

- Improved operations compared to existing through optimized signal timing



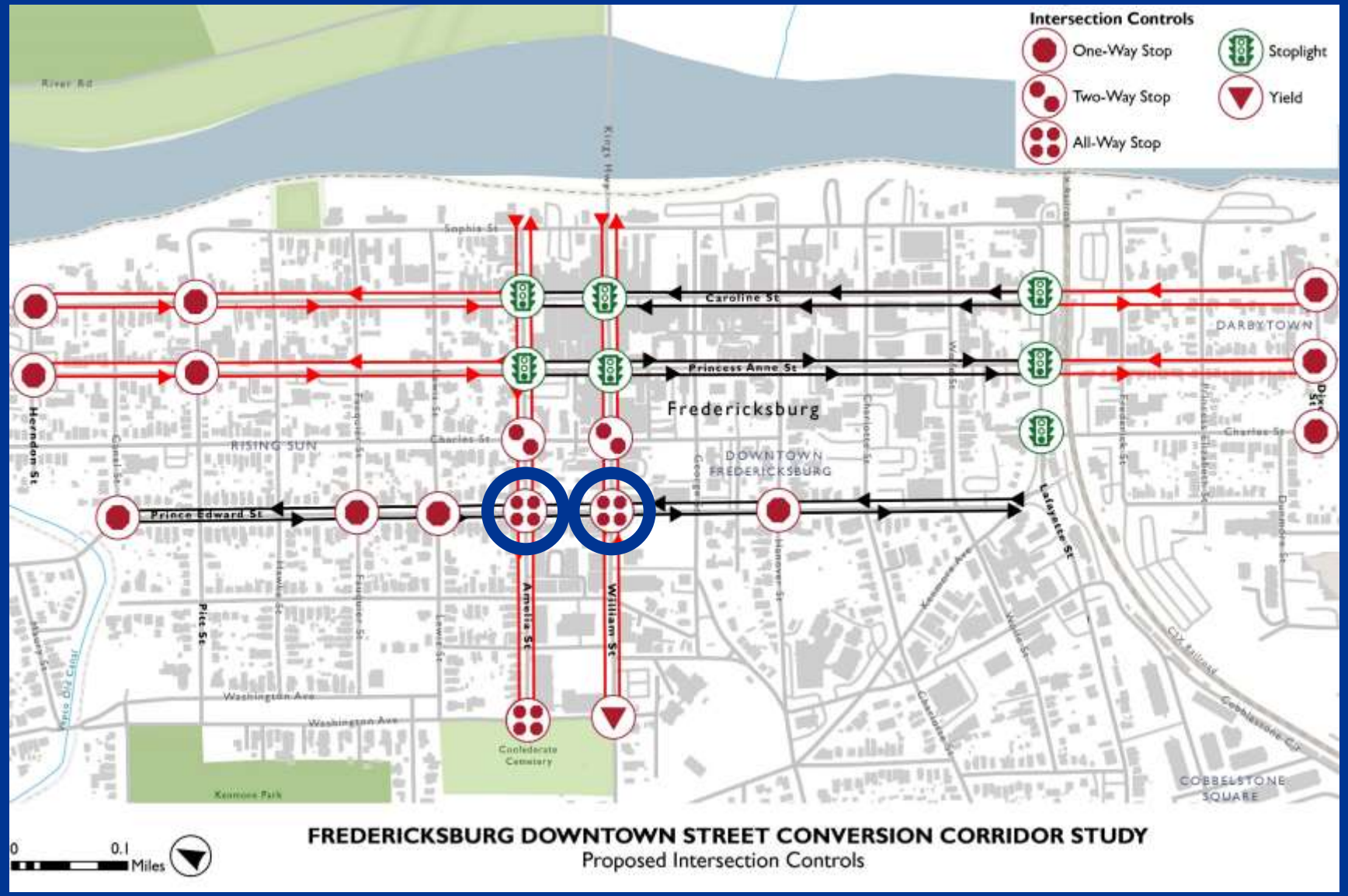

# 2034 Build Travel Directions

1. Princess Anne Street / Caroline Street North
2. Amelia Street / William Street
3. Princess Anne Street / Caroline Street South



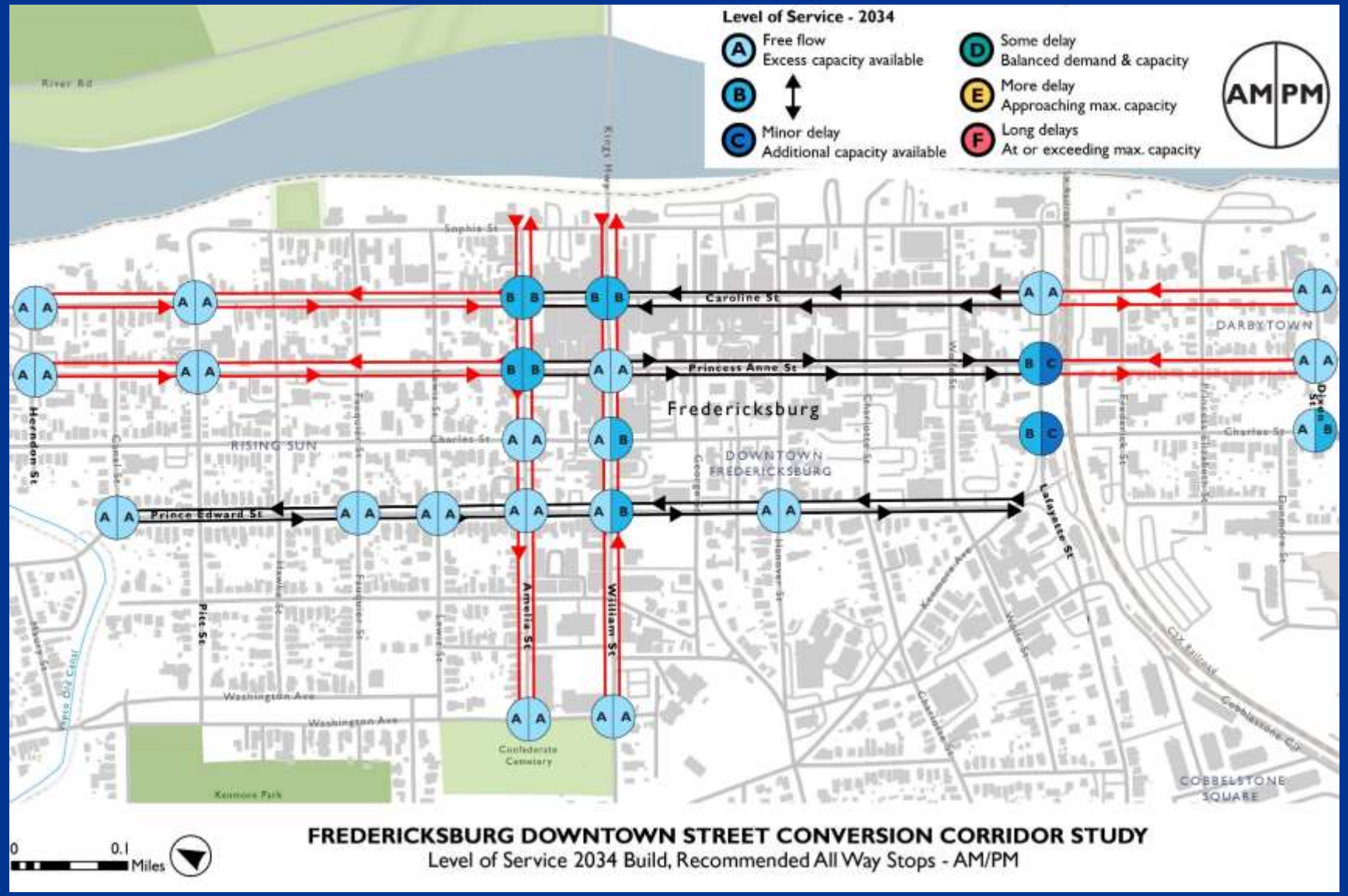

# 2034 Build 1 Levels of Service

- Existing intersection control to remain




# 2034 Build 2 Intersection Control

- Recommend converting two intersections to all-way stop control
  - Prince Edward / William
  - Prince Edward / Amelia

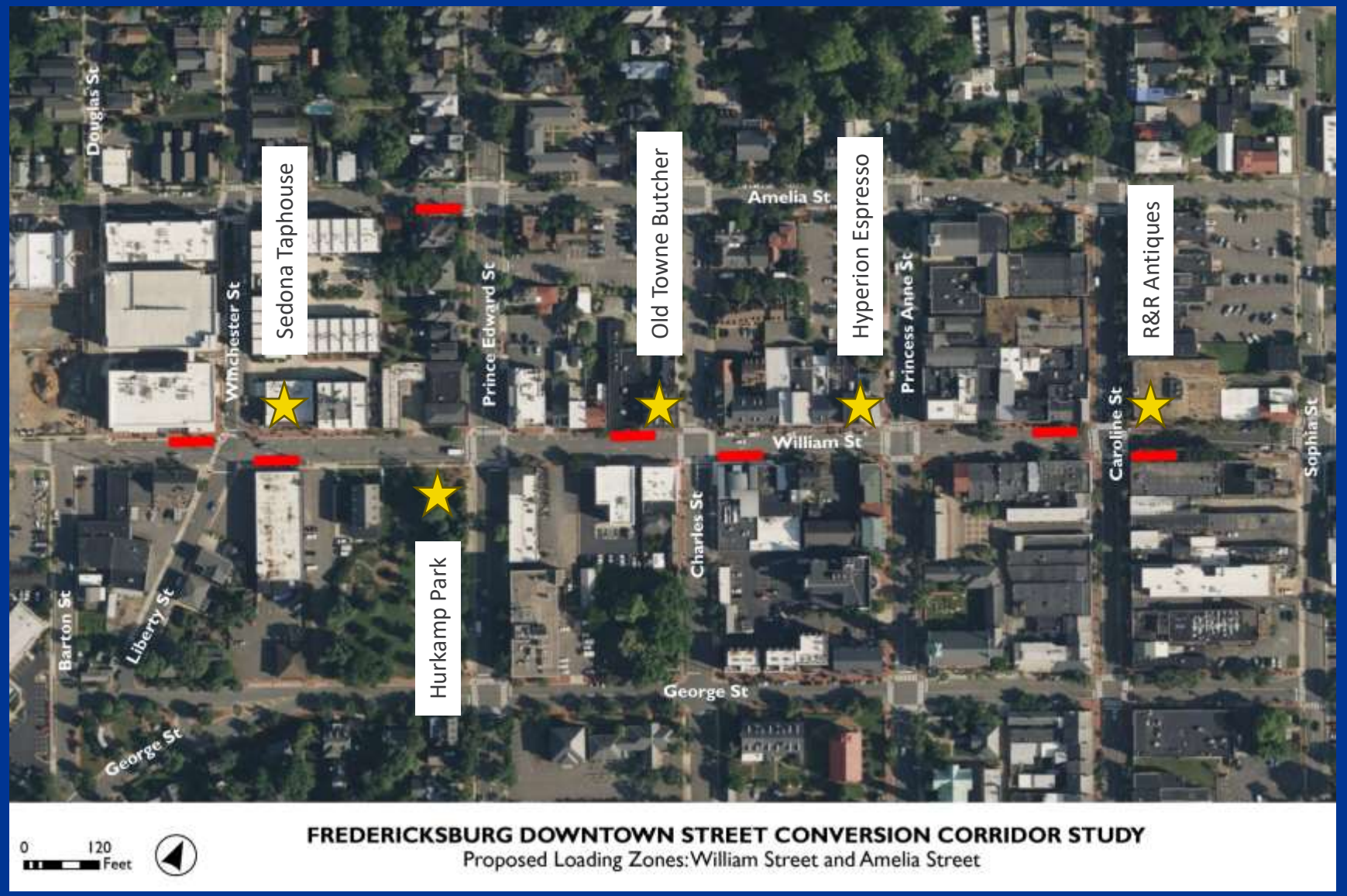



# 2034 Build 2 Levels of Service

- Recommend converting two intersections to all-way stop control
  - Prince Edward / William
  - Prince Edward / Amelia


# Recommended Loading Zones

- Princess Anne – 2 locations




# Recommended Loading Zones

- William Street - 6 locations
- 1 location on Amelia Street

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# Questions?

# APPENDIX G

November 2024 City Council Presentation

FXBG

# Downtown Fredericksburg Bicycle/Pedestrian Recommendations

November 2024

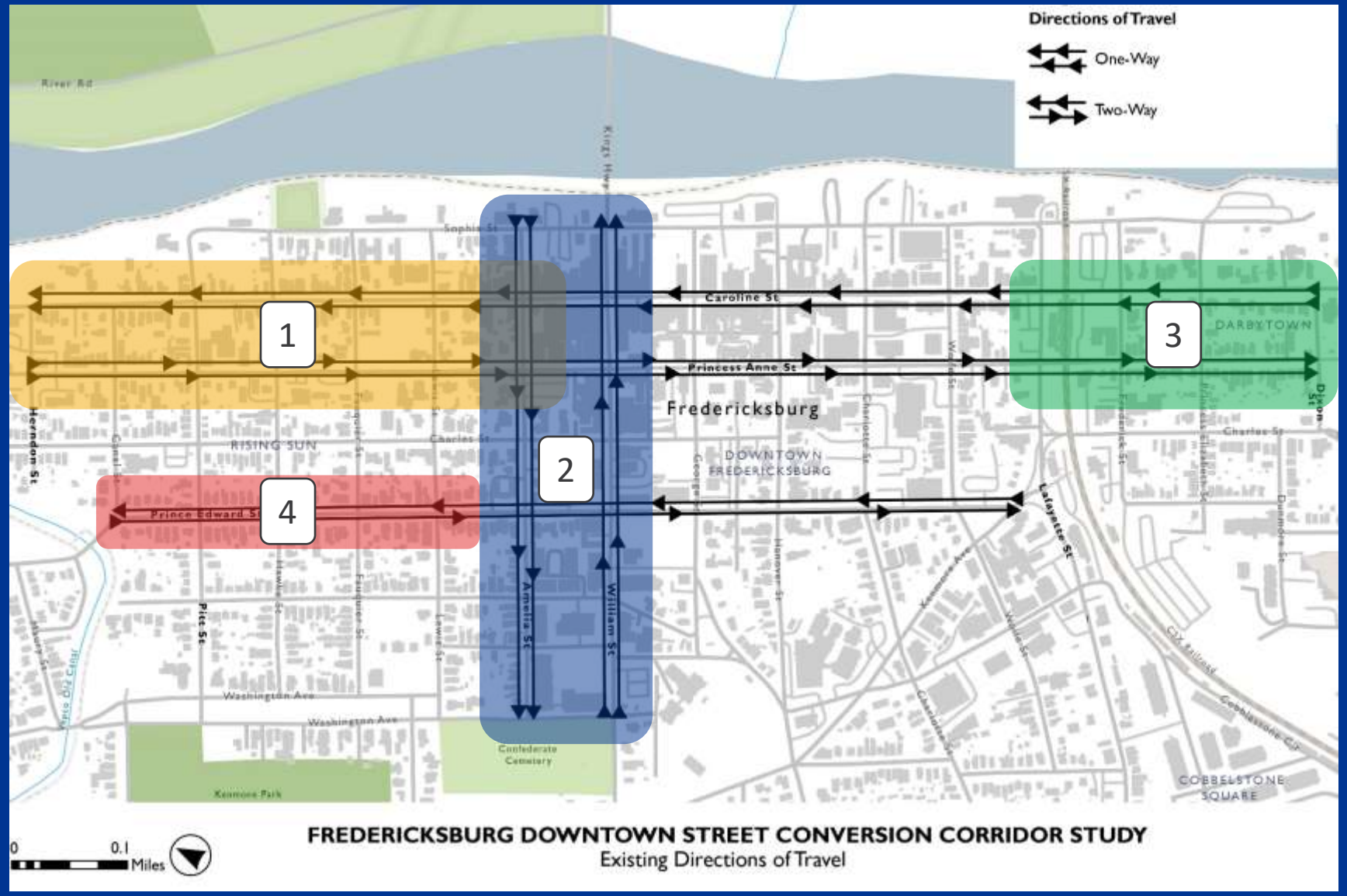
FXBG

# Outline

- Existing Conditions
- Recommendations for Bicycle/Pedestrian Infrastructure by Scenario
  - Scenario 1 – one-way streets
  - Scenario 2 – two-way streets
  - Both Scenarios

FXBG

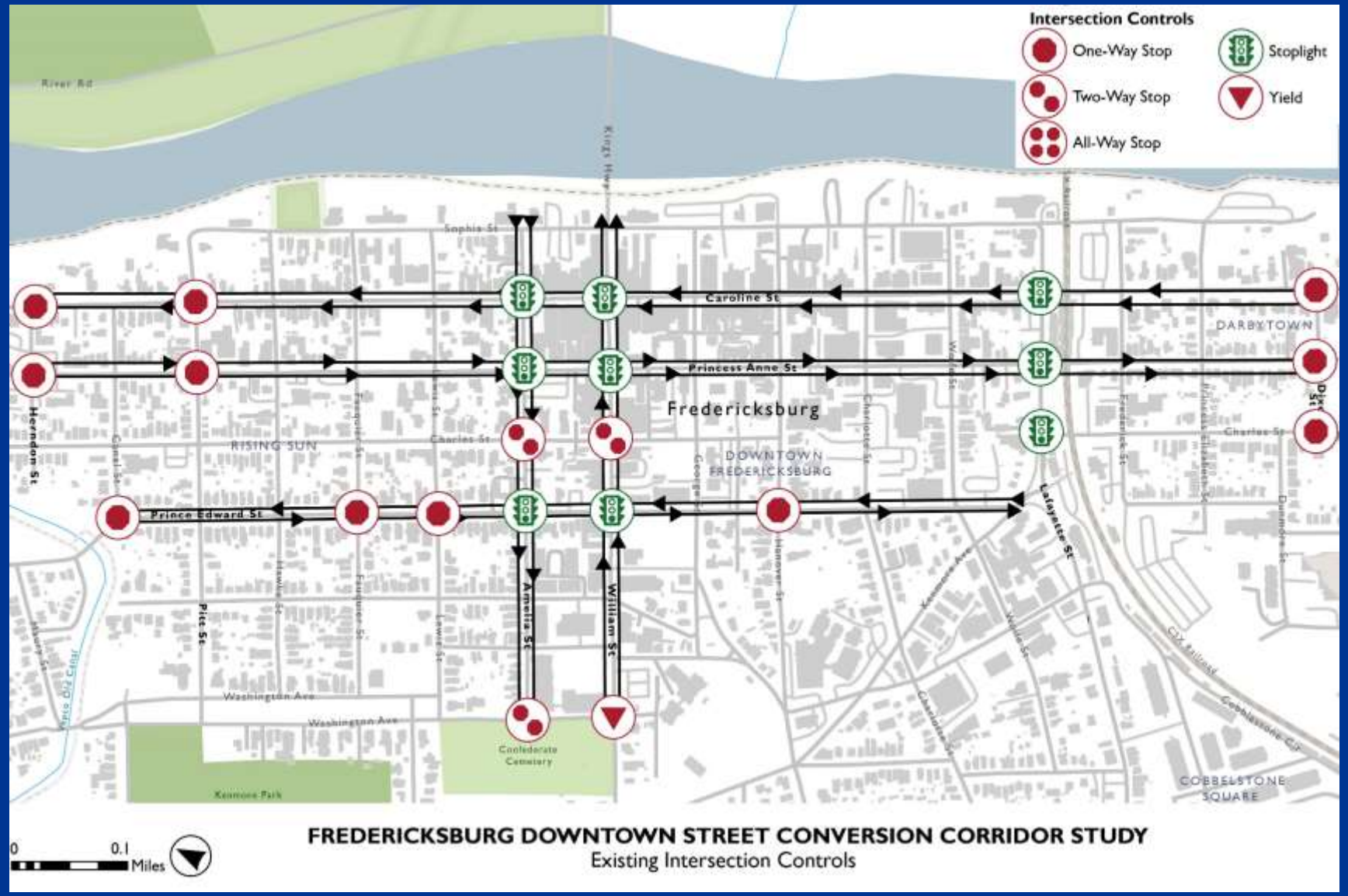
# Existing Conditions

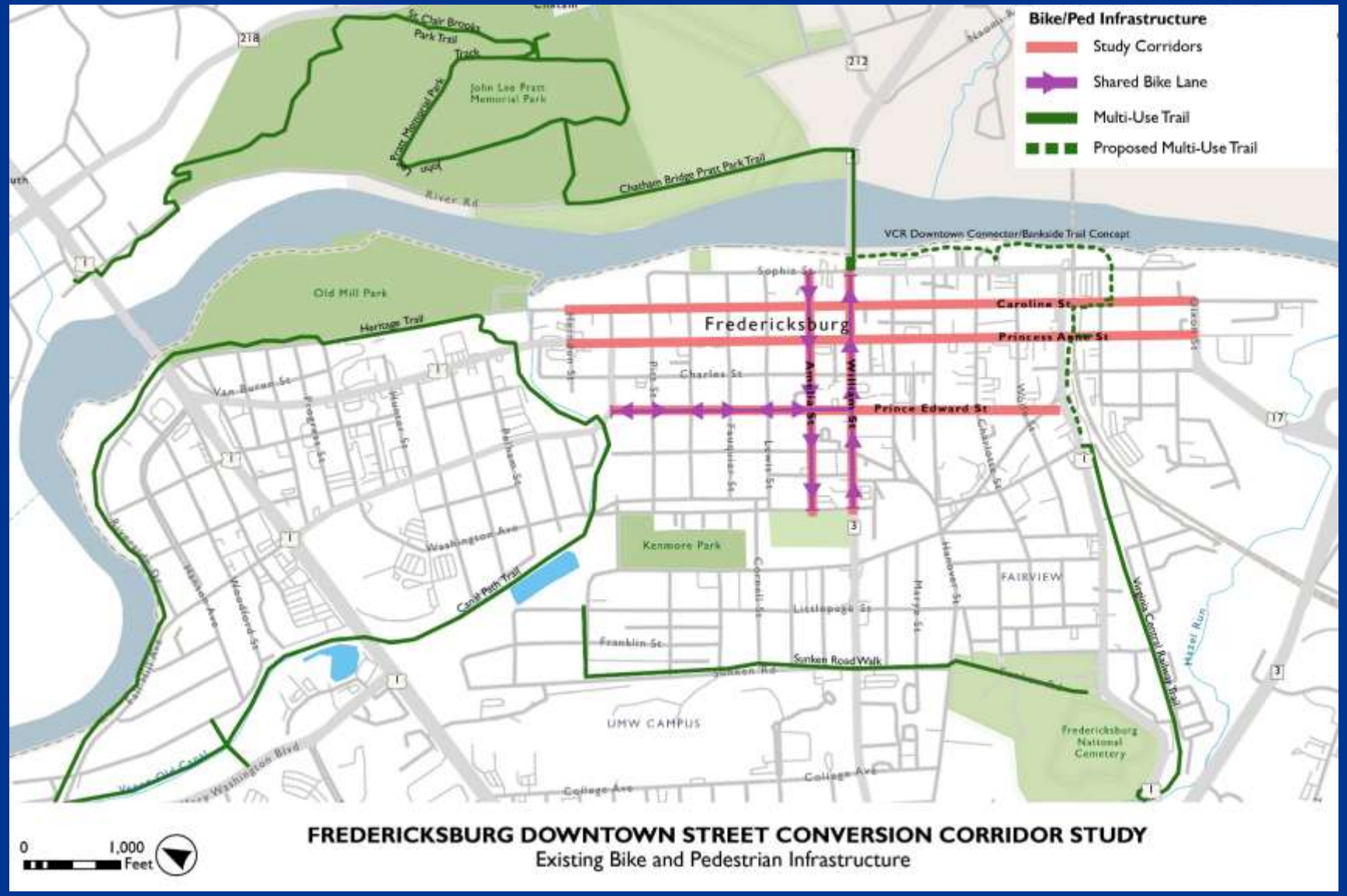



# Four Study Areas

1. Princess Anne Street / Caroline Street North
2. Amelia Street / William Street
3. Princess Anne Street / Caroline Street South
4. Prince Edward Street (traffic calming)

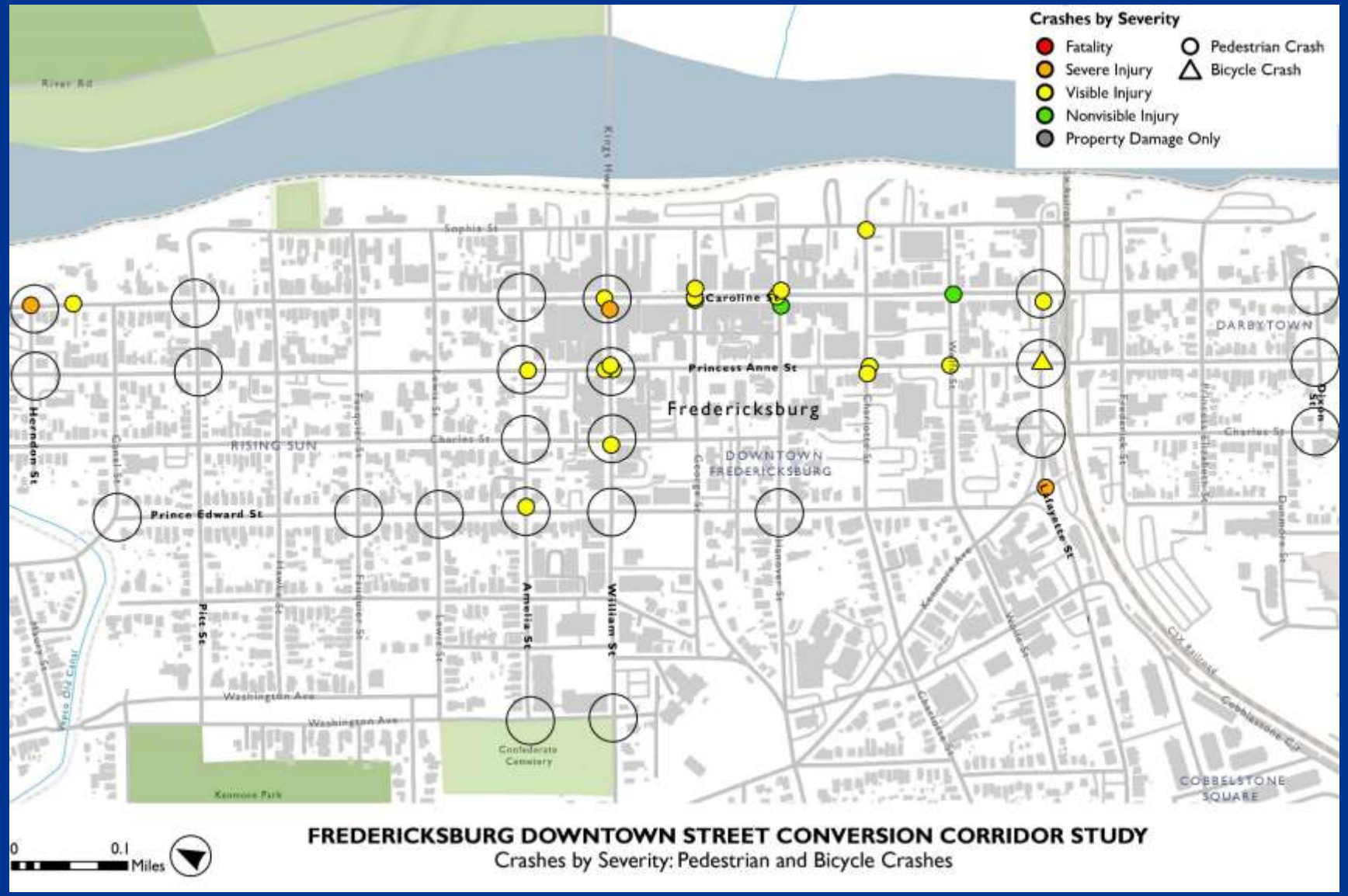
# 2024 Existing Intersection Control






# Existing Bicycle & Pedestrian Facilities

- Sidewalk
- Shared lanes
- Shared use paths



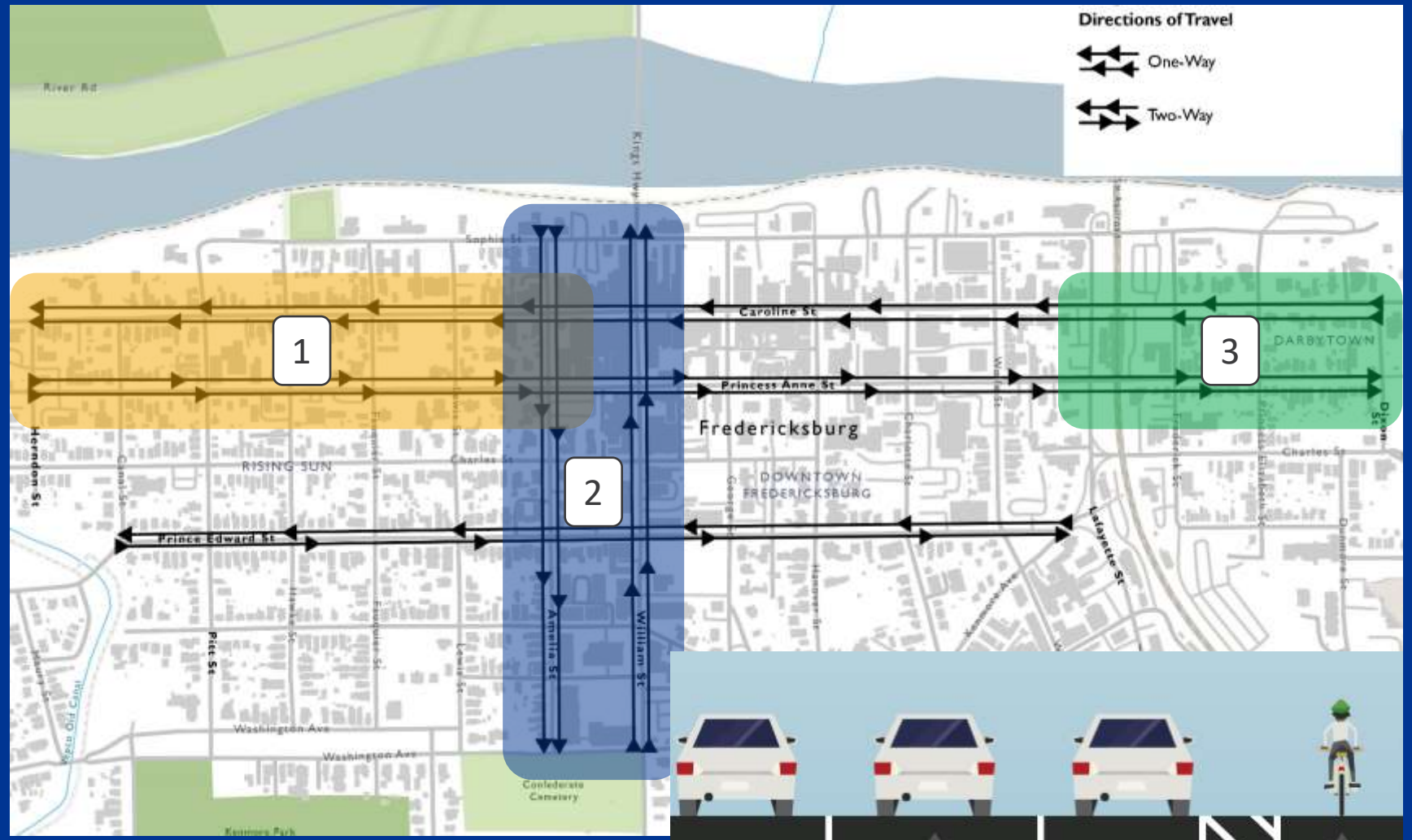

# Crash Analysis 2019-2023

- Bicycle and pedestrian crashes only
  - 23 pedestrian
  - 1 bicycle
- Almost exclusively at intersections

FXBG

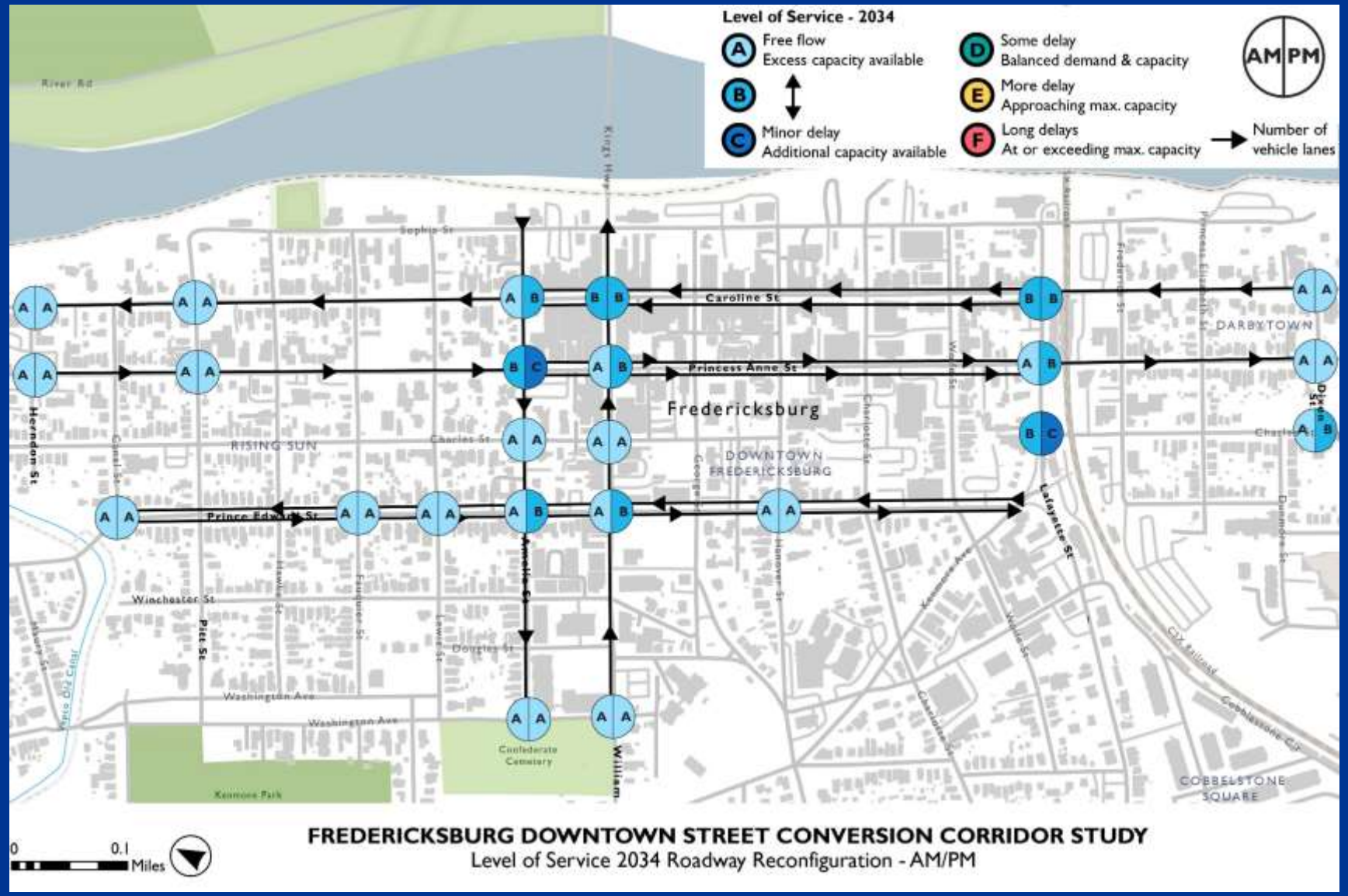
# Scenario 1 Recommendations

One-way streets with
continuous separated bicycle lanes



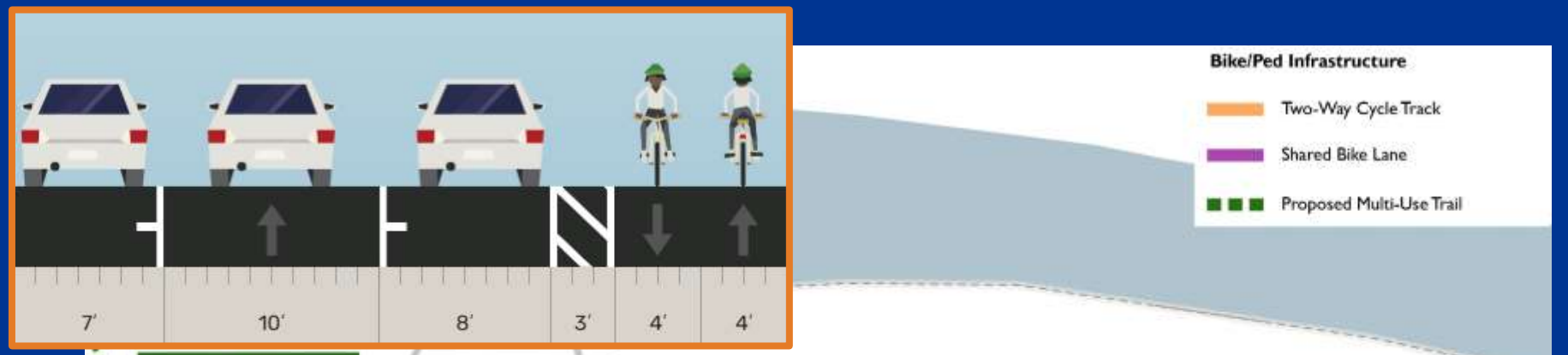

# Roadway Reconfiguration

- Maintain one-way pairs within study area
- Reduce corridors to one vehicle lane, one bicycle lane, and two parking lanes
- Strategically located curb-side loading zones




# 2034 Roadway Reconfiguration Levels of Service

- Similar to two-way conversion levels of service
- With recommended all-way stop control conversions at:
  - Prince Edward / William
  - Prince Edward / Amelia

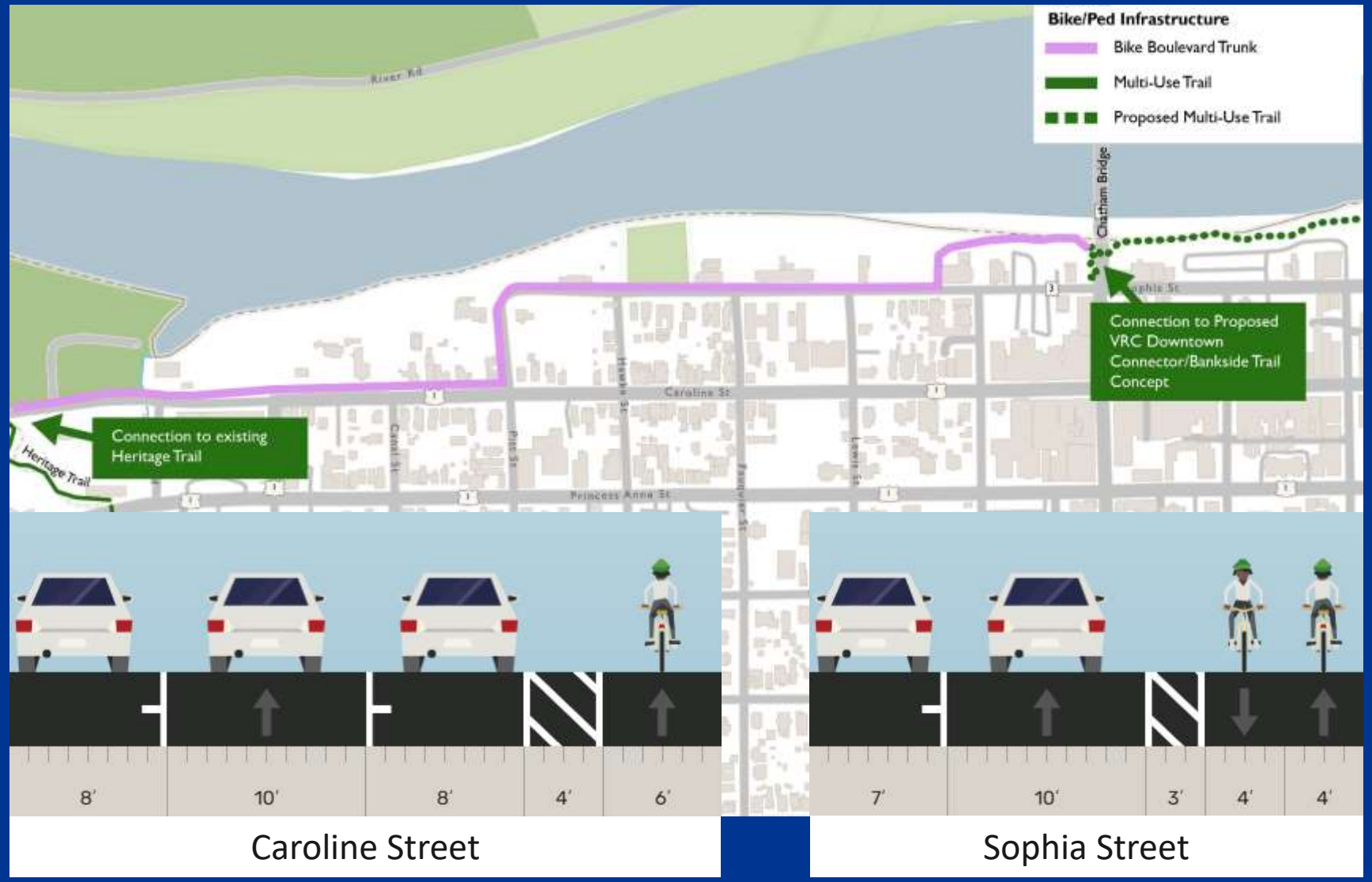






# Caroline Street Bike Lane

- Reduces Caroline Street to one lane northbound, north of Dixon Street
- Adds a two-way bike lane on the east side of Caroline Street, north of Dixon Street
- Maintains two parking lanes
- Connects to future Bankside Trail and Dixon Park Connector




Caroline Street

Sophia Street

# Sophia Street Bike Lane

- Converts Sophia Street to one lane one-way northbound, north of Amelia Street
- Adds a two-way bike lane on the east side of Sophia Street, north of Amelia Street
- Maintains one parking lane and one travel lane
- Connects parks, existing trails, and proposed trails

FXBG

# Scenario 2 Recommendations

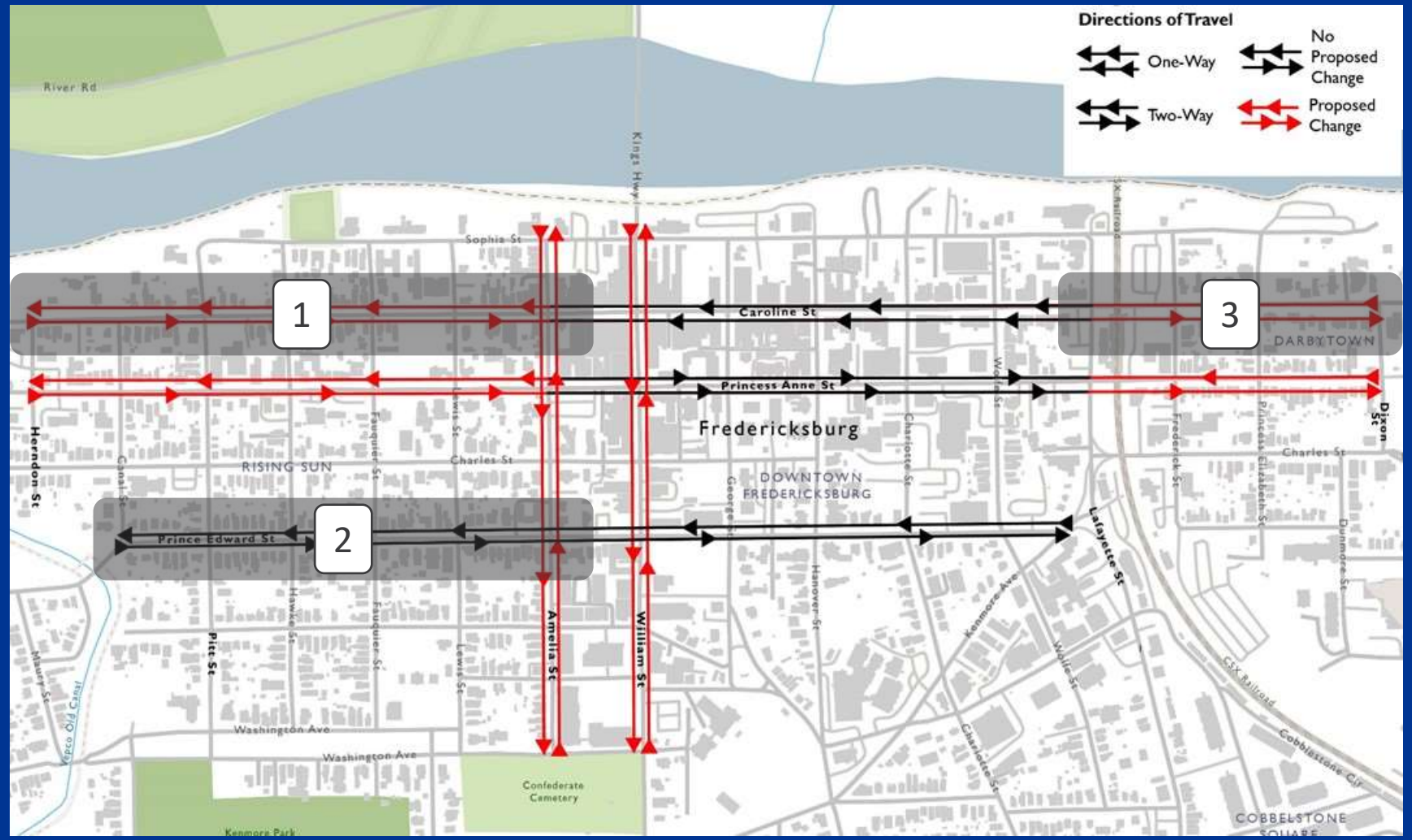
Two-way streets with designated bicycle boulevards and traffic calming

# Traffic Calming

- Infrastructure
  - Mini roundabouts at large intersections
  - High-visibility crosswalks on all legs
  - Speed tables on long blocks
- Policy
  - Reduce speed limit after installing infrastructure

Mini roundabouts on Floyd Avenue, Richmond, VA

Speed table on Main Street near VCU, Richmond, VA




# Traffic Calming

Messaging

- Encourage drivers to use Princess Anne Street for north/south travel through downtown

Where?

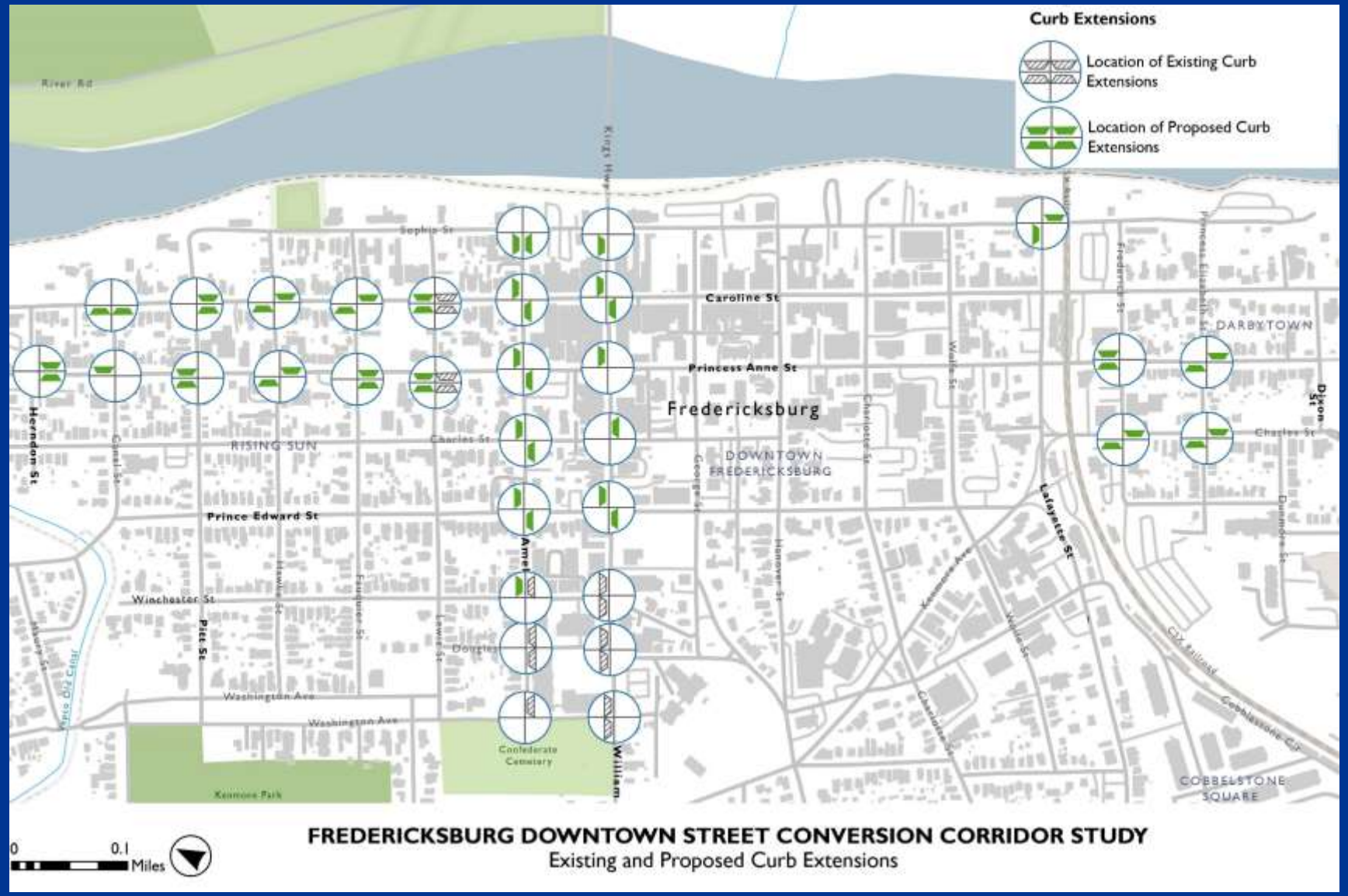
- Prince Edward Street
- Caroline Street

# Curb Extensions

- Reduces the exposure of pedestrians in the roadway
- “Daylights” the crossing for drivers by physically restricting parking at the intersection
- Does not remove any parking spaces

Princess Anne St at Lewis St

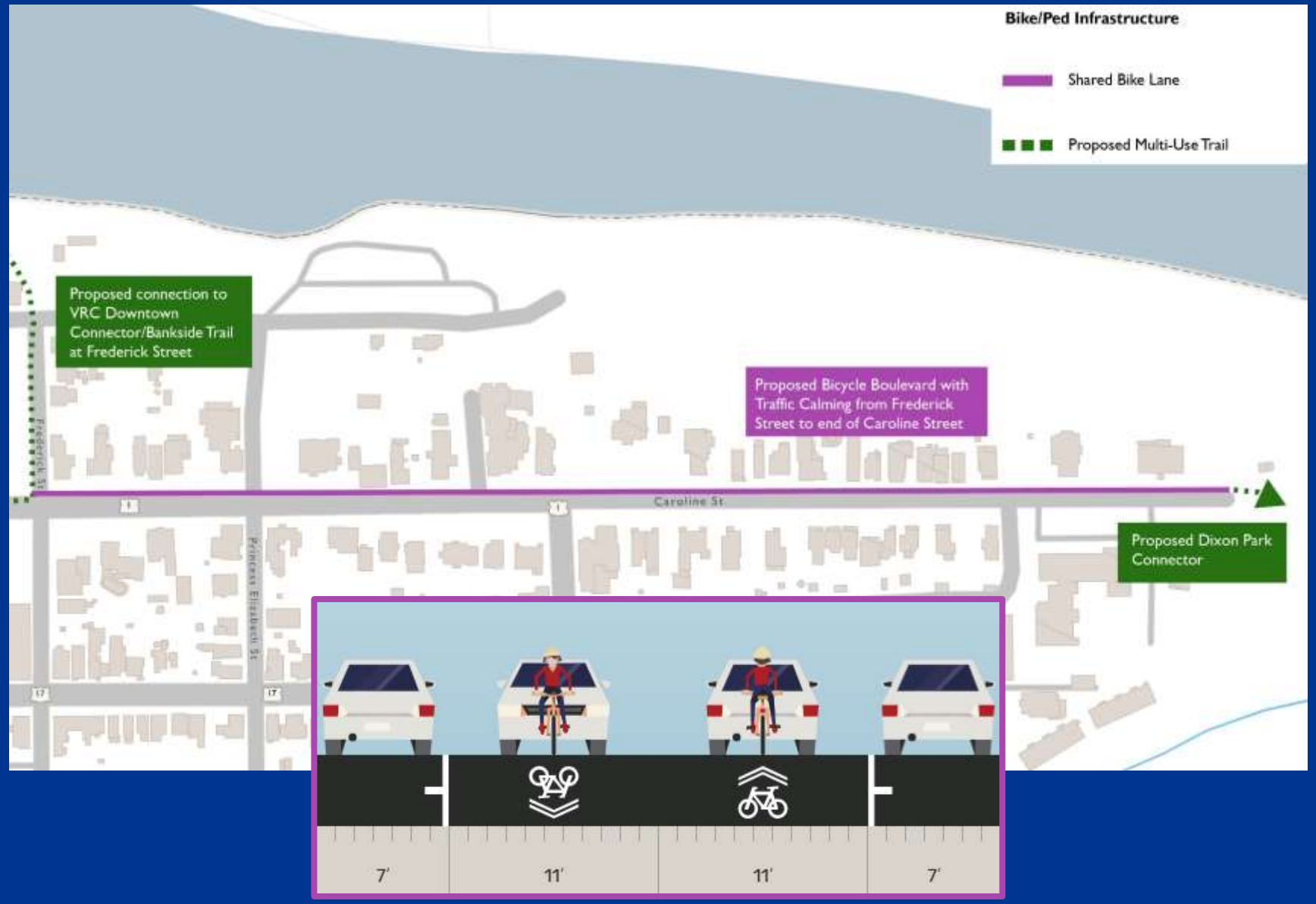
Caroline St at Pitt St




# Curb Extensions

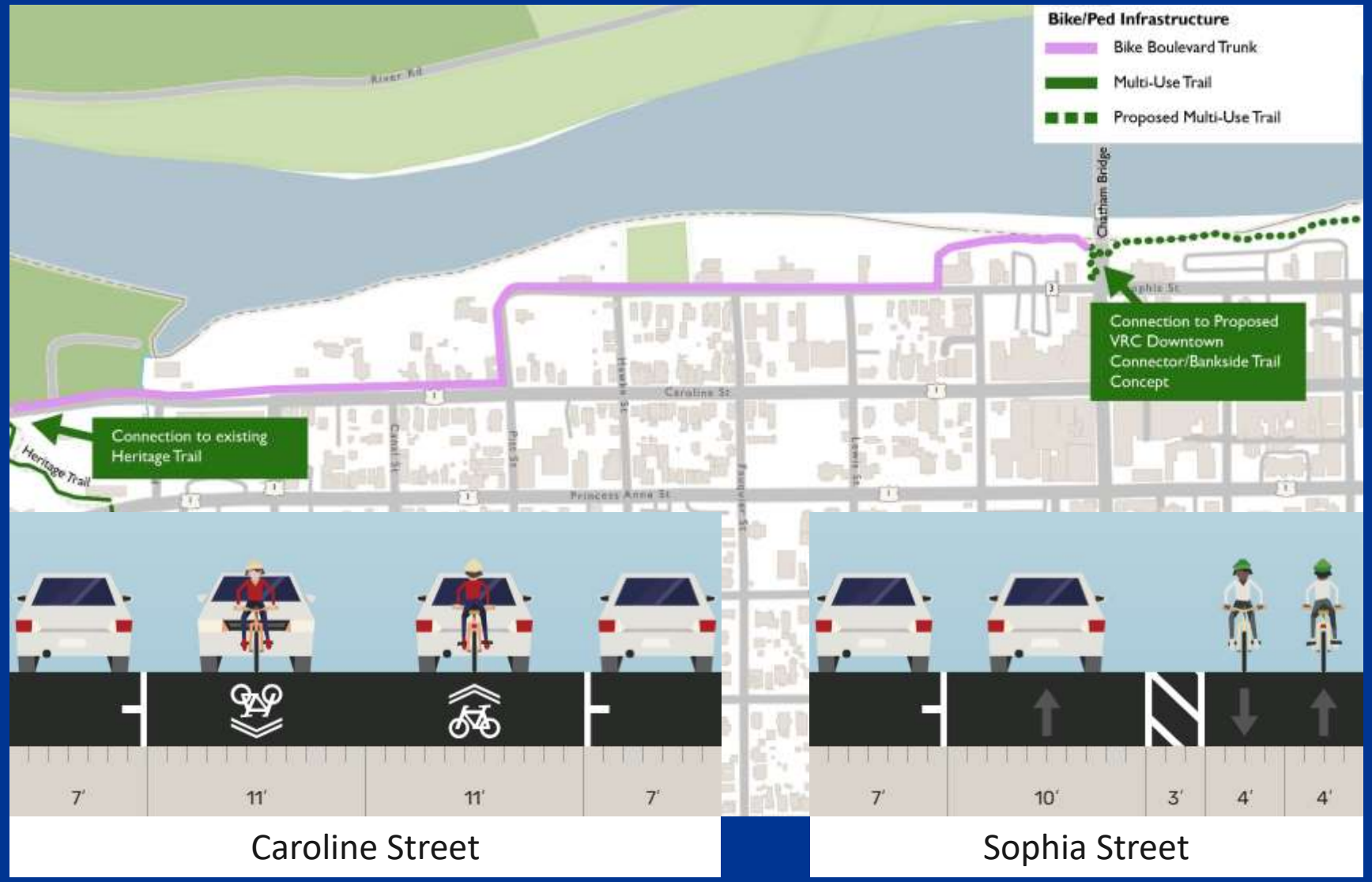
Where?

- Up to 2 per intersection, where applicable
- Locations were evaluated using turning radius for large vehicles to determine applicability




# Caroline Street Bike Boulevard

- Connects to future Bankside Trail and Dixon Park Connector
- Coordinate with SmartScale program to ensure compliance with funding for Dixon Park Connector




Caroline Street

Sophia Street

# Sophia Street Bike Lane

- Converts Sophia Street to one lane one-way northbound, north of Amelia Street
- Adds a two-way bike lane on the east side of Sophia Street, north of Amelia Street
- Maintains one parking lane and one travel lane
- Connects parks, existing trails, and proposed trails

FXBG

# All Scenario Recommendations

# Pedestrian Recall

- Provides the WALK sign automatically every time
- Improves side street delay without impacting main street coordination
- Setting this expectation may reduce unsafe crossing behavior

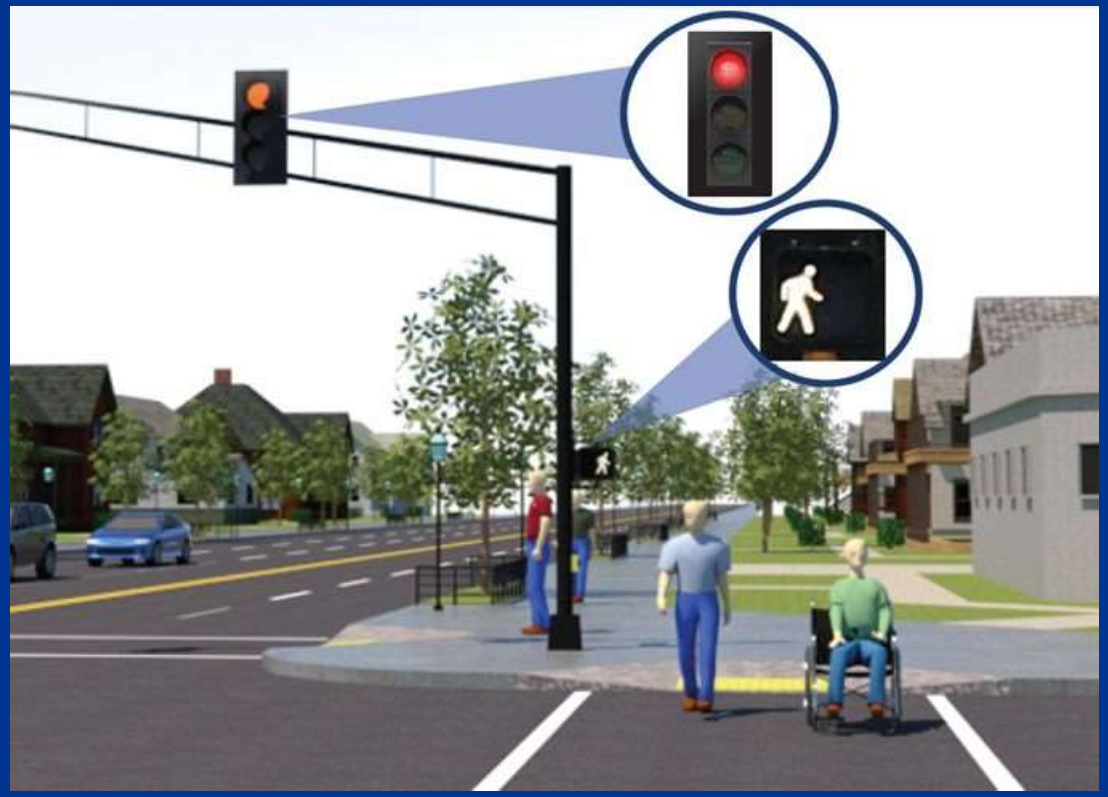
Where?

- All signalized intersections, after retiming

| | | | | | |
|---|---|---|---|---|---|
| Vehicle phase | GREEN TIME (35 s) | | | YELLOW | RED |
| Pedestrian phase | WALK (8 s) | FLASHING DON'T WALK (15 s) | STEADY DON'T WALK (12 s OF PEDESTRIAN "DOWN TIME") | STEADY DON'T WALK | |

# Leading Pedestrian Interval (LPI)

- Provides a head start for crossing pedestrians, typically 3-5 sec
- Keeps parallel vehicle traffic stopped on red
- Most effective when paired with “No Right on Red” at intersections



Where?

- All signalized intersections, after retiming

| | | | | | | |
|---|---|---|---|---|---|---|
| Vehicle phase | RED | GREEN TIME (35 s) | | | YELLOW | RED |
| Pedestrian phase | LPI (3 s) | WALK (8 s) | FLASHING DON'T WALK (15 s) | STEADY DON'T WALK (12 s OF PEDESTRIAN "DOWN TIME") | STEADY DON'T WALK | |

# Pedestrian Signing

- Reminds drivers to yield or stop for crossing pedestrians

Where?

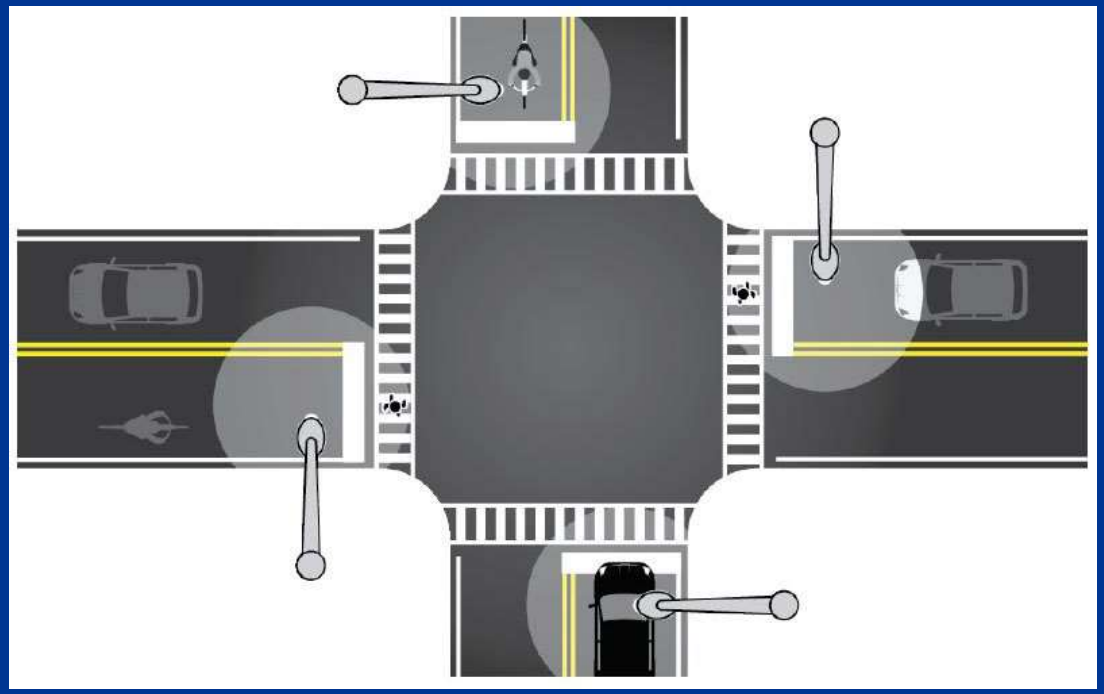
- “Turning Vehicles…” at signalized intersections, after evaluating for load bearing
- “Stop for Pedestrians…” at key uncontrolled marked crosswalks, after evaluating for turning vehicle radius


# Pedestrian Lighting

- Provides safety benefits to all roadway users by increasing visibility of pedestrians and vehicles
- May also improve personal security

Where?

- At marked crosswalks, after evaluating



# Next Steps

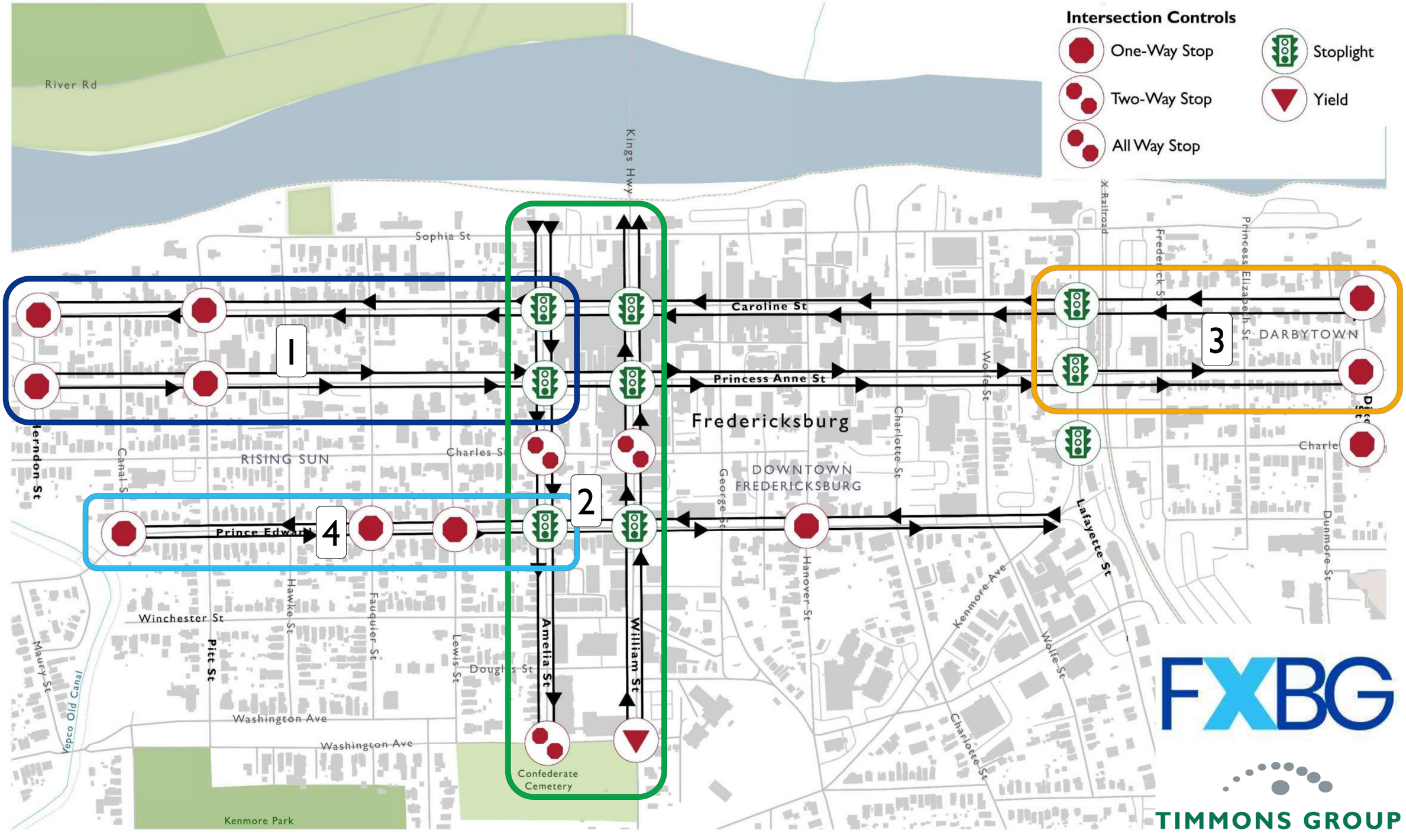
- Public Meeting
  - Date: December 2024
  - Location: TBD
- Refine concepts, develop cost estimates, and finalize recommendations in a report

FXBG

# Questions?

# APPENDIX H

December 2024 Public Meeting Materials

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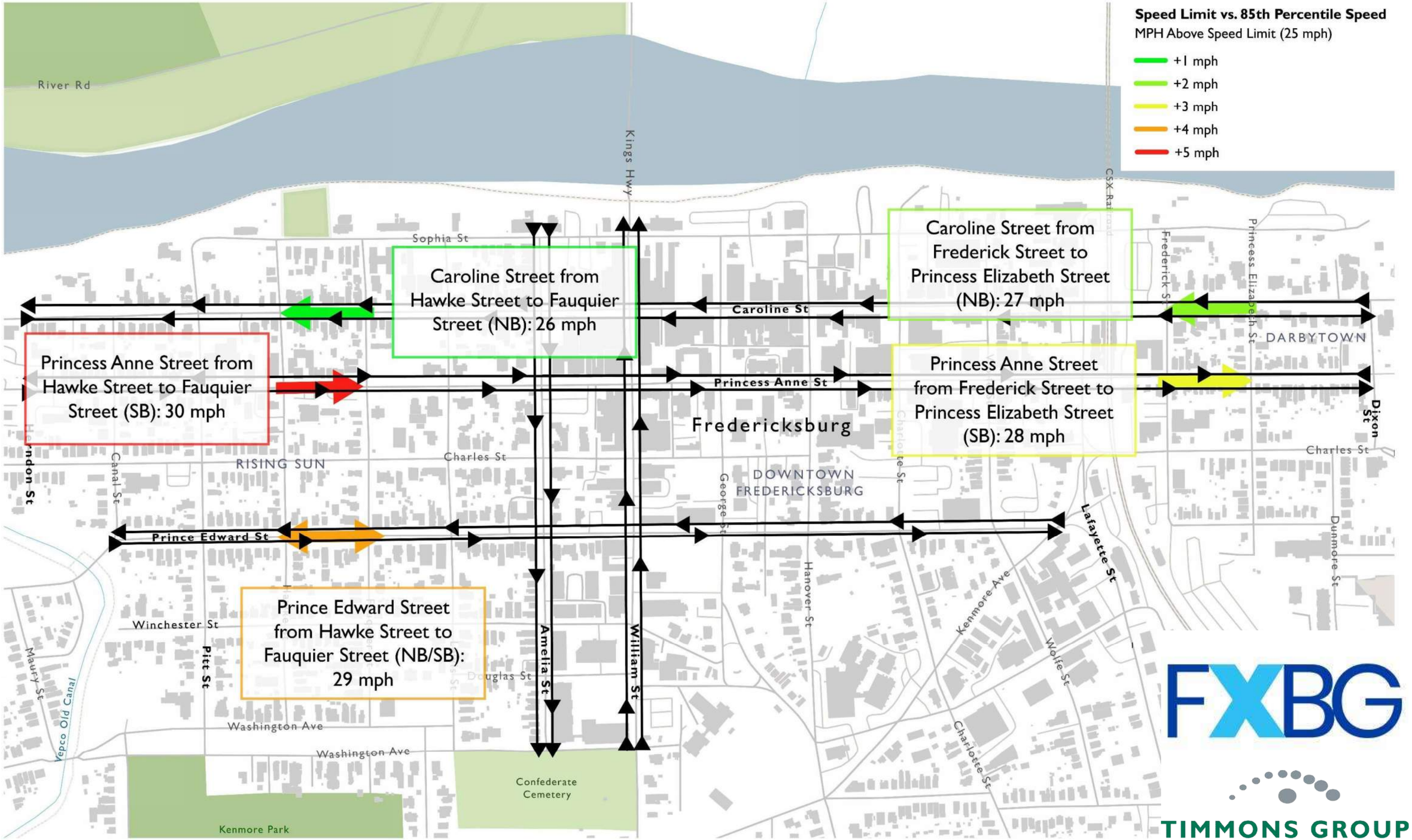
TIMMONS GROUP

0 500 Feet

# FREDERICKSBURG DOWNTOWN STREET CONVERSION CORRIDOR STUDY

Existing Intersection Controls

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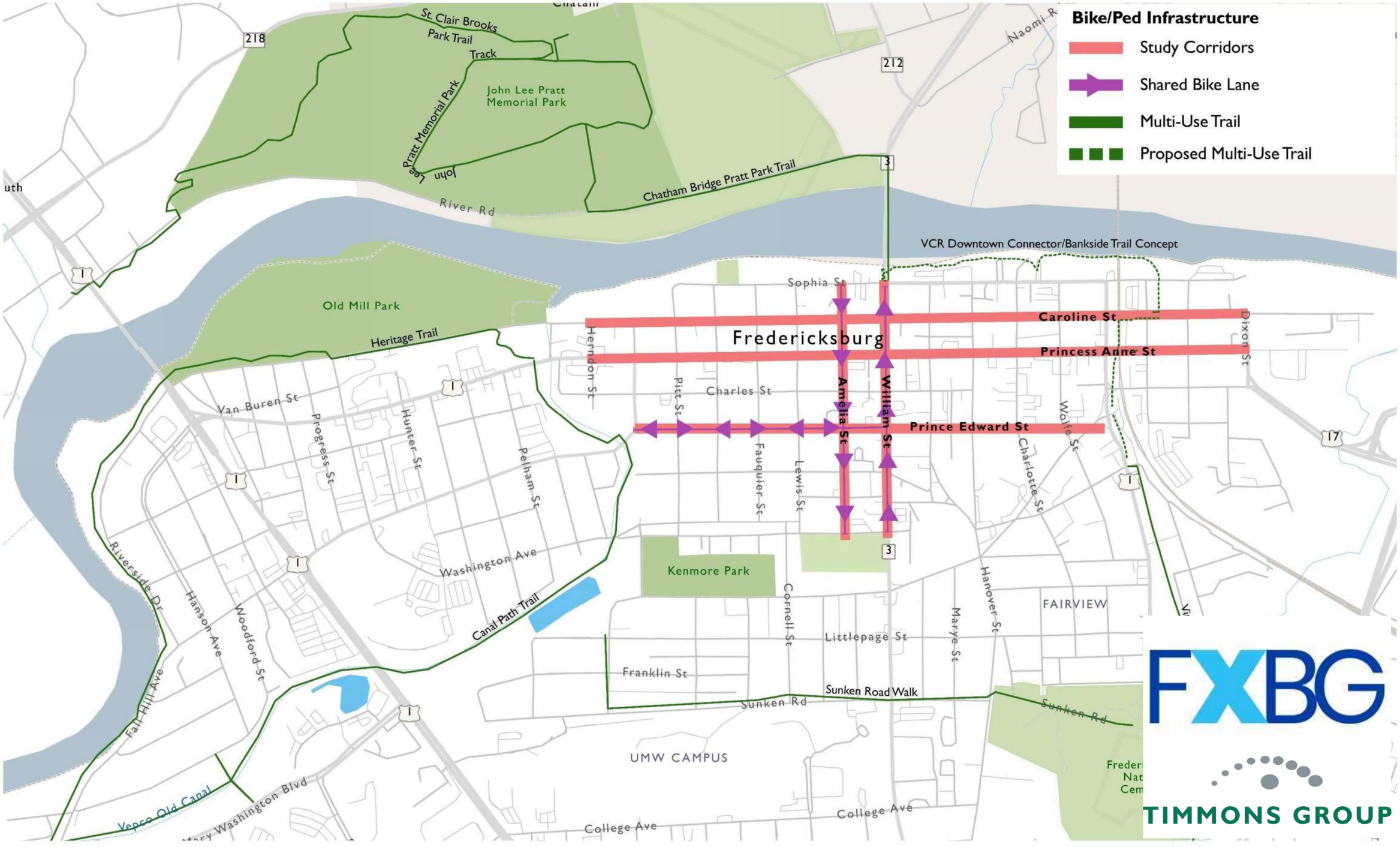
TIMMONS GROUP

**FREDERICKSBURG DOWNTOWN STREET CONVERSION CORRIDOR STUDY**

Speed Limit vs. 85th Percentile Speed




0 1,000 Feet

**FREDERICKSBURG DOWNTOWN STREET CONVERSION CORRIDOR STUDY**

Existing Bike and Pedestrian Infrastructure

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**Direction of Travel**

- Two-Way
- One-Way
- Proposed Change
- No Proposed Change

**Intersection Controls**

- One-Way Stop
- Two-Way Stop
- All Way Stop
- Stoplight
- Yield

River Rd
Kings Hwy
Sophia St
Caroline St
Princess Anne St
Fredericksburg
DOWNTOWN FREDERICKSBURG
DARBYTOWN
RISING SUN
Charles St
Herndon St
Canal St
Prince Edward St
Winchester St
Hawke St
Fauquier St
Pitt St
Maury St
Vepco Old Canal
Douglas St
Amelia St
William St
Washington Ave
Kenmore Park
Cemetery
George St
Hanover St
Charlotte St
Wolfe St
Kenmore Ave
Lafayette St
Frederick St
Princess Elizabeth St
Dunmore St
X-Railroad

Convert from signal

Convert to all way stop

FXBG

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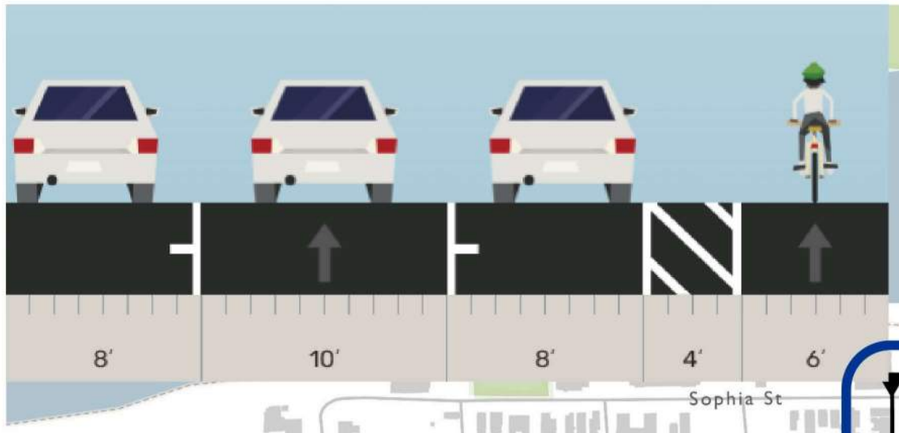
0 500 Feet

# FREDERICKSBURG DOWNTOWN STREET CONVERSION CORRIDOR STUDY

Proposed Two-Way Conversion Segments




Direction of Travel

Two-Way

One-Way

Caroline St

Princess Anne St

Prince Edward St

Sophia St

Kings Hwy

CSX Railroad

Frederick St

Princess Elizabeth St

Wolfe St

Charlotte St

George St

Hanover St

Kenmore Ave

Lafayette St

Dunmore St

Dixon St

Charles St

Fredericksburg

DOWNTOWN FREDERICKSBURG

DARBYTOWN

RISING SUN

Canal St

Herndon St

Maury St

Vepco Old Canal

Winchester St

Pitt St

Hawke St

Fauquier St

Lewis St

Douglas St

Washington Ave

Amelia St

William St

Confederate Cemetery

Kenmore Park

1

2

3

FXBG

TIMMONS GROUP

0 500 Feet

**FREDERICKSBURG DOWNTOWN STREET CONVERSION CORRIDOR STUDY**

Proposed One-Way Configuration with Bike Lanes


**Direction of Travel**

- Two-Way
- One-Way
- Proposed Change
- No Proposed Change

1

2

3

Caroline St

Princess Anne St

Prince Edward St

Amelia St

William St

Fredericksburg

DOWNTOWN FREDERICKSBURG

DARBYTOWN

RISING SUN

Kings Hwy

Sophia St

Charles St

Canal St

Lerndon St

Railroad

Frederick St

Princess Elizabeth St

Wolfe St

Charlotte St

George St

Hanover St

Kenmore Ave

Lafayette St

Dunmore St

Dixon St

Winchester St

Pitt St

Hawke St

Fauquier St

Lewis St

Douglas St

Washington Ave

Maury St

Vepco Old Canal

Confederate Cemetery

Kenmore Park

FXBG

TIMMONS GROUP

0 500 Feet

# FREDERICKSBURG DOWNTOWN STREET CONVERSION CORRIDOR STUDY

Proposed Two-Way Configuration with Traffic Calming

## Mini Roundabouts

- Reduce conflict points and speeding
- Typically fit within existing intersection footprints

Floyd Avenue, Richmond, VA

## Speed Tables

- Reduce speeding on long, uninterrupted blocks or ahead of pedestrian crossings

Main Street near VCU, Richmond, VA

## Curb Extensions

- Expands pedestrian area and can shorten the overall crossing distance
- Reduces corner radius to slow turning vehicles
- Physically restricts parking near pedestrian crossings

Princess Anne St at Lewis St

Caroline St at Pitt St

FXBG

TIMMONS GROUP

**FREDERICKSBURG DOWNTOWN STREET CONVERSION CORRIDOR STUDY**

Traffic Calming Elements

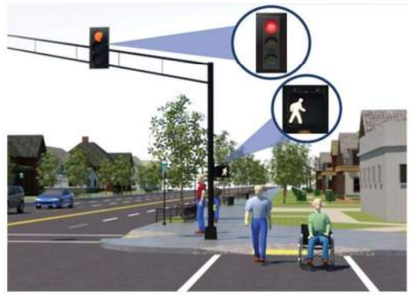
## Pedestrian Recall

- Provides the WALK sign automatically every time
- Improves side street delay without impacting main street coordination
- Setting this expectation may reduce unsafe crossing behavior

Where?
- All signalized intersections, after retiming

## Leading Pedestrian Interval (LPI)

- Provides a head start for crossing pedestrians, typically 3-5 sec
- Keeps parallel vehicle traffic stopped on red
- Most effective when paired with "No Right on Red" at intersections



Where?
- All signalized intersections, after retiming

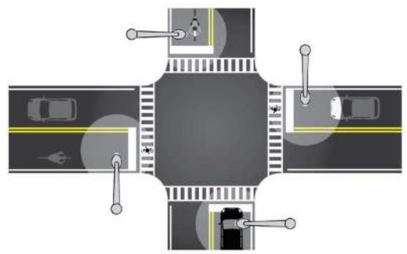
## Pedestrian Signing

- Reminds drivers to yield or stop for crossing pedestrians


Where?
- "Turning Vehicles…" at signalized intersections, after evaluating for load bearing
- "Stop for Pedestrians…" at key uncontrolled marked crosswalks, after evaluating for turning vehicle radius


## Pedestrian Lighting

- Provides safety benefits to all roadway users by increasing visibility of pedestrians and vehicles
- May also improve personal security



Where?
- At marked crosswalks, after evaluating

FXBG

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**FREDERICKSBURG DOWNTOWN STREET CONVERSION CORRIDOR STUDY**

Pedestrian Recommendations

# APPENDIX I

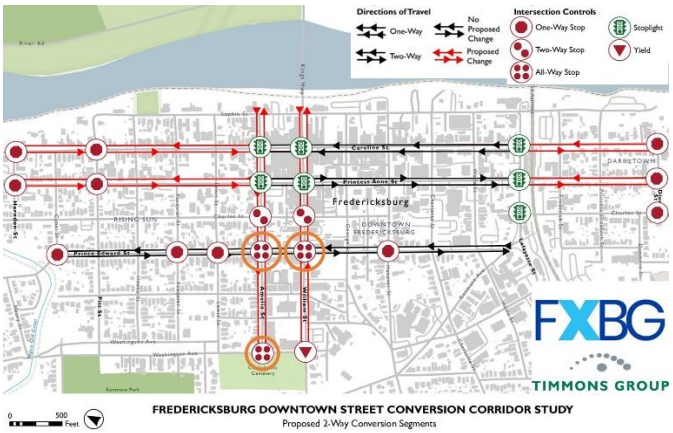
Public Survey Responses

# Fredericksburg Downtown Traffic Engineering Study Survey

*At the request of the City of Fredericksburg Department of Public Works, a study was conducted for the potential one-way to two-way conversion of the downtown Fredericksburg roadway network. The study area covers the streets of Caroline, Princess Anne, William, and Amelia, and extends generally to Washington Avenue in the west, Herndon Street in the north, Dixon Street in the south, and the Rappahannock River to the east. The intent of the study was to evaluate the feasibility and potential impacts of converting select one-way streets to two-way streets in a downtown area. This involved comprehensive data collection, traffic modeling, and analysis to assess how such a conversion would affect traffic flow, congestion, parking, and safety. Additionally, the study aims to explore the establishment of bicycle lanes through removal of travel lanes to ensure safe and accessible infrastructure for cyclists. Recommendations are also included for pedestrian improvements that will allow the downtown area to become more pedestrian friendly and walkable.*

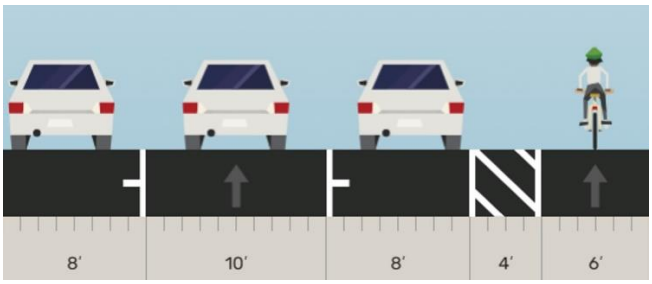
## Proposed Two-Way Conversion

Convert parts of Caroline Street, Princess Anne Street, William Street, and Amelia Street into two-way streets.



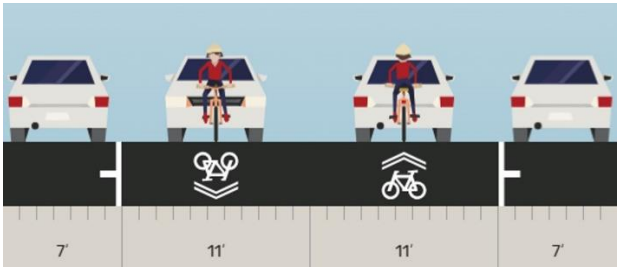

## Bike Lane Scenario 1: Keeping One-Way Streets

Keep the streets one-way, and to reduce each corridor to one vehicle lane, one bicycle lane, and two parking lanes.



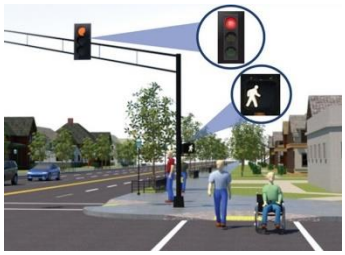

## Bike Lane Scenario 2: Two-Way Streets with Traffic Calming

Convert parts of Princess Anne Street, Caroline Street, Amelia Street, and William Street, and to add bike lanes on parts of Caroline Street and Prince Edward Street. It also proposes traffic calming elements: mini roundabouts, speed tables, and curb extensions.

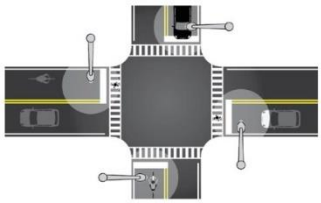



## Proposed Pedestrian Improvements

Includes elements like pedestrian recall, leading pedestrian interval, pedestrian signing, and pedestrian lighting.







# Comments and Questions

1. **Do you have any comments or questions on any of the above information?**

# Optional Demographic Questions

2. **What is your age?**

☐ Under 18 ☐ 18-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55-64

☐ 65-74 ☐ Over 75 ☐ Don't want to answer

3. **How would you describe your race?**

☐ White ☐ Black ☐ Asian ☐ Native American ☐ Other

☐ Don't want to answer

4. **How would you describe your ethnicity?**

☐ Hispanic/Latino ☐ Not Hispanic/Latino ☐ Don't want to answer

5. **Is your annual household income above $34,000?**

☐ Yes ☐ No ☐ Not sure ☐ Don't want to answer

6. **What is your zip code?**

| What is your age? | How would you describe your race? | How would you describe your ethnicity? | Is your annual household income above $34,000? | What is your zip code? | Do you have any questions or comments on any of the above information? |
|---|---|---|---|---|---|
| 45-54 | White | Not Hispanic/Latino | Yes | 22401 | We regularly go from Princess Anne to Sophia on Hawke street to park at our house on Sophia. There is severely limited visibility of what cars are coming on Caroline already, and I have to be halfway in the intersection before I can see if a car is coming. That becomes far more dangerous and complicated if Caroline is two way. This is not unique to just Hawke but common on crossing Caroline/Princess Anne from any small side street. The change to two way traffic without some traffic calming or mirrors or stops makes this dangerous for everyone. |
| 45-54 | White | Not Hispanic/Latino | Yes | 22401 | Thanks for providing the detailed explanations and visuals. I am in support of the conversion of one-way traffic on Caroline and Princess Anne to two-way traffic. Bike scenario #2 seems best, and pedestrian safety measures are always welcome. |
| 45-54 | White | Not Hispanic/Latino | Yes | 22401 | For zone 3, I propose that travel speeds are not as egregious as implied. This appears to be a solution looking for a problem.<br><br>If required, traffic calming in this area should not be addressed by degrading existing infrastructure capacity. Reducing these roads to either one way, single lane traffic or two way, two lane traffic is a Rube Goldberg solution. The other calming methods noted in the presentation (e.g., speed tables) would provide the same results.<br><br>The solution should not degrade quality of life of Darbytown homeowners and local drivers by increasing traffic congestion on Princess Anne St. As clearly shown in the study results, the proposed changes sub-optimize capacity, congesting Princess Anne St and effectively turning Caroline St into a long private driveway. Maybe that's the intent.<br><br>Also, there may be, at most, one bicyclist a day on Princess Anne St. I'm not sure why we need to invest taxpayer funds and degrade traffic throughput to support that low of a demand. |
| 55-64 | White | Not Hispanic/Latino | Yes | 22401 | We currently have speed tables on Hanson Ave and they create more speed and noise. Because the majority who use Hanson as a cut through from Rt 1 and Fall Hill, are regulars they know they can speed up to the table, crossover it then accelerate quickly. Speed tables only make more noise, especially when it's loud cars or motorcycles and more speed. |
| 65-74 | White | Not Hispanic/Latino | Yes | 22401 | I am very concerned about the safety of expanding traffic , adding bike lanes and maintaining on street parking on Amelia St. Amelia St is already pushing space available for traffic, bikes , on street resident parking and pedestrians. I use on street residents parking and have had my side mirror knocked off by the increased commercial truck traffic. Traffic has increased with opening of 2 new Apt buildings and increased commercial venues. This has directly resulted in an increase in constant large commercial truck traffic that not only navigates difficult turning radius' onto Amelia St but also regularly stops to unload and load blocking 1lane and resident parking. 2way traffic will exacerbate this already tenuous situation and increase the safety hazards for pedestrians.<br>I think accommodating bike traffic is important to accomplish within the existing one-way street designations.<br>Anothercause of the increase seems to be visitors cruising for parking so to avoid paying for garage. |
| 55-64 | White | Not Hispanic/Latino | Yes | 22405 | I think converting to two way traffic would be a big mistake. Often delivery truck dad block one lane of travel. There is also backed traffic with the current two travel lanes-reducing to one single would make it worse. |
| 35-44 | White | Not Hispanic/Latino | Yes | 22401 | Excellent analysis and reporting. I strongly support recommended changes! |
| 55-64 | White | Don't want to answer | Yes | 22401 | This is obviously a difficult decision for the city to make when you can't increase the size of the roadways. I am opposed to taking one lane for bicycles only without a study to prove that it is warranted. I agree it's difficult when there are bicycles on the one-way streets, but I also don't see that many people riding bicycles. And I don't agree with the two way, one way back to two way or reduced lane. It will be too confusing. We need crosswalk signals like what's on college Avenue on Princess Anne and Caroline Street. With people parking right up to the crosswalk, vehicles can't see people unless they're out into the street that want to cross the street. |
| Don't want to answer | Don't want to answer | Don't want to answer | Yes | 22401 | Two-way traffic on Caroline Street will not slow people down. I live on Caroline, and all it will do is lead to accidents.<br><br>Enforce the current speed limits using speed cameras and radar. It seems this method of traffic control hasn't been fully considered. |

| What is your age? | How would you describe your race? | How would you describe your ethnicity? | Is your annual household income above $34,000? | What is your zip code? | Do you have any questions or comments on any of the above information? |
|---|---|---|---|---|---|
| Older than 75 | White | Not Hispanic/Latino | Not sure | 22401 | The Two-Way Conversion is the best option, except leave William and Amelia one-way. Bike Lane Scenario #1 looks like the worst option. |
| 35-44 | White | Not Hispanic/Latino | Yes | 22401 | Please make our streets safer by calling traffic, improving intersection design and providing protected bike infrastructure throughout Downtown. The needs of our residents, businesses and visitors should take precedence over drivers cutting through downtown. |
| 55-64 | White | Not Hispanic/Latino | Yes | 22401 | Keep the streets one way! It's going to be confusing when a street switches midway to two way street. If anything- limit parking near intersections- you can't see when turning b/c cars are parked right up to the corners. No bike lanes— never see bikes downtown and parking is already limited. |
| 25-34 | White | Not Hispanic/Latino | Yes | 22401 | |
| 45-54 | White | Not Hispanic/Latino | Yes | 22408 | I have always wished part of Caroline Street could be closed off for pedestrians like other cities like Charlottesville and Boulder, Colorado, have done. I do not want Caroline and Princess Anne converted to two way traffic. |
| 45-54 | White | Not Hispanic/Latino | Yes | 22401 | Speed tables in downtown would be welcome. Also conversion to two way where possible. I fully support the extension of the shared use trail. I'm curious to see the economic impact of more of these changes. I'd love to see more bike lanes, but also want to see safe pedestrian and biking measures in my area (Small Area 10) too and in other neighborhoods. What can we afford? Where are our priorities? |
| 25-34 | White | Not Hispanic/Latino | Yes | 22401 | Converting the streets to a 2 way road is huge waste of time and resources. See downtown Culpepper and their traffic downtown on main streets. The flow of traffic downtown right now is very good and does not need much more improvements other than some things mentioned like bike lanes and some roundabouts. |
| 25-34 | Don't want to answer | Don't want to answer | Yes | 22401 | I like the idea of curb extensions. But making William Street two ways is a terrible idea! Can't believe it's even being considered. |
| Don't want to answer | Don't want to answer | Not Hispanic/Latino | Yes | 22401 | |
| 55-64 | White | Not Hispanic/Latino | Yes | 22401 | |
| 35-44 | White | Not Hispanic/Latino | Yes | 22401 | I appreciate the traffic calming round about at the suggested locations. I also like the idea of bump outs and pedestrian lighting. I know the budget will be tight to so all that is needed. What suggestions will provide the best traffic calming measure and ensure the safety of foot and bike traffic? |
| 55-64 | White | Not Hispanic/Latino | Yes | 22401 | I support two-way conversions in all three segments. In the two neighborhood segments they should absolutely be combined with traffic calming elements such as speed tables, mini roundabouts, and curb extensions. Such installations will make the bike sharrow (likely more palatable) option safer. We should have an aggressive program of pedestrian improvements regardless of which option (or none) is selected. |
| 25-34 | White | Not Hispanic/Latino | Yes | 22401 | Thank you for considering how to make Fredericksburg safer for pedestrians and bikers! We are extremely pro-pedestrian and, despite initial angst over change, believe steps taken to make our beloved city safer and easier to navigate on foot will ultimately have big benefits. |
| 35-44 | White | Not Hispanic/Latino | Yes | 22405 | Please do not change the flow of traffic. The one way streets serve the downtown area well. Add in enhancements for pedestrians and bicycles where able. |
| Older than 75 | Don't want to answer | Don't want to answer | Don't want to answer | 2240 | Comments regarding this engineering study have been emailed directly to Mike Craig as content of my message did not comply with 1000 characters in length. Race, ethnicity and income should have no influence on my responses. |
| 45-54 | White | Not Hispanic/Latino | Yes | 22401 | I prefer the Bike Lane Scenario 2, with all the traffic calming features. We need to slow traffic in the downtown corridor, as people speed too quickly and endanger people walking or cyclists. |
| 25-34 | White | Not Hispanic/Latino | Yes | 22401 | |
| 45-54 | White | Not Hispanic/Latino | Yes | 22401 | One concern is delivery trucks. They double-park on one-way streets (especially Willima Street, Princess Anne, and Caroline) to make deliveries to businesses, and traffic can pass these stopped vehicles by using the other lane. If these one-way streets are converted to two-way, there needs to be an ordinance prohibiting double-parking. |
| 65-74 | White | Not Hispanic/Latino | Yes | 22408 | |

| What is your age? | How would you describe your race? | How would you describe your ethnicity? | Is your annual household income above $34,000? | What is your zip code? | Do you have any questions or comments on any of the above information? |
|---|---|---|---|---|---|
| 35-44 | Don't want to answer | Don't want to answer | Don't want to answer | 22401 | What is the total cost of this including already expended manpower and future manpower and materials for this project? How will this impact businesses and business deliveries in the downtown area? Why is this being considered prior to the completion of ongoing projects like learning lane remain delayed? Why are we looking to make such drastic changes to downtown when you can't even effectively police it? Why is the mayor and council making choices without thinking them all the way through? Why don't we spend this money on things like parks, shelters, and civil services instead of spending all the money your set to make destroying our natural resources with your technology park? |
| 25-34 | White | Not Hispanic/Latino | Yes | | |
| Older than 75 | White | Not Hispanic/Latino | Yes | 22401 | I would like to know what will happen on William Street when trucks block a lane to make deliveries which happens all the time with all the restaurants. Also, while you're at it can you make Liberty St two-way? |
| 18-24 | White | Not Hispanic/Latino | No | 22401 | I love the direction that y'all are thinking about! For bike lanes, please ensure that then include some form of physical protection (bumpies in the road, plastic blockers, curb, etc) IN ADDITION to parked cars. Other countries have implemented bike lanes that have small physical protection but also allow ambulances to cross thru and use them in emergencies. |
| 35-44 | White | Not Hispanic/Latino | Yes | 22553 | Is the city able to run a trial period of Bike Lane Scenario 1, since it is the most cost effective? After the trial period, if it is deemed inadequate, move onto a vote for Scenario 2. |
| 25-34 | White | Not Hispanic/Latino | Yes | 22401 | Scenario 2 with traffic calming elements seems the best option. Scenario 1 wouldn't achieve the desired effect as traffic can still move quickly down a lane drivers know is one way and straight. In addition, bikes would need to enter the roadway from the dedicated bike lane in the busiest areas of downtown. It also puts pedestrians exiting vehicles in more danger as there's nowhere for another vehicle passing to yield in an emergency if cars are parked on both sides. Scenario 2 with the calming elements would do a better job at slowing the fast traffic. I especially like the mini roundabouts and the signage pylons in the road. Many times drivers aren't looking for pedestrians on the sides. Finally, the pedestrian interval should be increased, and would be better for those crossing the street slowly. |
| 45-54 | White | Not Hispanic/Latino | Yes | 22405 | I do not support making current one way streets into 2 way streets. When driving downtown during business hours, one frequently must change lanes to go around delivery vehicles and shoppers loading vehicles. Waiting isn't always an option as delivery vehicles are often there for a long time. Trying to go around a delivery truck and not being able to see what is coming at me because the street now has oncoming traffic will be hazardous. I'd rather see enforcement of current traffic speeds and pedestrian yielding than changes. |
| 45-54 | White | Not Hispanic/Latino | Yes | 22401 | |
| 25-34 | White | Not Hispanic/Latino | Yes | 22401 | |
| 55-64 | White | Hispanic/Latino | Yes | 22401 | |
| 35-44 | White | Not Hispanic/Latino | Yes | 22408 | |
| 55-64 | White | Not Hispanic/Latino | Yes | 22401 | Of the proposed options, I favor option 2 I'm also in favor of any/all of the proposed traffic calming measures, especially along Princess Anne, Caroline and Prince Ed. |
| 45-54 | White | Not Hispanic/Latino | Yes | 22401 | |
| 35-44 | White | Not Hispanic/Latino | Yes | 22407 | |
| Under 18 | White | Not Hispanic/Latino | No | 22401 | I am a resident of Sophia Street, north of Amelia Street. I support changes to make our downtown streets safer. Through-traffic is a dangerous and unpleasant nuisance, especially during rush hour when cars cut through our neighborhood. I support a protected bike lane on my street. Please also make the 1100 block of Sophia into a one-way street, SOUTHBOUND, to keep thru-traffic from speeding down my street. |
| 45-54 | White | Not Hispanic/Latino | Yes | 22401 | I prefer scenario 2.<br>Generally, everything we can do to enhance safety for those not in cars while at the same time reducing the supremacy of the car will make our city better, safer, more lively and robust. |
| | | | | | This is a terribly unhelpful way to conduct a public feedback survey. This platform offers the ability to do much more than provide a lot of information then ask for comments at the end. |
| 65-74 | White | Not Hispanic/Latino | Yes | 22401 | My preference is for two way conversions explained in the first option above. |
| 45-54 | White | Not Hispanic/Latino | Yes | 22401 | |
| 65-74 | White | Not Hispanic/Latino | Yes | 22401 | |
| 55-64 | White | Not Hispanic/Latino | No | 22405 | Looks good to me. I hope the city utilizes speed cameras. There should be more cameras and speeding tickets by mail 😉 |
| Under 18 | White | Not Hispanic/Latino | No | 22401 | I frequently ride my bike in downtown Fredericksburg. More protected lanes and safer intersections would encourage me to ride more often. Please implement the study recommendations. |

| What is your age? | How would you describe your race? | How would you describe your ethnicity? | Is your annual household income above $34,000? | What is your zip code? | Do you have any questions or comments on any of the above information? |
|---|---|---|---|---|---|
| 65-74 | White | Not Hispanic/Latino | Yes | 22401 | The intersection of Lafayette, Kenmore, and Prince Edward needs help for pedestrian traffic |
| Older than 75 | White | Not Hispanic/Latino | Yes | 22461 | I live at 603 Amelia St, and I am opposed to making Amelia and William Street two-way. The number of service trucks for the restaurants as well as USPS, UPS, and Amazon would make this a nightmare. 540-319-1233 Gordon Gay |
| Older than 75 | White | Not Hispanic/Latino | Yes | 22401 | College Ave, 15 mph please: it's a school zone. Would like speed limit all over 22401 to be 20 mph. Would like stop signs at every intersection. Would like marks on road and not physical barriers for slowing traffic. Would like protection for bikers. Like 2 way proposals |
| 25-34 | White | Not Hispanic/Latino | Yes | 22401 | Thank you so much for the presentation - it was great. I really love the separated bike lanes and the conversion of some of those unnecessary stoplights. Ultimately, though, I'm in favor of any traffic calming measure. |
| Older than 75 | White | Not Hispanic/Latino | Yes | 22401 | I appreciate ways to slow down vehicles going through Fredericksburg. Increasing walking, running, biking opportunities is worthy of high priority. Safety for pedestrians needs to be improved |
| 25-34 | White | Not Hispanic/Latino | Yes | 22401 | The one-way conversion with bike lanes is a great idea. It's not safe for students to bike to downtown and many of them don't have cars. I don't think sharrows are a good solution if we want to keep safety in consideration. |
| 45-54 | White | Not Hispanic/Latino | Yes | 22401 | I favor scenario 2 over keeping one-way + losing a lane to bikes |
| | | | | | We, the residents of the 1100 block of Sophia Street would like to express our desire for our block of Sophia to be converted into a single lane, one-way southbound street. For many years, drivers have treated our street like a highway and driven extremely fast northbound from the direction of the Chatham Bridge. This cut-through traffic is not appropriate for a residential street and creates a safety hazard for pedestrians, residents, and pets. Prohibiting northbound traffic from entering our street would solve this problem. Converting Sophia to one lane would also create space for the City to create protected multi-use path or cycle track on what's currently the northbound lane (the river side) of Sophia Street. The City's comp plan envisions Sophia Street as a bike/ped connection between Chatham Bridge/Bankside Trail and Heritage Trail/Canal Path. Lots of people run and bike on our street, which currently has no sidewalk on the river side. |
| 45-54 | White | Not Hispanic/Latino | Yes | 22401 | |
| 55-64 | White | Not Hispanic/Latino | Yes | 22401 | Where is the police presence, not as a response to an incident or incidents, but as proactive patrol presence? We need a sub-station for the police downtown. |
| 35-44 | White | Not Hispanic/Latino | Yes | 22401 | Is there a specific location online where people can submit location-specific questions? |
| 65-74 | White | Not Hispanic/Latino | Yes | 22401 | I am interested in traffic calming in any area or method. I think the city should be forward thinking in solutions - most of the people that are complaining won't be driving in 5 years…just saying! Protect our city of the future. Thank you! |
| 35-44 | White | Not Hispanic/Latino | Yes | 22401 | Please make Sophia St one way southbound |
| 65-74 | White | Not Hispanic/Latino | Yes | 22401 | Prince Edward St - need to slow traffic! |
| 35-44 | White | Not Hispanic/Latino | Yes | 22401 | I appreciate the plan for single lane, 2 parking and one bike lane. It slows traffic down and provides for safe crossings for pedestrians in the most highly traveled fast traffic area of our city. Please have a meeting with the business community to ensure stress from deliveries is not unheard. |
| 65-74 | White | Not Hispanic/Latino | Yes | 22401 | So appreciate more bike trails/connections around town. |
| 35-44 | White | Not Hispanic/Latino | Yes | 22401 | - slow the traffic<br>- build more bike/ped paths<br>- protect our neighborhoods from dangerous cut-through traffic |
| 18-24 | White | Not Hispanic/Latino | No | 22401 | I support a protected (by parked cars or something physical -- > see Netherlands) bike lane 100%<br>That being said, sidewalk repairs would enable accessibility for wheelchairs, etc.<br>I am a student at VMW |
| 45-54 | White | Not Hispanic/Latino | Yes | 22401 | Thank you for doing this! Yes to mini traffic circles and bike lanes |
| 65-74 | White | Not Hispanic/Latino | Yes | 22401 | Prefer bike lane #1 - I cycle frequently on Kenmore (2 way). Drivers @ 20-30 passing. That would be dangerous or impossible in much of downtown and place slower cyclists in danger.<br>I do not agree with removing lights at William and Edward. The intersection is heavily used, especially when farmer's market is open or other park activities. |
| 55-64 | White | Not Hispanic/Latino | Yes | 22401 | Personal preference for safety, the one-way traffic with dedicated bike lanes is much safer. Riding a bike with traffic is hazardous. The pedestrian leading walk with "no turn on red" should be implemented throughout the city, including Rt 1/Cowan Blvd, Rt 1/College, William St/College Ave. Drivers move too quickly and do not yield to pedestrians in crosswalks. |
| 55-64 | White | Not Hispanic/Latino | Yes | 22401 | Would like more details on mini roundabouts/speed tables on Princess Anne/Caroline. More discussion needed |

| What is your age? | How would you describe your race? | How would you describe your ethnicity? | Is your annual household income above $34,000? | What is your zip code? | Do you have any questions or comments on any of the above information? |
|---|---|---|---|---|---|
| 45-54 | White | Not Hispanic/Latino | Yes | 22401 | I would love mini roundabouts on Prince Edward @ Fauquier St. Also on Princess Anne. More 4 way stops please |
| Don't want to answer | Don't want to answer | Don't want to answer | Don't want to answer | 22401 | 2-way traffic will reduce speed but at what cost - leave things alone. Install 4 stops @ each intersection |
| 25-34 | White | Not Hispanic/Latino | Not sure | 22554 | Why not both proposals? As in, one lane for autos with a bike lane on Caroline and Princess Anne, plus mini roundabouts and traffic calming on William and Amelia? |
| Older than 75 | White | Not Hispanic/Latino | Don't want to answer | 22401 | Consider downtown traffic lights have turn for pedestrians only - going all ways (pedestrian scramble). pedestrians can go all direction and not block turning traffic. Separate light cycle for pedestrians only |
| 55-64 | White | Not Hispanic/Latino | Yes | 22401 | One way bike lane concept and negative results (1) parked vehicles between traffic and bike lane appears to create blind spots at intersections where vehicles turn over bike lane/ped crosswalks. (2) emergency vehicles will be significantly hindered |
| 55-64 | White | Don't want to answer | Don't want to answer | 22401 | 1. Where will delivery vehicles park?<br>2. In one lane version, how will emergency vehicles get through?<br>3. Bumpouts don't slow motorcycles! |
| 65-74 | White | Not Hispanic/Latino | Yes | 22401 | My concern is for the pedestrian traffic on Princess Anne Street + Caroline and that 2-way traffic would seem to be more dangerous an idea. Crossing the street may be more dangerous in that sense |
| 55-64 | White | Not Hispanic/Latino | Yes | 22401 | All of the suggestions are great but let us suggest making William St right hand lane between Sunken and College RIGHT TURN ONLY at the light! |
| Older than 75 | White | Not Hispanic/Latino | Yes | 22406 | What is the cost involved in these options? I like the idea of two way traffic. |
| | | | | | Prefer #1 |
| 35-44 | Don't want to answer | Don't want to answer | Yes | 22401 | What are the proposed connections between the existing bike paths? There is a stated goal of an uninterrupted route between Old Mill Park and Dixon Park, but the actual options of how that would look is not provided. |
| 45-54 | White | Not Hispanic/Latino | Yes | 22401 | two way traffic would improve street parking as well. safer pedestrian intersections definitely needed. great options. |
| 35-44 | White | Not Hispanic/Latino | Yes | 22401 | No need to make any changes. Waste of tax payer money. Council should focus on other priorities. |
| 35-44 | White | Not Hispanic/Latino | Yes | 22401 | Improving parking would have a greater impact to traffic downtown. I don't think adding two-way traffic and bike lanes will improve much of the current issues with driving around the area. Issues like pedestrian crossings (outside stop light controlled intersections) and parking are higher priority, in my opinion. The proposed changes feel like a waste of money. |
| 55-64 | White | Not Hispanic/Latino | Yes | 22401 | No |
| 55-64 | Don't want to answer | Don't want to answer | Don't want to answer | 22401 | 2 way conversion<br>-near impossible to back out of narrow driveways with 2-way traffic<br>-why "statistics" say there's not a problem 26 mph avg Caroline 30 Princess Anne<br>-police speeding tickets very low / accidents very low<br>-trying to cross Princess Anne/Caroline already difficult - will be even more - car or pedestrian<br>-with 2 -way even more dangerous to ride bikes<br>-parallel parking and door opening will stop traffic<br>Bike lanes<br>-taking away a lane for limited # of new bike users not worth effort<br>*concerned by comments during intro - "these recommendations are absolutely necessary"<br>*Washington/Fall Hill change was extreme benefit to the neighborhood<br>*study presenter gave "implied issues" not backed by evidence<br>*people run the red lights..<br>*how - as defined by residents - imperical evidence<br>not big investments<br>-curb extensions work!<br>-speed humps would help, but were told not viable due to fire/ambulance routes<br>-connect of possible bike lanes from Dixon park - ask bike riders to slow down |

# APPENDIX J

August 2025 Main Street Stakeholder Meeting Materials

FXBG

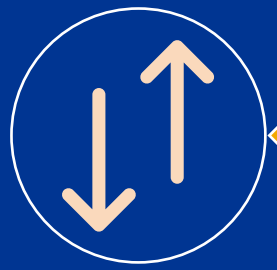
# Fredericksburg Downtown Transportation Engineering Study

August 2025

# Outline

- Study Overview
- William Street and Amelia Street Proposed Changes
- William Street at Charles Street Raised Intersection Project
- Parking and Loading Zone Discussion

# Mission



Determine the effect of converting several one-way street pairs to two-way travel related to safety, congestion, speed, and parking

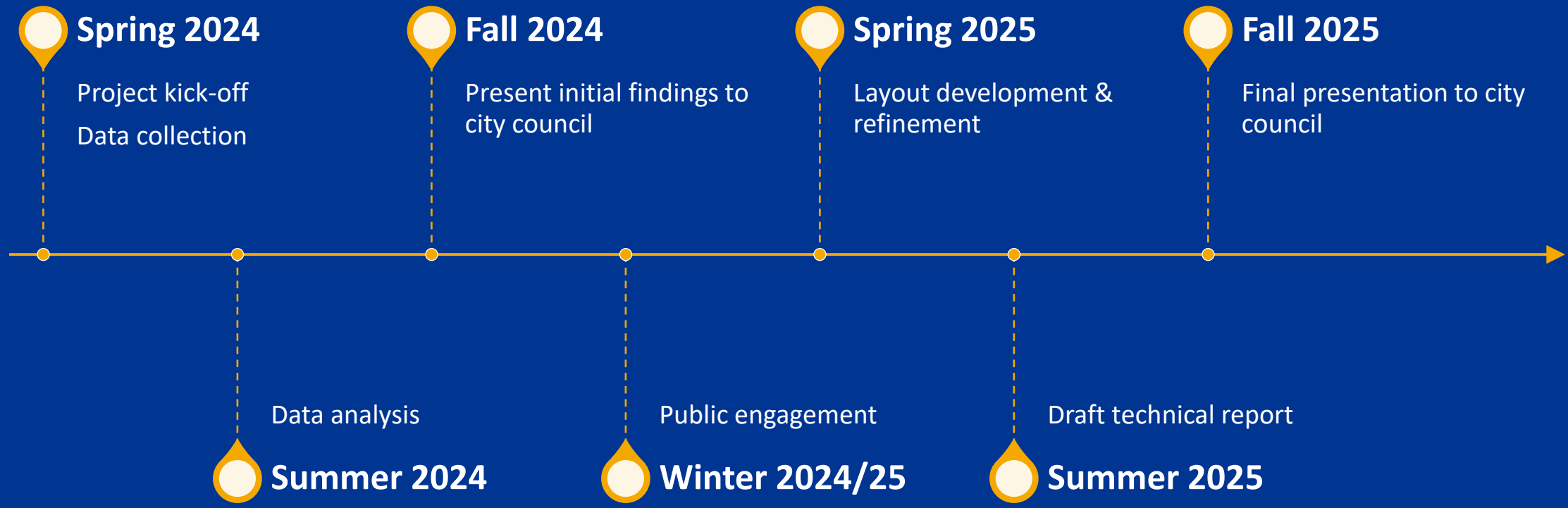
Assess different traffic calming techniques

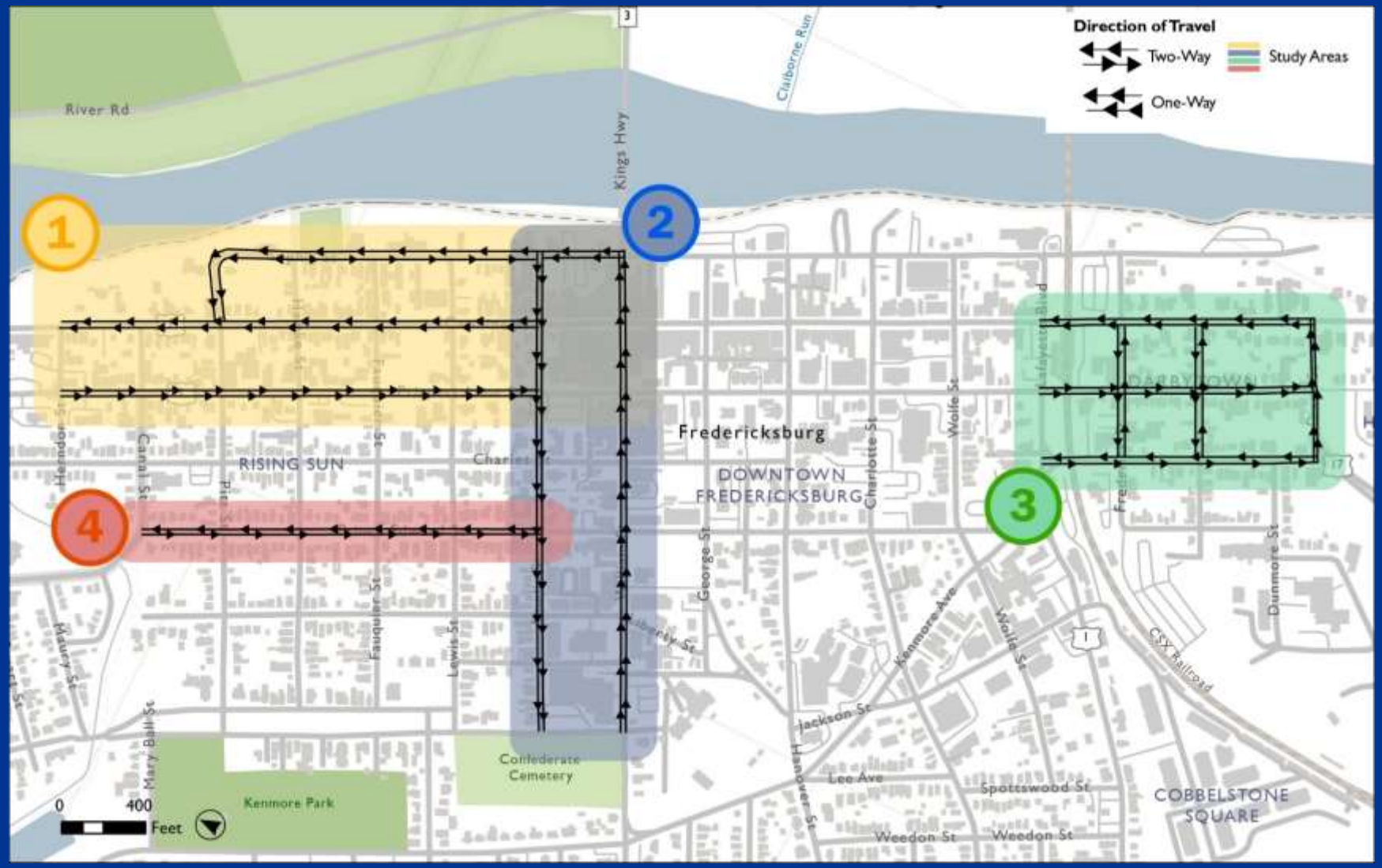
Evaluate bicycle and pedestrian improvements

# Expected Benefits

- Reduced speeds
- Improved traffic circulation
- Increased pedestrian and bicycle access

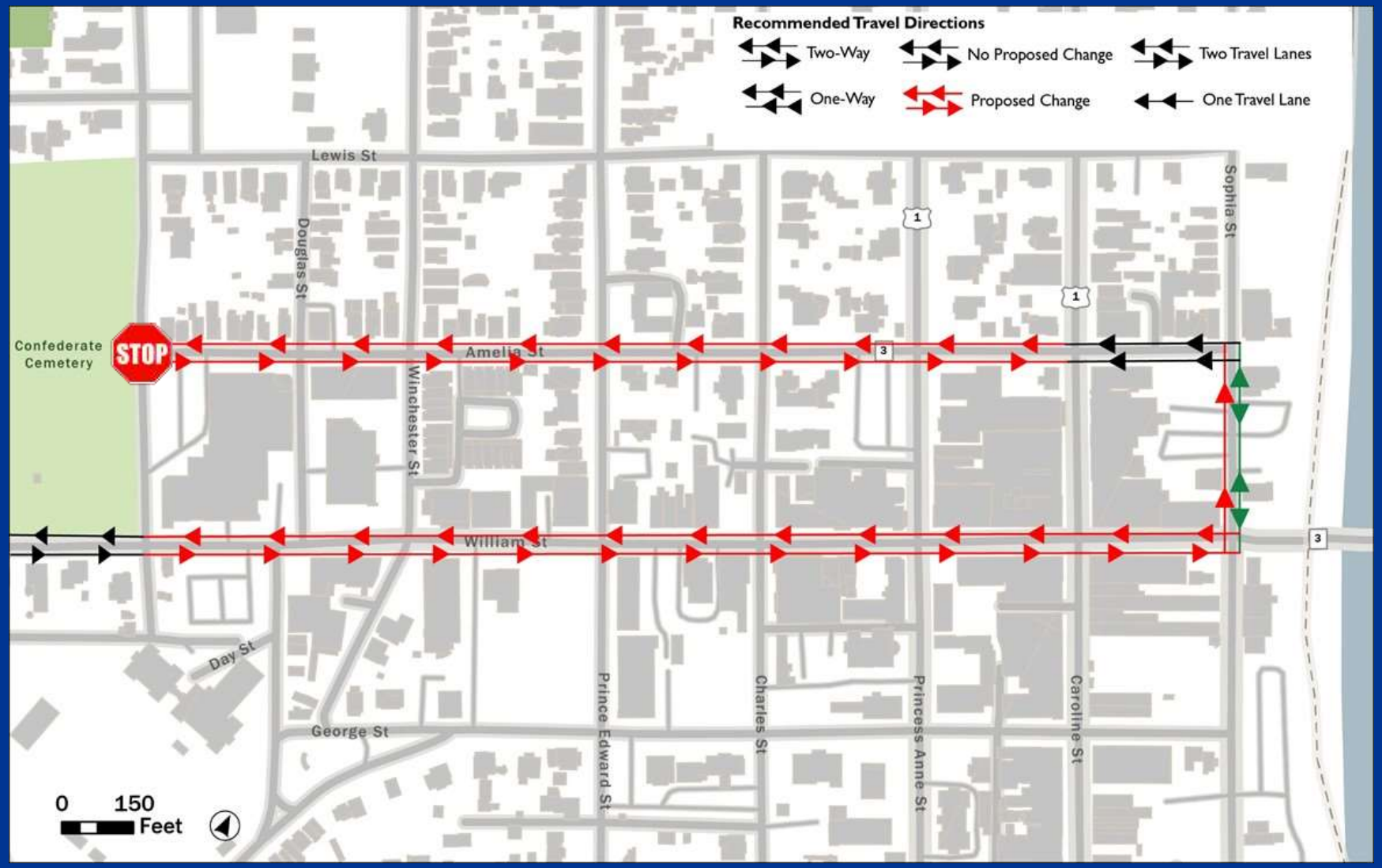
# Timeline


Spring 2024
Project kick-off
Data collection
Data analysis
Summer 2024
Fall 2024
Present initial findings to city council
Public engagement
Winter 2024/25
Spring 2025
Layout development & refinement
Draft technical report
Summer 2025
Fall 2025
Final presentation to city council




# Four Study Areas

1. North Princess Anne Street / Caroline Street
2. Amelia Street / William Street
3. South Princess Anne Street / Caroline Street
4. Prince Edward Street (traffic calming)




# Recommended Changes

- Convert travel on William Street and Amelia Street to two-way
- Change Amelia at Washington to all-way stop
- Keep one block of Amelia one-way
- Reduce one block of Sophia to one lane with two-way bike lanes


# Recommended Changes

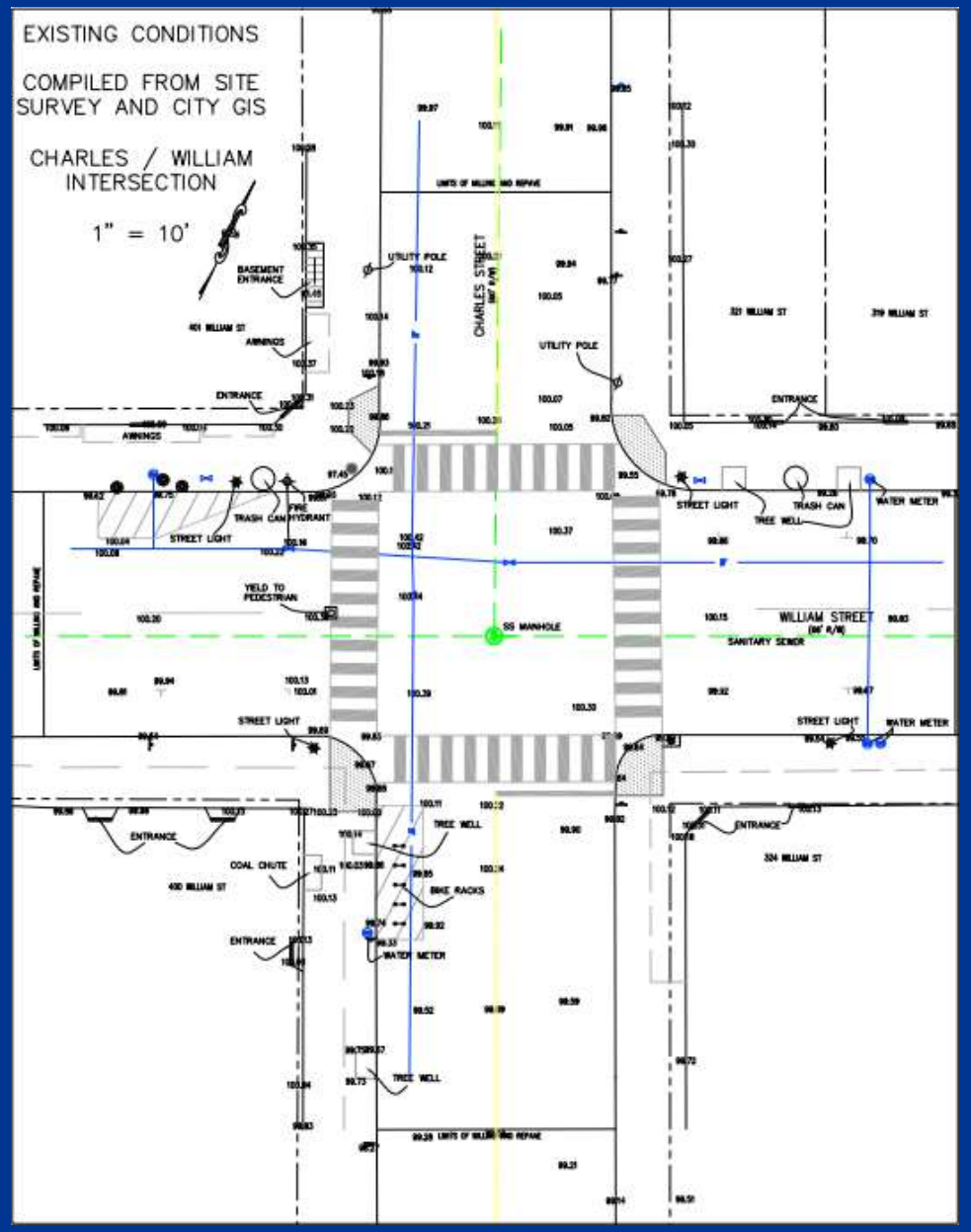
- Convert travel on William Street and Amelia Street to two-way
- Change Amelia at Washington to all-way stop


# Recommended Changes

- Convert travel on William Street and Amelia Street to two-way
- Raised intersection at William and Charles
- Keep one block of Amelia one-way
- Reduce one block of Sophia to one lane with two-way bike lanes

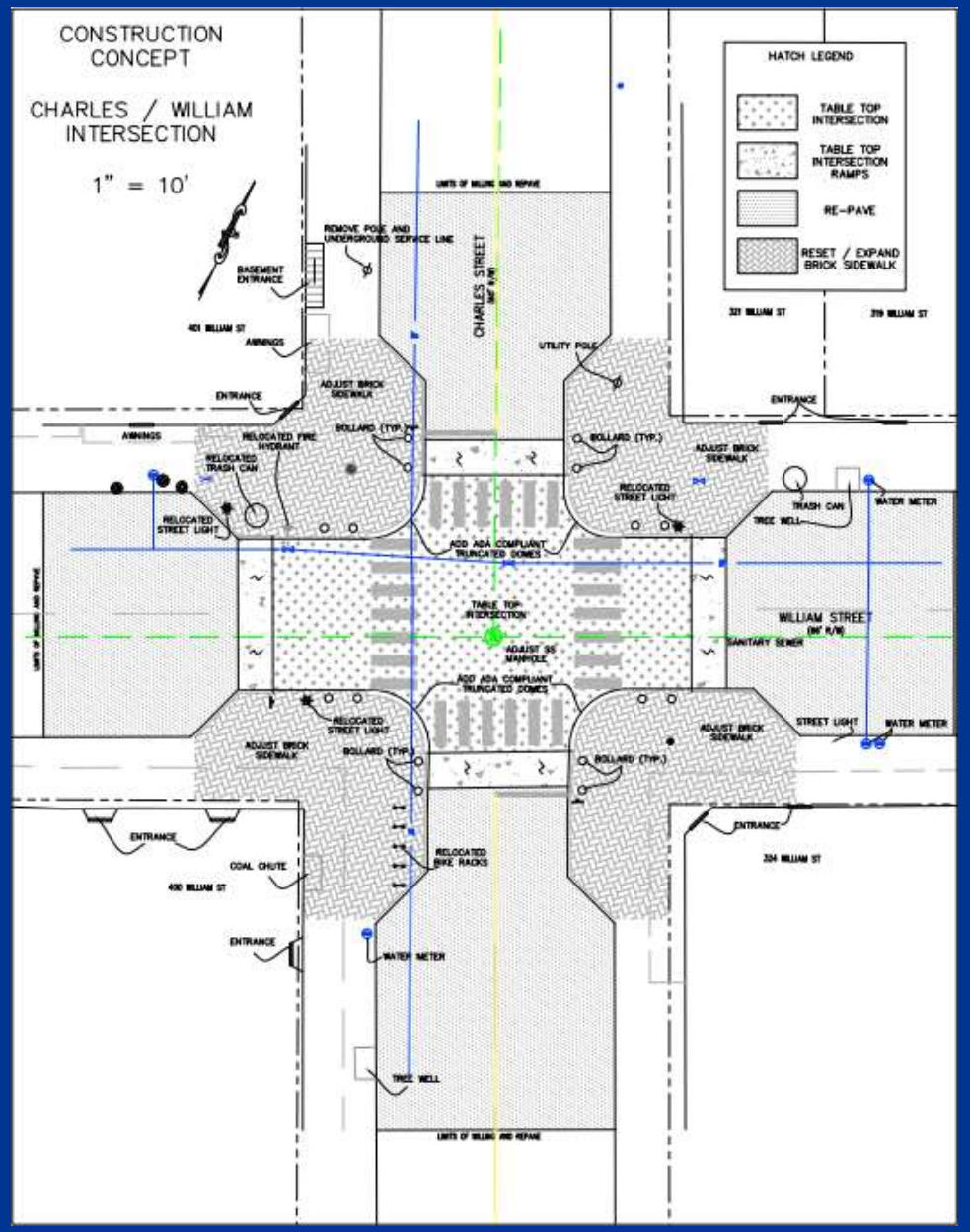
# William at Charles Raised Intersection

- Two travel lanes on each approach
- Parking on both sides of William and Charles, partially limited by pavement markings
- Marked pedestrian crossings on all four approaches



# William at Charles Raised Intersection

- Reduces travel speed
- Maintains two travel lanes on each approach
- Increases pedestrian area
- Reduces pedestrian crossing distance
- Physically limits parking at intersection



# Loading Zones

Existing loading zones:

- 109 Amelia Street

Proposed loading zones:

- 203 William Street (near Wild Hare)
- 300 William Street (Castiglia's)
- 403 William Street (Butcher)

# Parking

Approximate number of existing on-street parking spaces:

200

Approximate number of proposed on-street parking spaces:

190

Recommended changes to travel direction have a minimal impact on parking due to physically limiting parking near intersections with curb extensions

# Parking & Loading Discussion

- Are there opportunities to adjust curbside activities? Parking, loading, pick-up/drop-off?
- Is there an opportunity for shared loading and parking spots?
- Is there a need for dedicated, on-street loading spots on William and Amelia? If so, where?
- Is there a need for short-term (15-min) parking spots? If so, where?

# APPENDIX K

Proposed Improvement Cost Estimates

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City of Fredericksburg, VA

# Fredericksburg Downtown Engineering Study

**Traffic Signal Operations Improvements**

**Preliminary Planning Cost Estimate - September 2025**

**City of Fredericksburg, Virginia**

| Description | Unit | Est. Quantity | Unit Price ($) | Amount ($) |
|---|---|---|---|---|
| **Traffic Signal Upgrades** | | | | |
| Intersection re-timing | EA | 11 | $ 2,000 | $ 22,000 |
| LPI Implementation | EA | 10 | $ 1,000 | $ 10,000 |
| | | | Traffic Signal Upgrades Total | $ 32,000 |
| | | | ***Grand Total*** | ***$ 32,000*** |

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City of Fredericksburg, VA

# Fredericksburg Downtown Engineering Study

**William Street/Amelia Street Improvements**

**Preliminary Planning Cost Estimate - September 2025**

**City of Fredericksburg, Virginia**

| Description | Unit | Est. Quantity | Unit Price ($) | Amount ($) |
|---|---|---|---|---|
| **Preliminary Engineering** | | | | |
| Design work (15% of other categories) | LS | 1 | $ 270,720 | $ 270,720 |
| | | | Preliminary Engineering Total | $ 270,720 |
| **Pavement Marking & Signs** | | | | |
| Pavement marking eradication | LF | 25000 | $ 2.00 | $ 50,000 |
| New pavement markings | LF | 16800 | $ 3.50 | $ 58,800 |
| Sign upgrades (removal, moving existing, adding new) | EA | 120 | $ 350 | $ 42,000 |
| | | | Pavement Marking & Signs Total | $ 150,800 |
| **Curb Ramps & Extensions** | | | | |
| Upgraded ADA curb ramps | EA | 33 | $ 10,000 | $ 330,000 |
| Curb bump-outs | EA | 15 | $ 15,000 | $ 225,000 |
| Curb chokers | EA | 3 | $ 5,000 | $ 15,000 |
| | | | Curb Ramps & Extensions Total | $ 570,000 |
| **Traffic Signal Upgrades** | | | | |
| Audible pedestrian signal (APS) push buttons | EA | 56 | $ 2,000 | $ 112,000 |
| Decorative mast arms | EA | 6 | $ 15,000 | $ 90,000 |
| Decorative signal poles | EA | 6 | $ 40,000 | $ 240,000 |
| Signal heads (including junction boxes and conduit) | EA | 24 | $ 25,000 | $ 600,000 |
| New signs | EA | 56 | $ 750 | $ 42,000 |
| | | | Traffic Signal Upgrades Total | $ 1,084,000 |
| | | | **Sub-Total** | **$ 2,075,520** |
| | | | **Contingency (50%)** | **$ 1,037,760** |
| | | | ***Grand Total*** | ***$ 3,113,280*** |

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City of Fredericksburg, VA

## Fredericksburg Downtown Engineering Study

**Sophia Street Southbound Conversion**
**Preliminary Planning Cost Estimate - September 2025**
**City of Fredericksburg, Virginia**

| Description | Unit | Est. Quantity | Unit Price ($) | Amount ($) |
|---|---|---|---|---|
| **Preliminary Engineering** | | | | |
| Design work (15% of other categories) | LS | 1 | $ 4,069 | $ 4,069 |
| | | | Preliminary Engineering Total | $ 4,069 |
| **Pavement Marking & Signs** | | | | |
| Pavement marking eradication | LF | 1750 | $ 2.00 | $ 3,500 |
| New pavement markings | LF | 1750 | $ 3.50 | $ 6,125 |
| Sign upgrades (removal, moving existing, adding new) | EA | 50 | $ 350 | $ 17,500 |
| | | | Pavement Marking & Signs Total | $ 27,125 |
| | | | **Sub-Total** | **$ 31,194** |
| | | | **Contingency (50%)** | **$ 15,597** |
| | | | ***Grand Total*** | ***$ 46,791*** |

## Fredericksburg Downtown Street Conversion

**Sophia Street / Pitt Street / Caroline Street Bike Lanes**
**Preliminary Planning Cost Estimate - September 2025**
**City of Fredericksburg, Virginia**

| Description | Unit | Est. Quantity | Unit Price ($) | Amount ($) |
|---|---|---|---|---|
| **Preliminary Engineering** | | | | |
| Design work (15% of other categories) | LS | 1 | $ 107,869 | $ 107,869 |
| | | | Preliminary Engineering Total | $ 107,869 |
| **Pavement Marking & Signs** | | | | |
| Pavement marking eradication | LF | 2100 | $ 2.00 | $ 4,200 |
| New pavement markings | LF | 21000 | $ 3.50 | $ 73,500 |
| Sign upgrades (removal, moving existing, adding new) | EA | 36 | $ 350 | $ 12,600 |
| Bicycle lane flex posts | EA | 80 | $ 200 | $ 16,000 |
| | | | Pavement Marking & Signs Total | $ 106,300 |
| **Trail Extension** | | | | |
| Caroline St widening for bike lanes | LF | 1000 | $ 250 | $ 250,000 |
| New sidewalk | LF | 675 | $ 125 | $ 84,375 |
| New curb & gutter | LF | 675 | $ 250 | $ 168,750 |
| Construction grading | LS | 1 | $ 200,000 | $ 200,000 |
| | | | Trail Extension Total | $ 703,125 |
| | | | **Sub-Total** | **$ 917,294** |
| | | | **Contingency (50%)** | **$ 458,647** |
| | | | ***Grand Total*** | ***$ 1,375,941*** |

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City of Fredericksburg, VA

# Fredericksburg Downtown Engineering Study

**South Princess Anne Street/Caroline Street Improvements**

**Preliminary Planning Cost Estimate - September 2025**

**City of Fredericksburg, Virginia**

| Description | Unit | Est. Quantity | Unit Price ($) | Amount ($) |
|---|---|---|---|---|
| **Preliminary Engineering** | | | | |
| Design work (15% of other categories) | LS | 1 | $ 107,175 | $ 107,175 |
| | | | Preliminary Engineering Total | $ 107,175 |
| **Pavement Marking & Signs** | | | | |
| Pavement marking eradication | LF | 5000 | $ 2.00 | $ 10,000 |
| New pavement markings | LF | 25000 | $ 3.50 | $ 87,500 |
| Sign upgrades (removal, moving existing, adding new) | EA | 140 | $ 350 | $ 49,000 |
| | | | Pavement Marking & Signs Total | $ 146,500 |
| **Curb Ramps & Extensions** | | | | |
| Upgraded ADA curb ramps | EA | 22 | $ 10,000 | $ 220,000 |
| Curb bump-outs | EA | 12 | $ 15,000 | $ 180,000 |
| Curb chokers | EA | 5 | $ 5,000 | $ 25,000 |
| | | | Curb Ramps & Extensions Total | $ 425,000 |
| **Traffic Signal Upgrades** | | | | |
| Audible pedestrian signal (APS) push buttons | EA | 16 | $ 2,000 | $ 32,000 |
| Decorative mast arms | EA | 1 | $ 15,000 | $ 15,000 |
| Decorative signal poles | EA | 1 | $ 40,000 | $ 40,000 |
| Signal heads (including junction boxes and conduit) | EA | 2 | $ 25,000 | $ 50,000 |
| New signs | EA | 8 | $ 750 | $ 6,000 |
| | | | Traffic Signal Upgrades Total | $ 143,000 |
| | | | **Sub-Total** | **$ 714,500** |
| | | | **Contingency (50%)** | **$ 357,250** |
| | | | ***Grand Total*** | ***$ 1,071,750*** |

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# Fredericksburg Downtown Engineering Study

**North Princess Anne Street/Caroline Street Improvements**

**Preliminary Planning Cost Estimate - September 2025**

**City of Fredericksburg, Virginia**

| Description | Unit | Est. Quantity | Unit Price ($) | Amount ($) |
|---|---|---|---|---|
| **Preliminary Engineering** | | | | |
| Design work (15% of other categories) | LS | 1 | $ 103,275 | $ 103,275 |
| | | | Preliminary Engineering Total | $ 103,275 |
| **Pavement Marking & Signs** | | | | |
| Pavement marking eradication | LF | 5000 | $ 3.50 | $ 17,500 |
| New pavement markings | LF | 20000 | $ 5.50 | $ 110,000 |
| Sign upgrades (removal, moving existing, adding new) | EA | 120 | $ 350 | $ 42,000 |
| | | | Pavement Marking & Signs Total | $ 169,500 |
| **Curb Ramps & Extensions** | | | | |
| Upgraded ADA curb ramps | EA | 32 | $ 9,000 | $ 288,000 |
| Curb bump-outs | EA | 13 | $ 15,000 | $ 195,000 |
| Curb chokers | EA | 18 | $ 2,000 | $ 36,000 |
| | | | Curb Ramps & Extensions Total | $ 519,000 |
| | | | **Sub-Total** | **$ 791,775** |
| | | | **Contingency (50%)** | **$ 395,888** |
| | | | ***Grand Total*** | ***$ 1,187,663*** |

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# Fredericksburg Downtown Engineering Study

**Prince Edward Street Improvements**

**Preliminary Planning Cost Estimate - September 2025**

**City of Fredericksburg, Virginia**

| Description | Unit | Est. Quantity | Unit Price ($) | Amount ($) |
|---|---|---|---|---|
| **Preliminary Engineering** | | | | |
| Design work (15% of other categories) | LS | 1 | $ 77,850 | $ 77,850 |
| | | | Preliminary Engineering Total | $ 77,850 |
| **Pavement Marking & Signs** | | | | |
| Pavement marking eradication | LF | 3500 | $ 3.50 | $ 12,250 |
| New pavement markings | LF | 3500 | $ 5.50 | $ 19,250 |
| Sign upgrades (removal, moving existing, adding new) | EA | 50 | $ 350 | $ 17,500 |
| | | | Pavement Marking & Signs Total | $ 49,000 |
| **Curb Ramps & Extensions** | | | | |
| Upgraded ADA curb ramps | EA | 12 | $ 9,000 | $ 108,000 |
| Curb bump-outs | EA | 10 | $ 15,000 | $ 150,000 |
| Curb chokers | EA | 2 | $ 2,000 | $ 4,000 |
| | | | Curb Ramps & Extensions Total | $ 262,000 |
| **Intersection Upgrades** | | | | |
| Mini-roundabout | LS | 1 | $ 200,000 | $ 200,000 |
| Raised crosswalk | LS | 1 | $ 8,000 | $ 8,000 |
| | | | Intersection Upgrades Total | $ 208,000 |
| | | | **Sub-Total** | **$ 596,850** |
| | | | **Contingency (50%)** | **$ 298,425** |
| | | | ***Grand Total*** | ***$ 895,275*** |