

CONCEPT DEVELOPMENT REPORT

for

City of Camden
Traffic Signal Improvements
Camden County, NJ
February 2021; Revised May 2021



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Prepared for:

**Delaware Valley Regional Planning Commission
and the City of Camden**

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I. INTRODUCTION

A. Foreword

The Delaware Valley Regional Planning Commission (DVRPC), through its Local Capital Project Delivery (LCPD) Program, is performing an investigation to study and design new or upgraded traffic signal improvements for seventeen (17) existing intersections in the City of Camden. This program is consistent with the Project Delivery Process implemented by the New Jersey Department of Transportation (NJDOT). The intersections within the project limits are indexed and depicted on the project's Location Map (Appendix C) as per the listing presented below:

1. Westfield Avenue (MP 0.21) and 29th Street
2. Westfield Avenue (MP 0.72) and 34th Street
3. Federal Street (MP 2.96) and 35th Street
4. Federal Street (MP 3.01) and 36th Street (MP 0.00)
5. State Street (MP 0.64) and 10th Street (MP 0.50)(currently not signalized)
6. Atlantic Avenue (MP 0.48) and Broadway (MP33.27)
7. Broadway (MP 32.91) and Carl Miller Boulevard (MP 0.79)
8. Broadway (MP 32.82) and Ferry Avenue (MP 0.62)(also Jasper Street)
9. Broadway (MP 32.74) and Viola Street
10. Broadway (MP 32.66) and Jefferson Street
11. Atlantic Avenue (MP 0.92) and 9th Street (MP 0.68)
12. Atlantic Avenue (MP 0.85) and 8th Street
13. Atlantic Avenue (MP 1.11) and Mount Ephraim Avenue (MP 0.85)
14. Carl Miller Boulevard (MP 0.69) and 6th Street
15. Ferry Avenue (MP 0.72) and 6th Street
16. Morgan Street (MP 0.40) and 8th Street
17. Morgan Street (MP 0.50) and 9th Street (MP 1.83)

The list's milepost designations are as documented in the NJDOT Straight Line Diagrams (SLD; Appendix H).

B. Original and Successor Projects

Project programming has been established by the DVRPC and as documented in the DVRPC FY2018-2021 Transportation Improvement Program (TIP). The TIP identifies the project (DB# D2020, D2021 and D2022 for Phase 1, Phase 2 and Phase 3, respectively) is funded through the Surface Transportation Block Grant Program – Urban Funds Allocation (STBGP-STU).

The TIP provides that a concept development study will be conducted as part of the DVRPC's Local Concept Development Program, and further describes that the signalized intersections need to be upgraded to meet current MUTCD, AASHTO and NJDOT standards; curb, sidewalk and pavement restoration are also needed in order to improve vehicular and pedestrian travel. The project's needs, goals and objectives conform with the TIP and are as more fully described in Section II of this report.

Information provided on original projects was obtained based on the City of Camden's available as-built plans and traffic signal timing directives. Based on available information, there are no existing City of Camden successor projects at these 17 intersection locations. At the time of this report

preparation, it is anticipated that the NJDOT’s LCPD process will advance this project into future, subsequent design phases.

C. Data Reviewed

Information obtained during the development of this report was evaluated with the purpose of determining areas of nonconformance with current state/federal policies or design standards, and was used during the development of the improvement alternatives. The obtained information listed below was included, applied and supplemented by physical field site assessments in the evaluation:

- Problem Statement (Purpose & Need, Appendix **A**)
- As-Built Plans (see Table 1 below and Appendix **C**)
- Tax Maps (Appendix **D**)
- Crash Data provided by the City of Camden and NJDOT (Appendix **E**)
- Traffic Counts (Appendix **F**)
- Aerial Plans & Photo-imagery (Appendix **G**)
- Straight Line Diagrams (Appendix **H**)
- Environmental Screening Report (Appendix **K**)
- Digital Base Mapping (Appendix **L**)

Table 1 – As-Built Plans & Timing Directives

Intersections	As-Built Plans
1, 2, 3, 4, 7, 9, 10, 14, 15	City of Camden Roadway Plans (undated)
3, 4	NJDOT Signal Electrical Plan (1979)
1-4, 6-14, 16, 17	Traffic Signal Timing Directives

Timing signal timing directives were available for all existing signalized intersections except Ferry Avenue at 6th Street (Location 15). Traffic signal electrical plans were available for only Federal Street at 35th and 36th Streets (Locations 3 & 4). As-built roadway plans were unavailable at Locations 5, 6, 8, 11, 12, 13, 16 and 17.

D. Design Standards

The following design standards were used during the development of this report:

- AASHTO Policy on Geometric Design of Highways and Streets (7th Edition, 2018)
- NJDOT Roadway Design Manual 2015 (with updates)
- NJDOT Bicycle Compatible Roadways and Bikeways - Planning and Design Guidelines
- NJDOT Standard Construction Details - Roadway, Traffic Control, Bridge (2016 with updates)
- FHWA Manual on Uniform Traffic Control Devices (MUTCD) (2009 Edition with updates)

E. Characteristics of the Roadways and Surrounding Area

The project’s 17 intersections are located within urban areas of City of Camden in Camden County, and are immediately proximate to commercial, residential and/or institutional land uses.

F. Concept Development Scope Statement

A Concept Development (CD) Scope Statement was not developed for this project.

G. CD Public Involvement Action Plan (PIAP)

The traffic signalization improvements proposed under this project are anticipated to generate minimal to no impacts of significance to the travelling public during construction. Traffic signal improvement construction activities are anticipated to predominantly occur outside of travel lanes. Proposed pavement, curb, and portions of sidewalk construction activities may require short-term duration lane/parking lane closures. Where construction activities will be performed on easements within private property, these will be coordinated in advance with the owners to limit impacts.

Local Officials, community stakeholders and the general public were contacted, notified and updated on the project objectives, activities, findings and recommendations at scheduled intervals during the project. The applied public involvement methodology is as more fully described in the project's Public Involvement Action Plan (PIAP; Appendix Y).

H. Concurrent Design Projects

Project activities outreached to the City of Camden to identify the location and scope of possible Concurrent Design Projects. This coordination resulted in the identification of the following concurrent projects and studies, as provided by the Coopers Ferry Partnership:

- Camden City River Road Improvement Initiative (Federal Project No. HPP-543 (300) CON)
- River Road – Federal Street to 36th Street Concept Development (Camden County)
- Market Street and Federal Street Traffic Feasibility Study (2016, DVRPC)
- Market Street and Federal Street Traffic Improvement Project (Camden County)
- Liberty Property Trust Development Traffic Study (2016, Liberty Property Trust)
- Cooper Street Pedestrian Access Project (2018, City of Camden)
- Newton Avenue Signal and Alignment Improvements Concept Development (Camden County)
- Kaighn Avenue Reconstruction (Camden County)
- Haddon Avenue Improvements – Euclid Avenue to Newton Avenue Concept Development (Camden County)

As this project's activities were nearing completion, stakeholder coordination efforts informed the project team of the following additional projects:

- State Street Local Concept Development (Camden County)
- Camden City Port Access Truck Route Reconstruction (Camden County)

II. PURPOSE AND NEED

The purpose of the project is to investigate existing conditions and determine the extent of new or upgraded traffic signal improvements needed at seventeen (17) existing intersections in the City of Camden. The project's Needs, Goals and Objectives are as more fully described in Appendix A, and conform with the DVRPC's TIP, as referenced in Section I.B of this report.

A. Bridge Needs

No bridges are impacted under this study.

B. Scour Needs

No bridges are impacted under this study.

C. Maintenance Needs

Based on field investigations and review of project site photograph imagery, apparent maintenance needs include: signs that are missing, deteriorated or not meeting current signing application guidelines; faded/missing pavement markings (lane lines/crosswalks/stop bars); degraded pavement surface quality; insufficient roadway surface drainage; and, degraded or obsolete traffic signal conditions.

D. Roadway Needs

This CD study focuses on the evaluation of existing conditions and conceptual design of improvements to address traffic operations control deficiencies at the 17 included intersections.

E. Goals and Objectives

A set of project goals and objectives has been developed based upon the project's Purpose and Need, assessment of existing conditions, review of available information, and information solicited during stakeholder coordination. The Preliminary Preferred Alternative (PPA) identified under this study was developed to satisfy as many of the below-listed goals and objectives as possible:

- Maintain traffic during construction.
- Develop an expedited construction schedule that minimizes delays to the public.
- Avoid, or at least limit, property impacts, utility impacts and environmental impacts, where possible.
- Develop multi-modal, traffic signal improvement alternatives to provide improved intersection operational control and safety.

III. EXISTING INVENTORY AND CONDITION

A. Existing Bridge Inventory and Condition

No bridges are impacted under this study.

B. Scour

No bridges are impacted under this study.

C. Maintenance Issues

The Site Deficiencies Spreadsheet (Table 4 in Appendix B) details existing conditions at each intersection that have resulted, at least in part, from an absence of continual maintenance, including roadway drainage ponding, faded or worn pavement markings (lane lines, crosswalks and stop bars), signs that are missing, deteriorated or substandard, and degraded pavement surface quality.

Components of the traffic signal systems appear to be aged, damaged and/or not fully intact at several of the project's intersections.

D. Existing Roadway Inventory and Condition

In addition to the aforementioned Maintenance Issues, the Site Deficiencies Spreadsheet (Table 4 in Appendix B) additionally provides an assessment summary of findings regarding existing compliancy with the ADA standards, and roadway lighting sufficiency at each intersection based on visual observations.

E. Existing Utilities

Utilities are present at all 17 study locations. Aerial utilities include electric, telephone and cable. Underground utilities include gas, telephone, sewer and water. The following is a list of utility owners which have been identified as having existing facilities within the limits of one or more of the 17 intersections:

- Electric - PSE&G
- Telephone - Verizon-NJ, Inc
- Telephone – AT&T OSP (CORE)(Long Distance)
- Telephone – Trec Group Inc./AT&T (LAN)(Local Network Services)
- Telephone – Level 3 Communications
- Cable TV – Comcast Cable Communications, LLC
- Cable TV - Cablevision
- Gas – PSE&G
- Water - NJ American Water Co.
- Water – Merchantville/Pennsauken Water Commission
- Water/Sewer - City of Camden Dept. of Public Works
- Sanitary/Combined Sewer - Camden County MUA
- Sanitary/Combined Sewer – Pennsauken Sewerage Authority

F. Summary of Existing Deficiencies

An assessment of existing physical conditions was performed for each of the 17 study intersections. The evaluation performed a visual site screening of a range of selected intersection elements to identify apparent deficiencies, including roadway surface drainage ponding, signs that are missing/deteriorated/substandard, faded or worn pavement markings, signal systems not meeting current MUTCD standards, ADA non-compliancy, and potentially insufficient roadway lighting. The findings of this assessment were compiled and are summarized in a Table 4 (Appendix B).

G. List of Substandard Design Elements

Based on the NJDOT SLDs, all roadways within limits of the 17 study intersections have posted speed limits of 25 MPH. An evaluation of roadway geometric features, including sight distance, lane width and shoulder width, was performed at the 17 intersections, resulting in the evaluation findings that are summarized in the **Table 4 - Substandard Design Elements** (Appendix B). The presented information categorizes substandard/deficient design features where highlighted in red, and further identifies features which could be considered for possible improvement, where highlighted yellow. One location (Federal Street Eastbound and 36th Street) has its intersection sight distance obstructed by an adjacent building, while another location (Atlantic Avenue Eastbound approaching 8th Street)

has its traffic signal visibility partially obscured by a railroad bridge overpass. State Street Westbound at 10th Street has a substandard lane width. There are also multiple locations among the 17 intersections where pedestrian traffic control facilities are not ADA compliant.

H. Management Systems Input

The City of Camden is in the process of developing a roadway pavement asset management system. Pavement condition attributes were not available from the City of Camden at the time of this study.

Roadway asset management system databases were not available from the City of Camden during the time of this study.

The selection of the project's 17 intersections was established by the City of Camden's input provided at the beginning of the project.

I. As-Built Plans, Right of Way Maps and Jurisdiction Maps

As-built plans available during this project are as previously described under report Section I.C and are provided for reference herein (Appendix C). Right-of-Way plans/maps were not available from the City of Camden. Tax Maps for the project's intersection areas were obtained and compiled for use during the study, and are referenced herein (Appendix D). There are no known Jurisdiction Maps for these intersections, however, project coordination with the City of Camden Engineer's office identified that the project intersection's traffic signals are maintained by the City of Camden Public Works Department, inclusive of those intersections on Camden County routes.

Based on the NJDOT SLDs (Appendix H), the following list identifies Camden County routes that involve one or more roadways at 11 of the study intersections. The remaining roadways are under municipal jurisdiction (City of Camden):

- 36th Street (CR 611)
- Broadway (CR 551)
- Federal Street (CR 537)
- Ferry Avenue (CR 603)
- Mount Ephraim Avenue (CR 605)
- State Street (CR 601)
- Westfield Avenue (CR 610)

IV. TRAFFIC AND CRASH SUMMARY

A. Traffic Operations

The following identifies the roadway classifications within the study limits, as based on the NJDOT SLDs (Appendix H):

- Urban Principal Arterials: Mount Ephraim Avenue (CR 605); Broadway (CR 551); 9th Street
- Urban Minor Arterials: Federal Street (CR 537); Ferry Avenue (CR 603; East of Broadway); Morgan Street; Westfield Avenue (CR 610); 36th Street (CR 611)
- Urban Major Collectors: Atlantic Avenue; Carl Miller Boulevard; Ferry Avenue (CR 603; West of Broadway); 9th Street; 10th Street

B. Traffic Data

Weekday AM, PM and Saturday multi-modal traffic volume classification counts were conducted at the study intersections in 2017, 2018 or 2019 to establish base traffic pattern conditions. Peak Hour turning movement traffic volumes were determined from the classification count data, as summarized and graphically depicted in Appendix F.

C. Traffic Volume Forecasts

Traffic Volume Forecasts were performed for the project Design Year 2044 that was established by the City of Camden Engineer. The forecasting was based upon application of a subregional 0.204% Annual Background Growth Rate derived from available DVPRC socio-economic data forecasts, and incorporation of localized, surcharged site traffic assignments that will be attracted/generated by municipally-approved land development, as represented in the following available studies (by others):

- Downtown Corridors Traffic Feasibility Study (*dated June 30, 2016 for Coopers Ferry Partnership*)
- Liberty Property Trust Traffic Impact Study (*dated May 19, 2016 for Liberty Property Trust*)

D. Crash Data Analysis and Crash Diagram

Crash data records were made available by the City of Camden Police Department for each of the 17 intersections, for a 3-year period from January 2016 through December 2018 (Appendix E). Crash event information described in these individual reports was then utilized to prepare representative Collision Diagrams (Appendix J) to assist with summarizing the crash types and locations of all crashes at each intersection. NJDOT statewide crash data statistics for the County roadway system were researched and obtained for the 2016-18 period, for use in applying a comparative baseline to assess the crash data for the project's intersections (Appendix E).

The contributing factors to the evaluated crash events at the project's intersections were generally varied and also mostly specific to the conditions at each individual intersection. Upon review, there were no identified factors specific to a possible recurrent or systemic issue(s) with existing traffic signal operations. However, in some instances, similar contributing factors were noted at several of the intersections, including:

- Same direction sideswipe or fixed object crashes, apparently influenced by the presence of parked vehicles and/or narrower roadways (*this was the most commonly reported contributing factor documented*)
- Red light running
- Worn or unclear pavement markings
- Questionable roadway lighting environment
- Intoxicated drivers or pedestrians

V. SOCIAL, ECONOMIC AND ENVIRONMENTAL SCREENING

A. Community Outreach

The project's Community Outreach initiative was structured to meaningfully engage local officials and stakeholders within residential, institutional, municipal/service and business sectors. With the proactive information engagement with interested entities, the project strived to enable timely

stakeholder feedback and input that could be considered and applied in the development of proposed improvements meeting the project's Purpose and Need.

A comprehensive stakeholder database was researched and compiled for use in the Community Outreach process. Application of the PIAP methodology included the conduct of an initial Local Officials & Stakeholder Outreach meeting held on January 23, 2020 at the Camden County's Rietta L. Cream Library in the City of Camden, which focused on discussion of the project's objectives, schedule, and identifying existing deficiencies and community concerns. Subsequently, the project conducted a Public Information Center (PIC) forum on August 26, 2020 which provided a 30+ day follow-up outreach duration enabling stakeholders to offer project related input regarding proposed improvements. Following further advancement of project activities, a second Local Officials & Stakeholder Outreach forum was held, beginning on December 22, 2020 and receiving available public feedback through January 11, 2021. Specifics regarding the Community Outreach activities, and community feedback received, are described in the project's Public Outreach Summary Report and associated project correspondence and exhibits (Appendix [M](#)).

B. Noise and Air Quality

Sensitive receptors exist within 300 feet at 12 of the 17 study intersections as listed below and as described in the Environmental Screening Report (see Appendix [K](#)):

1. Westfield Avenue (MP 0.21) and 29th Street
3. Federal Street (MP 2.96) and 35th Street
4. Federal Street (MP 3.01) and 36th Street (MP 0.00)
5. State Street (MP 0.64) and 10th Street (MP 0.50)(currently not signalized)
6. Atlantic Avenue (MP 0.48) and Broadway (MP 33.27)
7. Broadway (MP 32.91) and Carl Miller Boulevard (MP 0.79)
8. Broadway (MP 32.82) and Ferry Avenue (MP 0.62)(also Jasper Street)
9. Broadway (MP 32.74) and Viola Street
12. Atlantic Avenue (MP 0.85) and 8th Street
13. Atlantic Avenue (MP 1.11) and Mount Ephraim Avenue (MP 0.85)
14. Carl Miller Boulevard (MP 0.69) and 6th Street
17. Morgan Street (MP 0.50) and 9th Street (MP 1.83)

No increases in air or noise impacts are anticipated. Any construction noise will be addressed as part of the standard commitments.

C. Socioeconomics

Areas within 150 feet of the subject intersections are predominantly made up of residential and commercial land uses. Demographic analysis of this community indicates that there is a large minority (88%) and low income (56%) population living within the study area. These percentages are equivalent to the 44th and 24th percentile when compared to the rest of the State of New Jersey. Based on the nature of the project, Socioeconomic Effects or Environmental Justice Involvement should be considered, but no impacts are anticipated.

D. Cultural Resources

The Reconnaissance-Level Historic Architectural Survey (see Appendix [K](#)) concluded that there are five (5) historic properties listed in the New Jersey Register (NJR) and/or National Register of Historic Places (NRHP), or that are eligible for listing in the NRHP within the Area of Potential Effects (APE):

- South Camden Historic District (encompassing intersection Locations 7, 8, 9, 10, 12 & 15)
- Camden Fire Department Engine Company #10 (Southeast corner of Location 17)
- South Camden Trust Company (Southeast corner of Location 8)
- State Street Historic District (west of Location 5)
- State Street Bridge (east of Location 5)

The survey found an additional 30 newly identified historic resources located within the APE, but none of these appear to possess sufficient significance or integrity to warrant survey at the intensive level. It concluded that the PPA at each intersection will not constitute an adverse effect on any of the listed and eligible properties within the APE. However, it added that, as project design phases progress, care should be taken to utilize context-sensitive design for work taking place within the boundaries of the historic district. Treatments and finishes for curbs and paving should be developed in consultation with the New Jersey Historic Preservation Office (SHPO) to be compatible with the historic and architectural character, significance, and setting of the South Camden Historic District. As this work is proposed within an NJR-listed historic district, an Application for Project Authorization may be required for the aforementioned six intersections located within the South Camden Historic District.

E. Section 4(f) Properties

The Environmental Screening Report (see Appendix **K**) describes eight (8) open space sites occurring within 500 feet of the intersections, but there are no Section 4(f) properties at these 17 locations.

F. Highlands/Pinelands

The project is not located within the Highlands or Pinelands protected areas.

G. Wetlands

Of the 17 intersections, NJ Department of Environmental Protection (NJDEP)-mapped wetlands are limited to the study area associated with the intersection of State Street and 10th Street (Location 5). A freshwater wetland is mapped as occurring immediately north of this study area, along the Cooper River. However, the only wetlands observed in the field within this area were contained within a man-made stormwater management basin immediately north of the intersection. This feature is anticipated to be classified as ordinary resource value and is not assigned a transition area per Federal Wetland Protection Act (FWPA) Rules. No wetlands were observed along the Cooper River within the study area, as its banks are steeply sloped and contain extensive riprap.

H. Reforestation

The PPA at each intersection will not result in any deforestation nor require any reforestation. There are a few trees within the study area that may be protected through a City Ordinance.

I. Floodplain

According to NJDEP GIS, the intersection of State Street and 10th Street (Location 5) lies within the 100-year floodplain of the Cooper River. In addition, the following intersections lie within or immediately adjacent to the 100-year floodplain of the Delaware River:

7. Broadway and Carl Miller Boulevard
8. Broadway and Ferry Avenue

9. Broadway and Viola Street
14. Carl Miller Boulevard and 6th Street
15. Ferry Avenue and 6th Street

J. Acid Producing Soils

Based on available information, the City of Camden is within an acid-producing soils region.

K. Sole Source Aquifer

The study area is located within an area identified by New Jersey Geological Survey (digital Sole Source Aquifer Coverage, 1998) as a Coastal Plain Sole Source Aquifer Region. However, there are not any impacts to underlying aquifer anticipated in association with the proposed project improvements.

L. Threatened/Endangered Species

The Environmental Screening Report (Appendix K) identifies the following threatened species that could potentially be affected by the project:

- Bald Eagle (*Haliaeetus leucocephalus*, State Endangered)
- Cooper's Hawk (*Accipiter cooperii*, Special Concern)
- Great Blue Heron (*Ardea herodias*, Special Concern)
- Atlantic Sturgeon (*Acipenser oxyrinchis*, State Endangered)
- Shortnose Sturgeon (*Acipenser brevirostrum*, State Endangered)
- Eastern Pondmussel (*Ligumia nasuta*, State Threatened)
- Tidewater Mucket (*Leptodea ochracea*, State Threatened)
- Yellow Lampmussel (*Lampsilis cariosa*, State Threatened)

The Report also identified the following species as occurring within one mile of the study area:

- Bald Eagle (*Haliaeetus leucocephalus*, State Endangered)
- Cooper's Hawk (*Accipiter cooperii*, Special Concern)
- Great Blue Heron (*Ardea herodias*, Special Concern)
- Peregrine Falcon (*Falco peregrinus*, State Endangered)
- Atlantic Sturgeon (*Acipenser oxyrinchis*, State Endangered)
- Shortnose Sturgeon (*Acipenser brevirostrum*, State Endangered)
- Eastern Pondmussel (*Ligumia nasuta*, State Threatened)
- Tidewater Mucket (*Leptodea ochracea*, State Threatened)
- Yellow Lampmussel (*Lampsilis cariosa*, State Threatened)

Additionally, Plant Grid mapping identifies the intersection of Westfield Avenue and 34th Street as occurring within and adjacent to habitat for the following plant species:

- Smartweed Dodder (*Cuscuta polygonorum*, S2-ranked)
- Nuttall's Mudwort (*Micranthemum micranthemoides*, State-endangered, SH-ranked)
- Awl-Leaf Arrowhead (*Sagittaria subulata*, S3-ranked)

Due to the potential presence of these species and their habitat, further environmental studies and consultation with appropriate agencies are required.

M. Category 1 Waters

This designation only pertains to impacts in the riparian zone, which does not apply to this project.

N. Vernal Pools

There are no vernal pools within the project area.

O. Stormwater

Projects that disturb greater than 1 acre or create 0.25 acres of net new impervious surface are classified by NJDEP as a "major development" and are required to implement stormwater management measures to address erosion control, water quality, water quantity and groundwater recharge pursuant to N.J.A.C. 7:8-5.2, stormwater management measures addressing erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards of N.J.A.C. 7:8-5.4 and 5.5. However, based on the NJ State Development and Redevelopment Plan, the 17 intersections (project sites) are located within the Metropolitan Planning Area (PA-1), and the project area is considered previously disturbed. This qualifies the project as being located within an "Urban Redevelopment Area," therefore groundwater recharge does not apply to the project pursuant to N.J.A.C. 7:8-5.4(a)2.ii.

P. Hazardous Waste

The Environmental Screening Report notes that several sites with NJDEP enforcement case numbers are present within the project area. Once more specific project plans are developed during Preliminary Engineering (PE) phase, a reevaluation should be made to determine whether environmental investigation will be required.

Q. Anticipated Environmental Permits or Approvals

It is anticipated that the improvement Alternative #2 at each intersection will require the following permits or agency coordination/approvals:

- NJDEP Freshwater Wetlands
- NJDEP Flood Hazard Area
- NJDEP Coastal Zone Management
- NJDEP Bureau of Tidelands Management
- NJ Endangered and Nongame Species
- US Fish and Wildlife Service
- US Army Corps of Engineers
- CAFRA Permit is not anticipated. Public highway improvement projects that do not result in additional travel lanes are exempt from CAFRA permits (N.J.A.C. 7:7).

R. Environmental Summary with Probable NEPA Document required

Potential environmental constraints for the project may require coordination with NJDEP, USFWS, and NJSHPO. Based on Table 4 of the Environmental Screening Report (see Appendix K), the following intersections are subject to the NJ Flood Hazard Area Protection Act Rules:

5. State Street and 10th Street
6. Atlantic Avenue and Broadway
8. Broadway and Ferry Avenue
10. Broadway and Jefferson Street
11. Atlantic Avenue and 9th Street
12. Atlantic Avenue and 8th Street
14. Carl Miller Boulevard and 6th Street
15. Ferry Avenue and 6th Street

Of these intersections, State Street and 10th Street (Location 5) is the only one also anticipated to be subject to the following:

- NJ Freshwater Wetlands Protection Act Rules (for Wetlands and Transition Areas), along with Riparian Zone
- NJ Coastal Zone Management Rules (Waterfront Development)
- NJ Endangered and Nongame Species Program requirements (for State-listed Threatened or Endangered Species)
- US Fish and Wildlife Service requirements (for Federally Listed Threatened or Endangered Species)
- US Army Corps of Engineers requirements (under Waters of the US)

Additionally, one other intersection (Location 2, Westfield Avenue and 34th Street) will be subject to NJ Natural Heritage Program (Natural Heritage Listed Plant Species) requirements.

The proposed intersection improvements are not expected to have the potential to result in significant adverse impacts. Therefore, a Categorical Exclusion Document (CED) is anticipated to be the appropriate environmental document.

VI. EVALUATION OF CONCEPTUAL ALTERNATIVES

A. Bridge Rehabilitation versus Bridge Replacement

No bridges are impacted under this study.

B. Temporary Bridge Location and Widening Constraints

No bridges are impacted under this study.

C. Conceptual Alternatives

The conceptual improvement alternatives considered include No-Build, Traffic Signal Replacement, and Traffic Signal Upgrade levels of improvement. The general descriptions of the scope of

improvements for the alternatives considered at each of the seventeen (17) intersections are as follows:

General Description of Alternatives

Alternative #1 - No Build: The No-build alternative is identified to preserve existing conditions. All existing intersections feature operational and/or physical deficiencies, non-compliant devices and signal hardware (other than site #5), faded or worn pavement markings, and non-compliant mobility features. These deficiencies have been determined using intersection capacity analysis software, application of MUTCD guidelines, review of available as-built documents, performance of field observations and engineering judgement. Some of the intersections were identified to have unacceptable Levels of Service (LOS=D or lower). Many of the existing signal controllers are aging and/or currently operate with only fixed/pre-timed timing plans without vehicle detection functionality. There are many locations where the crosswalks, stop bars and/or lane striping have faded or become worn. At most of the 17 intersections, pedestrian curb ramps are not ADA compliant. Many of the existing signs do not appear to comply with current MUTCD retro-reflectivity requirements based on visual inspection. On one-way streets, regulatory 'One Way' and 'Do Not Enter' signs were observed to be in either inadequate physical condition, or missing altogether.

Roadways at each intersection were assessed for their compliance with minimum combined lane and shoulder width required for bicycle compatibility, as outlined in the NJDOT Bicycle Compatible Roadways and Bikeways, Planning and Design Guidelines (Chapter 2 - Bicycle Compatible Roadway/Design Treatments, Table 1). The assessment was performed based on the magnitude of estimated Average Annual Daily Traffic volumes (AADT) derived from obtained peak hour volumes, as presented under the Existing Motor Vehicles Operations parameter summarized in the Complete Streets Checklist (Appendix V). For the relatively low posted speed (25 mph) on all roadways at these intersections, Chapter 2 provides that "little separation is needed for both a bicyclist and a motorist to feel comfortable during a passing event." For shared lanes under urban conditions at speeds less than 30mph, Chapter 2 recommends use of 14 feet wide shared use lanes with on-street parking, and 12 feet wide shared use lanes without parking. Existing bicycle lane signing and/or pavement markings are not provided at any of the project intersections, other than site #5. "Share the Road" signs or pavement markings (Sharrows) are not present at any of these intersections. Bicycle safe grates were observed to not exist at many of the intersections' storm drainage inlets.

Intersection-specific details for Alternative 1 are as more fully described below (following the Alternative #3 general description).

Alternative #2 - Traffic Signal Replacement: The Traffic Signal Replacement alternative is defined to fully resolve the previously described, multiple deficient existing intersection elements. All existing above-ground traffic signal hardware and elements will be removed and replaced, along with abandonment or replacement of select below-grade junction box and conduit features. Operational improvements were implemented at intersections in order to achieve acceptable Levels of Service (LOS=C or better). Using intersection capacity analysis software, signal timings were optimized to improve traffic flow and reduce vehicle delay and queuing. Existing traffic signal phasing was maintained at most locations; proposed signal phasing adjustments were developed at some locations to enable lead phasing for select vehicle movements, in response to public comments received during the public outreach process. Cycle length adjustments were made to reduce intersection vehicle delay, and will be coordinated with adjacent intersections to enable traffic progression. Existing pre-timed signal operations are improved by replacing electro-mechanical (and other limited-timing capability) signal controllers with modern signal controllers capable of more advanced signal timing capabilities to foster evolving traffic patterns associated with future economic growth. Vehicle microwave detection systems are added to side-street approaches, enabling each intersection to operate under semi-actuation. ADA-compliant pedestrian signal heads and pushbuttons with complementary R10-3i signing are provided for crosswalks. Proposed traffic signal

poles will support new intersection lighting luminaire arms where needed to provide improved intersection illumination. Per the requests of the NJDOT-BTE and the City of Camden Engineer, traffic signal head back-plates will be provided on all new vehicle signal heads to improve contrast visibility, and all above ground hardware will be black-powder coated for appearance consistency with other ongoing traffic signal improvements elsewhere throughout the City of Camden.

Proposed improvements under Alternative #2 were developed to address non-compliant mobility features, as identified through field observations and review of available information on existing conditions. Curb ramps that are not ADA compliant will be replaced. To ensure compliant Pedestrian Access Routes (PAR), each intersection's immediately surrounding infrastructure was assessed when determining how and where to position each proposed curb ramp. In association with these ADA improvements, the assessment also included identifying required sidewalk section improvements and driveway adjustment where appropriate.

Visible utilities and storm sewer features have been depicted on plans for Alternative #2 at each intersection based on field observations and review of available as-built information. The features shown are aerial utility support pole locations along with surface features of underground utilities and storm sewer such as inlets, manholes, hydrants, water and gas valves. Proposed traffic signal facilities will avoid conflicts with existing utilities where possible (see Appendix U). Exact alignments of existing underground pipes, conduits, water and gas mains will be further defined under subsequent project design phases (Preliminary Engineering and Final Design).

All existing intersection signs currently required by the MUTCD and/or NJDOT guidelines will be replaced or added in order to comply with current regulatory and retroreflectivity requirements, with new regulatory and warning signs to be installed where they are currently absent/missing. Signing for one-way streets with missing or deficient traffic control signs ('One Way'; 'Do Not Enter') will be included. Investigation of current City of Camden parking and bus stop regulations was not within the scope of this study; subsequent project design phase activities should include evaluation, and possible adjustment of city regulations where appropriate to enable adequate intersection sight lines uninhibited by curbside vehicles.

Traffic Signal Replacements include betterments to address faded and worn pavement markings. Due to existing, degraded pavement conditions, every intersection must be resurfaced within at least a portion of its project limits. Additionally, it is anticipated that existing surface drainage ponding deficiencies noted at some intersections can likely be remedied by regrading pavement to provide positive flow to existing inlets, as part of the proposed milling and pavement overlay, thereby avoiding need to install new inlets and storm pipe extensions. As such, faded and worn pavement markings (crosswalks, stop bars and lane striping) will be replaced with new markings within the project limits to improve lane use control and definition.

Intersection-specific details for proposed Alternative 2 improvements are as more fully described below (following the Alternative #3 general description) and as depicted on the Alternative 2 plans (see Appendix L).

Alternative #3 - Traffic Signal Upgrade: The Traffic Signal Upgrade alternative is identified to provide minor preventative maintenance to existing traffic signals. On projects involving aging traffic signal infrastructure, it sometimes may be desired for an agency to implement spot upgrades to select components of the traffic signal hardware in order to better maintain existing the traffic signal system, intersection operations and safety. Alternative #3 would include the following maintenance upgrades to improve the facilities and bring existing, outdated traffic signals into compliance with the current MUTCD, including pedestrian controls:

- Traffic signal retiming, including updated clearance intervals
- Installing LED pedestrian signal indications with countdown walk-interval timers and educational push button signs

- Replacing 8-inch vehicular traffic signal heads with 12-inch LED signal heads (with replacement of all vehicular signal heads, for consistency, if more than half require replacement)
- Providing “snow scoop” visors on all new vehicular signal heads
- Evaluating the potential need for lighting improvements
- Relocating signal hardware to mitigate chronic maintenance issues/knockdowns
- Replacing “piggy-back” traffic signal controllers (i.e. “M” cabinets mounted atop meter cabinets) with new controllers on P-MC foundations
- Installing microwave detection for all vehicle-actuated signal phases where in-pavement loop detectors were previously installed

The potential to identify select (‘spot’) Traffic Signal Upgrades to the existing traffic signal system facilities was considered during the project’s process of investigating and initially assessing existing conditions. This assessment also included the following notable contributing factors identified during the study:

- Absence of available traffic signal infrastructure for providing primary overhead-mounted traffic signal heads in accordance with the MUTCD guidelines
- Absence of Near Left-Far Right overhead traffic signal indications, in accordance with NJDOT practice
- Absence of a legacy vehicle detection system
- Use of unprotected, daisy-chained electrical distribution cabling between intersections to mitigate the physical absence of traffic signal controllers
- Use of aging trombone mast arms
- Unavailability of electrical as-built documentation confirming conduit sizes and conduit fill condition
- No identified locations experiencing chronic equipment knockdowns
- City of Camden’s request for black-powder coating of all traffic signal infrastructure, for appearance consistency with traffic signal improvements advanced elsewhere in the City under separate projects.
- Request for traffic signal visibility-enhancement backplate installations on all traffic signal heads
- Significantly deteriorated intersection pavement and/or sidewalks
- Absent and/or ADA-noncompliant pedestrian curb ramps
- Surface drainage ponding requiring pavement regrading

Alternative #3 Traffic Signal Upgrades are consistent with the extent of typical preventative maintenance improvements for traffic signals (NJDOT RDM Section 5.7). However, it was further determined that Alternative #3 would not meaningfully satisfy the intent of the project Purpose and Need to provide enhanced improvements to the traffic signalized intersections, due to the aforementioned contributing factors. Most prominently: structural pole and foundation loading considerations need to be fully evaluated to enable proposed vehicle detection and signal head backplate improvements; pole fabrication will be required to include surface powder coating; installation of ADA-compliant curb ramps are needed to safely serve the multi-modal urban environment; and pavement regrading is required during pavement repairs to improve surface drainage. Therefore, Alternative #3 was not further analyzed under this study.

Intersection-Specific Description of Alternatives

Intersection-specific descriptions for **Alternative #1 – No Build** and **Alternative #2 – Traffic Signal Replacement** are summarized as follows:

1. Westfield Avenue at 29th Street

The existing signalized intersection has three legs, with Westfield Avenue being an east-west roadway and 29th Street intersecting the north side. Both streets feature on-street parking, which results in less than the minimum combined lane and shoulder width (14' on Westfield Avenue, 12' on 28th Street) required for bicycle compatibility.

Alternative #1 - No Build

Under this alternative, no work would be performed, and therefore the following existing deficient features will remain:

- No shoulders are present on 29th Street
- All signal heads are mounted on pedestal poles (none overhead), so visibility is restricted
- No pedestrian signal heads
- Only one lighting fixture is present at intersection, and further analysis will need to be performed during PE to determine the level of lighting upgrades required
- Curb ramps, where existing, are not ADA compliant
- Small portable signs indicate that a school crossing is present across the easterly crosswalk of Westfield Avenue, but permanent signs do not exist

This alternative represents the lowest upfront cost and has no environmental impacts but does not meet the need to improve substandard and deficient existing conditions. It is noted that the existing traffic signal controller is electro-mechanical and operates under fixed-time phasing; vehicle detection is not provided on any approach. Additionally, the existing pavement is in poor condition, making it difficult to remedy and maintain faded or missing lane stripes, stop bars and crosswalk markings at intersection, even under routine maintenance.

Alternative #2 - Traffic Signal Replacement

Based on the existing signal design, proposed improvements would require its total replacement, including a modern controller. New traffic signal foundations would be built at four (4) locations, providing new poles and 15' mast arms with vehicular heads mounted vertically overhead for enhanced visibility. Countdown pedestrian heads would be added in compliance with current standards. Vehicular detection is proposed on the 29th Street Southbound approach to enable the signal to operate as semi-actuated. Pedestrian push buttons would be required for crossing Westfield Avenue. Existing striping for the lanes, crosswalks and stop bars will be replaced, with the stop bar on 29th Street approach placed further back from the intersection to allow enough room for intersection turning maneuvers. Based on the proximity of a building at the northeast corner to the traveled way, it is recommended that the southbound approach be signed with a No Turn on Red restriction due to intersection sight limitations. Permanent school crossing signs would be installed for improved visibility and safety. Resurfacing of deteriorated pavement would also be needed at the intersection to properly address pavement deterioration, riding surface quality, and enable resolution of existing, faded or missing markings. Four (4) curb ramp replacements along with associated sidewalk reconstruction are required for ADA compliance. Lighting improvements would be required to provide adequate illumination levels for pedestrians in crosswalks.

2. Westfield Avenue at 34th Street

The existing signalized intersection has three legs, with Westfield Avenue being an east-west roadway and 34th Street approaching from the north. The South leg of 34th Street is offset approximately 90 feet to the west of the signalized intersection and is one way Southbound. Both streets feature on-street parking, which results in less than the minimum combined lane and shoulder width on Westfield Avenue (14') required for bicycle compatibility.

Alternative #1 - No Build

Under this alternative, no work would be performed, and therefore the following existing deficient features will remain:

- Substandard (7') shoulder width on Westfield Avenue Eastbound
- All signal heads are mounted on pedestal poles (none overhead), so visibility is restricted
- Missing One-Way street signing for the South leg of 34th Street
- No pedestrian signal heads
- Curb ramps are present, but those at the northern leg may not be ADA compliant
- Ponding, due to inadequate surface drainage, is moderate to significant along the east gutter line of 34th Street north leg, and minor along south gutter of Westfield Avenue west of the intersection

This alternative represents the lowest upfront cost but does not meet the need to correct substandard and deficient existing conditions. It is noted that the existing traffic signal controller is electro-mechanical and operates fixed time since vehicle detection is not provided on any approach.

Alternative #2 - Traffic Signal Replacement

Based on the existing signal design, proposed improvements would require its total replacement, including a modern controller. New traffic signal foundations would be built in each of the four (4) quadrants where 34th Street intersects Westfield Avenue. Each new foundation would include a new pole and mast arm with vehicular heads mounted vertically overhead for enhanced visibility. Countdown pedestrian signal heads would be added in compliance with current standards. Vehicular detection is proposed on the 34th Street Southbound approach, to enable the signal to operate as semi-actuated. Pedestrian push buttons would be required for crossing Westfield Avenue at the striped easterly crosswalk. Existing striping for the lanes, crosswalks and stop bars is to be replaced. Resurfacing of deteriorated pavement would also be needed at the intersection to properly address pavement deterioration, riding surface quality, and enable resolution of existing, faded or missing markings. Also, existing ponding issues can be resolved with regrading pavement to provide positive flow to existing inlets with the proposed milling/overlay. New "One-Way" (R6-1) and "Wrong Way" (R5-1a) signs will be installed on south leg of 34th Street to confirm its one-way Southbound operation. "Do Not Enter signs" (R5-1) should also be installed facing the easterly driveway located just west of the north leg of 34th Street. "No Pedestrian Crossing" (R9-3) and "Use Crosswalk" (R9-3bP, with left or right arrows) signs will be installed near this driveway and at the south leg of 34th Street, to inform pedestrians to instead cross Westfield Avenue at the marked crosswalk on the east side of 34th Street. Based on the offset alignment of 34th Street at this intersection, it is recommended that its Southbound approach along with Westfield Avenue Eastbound be signed as "No Turn on Red" (R10-11a), with a "Stop Here on Red" (R10-6) sign added, to provide augmented intersection control. Three (3) new curb ramps along with associated sidewalk reconstruction are required for ADA compliance. Additionally, the

driveway on the west side of 34th Street north of the intersection is to be closed. Lighting improvements would be needed to provide adequate illumination levels for pedestrians in crosswalks.

3. Federal Street at 35th Street

The existing signalized intersection has four legs, with Federal Street as an east-west roadway and 35th Street one way Northbound on both legs. Both streets feature on-street parking and have combined lane and shoulder widths which exceed the minimum required for bicycle compatibility (14' required on Federal Street, 12' required on 35th Street).

Alternative #1 - No Build

Under this alternative, no work would be performed, and therefore the following existing deficient features will remain:

- Absence of a dedicated traffic signal controller
- Substandard (7.5') shoulder width on 34th Street Northbound and Southbound
- Mast arm signals mounted horizontally on trombone arms; visibility for heads facing Federal Street approaches is inadequate
- No curb ramps, crosswalks or stop bars; faded lane stripes
- No pedestrian signal heads
- Ponding, due to inadequate drainage, is moderate to significant along east gutter line of 35th Street south leg, and minor along east and west gutters of 35th Street north of the intersection

This alternative represents the lowest upfront cost and has no environmental impacts but does not meet the need to address substandard and deficient existing conditions. It is noted that the traffic signal operates under fixed timing since vehicle detection is not provided on any approach. Additionally, the pavement is in poor condition, so it would be difficult to upgrade and maintain faded or missing lane stripes, stop bars and crosswalk markings even under routine maintenance.

Alternative #2 - Traffic Signal Replacement

Based on the existing signal configuration, proposed improvements would require its total replacement, including provision of a dedicated, modern controller. New traffic signal foundations would be constructed in each of the four (4) quadrants of the intersection. Each new foundation will support a new pole and mast arm with vehicular heads mounted vertically overhead for enhanced visibility. Countdown pedestrian signal heads would be added in compliance with current standards. Additionally, a pedestal signal pole with pedestrian heads will be installed in the southeast corner. Vehicle detection is proposed on the 35th Street Northbound approach, so that the signal can operate as semi-actuated. Existing striping for the lanes, crosswalks and stop bars is to be replaced. Resurfacing of deteriorated pavement would also be needed at the intersection to properly address pavement deterioration, riding surface quality, and enable resolution of existing, faded or missing markings. Additionally, existing ponding issues can be remedied with regrading pavement to provide positive flow to existing inlets with the proposed milling/overlay. New "One-Way" (R6-1), "Do Not Enter" (R5-1) and "Wrong Way" (R5-1a) signs will be installed on each leg of 35th Street to confirm its one-way Northbound operation. These will be supplemented on Federal Street approaches by a "No Right Turn" (R3-1) sign on the Eastbound approach and "No Left Turn" (R3-2) signs on the Westbound approach. Based on the proximity of buildings in the southwest and southeast corners to the traveled way, it is recommended that the 35th Street Northbound approach as well as the Federal Street Westbound

approach both be signed as “No Turn on Red” (R10-11a). Curb ramp replacements at all four (4) corners along with associated sidewalk reconstruction are required for ADA compliance. Lighting improvements would be needed to provide adequate illumination levels for pedestrians in crosswalks.

4. Federal Street at 36th Street

The existing signalized intersection has four legs, with Federal Street as an east-west roadway. The South leg of 36th Street is offset approximately 40 feet west of the north leg and is one way Southbound, away from intersection. Federal Street, which provides for on-street parking, and 36th Street (no parking) each have combined lane and shoulder widths in excess of the 14' minimum required for bicycle compatibility.

Alternative #1 - No Build

Under this alternative, no improvements would be constructed, and therefore the following existing deficient features would remain:

- Substandard shoulder widths on north leg of 36th Street Northbound (2') and Southbound (5')
- Overhead mast arm signals mounted horizontally on trombone arms at 2 locations; all other signal heads are ground-mounted on pedestal poles only
- No crosswalks; faded stop bars and lane stripes
- “Stop Here on Red” sign at 36th Street Southbound located too distant from the actual stop bar
- No pedestrian signal heads
- Curb ramps are not ADA compliant
- Roadway ponding, due to inadequate drainage, along west gutter line of 36th Street's north leg
- Existing parking on Federal Street, west of the intersection, is too close to the intersection
- Undesirable intersection corner sight distance on Federal Street Eastbound due to close proximity of buildings to southwest quadrant

This alternative represents the lowest upfront cost and has no environmental impacts, but does not meet the to correct substandard and deficient existing conditions. It is noted that the traffic signal operates under fixed timing since vehicle detection is not provided on any approach. Additionally, the pavement's poor condition inhibits an ability to properly remedy faded or missing lane stripes, stop bars and crosswalk markings at intersection even under routine maintenance.

Alternative #2 - Traffic Signal Replacement

Based on the existing traffic signal arrangement, proposed improvements would require a total replacement. New traffic signal foundations would be installed at all locations, providing vehicular heads with vertical displays mounted overhead on new poles with mast arms for improved visibility, along with countdown pedestrian signal heads in compliance with current standards. Additionally, pedestal signal poles with pedestrian heads will be installed at the southeast and northeast corners. New signal heads and signal adjusted phasing will provide an Eastbound lead left phase to address traffic concerns expressed by the public. Vehicular detection is proposed on the 36th Street Southbound approach to enable the signal to operate as semi-actuated.

Pedestrian push buttons would be required for crossing Federal Street at the striped easterly crosswalk. Existing striping for the lanes, crosswalks and stop bars is to be replaced. Resurfacing of deteriorated pavement would also be needed at the intersection to properly address pavement deterioration, riding surface quality, and enable resolution of existing, faded or missing markings. Furthermore, existing ponding issues can be remedied with regrading pavement to provide positive flow to existing inlets with the proposed milling/overlay. The concrete driveway apron along the southern side of Federal Street is to be replaced. New “One-Way” (R6-1) and “Wrong Way” (R5-1a) signs will be installed on the south leg of 36th Street to confirm its one-way Southbound operation. “No Pedestrian Crossing” (R9-3) and “Use Crosswalk” (R9-3bP with left or right arrows) signs will be installed at the northwest corner and south leg of 36th Street, to inform pedestrians to cross Federal Street at the marked crosswalk on the east side of 36th Street. Based on the offset alignment of 36th Street at this intersection, it is recommended that its Southbound approach along with Federal Street Eastbound approach be signed as “No Turn on Red” (R10-11a). A “Stop Here on Red” (R10-6) sign should also be installed on this approach to complement the proposed Southbound stop bar location. Three (3) curb ramp replacements along with associated sidewalk reconstruction are required for ADA compliance. Lighting improvements will be needed to provide adequate illumination levels for pedestrians in crosswalks.

5. State Street at 10th Street

The State Street/10th Street intersection is currently unsignalized and warranted for signalization based on recommendations determined under a separate Camden County project. State Street is oriented in an east-west direction west of 10th Street, with 10th Street extending towards the south. East of 10th Street, State Street curves towards the north via a bridge crossing over the Cooper River. There are established bicycle (bike) lanes in both directions on State Street, along with a separate parallel bike route across an old truss bridge over the Cooper River on the south side of State Street, with this older bridge serving as a shared-use path. State Street east of the intersection features designated bike lanes in both directions across the Cooper River Bridge. State Street Westbound west of the intersection has signage and pavement markings (“Sharrows”) for a shared bike lane, indicating that bikes are to “Share the Road” with motor vehicles. An “Alternate Bike Route” sign is posted on Westbound State Street towards the north just before “Bike Lane Ends, Share the Road” signage; an existing north-south macadam bike path is present at its junction with the north side of State Street Westbound. Both 10th Street Southbound and the west side of State Street feature on-street parking resulting in combined lane and shoulder widths less than the 14’ minimum required for bicycle compatibility. The other lane directions feature combined lane and shoulder widths in excess of the 14’ minimum required.

Alternative #1 - No Build

Under this alternative, no improvements would be performed to the unsignalized intersection, and therefore the following existing deficiencies will remain:

- The intersection traffic control would be retained via the existing stop sign on 10th Street. Operational benefits realized by warranted traffic signalization would not be provided.
- Substandard or missing shoulders
- Faded crosswalks and stop bar on the 10th Street approach
- Curb ramps are present but may not be ADA compliant

This alternative represents the lowest upfront cost and has no environmental impacts but does not meet the anticipated need to correct substandard and deficient existing conditions, including new traffic signalization as recommended under the State Street corridor improvement study conducted by Camden County.

Alternative #2 - Traffic Signal Replacement

Traffic signalization of this intersection was recommended as part of a separate State Street corridor study prepared by others for Camden County. Proposed improvements to install a new traffic signal will therefore complement Camden County's improvement objectives for the State Street/10th Street intersection. New traffic signal foundations, poles and mast arms will be installed at four (4) locations, providing vehicular heads with vertical displays mounted overhead for enhanced visibility, along with countdown pedestrian signal heads in compliance with current standards. Additionally, a pedestal signal pole with pedestrian head will be installed at the southeast corner. Aerial wire conflicts in the southwest and southeast corners may require relocation of associated utilities. Vehicular detection is proposed on the 10th Street approach to enable the intersection's signal to operate as semi-actuated. Pedestrian push buttons would be required for crossing State Street at the striped easterly crosswalk. Existing striping for the lanes, crosswalks and stop bars is to be replaced. Resurfacing of deteriorated pavement would also be needed at the intersection to properly address pavement deterioration, riding surface quality, and enable resolution of existing, faded or missing markings. "No Pedestrian Crossing" (R9-3) and "Use Crosswalk" (R9-3bP with left or right arrows) signs will be installed at the southwest corner and north side west of 10th Street, to inform pedestrians to cross State Street at the marked crosswalk on the east side. Based on the location of the shared-use path on the south side of State Street east of the intersection, the stop bar on the 10th Street approach must be set further back. It is recommended that the 10th Street approach be signed with a "No Turn on Red" (R10-11a) restriction, along with a "Stop Here on Red" (R10-6) sign, due to intersection sight constraints imposed by an existing residential building on the southwest corner. Lighting improvements will be needed to provide adequate illumination levels for pedestrians in crosswalks. The guide rail on the west side of the State Street bridge would not be impacted by construction, so it is anticipated that neither the guide rail nor the guide rail attachments would need to be updated for compliance with FHWA's current "MASH" standards.

6. Atlantic Avenue at Broadway

The existing signalized intersection has four legs, with Broadway oriented as a north-south roadway. The east leg of Atlantic Avenue is slightly offset to the south and narrower than the west leg. Broadway features on-street parking resulting in combined lane and shoulder widths less than the 14' minimum required for bicycle compatibility. Both the west side of Atlantic Avenue (including on-street parking) and east side (no parking) provide the 14' required width for bicycle compatibility.

Alternative #1 - No Build

Under this alternative, no work would be performed, and therefore the following existing deficient features will remain:

- Substandard (6.5') shoulder width on Atlantic Avenue Eastbound and Westbound
- Mast arm signals mounted horizontally on trombone arms (with cover plate missing from the pole in the southeast corner)
- Faded or missing crosswalks and stop bars (except for north leg of Broadway)
- Absence of pedestrian signal heads
- Non-ADA compliant curb ramps
- Minor ponding, due to inadequate drainage, is present along south gutter of Atlantic Avenue and at Northwest corner of the intersection

This alternative represents the lowest upfront cost and has no environmental impacts but does not meet the need to correct substandard and deficient existing conditions. It is noted that the existing traffic signal controller operates with a fixed timing plan since vehicle detection is not provided for at the intersection.

Alternative #2 - Traffic Signal Replacement

Based on the existing signal configuration, proposed improvements would require a total replacement. New traffic signal foundations would be built in each of the four (4) quadrants of the intersection. Each new foundation would include a new pole and mast arm with vehicular heads mounted vertically overhead for enhanced visibility. Additionally, separate pedestal signal poles with countdown pedestrian signal heads, in compliance with current standards, will also be installed at all four (4) corners. Vehicular detection is proposed on the Atlantic Avenue approaches, to enable the signal to operate as semi-actuated. Pedestrian push buttons would be required for crossing Broadway at both of its crosswalks. Existing striping for the lanes, crosswalks and stop bars is to be replaced. Resurfacing of deteriorated pavement would also be needed at the intersection to properly address pavement deterioration, riding surface quality, and enable resolution of existing, faded or missing markings. Also, existing ponding issues can be remedied with regrading pavement to provide positive flow to existing inlets with the proposed milling/overlay. The building at northwest corner impedes sight distance, so it is recommended that Atlantic Avenue Eastbound be signed with "No Turn on Red" (R10-11a) control. Curb ramp replacements along with associated sidewalk reconstruction are required for ADA compliance at all four (4) corners. Lighting improvements will be needed to provide adequate illumination levels for pedestrians in crosswalks.

7. Broadway at Carl Miller Boulevard

The existing signalized intersection has four legs, with Broadway oriented as the north-south roadway and Carl Miller Boulevard oriented east-west. Curb "bulb-outs" exist on the Broadway approaches to reduce pedestrian crossing distances and locate the east-west crosswalks further from Carl Miller Boulevard. Carl Miller Boulevard and Broadway feature on-street parking, with combined lane and shoulder widths that are less than the required minimum width for bicycle compatibility (12' on Carl Miller Boulevard & 14' on Broadway).

Alternative #1 - No Build

Under this alternative, no improvements would be made, and therefore the following existing deficiencies would not be addressed:

- Absence of shoulders on Carl Miller Boulevard
- Absence of overhead-mounted traffic signals
- No pedestrian signal heads
- Faded crosswalks with missing stop bars on Broadway; also missing lane stripes on east leg of Carl Miller Boulevard
- Ponding due to inadequate drainage at the Northeast and Northwest corners

This alternative represents the lowest upfront cost and has no environmental impacts but does not meet the need to correct substandard and deficient existing conditions. It is noted that the existing traffic signal controller is electro-mechanical and operates with a fixed timing plan without vehicle detection on any approach. Additionally, the pavement is in poor condition, so it would be difficult to upgrade faded or missing lane stripes, stop bars and crosswalk markings at the intersection, even under routine maintenance.

Alternative #2 - Traffic Signal Replacement

Based on the existing signal configuration, proposed improvements will require its total replacement, including a modern 8-phase controller. New traffic signal foundations will be constructed at four (4) locations, each including a new pole and 15' mast arm with vehicular heads mounted vertically overhead for enhanced visibility. Additionally, separate pedestal signal poles with countdown pedestrian heads, in compliance with current standards, will also be installed at all four (4) corners. Vehicular detection is proposed on Carl Miller Avenue to provide for semi-actuated signal operations. Pedestrian push buttons will be required for crossing Broadway. Existing striping for the lanes, crosswalks and stop bars will be replaced, with stop bars on the Broadway approaches set back from the intersection to complement the east-west crosswalk locations established under prior construction of the corner bulb-outs. Resurfacing of deteriorated pavement would also be needed at the intersection to properly address pavement deterioration, riding surface quality, and enable resolution of existing, faded or missing markings. Additionally, existing ponding issues will be remedied with regrading pavement to provide positive flow to existing inlets with the proposed milling/overlay. "One-Way" (R6-1) and "Do Not Enter" (R5-1) signs will be installed on west side at Carl Miller Boulevard to further confirm its one-way Eastbound operation. These should be supplemented on Broadway approaches by a "No Right Turn" (R3-1) sign on the Southbound approach and "No Left Turn" (R3-2) signs on the Northbound approach. Additionally, "Lane Use" (R3-8EE, Left or Right Only) signs are proposed on the Carl Miller Boulevard Westbound approach to the intersection to help prevent wrong-way entry onto the west leg of this roadway, with a "Two-Way Traffic Ahead" (W6-3) and "Lane Use" (R[NJ]3-8F, Left Only/Thru & Right) signs on the Carl Miller Boulevard Eastbound approach. It is recommended that Broadway Northbound and Southbound approaches be signed with "No Turn on Red" (R10-11a) with a "Stop Here on Red" (R10-6) signs due to their setback stop bars. Lighting improvements will be needed to provide adequate illumination levels for pedestrians in crosswalks.

8. Broadway at Ferry Avenue

The existing 5-legged intersection incorporates skewed roadway alignments, with Broadway as a north-south roadway. Ferry Avenue is an east-west roadway east of the intersection, and is oriented in a northwest-southeast direction immediately west of the intersection. Jasper Street, the fifth leg, is a Westbound roadway oriented east-west on the west side of the intersection. Vehicle loop detectors are visible in the existing pavement on some of the approaches to the intersection. Pedestrian signal heads are provided. Broadway, Ferry Avenue west of the intersection, and Jasper Street all feature on-street parking resulting in combined lane and shoulder widths less than the 14' minimum required for bicycle compatibility. Ferry Avenue east of the intersection does not include on-street parking but is only 25' wide and thus does not provide for the minimum required 14' shared lane widths in each direction.

Alternative #1 - No Build

Under this alternative, no improvements would be constructed, and therefore the following existing deficient features will remain:

- No shoulders on Ferry Avenue
- Broadway Southbound has two substandard 10' lanes; signing for the left turn lane is inadequate; existing on-street parking constrains vehicle stacking potential
- Mast arm signals mounted horizontally on trombone arms; visibility for some heads is inadequate
- Splayed traffic signal mast arms mounted to one signal pole in the Southwest corner (does not meet current NJDOT guidelines)
- Pedestrian signal heads are provided at all approaches but do not appear to incorporate countdown timers
- Curb ramps are present, but some are not ADA compliant
- Crosswalks, stop bars and lane stripes are faded
- Ponding, due to inadequate drainage, at the Northwest and Northwest corners

This alternative represents the lowest upfront cost and has no environmental impacts but does not meet the need address substandard and deficient existing conditions.

Alternative #2 - Traffic Signal Replacement

Based on the existing signal layout, proposed improvements will require its total replacement. New traffic signal foundations would be constructed at five (5) locations, providing new poles and 15'-20' mast arms with vehicular heads mounted overhead for enhanced visibility. Additionally, separate pedestal signal poles with countdown pedestrian heads, in compliance with current standards, will also be installed at three (3) locations. Vehicular detection is proposed on Ferry Avenue approaches, so that the signal can operate as semi-actuated. Pedestrian push buttons will be required for crossing Broadway. Existing striping for the lanes, crosswalks and stop bars will be replaced. Resurfacing of deteriorated pavement would also be needed at the intersection to properly address pavement deterioration, riding surface quality, and enable resolution of existing, faded or missing markings. Furthermore, existing ponding issues will be remedied with regraded pavement to provide positive flow to existing inlets with the proposed milling/overlay. New "One-Way" (R6-1) and "Wrong Way" (R5-1a) signs will be installed on Jasper Street to confirm its one-way Westbound operation. New and additional "Lane Use" (R[NJ]3-8F, Left Only/Thru & Right) lane use control signs are proposed on Broadway Southbound approach to match the existing lane configuration. Existing, worn pavement markings will be replaced to complement the existing lane use control signing scheme on Ferry Avenue Eastbound. "No Turn on Red" (R10-11a) and "Stop Here on Red" (R10-6) signs are recommended on all Broadway and Ferry Avenue approaches based on the unusual five-leg geometry at the intersection, the locations of the set back crosswalks, and the close proximity to the intersection of several buildings. Five (5) curb ramp replacements along with associated sidewalk reconstruction are required for ADA compliance. Lighting improvements will be needed to provide adequate illumination levels for pedestrians in crosswalks.

The atypical geometry of the intersection could potentially expose pedestrians to unanticipated vehicle conflicts with turning traffic from Broadway and/or Ferry Avenue, especially for those in the crosswalk crossing Jasper Street. Based on this, and if it is determined that pedestrian volumes might increase in the coming years, future consideration could be given to providing a separate pedestrian-only phase (or Leading Pedestrian Intervals) at this location. It is noted that

during the study, a public comment was received regarding a consideration to potentially reduce pedestrian crossing distances. This consideration was initially screened with respect to potential truck turning movements that might be permitted to utilize Ferry Avenue (west of Broadway), pending completion of a Camden County-sponsored freight impact study that was being initiated at the time of this report preparation; the findings of this screening are depicted in Appendix M exhibits. Therefore, the ability to possibly incorporate intersection bump-outs at select locations should be further evaluated, along with potential future truck movements, under the future Preliminary Engineering phase.

9. Broadway at Viola Street

The existing signalized intersection has four legs, with Broadway as a north-south roadway and Viola Street aligned in the east-west direction. Curb “bulb-outs” exist on the Broadway approaches, which reduce pedestrian crossing distances and set crosswalks back from Viola Street. Viola Street and Broadway feature on-street parking, with combined lane and shoulder widths that are less than the required minimum width for bicycle compatibility (12’ on Viola Street & 14’ on Broadway).

Alternative #1 - No Build

Under this alternative, no improvements would be performed, and therefore the following existing deficient features will remain:

- Insufficient shoulder widths on Viola Street
- Absence of overhead-mounted traffic signals, limiting traffic signal visibility
- No pedestrian signal heads
- Faded crosswalks with missing stop bars on Broadway; missing lane striping on Viola Street
- Ponding, due to inadequate surface drainage, is present at the west gutter line north of Northwest bump-out

This alternative represents the lowest upfront cost and has no environmental impacts but does not meet the need to address substandard and deficient existing conditions. It is noted that the existing traffic signal controller is electro-mechanical and operates a fixed timing plan without vehicle detection on any approach. The roadway pavement is in poor condition, making it difficult to remedy faded or missing lane striping, stop bars and crosswalk markings, even under routine maintenance.

Alternative #2 - Traffic Signal Replacement

Based on the existing signal configuration, proposed improvements will require its total replacement, including a modern controller. New traffic signal foundations would be constructed at four (4) locations, providing new poles and 15’ mast arms with vehicular heads mounted vertically overhead for enhanced visibility. Additionally, separate pedestal signal poles with countdown pedestrian heads, in compliance with current standards, will also be installed at all four (4) corners. Aerial wire conflicts in the southwest corner may require relocation of associated utilities. Vehicle detection is proposed on the Viola Street approaches to enable the signal to operate as semi-actuated. Pedestrian push buttons will be required for crossing Broadway. Existing striping for the lanes, crosswalks and stop bars will be replaced, with stop bars on Broadway approaches set back from the intersection to complement the crosswalk locations

established with the previously constructed corner bulb-outs. Resurfacing of deteriorated pavement would also be needed at the intersection to properly address pavement deterioration, riding surface quality, and enable resolution of existing, faded or missing markings. Furthermore, roadway ponding issues can be remedied with regrading pavement to provide positive flow to existing inlets with the proposed milling/overlay. Based the crosswalk setbacks on Broadway and the proximity of existing buildings, it is recommended that all approaches be signed as “No Turn on Red” (R10-11a) with “Stop Here on Red” (R10-6) signage added to augment the intersection traffic control. “Pedestrian Crossing” (W11-2) signs are present at crosswalks on Broadway; the locations of these signs would conflict with “No Turn on Red” (R10-11a) and “Stop Here on Red” (R10-6) signs proposed on these approaches, and are no longer needed upon installation of the proposed pedestrian signals, so they should be removed. Lighting improvements will be needed to provide adequate illumination levels for pedestrians in crosswalks.

10. Broadway at Jefferson Street

The existing signalized intersection has four legs, with Broadway as a north-south roadway. Broadway and Jefferson Street feature on-street parking, with combined lane and shoulder widths that are less than the required minimum width for bicycle compatibility on Jefferson Street (12’ on Jefferson Street & 14’ on Broadway).

Alternative #1 - No Build

Under this alternative, no work would be performed, and therefore the following existing deficient features will remain:

- Insufficient shoulder widths on Jefferson Street
- Absence of overhead-mounted traffic signals, limiting traffic signal visibility
- No pedestrian signal heads
- Faded crosswalks with missing stop bars on Broadway; missing lane striping on Jefferson Street
- Ponding, due to inadequate surface drainage, is present at the west gutter line and Northwest corner

This alternative represents the lowest upfront cost and has no right-of-way or environmental impacts but does not meet the need to improve substandard and deficient existing conditions. It is noted that there is no existing controller at this location; the signal operates under a fixed timing plan operated by the electro-mechanical controller located at the Broadway/Viola Street intersection. Vehicle detection is not provided on any approach. The poor pavement condition limits effective upgrades/repairs to faded or missing lane stripes, stop bars and crosswalk markings even under routine maintenance.

Alternative #2 - Traffic Signal Replacement

Based on the existing signal configuration, proposed improvements would require a total replacement, including provision of a dedicated, modern controller. New traffic signal foundations would be constructed at all four (4) corners, providing new poles and mast arms with vehicular heads mounted vertically overhead for enhanced visibility. Countdown pedestrian heads will also be added in compliance with current standards. Vehicular detection is proposed on the Jefferson Street approaches to provide for semi-actuated operation. Pedestrian push buttons are required for crossing Broadway at both of its striped crosswalks. Existing striping for the lanes, crosswalks and stop bars is to be replaced or added. Resurfacing of deteriorated pavement would also be needed at the intersection to properly address pavement deterioration, riding surface quality, and

enable resolution of existing, faded or missing markings. Existing roadway ponding will be remedied with regrading pavement to provide positive flow to existing inlets with the proposed milling/overlay. Since there are buildings at the northwest (since demolished) and southeast corners impeding intersection sight distance, it is recommended that the Jefferson Street approaches be signed as “No Turn on Red” (R10-11a). New curb ramps along with associated sidewalk reconstruction are required for ADA compliance at all four (4) corners. Lighting improvements will be needed to provide adequate illumination levels for pedestrians in crosswalks.

11. Atlantic Avenue at 9th Street

The existing signalized intersection has four legs, with Atlantic Avenue as an east-west roadway and 9th Street one way Southbound on both legs. Both Atlantic Avenue and 9th Street feature on-street parking, with combined lane and shoulder widths that are less than the required minimum width for bicycle compatibility on 9th Street (12’ on 9th Street & 14’ on Atlantic Avenue).

Alternative #1 - No Build

Under this alternative, no work would be performed, and therefore the following existing deficient features will remain:

- Substandard shoulder widths on Atlantic Avenue and 9th Street
- Mast arm signals mounted horizontally on trombone arms
- Missing or faded crosswalks, stop bars, and lane stripes
- No pedestrian signal heads facing Atlantic Avenue approaches

This alternative represents the lowest upfront cost and has no right-of-way or environmental impacts, but does not meet the need to correct substandard and deficient existing conditions. Video image vehicle detectors exist for the 9th Avenue Southbound approach to enable this signal to operate under semi-actuation. Additionally, the pavement’s degraded condition makes it difficult to upgrade faded or missing lane stripes, stop bars and crosswalk markings even under routine maintenance.

Alternative #2 - Traffic Signal Replacement

Based on the existing signal layout, proposed improvements would require its total replacement. New traffic signal foundations will be installed at all four (4) corners, providing new poles and mast arms with vehicular heads mounted vertically overhead for enhanced visibility. Countdown pedestrian signal heads will also be added in compliance with current standards. Aerial wire conflicts in the southwest corner might require relocation of associated utilities. Vehicle detection is proposed for the 9th Street Southbound approach to enable the signal to operate as semi-actuated. Pedestrian push buttons are required for crossing Atlantic Avenue at both of its crosswalks. Existing striping for the lanes, crosswalks and stop bars is to be replaced. Resurfacing of deteriorated pavement would also be needed at the intersection to properly address pavement deterioration, riding surface quality, and enable resolution of existing, faded or missing markings. Also, existing ponding issues will be remedied with regrading pavement to provide positive flow to existing inlets with the proposed milling/overlay. “No Turn on Red” (R10-11a) signs exist on Atlantic Avenue Westbound; it is recommended that the 9th Street Southbound approached also be signed as “No Turn on Red” (R10-11a), since features at the northeast corner limit the intersection sight line from that approach. Additional “One-Way” (R6-1), “Do Not Enter”

(R5-1) and “Wrong Way” (R5-1a) signs will be installed on each leg of 9th Street to confirm its one-way Southbound operation. These will be supplemented on Atlantic Avenue approaches by a “No Left Turn” (R3-2) sign on the Eastbound approach and a “No Right Turn” (R3-1) sign on the Westbound approach. “Low Clearance” (W12-2) signs should be provided on the Atlantic Avenue Westbound and 9th Street Southbound approaches to address the existing substandard vertical underclearance at the railroad bridge on Atlantic Avenue west of 8th Street. The existing curb ramp is to be replaced at the southeast corner along with associated sidewalk reconstruction required for ADA compliance. Lighting improvements will be needed to provide adequate illumination levels for pedestrians in crosswalks.

12. Atlantic Avenue at 8th Street

The existing signalized intersection has four legs, with Atlantic Avenue as an east-west roadway and 8th Street as one way Northbound on both legs. Both Atlantic Avenue and 8th Street feature on-street parking, with combined lane and shoulder widths that are less than the required minimum width for bicycle compatibility on 8th Street (12’ on 8th Street & 14’ on Atlantic Avenue).

Alternative #1 - No Build

Under this alternative, no work would be performed, and therefore the following existing deficient features will remain:

- Substandard shoulder widths on Atlantic Avenue and 8th Street
- Mast arm signals mounted horizontally on trombone arms
- Missing or faded crosswalks, stop bars, and lane stripes
- No pedestrian signal heads facing Atlantic Avenue approaches
- Ponding due to inadequate drainage in the Northeast corner and Southwest corner
- Railroad bridge west of intersection (posted 12’-9” clearance) obstructs view for Atlantic Avenue Eastbound traffic approaching intersection

This alternative represents the lowest upfront cost and has no right-of-way or environmental impacts, but does not address the need to mitigate substandard and deficient existing conditions. Video image detection for 8th Street Northbound enables the signal to operate in a semi-actuated mode. The aging sections of intersection pavement condition render it difficult to upgrade lane striping, stop bars and crosswalk markings even under routine maintenance.

Alternative #2 - Traffic Signal Replacement

Based on the existing signal configuration, proposed improvements will require its total replacement. New traffic signal foundations will be installed at all four (4) corners, providing new poles and mast arms with vehicular heads mounted vertically overhead for enhanced visibility. Countdown pedestrian signal heads will be added in compliance with current standards. On Atlantic Avenue, an electronic “(RED) SIGNAL AHEAD” sign could be considered in order to help mitigate existing Eastbound sight distance constraints imposed by the railroad bridge. Aerial wire conflicts in the southwest corner may require associated utilities relocation. Vehicle detection is proposed on the 8th Street Northbound approach to support semi-actuated signal functionality. Pedestrian push buttons will be added for crossing Atlantic Avenue at both of its striped crosswalks. Existing striping for the lanes, crosswalks and stop bars is to be replaced. Resurfacing of deteriorated pavement would also be needed at the intersection to properly

address pavement deterioration, riding surface quality, and enable resolution of existing, faded or missing markings. Furthermore, existing ponding issues can be remedied with regrading pavement to provide positive flow to existing inlets with the proposed milling/overlay. Additional “One-Way” (R6-1), “Do Not Enter” (R5-1) and “Wrong Way” (R5-1a) signs will be installed on 8th Street to confirm its one-way Northbound operation. These will be supplemented on the Atlantic Avenue approaches by “No Left Turn” (R3-2) signs on the Westbound approach and a “No Right Turn” (R3-1) sign on the Eastbound approach. New “Low Clearance” (W12-2) signs are proposed on Atlantic Avenue Westbound and 8th Street Northbound to inform approaching motorists of the existing substandard vertical underclearance at the railroad bridge crossing both Atlantic Avenue and 8th Street. Curb ramp replacements along with associated sidewalk reconstruction are required for ADA compliance at all four (4) corners. Lighting improvements will provide adequate illumination levels for pedestrians in crosswalks.

13. Atlantic Avenue at Mount Ephraim Avenue

The existing signalized intersection has four legs with Atlantic Avenue as an east-west roadway and Mount Ephraim Avenue oriented as a north-south roadway on a slightly skewed intersection alignment. Atlantic Avenue features on-street parking which results in less than the minimum 14’ combined lane and shoulder width required for bicycle compatibility. Mount Ephraim Avenue has sufficient road width to provide the required 14’ wide shared use compatibility.

Alternative #1 - No Build

Under this alternative, no work would be performed, and therefore the following existing deficiencies would remain:

- Absence of shoulders on Ferry Avenue
- Inadequate lane use control signing for the Atlantic Avenue Eastbound right-turn lane
- Mast arm signals mounted horizontally on trombone arms
- ADA non-compliant curb ramps at some locations
- Faded crosswalks, stop bars and lane striping
- Degraded pavement surface quality

This alternative represents the lowest upfront cost but does not meet the need to improve existing conditions deficiencies. The existing signal incorporates microwave vehicle detection for the Atlantic Avenue approaches, the functionality of which could not be field verified under this study.

Alternative #2 - Traffic Signal Replacement

Based on the existing signal arrangement, proposed improvements will require replacement of the traffic signal system. New traffic signal foundations will be constructed at all four (4) corners, providing new poles and mast arms with vehicular heads mounted vertically overhead for enhanced visibility. Additionally, separate pedestal signal poles with countdown pedestrian heads, in compliance with current standards, will also be installed at five (5) locations. Vehicular detection is proposed on the Atlantic Avenue approaches to enable the signal to operate as semi-actuated. Pedestrian push buttons will be added for crossing Mount Ephraim Avenue at both of its striped crosswalks. Existing striping for the lanes, crosswalks and stop bars is to be replaced. The right turn lane on the eastbound approach will be extended and striping added, with new “Lane Use” (R[NJ]3-8AA, left & thru/right only) signs added. Resurfacing of deteriorated pavement would also be needed at the intersection to properly address pavement deterioration, riding surface quality, and enable resolution of existing, faded or missing markings. Atlantic

Avenue approaches are already signed for “No Turn on Red”. Mount Ephraim Avenue Southbound will also be posted as “No Turn on Red” (R10-11a) due to intersection sight constraints imposed by the building at the northeast corner. Based on the crosswalk setbacks for Mount Ephraim Avenue Southbound and both approaches of Atlantic Avenue, it is recommended that these three approaches also have “Stop Here on Red” (R10-6) signs added. Curb ramp replacements along with associated sidewalk reconstruction are required for ADA compliance at five (5) locations at the southeast, northwest and northeast corners. Lighting improvements will be needed to provide adequate illumination levels for pedestrians in crosswalks.

14. Carl Miller Boulevard at 6th Street

The existing signalized intersection has four legs, with Carl Miller Boulevard as an east-west roadway and 6th Street as one way Northbound on both legs. Carl Miller Boulevard Westbound does not provide on-street parking and 6th Street does provide on-street parking; each of these approaches has a combined lane and shoulder width in excess of the 12’ minimum required for bicycle compatibility. Due to on-street parking, Carl Miller Boulevard Eastbound does not provide the required 12’ shared use lane.

Alternative #1 - No Build

Under this alternative, no work would be performed, and therefore the following existing deficient features will remain:

- Absence of shoulders on Carl Miller Boulevard
- Shoulder widths (6.5’) are insufficient on 6th Street
- Absence of overhead mounted traffic signal heads
- Absence of pedestrian signal heads
- Faded crosswalks with missing stop bars on 6th Street; missing lane stripes on both streets
- Roadway drainage ponding, due to inadequate drainage, along the north gutter line
- An outdated school crossing sign is posted on the Carl Miller Boulevard Eastbound approach; absence of school crossing signage in the Westbound direction.

This alternative represents the lowest upfront cost and has no right-of-way or environmental impacts, but it does not meet the need to correct deficient existing conditions. It is noted that the existing traffic signal controller is electro-mechanical and is able to operate only on a fixed timing plan since vehicle detection is not provided on any approach. The intersection had degraded pavement sections in poor condition, rendering it difficult to upgrade faded or missing lane stripes, stop bars and crosswalk markings even under routine maintenance.

Alternative #2 - Traffic Signal Replacement

Based on the existing signal layout, proposed improvements will require a total replacement, including a modern controller. New traffic signal foundations will be constructed at all four (4) corners, providing new poles and mast arms with vehicular heads mounted vertically overhead for enhanced visibility. Countdown pedestrian signal heads will also be added in compliance with current standards. Aerial wire conflicts in the northwest corner may require relocation of associated utilities. Vehicle detection is proposed on the 6th Street Northbound approach to enable the signal to operate as semi-actuated. Pedestrian push buttons will be added for crossing Carl Miller Boulevard at its two striped crosswalks. Existing striping for the lanes, crosswalks and stop bars is to be replaced. Resurfacing of deteriorated pavement would also be needed at the

intersection to properly address pavement deterioration, riding surface quality, and enable resolution of existing, faded or missing markings. Also, existing ponding issues will be remedied by regrading pavement to provide positive flow to existing inlets with the proposed milling/overlay. Additional “One-Way” (R6-1), “Do Not Enter” (R5-1) and “Wrong Way” (R5-1a) signs will be installed on each leg of 6th Street to confirm its one-way Northbound operation. These will be supplemented on the Carl Miller Boulevard approaches by “No Right Turn” (R3-1) signs on the Eastbound approach and “No Left Turn” (R3-2) signs on the Westbound approach. Based on the close proximity of a building at the southeast corner, it is recommended that the Carl Miller Boulevard Westbound approach also be signed as “No Turn on Red” (R10-11a). Curb ramp replacements along with associated sidewalk reconstruction are required for ADA compliance at all four (4) corners). Lighting improvements will be required to provide adequate illumination levels for pedestrians in crosswalks.

15. Ferry Avenue at 6th Street

The existing signalized intersection has four legs, with Ferry Avenue oriented in the east-west direction, and 6th Street, which is one way in the Northbound direction, aligned as the north-south roadway with a slight intersection skew. Ferry Avenue has combined lane and shoulder widths in excess of the 14’ minimum required for bicycle compatibility. 6th Street has a combined lane and shoulder width in excess of the 12’ minimum required for bicycle compatibility.

Alternative #1 - No Build

Under this alternative, no work would be performed, and therefore the following existing deficient features will remain:

- Absence of shoulders on Ferry Avenue
- Shoulder widths (7.5’) are insufficient on 6th Street
- Absence of overhead mounted traffic signal heads
- No pedestrian signal heads
- Faded crosswalks with missing stop bars on 6th Street; missing lane striping on both streets
- Minor ponding, due to inadequate drainage, is present at the Northeast and Southwest corners

This alternative represents the lowest upfront cost and has no right-of-way or environmental impacts but does not meet the need to correct substandard and deficient existing conditions. It is noted that the existing traffic signal controller is electro-mechanical and operates fixed time since vehicle detection is not provided on any approach. Additionally, the pavement is in poor condition, rendering it difficult to effectively upgrade faded or missing lane stripes, stop bars and crosswalk markings at intersection even under routine maintenance.

Alternative #2 - Traffic Signal Replacement

Based on the existing signal configuration, proposed improvements will include a total replacement of the signal system, including a modern controller. New traffic signal foundations will be installed at all four (4) corners, providing new poles and mast arms with vehicular heads mounted vertically overhead for enhanced visibility. Separate pedestal signal poles with countdown pedestrian signal heads, in compliance with current standards, will also be installed at the northwest and northeast corners. Vehicle detection is proposed on the 6th Street Northbound approach, so that the signal can operate as semi-actuated. Pedestrian push buttons will be added for crossing Carl Miller Boulevard at its two striped crosswalks. Existing striping for the lanes, crosswalks and stop bars is to be replaced. Resurfacing of deteriorated pavement would also be

needed at the intersection to properly address pavement deterioration, riding surface quality, and enable resolution of existing, faded or missing markings. Furthermore, existing ponding issues will be remedied with regrading pavement to provide positive flow to existing inlets with the proposed milling/overlay. Additional “One-Way” (R6-1), “Do Not Enter” (R5-1) and “Wrong Way” (R5-1a) signs will be installed on each leg of 6th Street to confirm its one-way Northbound operation. These will be supplemented on the Ferry Avenue approaches with “No Right Turn” (R3-1) signs on the Eastbound approach and “No Left Turn” (R3-2) signs on the Westbound approach. Based on the proximity of a building at the southwest corner, it is recommended that the 6th Street Northbound approach be signed as “No Turn on Red” (R10-11a), since the building impedes the intersection sight line. Curb ramp replacements, along with associated sidewalk reconstruction, are required at the northwest and northeast corners for ADA compliance. Lighting improvements will be required to provide adequate illumination levels for pedestrians in crosswalks.

16. Morgan Street at 8th Street

The existing signalized intersection has four legs, with Morgan Street as an east-west roadway. The North leg of 8th Street is one way Northbound, away from intersection, while the south leg is two-way. Morgan Street prohibits parking in the Eastbound direction. Morgan Street and 8th Street both have combined lane and shoulder widths in excess of the 14’ minimum required for bicycle compatibility.

Alternative #1 - No Build

Under this alternative, no work would be performed, and the following existing deficient features would remain:

- Substandard (5’) shoulder width on 8th Street
- Mast arm signals mounted horizontally on trombone arms; poles at Northwest and Southeast corners are leaning over
- Absence of ADA compatible curb ramps; absence of crosswalks, stop bars and lane stripes
- No pedestrian signal heads
- Ponding, due to inadequate drainage, in the Southeast and Northwest corners

This alternative represents the lowest upfront cost but does not meet the need to mitigate deficient existing conditions. The existing signal controller operates with a fixed timing plan and vehicle detection is not provided on any approach. The intersection pavement has sections that are in poor condition, rendering it difficult to effectively upgrade faded or missing lane stripes, stop bars and crosswalk markings even under routine maintenance.

Alternative #2 - Traffic Signal Replacement

Based on the existing signal arrangement, proposed improvements will require a total replacement of the signal system. New traffic signal foundations will be installed at all four (4) corners, providing new poles and mast arms with vehicular heads mounted vertically overhead for enhanced visibility. Countdown pedestrian signal heads will be added in compliance with current standards. Additionally, separate pedestal signal poles with countdown pedestrian signal heads will also be installed at the northwest and northeast corners. Aerial wire conflicts in the northwest corner may require relocation of associated utilities. Vehicle detection is proposed on the 8th Street Northbound approach to enable semi-actuated operation of the signal. Pedestrian push buttons will be added for crossing Morgan Street at its two striped crosswalks. Existing

striping for the lanes, crosswalks and stop bars is to be replaced. Resurfacing of deteriorated pavement would also be needed at the intersection to properly address pavement deterioration, riding surface quality, and enable resolution of existing, faded or missing markings. Furthermore, existing roadway drainage ponding issues can be remedied with regrading pavement to provide positive flow to existing inlets with the proposed milling/overlay. "One-Way" (R6-1) and "Wrong Way" (R5-1a) signs will be installed on the north leg of 8th Street to confirm its one-way Northbound operation. Four (4) new curb ramps along with associated sidewalk reconstruction are required for ADA compliance. Lighting improvements will be required to provide adequate illumination levels for pedestrians in crosswalks.

17. Morgan Street at 9th Street

The existing signalized intersection has four legs, with Morgan Street oriented in the east-west direction. The north leg of 9th Street is one-way Southbound towards the intersection, while the south leg is two-way. There is a channelized right turn lane with a channelizing island located at the southwest corner for right turns from Morgan Street Eastbound to 9th Street Southbound. The Camden Fire Department Engine #10 building is located at the Southeast corner, and the existing signal timing indicates that a signal preemption is provided for this facility. Morgan Street prohibits parking in the Eastbound direction. Morgan Street and 9th Street both have combined lane and shoulder widths in excess of the 14' minimum required for bicycle compatibility. The Creative Arts Morgan Village Academy school is situated in the Northeast quadrant.

Alternative #1 - No Build

Under this alternative, no work would be performed, and therefore the following existing deficient features will remain:

- No shoulders on Morgan Street
- 9th Street Southbound has two substandard lanes; the lane use control signing for the lanes is inadequate; the permissible on-street parking could constrain potential vehicle stacking.
- Mast arm signals mounted horizontally on trombone arms; visibility for some heads is inadequate
- Pedestrian signal heads are provided for some of the approaches yet do not provide crossing countdown timers
- Curb ramps lacking at Southwest corner
- Long crossing distance for pedestrians at south leg of intersection due to roadway width
- Crosswalks, stop bars and lane stripes are faded
- Ponding exists at the Southeast gutter due to inadequate surface drainage
- School crossing signs posted on all approaches are outdated

This alternative represents the lowest upfront cost and has no right-of-way or environmental impacts but does not meet the need to improve the existing deficiencies. The existing controller operates with only a fixed timing plan since vehicle detection is not provided on any approach. Additionally, the aged pavement may make it difficult to effectively upgrade faded or missing lane stripes, stop bars and crosswalk markings even under routine maintenance.

Alternative #2 - Traffic Signal Replacement

Based on the existing signal design, proposed improvements will require total replacement of the signal system. New traffic signal foundations will be installed at all four (4) corners, providing new poles and mast arms with vehicular heads mounted vertically overhead for enhanced visibility. Countdown pedestrian signal heads will be added in compliance with current standards. A separate pedestal signal pole with countdown pedestrian signal head will also be installed at the northwest corner. Vehicle detection is proposed on the 8th Street approaches to enable the signal to operate under semi-actuation. Pedestrian push buttons will be added for crossing Morgan Street at its two striped crosswalks. Existing striping for the lanes, crosswalks and stop bars is to be replaced. Resurfacing of deteriorated pavement would also be needed at the intersection to properly address pavement deterioration, riding surface quality, and enable resolution of existing, faded or missing markings. Furthermore, existing roadway surface ponding will be remedied by regrading pavement to provide positive flow to existing inlets with the proposed milling/overlay. “One-Way” (R6-1) and “Do Not Enter” (R5-1) signs will be installed on the north leg of 8th Street, along with the channelized right turn from Morgan Boulevard Eastbound, to confirm the one-way operations. As required for ADA compliance, three (3) curb ramps along with associated sidewalk reconstruction will be replaced in the northwest, northeast and southeast corners, with four (4) new curb ramps added within the northwest and southwest corners. Lighting improvements will be required to provide adequate illumination levels for pedestrians in crosswalks.

D. Traffic Analysis

Intersection capacity analyses of the Weekday AM, PM and Saturday Peak Hour base conditions were performed and documented using FHWA Highway Capacity Software (HCS7) and Synchro 10 software (Appendix F), and were based on existing intersection configurations and available traffic signal operational timing and phasing data.

Intersection capacity analyses of the Weekday AM, PM and Saturday Peak Hour were performed and documented for the Design Year 2044 No-Build and Build conditions using FHWA Highway Capacity Software (HCS7) and Synchro 10 software (Appendix I). Adjustments to existing traffic signal operational timing were performed under the Build condition analyses to meet current industry guidelines for clearance intervals at all 17 intersections, and to improve the split timing where necessary at select intersections to achieve acceptable intersection performance (Level of Service \geq C). Supplemental adjustments to existing traffic signal operational phasing were also performed under the Build condition analyses at select intersections, to address input received during the project’s Community Outreach, as more fully described with the Level of Service results presented in Appendix R.

E. Hydrology and Hydraulics

Alternatives 2 and 3 at each intersection would add no new inlets, pipes, or roadway widenings, and little if any added impervious cover for ADA improvements, evaluations of Hydrology and Hydraulics (H&H) are unnecessary.

Regarding NJDEP Stormwater Management (SWM) Rules applicability, if Alternative 2 at each intersection is built as an individual project, the increased impervious area is less than 0.25 acres and the area of disturbance is less than 1 acre, therefore the project does not meet the NJDEP definition of a “major development” and will be exempt from SWM Rule compliance. However, the City of Camden is considering “batching” the intersections together into three (3) separate construction contracts. Based on input received from the City of Camden, the groupings will comprise: 1) Locations 1-5; 2) Locations 6-10; and 3) Locations 11-17. Combining the intersections into three (3) separate projects will not cause exceedance of the NJDEP major development thresholds as summarized in Table 2 below:

Table 2 – NJDEP Stormwater Management Rules Applicability

Intersections	Disturbance Area	Impervious Area
1-5	0.068 Acres	0.001 Acres
6-10	0.091 Acres	0.025 Acres
7-11	0.100 Acres	0.010 Acre

F. Right of Way Impacts and Review

No Right-of-Way (ROW) takings or easements are currently anticipated based on the improvements proposed at each intersection under Alternative 2, but this would need to be re-assessed as design of traffic signal improvements and refined design grading for ADA ramps is developed in more detail during PE.

G. Utility Impacts

As previously detailed, proposed traffic signal replacements under Alternative 2 could selectively impact aerial utilities at six (6) intersections (see Appendix U). Based on these improvements, no significant impacts to underground utilities are currently anticipated at any of the 17 intersections. All utility impacts will need to be re-assessed as design of traffic signal improvements and refined design grading for ADA ramps is developed in more detail during PE.

H. ITS Facilities

There are no known existing ITS facilities at any of the 17 intersections.

I. Complete Streets Policy

A Complete Streets Checklist was prepared as part of the development of the proposed improvement concepts. This checklist, along with a copy of the City of Camden’s Complete Streets Policy, is provided herein (Appendix V).

J. Access Impacts and Review

Project improvements for the PPA will impact access at the Westfield Avenue and 34th Street intersection (Location 2). There is a small retail store shopping area (“Master Super Market” & “Charles Dry Cleaners”) with parking in front of the stores located on Westfield Avenue just west of 34th Street. Alternative 2 at this intersection calls for closing the driveway on 29th Street that is closest to the intersection. No other impacts to existing driveways or access are currently anticipated at any of the other 16 intersections.

K. Constructability and Staging Plans and Detour Plan

The Alternative 2 improvements present little or no impact to the travelling public. All construction activities will occur outside of the travel lanes, and any necessary lane closures will be of a short-term duration using NJDOT Standard Roadway Construction Traffic Control Details.

L. Controlling Substandard Design Elements and Reasonable Assurance

NJDOT, during its review of this CD Report, will determine if Reasonable Assurance for a Design Exception is required for the proposed improvements.

M. Construction Cost Estimate

The estimated construction cost for the Alternative 2 improvements at each intersection has been prepared, detailed in Appendix Q and summarized in Table 3.A. Due to the scope and total cost of these improvements, and based on initial consultation with the City of Camden, it is anticipated that the intersections are to be selectively grouped and packaged within one of a total of three (3) separate construction contracts, summarized as follows:

- Group/Phase 1: Intersections 1-5 (Construction Cost = \$2,168,012)
- Group/Phase 2: Intersections 6-10 (Construction Cost = \$2,506,091)
- Group/Phase 3: Intersection 11-17 (Construction Cost = \$3,273,091)

The estimated construction cost for Alternative #3 is also presented in Appendix Q.

Table 3.A – Construction Cost Estimate

Intersection		Construction Cost Estimate
1.	Westfield Avenue and 29 th Street	\$425,768
2.	Westfield Avenue and 34 th Street	\$451,829
3.	Federal Street and 35 th Street	\$467,284
4.	Federal Street and 36 th Street	\$453,450
5.	State Street and 10 th Street	\$369,681
6.	Atlantic Avenue and Broadway	\$496,998
7.	Broadway and Carl Miller Boulevard	\$466,979
8.	Broadway and Ferry Avenue	\$590,828
9.	Broadway and Viola Street	\$465,338
10.	Broadway and Jefferson Street	\$485,948
11.	Atlantic Avenue and 9 th Street	\$430,426
12.	Atlantic Avenue and 8 th Street	\$469,205
13.	Atlantic Avenue and Mount Ephraim Avenue	\$491,485
14.	Carl Miller Boulevard and 6 th Street	\$469,263
15.	Ferry Avenue and 6 th Street	\$456,208
16.	Morgan Street and 8 th Street	\$460,257
17.	Morgan Street and 9 th Street	\$496,247
TOTAL		\$7,947,194 (~\$7,947,000)

N. Value Engineering Study and Report

A project that meets FHWA value threshold criteria is required to have a Value Engineering (VE) Study performed during Concept Development . Projects on the National Highway System (NHS) that utilize Federal-aid highway funding require performance of a VE Study for projects with an estimated total cost equal to, or greater than \$50 Million. The estimated total cost for the City of Camden Traffic Signal Improvements project is below the programmatic threshold value. Therefore, performance of a VE Study is not applicable to this project.

O. Life Cycle Cost Analysis

A Life Cycle Cost Analysis is typically prepared as part of a Value Engineering (VE) Study. VE reviews are warranted for Federal-aid projects with a total cost equal to, or greater than \$50 Million or more for roadway projects. The estimated total cost for the City of Camden Traffic Signal Improvements project is below the programmatic threshold value. Therefore, performance of a Life Cycle Cost Analysis is not applicable to this project (Appendix **W**).

P. Alternatives Matrix

An Alternatives Matrix has been prepared and is included (Appendix **R**).

Q. Risk Analysis Summary

A Risk Register was prepared and documented as part of the CD activities, and is provided in Appendix **S**. Evaluated risks include environmental permitting, utility relocations, and Right-of-Way (ROW) acquisitions. Total estimated construction cost does not exceed \$100 million, so a Quantitative Risk Analysis is not required (Appendix **T**). Potential aerial utility relocations have been identified (Appendix **U**). Since there are no existing or proposed ITS Facilities within the project limits, a Systems Engineering Review Form (SERF) is not applicable (Appendix **X**).

R. Discussions with Subject Matter Experts

A project coordination meeting was held on October 27, 2020 with the DVRPC, City of Camden Engineer, Coopers Ferry Partnership, Camden County Engineer, NJDOT Local Aid and Economic Development (LAED) and NJDOT Subject Matter Experts. A copy of the meeting minutes and action item correspondence is provided in Appendix **P**.

The NJDOT LAED and the DVRPC have determined that a preparation of a Design Communication Report (DCR) is not required for the project (Appendix **N**).

A municipal Resolution of Support (RoS) from the City of Camden was adopted and approved on April 13, 2021, as provided in Appendix **O**.

S. Preliminary Preferred Alternative (PPA)

The Preliminary Preferred Alternative (PPA) at each of the 17 intersections is Alternative 2 - Traffic Signal Replacement (Appendix **L**), which meets the project's Purpose and Need through improvements to traffic signal infrastructure, intersection traffic operation controls, and enhancements to transportation safety.

T. Preliminary Engineering Scope Statement

The Preliminary Engineering (PE) Scope Statement is included in Appendix **Z**.

The project anticipates completion of Local Concept Development by June 2021. The project's Preliminary Engineering and Final Design phases, inclusive of utility engineering and right-of-way engineering activities, and the subsequent Construction phase, are scheduled to occur according to the following timeline listed in Table 3.B, in accordance with the DVRPC's programmed TIP funding:

Table 3.B – Project Phase Timeline

Project Group	Project Phase	Fiscal Year Funding
1	Preliminary Engineering	2022
	Design	2023
	Construction	2025
2	Preliminary Engineering	2023
	Design	2024
	Construction	2026
3	Preliminary Engineering	2024
	Design	2025
	Construction	2027

VII. CONCEPT DEVELOPMENT RECOMMENDATION

A. Federal Highway Administration (FHWA) Approval of Report

The project’s Concept Development (CD) Phase has not been classified as a Project of Divisional Interest (PoDI), so the CD Report does not require FHWA review and approval.

B. Capital Program Screening Committee (CPSC) Recommendation

The NJDOT Capital Program Screening Committee Recommendation will be provided by the NJDOT if determined to be required following the review and approval by the Interagency Review Committee.

C. Capital Program Committee (CPC) Approval

The NJDOT Capital Program Committee Approval will be obtained by NJDOT LAED if determined to be applicable to this project.