

Pavement and Rehabilitation, North II Rogers Road PCC Reconstruction, 2023

Transportation Management Plan

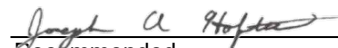
Delaware Department of Transportation
Agreement 1949 Task 4, Contract No. T202306102

Pavement and Rehabilitation,
North II Rogers Road PCC Reconstruction, 2023
New Castle County, Delaware

Prepared for:



Delaware Department of Transportation


Recommended

6/20/23
Date


Approved – Safety Programs Manager

06/20/2023
Date

Final Plan Submission
June 2023

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1. Project Description

Project Background

The Delaware Department of Transportation (DelDOT) has contracted with AECOM to provide transportation engineering and design services for the pavement rehabilitation along Rogers Road and portions of Business Route 13 (BUS 13) and the I-495 southbound on-ramp from BUS 13 in the City of Wilmington, New Castle County, DE. The project limits along Rogers Road are between just north of Medori Boulevard and the unsignalized junction with BUS 13, inclusive of the intersection. Along US 13 (South Heald Street), the construction extends between the intersection with BUS 13 and approximately 50 feet north of the signalized intersection with Rogers Road. In addition to this, the construction will include BUS 13 between just north of its intersection with US 13 (South Heald Street) and approximately 150 feet north of its intersection with Millside Drive. The I-495 southbound on-ramp will also be rehabilitated. The design proposes to replace the existing concrete pavement with new concrete pavement using precast panels.

Within the project limits, there are two signalized intersections. One is at Rogers Road and US 13 (South Heald Street) and the other is at BUS 13 and Millside Drive. The intersection of Rogers Road and BUS 13 is currently unsignalized. The purpose of this Transportation Management Plan (TMP) is to provide a plan for the mobility and safety needs of road users, construction workers, and stakeholders in the areas impacted by DelDOT construction activities. There are six phases of construction, one of which has four subphases, with six planned closures requiring detours.

AECOM has prepared this TMP for DelDOT in accordance with DelDOT's *Work Zone Safety and Mobility Procedures and Guidelines*, dated September 2007. Based on Chapter II of these guidelines, this TMP was prepared as a Type B document, with analysis of work zone impacts in order to determine appropriate working and lane closure hours for Rogers Road and BUS 13 during construction. Work zone traffic impacts on other nearby roadways used as diversion routes by traffic on this project have also been assessed. This TMP lays out a set of strategies and describes how these strategies will be implemented to manage the work zone impacts of the project. The TMP also includes a temporary Traffic Control Plan (TCP), as well as Transportation Operations (TO) and Public Information (PI) plan to address the work zone impacts of the project.

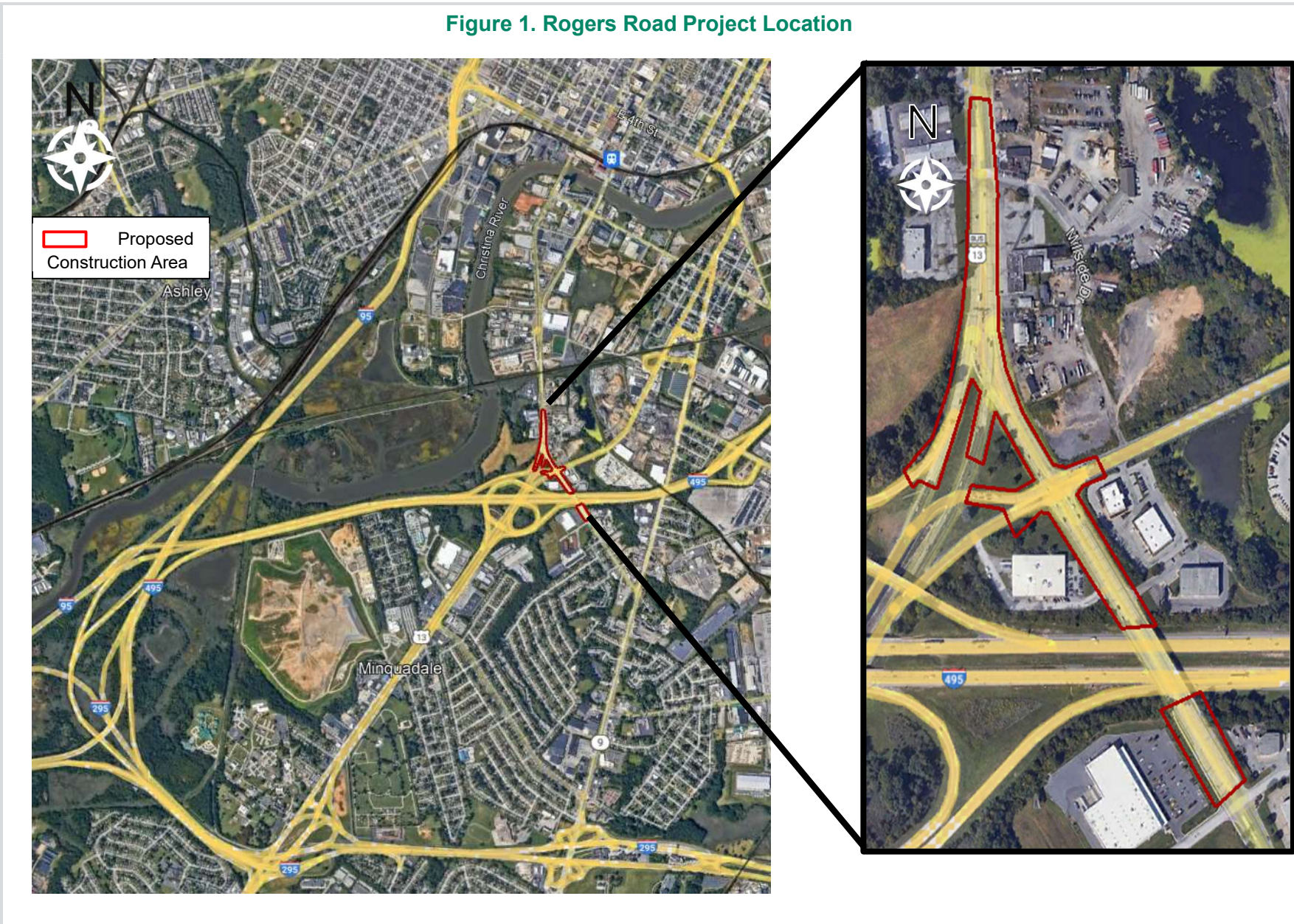
TMP Updates

This TMP document will be updated throughout the project. DelDOT will maintain the master copy of the TMP upon final design submission. Any updates made to the TMP past final submission will require new pages to be provided to the DelDOT TMP coordinator for insertion into the master TMP. Each new page will contain the current date at the bottom of the page and a memorandum describing the changes that will be implemented as a result of the update. The memorandum shall become part of the TMP and will be contained in **Appendix A**.

Project Location Map

Figure 1 shows the project construction area and the nearby roadways used for the detours.

Figure 1. Rogers Road Project Location



Project Schedule and Timeline

Construction is anticipated to begin in 2023 and last approximately one year.

Related Projects

The following projects are identified to be in the vicinity of the project area and along the proposed detour routes. Since some of these projects pose possible conflicts, mitigation measures are proposed as needed.

- **Rehabilitation of I-95 from I-495 to North of the Brandywine River Bridge** – Involves bridge rehabilitation including deck repairs/replacement, spall repairs, sealing of the substructure and superstructure, barrier replacement and painting on the steel girders. All lanes and ramps on impacted roadways are open to traffic at this time and are anticipated to remain open during the detours and construction of Rogers Road.
- **City of Wilmington Sewer Separation Project** – Includes sewer improvements along A Street, B Street, C Street and South Heald Street. A Street is expected to be worked on from August 2022 until July 2023, with B Street being worked on from August 2023 until July 2024 that will also impact South Heald Street between A Street and C Street. The work on C Street will impact South Heald Street between C Street and D Street from August 2024 until July 2025. As the construction schedule overlaps with this project and impacts roadways along the planned detour routes, coordination will be pursued to determine any detours that may be in place for this sewer separation work that may conflict with the detours proposed for the Rogers Road Pavement Rehabilitation and necessitate construction schedule adjustments.
- **Southbridge Streetscape Improvements Phase II** – Involves pedestrian upgrades extending south of A Street along South Heald Street and New Castle Avenue and along the eastern side of New Castle Avenue, between A Street and B Street. The proposed construction start date for this project is Fall/Winter 2023 and construction end date is Fall 2024. As the construction schedule overlaps with this project and impacts roadways along the planned detour routes, coordination will be pursued to determine any detours that may be in place for this work that may conflict with the detours proposed for the Rogers Road Pavement Rehabilitation and necessitate construction schedule adjustments.
- **Shared Use Path, South Church Street to South Walnut Street** – Involves construction of a shared use path between South Church Street and South Walnut Street south of the City of Wilmington's new Wetland Park. The proposed construction start and end date for the project is 2025. Since the Rogers Road project would be complete prior to the start of the project no mitigation measures are required.
- **Replacement of BR1-684 on South Heald Street** – Involves replacing the existing bridge along South Heald Street. The proposed construction start date for this project is 2024 and construction end date is 2026. Since the Rogers Road project would be complete prior to the start of the project no mitigation measures are required.
- **Replacement of BR1-686 on South Walnut Street** – Involves replacing the deck joints and bearing, repairing portions of the deck, sidewalk, bridge rail, columns and placing a concrete overlay. The proposed construction is planned to start after construction is completed for the Replacement of BR1-684 on South Heald Street project. Therefore, the Rogers Road project would be completed prior to the start of this project and no mitigation measures are required.
- **Southbridge Streetscape Improvements Phase III** – Involves improved overhead pedestrian-style lighting; crossings, sidewalk, and bumpouts around Hicks Park; new signal and crossings at C Street and New Castle Avenue; and bicycle striping designation on S. Claymont Street. The proposed construction start date for this project is Fall 2026. Since the

Rogers Road project would be complete prior to the start of this project, no mitigation measures are required.

2. Existing and Future Conditions

Existing Roadway Characteristics

Due to the travel impacts from the COVID-19 pandemic, existing Annual Average Daily Traffic (AADT) volumes in this section are reported from DelDOT's 2019 Vehicular Volume Summary provided in [DelDOT's GIS tool](#).

Rogers Road - within the project area:

DelDOT classifies Rogers Road as a major collector. The 2019 AADT in both directions is 9,309 vehicles per day (vpd). The roadway has a speed limit of 35 miles per hour (mph) in both directions between BUS 13 and New Castle Avenue.

US 13 (South Heald Street) – within the project area:

DelDOT classifies US 13 (South Heald Street) as a minor arterial. The 2019 AADT between BUS 13 and Garasches Lane in both directions is 5,076 vpd. The roadway has a speed limit of 35 mph along that section.

Interstate 495 (I-495) – Detour Route

DelDOT classifies I-495 as an interstate. The 2019 AADT between US 13 and US 9 in both directions is 103,938 vpd. The roadway has a speed limit is 65 mph in both directions.

SR 9A (Terminal Avenue) – Detour Route

DelDOT classifies SR 9A (Terminal Avenue) as a major collector. The 2019 AADT between New Castle Avenue and Christina Avenue in both directions is 5,657 vpd. The roadway has a speed limit of 25 mph in both directions along this section of the roadway.

SR 9 (New Castle Avenue) – Detour Route

DelDOT classifies SR 9 (New Castle Avenue) as a minor arterial. The 2019 AADT between Rogers Road and SR 9A (Terminal Avenue) in both directions is 14,604 vpd, and between SR 9A (Terminal Avenue) and US 13 (South Heald Street) in both directions is 10,575 vpd. The speed limit between Rogers Road and SR 9A (Terminal Avenue) is 40 mph, which reduces to 25 mph between SR 9A (Terminal Avenue) and US 13 (South Heald Street).

A Street – Detour Route

DelDOT classifies A Street as a local road. There is no AADT data available along A Street. The speed limit between Christina Avenue and a portion west of US 13 (South Heald Street) as well as between BUS 13 (South Walnut Street) and BUS 13 (South Market Street) is 25 mph. There is a short section between US 13 (South Heald Street) and BUS 13 (South Walnut Street) posted for 35 mph.

Business Route 13 (BUS 13) – Detour Route

DelDOT classifies BUS 13 as an urban principal arterial. The 2019 AADT between New Sweden Street and A Street in both directions is 29,392 vpd, and between New Sweden Street and Rogers Road is 27,974 vpd. The speed limit between New Sweden Street and Rogers Road ramps is 35

mph. A reduction in speed limit to 25 mph is observed between the intersections of BUS 13 with New Sweden Street and A Street. South of BUS 13 and US 13 (South Heald Street) the speed limit increases to 45 mph.

Interstate 95 (I-95) – Detour Route

DelDOT classifies I-95 as an interstate. The 2019 AADT between I-495 and the exit to/ from MLK Jr. Boulevard in both directions is 110,172 vpd. The roadway has a speed limit of 55 mph in both directions.

Interstate 295 (I-295) – Detour Route

DelDOT classifies I-295 as an interstate. The 2019 AADT between US 13 and I-95 in both directions is 91,326 vpd. The roadway has a speed limit of 50 mph in both directions.

Martin Luther King Jr. (MLK Jr.) Boulevard – Detour Route

DelDOT classifies MLK Jr. Boulevard as a principal arterial. The 2019 AADT between I-95 and BUS 13 in the westbound direction is 13,136 vpd. The roadway has a speed limit of 25 mph.

Existing Traffic Data

In addition to this existing AADT information, Automatic Traffic Recorder (ATR) data was collected bidirectionally along Rogers Road, BUS 13, US 13, and A Street for seven days in May 2022. This ATR data was used to determine the times during which road closures can occur. Additionally, four-hour Turning Movement Counts (TMC) were collected during an AM period from 7 AM to 9 AM and a PM period from 4 PM to 6 PM on May 17, 2022. The intersections at which data was collected are:

- Rogers Road and New Castle Avenue
- Rogers Road and US 13 (South Heald Street)
- New Castle Avenue and Terminal Avenue
- New Castle Avenue and New York Avenue
- New Castle Avenue and Townsend Street
- New Castle Avenue and C Street
- New Castle Avenue and B Street
- New Castle Avenue and A Street
- US 13 (South Heald Street) and A Street
- US 13 (South Heald Street) and B Street
- US 13 (South Heald Street) and C Street
- US 13 (South Heald Street) and D Street
- US 13 (South Heald Street) and Garasches Lane
- Garasches Lane and New Sweden Street
- BUS 13 and New Sweden Street
- BUS 13 (South Market Street) and A Street
- BUS 13 (South Walnut Street) and A Street

As noted in the Semi-Final TMP, additional ATR data and TMC data was collected in December 2022. The collected ATR data was used to determine the ramp volumes and in turn used for the detour analysis along I-495 ramps to US 13, I-95 ramp from MLK Jr. Blvd, I-95 ramp to I-295 EB and I-295 EB ramp to US 13 NB. Additionally, four-hour weekday TMC's were collected during an AM period from 7 AM to 9 AM and a PM period from 4 PM to 6 PM on December 8, 2022. The intersections at which data was collected are:

- US 13 (N Dupont Hwy) and I-495 Ramps
- Terminal Avenue and I-495 southbound Ramps
- Terminal Avenue and I-495 northbound Ramps
- South Heald Street and South Walnut Street

In addition to the weekday data, three-hour weekend TMC data was collected from 1:30 PM to 4:30 PM on December 10, 2022. The intersections at which data was collected are:

- MLK Jr Boulevard and North Market Street
- MLK Jr Boulevard and North Orange Street
- MLK Jr Boulevard and Tatnall Street
- MLK Jr Boulevard and West Street
- MLK Jr Boulevard and North King Street
- North Walnut Street and East 2nd Street
- North Walnut Street and E Front Street
- East 2nd Street and French Street
- MLK Jr Boulevard and Washington Street
- US 13 (N Dupont Hwy) and Memorial Drive
- US 13 (N Dupont Hwy) and Hazeldell Avenue
- US 13 (N Dupont Hwy) and Wildel Avenue
- US 13 (N Dupont Hwy) and Hessler Boulevard
- US 13 (N Dupont Hwy) and I-495 Ramps
- Terminal Avenue and I-495 southbound Ramps
- Terminal Avenue and I-495 northbound Ramps
- South Heald Street and South Walnut Street

Complete turning movement count data can be found in **Appendix D**.

3. Work Zone Impacts Assessment Report

General

The purpose of a Work Zone Impacts Assessment is to develop and evaluate the best combination of construction staging and temporary traffic control strategies to reduce work zone impacts. Typically, a Work Zone Assessment evaluates a detour option and one or more staged construction options with various lane shifts, off-alignment options, and full-roadway closures before determining the most feasible Maintenance of Traffic (MOT) alternative to implement. Temporary traffic control alternatives along Rogers Road were evaluated as part of the overall pavement replacement. The project team evaluated replacement of all pavement at the same time versus construction in various stages. It was determined that the replacement of all pavement at the same time would require extensive long term closure of Rogers Road and some portions of BUS 13. For this reason, construction in multiple phases with detours is proposed.

A temporary traffic control plan (TCP) based on the preferred MOT has been developed in accordance with the *Delaware Manual on Uniform Traffic Control Devices (DE MUTCD)* to maintain traffic during construction. The TCPs are found in **Appendix B** and detour plans are provided in **Appendix C**. Further discussion about the closures requiring detours is provided later in this TMP. The plans propose six construction phases, one with four sub-phases, and are described further in this section.

Phase 1 (60 days) – Close Rogers Rd between US 13 and BUS 13 with off-peak single lane closures on BUS 13 between Rogers Rd and Millside Dr

- Place all permanent warning signs as shown on the permanent warning sign location plan sheet and temporary warning signs as shown on the Phase 1 MOT sheets.
- Shift traffic to Phase 1 configuration:
 - a) Close Rogers Rd ramp to S Walnut St for duration of phase. See Phase 1 Rogers Rd to Walnut St ramps closure detour plan.
 - b) Close S Walnut St left turn lane using TA-21A of the Delaware MUTCD for duration of phase. See Phase 1 Rogers Rd to Walnut St ramps closure detour plan.
 - c) Close single lane on S Market St / S Walnut St using TA-33 of the Delaware MUTCD during allowable lane closure hours.
 - d) Close right lane on Rogers Rd using TA-23 of the Delaware MUTCD for duration of phase.
- Contractor shall reset drums to allow two through lanes on S Market St and S Walnut St for the peak hours given in the plans.
- Install erosion and sediment control.
- Remove existing concrete pavement, curb and concrete median.
- Construct drainage system.
- Construct concrete roadway, curb and median.
- Install temporary topsoil, seed and mulch in open median section.
- Stabilize all disturbed areas with topsoil, seed and mulch prior to removal of sediment control devices and switch to Phase 2 traffic control.

Phase 2 (30 days) – Close the intersection of Rogers Rd at US 13 with Rogers Rd closed between US 13 and BUS 13 and US 13 closed between BUS 13 and 100 ft north of Rogers Rd

- Place all permanent warning signs as shown on the permanent warning sign location plan sheet and temporary warning signs as shown on the Phase 2 MOT sheets.
- Shift traffic to Phase 2 configuration:
 - a) Close US 13 S Heald St for duration of phase. See Phase 2 Rogers Rd & S Heald St closure detour plan.
- Install erosion and sediment control.
- Remove existing concrete pavement, curb and concrete median.
- Install pavement sections and lane striping. Construct concrete roadway, curb and median.
- Stabilize all disturbed areas with topsoil, seed, and mulch prior to removal of sediment control devices and switch to Phase 3 traffic control.

Phase 3A (14 days) – Close Rogers Rd westbound between US 13 and Medori Blvd

- Place all permanent warning signs per the Phase 3A MOT and detour plans and shift traffic to Phase 3A configuration:
 - a) Close westbound Rogers Rd using TA-21 of the Delaware MUTCD for duration of phase. See Phase 3A Rogers Rd & S Heald St closure detour plan.
- Install erosion and sediment control.
- Remove existing concrete pavement.
- Install pavement sections and lane striping. Construct concrete roadway.
- Stabilize all disturbed areas with topsoil, seed, and mulch prior to removal of sediment control devices and switch to Phase 3B traffic control.

Phase 3B (14 days) – Close Rogers Rd eastbound between US 13 and Medori Blvd

- Place all permanent warning signs per Phase 3B MOT and detour plans and shift traffic to Phase 3B configuration:
 - a) Close eastbound Rogers Rd for duration of phase. See Phase 3B Rogers Rd & S Heald St closure detour plan.
- Install erosion and sediment control.
- Remove existing concrete pavement.
- Install pavement sections and lane striping. Construct concrete roadway.
- Stabilize all disturbed areas with topsoil, seed, and mulch prior to removal of sediment control devices and switch to Phase 3C traffic control.

Phase 3C (21 days) – Close outside lane and shoulders in both directions along Rogers Rd between US 13 and Medori Blvd

- Place all temporary warning signs per TA-21 of the Delaware MUTCD and shift traffic to Phase 3C configuration:
 - a) Close exterior lanes and shoulders on Rogers Rd to conform to TA-21 of the Delaware MUTCD during allowable lane closure hours.
- Remove existing striping as necessary and place temporary pavement striping via mobile operations per TA-35B of the Delaware MUTCD.
- Install erosion and sediment control.
- Remove existing concrete pavement and curb.
- Construct concrete shoulder and curb along Rogers Rd. Construct sidewalk patch.
- Stabilize all disturbed areas with topsoil, seed, and mulch prior to removal of sediment control devices and switch to Phase 3D traffic control.

Phase 3D (7 days) – Close median and single inside lane in both directions on Rogers Rd between US 13 and Medori Blvd

- Place all temporary warning signs per TA-33 of the Delaware MUTCD and shift traffic to Phase 3D configuration:
 - a) Close interior lanes of Rogers Rd during allowable lane closure hours and conforming to TA-30 of the Delaware MUTCD.
- Remove existing striping as necessary and place temporary pavement striping via mobile operations per TA-35B of the Delaware MUTCD.
- Install erosion and sediment control.
- Remove existing curb and concrete median.
- Construct SWM facilities, including pipes and structures.
- Construct curb and grass median along Rogers Rd.
- Install hot-mix patching around newly constructed median curb.
- Stabilize all disturbed areas with topsoil, seed, and mulch prior to removal of sediment control devices and switch to Phase 4 traffic control.

Phase 4 (21 days) – Close BUS 13 northbound between US 13 and Millside Drive

- Place all temporary warning signs as shown on the Phase 4 MOT sheets.
- Shift traffic to Phase 4 configuration:
 - a) Close S Walnut St within limits for duration of phase. See Phase 4 Walnut St closure detour plan.
- Install erosion and sediment control.
- Remove existing roadway and curb.
- Construct SWM facilities, including pipes and structures.
- Construct concrete roadway along S Walnut Street.
- Stabilize all disturbed areas with topsoil, seed, and mulch prior to removal of sediment control devices and switch to Phase 5 traffic control.

Phase 5 (45 days) – Close BUS 13 southbound between Millside Dr and I-495 southbound on-ramp as well as I-495 southbound on-ramp

- Place all temporary warning signs as shown on the Phase 5 MOT sheets. Place all detour signs as shown on the detour plan for Phase 5.
- Shift traffic to Phase 5 configuration:
 - a) Close S Market St for duration of phase. See Phase 5 S Market St and I-495 detour plan.
 - b) Close I-495 S ramp for duration of phase. See Phase 5 S Market St and I-495 detour plan.
 - c) Close S Walnut St left turn lane to conform to TA-21A of the Delaware MUTCD for duration of phase.
- Install erosion and sediment control.
- Construct concrete roadway along S Market Street.
- Stabilize all disturbed areas with topsoil, seed, and mulch prior to removal of sediment control devices and remove all warning signs.

Phase 6 (21 days) – all roadways entire length of project area

- Use TA-21, TA-23, and TA-33 to profile mill and overlay entire length of project area, including Rogers Rd, S Heald St, S Walnut St and S Market St.
- Use TA-35B to place permanent striping through the length of the project area.

Operational Analysis of Proposed Construction Phases

Construction for this project is currently proposed to be completed in six phases, with one phase broken into four subphases. There will be six detour scenarios required to complete the construction required. Further information regarding allowable lane closure times for Rogers Road and BUS 13 can be found in subsequent sections of this report.

Detours

Phase 1 Detour – Rogers Road Closure between US 13 and BUS 13

During the roadway closure of Rogers Road between US 13 (South Heald Street) and BUS 13 for Phase 1, detours will be provided for the southbound BUS 13 traffic destined to eastbound Rogers Road and westbound Rogers Road traffic destined to northbound BUS 13 as well as the eastbound driveway traffic across from Millside Drive destined to northbound BUS 13 and northbound BUS 13 traffic to the driveway.

Southbound BUS 13 to eastbound Rogers Rd

The southbound BUS 13 traffic will be directed to use I-495 to Terminal Avenue to New Castle Avenue to Rogers Road. This route is shown in **Figure 2**.

Westbound Rogers Road to northbound BUS 13

The westbound Rogers Road traffic to northbound BUS 13 was originally being directed to use US 13 (South Heald Street) to A Street to BUS 13 as shown in **Figure 2**. Analysis results explained in detail in the subsequent sections of this TMP showed that the westbound traffic detour as shown resulted in the intersection of New Castle Avenue and A Street exhibiting operational failure at multiple intersections in the detour. Therefore, an alternative to the westbound traffic is proposed and was evaluated for this submission. The proposed alternative, as shown in **Figure 3**, directs traffic to use New Castle Avenue to Terminal Avenue to I-495 southbound to BUS 13.

Eastbound Site Driveway to northbound BUS 13

The eastbound Site Driveway traffic at the BUS 13 and Millside Drive / Site Driveway intersection will be restricted to right turns only out of the driveway. This traffic will be directed to use BUS 13 southbound and make a u-turn at the I-495 ramp signalized intersection. At that point the traffic can then access BUS 13 northbound.

Northbound BUS 13 to Site Driveway

The northbound BUS 13 traffic to the Site Driveway will be directed to continue northbound on BUS 13. The traffic will then be routed left onto A Street to then head southbound on BUS 13 and make a right into the Site Driveway.

Figure 2. Phase 1 – Rogers Rd between US 13 & BUS 13 Closure - Option 1

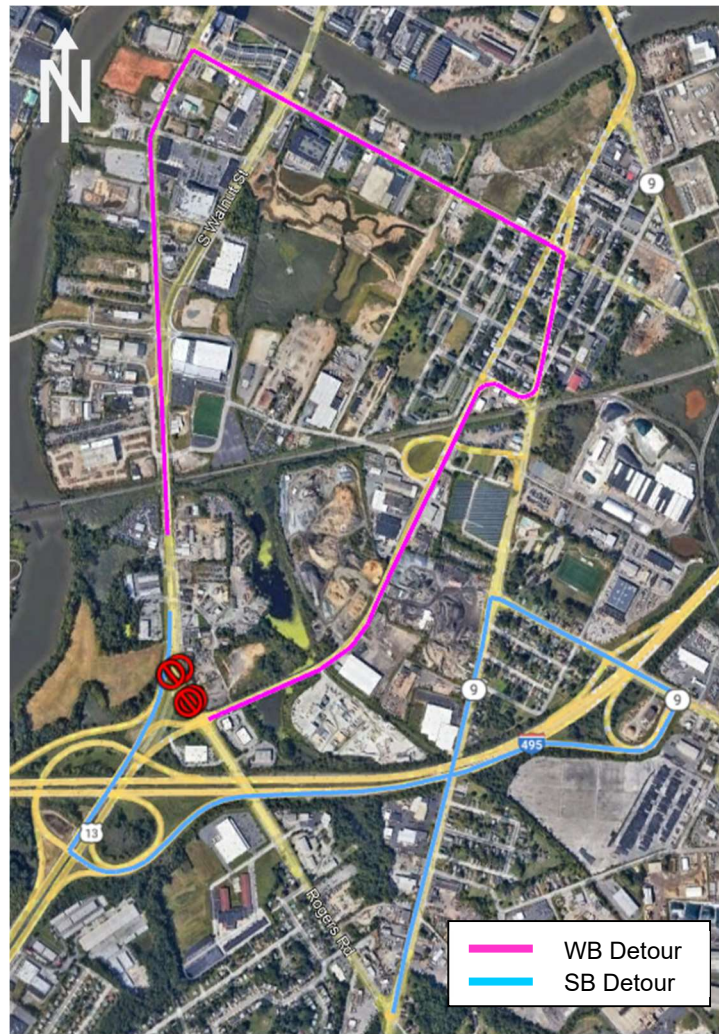
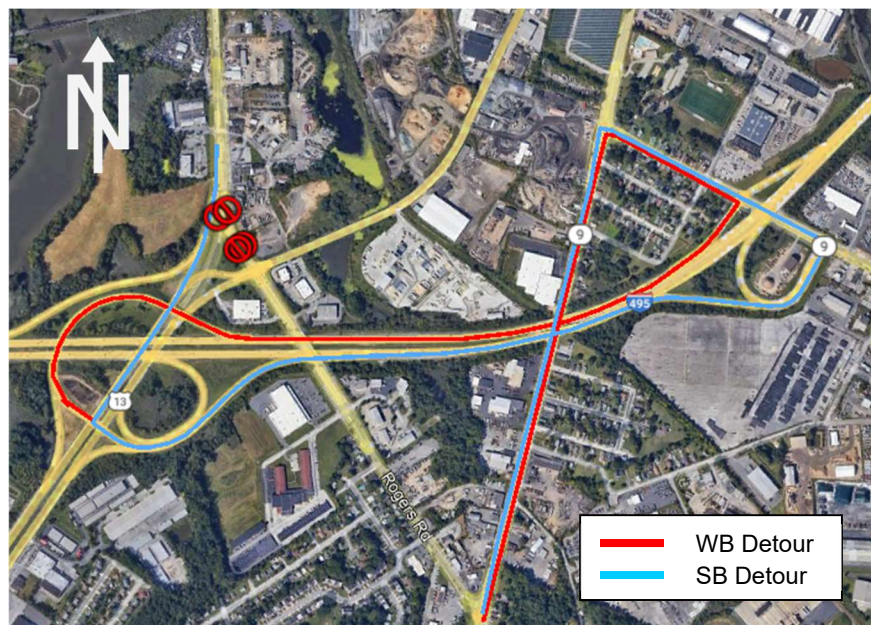


Figure 3. Phase 1 – Rogers Rd between US 13 & BUS 13 Closure - Option 2



Phase 2 Detour – US 13 Closure between BUS 13 and north of Rogers Road

During the portions of US 13 (South Heald Street) closed between BUS 13 and a few hundred feet north of Rogers Road for Phase 2, detours will be provided for the southbound US 13 (South Heald Street) traffic destined to southbound BUS 13 and northbound BUS 13 traffic destined to northbound US 13 (South Heald Street). Additionally, the section of Rogers Road between US 13 (South Heald Street) and BUS 13 will be closed so detours as shown in Phase 1 will be concurrent in this phase to direct southbound BUS 13 traffic to Rogers Road eastbound as well as Rogers Road westbound traffic to BUS 13 northbound. It is currently anticipated that these detours will be limited to implementation for approximately four weekends.

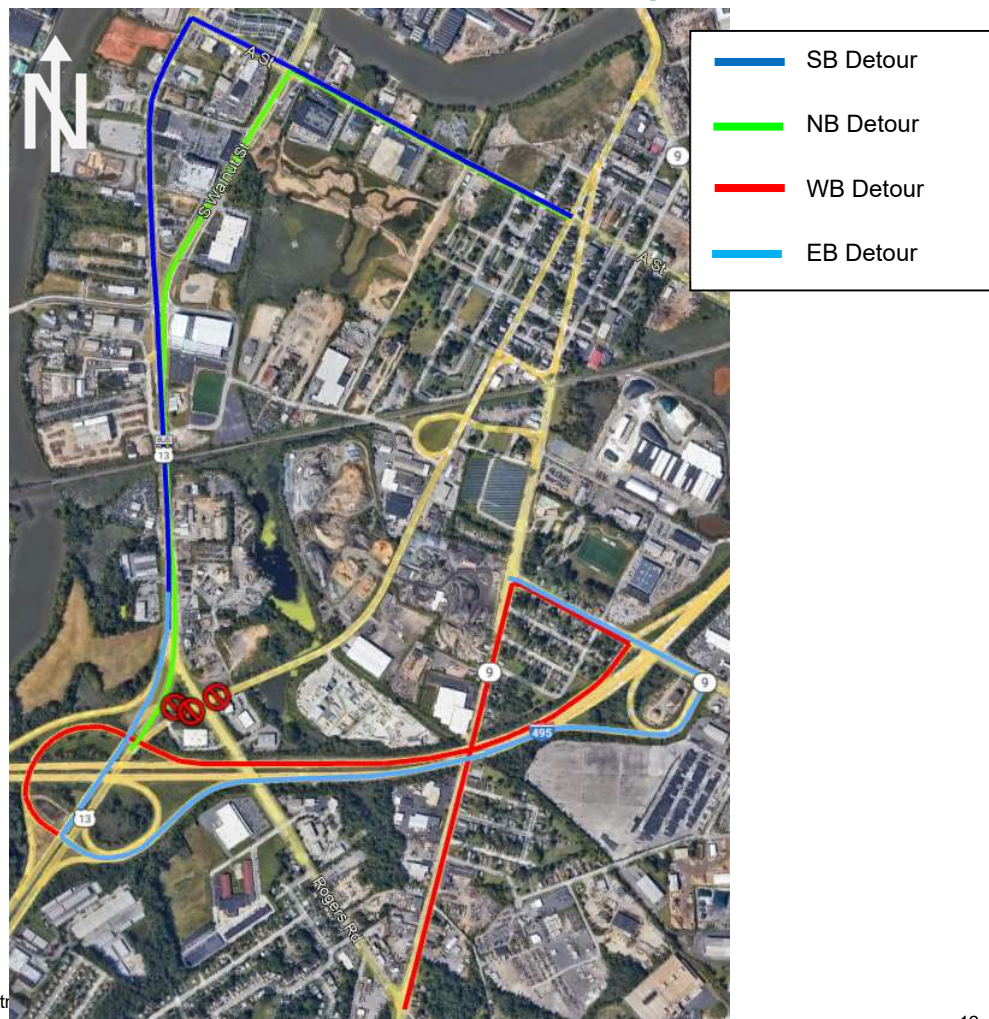
Southbound US 13 (South Heald Street) to southbound BUS 13

The southbound US 13 (South Heald Street) traffic will be directed to make a right from US 13 (South Heald Street) to A Street and access BUS 13 via A Street by making a left. This route is shown in **Figure 4**.

Northbound BUS 13 to northbound US 13 (South Heald Street)

The northbound BUS 13 traffic to northbound US 13 (South Heald Street) will be directed to continue along northbound BUS 13 and then make a right at A Street to then access US 13 (South Heald Street) via a right turn from A Street. This route is shown in **Figure 4**.

Figure 4. Phase 2 - US 13 between BUS 13 and north of Rogers Road Closure



Phase 3A Detour – Westbound Rogers Road between US 13 and Medori Boulevard

During the westbound Rogers Road closure between US 13 (South Heald Street) and Medori Boulevard during Phase 3A, a detour will be provided for the westbound Rogers Road traffic. The westbound Rogers Road traffic will be directed to continue northbound on New Castle Avenue and make a right turn at Terminal Avenue and continue to I-495 southbound, following the roadway to the exit to BUS 13. At the intersection of the I-495 southbound ramp with BUS 13, traffic can proceed northbound or southbound based on its desired destination. This route is shown in **Figure 5**.

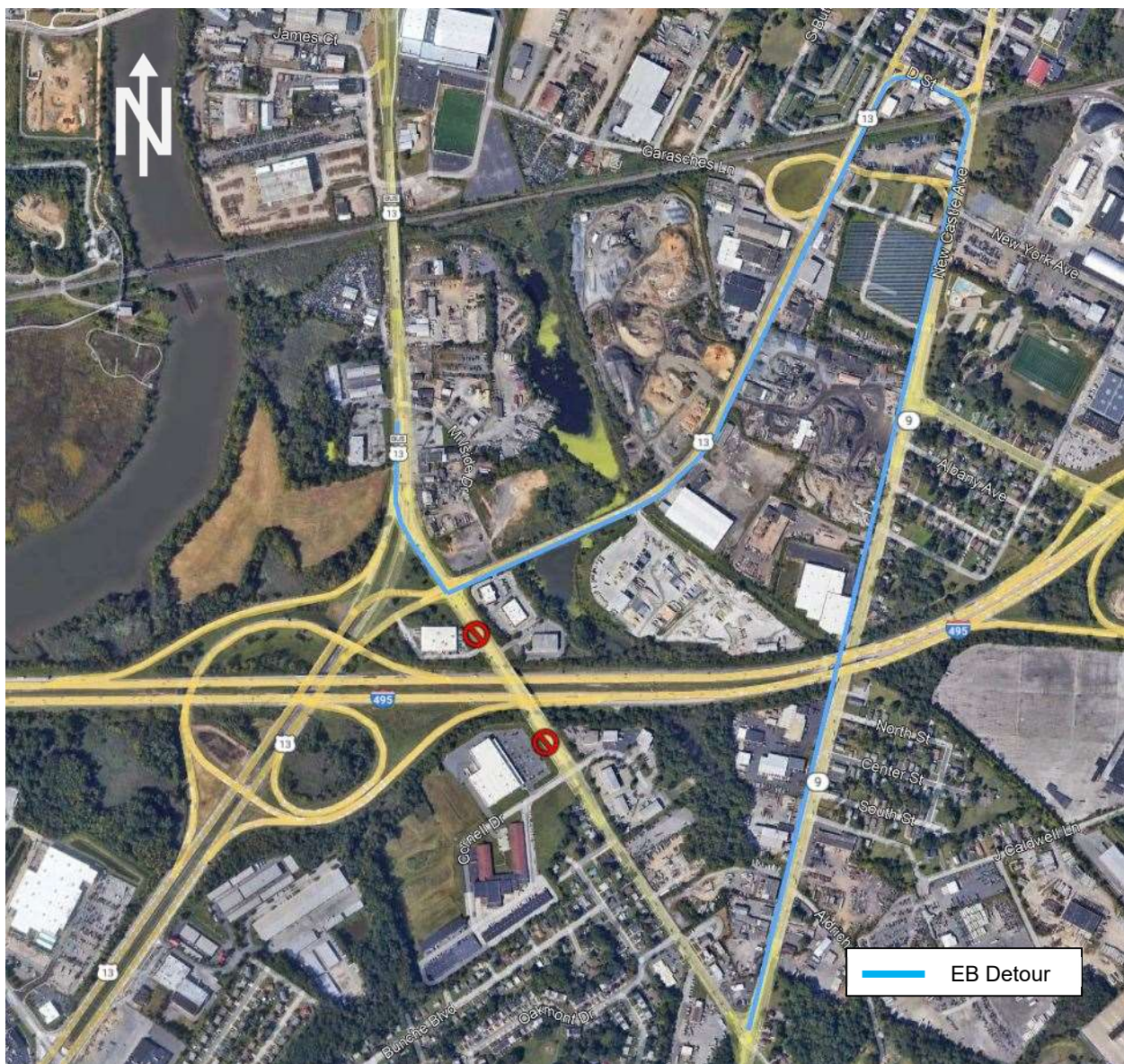
Figure 5. Phase 3A – Westbound Rogers Road between US 13 and Medori Boulevard Closure



Phase 3B Detour – Eastbound Rogers Road between US 13 and Medori Boulevard

During the eastbound Rogers Road closure between US 13 (South Heald Street) and Medori Boulevard during Phase 3B, a detour will be provided for the eastbound Rogers Road traffic. The eastbound Rogers Road traffic will be directed to make a left turn at US 13 (South Heald Street) and continue north, following the roadway along D Street. At D Street, traffic can proceed northbound on New Castle Avenue, if desired, or make the right to head southbound along New Castle Avenue and then proceed where desired once connecting back with Rogers Road. This route is shown in **Figure 6**.

Figure 6. Phase 3B – Eastbound Rogers Road between US 13 and Medori Boulevard Closure



Phase 4 Detour – Northbound BUS 13 between Rogers Road and Millside Drive

During the northbound BUS 13 closure between Rogers Road and Millside Drive, a detour will be provided for the northbound BUS 13 traffic. The northbound BUS 13 traffic will be directed north on US 13 (South Heald Street), make a right onto Rogers Road to access New Castle Avenue via a left turn and continue north on New Castle Avenue or make a left onto A Street and reach their respective destinations on N Walnut Street. This route is shown in **Figure 7**. During weekends only, the southbound BUS 13 left to Rogers Road will be closed to complete work through the intersection. Additionally, the eastbound driveway traffic across from Millside Drive destined to northbound BUS 13 will need to be diverted during overnight construction only. The eastbound Site Driveway traffic at the BUS 13 and Millside Drive / Site Driveway intersection will be restricted to right turns only out of the driveway at that time. This traffic will be directed to use BUS 13 southbound and make a u-turn at the I-495 ramp signalized intersection. At that point the traffic can then join the BUS 13 northbound detour as described above.

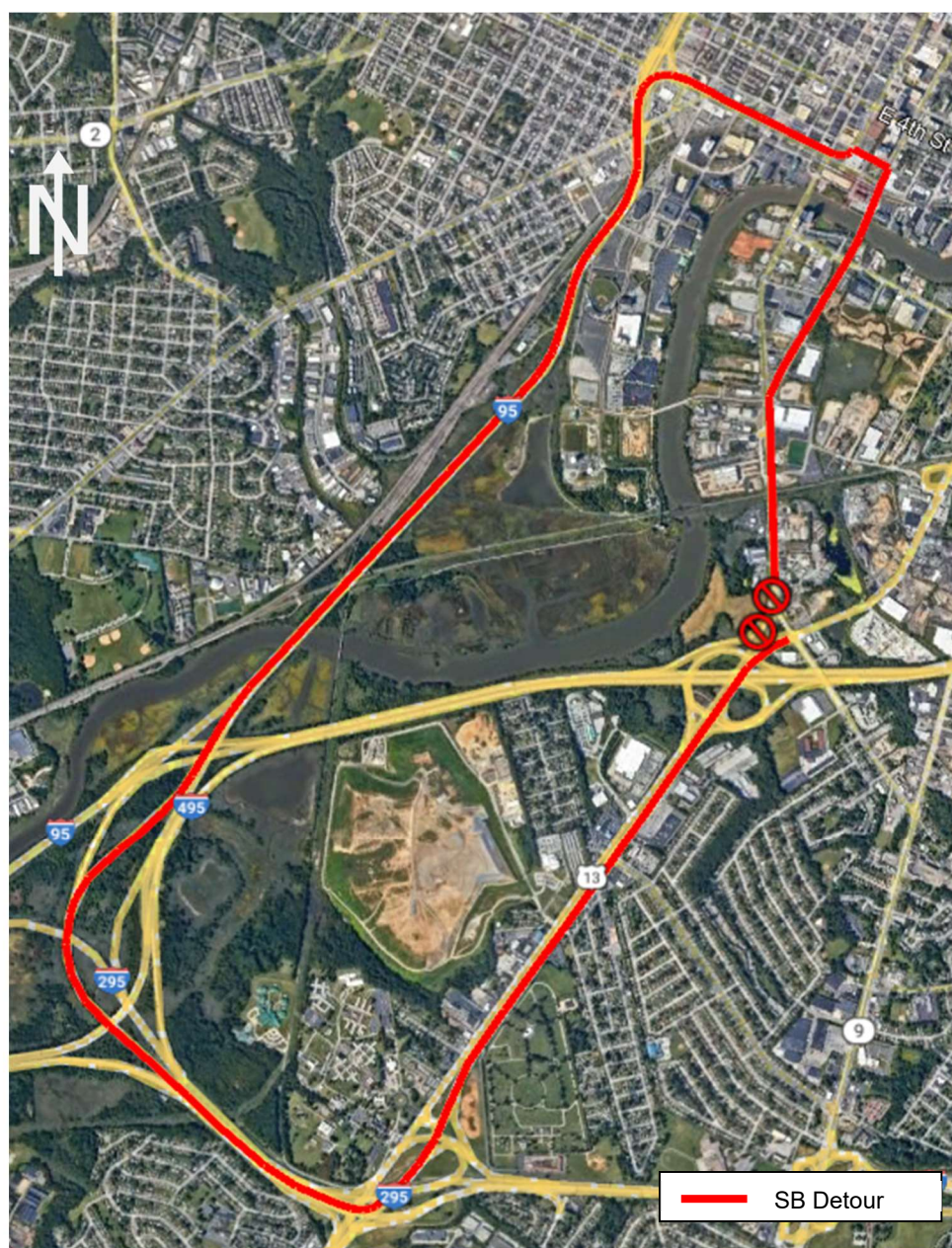
Figure 7. Phase 4 – Northbound BUS 13 between Rogers Road and Millside Drive Closure



Phase 5 Detour – Southbound I-495 on-ramp and BUS 13 between US 13 and Millside Drive

During the southbound I-495 on-ramp and southbound BUS 13 closure between US 13 (South Heald Street) and Millside Drive during Phase 5, a detour will be provided for the southbound traffic. The southbound traffic will be directed to make a right turn at MLK Jr. Boulevard and continue west to access I-95 via the on-ramp. Traffic will continue southbound on I-95. At the diverge, traffic can continue to I-95 southbound or route to I-295 eastbound and used the US 13 (N Dupont Highway) interchange to head northbound or southbound based on their desired destination. This route is shown in **Figure 8**. It is currently anticipated that this detour will be limited to implementation for approximately six weekends.

Figure 8. Phase 5 - Southbound BUS 13 and I-495 On-Ramp Closure



Work Zone Capacity Analysis

For the purposes of this submission, the hourly lane capacity was examined along I-95 southbound and I-495 northbound and southbound between the US 13 (N Dupont Highway) and Terminal Avenue interchanges along the detour routes. As previously mentioned, due to the impacts of COVID-19, the hourly volumes were estimated using 2019 AADT values obtained from [DeIDOT's GIS Tool](#) and the directional distribution, or D, factor by Traffic Pattern Group (TPG) presented in DeIDOT's *2019 Vehicle Volume Summary Book Introduction*. The D factor by TPG was applied for I-95, I-495, Rogers Road and BUS 13. The highest volumes with the given D factors were used to be conservative and volumes were grown to 2023 levels from 2019 values using DeIDOT growth factors. Diurnal distributions by weekday and weekend for the applicable TPGs involved in the detour analyzed were used to develop the hourly volume estimates. Both I-95 southbound and I-495 in both directions are three-lane highways. A capacity of 2,100 vehicles per hour per lane (vphpl) was assumed for this capacity analysis, which resulted in a capacity of 6,300 vph along these interstate segments.

Figure 9 depicts the estimated hourly volumes for a typical weekday along I-495 between the US 13 and Terminal Avenue interchanges in orange. These existing plus the estimated volumes that will be added to this section of I-495 due to the detour of Rogers Road traffic to I-495 in Phase 1 and Phase 3A are shown in the graphic in green and blue. The estimated volumes with the detoured traffic added are anticipated to be below the capacity threshold of 6,300 vph.

Figure 9. I-495 Weekday

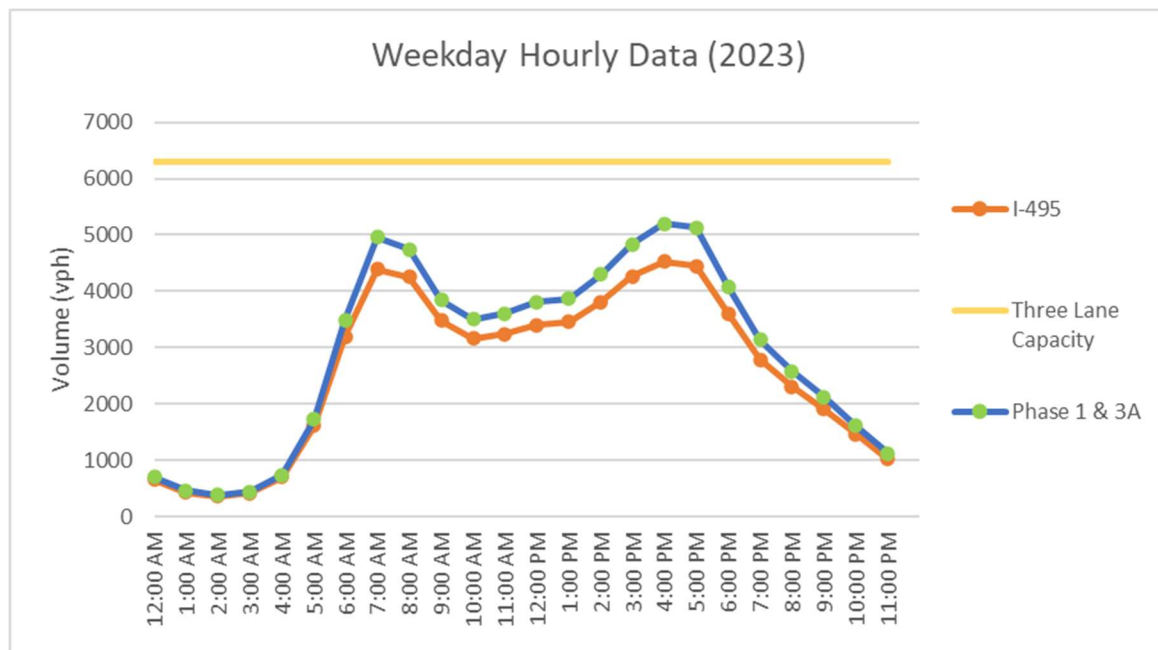


Figure 10 depicts the estimated hourly volumes for a typical weekend along I-495 between the US 13 and Terminal Avenue interchanges in black. These existing plus the estimated volumes that will be added to this section of I-495 due to the detour of Rogers Road traffic to I-495 in Phase 2 are shown in the graphic in green. The estimated volumes with the detoured traffic added are anticipated to be below the capacity threshold of 6,300 vph.

Figure 10. I-495 Weekend

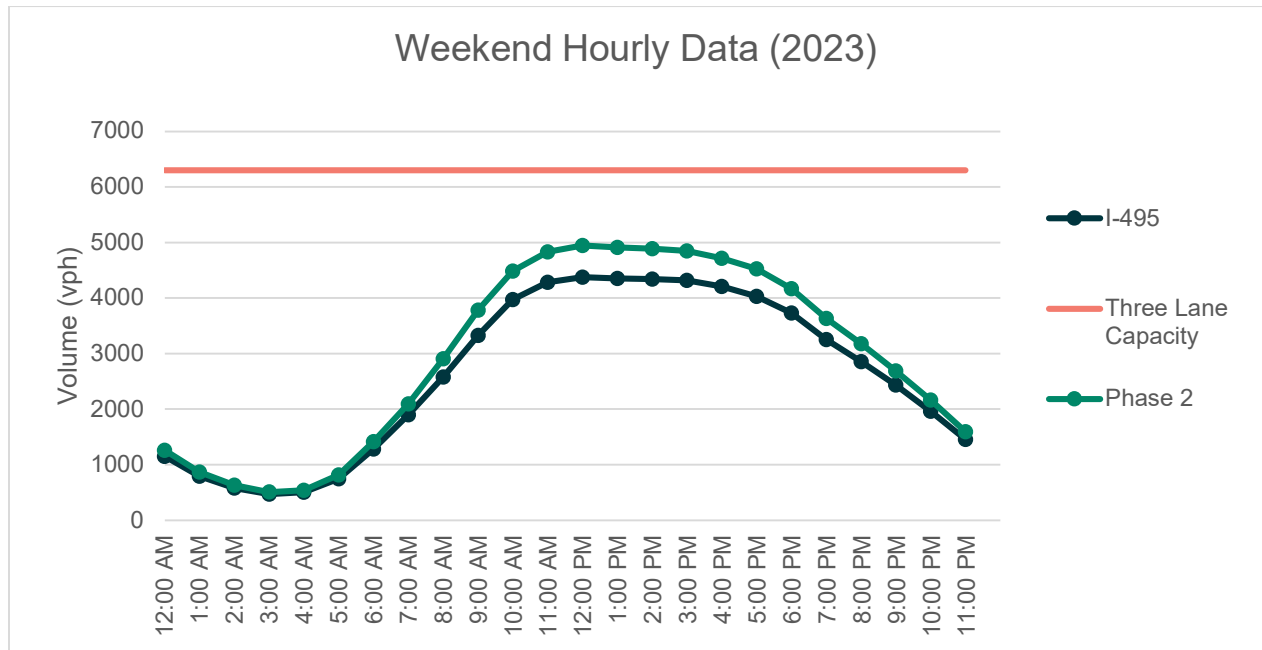
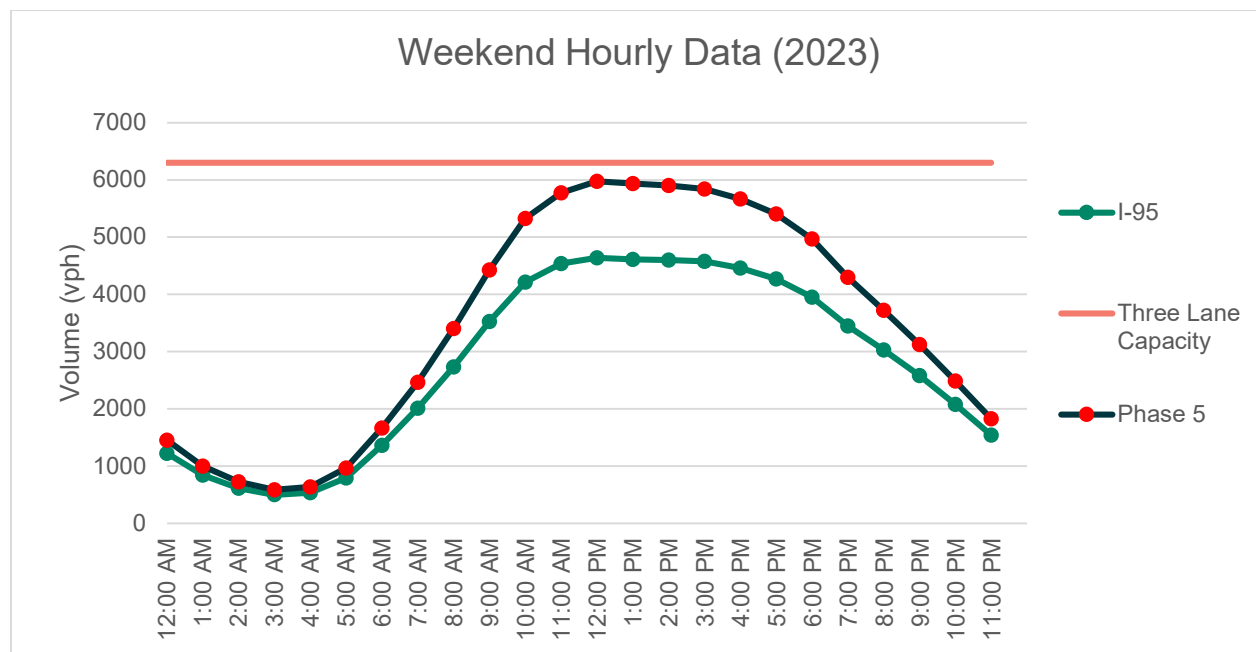


Figure 11 shows the estimated hourly volumes for a typical weekend along I-95 southbound between MLK Jr. Boulevard and I-295 in green. These existing plus the estimated volumes that will be added to this section of I-95 due to the detour of BUS 13 southbound traffic to I-95 in Phase 5 are shown in the graphic in black. The estimated volumes with the detoured traffic added are anticipated to be below the capacity threshold of 6,300 vph. Volumes do approach capacity limits, though are not in excess.

Figure 11. I-95 Weekend



As proposed in the Semi-Final TMP, additional data was collected along the following ramps:

- I-95 southbound On-Ramp from MLK Jr. Blvd
- I-295 eastbound Off-Ramp to US 13 northbound
- I-495 northbound Off-Ramp to US 13
- I-495 southbound Off-Ramp to US 13
- I-495 southbound On-Ramp from US 13
- I-495 southbound On-Ramp from US 9

This additional data collection was completed over a seven-day period and the Average Daily Traffic (ADT) was determined. From this ADT and the monthly factor published by DelDOT in the 2016 Diurnal Distribution Tables, the AADT was calculated. The monthly factor for the AADT calculation was obtained from ATR site number 8006 located along New Castle Avenue near Terminal Avenue. Since this ATR site was closest to the study area, the monthly factor from this site was used in the AADT calculation for all ramps.

Figure 12 shows the hourly volumes for a typical weekday along the I-495 southbound off-ramp to US 13 and I-495 southbound on-ramp from Terminal Avenue, in blue and gray, respectively. **Figure 13** shows the hourly volumes for a typical weekday along the I-495 northbound on-ramp from US 13 and I-495 northbound off-ramp from Terminal Avenue in blue and gray, respectively. These hourly volumes along with the detoured volumes from Rogers Road that will be added to the ramps in Phase 1 and 3A are shown in orange and yellow for the I-495 southbound off-ramp to US 13 and I-495 southbound on-ramp from Terminal Avenue in **Figure 12**, and for the I-495 northbound on-ramp from US 13 and I-495 northbound off-ramp to Terminal Avenue in **Figure 13**,

respectively. The estimated total volumes are anticipated to be below the capacity threshold of 2,100 vph.

Figure 12. I-495 Southbound Ramps Weekday

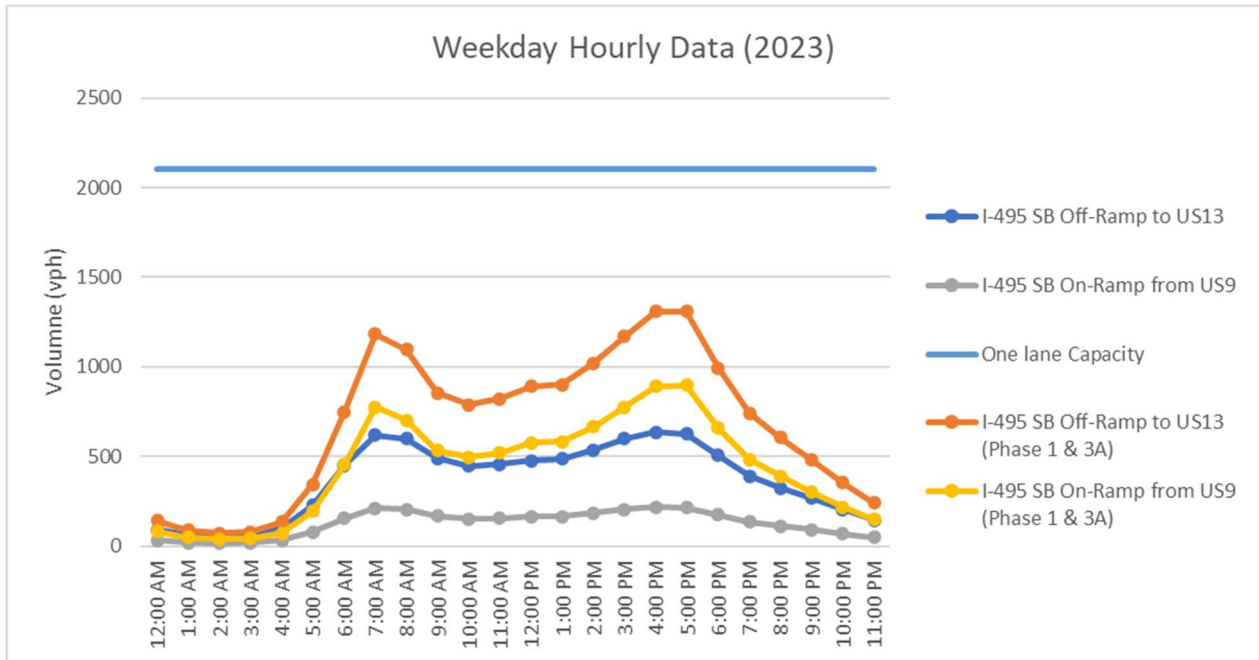


Figure 13. I-495 Northbound Ramps Weekday

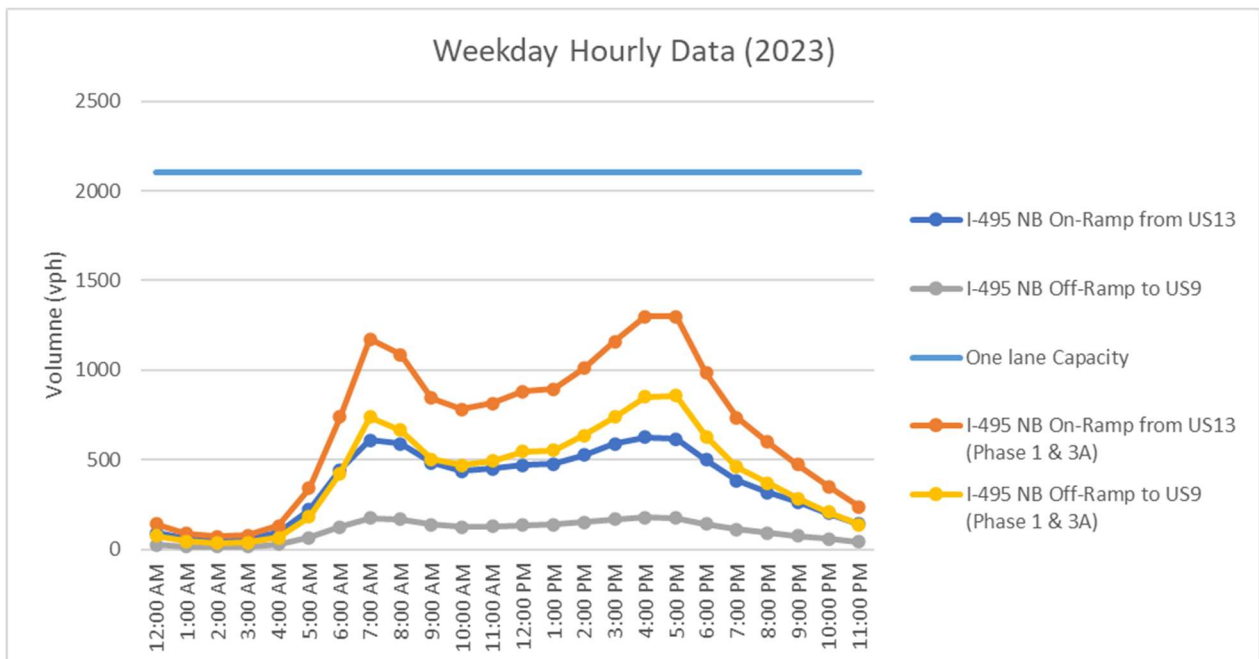


Figure 14 exhibits the hourly volumes for a typical weekend along the I-495 southbound off-ramp to US 13 and I-495 southbound on-ramp from Terminal Avenue in blue and gray, respectively. **Figure 15** exhibits the hourly volumes for a typical weekend along the I-495 northbound on-ramp from US 13 and I-495 northbound off-ramp from Terminal Avenue in blue and gray, respectively.

These hourly volumes along with the detoured volumes from Rogers Road that will be added to the ramps in Phase 2 are shown in orange and yellow for the I-495 southbound off-ramp to US 13 and I-495 southbound on-ramp from Terminal Avenue in **Figure 14**, and for the I-495 northbound on-ramp from US13 and I-495 northbound off-ramp to Terminal Avenue in **Figure 15**, respectively. The estimated hourly volumes and the hourly volumes with the detoured volumes, are anticipated to be below the capacity threshold of 2,100 vph.

Figure 14. I-495 Southbound Ramps Weekend

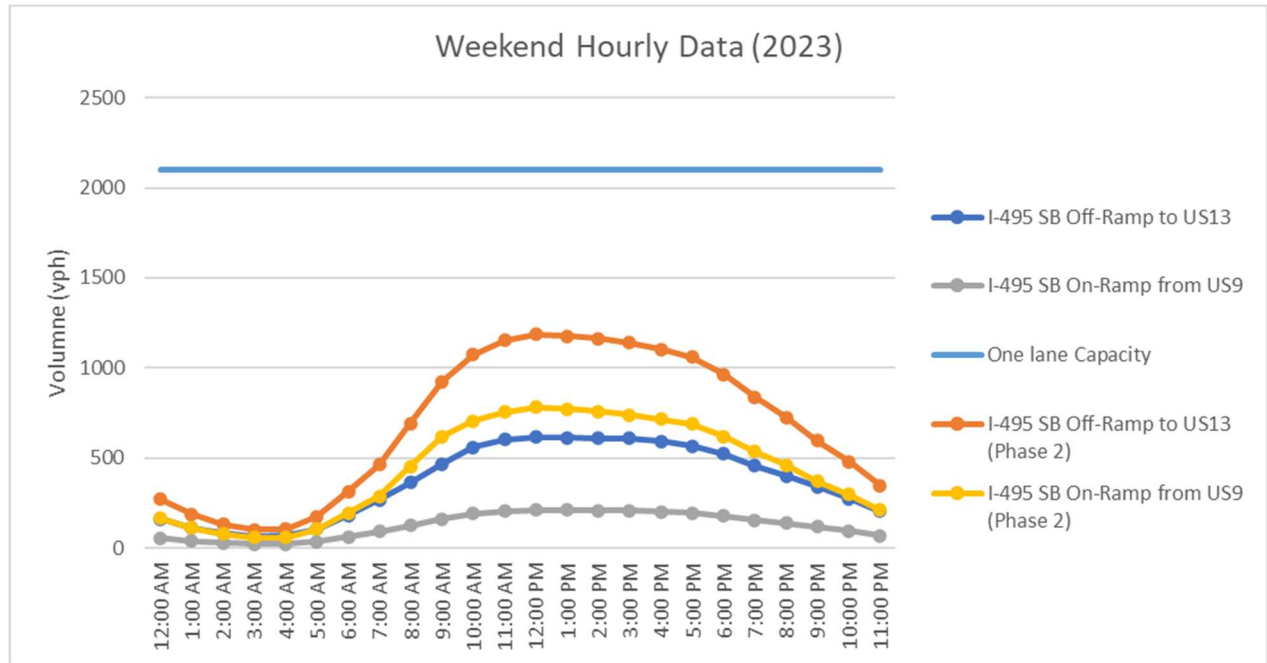


Figure 15. I-495 Northbound Ramps Weekend

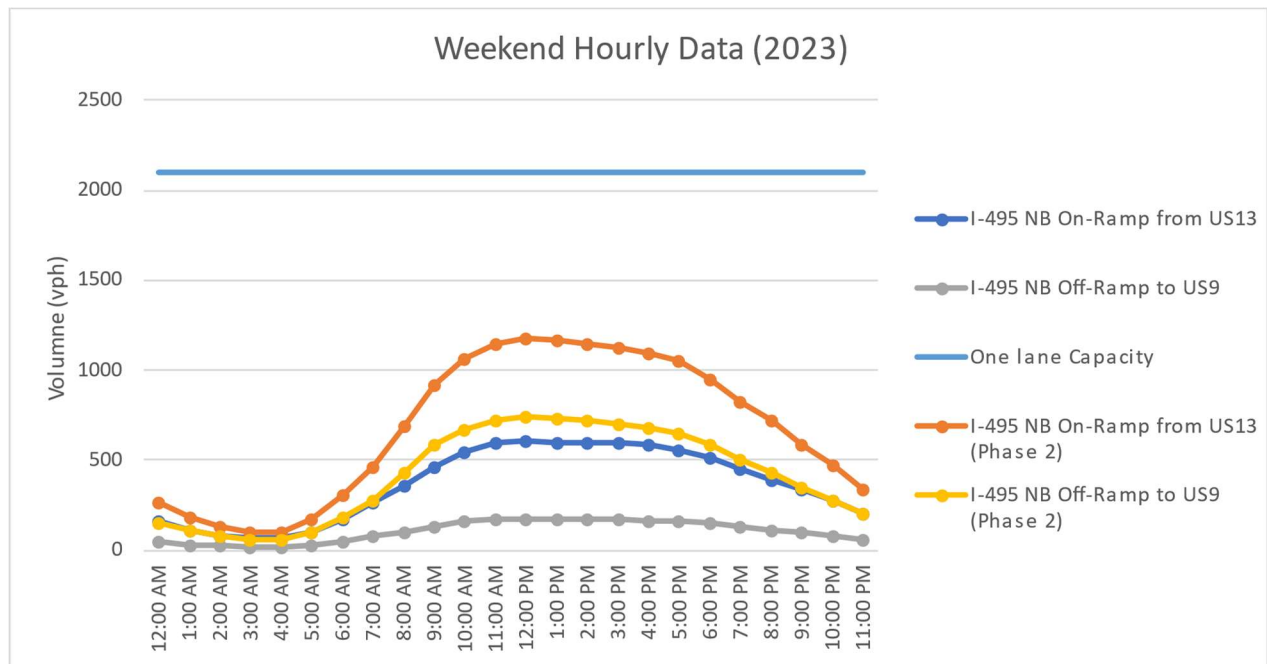
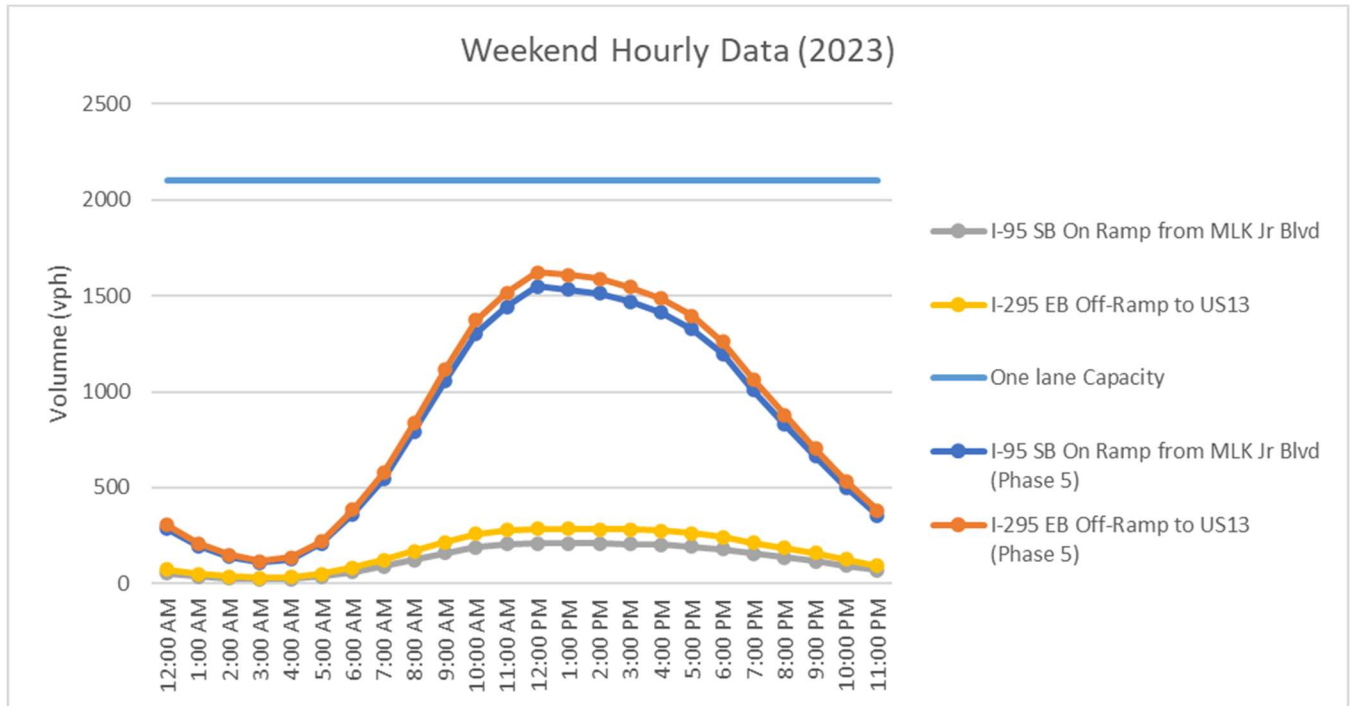


Figure 16 shows the hourly volumes for a typical weekend along the I-95 southbound on-ramp from MLK Jr. Blvd and I-295 eastbound off-ramp to US 13 northbound in gray and yellow, respectively. These hourly volumes along with the detoured volumes from BUS 13 that will be

added to the ramps in Phase 5 are shown in blue and orange for the I-95 southbound on-ramp from MLK Jr. Blvd and I-295 eastbound off-ramp to US 13 northbound, respectively. The estimated total volumes are anticipated to be below the capacity threshold of 2,100 vph.

Figure 16. I-95 and I-295 Ramps Weekend



Delay and Level of Service (LOS) Results Summary

Additional capacity analysis to evaluate impacts due to detoured traffic at intersections, assuming all traffic would reroute using the signed detour, was completed using Synchro 11. SimTraffic, the simulation component of Synchro, was utilized to report the 95th percentile queues to understand if there would be impacts to adjacent roadways and intersections due to queues. The capacity analysis looked at a typical weekday AM and PM peak hour period of 7:45 AM to 8:45 AM and 4:30 PM to 5:30 PM, respectively. The intersections included in the Synchro model are:

- US 13 (S Heald St) and Rogers Rd
- US 13 (S Heald St) and A St
- US 13 (S Heald St) and B St
- US 13 (S Heald St) and C St
- US 13 (S Heald St) and D St
- US 13 (S Heald St) and Garasches Ln
- BUS 13 and New Sweden St
- Garasches Ln and New Sweden St
- Rogers Rd and New Castle Ave
- New Castle Ave and Terminal Ave
- New Castle Ave and New York Ave
- New Castle Ave and Townsend St
- New Castle Ave and D St
- New Castle Ave and C St
- New Castle Ave and B St
- New Castle Ave and A St
- A St and BUS 13 (S Walnut St)
- A St and BUS 13 (S Market St)
- M.L.K. Jr Blvd and N Market St
- S Market St and E Front St
- S Walnut St and E Front St
- E 2nd St and French St
- N Walnut St and E 2nd St
- M.L.K. Jr Blvd / N King St and E 2nd St
- M.L.K. Jr Blvd and N Orange St
- M.L.K. Jr Blvd and Tatnall St
- M.L.K. Jr Blvd and West Str
- M.L.K. Jr Blvd and Washington St
- Terminal Ave and I-495 WB Ramps
- Terminal Ave and I-495 EB Ramps
- S Market St and I-495 SB On-Ramp
- US 13 (S Heald St) and BUS 13
- US 13 (N Dupont Hwy) and I-495 Ramps
- US 13 (N Dupont Hwy) and Hessler Blvd
- US 13 (N Dupont Hwy) and Memorial Dr
- US 13 (N Dupont Hwy) and Hazeldell Ave
- US 13 (N Dupont Hwy) and Wildel Ave

DelDOT records were requested for information on signal timings and these are included in **Appendix E**. Future growth rates were determined using a previous study performed by AECOM for the BR 1-684 and BR 1-686 Bridge Reconstruction projects along BUS 13 and US 13 (South Heald Street) in 2019. From this study the background growth rate of 1.02% was used in this analysis. The volumes projections were calculated for the opening year of 2023. The volume projections were developed for the Weekday AM and PM peak hours evaluated for that project. Additionally, a weekend peak hour was developed using a factor developed from the ATR data collected for the seven-day periods at the previously noted locations.

Using the construction year percent trucks and speeds, and other roadway parameters, capacity, delay and queuing analysis were completed for the following scenarios:

1. Construction Year 2023 – No Construction Scenario
2. Construction Year 2023 – Construction Phase without Mitigation Scenario
3. Construction Year 2023 – Construction Phase with Mitigation

The volume diagrams for the base construction year and each construction phase requiring detours are provided in **Appendix F**.

No Construction Scenario

A No Construction scenario was evaluated for capacity and 95th percentile queues using the developed 2023 volumes. The capacity analysis results for the Weekday AM and PM peak hours are presented in **Table 1** for all relevant construction phases with the exception of Phase 3A and 3D, which are presented with their related 95th percentile queue results in **Table 5**. The 95th percentile queue results for the Weekday AM and PM peak hour are presented in **Table 2**. The capacity and 95th percentile queue results for the Weekend peak hour for Phases 2, 4, and 5 are provided in **Table 4**.

The No Construction Scenario in general exhibits acceptable delays and levels of service (LOS), or a D or better for purposes of this report, with the exception of the following movements at the intersections noted below for the Weekday AM, Weekday PM, and Weekend peak hours:

- Rogers Road and US 13 (South Heald Street)
 - Rogers Road EB left
- New Castle Avenue and Terminal Avenue
 - Driveway EB left/thru/right
- BUS 13 and New Sweden Street
 - New Sweden Street EB left/thru
 - New Sweden Street WB left/thru/right
 - BUS 13 NB left
 - BUS 13 SB left

For both the AM and PM weekday peak hours, the westbound approach of Millside Drive at its intersection with BUS 13 operates at a LOS E as does the westbound approach of US 13 (South Heald St) at BUS 13. Additionally, in the AM peak hour only, the US 13 (South Heald Street) northbound left movement at its intersection with Rogers Road operates at a LOS E, the northbound BUS 13 through movement at Millside Drive operates at a LOS F, and the southbound left movement at the intersection of I-495 southbound ramps at Terminal Avenue operates at a LOS F. In the PM peak hour only, the southbound left of US 13 at its intersection with the I-495 ramps operates at a LOS F. The westbound approach at the intersection of BUS 13 and Millside Drive/ Royal Farms driveway operates poorly owing to the split phase and the northbound through in the AM peak only exhibits LOS F potentially due to the heavily weighted volumes for the northbound movements and the split phase operation at the intersection. The LOS at the intersection of New Sweden Street and BUS 13 is due to the eastbound and westbound approaches operating under split phases, protected left-turn phases for the northbound and southbound left turn phases, and the long cycle length to accommodate these and the coordination along BUS 13. Although the eastbound approach at the intersection of New Castle Avenue and Terminal Avenue also has an unfavorable LOS, the volume for this

approach is minimal and SimTraffic simulations showed that the vehicles clear the intersection every cycle. This intersection also operates with split phases for the eastbound and westbound approaches, likely adding to the failing LOS. Similarly, the left turns at the intersection of US 13 (South Heald Street) at Rogers Road operate as a protected-only phases and given the cycle length are likely the reason for the poor LOS.

Similarly, in the weekend peak hour conditions, the southbound right and in turn the southbound approach at the intersection of MLK Jr. Blvd and Tatnall Street exhibits an LOS E due to the coordination favoring the eastbound and westbound movements at the intersection. In addition, the northbound left and southbound left at the intersection of US 13 and Wildel Avenue, and the northbound left and northbound through movements at the intersection of US 13 and Hessler Boulevard, operate at LOS E or F due to the turns operating as protected phases and the progression heavily weighted for the northbound and southbound through movements. Additionally, the eastbound left/through movement at the intersection of US 13 and Hessler Boulevard operates at a LOS E due to that reason as well. The northbound left of US 13 at Memorial Drive operates at a LOS E due to the left turn phasing and cycle length at the intersection.

The 95th percentile queues in the No Construction Scenario for all peak hours are generally within available storage lengths. The westbound left/ through movement at US 13 (S Heald Street) and A Street displays queuing issues in the AM weekday and weekend peaks, though the queue is only approximately 10 feet over the available storage. This is likely due to the signal coordination preference to southbound US 13 (South Heald Street) as well as the short storage area. Similarly, the northbound left at the intersection of BUS 13 and Millside Drive displays queuing issues in the AM weekday peak hour with the queue length extending beyond storage by approximately 10 feet. This is mostly due to the split phased signal operations at the intersection leading to reduced time for the northbound and southbound movements. Additionally, it can also be seen that the northbound left at the intersection of BUS 13 and New Sweden Street exceeds the storage by approximately 50 feet during the weekday peak hours. The southbound through BUS 13 approach to its intersection with US 13 (S Heald Street) exceeds available storage by approximately 20 feet in the PM peak hour only, which could have some impact to the I-495 southbound on-ramp in that area. The northbound left on Walnut Street at 2nd Street showed some queues in excess of the available storage during the weekend peak hour, which is less than 200 feet due to the nearest adjacent signalized intersection.

Phase 1

Phase 1 of construction includes the closure of the Rogers Road connections between US 13 (South Heald Street) and BUS 13 and is anticipated to occur during all days of the week. As such, the capacity analysis results are presented in **Table 1** and the 95th percentile queue results are presented in **Table 2**.

The Phase 1 Construction without Mitigation Scenario has similar results to that of the No Construction Scenario with the exception of the southbound left and the southbound approach (AM peak hour only) at the intersection of I-495 southbound ramps and Terminal Avenue, and at the intersection of I-495 southbound off ramp and US 13, the eastbound approach (AM peak hour only), southbound left (both peak hours) and southbound approach (PM peak hour only). The increase in delay at I-495 southbound off ramp and Terminal Avenue is probably due to the increase in traffic along Terminal Avenue due to westbound Rogers Road detoured traffic, causing longer delays for the southbound left vehicles waiting for a gap in traffic to clear the intersection. Temporary signals are not anticipated to be installed at the intersections along Terminal Avenue with the I-495 ramps, therefore it is anticipated that the vehicles making the southbound right at the intersection of Terminal Avenue and I-495 southbound off-ramp, could use the 10-foot shoulder to navigate around the vehicles waiting to make the southbound left turn. Delay increases for the southbound and eastbound movements at the intersection of I-

495 southbound off ramp and US 13 are attributed to the increase in traffic at this intersection from the detour. Signal timing changes helped improve the delay as shown with mitigation in **Table 1**. It is to be noted that although the eastbound approach shows an LOS of E it is over the threshold of D by less than one second.

The Phase 1 Construction without Mitigation Scenario queue results are generally within the available storage length, with the exception of the eastbound right and northbound through at the intersection of S Market Street and New Sweden Street, southbound left/ through at the intersection of S Market Street and Howard Street, southbound movements at the intersection of S Market Street/ S Walnut Street and Millside Drive, southbound through at the intersection of S Market Street/ S Walnut Street and S Heald Street and southbound left at the intersection of I-495 southbound off ramp and US 13. Mitigation measures described above were implemented to improve operations and the queues of concern that were not exceeding available storage without the detour were reduced to within the available storage with the exception of the southbound left at the intersection of the I-495 ramps with US 13 in the AM peak hour. This movement exceeds the available storage length due to the volume, however timing changes at the intersection as mentioned above helped bring the 95th percentile queues within the available storage length in the PM peak hour. Although in the AM peak hour, the queue results show an increase in queue length, SimTraffic simulation showed that this did not significantly affect operations at the intersections feeding traffic to this movement and that the queue length exceeding available storage length was due to the mitigation strategies implemented at other intersections, reducing the queues at those intersections within the available storage and allowing the traffic volumes to actually reach this intersection in the simulation. At the intersection of Terminal Avenue with the I-495 southbound ramps, although the LOS is poor, it should be noted that the 95th percentile queue does not exceed the available storage length at the intersection.

Phase 2

Phase 2 of construction includes the closure of the intersection of US 13 (South Heald Street) at Rogers Road and is anticipated to occur on weekends. The capacity and 95th percentile queue results are provided in **Table 4**.

The Phase 2 Construction without Mitigation Scenario has similar results to that of the No Construction Scenario, with only the intersections of Terminal Avenue and I-495 northbound ramps, Terminal Avenue and I-495 southbound ramps, and the southbound left of US 13 at the I-495 ramps that also impacted queues at intersections to the north noted to deteriorate to unacceptable LOS or with queues in excess of available storage. This degradation of LOS is due to the additional detour volumes added at these intersections. As noted for Phase 1 above, timing changes at the intersection of US 13 and I-495 ramps improve the LOS and queues to acceptable levels. For intersections along Terminal Avenue, temporary signals are not anticipated to be installed at these intersections and is assumed that the vehicles making the southbound right at the intersection of Terminal Avenue and I-495 southbound off-ramp, could use the 10-foot shoulder to navigate around the vehicles waiting to make the southbound left turn. It should be noted that, although the southbound left and northbound left movements operate poorly the 95th percentile queues are within available storage length and the overall intersection operates with acceptable delay and LOS.

Phase 3A

Phase 3A of construction includes the closure of westbound Rogers Road between US 13 (South Heald Street) and Medori Boulevard and is anticipated to occur during all days of the week. As such, the capacity analysis results are presented in **Table 1** and the 95th percentile queue results are presented in **Table 2**.

The Phase 3A Construction without Mitigation Scenario has similar results to that of the No Construction Scenario, with no additional locations noted for unacceptable LOS. The

eastbound right of Rogers Road at New Castle Avenue does see an increase in the 95th percentile queues of 52 feet in the PM peak hour, which is only approximately two vehicles and may be a result of the random seeding of the SimTraffic simulations. The eastbound through / left lane queues do not exceed available storage. Since simulations showed that this increase in queue length does not adversely affect the operations at the intersection no mitigation measures were implemented for this phase.

Phase 3B

Phase 3B of construction includes the closure of eastbound Rogers Road between US 13 (South Heald Street) and Medori Boulevard and is anticipated to occur during all days of the week. As such, the capacity analysis results are presented in **Table 1** and the 95th percentile queue results are presented in **Table 2**.

The Phase 3B Construction without Mitigation Scenario has similar results to that of the No Construction Scenario, with the only additional location noted for queues in excess of the available storage being the westbound right movement on Rogers Road at its intersection with US 13 (South Heald Street). This is due to the westbound left turn traffic being combined into one lane with the westbound through traffic because of construction phasing, which causes the right turning traffic to queue behind the through / left traffic. The eastbound left of Rogers Road at US 13 (South Heald Street) degrades from a LOS E to LOS F with a significant increase in delay in both the AM and PM peak hour. The northbound left at the intersection also degrades from LOS D to LOS E in the PM peak hour, but the increase in delay is only about 2.5 seconds. In order to remedy this increase in delay, signal timings adjustments were made at this intersection due to which capacity results align more closely with the No Construction scenario. The eastbound left operates at an LOS E and the northbound left operates at an LOS of E in both peak hours. Overall the intersection LOS improves from an LOS E and LOS F in the AM and PM peak hours, respectively, in the no mitigation scenario to an LOS D in the mitigation scenario for both peak hours.

Phase 3C

Phase 3C of construction is anticipated to occur during all days of the week. As this doesn't require rerouting of traffic, but just lane provisions at the intersection of US 13 (South Heald Street) and Rogers Road, the capacity and 95th percentile queue results are provided in **Table 5**.

The Phase 3C Construction without Mitigation Scenario has similar results to that of the No Construction Scenario, with the only additional location noted for unacceptable LOS being the southbound US 13 (South Heald Street) left movement going from LOS D to LOS E in both peak hours. Additionally, the 95th percentile queues for the northbound US 13 (South Heald Street) approach exceed 700 feet in the AM and PM peak hours and for the westbound Rogers Road approach exceed 900 feet in the PM peak hour. Signal timing changes were implemented at the intersection and the capacity results showed an improved LOS from E to LOS D for the southbound left movement during the AM and PM peak hours. Consequently, the 95th percentile queues also improved with all queue lengths falling within the available storage lengths.

Phase 3D

Phase 3D of construction is anticipated to occur during all days of the week. As this doesn't require rerouting of traffic, but just lane provisions at the intersection of US 13 (South Heald Street) and Rogers Road in that the westbound Rogers Road left turns do not have an exclusive turn lane but are combined with the through movements to complete their movement from that lane. The capacity and 95th percentile queue results are provided in **Table 5**.

The Phase 3D Construction without Mitigation Scenario has similar results to that of the No Construction Scenario, with no additional locations noted for unacceptable LOS or queues therefore no mitigation measures are proposed.

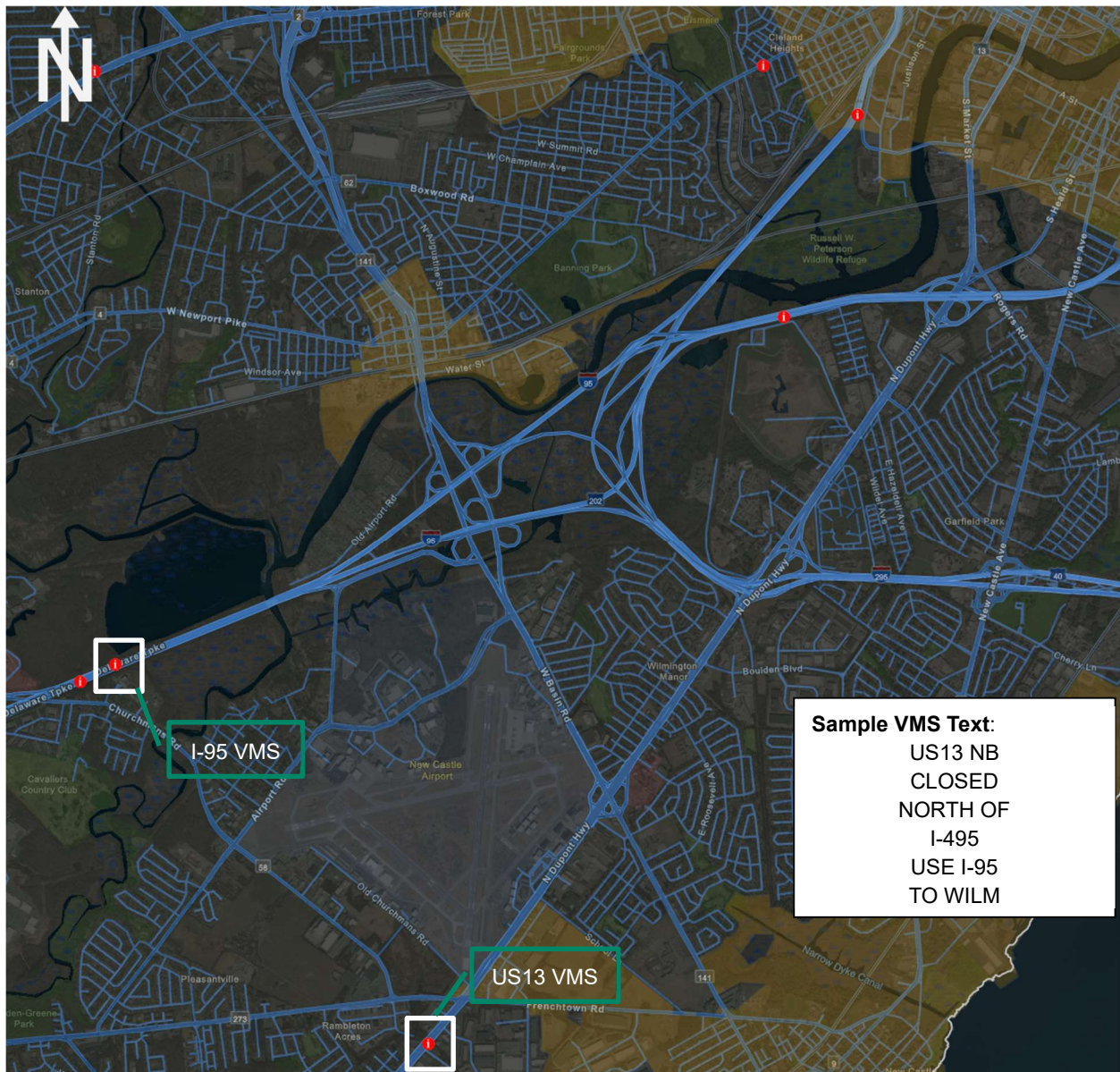
Phase 4

Phase 4 of construction includes the closure of northbound BUS 13 and is anticipated to occur during all days of the week, with the intersection closure of southbound BUS 13 to Rogers Road only on weekends and Millside Drive intersection closures only overnight. The capacity and 95th percentile queue results are provided in **Table 4** for the weekend closure and **Table 3** for weekday closures.

The Phase 4 Construction without Mitigation Scenario exhibits unacceptable LOS or queues at multiple movements and intersections along the detour route. The additional volume diverted to Rogers Road and New Castle Avenue shows significant degradation of LOS as compared to the no construction scenarios mainly for the movements where the detoured volumes were added. Generally, these degradations occur at the intersections of S Heald Street and A Street, New Castle and A Street, Walnut Street and A Street, Market Street and A Street, S Heald Street and Rogers Road, New Castle and C Street, New Castle and B Street, New Castle and Terminal Avenue, and New Castle and New York Avenue, Rogers Road and New Castle Avenue, S Market Street and S Heald Street, and US 13 and I-495 southbound off ramp/ northbound on ramp. The increase in delay is mostly due to the additional volume using a single left turn lane to New Castle Avenue from Rogers Road along with the limited left turn green time at New Castle Avenue and A Street. An added constraint is the coordination preference along New Castle Avenue and S Heald Street given to the northbound/ southbound movements. To improve operations at these intersections, signal timing optimization was completed along with an offset change at S Heald Street and A Street to ensure the northbound left traffic from New Castle Avenue are not restricted due to the coordination. For the weekend, timing changes were only implemented at the intersections of S Heald Street and Rogers Road, Rogers Road and New Castle Avenue, and S Heald Street and A Street. In the PM peak hour, in addition to the locations where timings were tweaked on the weekend, timing changes were implemented at Walnut Street and A Street. In the AM peak hour, timing changes at locations for the PM peak were completed as well as timing changes at New Castle Avenue and A Street, New Castle Avenue and Terminal Avenue, New Castle Avenue and B Street, and New Castle Avenue and C Street. Some delay issues were still present with these changes.

Similar to the delay and LOS, the 95th percentile queue results also show an increase in queue lengths beyond available storage length at the movements where the detoured traffic were added. In addition to these movements, some of the movements where the queue lengths extended beyond the available storage length are the westbound movement at New Castle Avenue and B Street, westbound A Street at Walnut Street and Market Street, northbound and southbound at S Heald Street and Rogers Road, southbound through and southbound through/ right at S Market Street and Millside Drive, eastbound Rogers Road at New Castle Avenue, and northbound and westbound at New Castle Avenue and Terminal Avenue. The queue length issues at these movements are due to the additional volumes flowing through these intersections and queues extending along the route from pinch points along New Castle Avenue. Mitigation measures mentioned above helped improve queue length for nearly all movements that displayed issues and the queue length that exceeded available storage length were from the additional volume and limited number of lanes to make turns. In addition to reduce the operational impact along S Heald Street and New Castle Avenue, it is recommended that the Variable Message Signs (VMS) along I-95 northbound and US 13 northbound be used to communicate that traffic headed to downtown Wilmington continue on or divert to use I-95. The VMS locations and sample text is shown in **Figure 17**.

Figure 17. VMS Locations and Sample Text



Phase 5

Phase 5 of construction includes the closure of southbound BUS 13 and the ramp to I-495 southbound and is anticipated to occur on weekends. The capacity and 95th percentile queue results are provided in **Table 4**.

The Phase 5 Construction without Mitigation Scenario has similar results to that of the No Construction Scenario, with a few additional locations noted for unacceptable LOS or queues. The intersections of Walnut Street at Howard Street and MLK Jr. Blvd at Market Street operate at a failing LOS and 95th percentile queues exceed the available storage length for the eastbound left at Walnut Street and Howard Street. Additionally, the low green time for Howard Street at its intersection with Walnut Street causes the LOS and 95th percentile queues to be unacceptable. In order to mitigate these unacceptable operations at the Walnut Street and Howard Street intersection, and in turn the intersections that are affected due to the eastbound Howard Street operations, green time from the northbound Walnut Street approach was borrowed and provided to the eastbound Howard Street approach. In doing so the overall

intersection LOS improved from an LOS of F to C. The additional green time to Howard Street also improved the operations at the intersection of MLK Jr. Blvd and Market Street with the overall intersection improving from an LOS F to LOS D. This also in turn reduced the 95th percentile queues at the intersection of Market Street with Howard Street as well as the at Market Street and A Street, which without the timing changes resulted in queues exceeding the available storage southbound at the intersection. With the timing changes at Walnut Street and Howard Street, the queues decreased to within the available storage lengths at those intersections, but as a result the processed traffic progressed along the detour route and it can be observed that the intersections of Walnut Street and A Street, Walnut Street and Front Street, Walnut Street and E 2nd Street, French Street and E 2nd Street, N King Street and E 2nd Street, and MLK Jr. Boulevard and Market Street show 95th percentile queues exceeding available storage length for movements where the detoured volumes were added. This is due to the single westbound left turn lane at the intersection of E 2nd Street and N King Street and the detoured volumes using this single lane to follow the detour. However, since the detour is through a city network, some traffic could potentially divert to other roadways and the queuing impacts would reduce significantly. Additionally, maximizing signal timings to these movements impacts overall intersection operations, therefore signal adjustments were only made to ensure vehicles in queue clear the intersections every other cycle if not every cycle.

Along US 13 (N Dupont Hwy), generally the LOS is not adversely affected from the volume increase and the overall operations at the intersections are within acceptable limits. The overall intersection LOS at US 13 and Hessler Blvd is noted to have an LOS of E, but the delay is over the threshold for an LOS of D by less than 3 seconds in the no mitigation, Since the eastbound, westbound, and southbound movements at this intersection operate acceptably, signal timing updates were made to mitigate the poor northbound LOS. This signal timing change helped improve the northbound LOS from E to D and that in turn improved the overall intersection LOS from E to D. Additionally, the intersection of US 13 and Memorial Drive exhibits an LOS of F in the no mitigation scenario for the northbound left movement due to the volume increase from the detour. In order to mitigate this without impacting other movements, signal timing adjustments were made, and the LOS improved from F to E (just as in the existing condition) for the northbound lefts at this intersection.

The 95th percentile queues were noted to be within available storage lengths at all intersections along US 13.

Table 1. Capacity Analysis Results – Weekday Peak Hours Phase 1 through Phase 3

Intersection	Movement	Weekday Peak Hour Capacity Results											
		2023 No Construction		2023 Detour Phase 1, no mitigation		2023 Detour Phase 3A, no mitigation		2023 Detour Phase 3B, no mitigation		2023 Detour Phase 1, mitigation		2023 Detour Phase 3B, mitigation	
		A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
S Heald St & A St	EBTR	25.2 (C)	25.9 (C)	25.2 (C)	25.9 (C)	25.2 (C)	25.9 (C)	25.2 (C)	25.9 (C)	25.2 (C)	25.9 (C)	25.2 (C)	25.9 (C)
	EB Approach	25.2 (C)	25.9 (C)	25.2 (C)	25.9 (C)	25.2 (C)	25.9 (C)	25.2 (C)	25.9 (C)	25.2 (C)	25.9 (C)	25.2 (C)	25.9 (C)
	WBLT	26.4 (C)	25.9 (C)	26.5 (C)	26.0 (C)	27.1 (C)	25.9 (C)	26.3 (C)	25.9 (C)	26.5 (C)	26.0 (C)	26.3 (C)	25.9 (C)
	WB Approach	26.4 (C)	25.9 (C)	26.5 (C)	26.0 (C)	27.1 (C)	25.9 (C)	26.3 (C)	25.9 (C)	26.5 (C)	26.0 (C)	26.3 (C)	25.9 (C)
	SBLT	8.2 (A)	8.9 (A)	8.2 (A)	9.0 (A)	8.2 (A)	8.9 (A)	8.2 (A)	8.9 (A)	8.2 (A)	9.0 (A)	8.2 (A)	8.9 (A)
	SBTR	8.1 (A)	8.8 (A)	8.1 (A)	8.8 (A)	8.1 (A)	8.8 (A)	8.1 (A)	8.8 (A)	8.1 (A)	8.8 (A)	8.1 (A)	8.8 (A)
	SB Approach	8.2 (A)	8.9 (A)	8.2 (A)	8.9 (A)	8.2 (A)	8.9 (A)	8.2 (A)	8.9 (A)	8.2 (A)	8.9 (A)	8.2 (A)	8.9 (A)
	Overall Intersection	13.2 (B)	12.2 (B)	13.4 (B)	12.4 (B)	13.9 (B)	12.2 (B)	13.2 (B)	12.2 (B)	13.4 (B)	12.4 (B)	13.2 (B)	12.2 (B)
New Castle Ave & A St	EBLT	25.3 (C)	25.2 (C)	25.3 (C)	25.2 (C)	25.3 (C)	25.2 (C)	25.3 (C)	25.2 (C)	25.3 (C)	25.2 (C)	25.3 (C)	25.2 (C)
	EB Approach	25.3 (C)	25.2 (C)	25.3 (C)	25.2 (C)	25.3 (C)	25.2 (C)	25.3 (C)	25.2 (C)	25.3 (C)	25.2 (C)	25.3 (C)	25.2 (C)
	WBTR	25.2 (C)	25.4 (C)	25.2 (C)	25.4 (C)	25.2 (C)	25.4 (C)	25.2 (C)	25.4 (C)	25.2 (C)	25.4 (C)	25.2 (C)	25.4 (C)
	WB Approach	25.2 (C)	25.4 (C)	25.2 (C)	25.4 (C)	25.2 (C)	25.4 (C)	25.2 (C)	25.4 (C)	25.2 (C)	25.4 (C)	25.2 (C)	25.4 (C)
	NBLT	20.3 (C)	18.5 (B)	20.4 (C)	18.6 (B)	20.6 (C)	18.5 (B)	20.3 (C)	18.5 (B)	20.4 (C)	18.6 (B)	20.3 (C)	18.5 (B)
	NBTR	19.8 (B)	18.1 (B)	19.8 (B)	18.2 (B)	20.0 (B)	18.1 (B)	19.8 (B)	18.1 (B)	19.8 (B)	18.2 (B)	19.8 (B)	18.1 (B)
	NB Approach	20.1 (C)	18.3 (B)	20.2 (C)	18.4 (B)	20.3 (C)	18.3 (B)	20.1 (C)	18.3 (B)	20.2 (C)	18.4 (B)	20.1 (C)	18.3 (B)
	Overall Intersection	20.6 (C)	19.5 (B)	20.7 (C)	19.5 (B)	20.8 (C)	19.5 (B)	20.6 (C)	19.5 (B)	20.7 (C)	19.5 (B)	20.6 (C)	19.5 (B)
S Walnut St & A St	EBLT	35.6 (D)	35.4 (D)	36.0 (D)	35.5 (D)	35.7 (D)	35.4 (D)	35.7 (D)	35.4 (D)	36.0 (D)	35.5 (D)	35.7 (D)	35.4 (D)
	EB Approach	35.6 (D)	35.4 (D)	36.0 (D)	35.5 (D)	35.7 (D)	35.4 (D)	35.7 (D)	35.4 (D)	36.0 (D)	35.5 (D)	35.7 (D)	35.4 (D)
	WBT	34.3 (C)	35.0 (C)	35.6 (D)	36.3 (D)	34.3 (C)	35.0 (D)	34.3 (C)	35.0 (D)	35.6 (D)	36.3 (D)	34.3 (C)	35.0 (D)
	WBR	34.7 (C)	33.2 (C)	34.7 (C)	33.3 (C)	34.7 (C)	33.3 (C)	34.7 (C)	33.3 (C)	34.7 (C)	33.3 (C)	34.7 (C)	33.3 (C)
	WB Approach	34.5 (C)	34.8 (C)	35.2 (D)	36.1 (D)	34.5 (C)	34.8 (C)	34.5 (C)	34.8 (C)	35.2 (D)	36.1 (D)	34.5 (C)	34.8 (C)
	NBLT	13.9 (B)	10.0 (A)	13.8 (B)	10.0 (A)	13.9 (B)	10.0 (A)	13.9 (B)	10.0 (A)	13.8 (B)	10.0 (A)	13.9 (B)	10.0 (A)
	NBT	12.3 (B)	9.5 (A)	12.3 (B)	9.5 (A)	12.3 (B)	9.5 (A)	12.3 (B)	9.5 (A)	12.3 (B)	9.5 (A)	12.3 (B)	9.5 (A)
	NBTR	13.0 (B)	9.7 (A)	12.9 (B)	9.7 (A)	13.0 (B)	9.7 (A)	13.0 (B)	9.7 (A)	12.9 (B)	9.7 (A)	13.0 (B)	9.7 (A)
	NB Approach	13.0 (B)	9.7 (A)	12.9 (B)	9.7 (A)	13.0 (B)	9.7 (A)	13.0 (B)	9.7 (A)	12.9 (B)	9.7 (A)	13.0 (B)	9.7 (A)
Overall Intersection	14.6 (B)	13.0 (B)	14.8 (B)	13.9 (B)	14.6 (B)	13.1 (B)	14.6 (B)	13.1 (B)	14.8 (B)	13.9 (B)	14.6 (B)	13.1 (B)	
S Market St & A St	WBL	14.5 (B)	25.2 (D)	15.6 (C)	29.4 (D)	14.5 (B)	25.2 (D)	14.5 (B)	25.2 (D)	15.6 (C)	29.4 (D)	14.5 (B)	25.2 (D)
	WB Approach	14.5 (B)	25.2 (D)	15.6 (C)	29.4 (D)	14.5 (B)	25.2 (D)	14.5 (B)	25.2 (D)	15.6 (C)	29.4 (D)	14.5 (B)	25.2 (D)
	SBL	8.5 (A)	8.6 (A)	8.5 (A)	8.6 (A)	8.5 (A)	8.6 (A)	8.5 (A)	8.6 (A)	8.5 (A)	8.6 (A)	8.5 (A)	8.6 (A)
	SBT	-	-	-	-	-	-	-	-	-	-	-	-
	SB Approach	0.7 (A)	0.6 (A)	0.7 (A)	0.6 (A)	0.7 (A)	0.6 (A)	0.7 (A)	0.6 (A)	0.7 (A)	0.6 (A)	0.7 (A)	0.6 (A)
	Overall Intersection	2.1 (A)	2.1 (A)	2.6 (A)	3.0 (A)	2.1 (A)	2.1 (A)	2.1 (A)	2.1 (A)	2.6 (A)	3.0 (A)	2.1 (A)	2.1 (A)

Intersection	Movement	Weekday Peak Hour Capacity Results											
		2023 No Construction		2023 Detour Phase 1, no mitigation		2023 Detour Phase 3A, no mitigation		2023 Detour Phase 3B, no mitigation		2023 Detour Phase 1, mitigation		2023 Detour Phase 3B, mitigation	
		A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
S Market St & New Sweden St	EBLT	80.9 (F)	75.8 (E)	80.9 (F)	75.8 (E)	80.9 (F)	75.8 (E)	80.9 (F)	75.8 (E)	80.9 (F)	79.5 (E)	80.9 (F)	75.8 (E)
	EBR	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)
	EB Approach	80.9 (F)	75.8 (E)	80.9 (F)	75.8 (E)	80.9 (F)	75.8 (E)	80.9 (F)	75.8 (E)	80.9 (F)	79.5 (E)	80.9 (F)	75.8 (E)
	WBLTR	84.5 (F)	66.2 (E)	85.3 (F)	64.4 (E)	85.3 (F)	66.2 (E)	85.3 (F)	66.2 (E)	85.3 (F)	79.8 (E)	85.3 (F)	66.2 (E)
	WB Approach	84.5 (F)	66.2 (E)	85.3 (F)	64.4 (E)	85.3 (F)	66.2 (E)	85.3 (F)	66.2 (E)	85.3 (F)	79.8 (E)	85.3 (F)	66.2 (E)
	NBUL	65.2 (E)	72.3 (E)	64.1 (E)	69.7 (E)	65.2 (E)	72.4 (E)	65.2 (E)	72.4 (E)	64.1 (E)	69.7 (E)	65.2 (E)	72.4 (E)
	NBT	15.3 (B)	9.8 (B)	15.4 (B)	10.5 (B)	15.2 (B)	9.8 (A)	15.2 (B)	9.8 (A)	15.4 (B)	10.2 (B)	15.2 (B)	9.8 (A)
	NB Approach	22.5 (C)	27.0 (C)	22.1 (C)	25.5 (C)	22.4 (C)	26.7 (C)	22.4 (C)	26.7 (C)	22.1 (C)	25.3 (C)	22.4 (C)	26.7 (C)
	SBL	79.9 (E)	71.8 (E)	76.2 (E)	72.4 (E)	79.9 (E)	71.4 (E)	79.9 (E)	71.4 (E)	76.2 (E)	72.4 (E)	79.9 (E)	71.4 (E)
	SBT	20.7 (C)	37.0 (D)	19.5 (B)	35.5 (D)	20.2 (C)	37.2 (D)	20.2 (C)	37.2 (D)	19.5 (B)	34.2 (C)	20.2 (C)	37.2 (D)
	SBR	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)
	SB Approach	20.7 (C)	37.6 (D)	20.0 (C)	36.2 (D)	20.6 (C)	37.7 (C)	20.6 (C)	37.7 (D)	20.0 (C)	34.9 (C)	20.6 (C)	37.7 (D)
Overall Intersection	23.7 (C)	34.2 (D)	23.2 (C)	33.4 (C)	23.6 (C)	34.3 (C)	23.6 (C)	34.3 (C)	23.2 (C)	33.2 (C)	23.6 (C)	34.3 (C)	
New Castle Ave & Rogers Rd/Sutton Ln	EBLT	31.4 (C)	43.7 (D)	31.3 (C)	43.7 (D)	31.3 (C)	41.0 (D)	-	44.5 (D)	31.3 (C)	43.7 (D)	-	44.5 (D)
	EBR	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	-	0.0 (A)	0.0 (A)	0.0 (A)	-	0.0 (A)
	EB Approach	31.4 (C)	43.7 (D)	31.3 (C)	43.7 (D)	31.3 (C)	41.0 (D)	-	44.5 (D)	31.3 (C)	43.7 (D)	-	44.5 (D)
	WBLTR	29.0 (C)	39.6 (D)	28.9 (C)	39.6 (D)	28.9 (C)	35.1 (D)	31.3 (C)	45.2 (D)	28.9 (C)	39.6 (D)	31.3 (C)	45.2 (D)
	WB Approach	29.0 (C)	39.6 (D)	28.9 (C)	39.6 (D)	28.9 (C)	35.1 (D)	31.3 (C)	45.2 (D)	28.9 (C)	39.6 (D)	31.3 (C)	45.2 (D)
	NBL	5.0 (A)	3.7 (A)	3.8 (A)	3.0 (A)	0.0 (A)	0.0 (A)	5.1 (A)	4.2 (A)	3.8 (A)	3.0 (A)	5.1 (A)	4.2 (A)
	NBT	3.4 (A)	2.5 (A)	4.0 (A)	2.8 (A)	4.2 (A)	4.4 (A)	2.2 (A)	1.4 (A)	4.0 (A)	2.8 (A)	2.2 (A)	1.4 (A)
	NBTR	3.4 (A)	2.5 (A)	3.9 (A)	2.7 (A)	4.2 (A)	4.3 (A)	2.1 (A)	1.4 (A)	3.9 (A)	2.7 (A)	2.1 (A)	1.4 (A)
	NB Approach	4.0 (A)	2.9 (A)	3.9 (A)	2.8 (A)	4.2 (A)	4.3 (A)	3.2 (A)	2.4 (A)	3.9 (A)	2.8 (A)	3.2 (A)	2.4 (A)
	SBTL	8.8 (A)	6.0 (A)	6.6 (A)	5.1 (A)	2.9 (A)	3.8 (A)	7.7 (A)	5.7 (A)	6.6 (A)	5.1 (A)	7.7 (A)	5.7 (A)
	SBR	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)
	SB Approach	8.8 (A)	6.0 (A)	6.6 (A)	5.1 (A)	2.9 (A)	3.8 (A)	7.7 (A)	5.6 (A)	6.6 (A)	5.1 (A)	7.7 (A)	5.6 (A)
Overall Intersection	6.9 (A)	6.5 (A)	6.3 (A)	6.1 (A)	5.6 (A)	8.0 (A)	5.2 (A)	4.4 (A)	6.3 (A)	6.1 (A)	5.2 (A)	4.4 (A)	

Intersection	Movement	Weekday Peak Hour Capacity Results											
		2023 No Construction		2023 Detour Phase 1, no mitigation		2023 Detour Phase 3A, no mitigation		2023 Detour Phase 3B, no mitigation		2023 Detour Phase 1, mitigation		2023 Detour Phase 3B, mitigation	
		A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
New Castle Ave & Driveway/Terminal Ave	EBLTR	529.0 (F)	84.8 (F)	526.0 (F)	81.7 (F)	525.7 (F)	81.7 (F)	534.7 (F)	84.8 (F)	526.0 (F)	81.7 (F)	534.7 (F)	84.8 (F)
	EB Approach	529.0 (F)	84.8 (F)	526.0 (F)	81.7 (F)	525.7 (F)	81.7 (F)	534.7 (F)	84.8 (F)	526.0 (F)	81.7 (F)	534.7 (F)	84.8 (F)
	WBL	28.3 (C)	47.3 (D)	28.4 (C)	45.7 (D)	28.7 (C)	45.4 (D)	29.0 (C)	47.3 (D)	28.4 (C)	45.7 (D)	29.0 (C)	47.3 (D)
	WBR	-	-	-	-	-	-	-	-	-	-	-	-
	WB Approach	28.4 (C)	47.9 (D)	28.4 (C)	45.7 (D)	28.7 (C)	45.4 (D)	29.0 (C)	47.3 (D)	28.4 (C)	45.7 (D)	29.0 (C)	47.3 (D)
	NBL	11.1 (B)	0.0 (A)	10.8 (B)	0.0 (A)	10.8 (B)	0.0 (A)	11.7 (B)	-	10.8 (B)	0.0 (A)	11.7 (B)	-
	NBT	13.4 (B)	9.8 (A)	13.0 (B)	9.5 (A)	13.4 (B)	9.5 (A)	13.7 (B)	9.8 (A)	13.0 (B)	9.5 (A)	13.7 (B)	9.8 (A)
	NBR	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)
	NB Approach	13.4 (B)	9.8 (A)	13.0 (B)	9.5 (A)	13.4 (B)	9.5 (A)	13.7 (B)	9.8 (A)	13.0 (B)	9.5 (A)	13.7 (B)	9.8 (A)
	SBL	9.4(A)	6.8 (A)	8.8 (A)	6.6 (A)	9.0 (A)	6.5 (A)	9.3 (A)	6.9 (A)	8.8 (A)	6.6 (A)	9.3 (A)	6.9 (A)
	SBTR	9.4 (A)	5.4 (A)	8.7 (A)	5.1 (A)	8.6 (A)	5.1 (A)	11.5 (B)	7.0 (A)	8.7 (A)	5.1 (A)	11.5 (B)	7.0 (A)
	SB Approach	9.4 (A)	5.9 (A)	8.8 (A)	5.7 (A)	8.8 (A)	5.7 (A)	11.0 (B)	7.0 (A)	8.8 (A)	5.7 (A)	11.0 (B)	7.0 (A)
Overall Intersection	33.1 (C)	22.4 (C)	33.0 (C)	21.0 (C)	32.1 (C)	20.5 (C)	26.9 (C)	16.4 (B)	33.0 (D)	21.0 (C)	26.9 (C)	16.4 (B)	
New Castle Ave & C St	EBLT	24.8 (C)	25.3 (C)	24.9 (C)	25.3 (C)	24.8 (C)	25.3 (C)	24.8 (C)	25.3 (C)	24.9 (C)	25.3 (C)	24.8 (C)	25.3 (C)
	EB Approach	24.8 (C)	25.3 (C)	24.9 (C)	25.3 (C)	24.8 (C)	25.3 (C)	24.8 (C)	25.3 (C)	24.9 (C)	25.3 (C)	24.8 (C)	25.3 (C)
	NBLT	9.7 (A)	9.0 (A)	9.7 (A)	9.0 (A)	9.8 (A)	9.0 (A)	9.7 (A)	9.0 (A)	9.7 (A)	9.0 (A)	9.7 (A)	9.0 (A)
	NBTR	9.9 (A)	9.2 (A)	9.9 (A)	9.1 (A)	10.0 (A)	9.2 (A)	9.9 (A)	9.2 (A)	9.9 (A)	9.1 (A)	9.9 (A)	9.2 (A)
	NB Approach	9.8 (A)	9.1 (A)	9.8 (A)	9.1 (A)	9.9 (A)	9.1 (A)	9.8 (A)	9.1 (A)	9.8 (A)	9.1 (A)	9.8 (A)	9.1 (A)
	Overall Intersection	10.4 (B)	10.5 (B)	10.5 (B)	10.5 (B)	10.5 (B)	10.5 (B)	10.4 (B)	10.5 (B)	10.5 (B)	10.5 (B)	10.4 (B)	10.5 (B)
New Castle Ave & B St	WBT	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)
	WBTR	24.7 (C)	24.8 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)
	WB Approach	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)
	NBLT	21.1 (C)	19.0 (B)	21.1 (C)	19.1 (B)	21.3 (C)	19.0 (B)	21.1 (C)	19.0 (B)	21.1 (C)	19.1 (B)	21.1 (C)	19.0 (B)
	NBT	21.3 (C)	19.2 (B)	21.4 (C)	19.3 (B)	21.6 (C)	19.2 (B)	21.3 (C)	19.2 (B)	21.4 (C)	19.3 (B)	21.3 (C)	19.2 (B)
	NB Approach	21.2 (C)	19.1 (B)	21.2 (C)	19.2 (B)	21.4 (C)	19.1 (B)	21.2 (C)	19.1 (B)	21.2 (C)	19.2 (B)	21.2 (C)	19.1 (B)
	Overall Intersection	21.4 (C)	19.6 (B)	21.5 (C)	19.6 (B)	21.6 (C)	19.6 (B)	21.4 (C)	19.6 (B)	21.5 (C)	19.6 (B)	21.4 (C)	19.6 (B)
S Heald St & B St	WBLT	25.5 (C)	25.0 (C)	25.4 (C)	25.0 (C)	25.5 (C)	25.0 (C)	25.5 (C)	25.0 (C)	25.4 (C)	25.0 (C)	25.5 (C)	25.0 (C)
	WBT	24.8 (C)	24.9 (C)	24.7 (C)	24.9 (C)	24.7 (C)	24.9 (C)	24.7 (C)	24.9 (C)	24.7 (C)	24.9 (C)	24.7 (C)	24.9 (C)
	WB Approach	25.3 (C)	25.0 (C)	25.2 (C)	24.9 (C)	25.3 (C)	25.0 (C)	25.3 (C)	25.0 (C)	25.2 (C)	24.9 (C)	25.3 (C)	25.0 (C)
	SBT	17.7 (B)	20.0 (C)	17.3 (B)	19.6 (B)	17.9 (B)	20.0 (B)	17.6 (B)	20.0 (B)	17.3 (B)	19.6 (B)	17.6 (B)	20.0 (B)
	SBTR	17.7 (B)	19.9 (B)	17.3 (B)	19.6 (B)	17.9 (B)	19.9 (B)	17.7 (B)	19.9 (B)	17.3 (B)	19.6 (B)	17.7 (B)	19.9 (B)
	SB Approach	17.7 (B)	19.9 (B)	17.3 (B)	19.6 (B)	17.9 (B)	19.9 (B)	17.7 (B)	19.9 (B)	17.3 (B)	19.6 (B)	17.7 (B)	19.9 (B)
	Overall Intersection	18.9 (B)	20.5 (C)	18.6 (B)	20.2 (C)	19.0 (B)	20.5 (C)	18.8 (B)	20.5 (C)	18.6 (B)	20.2 (C)	18.8 (B)	20.5 (C)

Intersection	Movement	Weekday Peak Hour Capacity Results											
		2023 No Construction		2023 Detour Phase 1, no mitigation		2023 Detour Phase 3A, no mitigation		2023 Detour Phase 3B, no mitigation		2023 Detour Phase 1, mitigation		2023 Detour Phase 3B, mitigation	
		A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
S Heald St & C St	EBTR	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)
	EB Approach	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)
	WBLT	25.6 (C)	26.3 (C)	25.4 (C)	26.2 (C)	25.6 (C)	26.3 (C)	25.6 (C)	26.3 (C)	25.4 (C)	26.2 (C)	25.6 (C)	26.3 (C)
	WB Approach	25.6 (C)	26.3 (C)	25.4 (C)	26.2 (C)	25.6 (C)	26.3 (C)	25.6 (C)	26.3 (C)	25.4 (C)	26.2 (C)	25.6 (C)	26.3 (C)
	SBLT	18.0 (B)	19.7 (B)	17.6 (B)	19.3 (B)	18.2 (B)	19.7 (B)	18.0 (B)	19.7 (B)	17.6 (B)	19.3 (B)	18.0 (B)	19.7 (B)
	SBTR	17.7 (B)	19.2 (B)	17.3 (B)	18.9 (B)	17.9 (B)	19.2 (B)	17.7 (B)	19.2 (B)	17.3 (B)	18.9 (B)	17.7 (B)	19.2 (B)
	SB Approach	17.8 (B)	19.5 (B)	17.5 (B)	19.1 (B)	18.0 (B)	19.5 (B)	17.8 (B)	19.5 (B)	17.5 (B)	19.1 (B)	17.8 (B)	19.5 (B)
Overall Intersection	19.1 (B)	20.5 (C)	18.8 (B)	20.2 (C)	19.2 (B)	20.5 (C)	19.0 (B)	20.5 (C)	18.8 (B)	20.2 (C)	19.0 (B)	20.5 (C)	
S Heald St & D St	EBTR	25.5 (C)	25.4 (C)	25.5 (C)	25.4 (C)	25.5 (C)	25.4 (C)	25.5 (C)	25.4 (C)	25.5 (C)	25.4 (C)	25.5 (C)	25.4 (C)
	EB Approach	25.5 (C)	25.4 (C)	25.5 (C)	25.4 (C)	25.5 (C)	25.4 (C)	25.5 (C)	25.4 (C)	25.5 (C)	25.4 (C)	25.5 (C)	25.4 (C)
	SBLT	17.7 (B)	19.9 (B)	17.3 (B)	19.4 (B)	17.9 (B)	19.9 (B)	17.7 (B)	19.9 (B)	17.3 (B)	19.4 (B)	17.7 (B)	19.9 (B)
	SBTR	17.8 (B)	20.0 (C)	17.4 (B)	19.6 (B)	18.0 (B)	20.0 (C)	17.8 (B)	20.0 (C)	17.4 (B)	19.6 (B)	17.8 (B)	20.0 (C)
	SB Approach	17.8 (B)	19.9 (B)	17.4 (B)	19.5 (B)	18.0 (B)	19.9 (B)	17.8 (B)	19.9 (B)	17.4 (B)	19.5 (B)	17.8 (B)	19.9 (B)
	Overall Intersection	18.8 (B)	20.4 (C)	18.5 (B)	20.0 (B)	18.9 (B)	20.4 (C)	18.8 (B)	20.4 (C)	18.5 (B)	20.0 (B)	18.8 (B)	20.4 (C)
S Heald St & Rogers Rd	EBL	67.6 (E)	60.7 (E)	-	-	10.8 (B)	60.8 (E)	215.5 (F)	332.7 (F)	-	-	61.4 (E)	63.6 (E)
	EBT	13.4 (B)	15.2 (B)	-	-	12.8 (B)	14.8 (B)	-	7.7 (A)	-	-	-	7.7 (A)
	EB Approach	15.3 (B)	16.2 (B)	0.0 (A)	0.0 (A)	12.7 (B)	15.8 (B)	215.5 (F)	331.7 (F)	0.0 (A)	0.0 (A)	61.4 (E)	63.4 (E)
	WBL	15.6 (B)	17.0 (B)	11.8 (B)	12.6 (B)	-	-	32.9 (C)	26.0 (C)	11.8 (B)	12.6 (B)	51.4 (D)	43.9 (D)
	WBT	20.1 (C)	20.4 (C)	-	-	-	-			-	-		
	WBR	15.0 (B)	15.5 (B)	11.7 (B)	12.3 (B)	-	-	21.9 (C)	17.9 (B)	11.7 (B)	12.3 (B)	27.2 (C)	25.2 (C)
	WB Approach	19.0 (B)	19.7 (B)	11.7 (B)	12.4 (B)	0.0 (A)	0.0 (A)	31.3 (C)	25.6 (C)	11.7 (B)	12.5 (B)	47.8 (D)	43.0 (D)
	NBL	56.1 (E)	52.8 (D)	-	-	15.9 (B)	52.8 (D)	57.7 (E)	55.5 (E)	-	-	56.0 (E)	55.5 (E)
	NBT	34.9 (C)	34.7 (C)	33.1 (C)	33.0 (C)	33.8 (C)	34.8 (C)	38.0 (D)	34.4 (C)	33.1 (C)	32.9 (C)	35.6 (D)	34.4 (C)
	NBR	29.4 (C)	32.5 (C)	28.2 (C)	31.9 (C)	27.2 (C)	32.5 (C)	-	-	28.2 (C)	32.0 (C)	-	-
	NB Approach	32.3 (C)	33.7 (C)	29.7 (C)	32.1 (C)	30.3 (C)	33.8 (C)	38.2 (D)	34.8 (C)	29.7 (C)	32.2 (C)	35.8 (D)	34.8 (C)
	SBL	49.0 (D)	45.4 (D)	39.8 (D)	36.5 (D)	39.6 (D)	45.4 (D)	-	-	39.8 (D)	36.5 (D)	-	-
	SBT	12.9 (B)	25.4 (C)	12.9 (B)	18.1 (B)	12.3 (B)	25.4 (C)	12.0 (B)	37.3 (D)	18.2 (B)	18.1 (B)	30.2 (C)	37.3 (D)
	SBR	22.9 (C)	22.1 (C)	-	-	11.2 (B)	22.7 (C)	29.3 (C)	31.9 (C)	-	-	27.9 (C)	31.9 (C)
	SB Approach	28.3 (C)	33.8 (C)	25.1 (C)	27.3 (C)	22.7 (C)	33.9 (C)	16.4 (B)	36.1 (D)	28.0 (C)	27.3 (C)	29.6 (C)	36.1 (D)
Overall Intersection	23.7 (C)	25.7 (C)	26.4 (C)	27.9 (C)	23.3 (C)	28.2 (C)	65.3 (E)	105.7 (F)	27.0 (C)	28.0 (C)	44.6 (D)	45.0 (D)	

Intersection	Movement	Weekday Peak Hour Capacity Results											
		2023 No Construction		2023 Detour Phase 1, no mitigation		2023 Detour Phase 3A, no mitigation		2023 Detour Phase 3B, no mitigation		2023 Detour Phase 1, mitigation		2023 Detour Phase 3B, mitigation	
		A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
S Heald St & Garasches Ln	EBL	12.4 (B)	13.1 (B)	12.0 (B)	14.7 (B)	12.1 (B)	12.8 (B)	14.5 (B)	14.5 (B)	12.0 (B)	14.7 (B)	14.5 (B)	14.5 (B)
	EBR	9.1 (A)	9.5 (A)	8.8 (A)	9.3 (A)	9.2 (A)	9.5 (A)	8.8 (A)	8.9 (A)	8.8 (A)	9.3 (A)	8.8 (A)	8.9 (A)
	EB Approach	11.2 (B)	11.5 (B)	11.0 (B)	12.5 (B)	11.0 (B)	11.4 (B)	13.4 (B)	13.3 (B)	11.0 (B)	12.5 (B)	13.4 (B)	13.3 (B)
	NBL	8.0 (A)	8.3 (A)	7.9 (A)	8.3 (A)	8.0 (A)	8.3 (A)	7.7 (A)	7.8 (A)	7.9 (A)	8.3 (A)	7.7 (A)	7.8 (A)
	NBT	0.1 (A)	0.1 (A)	0.1 (A)	0.1 (A)	0.1 (A)	0.1 (A)	0.1 (A)	0.1 (A)	0.1 (A)	0.1 (A)	0.1 (A)	0.1 (A)
	NB Approach	1.1 (A)	1.3 (A)	1.0 (A)	3.4 (A)	1.0 (A)	1.3 (A)	0.4 (A)	0.4 (A)	1.0 (A)	3.4 (A)	0.4 (A)	0.4 (A)
	Overall Intersection	1.4 (A)	1.2 (A)	1.4 (A)	2.1 (A)	1.3 (A)	1.2 (A)	0.9 (A)	1.0 (A)	1.4 (A)	2.1 (A)	0.9 (A)	1.0 (A)
New Sweden St & Garasches Ln	WBLR	9.2 (A)	9.0 (A)	9.2 (A)	9.6 (A)	9.2 (A)	9.3 (A)	9.2 (A)	9.3 (A)	9.2 (A)	9.6 (A)	9.2 (A)	9.3 (A)
	WB Approach	9.2 (A)	9.0 (A)	9.2 (A)	9.6 (A)	9.2 (A)	9.3 (A)	9.2 (A)	9.3 (A)	9.2 (A)	9.6 (A)	9.2 (A)	9.3 (A)
	NBTR	-	-	0.0 (A)	-	-	-	-	-	-	-	-	-
	NB Approach	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)
	SBTL	7.5 (A)	7.6 (A)	7.5 (A)	6.0 (A)	7.5 (A)	7.6 (A)	7.5 (A)	7.6 (A)	7.5 (A)	6.0 (A)	7.5 (A)	7.6 (A)
	SB Approach	4.3 (A)	6.0 (A)	4.3 (A)	6.0 (A)	4.3 (A)	6.0 (A)	4.3 (A)	6.0 (A)	4.3 (A)	6.0 (A)	4.3 (A)	6.0 (A)
	Overall Intersection	3.6 (A)	6.1 (A)	3.6 (A)	7.3 (A)	3.6 (A)	6.5 (A)	3.6 (A)	6.5 (A)	3.6 (A)	7.3 (A)	3.6 (A)	6.5 (A)
S Market St & Howard St	SBLT	0.5 (A)	0.7 (A)	0.5 (A)	0.8 (A)	0.5 (A)	0.7 (A)	0.5 (A)	0.7 (A)	0.5 (A)	0.8 (A)	0.5 (A)	0.7 (A)
	SBT	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)
	SB Approach	0.4 (A)	0.6 (A)	0.4 (A)	0.6 (A)	0.4 (A)	0.6 (A)	0.4 (A)	0.6 (A)	0.4 (A)	0.6 (A)	0.4 (A)	0.6 (A)
	Overall Intersection	0.4 (A)	0.6 (A)	0.4 (A)	0.6 (A)	0.4 (A)	0.6 (A)	0.4 (A)	0.6 (A)	0.4 (A)	0.6 (A)	0.4 (A)	0.6 (A)
S Walnut St & Howard St	EBL	-	-	-	-	-	-	-	-	-	-	-	-
	EB Approach	-	-	-	-	-	-	-	-	-	-	-	-
	NBLT	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)
	NBT	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)
	NB Approach	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)
	Overall Intersection	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)	0.5 (A)	0.3 (A)
New Castle Ave & New York Ave	WBLR	13.3 (B)	11.8 (B)	13.3 (B)	11.8 (B)	13.4 (B)	11.8 (B)	18.2 (C)	17.2 (C)	13.3 (B)	11.8 (B)	18.2 (C)	17.2 (C)
	WB Approach	13.3 (B)	11.8 (B)	13.3 (B)	11.8 (B)	13.4 (B)	11.8 (B)	18.2 (C)	17.2 (C)	13.3 (B)	11.8 (B)	18.2 (C)	17.2 (C)
	NBT	-	-	-	-	-	-	-	-	-	-	-	-
	NBTR	-	-	-	-	-	-	-	-	-	-	-	-
	NB Approach	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)
	SBLT	8.8 (A)	9.0 (A)	8.8 (A)	9.1 (A)	9.0 (A)	9.1 (A)	8.6 (A)	9.0 (A)	8.8 (A)	9.1 (A)	8.6 (A)	9.0 (A)
	SB Approach	1.6 (A)	0.6 (A)	1.6 (A)	0.7 (A)	1.4 (A)	0.7 (A)	0.4 (A)	0.3 (A)	1.6 (A)	0.7 (A)	0.4 (A)	0.3 (A)
	Overall Intersection	1.0 (A)	0.7 (A)	1.0 (A)	0.7 (A)	0.9 (A)	0.7 (A)	0.9 (A)	0.7 (A)	1.0 (A)	0.7 (A)	0.9 (A)	0.7 (A)

Intersection	Movement	Weekday Peak Hour Capacity Results											
		2023 No Construction		2023 Detour Phase 1, no mitigation		2023 Detour Phase 3A, no mitigation		2023 Detour Phase 3B, no mitigation		2023 Detour Phase 1, mitigation		2023 Detour Phase 3B, mitigation	
		A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
S Market St & S Walnut St & Millside Dr	EBL	54.5 (D)	53.6 (D)	-	-	54.7 (D)	53.6 (D)	Intersection not impacted by detour routing	-	-	Intersection not impacted by detour routing	-	-
	EBR	42.7 (D)	48.7 (D)	55.0 (D)	54.7 (D)	42.8 (D)	48.7 (D)		55.0 (D)	54.7 (D)			
	EB Approach	49.9 (D)	50.5 (D)	55.0 (D)	54.7 (D)	50.0 (D)	50.5 (D)		55.0 (D)	54.7 (D)			
	WBL	61.2 (E)	58.4 (E)	-	-	-	-		-	-			
	WBTR	56.7 (E)	54.8 (D)	57.6 (E)	58.5 (E)	57.6 (E)	58.5 (E)		57.6 (E)	58.5 (E)			
	WB Approach	60.9 (E)	57.5 (E)	57.6 (E)	58.5 (E)	57.6 (E)	58.5 (E)		57.6 (E)	58.5 (E)			
	SBL	38.3 (D)	6.1 (A)	7.0 (A)	1.7 (A)	37.9 (D)	6.4 (A)		4.5 (A)	1.7 (A)			
	SBTR	38.1 (D)	14.9 (B)	19.5 (B)	5.3 (A)	36.9 (D)	15.1 (B)		13.2 (B)	5.3 (A)			
	SB Approach	38.1 (D)	14.9 (B)	19.5 (B)	5.3 (A)	36.9 (D)	15.0 (B)		13.1 (B)	5.2 (A)			
	NBL	5.2 (A)	3.5 (A)	-	-	6.2 (A)	4.1 (A)		-	-			
	NBT	311.4 (F)	17.0 (B)	274.0 (F)	17.7 (B)	299.6 (F)	21.3 (C)		271.1 (F)	15.9 (B)			
	NBR	11.6 (B)	9.6 (A)	6.5 (A)	7.5 (A)	11.2 (B)	9.7 (A)		6.5 (A)	7.5 (A)			
	NB Approach	285.1 (F)	15.8 (B)	272.1 (F)	17.6 (B)	274.5 (F)	19.8 (B)		269.3 (F)	15.9 (B)			
	Overall Intersection	199.8 (F)	19.0 (B)	181.9 (F)	15.9 (B)	192.6 (F)	21.0 (C)		178.2 (F)	15.1 (B)			
S Market St/ S Walnut St & S Heald St	WBT	58.9 (E)	56.7 (E)	58.9 (E)	56.8 (E)	59.8 (E)	57.8 (E)	63.3 (E)	58.9 (E)	56.8 (E)	56.8 (E)	63.1 (E)	56.3 (E)
	WB Approach	58.9 (E)	56.7 (E)	58.9 (E)	56.8 (E)	59.8 (E)	57.8 (E)	63.3 (E)	58.9 (E)	56.8 (E)	56.8 (E)	63.1 (E)	56.3 (E)
	NBT	2.9 (A)	2.5 (A)	4.8 (A)	3.0 (A)	3.1 (A)	2.4 (A)	6.4 (A)	4.5 (A)	3.0 (A)	3.1 (A)	6.4 (A)	2.7 (A)
	NB Approach	2.9 (A)	2.5 (A)	4.8 (A)	3.0 (A)	3.1 (A)	2.4 (A)	6.4 (A)	4.5 (A)	3.0 (A)	3.1 (A)	6.4 (A)	2.7 (A)
	SBT	0.3 (A)	0.4 (A)	0.4 (A)	0.6 (A)	0.3 (A)	0.4 (A)	0.3 (A)	0.4 (A)	0.6 (A)	0.6 (A)	0.3 (A)	0.3 (A)
	SB Approach	0.3 (A)	0.4 (A)	0.4 (A)	0.6 (A)	0.3 (A)	0.4 (A)	0.3 (A)	0.4 (A)	0.6 (A)	0.6 (A)	0.3 (A)	0.3 (A)
	Overall Intersection	5.3 (A)	7.5 (A)	5.0 (A)	6.2 (A)	4.4 (A)	5.6 (A)	7.3 (A)	5.4 (A)	6.1 (A)	6.2 (A)	7.3 (A)	7.8 (A)
I-495 SB Ramps & Terminal Ave	EBT	-	-	-	-	-	-	Intersection not impacted by detour routing	-	-	Intersection not impacted by detour routing	-	-
	EBTR	-	-	-	-	-	-		-	-			
	EB Approach	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)		0.0 (A)	0.0 (A)			
	WBL	11.2 (B)	9.1 (A)	15.7 (B)	10.6 (B)	10.8 (B)	10.8 (B)		15.7 (C)	10.6 (B)			
	WBT	-	-	-	-	-	-		-	-			
	WB Approach	6.2 (A)	5.4 (A)	9.1 (A)	6.6 (A)	6.3 (A)	6.8 (A)		9.1 (A)	6.6 (A)			
	SBLT	58.3 (F)	31.6 (D)	136.9 (F)	42.1 (E)	45.7 (E)	29.6 (D)		136.9 (F)	42.1 (E)			
	SBR	11.4 (B)	10.8 (B)	11.0 (B)	10.6 (B)	10.8 (B)	10.5 (B)		11.0 (B)	10.6 (B)			
	SB Approach	26.2 (D)	14.6 (B)	56.7 (F)	18.0 (C)	23.7 (C)	15.1 (C)		56.7 (F)	18.0 (C)			
Overall Intersection	12.5 (B)	7.0 (A)	21.1 (C)	7.0 (A)	9.1 (A)	5.8 (A)	21.1 (C)	7.0 (A)					

Intersection	Movement	Weekday Peak Hour Capacity Results											
		2023 No Construction		2023 Detour Phase 1, no mitigation		2023 Detour Phase 3A, no mitigation		2023 Detour Phase 3B, no mitigation		2023 Detour Phase 1, mitigation		2023 Detour Phase 3B, mitigation	
		A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
I-495 NB Ramps & Terminal Ave	EBT	-	-	-	-	-	-	Intersections not impacted by detour routing	-	-	Intersections not impacted by detour routing	-	-
	EBR	-	-	-	-	-	-		-	-			
	EB Approach	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)		0.0 (A)	0.0 (A)			
	WBLT	9.0 (A)	7.8 (A)	9.0 (A)	7.8 (A)	8.1 (A)	7.6 (A)		9.0 (A)	7.8 (A)			
	WBT	-	-	-	-	-	-		-	-			
	WB Approach	3.0 (A)	2.3 (A)	3.0 (A)	2.3 (A)	2.7 (A)	2.2 (A)		3.0 (A)	2.3 (A)			
	NBL	19.0 (C)	14.9 (B)	19.0 (C)	14.9 (B)	18.0 (C)	14.6 (B)		19.0 (C)	14.9 (B)			
	NBR	11.9 (B)	9.5 (A)	11.9 (B)	9.5 (A)	10.9 (B)	8.9 (A)		11.9 (B)	9.5 (A)			
	NB Approach	13.7 (B)	12.1 (B)	13.7 (B)	12.1 (B)	12.7 (B)	11.7 (B)		13.7 (B)	12.1 (B)			
	Overall Intersection	4.7 (A)	2.9 (A)	4.7 (A)	2.9 (A)	4.3 (A)	2.8 (A)		4.7 (A)	2.9 (A)			
I 495 SB Off Ramp NB On Ramp & US 13	EB Approach	54.3 (D)	53.8 (D)	57.8 (E)	52.1 (D)	54.0 (D)	54.8 (D)	55.2 (E)	52.1 (D)				
	NB Approach	13.1 (B)	12.0 (B)	24.2 (C)	18.7 (B)	22.9 (C)	18.2 (B)	46.9 (D)	53.6 (D)				
	SBL	51.0 (D)	123.6 (F)	105.3 (F)	171.0 (F)	48.8 (D)	183.1 (F)	80.9 (E)	133.2 (F)				
	SBT	0.9 (A)	4.4 (A)	8.3 (A)	17.7 (B)	5.6 (A)	10.9 (B)	8.1 (A)	17.7 (B)				
	SB Approach	4.0 (A)	11.2 (B)	44.0 (D)	60.4 (E)	8.4 (A)	21.3 (C)	34.8 (D)	49.9 (D)				
	Overall Intersection	11.1 (B)	25.3 (C)	37.2 (D)	46.9 (D)	23.6 (C)	25.8 (C)	43.1 (D)	51.3 (D)				

Table 2. 95th Percentile Queue Results – Weekday Peak Hours Phase 1 through Phase 3

Intersection	Movement	Available Storage Length (ft)	Weekday Peak Hour 95th Percentile Queue in Feet											
			2023 No Construction		2023 Detour Phase 1, no mitigation		2023 Detour Phase 3A, no mitigation		2023 Detour Phase 3B, no mitigation		2023 Detour Phase 1, mitigation		2023 Detour Phase 3B, mitigation	
			A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
S Heald St & A St	EBTR	230	67	82	62	78	68	82	71	80	62	75	68	86
	WBLT	73	83	72	86	74	92	75	80	76	80	76	77	71
	SBLT	187	113	139	101	146	105	145	107	147	109	146	110	143
	SBTR	353	81	116	76	114	76	106	86	110	88	114	85	111
New Castle Ave & A St	EBLT	68	36	45	43	41	38	38	46	39	41	47	42	44
	WBTR	249	53	54	51	59	57	63	51	54	59	57	57	60
	NBLT	420	58	26	75	27	122	30	58	35	51	40	65	22
	NBTR	420	43	29	62	33	98	32	44	33	47	35	57	34
S Walnut St & A St	EBLT	862	124	117	110	108	125	118	139	116	118	120	120	119
	WBT	>1000	78	96	142	679	83	106	92	88	110	131	82	92
	WBR	>1000	77	55	92	88	81	59	92	57	84	56	96	59
	NBLT	570	186	143	164	217	194	141	178	136	176	149	171	130
	NBT	570	278	194	164	190	277	203	288	201	186	198	283	196
	NBTR	570	306	230	171	222	311	239	331	235	204	230	313	232
S Market St/Market St & A St	WBL	890	92	131	578	1035	85	132	98	124	115	175	85	111
	SBL	845	4	12	133	181	6	11	10	9	8	9	-	12
	SBT	845	3	-	433	550	-	-	3	-	6	5	3	3
S Market St & New Sweden St	EBLT	>1000	90	88	940	1063	82	97	82	90	93	94	86	94
	EBR	430	-	277	687	715	-	301	-	273	25	248	27	284
	WBLTR	>1000	88	137	106	753	109	124	94	153	109	169	97	165
	NBUL	340	387	355	481	483	398	372	374	373	395	459	401	330
	NBT	>1000	513	208	2047	1929	567	238	450	268	475	1126	501	227
	SBL	210	38	110	69	126	80	160	20	149	92	124	82	139
	SBT	>1000	351	518	568	479	358	562	354	563	442	539	356	516
	SBR	>1000	10	343	382	407	-	221	-	375	-	267	-	355
New Castle Ave & Rogers Rd/Sutton Ln	EBLT	247	111	113	129	93	93	180	-	7	132	111	-	6
	EBR	80	41	54	51	37	35	106	-	-	57	42	-	-
	WBLTR	>1000	21	8	11	7	17	9	28	8	17	11	16	12
	NBL	636	125	104	24	21	-	-	93	126	28	22	90	119
	NBT	636	67	57	107	75	99	100	22	20	114	77	10	14
	NBTR	636	95	77	139	97	119	126	27	27	136	93	7	25
	SBLT	664	103	74	73	58	55	59	106	165	78	60	98	147
	SBT	664	101	74	73	50	67	59	121	185	84	59	119	163
	SBR	215	-	-	-	-	-	-	-	-	-	-	-	-

Intersection	Movement	Available Storage Length (ft)	Weekday Peak Hour 95th Percentile Queue in Feet											
			2023 No Construction		2023 Detour Phase 1, no mitigation		2023 Detour Phase 3A, no mitigation		2023 Detour Phase 3B, no mitigation		2023 Detour Phase 1, mitigation		2023 Detour Phase 3B, mitigation	
			A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
New Castle Ave & Driveway/Terminal Ave	EBLTR	500	104	42	90	41	96	46	94	49	102	51	102	39
	WBL	800	109	157	90	148	95	137	132	167	81	158	130	164
	WBR	170	-	-	-	-	-	-	-	-	-	-	-	20
	NBL	155	6	-	6	-	6	-	9	-	9	-	8	-
	NBT	>1000	93	82	151	83	123	78	91	72	106	88	87	70
	NBR	195	46	16	138	72	130	102	32	-	91	44	11	-
	SBL	188	80	54	82	67	85	67	95	71	89	79	85	66
	SBT	925	48	51	35	40	33	45	116	151	41	43	120	139
SBTR	925	63	71	58	57	48	64	130	165	48	63	145	153	
New Castle Ave & C St	EBLT	307	40	50	44	54	34	50	38	59	40	55	44	52
	NBLT	372	136	92	159	80	160	95	153	92	149	88	160	92
	NBTR	>1000	137	82	142	74	144	90	143	86	140	80	147	90
New Castle Ave & B St	WBT	387	54	45	51	50	54	48	59	48	52	46	53	46
	WBTR	387	16	26	18	26	23	29	21	29	22	26	20	29
	NBLT	304	45	48	43	47	44	46	45	47	48	54	47	47
	NBT	304	35	37	39	29	29	36	31	33	35	36	36	35
S Heald St & B St	WBLT	194	73	63	72	67	81	68	86	70	76	67	77	64
	WBT	194	24	26	28	30	27	33	27	29	30	29	20	28
	SBT	407	54	52	50	48	59	49	46	47	51	56	51	51
	SBTR	407	60	65	60	62	75	70	61	76	60	72	63	69
S Heald St & C St	EBTR	200	50	55	58	50	51	45	59	46	50	47	53	51
	WBLT	308	57	69	47	72	62	71	46	77	55	79	61	77
	SBLT	308	49	42	51	48	49	44	48	44	46	48	48	42
	SBTR	308	55	41	45	41	51	47	55	52	52	43	57	49
S Heald St & D St	EBTR	447	74	67	74	74	75	62	72	68	81	65	80	76
	SBLT	172	36	50	30	47	38	53	37	47	34	48	38	45
	SBTR	402	62	63	54	59	66	65	69	78	56	69	62	76

Intersection	Movement	Available Storage Length (ft)	Weekday Peak Hour 95th Percentile Queue in Feet											
			2023 No Construction		2023 Detour Phase 1, no mitigation		2023 Detour Phase 3A, no mitigation		2023 Detour Phase 3B, no mitigation		2023 Detour Phase 1, mitigation		2023 Detour Phase 3B, mitigation	
			A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
S Heald St/Heald St & Rogers Rd	EBL	336	26	34	-	-	33	32	331	333	-	-	227	291
	EBT	336	146	159	-	-	149	168	-	-	-	-	-	4
	WBL	>1000	62	69	52	56	-	-	311	307	50	56	287	285
	WBT	>1000	226	174	-	-	-	-			-	-	-	-
	WBR	130	88	25	-	-	-	-	136	65	-	-	142	102
	NBL	410	22	22	-	-	19	22	20	25	-	-	21	20
	NBT	665	182	129	184	122	168	122	344	239	195	117	328	259
	NBR	715	35	52	40	80	31	59	-	-	76	110	-	-
	SBL	>1000	111	158	119	149	121	162	-	-	110	156	-	-
	SBT	>1000	127	141	-	-	116	135	96	184	-	-	128	163
SBR	160	46	52	107	114	63	78	54	71	112	128	79	69	
S Heald St & Garasches Ln	EBL	>1000	62	49	54	40	50	39	62	53	45	54	60	57
	EBR	>1000	48	52	33	40	20	18	40	36	40	50	37	44
	NBLT	>1000	23	31	16	57	20	23	17	20	27	48	20	24
	SBT	>1000	-	3	4	-	8	-	4	-	-	-	-	-
	SBTR	>1000	7	-	7	3	-	5	-	-	-	3	-	-
New Sweden St & Garasches Ln	WBLR	>1000	48	54	46	66	52	56	50	55	49	61	50	59
	SBL	>1000	15	17	18	13	15	15	15	19	16	23	11	17
S Market St & Howard St	SBLT	704	168	239	861	971	150	209	150	218	149	218	148	207
	SBT	704	151	229	854	999	149	228	166	243	166	242	155	231
S Walnut St & Howard St	EBL	704	116	88	104	60	116	99	117	86	125	92	123	88
	NBLT	911	192	65	183	47	185	62	187	73	193	33	181	69
	NBT	>1000	333	97	249	88	337	91	334	130	270	69	331	113
New Castle Ave & New York Ave	WBLR	>1000	60	32	59	34	61	36	64	33	60	32	64	35
	NBT	>1000	14	5	14	3	26	6	17	12	16	-	20	10
	NBTR	994	19	21	15	14	24	16	13	-	27	-	18	9
	SBLT	657	19	19	17	25	29	16	63	42	22	21	53	55

Intersection	Movement	Available Storage Length (ft)	Weekday Peak Hour 95th Percentile Queue in Feet											
			2023 No Construction		2023 Detour Phase 1, no mitigation		2023 Detour Phase 3A, no mitigation		2023 Detour Phase 3B, no mitigation		2023 Detour Phase 1, mitigation		2023 Detour Phase 3B, mitigation	
			A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
S Market St & S Walnut St & Millside Dr	EBL	250	145	134	-	-	153	133	Intersections not impacted by detour routing	-	-	Intersections not impacted by detour routing		
	EBR	250	216	201	189	202	181	168		198	196			
	WBL	100	41	54	52	87	-	-		41	67			
	WBTR	600	5	23			38	53						
	NBL	300	310	145	-	-	300	116		-	-			
	NBT	>1000	585	292	576	237	578	260		641	240			
	NBR	>1000	463	125	128	13	138	34		137	15			
	SBL	120	2	96	-	145	4	77		4	79			
	SBT	>1000	514	822	3019	3099	1085	966		582	289			
	SBTR	>1000	475	872	3042	3090	1085	986		543	321			
S Market St/ S Walnut St & S Heald St	WBT	300	114	141	110	210	90	116	113	140				
	NBT	>1000	128	72	613	145	157	48	368	137				
	SBT	665	106	190	983	961	82	133	428	107				
I-495 SB Off Ramp & On Ramp & Terminal Ave	EBT	>1000	2	-	15	2	-	-	9	11				
	EBTR	>1000	22	21	57	44	28	22	74	64				
	WBLT	330	110	72	148	88	71	88	150	90				
	WBT	690	3	5	-	0	3	-	5	-				
	SBLT	750	166	85	480	134	135	68	603	349				
	SBR	750	61	34	213	53	19	11	215	135				
I-495 NB Off Ramp & On Ramp & Terminal Ave	EBT	630	57	32	57	4	36	28	51	15				
	EBR	630	78	61	74	62	81	59	71	52				
	WBLT	550	81	39	87	47	53	37	80	36				
	WBT	550	-	-	-	-	-	-	-	-				
	NBL	>1000	75	68	76	64	61	58	75	61				
	NBR	330	26	-	-	-	18	-	37	-				
I 495 SB Off Ramp NB On Ramp & US 13	EBT	300	77	76	259	196	201	207	200	196				
	NBT	915	303	218	488	251	300	216	308	318				
	SBL	720	111	113	772	772	103	117	842	464				
	SBT	>1000	113	133	1226	1221	146	195	1486	196				

Table 3. Capacity Analysis and 95th Percentile Queue Results – Weekday Peak Hours Phase 4

Intersection	Movement	Weekday Peak Hour Capacity Results						Weekday Peak Hour 95 th Percentile Queue in Feet						
		2023 No Construction		2023 Detour Phase 4, no mitigation		2023 Detour Phase 4, mitigation		2023 No Construction		2023 Detour Phase 4, no mitigation		2023 Detour Phase 4, mitigation		
		A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	Available Storage Length	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
S Heald St & A St	EBTR	25.2 (C)	25.9 (C)	25.2 (C)	25.9 (C)	8.7 (A)	8.9 (A)	230	67	82	158	74	54	69
	EB Approach	25.2 (C)	25.9 (C)	25.2 (C)	25.9 (C)	8.7 (A)	8.9 (A)	-	-	-	-	-	-	-
	WBLT	26.4 (C)	25.9 (C)	101.8 (F)	63.5 (F)	28.9 (C)	27.1 (C)	73	83	72	87	83	97	95
	WB Approach	26.4 (C)	25.9 (C)	101.8 (F)	63.5 (F)	28.9 (C)	27.1 (C)	-	-	-	-	-	-	-
	SBLT	8.2 (A)	8.9 (A)	8.2 (A)	9.0 (A)	25.7 (C)	28.9 (C)	187	113	139	360	191	157	205
	SBTR	8.1 (A)	8.8 (A)	8.2 (A)	8.8 (A)	25.6 (C)	28.3 (C)	353	81	116	340	183	120	188
	SB Approach	8.2 (A)	8.9 (A)	8.2 (A)	8.9 (A)	25.6 (C)	28.6 (C)	-	-	-	-	-	-	-
	Overall Intersection	13.2 (B)	12.2 (B)	66.0 (E)	34.9 (C)	26.9 (C)	26.8 (C)	-	-	-	-	-	-	-
New Castle Ave & A St	EBLT	25.3 (C)	25.2 (C)	25.3 (C)	25.2 (C)	28.5 (C)	25.2 (C)	68	36	45	40	50	50	49
	EB Approach	25.3 (C)	25.2 (C)	25.3 (C)	25.2 (C)	28.5 (C)	25.2 (C)	-	-	-	-	-	-	-
	WBTR	25.2 (C)	25.4 (C)	25.2 (C)	25.4 (C)	28.5 (C)	25.4 (C)	249	53	54	131	58	85	104
	WB Approach	25.2 (C)	25.4 (C)	25.2 (C)	25.4 (C)	28.5 (C)	25.4 (C)	-	-	-	-	-	-	-
	NBLT	20.3 (C)	18.5 (B)	168.9 (F)	35.9 (D)	130.0 (F)	35.9 (D)	420	58	26	441	440	175	103
	NBTR	19.8 (B)	18.1 (B)	111.4 (F)	32.0 (C)	80.0 (F)	32.0 (C)	420	43	29	622	617	156	77
	NB Approach	20.1 (C)	18.3 (B)	141.5 (F)	34.0 (C)	106.2 (F)	34.0 (C)	-	-	-	-	-	-	-
	Overall Intersection	20.6 (C)	19.5 (B)	138.3 (F)	33.6 (C)	104.0 (F)	33.6 (C)	-	-	-	-	-	-	-
S Walnut St & A St	EBLT	35.6 (D)	35.4 (D)	134.9 (F)	70.2 (E)	30.8 (C)	21.9 (C)	862	124	117	128	110	121	110
	EB Approach	35.6 (D)	35.4 (D)	134.9 (F)	70.2 (E)	30.8 (C)	21.9 (C)	-	-	-	-	-	-	-
	WBT	34.3 (C)	35.0 (C)	155.3 (F)	115.5 (F)	38.5 (D)	29.1 (C)	>1000	78	96	287	2374	440	796
	WBR	34.7 (C)	33.2 (C)	36.0 (D)	34.9 (C)	22.6 (C)	19.0 (B)	>1000	77	55	132	176	217	185
	WB Approach	34.5 (C)	34.8 (C)	138.4 (F)	107.5 (F)	36.3 (D)	28.1 (C)	-	-	-	-	-	-	-
	NBLT	13.9 (B)	10.0 (A)	9.1 (A)	8.3 (A)	18.2 (B)	19.6 (B)	570	186	143	60	233	103	100
	NBT	12.3 (B)	9.5 (A)	8.8 (A)	8.2 (A)	17.7 (B)	19.3 (B)	570	278	194	74	99	142	85
	NBTR	13.0 (B)	9.7 (A)	9.0 (A)	8.3 (A)	18.0 (B)	19.6 (B)	570	306	230	106	65	177	113
	NB Approach	13.0 (B)	9.7 (A)	8.9 (A)	8.3 (A)	17.9 (B)	19.5 (B)	-	-	-	-	-	-	-
Overall Intersection	14.6 (B)	13.0 (B)	69.5 (E)	68.8 (E)	26.2 (C)	24.4 (C)	-	-	-	-	-	-	-	
S Market St & A St	WBL	14.5 (B)	25.2 (D)	126.0 (F)	461.5 (F)	126.0 (F)	461.5 (F)	890	92	131	276	994	361	885
	WB Approach	14.5 (B)	25.2 (D)	126.0 (F)	461.5 (F)	126.0 (F)	461.5 (F)	-	-	-	-	-	-	-
	SBL	8.5 (A)	8.6 (A)	8.5 (A)	8.6 (A)	8.5 (A)	8.6 (A)	845	4	12	8	111	-	50
	SBT	-	-	-	-	-	-	845	3	-	14	441	-	122
	SB Approach	0.7 (A)	0.6 (A)	0.7 (A)	0.6 (A)	0.7 (A)	0.6 (A)	-	-	-	-	-	-	-
	Overall Intersection	2.1 (A)	2.1 (A)	49.1 (E)	113.6 (F)	49.1 (E)	113.6 (F)	-	-	-	-	-	-	-

Intersection	Movement	Weekday Peak Hour Capacity Results						Weekday Peak Hour 95 th Percentile Queue in Feet						
		2023 No Construction		2023 Detour Phase 4, no mitigation		2023 Detour Phase 4, mitigation		2023 No Construction		2023 Detour Phase 4, no mitigation		2023 Detour Phase 4, mitigation		
		A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	Available Storage Length	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
S Market St & New Sweden St	EBLT	80.9 (F)	75.8 (E)	80.9 (F)	75.8 (E)	80.9 (F)	75.8 (E)	>1000	90	88	84	946	84	95
	EBR	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	430	-	277	-	658	-	347
	EB Approach	80.9 (F)	75.8 (E)	80.9 (F)	75.8 (E)	80.9 (F)	75.8 (E)	-	-	-	-	-	-	-
	WBLTR	84.5 (F)	66.2 (E)	83.2 (F)	66.0 (E)	83.2 (F)	66.0 (E)	>1000	88	137	90	620	98	134
	WB Approach	84.5 (F)	66.2 (E)	83.2 (F)	66.0 (E)	83.2 (F)	66.0 (E)	-	-	-	-	-	-	-
	NBL	65.2 (E)	72.3 (E)	65.2 (E)	65.2 (E)	65.2 (E)	65.2 (E)	340	387	355	172	141	171	134
	NBT	15.3 (B)	9.8 (B)	6.9 (A)	9.0 (A)	6.9 (A)	9.0 (A)	>1000	513	208	197	68	207	84
	NB Approach	22.5 (C)	27.0 (C)	15.6 (B)	26.5 (C)	15.6 (B)	26.5 (C)	-	-	-	-	-	-	-
	SBL	79.9 (E)	71.8 (E)	73.7 (E)	75.7 (E)	73.7 (E)	75.7 (E)	210	38	110	86	209	152	233
	SBT	20.7 (C)	37.0 (D)	10.9 (B)	18.1 (B)	10.9 (B)	18.1 (B)	>1000	351	518	297	528	378	453
	SBR	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	>1000	10	343	4	556	54	267
	SB Approach	20.7 (C)	37.6 (D)	13.4 (B)	21.2 (C)	13.4 (B)	21.2 (C)	-	-	-	-	-	-	-
Overall Intersection	23.7 (C)	34.2 (D)	17.8 (B)	25.4 (C)	17.8 (B)	25.4 (C)	-	-	-	-	-	-	-	
New Castle Ave & Rogers Rd/Sutton Ln	EBLT	31.4 (C)	43.7 (D)	1070.8 (F)	294.9 (F)	460.7 (F)	34.7 (C)	247	111	113	3849	3215	986	3675
	EBR	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	80	41	54	203	204	192	182
	EB Approach	31.4 (C)	43.7 (D)	1070.8 (F)	294.9 (F)	460.7 (F)	34.7 (C)	-	-	-	-	-	-	-
	WBLTR	29.0 (C)	39.6 (D)	21.1 (C)	20.7 (C)	8.2 (A)	8.1 (A)	>1000	21	8	17	12	12	8
	WB Approach	29.0 (C)	39.6 (D)	21.1 (C)	20.7 (C)	8.2 (A)	8.1 (A)	-	-	-	-	-	-	-
	NBL	5.0 (A)	3.7 (A)	12.5 (B)	11.9 (B)	28.9 (C)	27.0 (C)	636	125	104	407	127	195	48
	NBT	3.4 (A)	2.5 (A)	14.7 (B)	13.2 (B)	53.8 (D)	36.8 (D)	636	67	57	1146	1130	350	254
	NBTR	3.4 (A)	2.5 (A)	14.6 (B)	13.2 (B)	53.0 (D)	36.5 (D)	636	95	77	1154	1136	316	235
	NB Approach	4.0 (A)	2.9 (A)	14.5 (B)	13.2 (B)	51.2 (D)	36.5 (D)	-	-	-	-	-	-	-
	SBTL	8.8 (A)	6.0 (A)	17.3 (B)	15.5 (B)	43.4 (D)	37.8 (D)	664	103	74	84	69	149	137
	SBR	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	664	101	74	-	-	-	-
	SB Approach	8.8 (A)	6.0 (A)	17.3 (B)	15.5 (B)	43.4 (D)	37.8 (D)	-	-	-	-	-	-	-
Overall Intersection	6.9 (A)	6.5 (A)	608.2 (F)	129.6 (F)	280.2 (F)	36.0 (D)	-	-	-	-	-	-	-	

Intersection	Movement	Weekday Peak Hour Capacity Results						Weekday Peak Hour 95 th Percentile Queue in Feet							
		2023 No Construction		2023 Detour Phase 4, no mitigation		2023 Detour Phase 4, mitigation		2023 No Construction		2023 Detour Phase 4, no mitigation		2023 Detour Phase 4, mitigation			
		A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	Available Storage Length	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	
New Castle Ave & Driveway/Terminal Ave	EBLTR	529.0 (F)	84.8 (F)	519.0 (F)	84.8 (F)	564.5 (F)	84.8 (F)	500	104	42	84	41	102	51	
	EB Approach	529.0 (F)	84.8 (F)	519.0 (F)	84.8 (F)	564.5 (F)	84.8 (F)	-	-	-	-	-	-	-	
	WBL	28.3 (C)	47.3 (D)	28.4 (C)	43.8 (D)	47.3 (D)	43.8 (D)	800	109	157	1308	1327	88	115	
	WBR	-	-	-	-	-	-	170	-	-	257	256	50	24	
	WB Approach	28.4 (C)	47.9 (D)	28.4 (C)	43.8 (D)	47.3 (D)	43.8 (D)	-	-	-	-	-	-	-	
	NBL	11.1 (B)	0.0 (A)	10.2 (B)	0.0 (A)	8.8 (A)	0.0 (A)	155	6	-	60	-	-	-	-
	NBT	13.4 (B)	9.8 (A)	434.2 (F)	15.7 (B)	287.0 (F)	14.7 (B)	>1000	93	82	4221	4540	277	189	
	NBR	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	195	46	16	300	300	187	62	
	NB Approach	13.4 (B)	9.8 (A)	433.7 (F)	15.7 (B)	286.7 (F)	14.7 (B)	-	-	-	-	-	-	-	
	SBL	9.4(A)	6.8 (A)	15.2 (B)	12.7 (B)	21.2 (C)	12.7 (B)	188	80	54	61	36	89	80	
	SBTR	9.4 (A)	5.4 (A)	8.5 (A)	4.8 (A)	7.3 (A)	4.8 (A)	925	63	71	33	43	51	71	
SB Approach	9.4 (A)	5.9 (A)	11.5 (B)	7.4 (A)	13.6 (B)	7.4 (A)	-	-	-	-	-	-	-		
Overall Intersection	33.1 (C)	22.4 (C)	373.7 (F)	18.4 (B)	251.5 (F)	17.7 (B)	-	-	-	-	-	-	-		
New Castle Ave & C St	EBLT	24.8 (C)	25.3 (C)	24.9 (C)	25.3 (C)	25.6 (C)	25.3 (C)	307	40	50	36	111	33	50	
	EB Approach	24.8 (C)	25.3 (C)	24.9 (C)	25.3 (C)	25.6 (C)	25.3 (C)	-	-	-	-	-	-	-	
	NBLT	9.7 (A)	9.0 (A)	156.4 (F)	23.1 (C)	146.0 (F)	23.1 (C)	372	136	92	324	325	366	260	
	NBTR	9.9 (A)	9.2 (A)	170.8 (F)	25.6 (C)	159.7 (F)	25.6 (C)	>1000	137	82	326	325	368	251	
	NB Approach	9.8 (A)	9.1 (A)	163.2 (F)	24.3 (C)	152.5 (F)	24.3 (C)	-	-	-	-	-	-	-	
	Overall Intersection	10.4 (B)	10.5 (B)	161.7 (F)	24.3 (C)	151.1 (F)	24.3 (C)	-	-	-	-	-	-	-	
New Castle Ave & B St	WBT	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	26.2 (C)	24.7 (C)	387	54	45	69	50	46	46	
	WBTR	24.7 (C)	24.8 (C)	24.7 (C)	24.7 (C)	26.3 (C)	24.7 (C)	387	16	26	68	71	24	27	
	WB Approach	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	26.2 (C)	24.7 (C)	-	-	-	-	-	-	-	
	NBLT	21.1 (C)	19.0 (B)	191.6 (F)	37.8 (D)	171.1 (F)	37.8 (D)	304	45	48	339	337	101	61	
	NBT	21.3 (C)	19.2 (B)	211.7 (F)	39.9 (D)	189.7 (F)	39.9 (D)	304	35	37	355	380	95	54	
	NB Approach	21.2 (C)	19.1 (B)	200.9 (F)	38.8 (D)	179.7 (F)	38.8 (D)	-	-	-	-	-	-	-	
	Overall Intersection	21.4 (C)	19.6 (B)	198.3 (F)	38.4 (D)	177.5 (F)	38.4 (D)	-	-	-	-	-	-	-	
S Heald St & B St	WBLT	25.5 (C)	25.0 (C)	25.5 (C)	25.0 (C)	25.5 (C)	25.0 (C)	194	73	63	114	58	76	67	
	WBT	24.8 (C)	24.9 (C)	24.7 (C)	24.9 (C)	24.7 (C)	24.9 (C)	194	24	26	37	20	27	39	
	WB Approach	25.3 (C)	25.0 (C)	25.3 (C)	25.0 (C)	25.3 (C)	25.0 (C)	-	-	-	-	-	-	-	
	SBT	17.7 (B)	20.0 (C)	17.3 (B)	19.5 (B)	17.3 (B)	19.5 (B)	407	54	52	287	139	130	202	
	SBTR	17.7 (B)	19.9 (B)	17.4 (B)	19.5 (B)	17.4 (B)	19.5 (B)	407	60	65	292	148	151	219	
	SB Approach	17.7 (B)	19.9 (B)	17.3 (B)	19.5 (B)	17.3 (B)	19.5 (B)	-	-	-	-	-	-	-	
	Overall Intersection	18.9 (B)	20.5 (C)	18.7 (B)	20.1 (C)	18.7 (B)	20.1 (C)	-	-	-	-	-	-	-	

Intersection	Movement	Weekday Peak Hour Capacity Results						Weekday Peak Hour 95 th Percentile Queue in Feet						
		2023 No Construction		2023 Detour Phase 4, no mitigation		2023 Detour Phase 4, mitigation		2023 No Construction		2023 Detour Phase 4, no mitigation		2023 Detour Phase 4, mitigation		
		A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	Available Storage Length	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
S Heald St & C St	EBTR	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	200	50	55	208	90	55	50
	EB Approach	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	24.7 (C)	-	-	-	-	-	-	-
	WBLT	25.6 (C)	26.3 (C)	25.6 (C)	26.3 (C)	25.6 (C)	26.3 (C)	308	57	69	82	95	48	82
	WB Approach	25.6 (C)	26.3 (C)	25.6 (C)	26.3 (C)	25.6 (C)	26.3 (C)	-	-	-	-	-	-	-
	SBLT	18.0 (B)	19.7 (B)	17.7 (B)	19.3 (B)	17.7 (B)	19.3 (B)	308	49	42	305	190	53	39
	SBTR	17.7 (B)	19.2 (B)	17.4 (B)	18.8 (B)	17.4 (B)	18.8 (B)	308	55	41	294	192	47	39
	SB Approach	17.8 (B)	19.5 (B)	17.5 (B)	19.1 (B)	17.5 (B)	19.1 (B)	-	-	-	-	-	-	-
Overall Intersection	19.1 (B)	20.5 (C)	18.9 (B)	20.3 (C)	18.9 (B)	20.3 (C)	-	-	-	-	-	-	-	
S Heald St & D St	EBTR	25.5 (C)	25.4 (C)	25.5 (C)	25.4 (C)	25.5 (C)	25.4 (C)	447	74	67	246	273	89	71
	EB Approach	25.5 (C)	25.4 (C)	25.5 (C)	25.4 (C)	25.5 (C)	25.4 (C)	-	-	-	-	-	-	-
	SBLT	17.7 (B)	19.9 (B)	17.4 (B)	19.4 (B)	17.4 (B)	19.4 (B)	172	36	50	490	447	32	41
	SBTR	17.8 (B)	20.0 (C)	17.5 (B)	19.5 (B)	17.5 (B)	19.5 (B)	402	62	63	421	400	47	57
	SB Approach	17.8 (B)	19.9 (B)	17.4 (B)	19.5 (B)	17.4 (B)	19.5 (B)	-	-	-	-	-	-	-
	Overall Intersection	18.8 (B)	20.4 (C)	18.6 (B)	20.0 (B)	18.6 (B)	20.0 (B)	-	-	-	-	-	-	-
S Heald St & Rogers Rd	EBL	67.6 (E)	60.7 (E)	74.8 (E)	75.7 (E)	95.2 (F)	84.3 (F)	336	26	34	38	17	39	37
	EBT	13.4 (B)	15.2 (B)	20.6 (C)	24.6 (C)	43.0 (D)	46.9 (D)	336	146	159	319	311	127	366
	EB Approach	15.3 (B)	16.2 (B)	22.5 (C)	25.7 (C)	44.8 (D)	47.8 (D)	-	-	-	-	-	-	-
	WBL	15.6 (B)	17.0 (B)	22.7 (C)	25.8 (C)	44.0 (D)	48.9 (D)	>1000	62	69	53	68	58	111
	WBT	20.1 (C)	20.4 (C)	-	-	-	-	>1000	226	174	-	-	-	-
	WBR	15.0 (B)	15.5 (B)	21.8 (C)	23.5 (C)	40.8 (D)	40.1 (D)	130	88	25	-	-	-	-
	WB Approach	19.0 (B)	19.7 (B)	22.2 (C)	25.2 (C)	42.0 (D)	46.8 (D)	-	-	-	-	-	-	-
	NBL	56.1 (E)	52.8 (D)	-	-	-	-	410	22	22	-	-	-	-
	NBT	34.9 (C)	34.7 (C)	28.5 (C)	28.7 (C)	14.0 (B)	18.0 (B)	665	182	129	563	810	60	1020
	NBR	29.4 (C)	32.5 (C)	1072.1 (F)	307.4 (F)	558.8 (F)	151.3 (F)	715	35	52	454	505	85	598
	NB Approach	32.3 (C)	33.7 (C)	984.4 (F)	282.1 (F)	513.1 (F)	139.2 (F)	-	-	-	-	-	-	-
	SBL	49.0 (D)	45.4 (D)	59.4 (E)	65.8 (E)	376.1 (F)	98.2 (F)	>1000	111	158	288	2529	103	1563
	SBT	12.9 (B)	25.4 (C)	19.9 (B)	17.1 (B)	9.1 (A)	9.4 (A)	>1000	127	141	-	-	-	-
	SBR	22.9 (C)	22.1 (C)	-	-	-	-	160	45	52	99	2571	116	778
SB Approach	28.3 (C)	33.8 (C)	37.9 (D)	41.5 (D)	175.9 (F)	53.8 (D)	-	-	-	-	-	-	-	
Overall Intersection	23.7 (C)	25.7 (C)	789.0 (F)	181.9 (F)	427.2 (F)	103.4 (F)	-	-	-	-	-	-	-	

Intersection	Movement	Weekday Peak Hour Capacity Results						Weekday Peak Hour 95 th Percentile Queue in Feet						
		2023 No Construction		2023 Detour Phase 4, no mitigation		2023 Detour Phase 4, mitigation		2023 No Construction		2023 Detour Phase 4, no mitigation		2023 Detour Phase 4, mitigation		
		A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	Available Storage Length	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
S Heald St & Garasches Ln	EBL	12.4 (B)	13.1 (B)	12.0 (B)	12.5 (B)	12.0 (B)	12.5 (B)	>1000	62	49	268	42	62	57
	EBR	9.1 (A)	9.5 (A)	9.0 (A)	9.3 (A)	9.0 (A)	9.3 (A)	>1000	48	52	39	37	39	48
	EB Approach	11.2 (B)	11.5 (B)	11.0 (B)	11.2 (B)	11.0 (B)	11.2 (B)	-	-	-	-	-	-	-
	NBL	8.0 (A)	8.3 (A)	7.9 (A)	8.2 (A)	7.9 (A)	8.2 (A)	>1000	23	31	254	48	12	29
	NBT	0.1 (A)	0.1 (A)	0.1 (A)	0.1 (A)	0.1 (A)	0.1 (A)	>1000			235	26		
	NB Approach	1.1 (A)	1.3 (A)	1.0 (A)	1.3 (A)	1.0 (A)	1.3 (A)	-	-	-	-	-	-	-
	Overall Intersection	1.4 (A)	1.2 (A)	1.4 (A)	1.3 (A)	1.4 (A)	1.3 (A)	-	-	-	-	-	-	-
New Sweden St & Garasches Ln	WBLR	9.2 (A)	9.0 (A)	9.2 (A)	9.3 (A)	9.2 (A)	9.3 (A)	>1000	48	54	39	54	45	50
	WB Approach	9.2 (A)	9.0 (A)	9.2 (A)	9.3 (A)	9.2 (A)	9.3 (A)	-	-	-	-	-	-	-
	NB Approach	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	-	-	-	-	-	7	-
	SBTL	7.5 (A)	7.6 (A)	7.5 (A)	7.6 (A)	7.5 (A)	7.6 (A)	>1000	15	17	15	13	26	10
	SB Approach	4.3 (A)	6.0 (A)	4.3 (A)	6.0 (A)	4.3 (A)	6.0 (A)	-	-	-	-	-	-	-
	Overall Intersection	3.6 (A)	6.1 (A)	3.6 (A)	6.5 (A)	3.6 (A)	6.5 (A)	-	-	-	-	-	-	-
S Market St & Howard St	SBLT	0.5 (A)	0.7 (A)	0.7 (A)	1.0 (A)	0.7 (A)	1.0 (A)	704	168	239	176	833	157	389
	SBT	0.3 (A)	0.5 (A)	0.4 (A)	0.6 (A)	0.4 (A)	0.6 (A)	704	151	229	166	835	171	393
	SB Approach	0.4 (A)	0.6 (A)	0.5 (A)	0.7 (A)	0.5 (A)	0.7 (A)	-	-	-	-	-	-	-
	Overall Intersection	0.4 (A)	0.6 (A)	0.5 (A)	0.7 (A)	0.5 (A)	0.7 (A)	-	-	-	-	-	-	-
S Walnut St & Howard St	EBL	-	-	-	-	-	-	704	116	88	99	57	127	102
	EB Approach	-	-	-	-	-	-	-	-	-	-	-	-	-
	NBLT	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	911	192	65	86	39	87	39
	NBT	0.5 (A)	0.3 (A)	0.3 (A)	0.2 (A)	0.3 (A)	0.2 (A)	>1000	333	97	193	58	181	57
	NB Approach	0.5 (A)	0.3 (A)	0.3 (A)	0.2 (A)	0.3 (A)	0.2 (A)	-	-	-	-	-	-	-
	Overall Intersection	0.5 (A)	0.3 (A)	0.3 (A)	0.2 (A)	0.3 (A)	0.2 (A)	-	-	-	-	-	-	-
New Castle Ave & New York Ave	WBLR	13.3 (B)	11.8 (B)	1031.7 (F)	52.7 (F)	1031.7 (F)	52.7 (F)	>1000	60	32	1139	678	74	46
	WB Approach	13.3 (B)	11.8 (B)	1031.7 (F)	52.7 (F)	1031.7 (F)	52.7 (F)	-	-	-	-	-	-	-
	NBT	-	-	-	-	-	-	>1000	14	5	154	162	64	24
	NBTR	-	-	-	-	-	-	994	19	21	161	162	61	23
	NB Approach	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	-	-	-	-	-	-	-
	SBLT	8.8 (A)	9.0 (A)	33.8 (D)	19.3 (C)	33.8 (D)	19.3 (C)	657	19	19	145	187	22	38
	SB Approach	1.6 (A)	0.6 (A)	6.0 (A)	1.4 (A)	6.0 (A)	1.4 (A)	-	-	-	-	-	-	-
	Overall Intersection	1.0 (A)	0.7 (A)	14.3 (B)	1.0 (A)	14.3 (B)	1.0 (A)	-	-	-	-	-	-	-

Intersection	Movement	Weekday Peak Hour Capacity Results						Weekday Peak Hour 95 th Percentile Queue in Feet						
		2023 No Construction		2023 Detour Phase 4, no mitigation		2023 Detour Phase 4, mitigation		2023 No Construction		2023 Detour Phase 4, no mitigation		2023 Detour Phase 4, mitigation		
		A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	Available Storage Length	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour	A.M. Peak Hour	P.M. Peak Hour
S Market St & S Walnut St & Millside Dr	EBL	54.5 (D)	53.6 (D)	93.0 (F)	53.6 (D)	93.0 (F)	53.6 (D)	250	145	134	149	133	151	142
	EBR	42.7 (D)	48.7 (D)	69.5 (E)	48.7 (D)	69.5 (E)	48.7 (D)	250	216	201	275	280	286	216
	EB Approach	49.9 (D)	50.5 (D)	83.8 (F)	50.5 (D)	83.8 (F)	50.5 (D)	-	-	-	-	-	-	-
	WBL	61.2 (E)	58.4 (E)	92.3 (F)	58.4 (E)	92.3 (F)	58.4 (E)	100	41	54	46	310	44	79
	WBTR	56.7 (E)	54.8 (D)	87.7 (F)	54.8 (D)	87.7 (F)	54.8 (D)	600	5	23	9	24	10	22
	WB Approach	60.9 (E)	57.5 (E)	92.0 (F)	57.5 (E)	92.0 (F)	57.5 (E)	-	-	-	-	-	-	-
	SBL	38.3 (D)	6.1 (A)	52.1 (D)	3.8 (A)	52.1 (D)	3.8 (A)	120	2	96	36	74	10	96
	SBTR	38.1 (D)	14.9 (B)	359.4 (F)	17.4 (B)	359.4 (F)	17.4 (B)	>1000	514	872	1148	3497	2548	2663
	SB Approach	38.1 (D)	14.9 (B)	355.2 (F)	17.2 (B)	355.2 (F)	17.2 (B)	-	-	-	-	-	-	-
	NBL	5.2 (A)	3.5 (A)	42.4 (D)	9.1 (A)	42.4 (D)	9.1 (A)	300	310	145	54	16	50	20
	NBT	311.4 (F)	17.0 (B)	67.3 (E)	11.1 (B)	67.3 (E)	11.1 (B)	>1000	585	292	193	106	190	79
	NBR	11.6 (B)	9.6 (A)	45.6 (D)	10.2 (B)	45.6 (D)	10.2 (B)	>1000	463	125	16	13	13	9
	NB Approach	285.1 (F)	15.8 (B)	65.1 (E)	10.9 (B)	65.1 (E)	10.9 (B)	-	-	-	-	-	-	-
	Overall Intersection	199.8 (F)	19.0 (B)	228.7 (F)	22.0 (C)	228.7 (F)	22.0 (C)	-	-	-	-	-	-	-
S Market St/ S Walnut St & S Heald St	WBT	58.9 (E)	56.7 (E)	58.9 (E)	56.8 (E)	58.9 (E)	56.8 (E)	300	114	141	105	161	114	158
	WB Approach	58.9 (E)	56.7 (E)	58.9 (E)	56.8 (E)	58.9 (E)	56.8 (E)	-	-	-	-	-	-	-
	NBT	2.9 (A)	2.5 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	>1000	128	72	-	-	-	-
	NB Approach	2.9 (A)	2.5 (A)	0.0 (A)	0.0 (A)	0.0 (A)	0.0 (A)	-	-	-	-	-	-	-
	SBT	0.3 (A)	0.4 (A)	0.3 (A)	0.4 (A)	0.3 (A)	0.4 (A)	665	106	190	71	100	89	141
	SB Approach	0.3 (A)	0.4 (A)	0.3 (A)	0.4 (A)	0.3 (A)	0.4 (A)	-	-	-	-	-	-	-
	Overall Intersection	5.3 (A)	7.5 (A)	10.0 (A)	10.8 (B)	10.0 (A)	10.8 (B)	-	-	-	-	-	-	-
I 495 SB Off Ramp NB On Ramp & US 13	EB Approach	54.3 (D)	53.8 (D)	54.3 (D)	53.8 (D)	54.3 (D)	53.8 (D)	300	77	76	95	352	127	109
	NB Approach	13.1 (B)	12.0 (B)	13.1 (B)	12.0 (B)	13.1 (B)	12.0 (B)	915	303	218	334	405	300	346
	SBL	51.0 (D)	123.6 (F)	51.0 (D)	146.0 (F)	51.0 (D)	146.0 (F)	720	111	113	140	264	122	119
	SBT	0.9 (A)	4.4 (A)	2.8 (A)	4.8 (A)	2.8 (A)	4.8 (A)	>1000	113	133	159	163	187	162
	SB Approach	4.0 (A)	11.2 (B)	5.9 (A)	12.9 (B)	5.9 (A)	12.9 (B)	-	-	-	-	-	-	-
	Overall Intersection	11.1 (B)	25.3 (C)	11.8 (B)	14.2 (B)	11.8 (B)	14.2 (B)	-	-	-	-	-	-	-

Table 4. Capacity Analysis and 95th Percentile Queue Results - Weekend Peak Hour

Intersection	Movement	Weekend Peak Hour													
		2023 No Construction		2023 Detour Phase 2, no mitigation		2023 Detour Phase 4, no mitigation		2023 Detour Phase 5, no mitigation		2023 Detour Phase 2, mitigation		2023 Detour Phase 4, mitigation		2023 Detour Phase 5, mitigation	
		Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet
S Heald St & A St	EBTR	25.1 (C)	76	47.4 (D)	207	25.1 (C)	66	25.1 (C)	53	47.4 (D)	252	8.7 (A)	52	25.1 (C)	56
	EB Approach	25.1 (C)	-	47.4 (D)	-	25.1 (C)	-	25.1 (C)	-	47.4 (D)	-	8.7 (A)	-	25.1 (C)	-
	WBLT	26.3 (C)	82	30.6 (C)	92	51.9 (D)	152	26.3 (C)	82	30.6 (C)	93	26.3 (C)	104	26.3 (C)	79
	WB Approach	26.3 (C)	-	30.6 (C)	-	51.9 (D)	-	26.3 (C)	-	30.6 (C)	-	26.3 (C)	-	26.3 (C)	-
	SBLT	8.2 (A)	109	8.1 (A)	87	8.1 (A)	98	8.2 (A)	104	8.1 (A)	82	25.4 (C)	131	8.2 (A)	111
	SBTR	8.1 (A)	88	8.1 (A)	89	8.1 (A)	74	8.1 (A)	84	8.1 (A)	78	25.2 (C)	111	8.1 (A)	82
	SB Approach	8.1 (A)	-	8.1 (A)	-	8.1 (A)	-	8.1 (A)	-	8.1 (A)	-	25.3 (C)	-	8.1 (A)	-
	Overall Intersection	13.1 (B)	-	28.7 (C)	-	35.2 (D)	-	13.1 (B)	-	28.7 (C)	-	25.2 (C)	-	13.1 (B)	-
New Castle Ave & A St	EBLT	25.2 (C)	35	25.9 (C)	45	25.2 (C)	54	25.2 (C)	35	25.9 (C)	41	25.2 (C)	41	25.2 (C)	41
	EB Approach	25.2 (C)	-	25.9 (C)	-	25.2 (C)	-	25.2 (C)	-	25.9 (C)	-	25.2 (C)	-	25.2 (C)	-
	WBTR	25.2 (C)	50	25.2 (C)	57	25.2 (C)	65	25.2 (C)	51	25.2 (C)	63	25.2 (C)	88	25.2 (C)	55
	WB Approach	25.2 (C)	-	25.2 (C)	-	25.2 (C)	-	25.2 (C)	-	25.2 (C)	-	25.2 (C)	-	25.2 (C)	-
	NBLT	20.1 (C)	45	20.6 (C)	204	23.9 (C)	626	20.1 (B)	43	20.6 (C)	302	41.1 (D)	87	20.1 (C)	52
	NBTR	19.5 (B)	37	19.9 (B)	160	132.8 (F)	654	19.5 (B)	33	19.9 (B)	255	34.9 (C)	95	19.5 (B)	38
	NB Approach	19.8 (B)	-	20.3 (C)	-	104.5 (F)	-	19.8 (B)	-	20.3 (C)	-	38.2 (D)	-	19.8 (B)	-
	Overall Intersection	20.4 (C)	-	20.9 (C)	-	101.5 (F)	-	20.4 (C)	-	20.9 (C)	-	37.7 (D)	-	20.4 (C)	-
S Walnut St & A St	EBLT	35.5 (D)	98	36.9 (D)	120	127.0 (F)	157	35.5 (D)	85	36.9 (D)	123	127.0 (F)	243	35.5 (D)	115
	EB Approach	35.5 (D)	-	36.9 (D)	-	127.0 (F)	-	35.5 (D)	-	36.9 (D)	-	127.0 (F)	-	35.5 (D)	-
	WBT	34.3 (C)	83	38.8 (D)	209	134.2 (F)	408	34.3 (C)	98	38.8 (D)	200	134.2 (F)	844	34.3 (C)	119
	WBR	34.5 (C)	81	34.5 (C)	97	35.8 (D)	184	34.5 (C)	96	34.5 (C)	110	35.8 (D)	266	34.5 (C)	113
	WB Approach	34.4 (C)	-	37.8 (D)	-	120.0 (F)	-	34.4 (C)	-	37.8 (D)	-	120.0 (F)	-	34.4 (C)	-
	NBLT	9.9 (A)	123	10.7 (B)	101	8.2 (A)	44	13.6 (B)	233	10.7 (B)	92	8.2 (A)	41	13.6 (B)	685
	NBT	9.5 (A)	93	10.1 (B)	136	8.1 (A)	36	12.1 (B)	160	10.1 (B)	121	8.1 (A)	32	12.1 (B)	705
	NBTR	9.7 (A)	125	10.7 (B)	218	8.2 (A)	48	12.8 (B)	111	10.7 (B)	193	8.2 (A)	42	12.8 (B)	633
	NB Approach	9.7 (A)	-	10.4 (B)	-	8.1 (A)	-	12.7 (B)	-	10.4 (B)	-	8.1 (A)	-	12.7 (B)	-
Overall Intersection	13.0 (B)	-	14.9 (B)	-	85.3 (F)	-	14.3 (B)	-	14.9 (B)	-	85.3 (F)	-	14.3 (B)	-	
S Market St & A St	WBL	14.1 (B)	81	18.1 (C)	196	91.9 (F)	384	14.1 (B)	867	18.1 (C)	192	91.9 (F)	869	14.1 (B)	77
	WB Approach	14.1 (B)	-	18.1 (C)	-	91.9 (F)	-	14.1 (B)	-	18.1 (C)	-	91.9 (F)	-	14.1 (B)	-
	SBL	8.5 (A)	4	8.4 (A)	4	8.5 (A)	7	8.5 (A)	294	8.4 (A)	5	8.5 (A)	6	8.5 (A)	5
	SBT	-	-	-	-	-	13	-	1334	-	3	-	3	-	70
	SB Approach	0.7 (A)	-	0.7 (A)	-	0.7 (A)	-	0.7 (A)	-	0.7 (A)	-	0.7 (A)	-	0.7 (A)	-
	Overall Intersection	2.0 (A)	-	4.0 (A)	-	35.1 (E)	-	2.0 (A)	-	4.0 (A)	-	35.1 (E)	-	2.0 (A)	-

Intersection	Movement	Weekend Peak Hour													
		2023 No Construction		2023 Detour Phase 2, no mitigation		2023 Detour Phase 4, no mitigation		2023 Detour Phase 5, no mitigation		2023 Detour Phase 2, mitigation		2023 Detour Phase 4, mitigation		2023 Detour Phase 5, mitigation	
		Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet
S Market St & New Sweden St	EBLT	81.3 (F)	82	81.3 (F)	85	81.3 (F)	90	152.8 (F)	292	81.3 (F)	88	81.3 (F)	86	152.8 (F)	296
	EBR	0.0 (A)	-	0.0 (A)	48	0.0 (A)	20	0.0 (A)	-	0.0 (A)	-	0.0 (A)	59	0.0 (A)	-
	EB Approach	81.3 (F)	-	81.3 (F)	-	81.3 (F)	-	152.8 (F)	-	81.3 (F)	-	81.3 (F)	-	152.8 (F)	-
	WBLTR	86.9 (F)	95	82.5 (F)	99	84.6 (F)	92	84.8 (F)	55	82.5 (F)	118	84.6 (F)	126	84.8 (F)	51
	WB Approach	86.9 (F)	-	82.5 (F)	-	84.6 (F)	-	84.8 (F)	-	82.5 (F)	-	84.6 (F)	-	84.8 (F)	-
	NBL	64.5 (E)	322	63.6 (E)	337	69.9 (E)	120	64.5 (E)	338	63.6 (E)	320	69.9 (E)	116	64.5 (E)	335
	NBT	6.8 (A)	225	7.8 (A)	314	5.8 (A)	69	11.7 (B)	283	7.8 (A)	228	5.8 (A)	79	11.7 (B)	308
	NBR	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-
	NB Approach	21.5 (C)	-	20.2 (C)	-	24.4 (C)	-	23.9 (B)	-	20.2 (C)	-	24.4 (C)	-	23.9 (C)	-
	SBL	79.9 (E)	56	76.2 (E)	64	74.6 (E)	131	79.9 (E)	21	76.2 (E)	65	74.6 (E)	198	79.9 (E)	24
	SBT	19.1 (B)	364	19.8 (B)	424	8.9 (A)	420	19.0 (B)	48	19.8 (B)	359	8.9 (A)	532	19.0 (B)	53
	SBR	0.0 (A)	10	0.0 (A)	129	0.0 (A)	96	0.0 (A)	-	0.0 (A)	8	0.0 (A)	277	0.0 (A)	-
	SB Approach	19.5 (B)	-	20.3 (C)	-	11.8 (B)	-	25.4 (C)	-	20.3 (C)	-	11.8 (B)	-	25.4 (C)	-
Overall Intersection	23.3 (C)	-	22.6 (C)	-	19.3 (B)	-	42.9 (D)	-	22.6 (C)	-	19.3 (B)	-	42.9 (D)	-	
New Castle Ave & Rogers Rd/Sutton Ln	EBLT	31.4 (C)	109	0.0 (A)	-	434.1 (F)	3866	31.4 (C)	92	0.0 (A)	-	89.4 (F)	1019	31.4 (C)	110
	EBR	0.0 (A)	47	0.0 (A)	-	0.0 (A)	198	0.0 (A)	19	0.0 (A)	-	0.0 (A)	197	0.0 (A)	42
	EB Approach	31.4 (C)	-	0.0 (A)	-	434.1 (F)	-	31.4 (C)	-	0.0 (A)	-	89.4 (F)	-	31.4 (C)	-
	WBLTR	29.0 (C)	18	30.9 (C)	19	21.1 (C)	43	29.0 (C)	18	30.9 (C)	17	8.2 (A)	12	29.0 (C)	19
	WB Approach	29.0 (C)	-	30.9 (C)	-	21.1 (C)	-	29.0 (C)	-	30.9 (C)	-	8.2 (A)	-	29.0 (C)	-
	NBL	4.8 (A)	120	0.0 (A)	-	12.4 (B)	321	4.8 (A)	116	0.0 (A)	-	28.6 (C)	71	4.8 (A)	123
	NBT	3.3 (A)	54	2.6 (A)	43	14.3 (B)	985	3.3 (A)	63	2.6 (A)	25	47.4 (D)	279	3.3 (A)	71
	NBTR	3.3 (A)	91	2.6 (A)	46	14.2 (B)	983	3.3 (A)	96	2.6 (A)	32	46.8 (D)	265	3.3 (A)	104
	NB Approach	3.8 (A)	-	2.6 (A)	-	14.1 (B)	-	3.8 (A)	-	2.6 (A)	-	45.5 (D)	-	3.8 (A)	-
	SBTL	0.0 (A)	98	0.0 (A)	19	0.0 (A)	94	0.0 (A)	98	0.0 (A)	23	0.0 (A)	151	0.0 (A)	99
	SBT	8.4 (A)	101	2.2 (A)	40	17.1 (B)	91	8.4 (A)	102	2.2 (A)	44	41.5 (D)	144	8.4 (A)	98
	SBR	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-
	SB Approach	8.4 (A)	-	2.2 (A)	-	17.1 (B)	-	8.4 (A)	-	2.2 (A)	-	41.5 (D)	-	8.4 (A)	-
Overall Intersection	6.7 (A)	-	2.6 (A)	-	195.9 (F)	-	6.7 (A)	-	2.6 (A)	-	63.7 (E)	-	6.7 (A)	-	

Intersection	Movement	Weekend Peak Hour													
		2023 No Construction		2023 Detour Phase 2, no mitigation		2023 Detour Phase 4, no mitigation		2023 Detour Phase 5, no mitigation		2023 Detour Phase 2, mitigation		2023 Detour Phase 4, mitigation		2023 Detour Phase 5, mitigation	
		Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet
New Castle Ave & Driveway/Terminal Ave	EBLTR	516.5 (F)	94	536.2 (F)	103	507.0 (F)	94	516.5 (F)	100	536.2 (F)	98	507.0 (F)	99	516.5 (F)	100
	EB Approach	516.5 (F)	-	536.2 (F)	-	507.0 (F)	-	516.5 (F)	-	536.2 (F)	-	507.0 (F)	-	516.5 (F)	-
	WBL	28.2 (C)	102	33.2 (C)	250	28.2 (C)	1679	28.2 (C)	103	33.2 (C)	125	28.2 (C)	74	28.2 (C)	105
	WBR	-	-	-	-	-	350	-	-	-	-	-	21	-	-
	WB Approach	28.2 (C)	-	33.2 (C)	-	28.2 (C)	-	28.2 (C)	-	33.2 (C)	-	28.2 (C)	-	28.2 (C)	-
	NBL	10.9 (B)	8	12.9 (B)	8	10.0 (A)	75	10.9 (B)	8	12.9 (B)	6	10.0 (A)	50	10.9 (B)	8
	NBT	13.1 (B)	88	15.7 (B)	96	142.3 (F)	4891	13.1 (B)	92	15.7 (B)	101	142.3 (F)	408	13.1 (B)	90
	NBR	0.0 (A)	12	0.0 (A)	62	0.0 (A)	298	0.0 (A)	18	0.0 (A)	63	0.0 (A)	255	0.0 (A)	33
	NB Approach	13.0 (B)	-	15.7 (B)	-	142.0 (F)	-	13.0 (B)	-	15.7 (B)	-	142.0 (F)	-	13.0 (B)	-
	SBL	9.2 (A)	71	10.6 (B)	92	14.8 (B)	65	9.2 (A)	73	10.6 (B)	97	14.8 (B)	89	9.2 (A)	83
	SBT	9.2 (A)	36	11.3 (B)	62	8.3 (A)	33	9.2 (A)	39	11.3 (B)	79	8.3 (A)	39	9.2 (A)	42
	SBTR	0.0 (A)	63	0.0 (A)	92	0.0 (A)	50	0.0 (A)	62	0.0 (A)	99	0.0 (A)	53	0.0 (A)	62
	SB Approach	9.2 (A)	-	11.0 (B)	-	11.2 (B)	-	9.2 (A)	-	11.0 (B)	-	11.2 (B)	-	9.2 (A)	-
	Overall Intersection	32.2 (C)	-	30.5 (C)	-	122.5 (F)	-	32.2 (C)	-	30.5 (C)	-	122.5 (F)	-	32.2 (C)	-
New Castle Ave & C St	EBLT	24.8 (C)	38	25.0 (C)	37	24.8 (C)	44	24.8 (C)	39	25.0 (C)	46	24.8 (C)	30	24.8 (C)	35
	EB Approach	24.8 (C)	-	25.0 (C)	-	24.8 (C)	-	24.8 (A)	-	25.0 (C)	-	24.8 (C)	-	24.8 (C)	-
	NBLT	9.6 (A)	145	9.7 (A)	143	24.7 (C)	394	9.6 (A)	151	9.7 (A)	139	24.7 (C)	353	9.6 (A)	147
	NBTR	9.7 (A)	133	9.8 (A)	129	26.9 (C)	385	9.7 (A)	134	9.8 (A)	131	26.9 (C)	342	9.7 (A)	123
	NB Approach	9.6 (A)	-	9.7 (A)	-	25.7 (C)	-	9.6 (A)	-	9.7 (A)	-	25.7 (C)	-	9.6 (A)	-
	Overall Intersection	10.3 (B)	-	10.5 (B)	-	25.7 (C)	-	10.3 (B)	-	10.5 (B)	-	25.7 (C)	-	10.3 (B)	-
New Castle Ave & B St	WBT	24.7 (C)	45	24.7 (C)	55	24.7 (C)	525	24.7 (C)	49	24.7 (C)	49	24.7 (C)	59	24.7 (C)	55
	WBTR	24.7 (C)	21	24.7 (C)	23	24.7 (C)	487	24.7 (C)	22	24.7 (C)	20	24.7 (C)	20	24.7 (C)	23
	WB Approach	24.7 (C)	-	24.7 (C)	-	24.7 (C)	-	24.7 (C)	-	24.7 (C)	-	24.7 (C)	-	24.7 (C)	-
	NBLT	20.8 (C)	44	21.2 (C)	42	45.1 (D)	452	20.8 (C)	45	21.2 (C)	49	45.1 (D)	76	20.8 (C)	44
	NBT	21.0 (C)	28	21.4 (C)	30	49.8 (D)	461	21.0 (C)	31	21.4 (C)	33	49.8 (D)	87	21.0 (C)	28
	NB Approach	20.9 (C)	-	21.3 (C)	-	47.3 (D)	-	20.9 (C)	-	21.3 (C)	-	47.3 (D)	-	20.9 (C)	-
	Overall Intersection	21.1 (C)	-	21.5 (C)	-	46.9 (D)	-	21.1 (C)	-	21.5 (C)	-	46.9 (D)	-	21.1 (C)	-
S Heald St & B St	WBLT	25.4 (C)	67	25.1 (C)	67	25.4 (C)	97	25.4 (C)	72	25.1 (C)	67	25.4 (C)	76	25.4 (C)	73
	WBT	24.7 (C)	15	24.7 (C)	28	24.7 (C)	17	24.7 (C)	18	24.7 (C)	21	24.7 (C)	24	24.7 (C)	29
	WB Approach	25.2 (C)	-	25.0 (C)	-	25.2 (C)	-	25.2 (C)	-	25.0 (C)	-	25.2 (C)	-	25.2 (C)	-
	SBT	17.5 (B)	53	19.9 (B)	125	17.1 (B)	46	17.5 (B)	54	19.9 (B)	130	17.1 (B)	130	17.5 (B)	50
	SBTR	17.5 (B)	70	19.9 (B)	154	17.2 (B)	54	17.5 (B)	55	19.9 (B)	164	17.2 (B)	137	17.5 (B)	64
	SB Approach	17.5 (B)	-	19.9 (B)	-	17.1 (B)	-	17.5 (B)	-	19.9 (B)	-	17.1 (B)	-	17.5 (B)	-
	Overall Intersection	18.7 (B)	-	20.3 (C)	-	18.5 (B)	-	18.7 (B)	-	20.3 (C)	-	18.5 (B)	-	18.7 (B)	-

Intersection	Movement	Weekend Peak Hour													
		2023 No Construction		2023 Detour Phase 2, no mitigation		2023 Detour Phase 4, no mitigation		2023 Detour Phase 5, no mitigation		2023 Detour Phase 2, mitigation		2023 Detour Phase 4, mitigation		2023 Detour Phase 5, mitigation	
		Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet
S Heald St & C St	EBTR	24.6 (C)	54	24.7 (C)	51	24.6 (C)	60	24.6 (C)	50	24.7 (C)	52	24.6 (C)	47	24.6 (C)	54
	EB Approach	24.6 (C)	-	24.7 (C)	-	24.6 (C)	-	24.6 (C)	-	24.7 (C)	-	24.6 (C)	-	24.6 (C)	-
	WBLT	25.5 (C)	55	25.1 (C)	45	25.5 (C)	41	25.5 (C)	59	25.1 (C)	44	25.5 (C)	62	25.5 (C)	48
	WB Approach	25.5 (C)	-	25.1 (C)	-	25.5 (C)	-	25.5 (C)	-	25.1 (C)	-	25.5 (C)	-	25.5 (C)	-
	SBLT	17.8 (B)	49	20.2 (C)	43	17.4 (B)	33	17.8 (B)	51	20.2 (C)	44	17.4 (B)	46	17.8 (B)	45
	SBTR	17.5 (B)	52	19.6 (B)	52	17.2 (B)	39	17.5 (B)	53	19.6 (B)	50	17.2 (B)	54	17.5 (B)	48
	SB Approach	17.7 (B)	-	19.9 (B)	-	17.3 (B)	-	17.7 (B)	-	19.9 (B)	-	17.3 (B)	-	17.7 (B)	-
	Overall Intersection	18.9 (B)	-	20.4 (C)	-	18.7 (B)	-	18.9 (B)	-	20.4 (C)	-	18.7 (B)	-	18.9 (B)	-
S Heald St & D St	EBTR	25.4 (C)	71	25.4 (C)	72	25.4 (C)	68	25.4 (C)	70	25.4 (C)	69	25.4 (C)	73	25.4 (C)	73
	EB Approach	25.4 (C)	-	25.4 (C)	-	25.4 (C)	-	25.4 (C)	-	25.4 (C)	-	25.4 (C)	-	25.4 (C)	-
	SBLT	17.6 (B)	40	19.6 (B)	25	17.2 (B)	29	17.6 (B)	45	19.6 (B)	21	17.2 (B)	37	17.6 (B)	36
	SBTR	17.7 (B)	60	19.7 (B)	62	17.3 (B)	53	17.7 (B)	60	19.7 (B)	55	17.3 (B)	57	17.7 (B)	60
	SB Approach	17.6 (B)	-	19.7 (B)	-	17.2 (B)	-	17.6 (B)	-	19.7 (B)	-	17.2 (B)	-	17.6 (B)	-
	Overall Intersection	18.6 (B)	-	20.2 (C)	-	18.4 (B)	-	18.6 (B)	-	20.2 (C)	-	18.4 (B)	-	18.6 (B)	-
S Heald St & Rogers Rd	EBL	67.4 (E)	40	-	-	-	-	-	-	-	-	-	-	-	-
	EBT	13.0 (B)	148	-	-	-	-	-	-	-	-	-	-	-	-
	EB Approach	15.0 (B)	-	-	-	0.0 (A)	-	0.0 (A)	-	-	-	0.0 (A)	-	0.0 (A)	-
	WBL	15.3 (B)	62	-	-	19.3 (B)	49	12.7 (B)	44	-	-	31.0 (C)	63	12.7 (B)	55
	WBT	19.5 (B)	259	-	-	-	-	16.5 (B)	215	-	-	-	-	16.5 (B)	186
	WBR	14.8 (B)	91	-	-	18.9 (B)	-	12.5 (B)	60	-	-	29.9 (C)	-	12.5 (B)	70
	WB Approach	18.5 (B)	-	-	-	19.1 (B)	-	15.6 (B)	-	-	-	30.3 (C)	-	15.6 (B)	-
	NBL	52.4 (D)	19	-	-	-	-	46.5 (D)	21	-	-	-	-	46.5 (D)	15
	NBT	34.5 (C)	189	-	-	24.3 (C)	890	30.3 (C)	169	-	-	15.0 (B)	153	30.3 (C)	161
	NBR	29.4 (C)	32	-	-	217.2 (F)	612	27.3 (C)	28	-	-	129.9 (F)	316	27.3 (C)	15
	NB Approach	32.1 (C)	-	-	-	194.6 (F)	-	28.3 (C)	-	-	-	116.4 (F)	-	28.3 (C)	-
	SBL	47.9 (D)	109	-	-	51.0 (D)	351	41.7 (D)	107	-	-	53.7 (D)	118	41.7 (D)	96
	SBT	12.6 (B)	125	-	-	14.5 (B)	-	13.8 (B)	115	-	-	7.7 (A)	-	13.8 (B)	116
	SBR	23.1 (C)	55	-	-	-	114	20.0 (B)	49	-	-	-	85	20.0 (B)	50
SB Approach	27.8 (C)	-	-	-	31.1 (C)	-	25.5 (C)	-	-	-	26.7 (C)	-	25.5 (C)	-	
Overall Intersection	23.3 (C)	-	-	-	166.7 (F)	-	23.1 (C)	-	-	-	101.9 (F)	-	23.1 (C)	-	

Intersection	Movement	Weekend Peak Hour													
		2023 No Construction		2023 Detour Phase 2, no mitigation		2023 Detour Phase 4, no mitigation		2023 Detour Phase 5, no mitigation		2023 Detour Phase 2, mitigation		2023 Detour Phase 4, mitigation		2023 Detour Phase 5, mitigation	
		Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet
S Heald St & Garasches Ln	EBL	12.2 (B)	56	9.0 (A)	61	11.8 (B)	56	12.2 (B)	46	9.0 (A)	58	11.8 (B)	59	12.2 (B)	56
	EBR	9.1 (A)	47	8.5 (A)	14	8.8 (A)	39	9.1 (A)	46	8.5 (A)	11	8.8 (A)	39	9.1 (A)	43
	EB Approach	11.0 (B)	-	9.0 (A)	-	10.8 (B)	-	11.0 (B)	-	9.0 (A)	-	10.8 (B)	-	11.0 (B)	-
	NBL	8.0 (A)	20	0.0 (A)	-	7.9 (A)	18	8.0 (A)	20	0.0 (A)	-	7.9 (A)	22	8.0 (A)	24
	NBT	0.1 (A)		-		0.1 (A)		-		0.1 (A)		-		0.1 (A)	-
	NB Approach	1.0 (A)	-	0.0 (A)	-	1.0 (A)	-	1.0 (A)	-	0.0 (A)	-	1.0 (A)	-	1.0 (A)	-
	SBTR	-	8	-	-	-	-	-	4	-	-	-	-	-	4
	SB Approach	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-
	Overall Intersection	1.3 (A)	-	5.1 (A)	-	1.4 (A)	-	1.3 (A)	-	5.1 (A)	-	1.4 (A)	-	1.3 (A)	-
New Sweden St & Garasches Ln	WBLR	9.1 (A)	47	9.1 (A)	39	9.1 (A)	42	9.1 (A)	48	9.1 (A)	43	9.1 (A)	49	9.1 (A)	45
	WB Approach	9.1 (A)	-	9.1 (A)	-	9.1 (A)	-	9.1 (A)	-	9.1 (A)	-	9.1 (A)	-	9.1 (A)	-
	NBTR	0.0 (A)	-	-	-	-	-	-	-	-	-	-	-	-	-
	NB Approach	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-
	SBTL	7.5 (A)	10	7.5 (A)	6	7.5 (A)	15	7.5 (A)	10	7.5 (A)	11	7.5 (A)	14	7.5 (A)	11
	SB Approach	4.3 (A)	-	3.7 (A)	-	4.3 (A)	-	4.3 (A)	-	3.7 (A)	-	4.3 (A)	-	4.3 (A)	-
	Overall Intersection	3.6 (A)	-	2.8 (A)	-	3.6 (A)	-	3.6 (A)	-	2.8 (A)	-	3.6 (A)	-	3.6 (A)	-
S Market St & Howard St	SBLT	0.5 (A)	175	0.5 (A)	203	0.6 (A)	151	3.0 (A)	741	0.5 (A)	198	0.6 (A)	148	3.0 (A)	560
	SBT	0.3 (A)	163	0.3 (A)	164	0.4 (A)	170	0.2 (A)	910	0.3 (A)	151	0.4 (A)	168	0.2 (A)	519
	SB Approach	0.4 (A)	-	0.4 (A)	-	0.5 (A)	-	3.0 (A)	-	0.4 (A)	-	0.5 (A)	-	3.0 (A)	-
	Overall Intersection	0.4 (A)	-	0.4 (A)	-	0.5 (A)	-	3.0 (A)	-	0.4 (A)	-	0.5 (A)	-	3.0 (A)	-
S Walnut St & Howard St	EBL	17.6 (B)	76	-	165	-	103	609.9 (F)	857	-	177	-	104	57.4 (E)	842
	EB Approach	17.6 (B)	-	-	-	-	-	609.9 (F)	-	-	-	-	-	57.4 (E)	-
	NBLT	0.0 (A)	150	0.0 (A)	115	0.0 (A)	37	0.0 (A)	-	0.0 (A)	102	0.0 (A)	38	0.0 (A)	-
	NBT	10.2 (B)	186	0.3 (A)	288	0.2 (A)	55	9.3 (A)	172	0.3 (A)	265	0.2 (A)	65	21.4 (C)	592
	NB Approach	10.2 (B)	-	0.3 (A)	-	0.2 (A)	-	9.3 (A)	-	0.3 (A)	-	0.2 (A)	-	21.4 (C)	-
	Overall Intersection	10.8 (B)	-	0.3 (A)	-	0.2 (A)	-	235.1 (F)	-	0.3 (A)	-	0.2 (A)	-	34.9 (C)	-
New Castle Ave & New York Ave	WBLR	13.1 (B)	60	13.0 (B)	61	98.6 (F)	1027	13.1 (B)	63	13.0 (B)	59	98.6 (F)	76	13.1 (B)	62
	WB Approach	13.1 (B)	-	13.0 (B)	-	98.6 (F)	-	13.1 (B)	-	13.0 (B)	-	98.6 (F)	-	13.1 (B)	-
	NBT	-	17	-	30	-	204	-	18	-	18	-	48	-	10
	NBTR	-	8	-	15	-	205	-	17	-	20	-	48	-	23
	NB Approach	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-	0.0 (A)	-
	SBLT	8.7 (A)	18	8.9 (A)	36	17.6 (C)	207	8.7 (A)	17	8.9 (A)	26	17.6 (C)	28	8.7 (A)	21
	SB Approach	1.4 (A)	-	4.4 (A)	-	3.3 (A)	-	1.4 (A)	-	4.4 (A)	-	3.3 (A)	-	1.4 (A)	-
	Overall Intersection	0.9 (A)	-	1.0 (A)	-	1.9 (A)	-	0.9 (A)	-	1.0 (A)	-	1.9 (A)	-	0.9 (A)	-

Intersection	Movement	Weekend Peak Hour													
		2023 No Construction		2023 Detour Phase 2, no mitigation		2023 Detour Phase 4, no mitigation		2023 Detour Phase 5, no mitigation		2023 Detour Phase 2, mitigation		2023 Detour Phase 4, mitigation		2023 Detour Phase 5, mitigation	
		Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet
S Market St & S Walnut St & Millside Drive	EBL	43.6 (D)	139	43.6 (D)	147	86.3 (F)	144	43.5 (D)	140	43.6 (D)	140	86.3 (F)	148	43.5 (D)	142
	EBTR	35.2 (D)	173	35.2 (D)	202	64.5 (E)	288	-	252	35.2 (D)	159	64.5 (E)	279	-	242
	EB Approach	40.3 (D)	-	40.3 (D)	-	77.7 (E)	-	43.5 (D)	-	40.3 (D)	-	77.7 (E)	-	43.5 (D)	-
	WBL	48.7 (D)	39	49.8 (D)	48	90.5 (F)	39	-	-	49.8 (D)	33	90.5 (F)	30	-	-
	WBLTR	46.5 (D)	8	46.8 (D)	8	82.3 (F)	9	49.0 (D)	28	46.8 (D)	12	82.3 (F)	7	49.0 (D)	31
	WB Approach	48.6 (D)	-	49.6 (D)	-	89.9 (F)	-	49.0 (D)	-	49.6 (D)	-	89.9 (F)	-	49.0 (D)	-
	SBL	15.0 (B)	5	14.9 (B)	3	40.4 (D)	14	16.9 (B)	5	14.9 (B)	-	40.4 (D)	11	16.9 (B)	-
	SBT	26.0 (C)	516	27.8 (C)	2636	141.9 (F)	2966	18.0 (B)	-	27.8 (C)	462	141.9 (F)	2885	18.0 (B)	-
	SBTR		669		2650		2969		-		51		461		2887
	SB Approach	26.0 (C)	-	27.7 (C)	-	141.0 (F)	-	18.0 (B)	-	27.7 (C)	-	141.0 (F)	-	18.0 (B)	-
	NBL	9.5 (A)	117	6.4 (A)	102	45.4 (D)	8	12.0 (B)	90	5.8 (A)	76	45.4 (D)	11	12.0 (B)	73
	NBT	28.8 (C)	270	31.2 (C)	260	46.3 (D)	-	39.8 (D)	241	27.6 (C)	191	46.3 (D)	-	39.8 (D)	260
	NBR	12.5 (B)	53	12.4 (B)	20	-	29	14.7 (B)	16	12.4 (B)	23		30	14.7 (B)	124
	NB Approach	27.1 (C)	-	29.3 (C)	-	46.2 (D)	-	37.5 (D)	-	26.0 (C)	-	46.2 (D)	-	37.5 (D)	-
Overall Intersection	28.3 (C)	-	29.9 (C)	-	126.9 (F)	-	37.5 (D)	-	28.3 (C)	-	126.9 (F)	-	37.5 (D)	-	
S Market St/ S Walnut St & S Heald St	WBT	39.8 (D)	79	0.0 (A)	-	58.9 (E)	96	39.8 (D)	83	0.0 (A)	-	58.9 (E)	98	39.8 (D)	84
	WB Approach	39.8 (D)	-	0.0 (A)	-	58.9 (E)	-	39.8 (D)	-	0.0 (A)	-	58.9 (E)	-	39.8 (D)	-
	NBT	4.1 (A)	150	1.1 (A)	-	0.0 (A)	-	4.1 (A)	127	1.1 (A)	-	0.0 (A)	-	4.1 (A)	133
	NB Approach	4.1 (A)	-	1.1 (A)	-	0.0 (A)	-	4.1 (A)	-	1.1 (A)	-	0.0 (A)	-	4.1 (A)	-
	SBT	3.8 (A)	111	11.5 (B)	1029	0.8 (A)	135	37.4 (D)	-	11.5 (B)	-	0.8 (A)	140	37.4 (D)	-
	SB Approach	9.2 (A)	-	11.5 (A)	-	0.8 (A)	-	37.4 (D)	-	11.5 (A)	-	0.8 (A)	-	37.4 (D)	-
	Overall Intersection	12.2 (B)	-	5.0 (A)	-	8.3 (A)	-	12.2 (B)	-	5.0 (A)	-	8.3 (A)	-	12.2 (B)	-
I-495 SB Ramps & Terminal Ave	EBT	-	4	-	353	Intersection not impacted by detour routing	Intersection not impacted by detour routing	-	339	Intersection not impacted by detour routing	Intersection not impacted by detour routing	-	339	Intersection not impacted by detour routing	Intersection not impacted by detour routing
	EBTR	-		-	562			-	466						
	EB Approach	0.0 (A)	-	0.0 (A)	-			0.0 (A)	-						
	WBLT	7.9 (A)	36	10.5 (B)	347			10.5 (B)	246						
	WBT	-	-	-	536			-	304						
	WB Approach	3.8 (A)	-	3.8 (A)	-			3.8 (A)	-						
	SBLT	11.8 (B)	31	72.0 (F)	791			72.0 (F)	620						
	SBR	9.7 (A)	21	12.0 (B)	762			12.0 (B)	554						
	SB Approach	10.0 (B)	-	34.1 (D)	-			34.1 (D)	-						
	Overall Intersection	4.9 (A)	-	11.4 (B)	-			11.4 (B)	-						

Intersection	Movement	Weekend Peak Hour													
		2023 No Construction		2023 Detour Phase 2, no mitigation		2023 Detour Phase 4, no mitigation		2023 Detour Phase 5, no mitigation		2023 Detour Phase 2, mitigation		2023 Detour Phase 4, mitigation		2023 Detour Phase 5, mitigation	
		Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet
I-495 NB Ramps & Terminal Ave	EBT	-	-	-	56	Intersection not impacted by detour routing	Intersection not impacted by detour routing	-	16	Intersection not impacted by detour routing	Intersection not impacted by detour routing	-	32	Intersection not impacted by detour routing	Intersection not impacted by detour routing
	EBR	-	32	-	86			-	75						
	EB Approach	0.0 (A)	-	0.0 (A)	-			0.0 (A)	-						
	WBLT	7.4 (A)	16	8.1 (A)	49			8.1 (A)	50						
	WBT	-	-	-	102			-	24						
	WB Approach	2.3 (A)	-	2.6 (A)	-			2.6 (A)	-						
	NBL	10.5 (B)	60	68.1 (F)	303			68.1 (F)	263						
	NBR	8.6 (A)	-	10.7 (B)	205			10.7 (B)	117						
	NB Approach	9.6 (A)	-	40.3 (E)	-			40.3 (E)	-						
Overall Intersection	3.0 (A)	-	16.1 (C)	-	16.1 (C)	-									
I 495 SB Off Ramp NB On Ramp & US 13	EB Approach	36.4 (D)	130	64.1 (E)	170	45.8 (D)	85	38.4 (D)	149	64.1 (E)	161	45.8 (D)	93	38.4 (D)	128
	NB Approach	10.3 (B)	198	16.9 (B)	255	15.2 (B)	351	9.6 (A)	201	36.1 (D)	321	15.2 (B)	340	9.6 (A)	190
	SBL	37.2 (D)	106	207.2 (F)	786	67.3 (E)	387	38.2 (D)	33	89.4 (F)	484	67.3 (E)	268	38.2 (D)	36
	SBT	4.3 (A)	132	7.2 (A)	1219	3.7 (A)	188	2.8 (A)	42	7.2 (A)	140	3.7 (A)	102	2.8 (A)	38
	SB Approach	7.3 (A)	-	59.5 (E)	-	20.8 (C)	-	6.2 (A)	-	28.7 (C)	-	20.8 (C)	-	6.2 (A)	-
	Overall Intersection	9.6 (A)	-	39.8 (D)	-	19.3 (B)	-	10.6 (B)	-	37.7 (D)	-	19.3 (B)	-	10.6 (B)	-
US 13 & Hessler Blvd	EBLT	79.6 (E)	99	Intersections not impacted by detour routing	Intersections not impacted by detour routing	Intersection not impacted by detour routing	Intersection not impacted by detour routing	33.7 (C)	87	Intersections not impacted by detour routing	Intersections not impacted by detour routing	34.6 (C)	93		
	EBR	33.5 (C)	-					33.5 (C)	-			34.3 (C)	-		
	EB Approach	33.6 (C)	-					33.6 (C)	-			34.4 (C)	-		
	WBLT	6.5 (A)	11					8.2 (A)	14			8.2 (A)	14		
	WBTR	43.2 (D)	37					42.5 (D)	35			42.6 (D)	36		
	WB Approach	43.2 (D)	-					42.5 (D)	-			42.6 (D)	-		
	NBL	63.9 (E)	94					60.0 (E)	110			50.2 (D)	97		
	NBT	58.0 (E)	334					73.4 (E)	372			54.0 (D)	322		
	NBR	25.3 (C)	-					25.3 (C)	-			23.9 (C)	-		
	NB Approach	58.2 (E)	-					71.3 (E)	-			53.2 (D)	-		
	SBL	36.5 (D)	32					37.0 (D)	15			37.7 (D)	13		
	SBT	31.2 (C)	507					26.2 (C)	187			30.3 (C)	199		
	SBR	23.1 (C)	212					23.2 (C)	-			26.7 (C)	-		
	SB Approach	30.7 (C)	-					26.0 (C)	-			30.1 (C)	-		
Overall Intersection	45.5 (D)	-	57.7 (E)	-	46.0 (D)	-									

Intersection	Movement	Weekend Peak Hour													
		2023 No Construction		2023 Detour Phase 2, no mitigation		2023 Detour Phase 4, no mitigation		2023 Detour Phase 5, no mitigation		2023 Detour Phase 2, mitigation		2023 Detour Phase 4, mitigation		2023 Detour Phase 5, mitigation	
		Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet
US 13 & Memorial Dr	EBL	46.8 (D)	83	Intersections not impacted by detour routing	Intersections not impacted by detour routing	46.8 (D)	69	Intersections not impacted by detour routing	Intersections not impacted by detour routing	33.6 (C)	79				
	EBLT	3.6 (A)				3.6 (A)				3.6 (A)		3.6 (A)			
	EB Approach	46.8 (D)	-			46.8 (D)	-			33.6 (C)	-				
	WBL	45.1 (D)	240			45.1 (D)	-			42.3 (D)	-				
	WBT	13.1 (B)	101			13.1 (B)	276			6.7 (A)	219				
	WBR	40.9 (D)	85			40.9 (D)	83			39.6 (D)	69				
	WB Approach	43.1 (D)	-			43.1 (D)	-			41.1 (D)	-				
	NBL	73.7 (E)	65			82.1 (F)	76			63.8 (E)	76				
	NBT	14.1 (B)	212			14.5 (B)	242			18.9 (B)	272				
	NBR	22.4 (C)	79			20.6 (C)	70			22.9 (C)	44				
	NB Approach	17.5 (B)	-			22.2 (C)	-			21.0 (C)	-				
	SBL	39.7 (D)	202			28.9 (C)	133			47.2 (D)	135				
	SBT	18.1 (B)	292			16.4 (B)	192			12.8 (B)	178				
	SBR	13.9 (B)	-			13.9 (B)	-			15.4 (B)	-				
	SB Approach	21.2 (C)	-			16.4 (B)	-			17.9 (B)	-				
Overall Intersection	20.0 (B)	-	21.5 (C)	-	21.9 (C)	-									
US 13 & Hazeldell Ave	WBLR	45.7 (D)	45	45.7 (D)	55	45.7 (D)	47								
	WB Approach	45.7 (D)	-	45.7 (D)	-	45.7 (D)	-								
	NBT	8.7 (A)	154	8.4 (A)	198	8.4 (A)	229								
	NBR	7.5 (A)	18	6.8 (A)	47	6.8 (A)	48								
	NB Approach	8.7 (A)	-	8.4 (A)	-	8.4 (A)	-								
	SBL	51.7 (D)	63	51.2 (D)	58	51.9 (D)	51								
	SBT	1.4 (A)	40	2.1 (A)	38	2.8 (A)	57								
	SB Approach	3.0 (A)	-	3.6 (A)	-	4.3 (A)	-								
Overall Intersection	5.8 (A)	-	7.1 (A)	-	7.8 (A)	-									

Intersection	Movement	Weekend Peak Hour													
		2023 No Construction		2023 Detour Phase 2, no mitigation		2023 Detour Phase 4, no mitigation		2023 Detour Phase 5, no mitigation		2023 Detour Phase 2, mitigation		2023 Detour Phase 4, mitigation		2023 Detour Phase 5, mitigation	
		Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet
US 13 & Wildel Ave	EBL	3.6 (A)	37					3.6 (A)	36					3.6 (A)	41
	EBR	43.2 (D)	-					43.2 (D)	-					43.2 (D)	-
	EB Approach	27.0 (C)	-					27.0 (C)	-					27.0 (C)	-
	WBL	6.3 (A)	71					6.3 (A)	80					6.3 (A)	71
	WBR	43.2 (D)	33					43.2 (D)	30					43.2 (D)	33
	WB Approach	18.6 (B)	-					18.6 (B)	-					18.6 (B)	-
	NBL	80.1 (F)	58					51.9 (D)	51					51.9 (D)	59
	NBT	6.1 (A)	98					6.8 (A)	109					6.8 (A)	123
	NBR	4.5 (A)	-					4.4 (A)	-					4.4 (A)	-
	NB Approach	6.8 (A)	-					7.1 (A)	-					8.2 (A)	-
	SBL	56.5 (E)	19					56.1 (E)	12					55.4 (E)	13
	SBT	2.3 (A)	55					3.8 (A)	52					3.7 (A)	59
	SBR	4.5 (A)	5					4.9 (A)	3					4.9 (A)	5
	SB Approach	2.5 (A)	-					4.0 (A)	-					3.8 (A)	-
Overall Intersection	5.2 (A)	-	6.7 (A)	-	7.4 (A)	-									
MLK Jr Blvd & Washington St	WBT	3.3 (A)	38	Intersections not impacted by detour routing	Intersections not impacted by detour routing			9.6 (A)	109	Intersections not impacted by detour routing	Intersections not impacted by detour routing			5.1 (A)	115
	WB Approach	3.3 (A)	-					9.6 (A)	-					5.1 (A)	-
	SBR	52.5 (D)	11					52.5 (D)	26					52.5 (D)	44
	SB Approach	52.5 (D)	-					52.5 (D)	-					52.5 (D)	-
	Overall Intersection	20.1 (C)	-					13.3 (B)	-					9.2 (A)	-
MLK Jr Blvd & West St	WBTR	1.3 (A)	67					0.8 (A)	97					4.3 (A)	150
	WB Approach	1.3 (A)	-					0.8 (A)	-					4.3 (A)	-
	NBT	8.9 (A)	14					8.9 (A)	10					8.9 (A)	18
	NB Approach	8.9 (A)	-					8.9 (A)	-					8.9 (A)	-
	Overall Intersection	9.1 (A)	-					2.8 (A)	-					4.6 (A)	-
MLK Jr Blvd & Tatnall St	WBT	10.6 (B)	67					14.3 (B)	269					10.5 (B)	278
	WB Approach	10.6 (B)	-					14.3 (B)	-					10.5 (B)	-
	SBR	55.2 (E)	5					55.2 (E)	59					55.2 (E)	17
	SB Approach	55.2 (E)	-					55.2 (E)	-					55.2 (E)	-
	Overall Intersection	16.3 (B)	-					15.4 (B)	-					11.7 (B)	-
MLK Jr Blvd & Orange St	WBTR	1.2 (A)	23					0.8 (A)	51					1.4 (A)	23
	WB Approach	1.2 (A)	-					0.8 (A)	-					1.4 (A)	-
	NBT	54.8 (D)	22					16.9 (B)	19					16.9 (B)	29
	NB Approach	54.8 (D)	-					16.9 (B)	-					16.9 (B)	-
	Overall Intersection	7.6 (A)	-					2.2 (A)	-					2.4 (A)	-

Intersection	Movement	Weekend Peak Hour													
		2023 No Construction		2023 Detour Phase 2, no mitigation		2023 Detour Phase 4, no mitigation		2023 Detour Phase 5, no mitigation		2023 Detour Phase 2, mitigation		2023 Detour Phase 4, mitigation		2023 Detour Phase 5, mitigation	
		Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet
MLK Jr Blvd & Market St	WBL	46.0 (D)	277	Intersections not impacted by detour routing	Intersections not impacted by detour routing	34.6 (C)	369	Intersections not impacted by detour routing	Intersections not impacted by detour routing	27.4 (C)	235	Intersections not impacted by detour routing	Intersections not impacted by detour routing	49.3 (D)	406
	WBT	41.3 (D)	138			124.1 (F)	441			43.7 (D)	-			54.9 (D)	145
	WB Approach	44.5 (D)	-			101.3 (F)	-			54.9 (D)	-			44.5 (D)	-
	SBTR	53.6 (D)	151			54.3 (D)	184			54.9 (D)	-			44.5 (D)	-
	SB Approach	53.6 (D)	-			54.3 (D)	-			54.9 (D)	-			44.5 (D)	-
	Overall Intersection	46.0 (D)	-			98.0 (F)	-			44.5 (D)	-			44.5 (D)	-
N King St & E 2 nd St	WBLT	5.8 (A)	72	Intersections not impacted by detour routing	Intersections not impacted by detour routing	38.4 (D)	260	Intersections not impacted by detour routing	Intersections not impacted by detour routing	38.4 (D)	290	Intersections not impacted by detour routing	Intersections not impacted by detour routing	38.4 (D)	-
	WB Approach	5.8 (A)	-			38.4 (D)	-			38.4 (D)	-			38.4 (D)	-
	SBTR	54.8 (D)	315			51.5 (D)	765			51.5 (D)	688			51.5 (D)	-
	SB Approach	51.5 (D)	-			51.5 (D)	-			51.5 (D)	-			51.5 (D)	-
	Overall Intersection	33.5 (C)	-			42.5 (D)	-			42.5 (D)	-			42.5 (D)	-
French St & E 2 nd St	WBTL	1.7 (A)	59	Intersections not impacted by detour routing	Intersections not impacted by detour routing	0.5 (A)	314	Intersections not impacted by detour routing	Intersections not impacted by detour routing	0.5 (A)	298	Intersections not impacted by detour routing	Intersections not impacted by detour routing	0.5 (A)	-
	WB Approach	1.7 (A)	-			0.5 (A)	-			0.5 (A)	-			0.5 (A)	-
	NBL	49.3 (D)	70			-	74			-	79			-	79
	NB Approach	49.3 (D)	-			-	-			-	-			-	-
	Overall Intersection	6.5 (A)	-			0.5 (A)	-			0.5 (A)	-			0.5 (A)	-
Walnut St & 2 nd St	WBT	9.9 (A)	65	Intersections not impacted by detour routing	Intersections not impacted by detour routing	29.9 (C)	127	Intersections not impacted by detour routing	Intersections not impacted by detour routing	30.2 (C)	118	Intersections not impacted by detour routing	Intersections not impacted by detour routing	30.2 (C)	55
	WBR	9.9 (A)	38			30.0 (C)	75			30.2 (C)	-			30.2 (C)	-
	WB Approach	9.9 (A)	-			29.9 (C)	-			30.2 (C)	-			30.2 (C)	-
	NBL	45.9 (D)	224			43.0 (D)	276			42.7 (D)	331			42.7 (D)	331
	NBT	51.5 (D)	326			27.4 (C)	147			27.2 (C)	222			27.2 (C)	222
	NB Approach	49.5 (D)	-			38.2 (D)	-			37.9 (D)	-			37.9 (D)	-
	Overall Intersection	45.1 (D)	-			37.7 (D)	-			37.4 (D)	-			37.4 (D)	-
Walnut St & Front St	EBL	18.4 (B)	142	Intersections not impacted by detour routing	Intersections not impacted by detour routing	37.0 (D)	137	Intersections not impacted by detour routing	Intersections not impacted by detour routing	37.4 (D)	141	Intersections not impacted by detour routing	Intersections not impacted by detour routing	37.4 (D)	130
	EBT	18.5 (B)	127			37.2 (D)	133			37.7 (D)	130			37.7 (D)	130
	EB Approach	18.4 (B)	-			37.1 (D)	-			37.5 (D)	-			37.5 (D)	-
	NBT	52.1 (D)	259			39.1 (D)	964			38.7 (D)	1434			38.7 (D)	1434
	NB Approach	52.5 (D)	-			39.2 (D)	-			38.8 (D)	-			38.8 (D)	-
	Overall Intersection	43.1 (D)	-			38.9 (D)	-			38.6 (D)	-			38.6 (D)	-

Table 5. Capacity Analysis and 95th Percentile Queue Results – Phases 3A and 3D

Intersection	Peak Hour	Movement	Available Storage Length (ft)	2023 No Construction		2023 Phase 3D, no mitigation		2023 Phase 3C, no mitigation		2023 Phase 3C, mitigation		
				Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	Delay in seconds (LOS)	95 th %ile queue in feet	
S Heald St/Heald St & Rogers Rd	A.M.	EBL	336	67.6 (E)	26	67.6 (E)	32	74.8 (E)	54	60.4 (E)	47	
		EBT	336	13.4 (B)	146	13.4 (B)	145	20.6 (C)	180	17.3 (B)	142	
		EB Approach			15.3 (B)	-	15.3 (B)	-	22.5 (C)	-	18.8 (B)	-
		WBL	>1000	15.6 (B)	62	22.1 (C)	267	40.5 (D)	662	-	41.5 (D)	314
		WBT	>1000	20.1 (C)	226							
		WBR	130	15.0 (B)	95	15.0 (B)	104					
		WB Approach			19.1 (B)	-	21.1 (C)	-	40.5 (D)	-	41.5 (D)	-
		NBL	412	56.1 (E)	22	52.7 (D)	16	37.4 (D)	950	37.0 (D)	227	
		NBT	664	34.9 (C)	182	34.9 (C)	176					
		NBR	712	29.4 (C)	35	29.4 (C)	45					
		NB Approach			32.3 (C)	-	32.2 (C)	-	37.4 (D)	-	37.0 (D)	-
		SBL	>1000	49.0 (D)	111	49.0 (D)	110	59.4 (E)	125	42.4 (D)	106	
		SBT	>1000	12.9 (B)	127	12.9 (B)	122	19.9 (B)	153	14.7 (B)	90	
		SBR	159	22.9 (C)	46	23.6 (C)	66	16.2 (B)	47	13.7 (B)	53	
		SB Approach			28.3 (C)	-	28.5 (C)	-	34.6 (C)	-	21.2 (C)	-
		Overall Intersection			23.7 (C)	-	24.5 (C)	-	35.5 (D)	-	33.5 (C)	-
	P.M.	EBL	336	60.7 (E)	34	60.8 (E)	35	75.7 (E)	31	42.8 (D)	36	
		EBT	336	15.2 (B)	159	15.2 (B)	151	24.6 (C)	221	16.3 (B)	177	
		EB Approach			16.2 (B)	-	16.3 (B)	-	25.7 (C)	-	16.9 (B)	-
		WBL	>1000	17.0 (B)	69	23.5 (C)	256	-	987	-	33.7 (C)	370
		WBT	>1000	20.4 (C)	174							
		WBR	130	15.5 (B)	25	15.6 (B)	65	38.9 (D)				
		WB Approach			19.7 (B)	-	23.1 (C)	-	38.9 (D)	-	33.7 (C)	-
		NBL	412	52.8 (D)	22	52.8 (D)	21	32.9 (C)	1021	30.3 (C)	183	
		NBT	664	34.7 (C)	129	34.8 (C)	112					
		NBR	712	32.5 (C)	52	32.5 (C)	62					
		NB Approach			33.7 (C)	-	33.8 (C)	-	32.9 (C)	-	30.3 (C)	-
		SBL	>1000	45.4 (D)	158	45.4 (D)	177	65.8 (E)	180	35.4 (D)	150	
SBT	>1000	25.4 (C)	141	25.4 (C)	149	17.1 (B)	175	13.8 (B)	104			
SBR	159	22.1 (C)	52	22.7 (C)	70	15.4 (B)	50	12.3 (B)	45			
SB Approach			33.8 (C)	-	33.9 (C)	-	38.3 (D)	-	23.1 (C)	-		
Overall Intersection			25.7 (C)	-	26.8 (C)	-	34.6 (C)	-	26.4 (C)	-		

Daily Road User Cost (RUC) calculations were performed for the six detours analyzed as a part of this TMP. The worksheet entries and outputs are provided in **Appendix J**. A summary of the daily RUC for each detour is provided in **Table 6**.

Table 6. Daily Road User Costs

Construction Phase & Detoured Route	Daily Road User Cost
Phase 1 – Rogers Rd between US 13 and BUS 13 (Rogers WB + Rogers EB)	\$ 20,900
Phase 2 – US 13 (South Heald St) NB & SB (Phase 1 + Heald NB + Heald SB)	\$ 30,500
Phase 3A – Rogers Rd WB between Medori Blvd and US 13 (South Heald St)	\$ 12,000
Phase 3B – Rogers Rd EB between Medori Blvd and US 13 (South Heald St)	\$ 9,000
Phase 4 – BUS 13 NB between US 13 (South Heald St) and Millside Dr	\$ 84,160
Phase 5 – BUS 13 SB & I-495 Ramp between Millside Dr and US 13 (South Heald St)	\$130,000

Additionally, RUC calculations were performed for late openings from the detours or lane closures for the three weekend detour phases (Phase 2, Phase 4, and Phase 5), overnight detour during Phase 4 at the intersection of Millside Drive at BUS 13, and lane restrictions beyond the allowable hours for BUS 13 in Phase 1. The worksheet entries and outputs are provided in **Appendix J**. A summary of the RUCs to be enforced as specified for each scenario is provided in **Table 7**.

Table 7. Interval Road User Costs

Construction Phase & Detoured Route	Road User Cost
Phase 1 – Lane restriction late opening for BUS 13 NB (hourly)	\$ 6,715
Phase 1 – Lane restriction late opening for BUS 13 SB (hourly)	\$ 3,405
Phase 2 – Weekend detour late opening compounded every 15-minutes starting 7 AM Monday, with maximum daily as specified in Table 5	\$ 560
Phase 4 – Weekend detour late opening compounded every 15-minutes starting 7 AM Monday, with maximum daily of \$2,700	\$ 140
Phase 4 – Overnight detour late opening compounded every 15-minutes starting 7 AM, with maximum daily as specified in Table 5	\$ 110
Phase 5 – Weekend detour late opening compounded every 15-minutes starting 7 AM Monday, with maximum daily as specified in Table 5	\$ 1,305

Crash Analysis

Safety analysis was completed using the latest three years (May 2019 – July 2022) of crash data obtained from DelDOT using their Crash Analysis Reporting System (CARS) which included detailed information regarding the number, types of crashes, time of day, year and driver behavior contributing to the crash. These CARS crash summaries are provided in **Appendix H**. The crash analysis included the intersections pinned in yellow in **Figure 18** below. The crashes included some of the key turning point intersections along the core detour routes where the number of detours would be significant.

Figure 18. Crash Analysis Locations

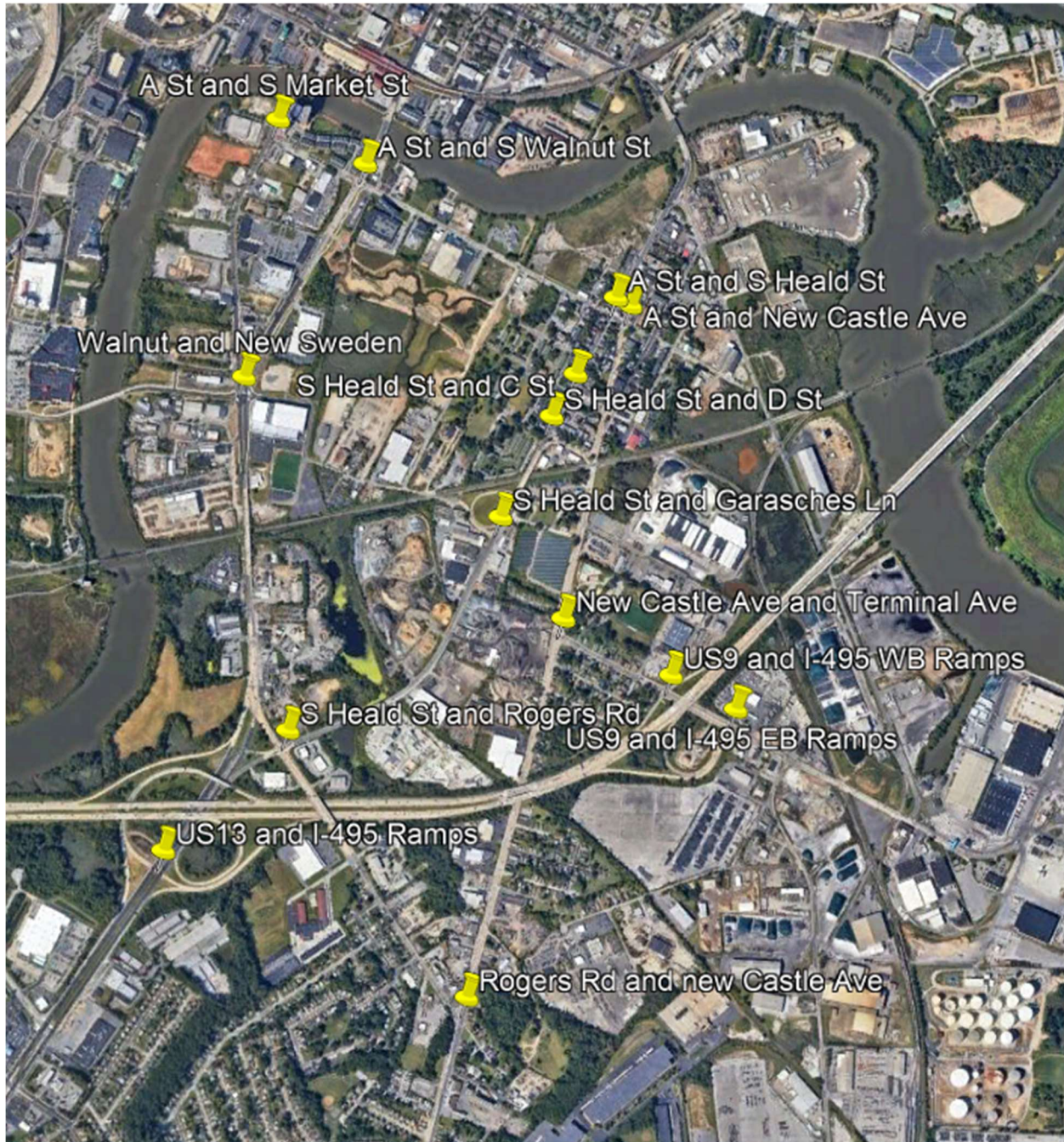


Table 8 provides the total number of crashes and injuries by intersection. There was a total of 168 crashes in the three-year period that resulted in 52 injuries and one fatality. Of these crashes, 71 (42%) were angle crashes, 51 (30%) were rear-end crashes, 21 (13%) were sideswipe crashes, 13 (8%) were non collision type of crashes, and five (3%) were other types of crashes. The higher percentage of angle crashes and rear end crashes suggest congestion issues at the intersections and specifically with angle crashes could be a concern for left turning vehicles. Measures, specifically for signal timings to mitigate congestion during construction, will be considered.

Of the total number of crashes, the highest number of crashes was reported at the intersection of A Street and South Walnut Street with 37, or 22%, of the crashes, 11 injuries and one fatal crash. The fatal crash was an angle collision that involved a driver under the influence. Other intersections that experienced a total of 20 crashes or more included: New Castle Avenue at Rogers Road, New Castle Avenue at Terminal Avenue, and South Heald Street at Rogers Road with 25 (15%), 21 (13%), and 20 (12%) crashes, respectively. US 9 and I-495 southbound ramps and A Street and New Castle Avenue saw 15 (9%) and 10 (6%) crashes, respectively. A Street and South Market Street, US 13 and I-95 Ramps, and US 9 and I-495 northbound ramps each had eight (5%) crashes. Finally, A Street at South Heald Street and South Heald Street at C Street each had six (4%) crashes, BUS 13 at New Sweden Street had three (2%) crashes, and South Heald Street at Garasches Lane had one (1%) crash.

Table 8. Number of Crash and Injury by Intersection

Intersection/Segment	Total Crashes	Angle	Head On	Rear End	Non-Collision	Other	Sideswipe	Unknown	Fatalities	Injuries	Property Damage Only
A St & S Market St	8	2	1	1	2	0	2	0	0	3	5
A St & S Walnut St	37	17	2	6	2	2	8	0	1	11	25
A St & S Heald St	6	4	0	1	0	1	0	0	0	3	3
A St & New Castle Ave	10	1	2	3	0	0	4	0	0	3	7
S Market St & New Sweden St	3	1	0	2	0	0	0	0	0	1	2
S Heald St & C St	6	5	0	0	1	0	0	0	0	4	2
S Heald St & Garasches Ln	1	0	0	0	0	1	0	0	0	1	0
S Heald St & Rogers Rd	20	7	0	10	2	0	1	0	0	2	18
US 13 & I-495 Ramps	8	5	0	3	0	0	0	0	0	3	5
New Castle Ave & Terminal Ave	21	13	1	4	0	1	2	0	0	12	9
New Castle Ave & Rogers Rd	25	10	1	12	1	0	1	0	0	7	18
US 9 & I-495 WB Ramps	15	2	0	9	2	0	2	0	0	1	14
US 9 & I-495 EB Ramps	8	4	0	0	3	0	1	0	0	1	7
Total	168	71	7	51	13	5	21	0	1	52	115

Qualitative Work Zone Evaluations

The work zone alternatives evaluated for this project are listed in **Table 9**. This project is anticipated to impact the corridor by requiring a staged work zone area and detours for completion of the concrete pavement reconstruction along Rogers Road. According to DeIDOT's *Work Zone Safety and Mobility Procedures and Guidelines* (Chapter II, Section 1 Identification of Significant Projects), all projects on the National Highway System that occupy a location for more than five consecutive days with either intermittent or continuous lane closures are deemed to be significant projects, triggering the need for a Type B Transportation Management Plan, including quantitative and qualitative work zone evaluations. This project is considered significant in accordance with the *Work Zone Safety and Mobility Procedure and Guidelines* because construction will impact Rogers Road and US 13. US 13 is considered an intermodal connector on the National Highway Network and intermittent or continuous lane closures will be present and may occupy the roadway for more than five days.

Temporary Lane Closures

Temporary Traffic Control

During the course of this project, temporary lane closures will be in place along Rogers Road and may be considered during restricted times along BUS 13. In order to determine the appropriate lane closure times, the field-collected hourly traffic volume data obtained in May 2022 from the project ATRs were grown to estimated 2023 volumes. These values were then compared to work zone capacities as outlined by DeIDOT. The capacity threshold for a single lane on a freeway facility of 1,340 vph as provided in Table 2 of DeIDOT's *Work Zone Safety and Mobility Procedure and Guidelines* is approximately 60% of the threshold for a single lane on a freeway. The Highway Capacity Manual (HCM) 2010 base saturation flow rate for signalized and urban roadways of 1,750 vph per lane, which when reduced by 40 percent results in a single lane capacity of non-freeway roadways with signalized intersections of 1,050 vph per lane.

The allowable hourly lane closure chart showing times when a lane can be closed shaded in gray for westbound Rogers Road is provided in **Table 10** and for eastbound Rogers Road is provided in **Table 11**. From the capacity thresholds and hourly volumes of the roadway, it was determined that single lane closures can occur any time of day or day of the week along Rogers Road due to the low volumes.

The allowable hourly lane closure chart showing times when a lane can be closed shaded in gray for northbound BUS 13 is provided in **Table 12** and for southbound BUS 13 is provided in **Table 13**. From the capacity thresholds and hourly volumes of the roadway, it was determined that single lane closures cannot occur Monday to Friday between 7:00 AM and 10 AM, and between 2:00 PM and 7:00 PM along northbound BUS 13. Similarly, along southbound BUS 13, road closures cannot occur on weekdays between 1:00 PM and 7:00 PM.

Table 9. Qualitative Work Zone Assessment

Factor	Full Roadway Closures	Staged Work Zone with Temporary Barricade
Right-of-way and environmental impacts	None anticipated	None anticipated
Construction duration	One season	One season
Number of construction phases	Four Phases, 2 Sub Phases	Two Sub Phases
Impacts to permanent earthwork, retaining walls, etc.	None anticipated	None anticipated
Ability to maintain existing drainage, lighting and other roadside systems	No impacts anticipated	No impacts anticipated
Ability to maintain standard lane widths	No change to standard lane widths is anticipated	No change to standard lane widths is anticipated
Ability to maintain access	Impacts anticipated due to detour, but access to businesses provided	Access maintained for all roads and driveways during construction
Impacts to pedestrian and bicycle facilities	None anticipated	None anticipated
Impacts on emergency services (fire, police, ambulance, hospitals)	Some impacts due to detours	Minor impacts due to lane reductions on Rogers Road
Work Zone Safety	Full time closure of roadway or intersection	Temporary barrier protection
Ability to maintain existing number of lanes	Existing number of lanes will be maintained along all detour routes	BUS 13 northbound and Rogers Road will have lane reductions for construction of shoulders and median
Ability to accommodate all turning movements	Impacts due to detour, access maintained	All turning movements, though lane reductions anticipated
Constructability and construction equipment access	Construction access will be maintained at the ends of each phase work area, or intersections within phases where applicable	Construction access will be maintained from Rogers Road

Table 10. Allowable Lane Closure Hours - WB Rogers Rd

LANE CLOSED
 LANE OPEN

ALLOWABLE LANE CLOSURE HOURS - NB Rogers Rd

	12:00 AM	1:00 AM	2:00 AM	3:00 AM	4:00 AM	5:00 AM	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM	
SUNDAY																									
MONDAY																									
TUESDAY																									
WEDNESDAY																									
THURSDAY																									
FRIDAY																									
SATURDAY																									

Table 11. Allowable Lane Closure Hours - EB Rogers Rd

LANE CLOSED
 LANE OPEN

ALLOWABLE LANE CLOSURE HOURS - SB Rogers Rd

	12:00 AM	1:00 AM	2:00 AM	3:00 AM	4:00 AM	5:00 AM	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM	
SUNDAY																									
MONDAY																									
TUESDAY																									
WEDNESDAY																									
THURSDAY																									
FRIDAY																									
SATURDAY																									

Table 12. Allowable Lane Closure Hours – NB BUS 13 (South Walnut Street)

LANE CLOSED
 LANE OPEN

ALLOWABLE LANE CLOSURE HOURS - NB Walnut St

	12:00 AM	1:00 AM	2:00 AM	3:00 AM	4:00 AM	5:00 AM	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM
SUNDAY																								
MONDAY																								
TUESDAY																								
WEDNESDAY																								
THURSDAY																								
FRIDAY																								
SATURDAY																								

Table 13. Allowable Lane Closure Hours – SB BUS 13 (South Market Street)

LANE CLOSED
 LANE OPEN

ALLOWABLE LANE CLOSURE HOURS - SB Market St

	12:00 AM	1:00 AM	2:00 AM	3:00 AM	4:00 AM	5:00 AM	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM
SUNDAY																								
MONDAY																								
TUESDAY																								
WEDNESDAY																								
THURSDAY																								
FRIDAY																								
SATURDAY																								

Planned Special Events and Holidays

During the DeIDOT observed holidays and special events, the contractor will not perform any activities that will impede traffic by not performing short-term travel lane-restrictions and implementing a new long-term travel lane restriction or perform any activity that will impede traffic.

Holiday restrictions will follow those outlined in Section 801.3.5 of the DeIDOT Standard Specifications June 2021 edition which states that “the department will not allow travel lane, turn lane, ramp or road closures on interstate, freeways, expressways, or principal arterials during the following holidays, unless otherwise noted in the contract documents”. These holidays are noted in addition to special events and would only be applicable for BUS 13 in the project area.

1. Christmas Day
2. New Year’s Day
3. Memorial Day
4. Independence Day
5. Labor Day
6. Thanksgiving Day

The DeIDOT Standard Specifications Section 801.3.5 (June 2022) also states that lanes can be open for a period of time depending on the day of the week that the legal or observed holiday falls. Per the specification, **Table 14** below lists the period of time that the lanes must remain open, unless otherwise allowed by the contract.

Table 14. Day of Holiday Lane Closure Restrictions

Day of Holiday or Event	Time All Lanes Must be Open to Traffic
Sunday	12:00 PM Friday through 5:59 AM Monday
Monday	12:00 PM Friday through 11:59 PM Monday
Tuesday	12:00 PM Monday through 11:59 PM Tuesday
Wednesday	12:00 PM Tuesday through 11:59 PM Wednesday
Thursday	12:00 PM Wednesday through 11:59 PM Thursday
Thursday (Thanksgiving)	6:00 AM Wednesday through 11:59 PM Sunday
Friday	12:00 PM Thursday through 5:59 AM Monday
Saturday	12:00 PM Friday through 5:59 AM Monday

No planned special events were identified at this time.

4. Selected Work Zone Impacts Management Strategies

Temporary Traffic Control Plan (TCP)

The temporary traffic control plan (TCP) for this project is presented in **Appendix B**. Traffic operations may be impacted due to the work zone despite efforts made to ensure work zones operate efficiently and safely. It is therefore necessary for motorists to plan their alternatives or expect delays when detours are in place along Rogers Road and BUS 13 during peak hours.

Temporary Traffic Control Devices

The DE MUTCD provides standards, guidelines, and other information pertaining to installing, maintaining, and operating traffic control devices on streets and highways. Part 6 of the DE MUTCD (Temporary Traffic Control), addresses safety, mobility, and constructability issues in work zones. Temporary traffic control devices and other safety devices used for this project include,

- Temporary Signs
- Arrow Panels
- Channelizing Devices
- Barricades
- Temporary Pavement Markings
- Lighting Devices
- Portable Changeable Message Signs
- Temporary traffic signals

Traffic Signals during Construction

There are two traffic signals within the project limits: (1) Rogers Road and US 13 (South Heald Street) and (2) BUS 13 and Millside Drive. The lane allowances during six construction phases will necessitate shifting the signal heads along the existing span wire at the intersection of Rogers Road and US 13 (South Heald Street), which is shown on the temporary signal plans provided in **Appendix B**. The lane allowances during two construction phases will necessitate signal heads to be bagged and installation of a fisheye camera for vehicle detection at the intersection of BUS 13 and Millside Drive, redlined temporary signal plans for which are provided in **Appendix B**. Additionally, along with the traffic signals present along the detour routes, impacted signalized intersections will be monitored via CCTV cameras connected to the TMC. Signal timings will be optimized by DeIDOT staff at the TMC as needed.

Public Information Plan

The Public Information (PI) plan consists of notifying public entities, local school districts, municipalities, emergency responders, news outlets and the traveling public of the start of the Rogers Road Pavement Rehabilitation, major traffic switches, lane closures along Rogers Road and BUS 13 along with their respective detours. The following methods will be utilized to notify the public of the repair work:

- DeIDOT Press releases
- DeIDOT radio station WTMC, 1380 AM
- DeIDOT Smartphone Application (App)
- DeIDOT website (<https://deldot.gov/>), including:
 - Interactive Traffic Map
 - Streaming audio of WTMC
 - MyDeIDOT email alerts
 - Live Traffic Cameras

Transportation Operations Plan

Pedestrian access is non-continuous along Rogers Road and existing access will be maintained throughout construction.

The following Transportation Operation (TO) strategies shall be used during the project:

Transit

Several existing DART bus routes currently utilize the project location. The route schedules and maps are provided in **Appendix I**. The routes that utilize BUS 13 northbound and southbound through the project area are as follows:

- Wilmington/ University Plaza / Newark (Route 10, Monday to Saturday)
- Philadelphia Pike/ DuPont Highway (Route 13, Daily)
- Pike Creek Valley / Foulk Rd (Route 18, Monday to Friday) – Express Route ONLY
- Miller Road Shopping Center / Wilmington / DuPont Highway / Wrangle Hill (Route 25, Monday to Saturday)
- Nemours Children’s Hospital / Wilmington DMV / Probation & Parole / Riveredge Industrial Park (Route 28, Monday to Saturday)
- Christiana Mall / Newark (Route 33, Daily)
- Wilmington / Christiana Mall / Wrangle Hill / Middletown (Route 37, Monday to Friday)
- Glasgow / US Routes 13 & 40 / Wilmington (Route 40, Daily)
- Glasgow / Newark Express (Route 42, Monday to Friday)
- DuPont Hwy. / Llangollen / Middletown (Route 47, Monday to Saturday and Memorial Day, Independence Day and Labor Day)
- Intercounty Wilmington / Dover (Route 301, Monday to Saturday)

Coordination with DART will occur to institute temporary bus stop relocations and discuss temporary bus route changes. During Phase 1, when the outside lane along northbound BUS 13 is being reconstructed, a temporary bus stop location can be provided north of the

intersection of Millside Drive. For routes traveling along BUS 13 northbound during the detour in Phase 4, the stop at Millside Drive will need to be temporarily skipped and buses can utilize Garasches Lane to pick up passengers at a relocation of the bus stop at the Chase Fieldhouse, perhaps coordinating with the business for an on-site location. For routes traveling along BUS 13 southbound during the detour in Phase 5, a temporary bus stop location can be provided north of the intersection of Millside Drive and buses could route to Rogers Road, making a right onto US 13 (South Heald Street) to then access BUS 13 again and pick up its route without missing the next stop.

Signal Timing/ Coordination Improvements

In order to facilitate transportation operations along the detour routes and possible diversion routes for this project, traffic signals at relevant intersections will be monitored remotely via temporary closed-circuit television (CCTV) cameras. Signal timings may be adjusted to improve traffic operations during construction and will be done so by the DeIDOT TMC.

All signalized intersections within the project area are to be monitored during construction for timing adjustments and capacity concerns.

Existing Traffic Monitoring CCTV Cameras

Currently, there are no traffic monitoring CCTV cameras located along Rogers Road. However, traffic monitoring CCTV cameras are located along the detour routes at:

- BUS 13 at New Sweden Street
- BUS 13 (South Market Street) at Howard Street
- MLK Jr. Boulevard / King Street at E. 2nd Street
- MLK Jr. Boulevard at Justison Street / SR 48
- I-95 NB Exit at Maryland Avenue
- I-95 at I-495 Interchange
- I-495 at US 13 (Dupont Highway) Interchange
- I-495 at Terminal Avenue Interchange

Proposed Traffic Monitoring CCTV Cameras

For the purpose of the detours, DeIDOT should consider placing portable CCTV cameras at the following locations:

- New Castle Ave at Rogers Road
- New Castle Avenue at Terminal Avenue
- US 13 (South Heald Street) at Rogers Road
- A Street at US 13 (South Heald Street)
- US 13 (Dupont Highway) at I-495 Ramps
- A Street at BUS 13 (South Walnut Street)

DeIDOT Radio Station WTMC, 1380 AM

Traveler information will be updated accordingly with scheduled construction durations. Temporary project-specific conditions during construction phasing are to be announced rather than long-term issues (for example, broadcast any lane closures/shifts instead of general road work occurring and to expect delays).

Transportation Management Center (TMC)

The TMC will be used to monitor traffic conditions and coordinate response to traffic incidents.

Coordination with the Media

DeIDOT will coordinate updates and changes in diversion routes or closures with the media in order to disseminate information as quickly and as widely as possible.

Safety Officer

DeIDOT's Traffic Safety Officer will periodically review temporary control setups during construction of this project and will provide inspection reports based on those periodic reviews. The contractor is required to have a certified Traffic Control Supervisor assigned to this project to supervise the installation and maintenance of the temporary traffic control devices.

Incident/ Emergency Response Plan

DeIDOT will coordinate with area Emergency Responders to develop an emergency response plan for this project.

Traffic Monitoring System

Wavetronix devices are present at most interstate ramps and signalized intersections along the detour routes. These locations include:

Intersections:

- New Castle Ave at Rogers Road
- US 13 (Dupont Highway) at Fairview Avenue / Gracelawn Memorial Park
- US 13 (Dupont Highway) at Memorial Drive
- US 13 (Dupont Highway) at I-495 Ramps
- BUS 13 at US 13 (South Heald Street)
- BUS 13 at Millside Drive
- BUS 13 at New Sweden Street
- I-95 NB Off-Ramp at Maryland Avenue

Ramps:

- I-95 at Maryland Avenue
- I-95 at Frawley Stadium

- I-95 at Little Mill Creek
- I-95 at Christiana River
- I-95 SB at I-295 split
- I-495 at Hessler Boulevard
- I-495 NB Ramp from US 13
- I-495 at Rogers Road
- I-495 S/O Terminal Ave
- I-495 NB ramp to Terminal Ave
- I-495 SB Ramp to Terminal Ave
- I-495 north of Terminal Ave

In addition to Wavetronix devices, Bluetooth detectors are present at the following intersections:

- S Walnut Street and Front Street
- M.L.K Boulevard and S Market Street
- M.L.K. Boulevard and Justison Street
- I-95 NB Off-Ramp and Maryland Avenue
- I-95 NB between I-495 and M.L.K Boulevard
- I-95 SB Off-Ramp to I-295 SB
- US13 NB at I-495 Ramps
- I-495 EB between I-95 and Terminal Avenue
- I-495 EB Off-Ramp to Terminal Avenue
- New Castle Avenue and C Street

Traffic monitoring will occur using data at these available Wavetronix and Bluetooth device locations.

5. TMP Monitoring Requirements

Method for Verification of Work Zone Setup

As a part of the work zone setup verification, it needs to be verified that all traffic control devices are set according to the traffic control plans and *Figure 3: Traffic Control Inspection Report* from the *Work Zone Safety and Mobility Procedures and Guidelines* is completed.

Process for Monitoring TMP Performance

TMP performance monitoring needs to be done by keeping a log of the observations and at a minimum ensure traffic delays are not excessive. Traffic delays can be evaluated by ensuring delays at traffic signals are no longer than two cycles and there is no “spillback” of traffic such that vehicle queue lengths block intersections or turning lanes.

Approach for Corrective Action when TMP Performance Requirements are not met

When TMP performance requirements mentioned above are not met, the following corrective actions will be implemented:

- Notify DeIDOT’s TMC (and the Contractor if appropriate) to reprogram the messages on portable changeable message boards to make them easy to understand and follow
- If traffic delays are excessive, notify DeIDOT’s TMC to adjust the timings at traffic signals or to provide personnel to make any possible field adjustments to mitigate any observed negative impacts to traffic flow

In addition to the above, *Figure 4: Post-Construction TMP Review Form* from the *Work Zone Safety and Mobility Procedures and Guidelines* needs to be completed as part of the TMP performance and corrective action evaluation.

6. Contingency Plan

A quick reference sheet will be developed as a guide to assist field personnel and emergency responders. It will be distributed to the project team. One side of this quick reference sheet will have the project area map showing the project location, suggested diversion routes and intersections with traffic signal modifications. The opposite side will have a Matrix of Incident and Event Management Responsibilities showing important contacts and responsibilities for the contingency scenarios listed below.

Contingency Plan Triggers and Potential Activities

The proposed detour routes offer the least disturbance to the surrounding roadway network. If a contingency plan is needed due to unforeseen circumstances along the detour routes, DeIDOT forces should pause construction, look at alternatives and reuse directions of either detour routes. The TMC will still be able to add timings to maximize capacity and traffic flow based on these unforeseen conditions

Incident Management Contacts and Responsibilities

The emergency contact list provided in **Table 15** was created for distribution among field personnel directly involved in the project. *Updates to this section will be provided as they are made available; if after the final plan submission, updates will be included in **Appendix A**.*

DeIDOT TMC 302-659-4600

Responsibilities: Coordinates response to any transportation incident in the impacted area, reported by the contractor or otherwise. Communicate recommendations to Project Manager and implement contingency plans

DeIDOT Safety Officer

Responsibilities: Generally, monitors and comments on the Traffic Control Plan and guides Contractor’s adherence to DeIDOT safety practice

Emergency Responders/ 911

Responsibilities: Respond to emergencies and coordinate with DeIDOT TMC on transportation incidents

Table 15. Project Personnel Contact List

Name	Title / Agency	Phone Number
James Osborne	DeIDOT Safety Programs Manager	302-542-7201
Gerald Nagyiski	Chief Safety Officer	302-222-5977
Justin Sauble	North District Safety Officer	TBD
TBD	Project Supervisor	TBD
TBD	Project Resident	TBD
TBD	Area Engineer	TBD
TBD	Construction Group Engineer	TBD

Incident Management Process

To be coordinated with Emergency Services and updated as needed in **Appendix A**.

7. TMP Implementation Costs

There are no additional TMP Implementation Costs beyond the normal costs for temporary traffic control and installation of temporary wireless video cameras with connection to the TMC, therefore no additional information is provided in this section. It is anticipated that 911 camera installation work will be done by DeIDOT maintenance forces and no TMC items will be listed in the PS&E Bid Package.