The Norwood
Mobility Project

The Norwood Mobility Plan

Adopted February 24, 2026

Resolution # 2026 0043

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The Norwood Mobility Project

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Why Norwood Avenue?

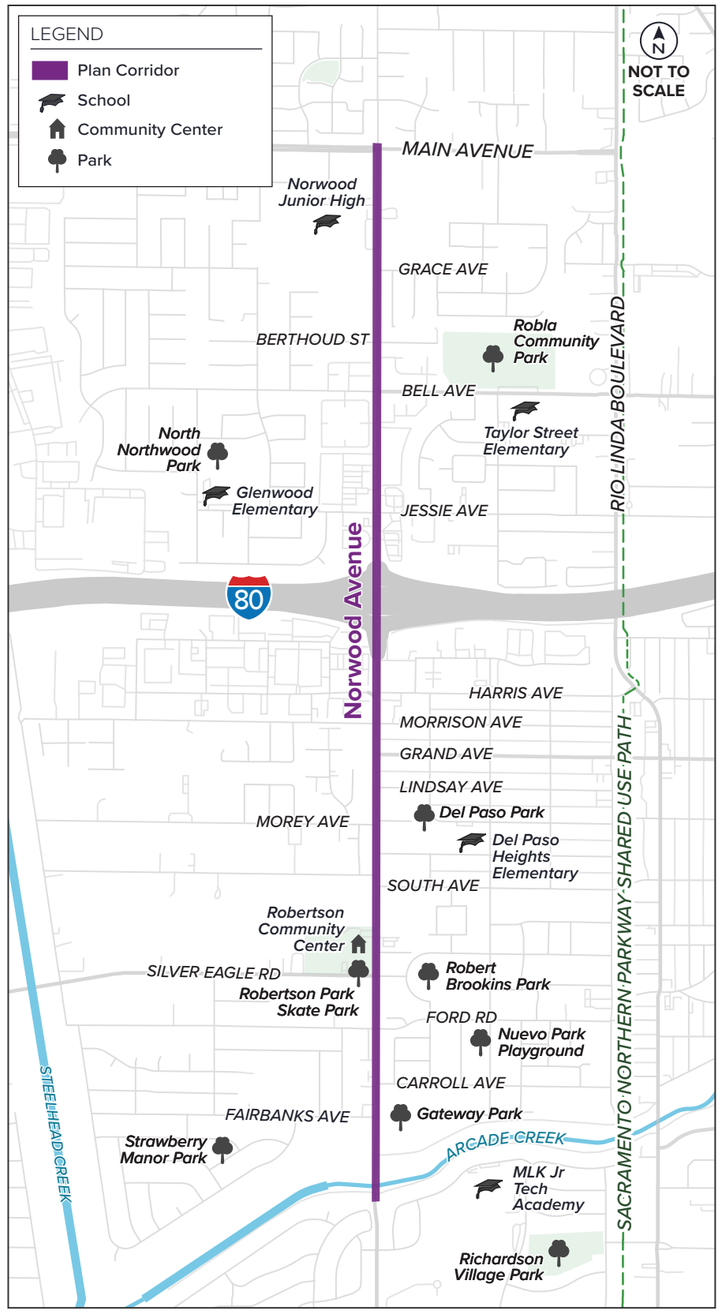

FIGURE 1. NORWOOD AVENUE STUDY AREA

Norwood Avenue is a critical corridor serving communities, schools and businesses.

Over 17,000 people live within 0.5 miles of Norwood Avenue, giving them access to places that shape daily life:

- **Five schools**
- **Nine parks**
- **A community center**
- **Supermarkets, restaurants, and other businesses**

Norwood Avenue is a vital north-south connection in northern Sacramento. As shown in **Figure 1**, this plan includes Norwood Avenue from Main Avenue in the north to Arcade Creek in the south.

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Norwood Avenue links two historically disadvantaged communities, and connects people to schools, homes, parks, local businesses, and regional destinations. It is the backbone for thousands of residents who live and work nearby.

Today, Norwood Avenue reflects an older design focused primarily on moving cars through, not supporting the communities who need access to destinations along the street. The street has narrow or missing sidewalks, limited space for biking, and inconsistent connections to transit. People using the corridor face barriers to mobility, including long distances between marked and controlled crossings, high vehicle speeds, and limited shade. These challenges make it difficult for the area communities, especially youth, seniors, and people with disabilities, to get where they need to go.

Norwood Avenue is a high priority for the City of Sacramento. It is part of the City's Vision Zero High Injury Network, a list of corridors with the most severe and fatal crashes. It is identified as a priority project in the City's Transportation Priorities Plan, which was shaped by extensive community input. The corridor plays an important role in meeting broader City goals around climate action, community equity, and active transportation, supporting efforts like the Climate Action and Adaptation Plan, the Sacramento Area Council of Governments (SACOG) Regional Trail Network, and the Sacramento Regional Transit (SacRT) Bus Stop Improvement Plan.

The purpose of The Norwood Mobility Plan is to transform this corridor into a place that better reflects the needs and aspirations of the communities on and near the street. Through strong partnerships and meaningful engagement, the Plan will help redesign Norwood Avenue as a welcoming, inclusive, and connected corridor, making it easier and more comfortable for people to walk, bike, take transit, and reach daily destinations.

The project team walking the Norwood Avenue corridor to document existing conditions. They took note of multiple transit stops (left) and school zones (right).

2

Project Goals

MOBILITY

This goal aims to connect people to school, work, parks, and essential services. This includes:

- Supporting transit, including SacRT Routes 19 and 86 that serve Norwood Avenue, connecting communities with limited mobility options
- Eliminating the I-80 barrier for people walking and bicycling
- Supporting access to I-80 for regional travel

COMMUNITY

This goal aims to support and uplift community. This includes:

- Addressing long-faced barriers to transportation access, housing, and services in two disadvantaged communities in the corridor
- Centering local voices in the corridor planning process for a more connected, inclusive corridor

The area surrounding Norwood Avenue is home to over 17,000 people and includes 1,900 jobs. Norwood Avenue runs through two disadvantaged communities where residents have long faced barriers to transportation access, housing, and services. The corridor planning process centered local voices for a more connected, inclusive corridor.

Historic neighborhoods adjacent to Norwood Avenue, such as West Del Paso Heights and Strawberry Manor, reflect deep roots with legacy connections to farming and multi-generational communities. Community organizations such as the Hmong Youth and Parents United (HYPU) and Mutual Assistance Network (MAN) provide vital support for youth, families, and neighborhood development. Cultural, recreational, and civic spaces like the Robertson Community Center and nearby parks highlight the community's resilience and engagement.

SAFETY

This goal aims to address transportation safety challenges. Between 2018 and 2022, 137 crashes on Norwood resulted in an injury, injuring:

- 13 people walking
- 16 people biking
- 108 people in a car

VISION ZERO SACRAMENTO

Our Safety is Homegrown

MOVING TOWARDS VISION ZERO

The City is currently working on an update to the 2018 Vision Zero Action Plan:

- Using historic crash data to pinpoint the factors contributing to traffic deaths and serious injuries
- Identifying proven safety countermeasures to address those factors through education, engineering, enforcement, and evaluation
- Taking a systematic and comprehensive approach to our transportation environment

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The Process

To achieve the project goals, the Norwood Mobility study followed a four-step process, as shown chronologically in **Figure 2** and listed below:

1. UNDERSTAND EXISTING CONDITIONS AND COMMUNITY NEEDS

A detailed technical analysis was completed to evaluate current conditions and community needs for walking, biking, transit, and driving along Norwood Avenue. These findings were shared with the community during a series of open houses and workshops in winter 2024/2025, where residents added valuable insights. A full summary is provided in **Appendix A – Existing Conditions Report**.

2. DEVELOP AND EVALUATE CORRIDOR DESIGN ALTERNATIVES

In response to both technical findings and community needs, three design alternatives were created. Each proposed new sidewalks, bikeways, crosswalks, intersection changes, and safety improvements. These alternatives are described in **Appendix B – Alternatives Development Report**.

3. SELECT A PREFERRED DESIGN CONCEPT

The three alternatives were presented to the community for feedback. Based on community input, the City identified a preferred design concept that addresses safety, connectivity, and community vision. This Plan reflects that preferred concept.

4. PLAN FOR IMPLEMENTATION

Concept plans and cost estimates were prepared for the preferred concept to position the City for next steps towards implementation. The concept plans are provided in **Appendix D - Concept Plan Set**, while the cost estimates are in **Appendix E - Planning Level Cost Estimates**.

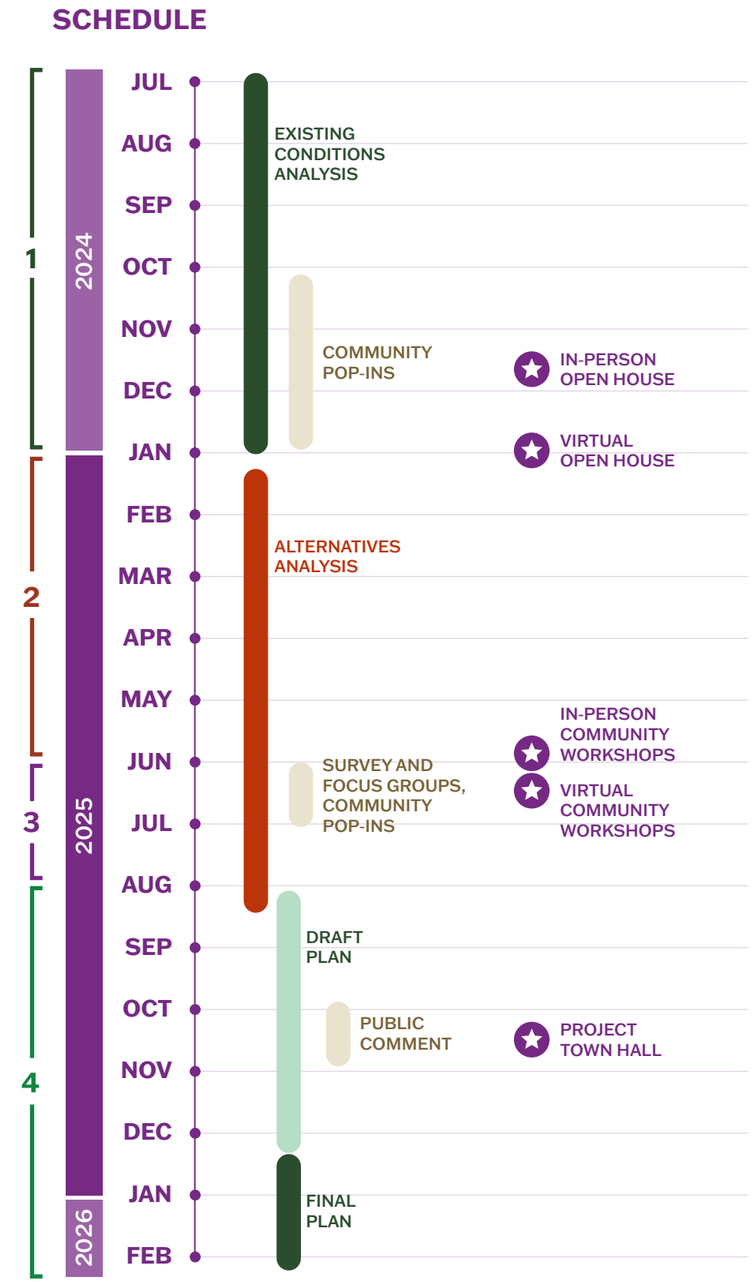

FIGURE 2. NORWOOD AVENUE STUDY PROCESS

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Norwood Avenue Today

CORRIDOR DESCRIPTION

The Norwood Avenue planning area is from Main Avenue in the north to Arcade Creek in the south, covering approximately 1.7 miles. It includes the I-80 interchange and overpass, which is one of the only crossings of the freeway in the area, making Norwood Avenue a critical connector for communities traveling to other neighborhoods, schools, parks, and regional destinations.

The corridor primarily features two travel lanes in each direction, with a center two-way left-turn lane along many segments, as shown in **Figure 3**. It passes through a mix of single-family and multi-family residential areas, schools, local parks, and community-serving commercial and industrial zones, including a retail job center near Jessie Avenue and an industrial job center south of the freeway. While there is only one school on the street, there are four other schools immediately off the corridor.

Today, Norwood Avenue lacks consistent sidewalks, bikeways, and crossings. SacRT's Route 19 provides the only fixed-route transit service along the corridor. SacRT's Route 86 runs perpendicular to the corridor, however, it overlaps Route 19 between Grand Avenue and Silver Eagle Road. These gaps (as shown in **Figure 4**) limit mobility options and comfort for people walking, biking, or riding transit—especially given the corridor's role in serving two historically underserved communities and multiple schools and parks.

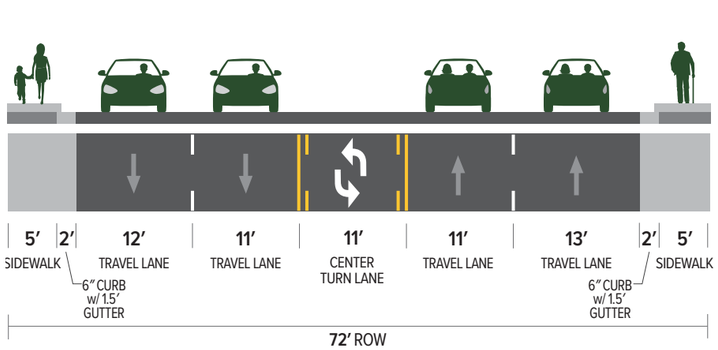

FIGURE 3. NORWOOD AVENUE TYPICAL EXISTING CROSS SECTION

The corridor was organized into four segments (as shown in **Figure 5** on the following page) based on general characteristics and surrounding land use.

A summary of each segment is included below, with more detailed information about the study corridor and current conditions included in **Appendix A**.

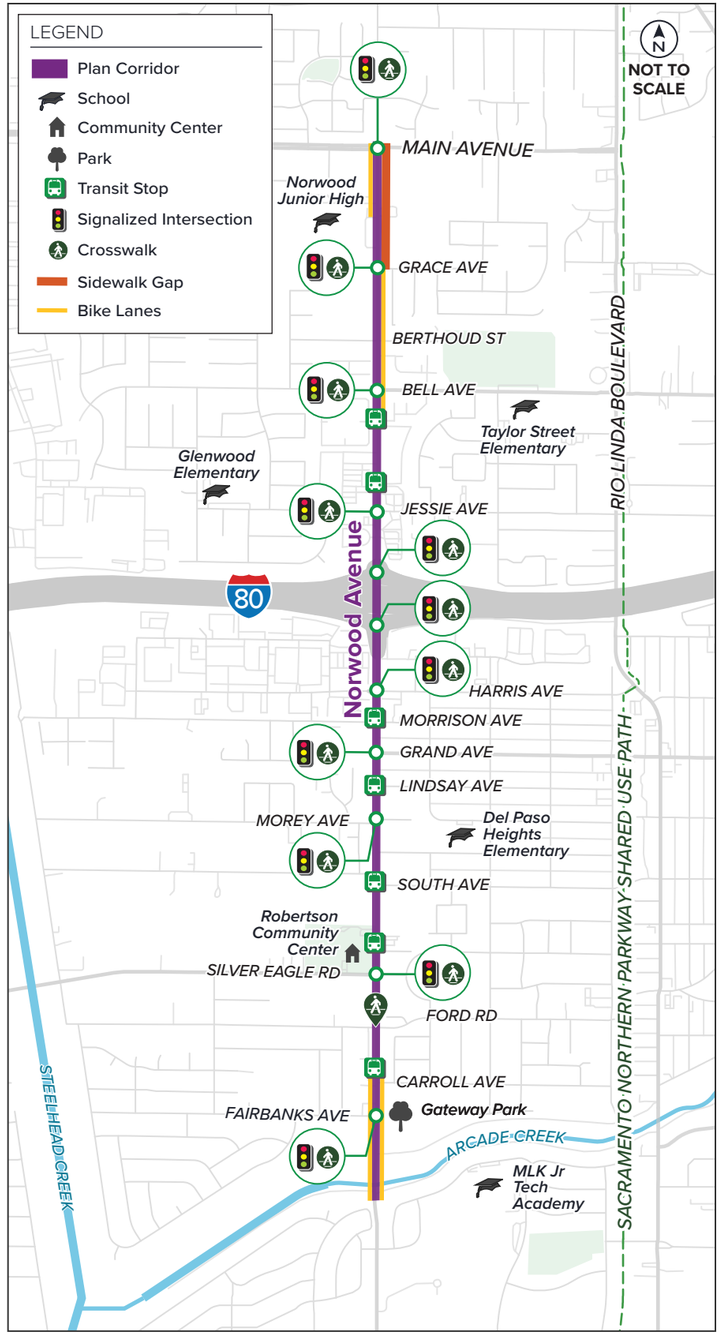

FIGURE 4. NORWOOD AVENUE STUDY AREA EXISTING CONDITIONS

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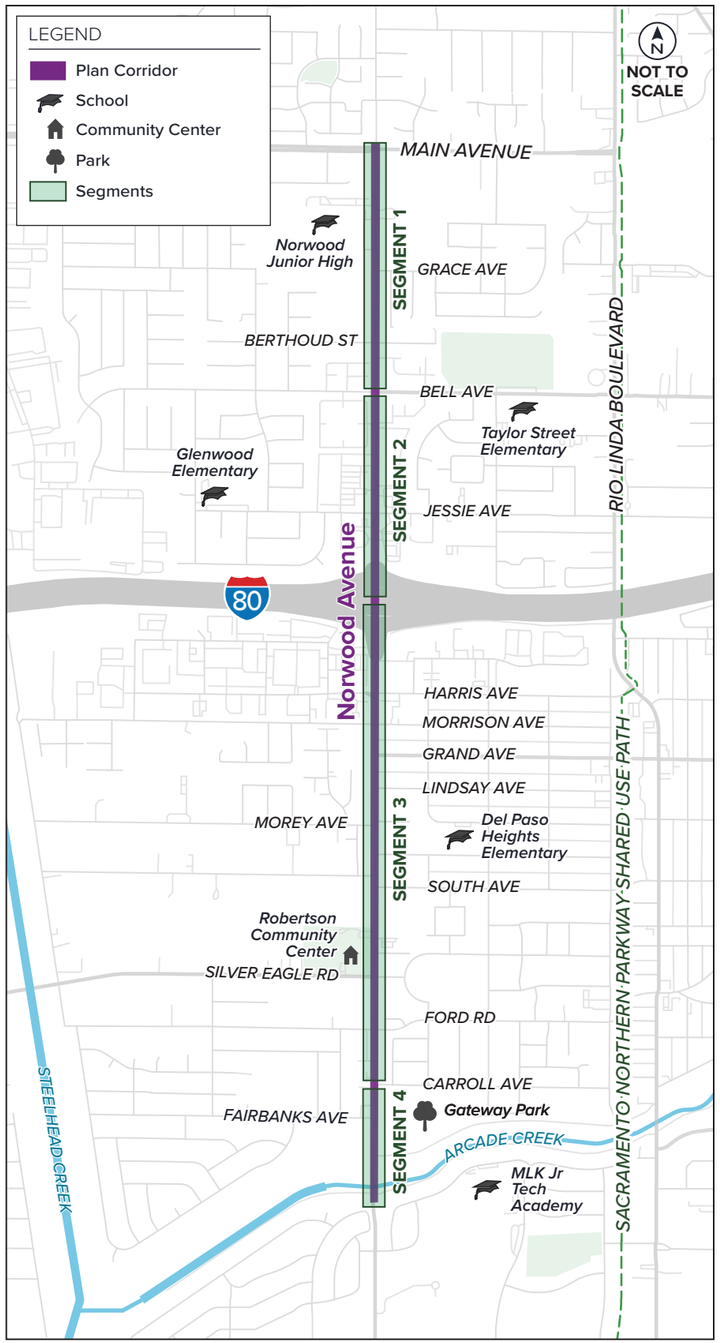

FIGURE 5. NORWOOD AVENUE STUDY AREA SEGMENTS

SEGMENT #1: MAIN AVENUE TO BELL AVENUE

Adjacent land uses include residential and vacant lands, with Norwood Junior High School located south of Main Avenue. This segment of Norwood Avenue has one lane per direction from Grace Avenue to Main Avenue and transitions to two lanes per direction with a center turn-lane from Grace Avenue to Bell Avenue.

The posted speed limit for Segment 1 is 25 MPH in the school zone, and 35 MPH outside of the school zone. The annual daily traffic is 12,064 vehicles. While there are places where there are sidewalks and bikeways, there are also locations that do not have sidewalks or bikeways (gaps in the network). The sidewalks and bikeways are also inconsistent in width. There is lighting for the street except at vacant parcels. There is no existing transit service in this segment.

Figure 6 shows the existing cross section view of Segment 1.

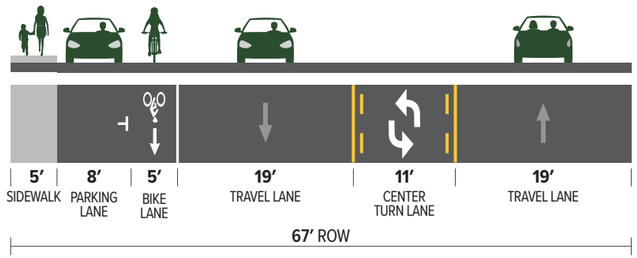

FIGURE 6. MAIN AVENUE TO BELL AVENUE EXISTING CROSS SECTION

Typical alignment along Segment 1.

SEGMENT #2: BELL AVENUE TO I-80

Adjacent land uses include residential and commercial uses, with some parking lot frontage and fast-food restaurants near the freeway. This segment of Norwood Avenue is two lanes per direction with a center turn-lane.

The posted speed limit for Segment 2 is 35 MPH, and the annual daily traffic is 19,310 vehicles. There are sidewalks on both sides of the street. The only bikeway is a 200-foot- segment that approaches Bell Avenue from the south. Lighting is provided for the street and sidewalks. Bus Route 19 operates south of Bell Avenue.

On-street parking is allowed between Bell Avenue and Jessie Avenue on both sides of the street, in front of adjacent apartments and businesses.

Figure 7 shows the existing cross section view of Segment 2.

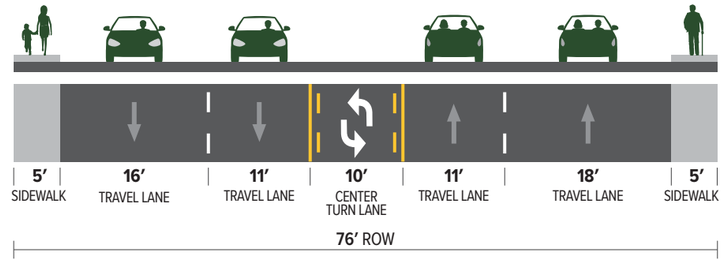

FIGURE 7. BELL AVENUE TO I-80 EXISTING CROSS SECTION

Typical alignment along Segment 2.

SEGMENT #3: I-80 TO CARROLL AVENUE

Adjacent land uses include residential and commercial uses, along with some parks and Robertson Community Center. This segment of Norwood Avenue is two lanes per direction with a center turn-lane.

The posted speed limit for Segment 3 is 25 MPH in the school zone, and 35 MPH outside of the school zone. The annual daily traffic is 10,772 vehicles. There are sidewalks on both sides. There are no bikeways. There is lighting for the street except at vacant parcels. Bus Route 86 crosses Norwood Avenue in this segment and Bus Route 19 operates in both directions along this segment with ten stops.

Figure 8 shows the existing cross section view of Segment 3.

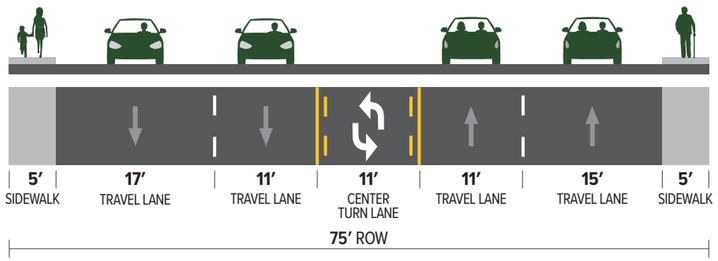

FIGURE 8. I-80 TO CARROLL AVENUE CROSS SECTION

Typical alignment along Segment 3.

SEGMENT #4: CARROLL AVENUE TO ARCADE CREEK

Adjacent land use is mostly residential and includes Gateway Park on the east side. This segment of Norwood Avenue is two lanes per direction with a center turn lane from Carroll Avenue to Fairbanks Avenue. From Fairbanks Avenue to Arcade Creek the roadway narrows to one lane per direction across the Arcade Creek bridge.

The posted speed limit for Segment 4 is 35 MPH, and the annual daily traffic is 14,302 vehicles. This segment has consistent sidewalks and bike lanes on both sides of the street. Lighting is present for the street and sidewalks. Bus Route 19 operates in both directions along the segment.

Figure 9 shows the existing cross section view of Segment 4.

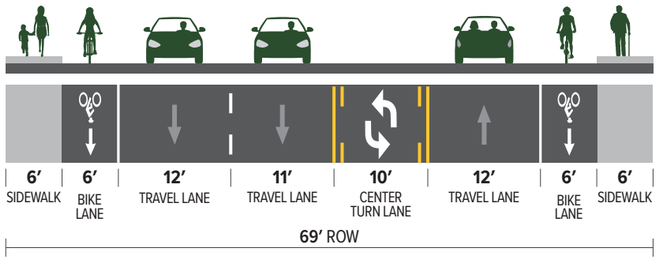

FIGURE 9. CARROLL AVENUE TO ARCADE CREEK CROSS SECTION

Typical alignment along Segment 4.

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CRASH TRENDS

Between 2018 and 2022, a total of 16 fatal or serious injury crashes occurred along Norwood Avenue,

reemphasizing the safety need identified in the City's 2018 Vision Zero Action Plan.

The top three primary crash factors on Norwood Avenue were:

- **Driver failing to yield the right-of-way**
- **Disobeying traffic signals or signs**
- **Unsafe speeds**

Figures 10 and 11 show the crash causes, types, frequency, and locations along Norwood Avenue. Crashes were most common at intersections, especially in the central portion of the corridor. Broadside crashes were the most frequent overall, often happening where vehicles failed to yield while turning.

The area between the I-80 interchange and Harris Avenue showed more rear-end crashes, often linked to congestion during peak hours. Signal violations were reported at Grand Avenue and Silver Eagle Road, while unsafe speeds were a factor between Silver Eagle Road and Fairbanks Avenue.

The highest concentration of crashes occurred between Bell Avenue and Jessie Avenue, where a mix of head-on, sideswipe, and turning-related collisions were recorded. This segment also had the most reported crashes involving people walking or biking, including sideswipes and midblock conflicts.

At Norwood Avenue and Grand Avenue, multiple DUI and hit-object crashes were reported, along with sideswipe crashes involving people biking.

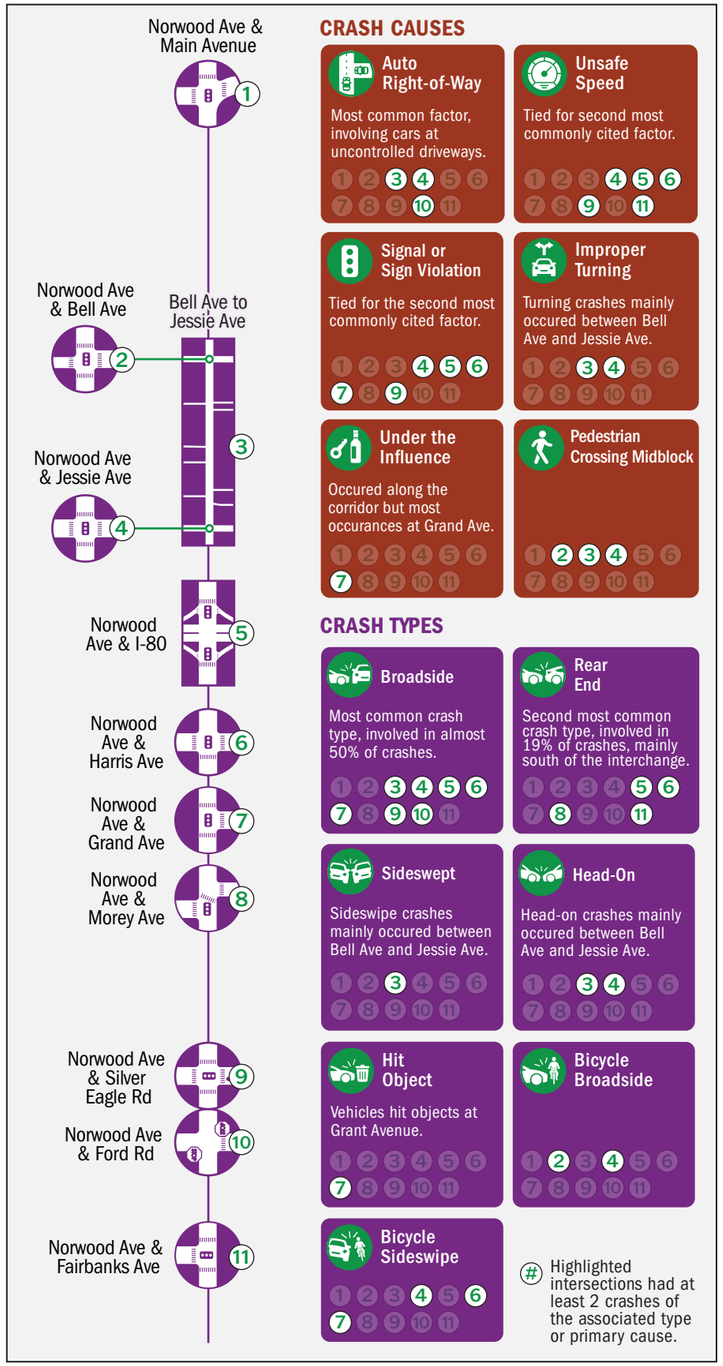

FIGURE 10. NORWOOD AVENUE CRASH FACTORS

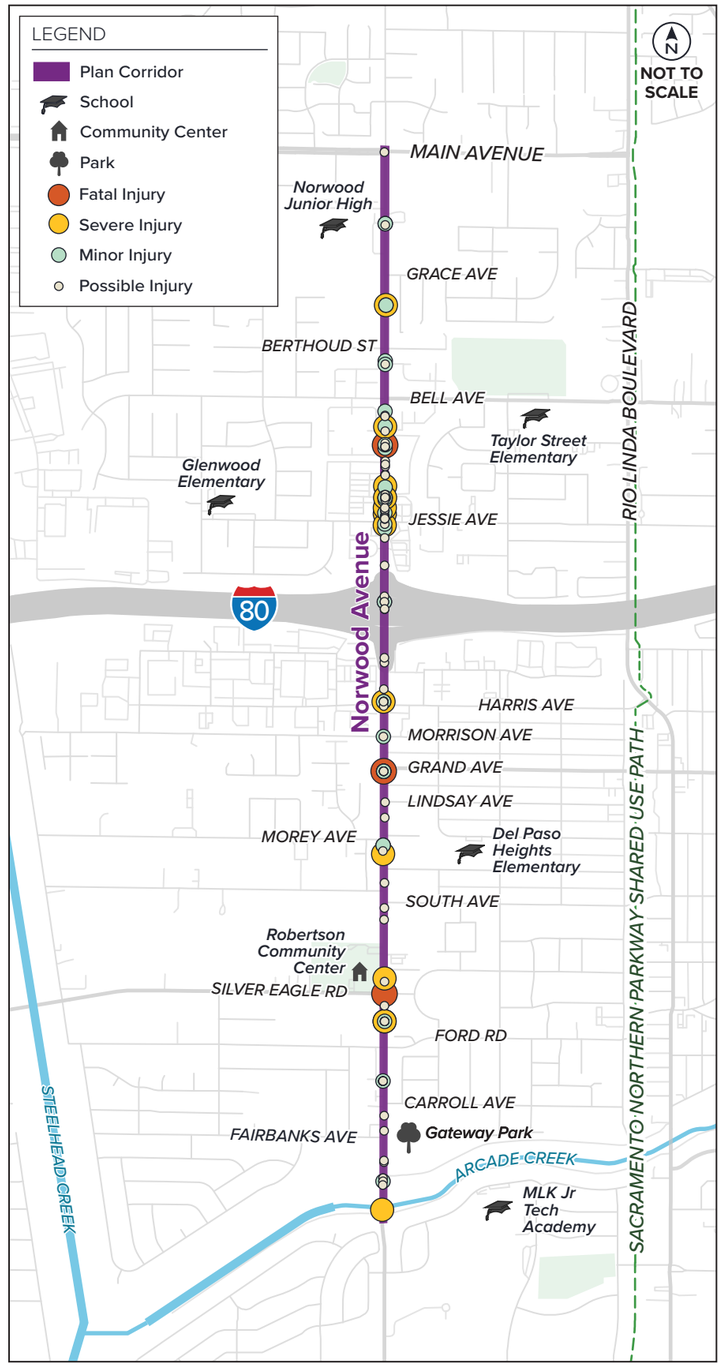

FIGURE 11. NORWOOD AVENUE CRASH LOCATIONS

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Community Engagement

The Norwood Avenue Mobility Project is rooted in the voices and experiences of the people who live, work, travel, and gather along the corridor.

From the beginning, the planning process has emphasized community engagement and feedback to ensure that the corridor vision is shaped by local priorities, values, and lived realities. Engagement efforts sought to reach a broad cross-section of the corridor's diverse residents, businesses, and organizations, recognizing the long history of transportation barriers and the community's vision for a safer and more connected Norwood Avenue. The following chapter outlines how community voices shaped the planning process and how they were incorporated into the final plan.

ENGAGEMENT GUIDING PRINCIPLES

- Community engagement is based on the belief that those who are affected by a decision have a right to be involved in the decision-making process.
- Community engagement promotes sustainable decisions by recognizing and communicating the needs and interests of all participants, including decision-makers.
- Community engagement seeks out and facilitates the involvement of those potentially affected by or interested in a decision.
- Community engagement provides participants with the information they need to participate in a meaningful way.
- Community engagement communicates to participants how their input affected the decision.

ENGAGEMENT METHODS

The Community Engagement Plan took place in three phases:

- Phase 1: Listen and Learn
- Phase 2: Share and Refine
- Phase 3: Report Back

COMMUNITY IDENTIFIED PRIORITIES

- Make streets safer, especially in areas where lots of crashes have happened.
- Add more designated places to cross the street, like crosswalks with signals, so it's easier and safer for people walking.
- Plant trees to calm traffic, provide shade for people walking and bicycling, and to create a sense of inviting space.
- Build calm, comfortable routes that help people walk, bike, or roll to get to the bus safely.

More details about the engagement can be found in **Appendix C – Engagement Summaries**.

The project team connecting with the community at a variety of engagement events.

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PHASE 1: LISTEN AND LEARN

The first engagement phase introduced the planning process and invited community members to share their needs and ideas through the following elements:

- City webpage
- Web-based engagement tools (as shown in **Figure 12**)
  - » Community Needs and Priorities Surveys
  - » Online Mapping/Comment Capture Tool
  - » City Newsletter/ Blog posts
- Multilingual Engagement Materials and Tools
- Community Advisory Committee
- Pop-ins at Local Events
  - » Harvest Festival
  - » Community Association Meetings
- Virtual and In-Person Workshops

Figures 13 and **14** on the following page provide a summary of the engagement comments by type, location, and category.

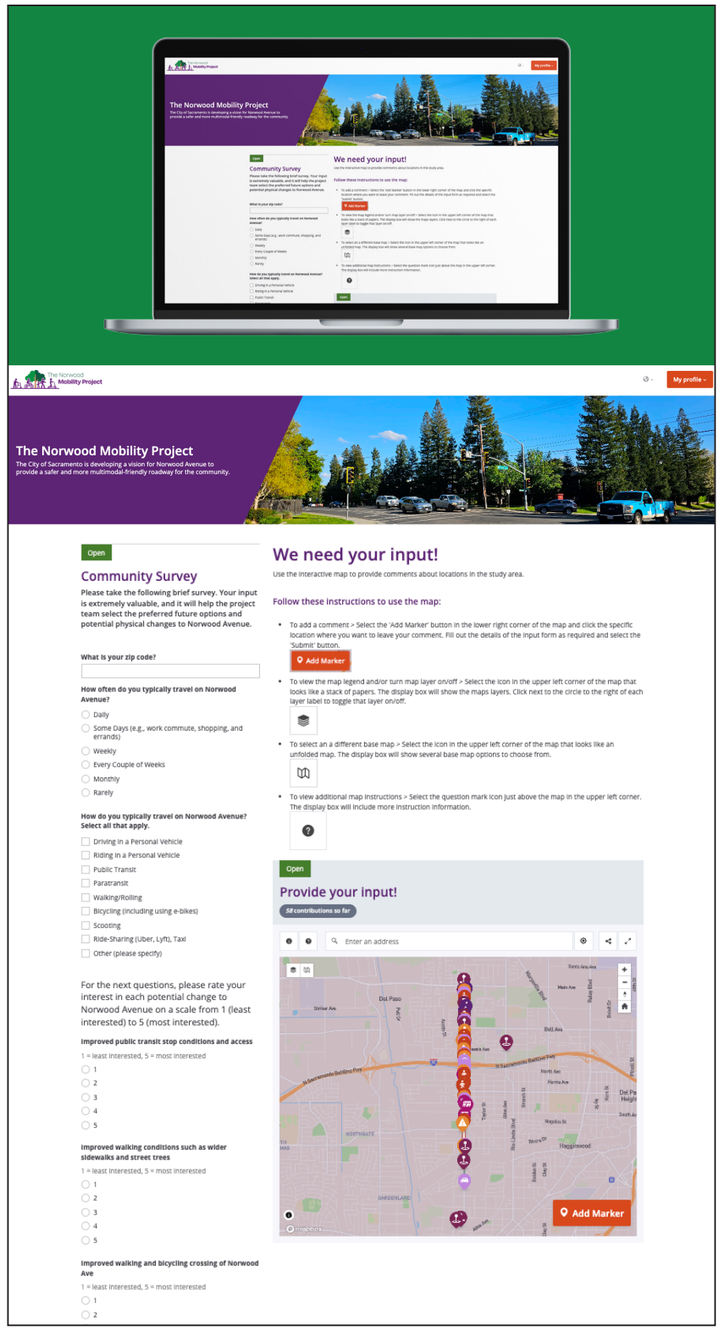

FIGURE 12. PHASE 1 WEB-BASED ENGAGEMENT TOOLS

Community feedback was collected in a variety of formats. The project team handed out flyers with links to online engagement tools (top), in addition to participating in pop-ins at local events and hosting virtual and in-person workshops (middle, bottom).

Through the community needs and priority surveys, the planning team learned:

- High daily use: 76% of survey respondents travel on Norwood Avenue every day
- Travel modes: 75% typically drive, 29% walk or roll, and 16% use public transit
- Top priorities:
  - » Safer and more frequent pedestrian/bike crossings
  - » Slower driver speeds, improved driver safety
  - » Better walking conditions (e.g., wider sidewalks, added street trees)

Based on responses from the online interactive map and in-person events, the primary locations of concern were the intersections of Norwood Avenue with Bell Avenue, Jessie Avenue, and I-80 eastbound and westbound on/off ramps. These four locations made up almost half of the comments collected during this phase. Walking access, driving operations, and safety were the most prominent concerns for respondents at those locations.

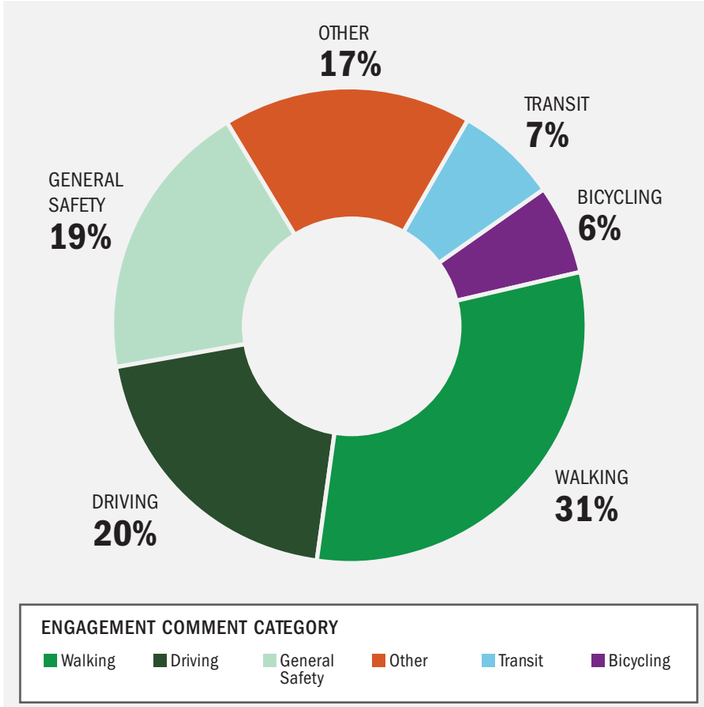

FIGURE 13. ENGAGEMENT COMMENTS BY CATEGORY

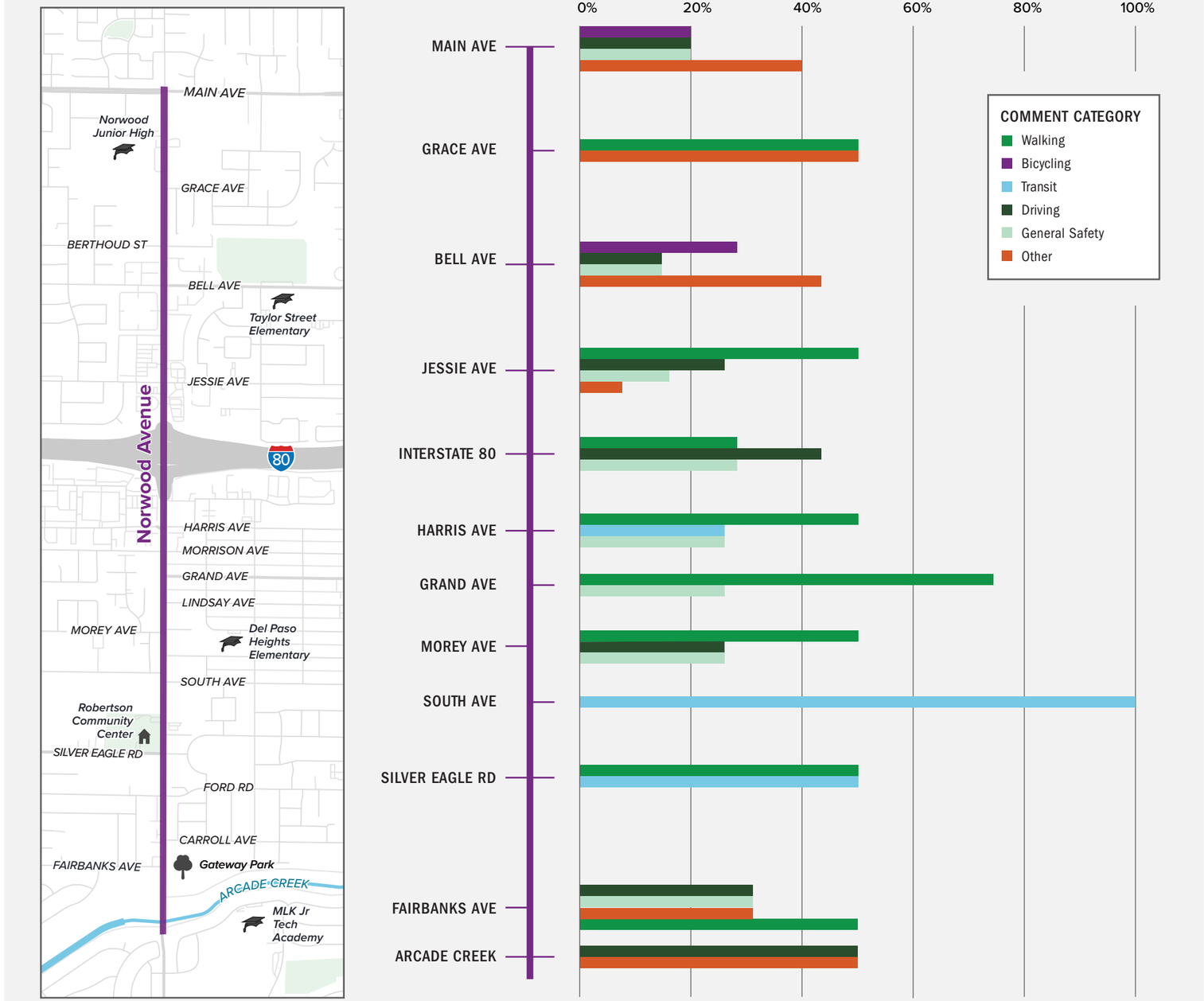

FIGURE 14. ENGAGEMENT COMMENT TYPES BY LOCATION

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INCORPORATING COMMUNITY INPUT

Based on identified needs for the corridor and community comments, the project team identified **five key elements** to incorporate into a corridor vision.

KEY ELEMENTS TO ADDRESS WALKING AND ROLLING NEEDS

- Wider and connected sidewalks that are low stress and comfortable to walk and roll along
- Shade trees and landscape buffer to provide relief for people walking and provide separation for people walking
- Striped and signalized crosswalks for accessible and safer crossing for all users
- Connections to parks, schools and recreation opportunities

COMMUNITY INPUT

"[Need] wider sidewalks."

"Provide safe crossways"; "make crossing more visible and safer."

"Improved child safety to/from/around schools."

"Would love to have wide sidewalks all the way through Norwood."

"Sidewalks are too narrow and does not allow for enough clearance for wheelchairs, strollers, etc."

KEY ELEMENTS TO ADDRESS BICYCLING NEEDS

- Bikeways separated from the street for a more comfortable and low stress environment for people biking
- Intersection treatments to reduce conflicts and provide bicycle detection at traffic signals
- Connections to parks, schools and recreation opportunities

COMMUNITY INPUT

"[Need] wider bike lanes."

"Smoother roads to get rid of cracks and holes are dangerous for bikers."

"Bike lanes seem to be non-existent."

KEY ELEMENTS TO ADDRESS TRANSIT NEEDS

- Lower stress environment providing buffered sidewalks and bikeways, and marked crosswalks to bus stops for all users
- Improved stop amenities with shade, seating, lighting and maintenance consistent with demand and service
- Intersection and stop treatments to improve on-time performance

COMMUNITY INPUT

"[Need] more transportation service and more frequent."

"Bus stops don't feel safe. No division between property and bus stop- no benches, etc."

"Bus stops need shelters + places to sit."

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KEY ELEMENTS TO ADDRESS DRIVING NEEDS

- Access to homes, businesses and schools with a consistent design
- Reallocated street space to enhance safety by minimizing conflicts between people driving and other street users
- Street lighting to improve visibility at intersections and along the corridor at night
- Roundabouts to improve access to key side streets

COMMUNITY INPUT

"[Need] proper lighting."

"Use roundabouts."

"[Need] ways to slow down vehicular traffic. Vehicles routinely speed over 40 mph."

"Speeding cars make it difficult to get from side streets to Norwood center lane."

"Meter entering west bound on I-80 causes bottleneck on northbound and southbound."

KEY ELEMENTS TO SUPPORT COMMUNITY HEALTH

- Low stress and safer elements will encourage people to walk and bike recreationally
- Elements that improve the attractiveness of the corridor (like landscaping and art) will spur economic investment
- Gateway elements like roundabouts and trees will lower speeds in the corridor and improve air quality

COMMUNITY INPUT

"[Install] artworks of Norwood Jr. High students."

"[Find] ways to slow down vehicular traffic."

"Use roundabouts."

"Need more flowers and trees."

"More TREES!"

"Improved access to park."

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CREATING A CONCEPT DESIGN

Based on community priorities and the conditions of Norwood Avenue, the project team identified a set of design elements that could help achieve the project's goals. Each element was reviewed individually and in combination to form different corridor alternatives. These alternatives, shown in **Figures 15-19**, offered a range of approaches for improving mobility and safety while reflecting community needs.

OVERCOMING CHALLENGES AND CONSTRAINTS

Community members shared their vision on how to improve mobility and safety while meeting the project's goals. While many ideas were suggested, Norwood Avenue does not have space for every feature, and widening the corridor by taking private property is not a feasible option. The project team balanced community input, safety, mobility for all users, effectiveness, and feasibility to identify options that best fit community priorities within the existing street space.

ACHIEVING PROJECT GOALS

Each alternative was evaluated, both by the project team and the community, on how well it met the **project's goals:**

Mobility

Safety

Community

Each alternative was also evaluated on how well it met the **project's priorities:**

Mobility Priorities:

- Improve signal protected crossing opportunities
- Create low stress, accessible paths to transit

Safety Priorities:

- Improve safety between Jessie Avenue and Belle Avenue
- Improve safety between Harris Avenue and Silver Eagle Road
- Create low stress, separated space for people biking

NORWOOD AVENUE ALTERNATIVES

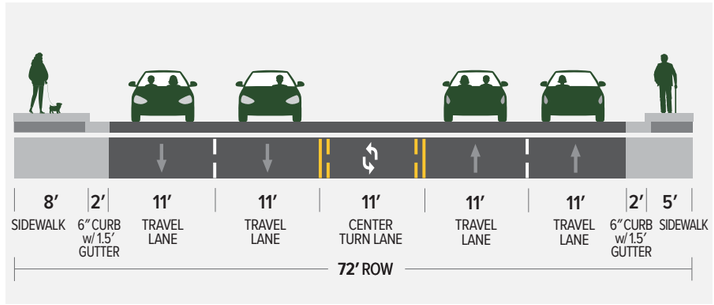

FIGURE 15. ALTERNATIVE 1 (SIDEWALK IMPROVEMENT)

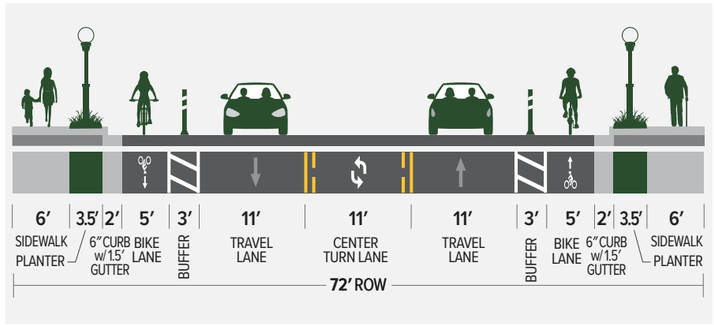

FIGURE 16. ALTERNATIVE 2A (LANE REALLOCATION)

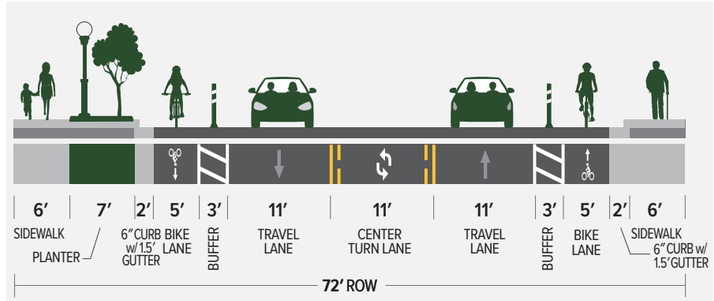

FIGURE 17. ALTERNATIVE 2B (LANE REALLOCATION)

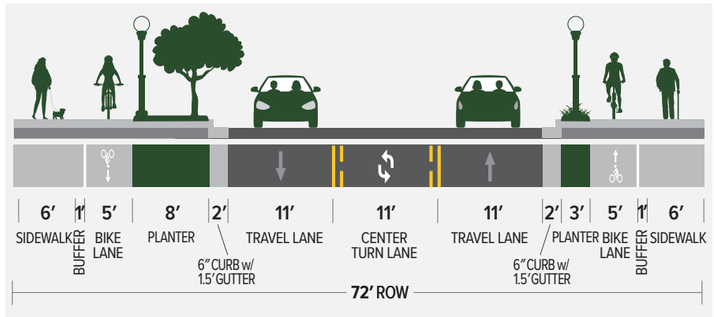

FIGURE 18. ALTERNATIVE 2C (LANE REALLOCATION)

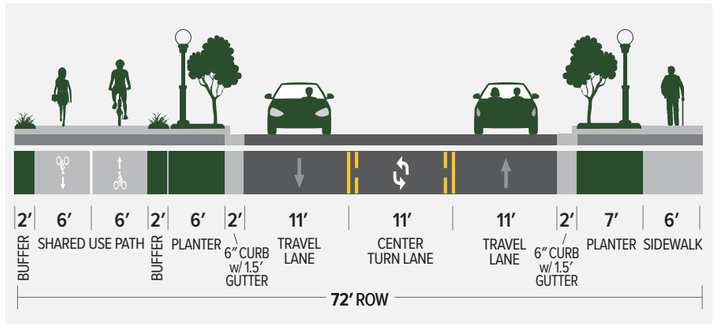

FIGURE 19. ALTERNATIVE 3 (SHARED USE PATH)

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PHASE 2: SHARE AND REFINE

The second engagement phase focused on sharing potential improvements based on community input and refining them through continued feedback, with clear documentation of how ideas shaped the final plan.

- City webpage
- Web-based Engagement Tools
  - » Alternative and Proposed Element Surveys
  - » City Newsletter/ Blog posts
- Multilingual Engagement Materials and Tools
- Community Advisory Committee
- Pop-ins at Local Events
  - » Robla Park Community Association Meetings/ Mini-Workshops
  - » Hagginwood Community Association Meeting
  - » Council District 1 Community Conversations Event
- Virtual and In-Person Workshops

FEEDBACK ON PROJECT ELEMENTS

- Roundabouts were generally favored for traffic-calming and safety benefits
- Removing on-street parking to use the space for protected bike lanes or wider sidewalks was supported, if there is sufficient parking provided elsewhere to support visitors of local businesses
- All improvements to walking, biking, and transit infrastructure and facilities were broadly supported
- Adding signalized crosswalks was supported as necessary, however, there were concerns about cost
- Bikeways, bus shelters, and sidewalk widening were seen as essential for improving safety and equity for active transportation users
- The need for clearly delineated routes that are separated from vehicles was emphasized
- Reducing vehicle travel lanes received positive feedback, while recognizing it could increase congestion
- Future evaluation of median street trees was requested by the community

More details about the engagement can be found in **Appendix C – Engagement Summaries**.

COMMUNITY EVENTS

- Community pop-ins and presentations
- Five in-person and virtual workshops
- Online surveys and virtual map

Community members viewing and giving feedback on the Norwood Avenue alternatives.

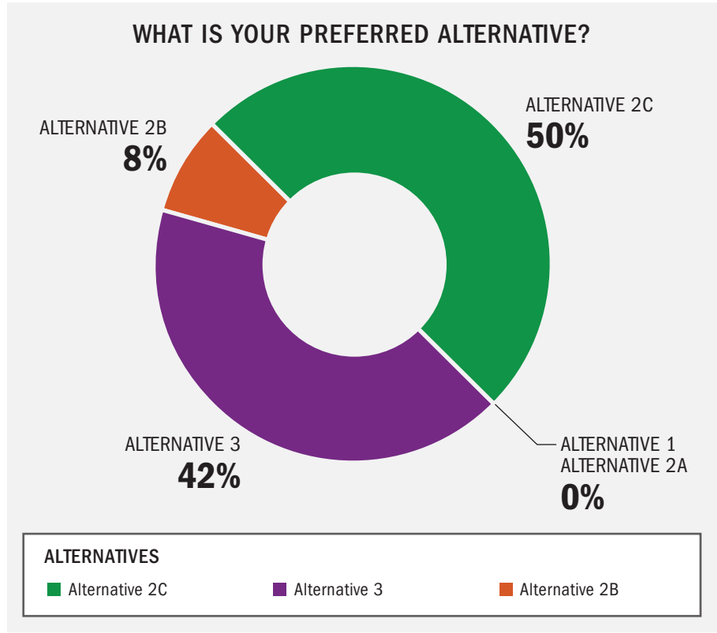

FIGURE 20. PROPOSED ALTERNATIVES BY COMMUNITY PREFERENCE

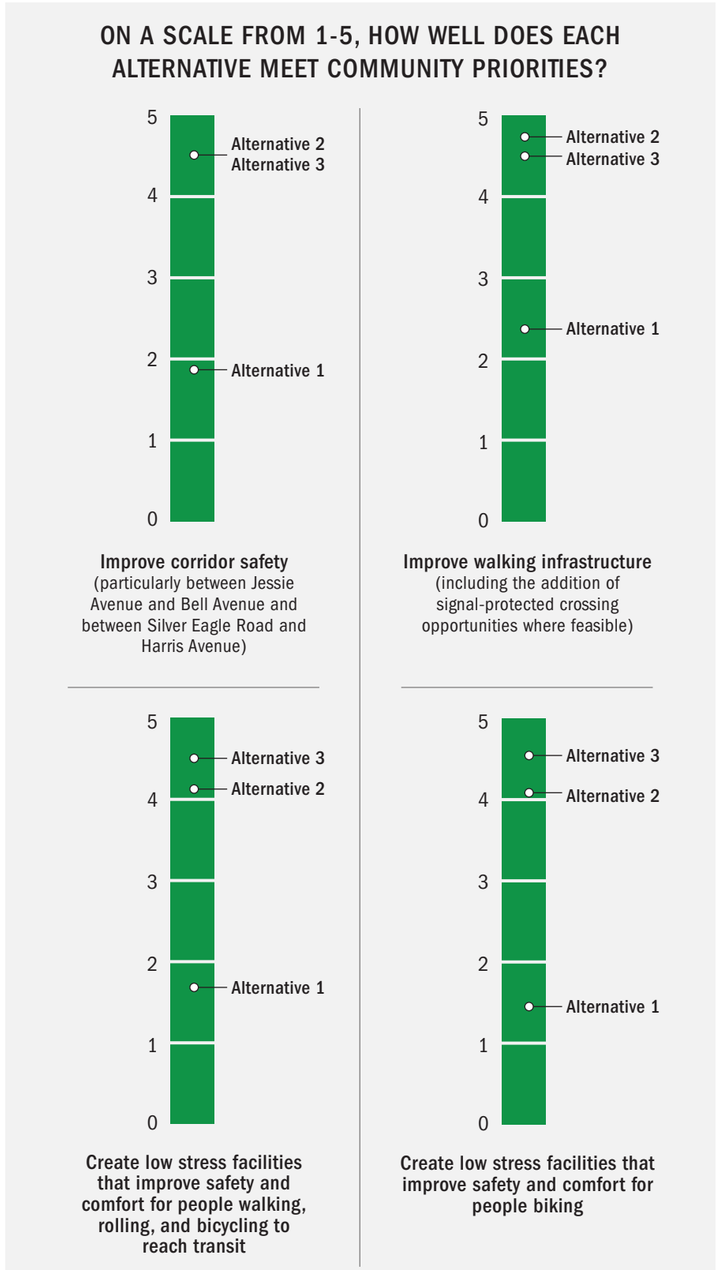

FIGURE 21. PROPOSED ALTERNATIVES RANKED BY COMMUNITY PRIORITIES

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PHASE 3: PUBLIC REVIEW OF DRAFT PLAN

The third engagement phase focused on presenting the draft plan for public review and incorporating community feedback into the final plan.

- City webpage
- Web-based Engagement Tools
  - » Online feedback page for draft plan, as shown in **Figure 22**
  - » City Newsletter/ Blog posts
- Multilingual Engagement Materials and Tools
- Pop-ins at Local Events
  - » Hagginwood Community Association Meeting
  - » District 2 Town Hall
  - » Active Transportation Commission Meeting
  - » Hmong Youth and Parents United (HYPU) Trunk or Treat Event
  - » Mutual Assistance Network (MAN) Harvest Festival
  - » Robla Park Community Association Meeting
- Virtual and In-Person Workshops

COMMUNITY EVENTS

- Six community pop-in events and presentations
- One in-person and one virtual workshop
- Online engagement form for reviewing and commenting on the draft plan

Pop-in at the HYPU Trunk or Treat on October 24.

Pop-in at the MAN Harvest Festival on October 25.

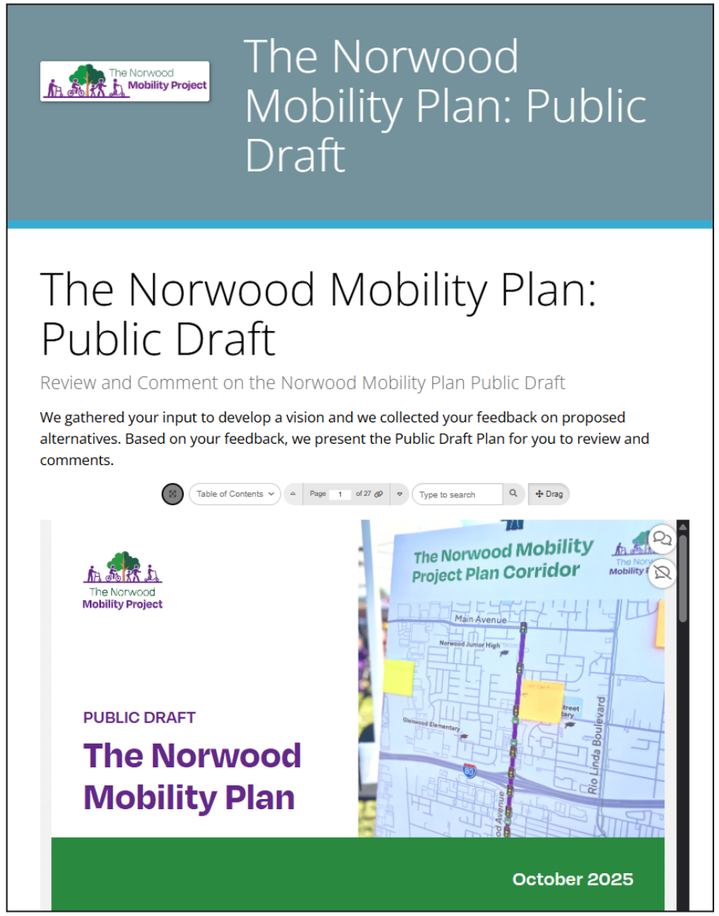

FIGURE 22. PHASE 3 ONLINE FEEDBACK PAGE FOR DRAFT PLAN

COMMUNITY FEEDBACK

- Roundabouts were generally favored with some specific suggestions made:
  - » Ensure landscaping in the center does not obstruct driver view.
  - » Exploring a future roundabout at Morey Avenue would be supported.
  - » Consider smaller center circles in roundabouts to avoid right-of-way impacts.
  - » A two-lane roundabout may be unnecessary where only a right-turn slip lane exists today, as it could circumvent traffic calming goals.
- Green walkways with trees, flowers, and shrubs will make the corridor more inviting and offer some privacy for nearby residents. Landscaping along Norwood Avenue should be sustainable in the long term.
- Project limits don't extend further south along Norwood Avenue, which may exclude some communities and neighborhoods from safety and accessibility benefits.
- Feedback suggested adding multi-use lanes between Interstate 80 (I-80) north to Main Avenue and between I-80 south to Carrol Avenue.
- Feedback suggested adding a left-hand turning lane northbound at Jesse and Norwood and a left-hand turning lane southbound to prevent unsafe pedestrian crossings near the Chevron gas station.
- Concerns on how a lane reduction could impact congestion on Norwood Avenue.
- There were concerns regarding the reduction of parking availability south of Bell Avenue on Norwood Avenue.

More details about phase 3 engagement can be found in **Appendix C – Engagement Summaries**.

6

The Vision

ADVANCING A CONCEPT DESIGN

After evaluating three alternatives (**Appendix B**) and incorporating community feedback, the following key elements were selected for further design refinement.

Appendix D includes a conceptual design drawing that provides more detail for the entire study area.

CROSS SECTION RECOMMENDATIONS

The recommended cross section (shown below in **Figure 23**) is primarily based on Alternative 2C, with an added connection over both sides of the interchange from Alternative 3. It includes:

- Adding street shade trees on the west side of the street, sidewalk lighting, and a landscaping buffer
- Adding sidewalks north of Berthoud Street
- Removing a travel lane in each direction north of Jessie Avenue and south of Harris Avenue
- Adding a separated bikeway in each direction
- Removing on-street parking south of Bell Avenue
- Adding a cantilever bridge on both sides of the I-80 overpass to provide connections for people walking and biking over the overpass
- Constructing roundabouts at key intersections to slow vehicle speeds and reduce conflicts between vehicles

Figure 24 shows the recommended alternative applied to the whole corridor.

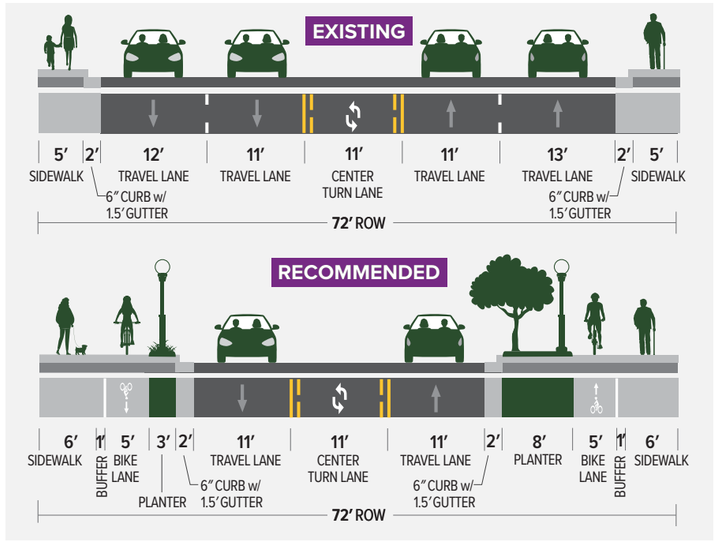

FIGURE 23. NORWOOD AVENUE RECOMMENDED ALTERNATIVE CROSS SECTION

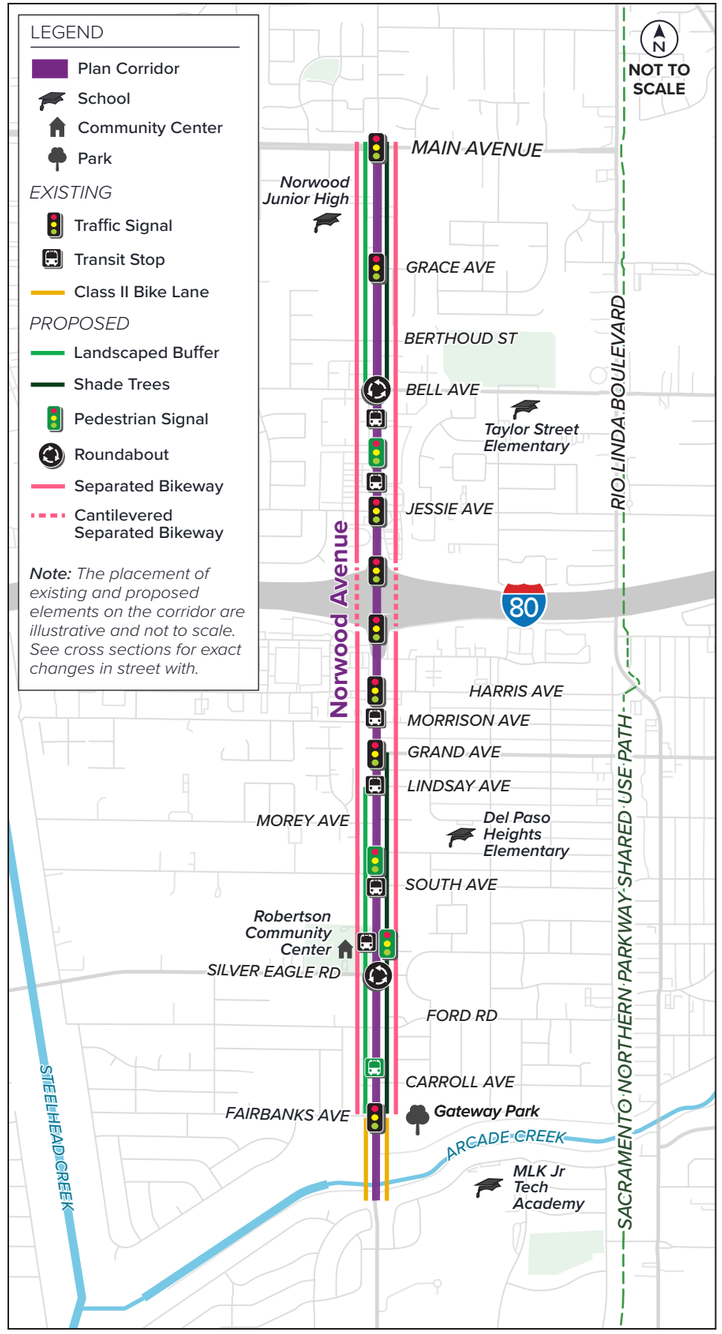

FIGURE 24. NORWOOD AVENUE RECOMMENDED ALTERNATIVE

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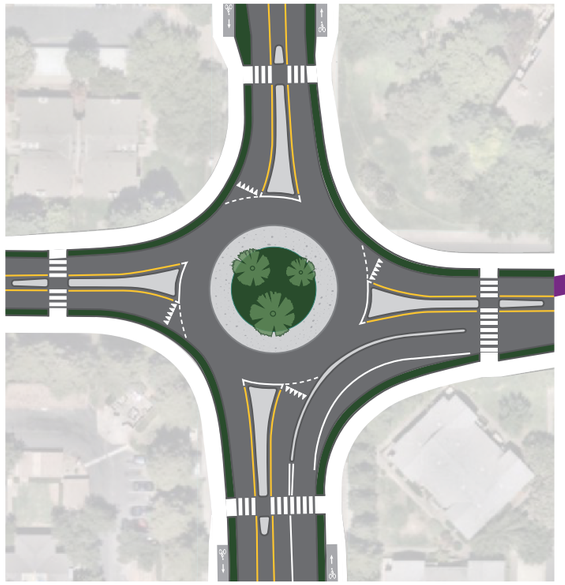
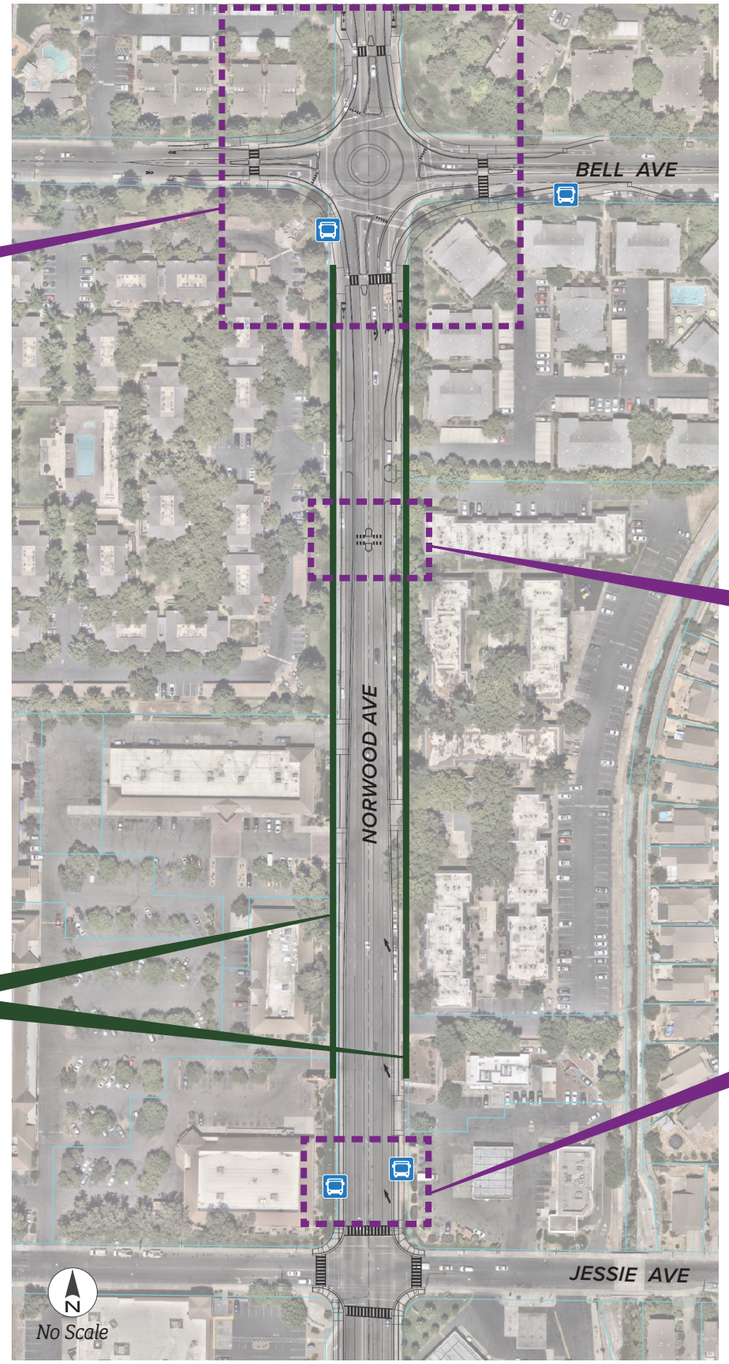


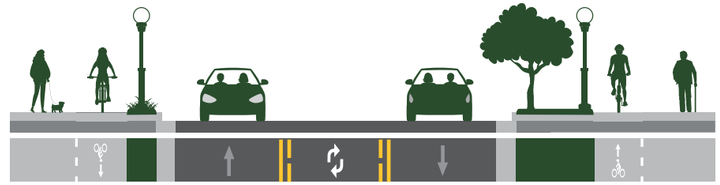
Roundabout (Bell Avenue)

- Slow traffic
- Reduce severity of crashes
- Gateway treatment

Removal of On-Street Parking

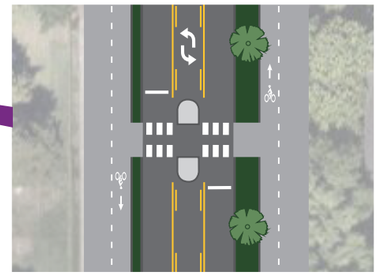
- Reduced demand for midblock crossing





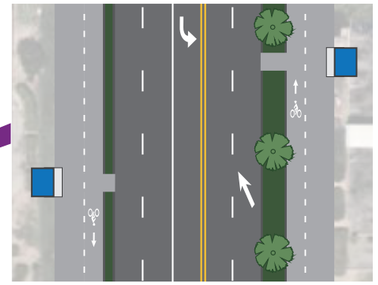
Shade Trees, Widened Sidewalk, Separated Bikeway, & Sidewalk Scale Lighting

- Separation for people walking and biking from people driving
- Shade provides relief from high temperatures and sun exposure
- Sidewalk lighting provides comfort and increased safety



Striped Crosswalk and Signalized Pedestrian Crossing

- Increased visibility and safety at preferred crossing locations



Bus Stop Shelter With Benches

- Bus stop shelter rotated to protect from sun
- Increased waiting space

FIGURE 25. PROJECT ELEMENTS BETWEEN BELL AVENUE AND JESSIE AVENUE

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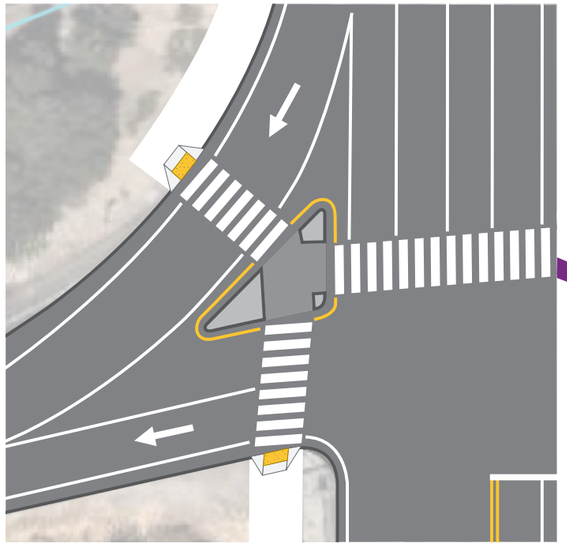
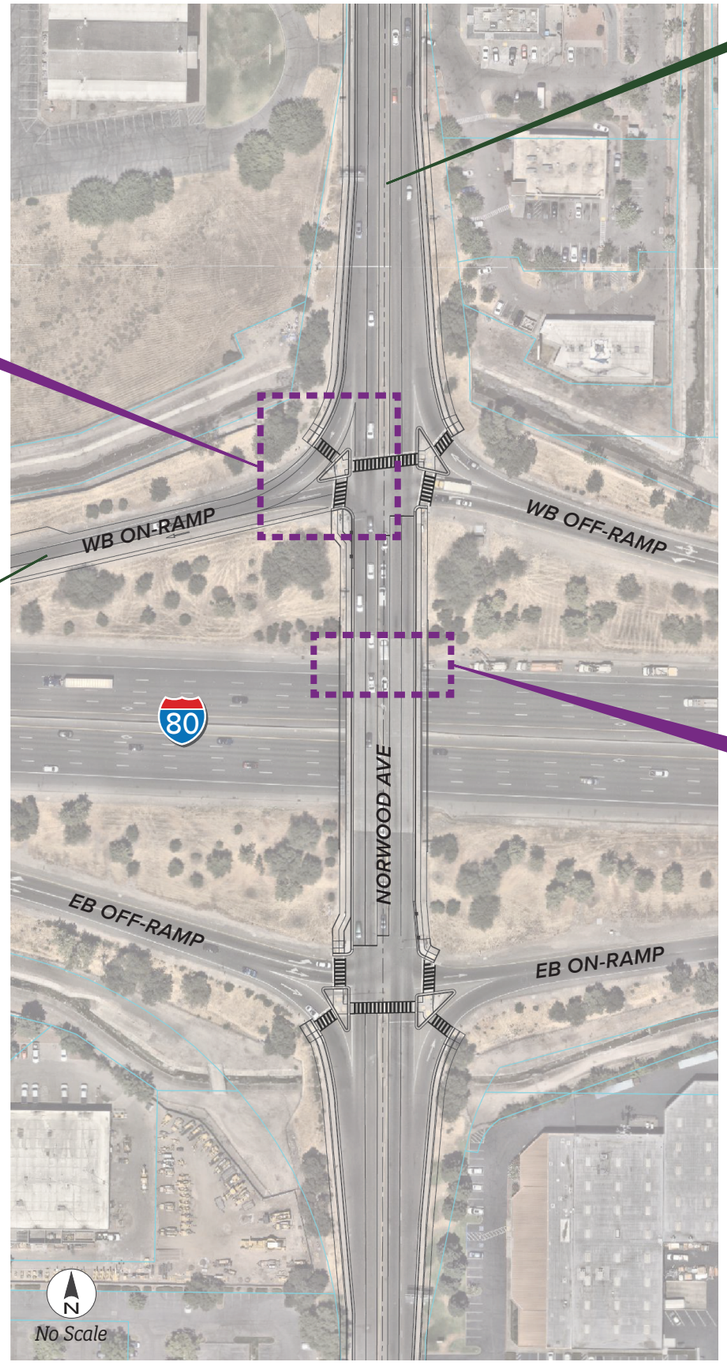


Striped & Signalized Pedestrian Crossing

- Increased visibility and safety at ramp crossing

Additional Capacity

- This plan includes Caltrans adding additional storage lane for the I-80 Westbound on-ramp



Consistent Freeway Access

- Maintaining current number of vehicle travel lanes near the interchange will allow for consistent freeway access operations and truck traffic

Freeway With Cantilever Bikeway on Both Sides

- Separation for people walking and biking from people driving
- Cantilever structure will allow necessary width without a new structure

FIGURE 26. PROJECT ELEMENTS FOR THE I-80 INTERCHANGE

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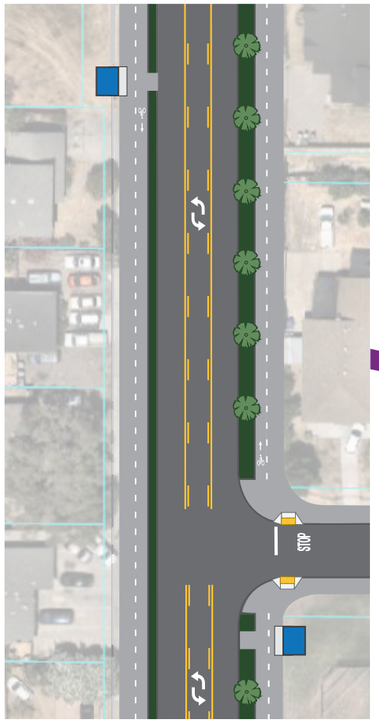
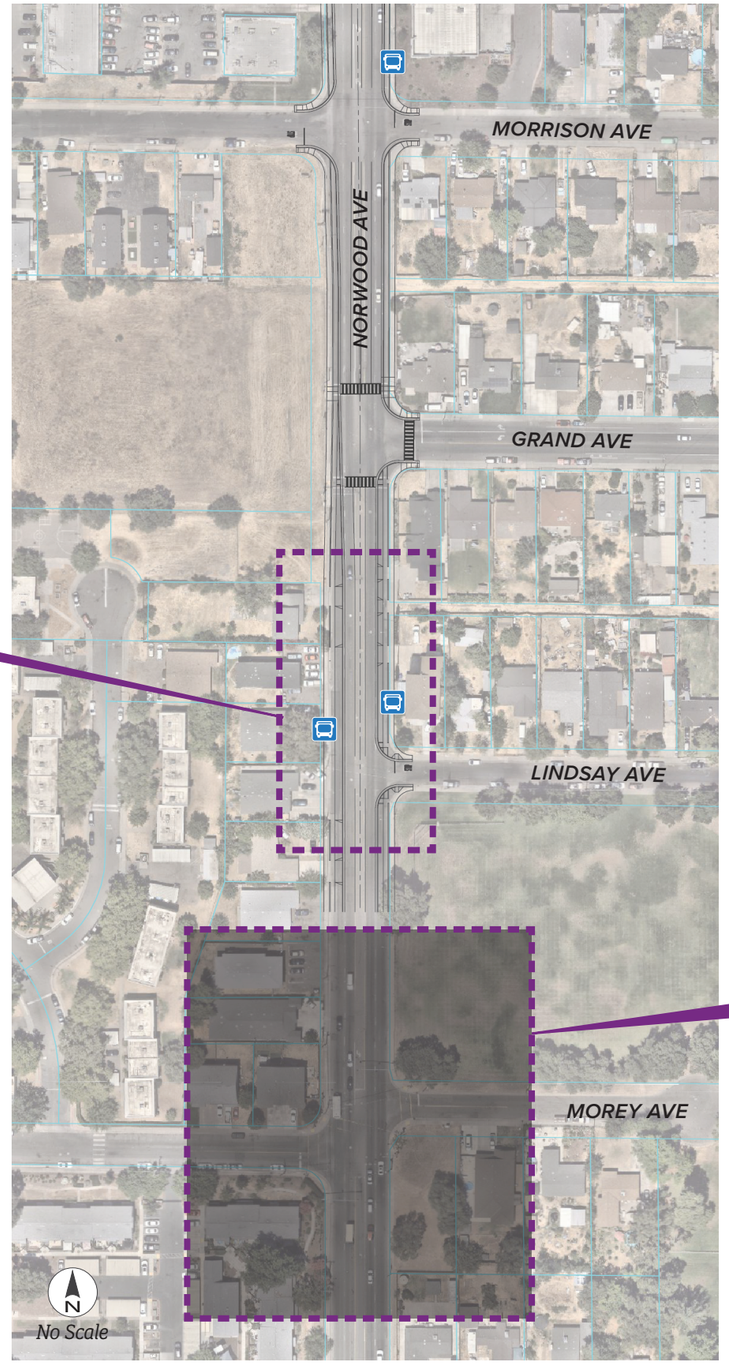
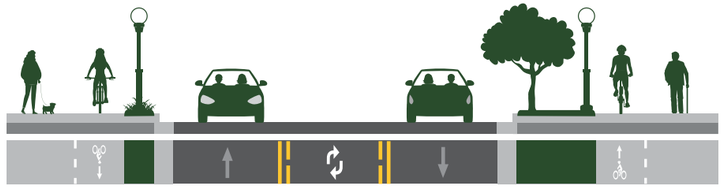


Bus Stop Shelter With Benches

- Bus stop shelter rotated to protect from sun
- Increased waiting space





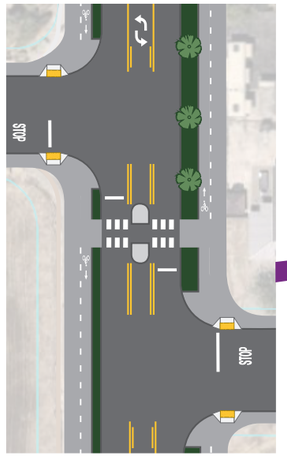
Shade Trees, Widened Sidewalk, Separated Bikeway, & Sidewalk Scale Lighting

- Separation for people walking and biking from people driving
- Shade provides relief from high temperatures and sun exposure
- Sidewalk lighting provides comfort and increased safety

Future Study

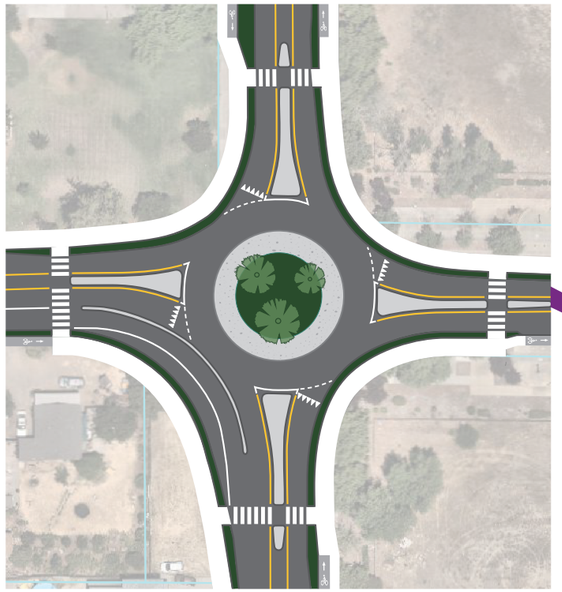
- A future feasibility study will determine if a roundabout at Morey Ave can be implemented
- A roundabout will slow traffic and simplify the offset crossing

FIGURE 27. PROJECT ELEMENTS BETWEEN MORRISON AVENUE AND MOREY AVENUE



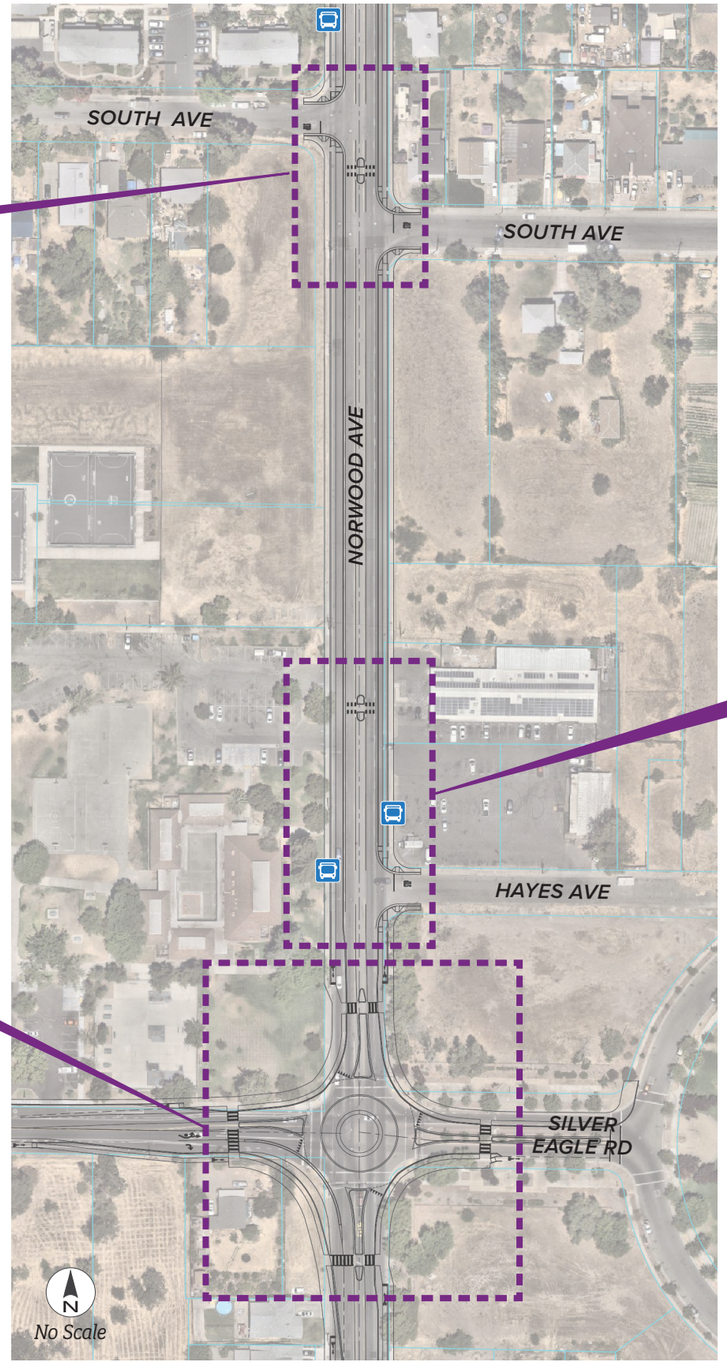
Striped & Signalized Pedestrian Crossing

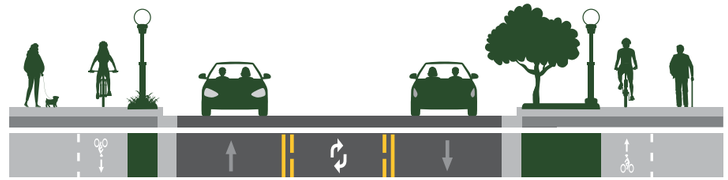
- Increased visibility and safety
- Gap closure for Bikeway on South Avenue



Roundabout (Silver Eagle Road)

- Slow traffic
- Reduce severity of crashes
- Gateway treatment





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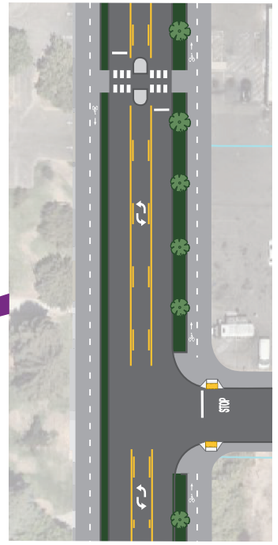

Striped Crosswalk & Signalized Pedestrian Crossing

- Increased visibility and safety at preferred crossing locations
- Access to and from bus stops and Community Center

Future Refinement and Coordination Needed

As design progresses, the City will consider the following items for refinement and coordination:

- Any change to lane capacity or control on Caltrans freeway ramps will need to be coordinated with Caltrans
- Utility relocation will need to be coordinated with Sacramento Municipal Utility District (SMUD).
- A structural analysis will be needed to confirm that a cantilever structure over I-80 is feasible. Alternatively, a separate structure could be considered over I-80 with safe and comfortable crossings to connect the new structure back to Norwood Avenue.
- The feasibility of median trees at certain locations, as desired by the community, will be determined.

FIGURE 28. PROJECT ELEMENTS BETWEEN KESNER AVENUE AND SILVER EAGLE ROAD

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7

How Do We Get There?

The Norwood Mobility Plan presents a vision for a future Norwood Avenue that will improve safety and mobility.

This plan is expected to be brought to City Council for their consideration for adoption in early 2026. With plan adoption, the City will move forward towards securing funding (e.g., federal or state grants with local matches) for the implementation of the vision outlined in this plan. Given the cost of the preferred concept, the City will look for ways to implement the proposed changes in phases or look for quick-build opportunities to help address key safety needs as quickly as possible.

PROJECT COST

The cost for the preferred concept is estimated at $149.9 million based on recent construction bid unit costs with an escalation factor of 5% to account for construction in ten years. Major construction cost items include roadway excavation and improvements for the bikeway and sidewalk improvements as well as cantilever structure over the freeway. A contingency factor was included to account for refinement of project design, changes in project details, or unforeseen changes in construction costs. The soft costs for environmental, PS&E and construction administration and oversight are included in the Project Development Support costs.

Actual project costs will be determined by surveyed base mapping, geotechnical reports, concept refinement, environmental reviews, right of way availability, project phasing, and bid conditions at the time of advertisement. Project costs would be reviewed prior to any grant application or initiation of a Capital Improvement Project to revalidate and update the assumptions in this study as necessary.

A detailed cost estimate is provided in **Appendix E - Planning Level Cost Estimates.**

MAJOR COST CATEGORIES

PRELIMINARY DESIGN AND ENVIRONMENTAL CLEARANCE

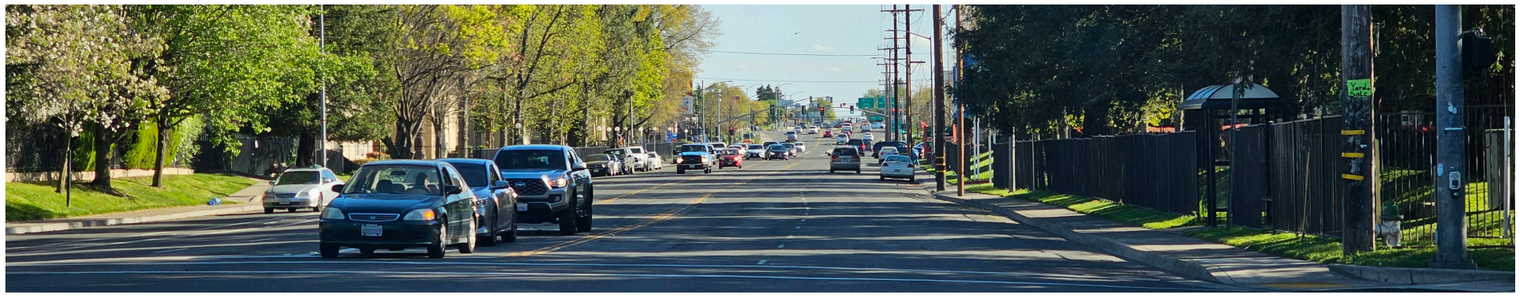
- Conducts public and stakeholder engagement to refine the proposed concepts developed from the planning study and ensure it meets the community and stakeholder needs
- Advances the engineering and design of the project to a 30% level of completion. Better defines project solutions, footprint, feasibility and costs
- Identifies a project's potential impacts and mitigates significant impacts on the community and the environment
- Determines implementation pathways, including how the project will be phased and built

FINAL DESIGN DOCUMENTATION

- Advances the engineering and design of the project to a 60%, 90% and 100% level of design
- Public and stakeholder engagement continues during the final design phase, to inform the community of the proposed project and what to anticipate during construction
- Obtains necessary rights of way and permissions and permits to construct the project

CONSTRUCTION, INSPECTION AND CERTIFICATION

- Includes hiring contractors and building the work to city standards
- Includes opportunities for local contractors and businesses to work on the proposed project and what to anticipate during construction



A snapshot of present-day Norwood Avenue, a vital north-south corridor and opportunity for improved mobility for the communities who live, work, and travel in the area.

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The Norwood
Mobility Project

Appendix

The Norwood
Mobility Project

A - Existing Conditions Analysis Report, April 2025

Norwood Avenue Mobility Project

Existing Conditions Analysis Report

April 2025

PREPARED FOR:

City of SACRAMENTO

DKS

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Prepared for City of Sacramento

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Prepared by DKS Associates

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Introduction

Project Background

Norwood Avenue is part of the High Injury Network in the City of Sacramento's Vison Zero Action Plan[1], which means that the corridor experiences a high number of fatal and serious injury crashes for people driving, walking, and bicycling. Additionally, Norwood Avenue is a high priority corridor in the Sacramento Transportation Priorities Plan[2]. The purpose of the Norwood Mobility Project is to evaluate the safety and mobility for all users of the corridor and identify areas for improvements that will eliminate barriers, improve access, and support the needs of the surrounding community. The project will also meet State, regional, and local requirements such as California Executive Order of reducing greenhouse gas emissions, California State Transportation Agency (CalSTA) Climate Action Plan of investing in safer walking and bicycling infrastructure, Sacramento Regional Transit (SacRT) Bus Stop Improvement Plan, and the Sacramento Area Council of Governments (SACOG) Regional Trail Network.

Policy Framework and Setting

In 2019, the City of Sacramento adopted a Complete Streets Policy[3] which confirms the City's commitment to Complete Streets to ensure that future transportation projects support a safer, accessible, and connected multi-modal transportation network.

On February 27, 2024, the City of Sacramento adopted the Sacramento 2040 General Plan and Climate Action & Adaptation Plan. The General Plan lists several goals, policies, and implementation actions for the City. The Mobility section of the 2040 General Plan outlines several policies that are related to the Norwood Mobility Plan.

The following policies relate to Norwood Avenue:

- M-1.1. *The City shall maintain a street classification system that considers the role of streets as corridors for movement but prioritizes a context-sensitive Complete Streets concept that enables connected, comfortable, and convenient travel for those walking, rolling, and taking transit.*
- M-1.2. *The City shall prioritize mobility, comfort, health, safety, and convenience for those walking, followed by those bicycling and riding transit, ahead of design and operations for those driving.*
- M-1.3. *The City shall plan and make investments to foster a transportation system that improves the health of Sacramento residents through actions that make active transportation, nonmotorized modes, high-occupancy, and zero emission vehicles*

[1] City of Sacramento Vision Zero Action Plan (2018)

[2] City of Sacramento Transportation Priorities Plan (2022)

[3] Resolution 2019-0460

(ZEVs) viable, attractive alternatives to automobiles that use internal combustion engines.

- M-1.4. *In planning, designing, and managing the transportation system, the City shall prioritize person throughput to shift trips to more efficient travel modes and upgrade the performance of limited street space.*
- M-1.5. *The City shall maintain street design and operations standards that prioritize comfort and travel time for walking, bicycling, and transit, while managing vehicle speeds and traffic volumes, updating them as best practices evolve.*
- M-1.6. *Wherever feasible, the City shall design buildings, the public realm, streets, and pedestrian access to integrate transit into existing neighborhoods and proposed developments and destinations such as schools, employment centers, commercial centers, major attractions, and public walking spaces to improve access for users by transit.*
- M-1.9. *The City shall ensure that the transportation system is planned and implemented with an equitable process to achieve equitable outcomes and investments so that all neighborhoods one day will have similar levels of transportation infrastructure such as sidewalks, marked low stress crossings, and bikeways.*
- M-1.10. *The City shall continue to engage the community in decisions that affect mobility, including planning, design outcomes and implementation, with a particular focus on planning with, and not for, historically marginalized, disadvantaged communities and environmental justice communities.*
- M.1.11. *The City shall strive to increase bicycling and walking citywide so that it can meet its equity, reduced vehicle miles traveled, and sustainability goals.*
- M-1.13. *The City shall design streets to prioritize walking by including design elements such as the following:*
    - *Grid networks that provide high levels of connectivity;*
    - *Closely spaced intersections;*
    - *Frequent and low-stress crossings;*
    - *Wide, unobstructed walkable sidewalks;*
    - *Separation from vehicle traffic;*
    - *Street trees that provide shading; and*
    - *Minimal curb cuts.*
- M-1.14. *The City shall work to complete the network of tree-shaded sidewalks throughout the city, to the greatest extent feasible, by building new sidewalks and crossings, especially within the high-injury network, in disadvantaged communities, near high-ridership transit stops, and near important destinations, such as schools, parks, and commercial areas. Walking facilities should incorporate shade trees.*
- M-1.15. *The City shall require new subdivisions, new multi-unit dwelling developments, and new developments along commercial corridors to include well-lit, tree-shaded walkways where feasible, that provide direct links to the public realm or adjacent public destinations such as transit stops and stations, schools, parks and shopping centers.*

- M-1.16. *The City shall remove barriers to walking, where feasible, and work with utility companies to remove barriers to allow people of all abilities to move with comfort and convenience throughout the city, including through the following:*
    - *Provisions of curb ramps, crosswalks, and overpasses;*
    - *Relocation of infrastructure of street furniture that impedes travel pathways;*
    - *Reducing or consolidating driveways and curb cuts;*
    - *Providing long and short-term bicycle and scooter parking to minimize sidewalk obstructions; and*
    - *Creation of additional walking entrances to important destinations like schools, parks, and commercial areas.*
- M-1.17. *The City shall plan and seek funding for a continuous, low-stress bikeway network consisting of bicycling-friendly facilities that connect neighborhoods with destinations and activity centers throughout the city.*
- M-1.8. *When designing projects, the City shall prioritize designs that strengthen the protection of people bicycling such as improvements that increase visibility of bicyclists, increase bikeway widths, raise bikeways, design safer intersection crossings and turns, and separate bikeways from driving traffic wherever feasible.*
- M-1.9. *When designing projects, the City shall prioritize designs that encourage walking and improve walking safety best practice designs and considerations for efficiencies in walking.*
- M-1.26. *The City shall encourage the Sacramento Regional Transit District (SacRT) to implement bus shelter design that encourages transit use, informed by ADA-compliance, bus stop placement, and passenger safety best practices. Where feasible, the City should collaborate with SacRT on bus stop designs for major corridor improvement projects.*

Additionally, in the 2040 General Plan is the North Sacramento Community Plan, which identifies policies specific to North Sacramento which includes Norwood Avenue. The North Sacramento Community Plan also identifies the Norwood Area Circulation and Infrastructure Plan (2007) as a plan that is directly related to the North Sacramento community.

The following North Sacramento Community Plan policies in the 2040 General Plan relate to Norwood Avenue:

- NS-M-2. *The City shall continue to support community efforts to offer, promote, and expand access to bikes, bike skills, and bike repair.*
- NS-M-3. *The City shall continue to invest in walking improvements in North Sacramento Community Plan Area, working closely with the communities to ensure the community needs are addressed.*
- NS-M-4. *When making street improvements the City shall recognize that speed is the greatest factor in collisions, and this should be addressed in the North Sacramento Community Plan Area. Staff should apply speed reduction measures as funding allows.*

- NS-M-5. *The City should encourage and collaborate with the Sacramento Regional Transit District (SacRT) to plan and implement high frequency, connected, and convenient trans tot the North Natomas Community Plan Area and the wider city.*
- NS-M-6. *The City shall continue to seek funding to carry out improvements as prioritized in the Transportation Priorities Plan for streets that lack sidewalks and street lighting, are under heavy use by pedestrians, or will not be improved through new development and assessment districts.*
- NS-PFS-7. *The City shall encourage property owners to form assessment districts in order to support the provision of infrastructure.*

The Norwood Area Circulation & Infrastructure Plan recommendations for Norwood Avenue include, "stripe the bike lanes and properly mark them along Norwood Avenue to improve the safety of the bicyclists and request that RT provide bus shelters and other pertinent improvements at the existing bus stops to improve the comfort of riders as well as aesthetics. Additionally, as improvements occur along Norwood Avenue, sidewalk improvements should comply with ADA requirements, including removing impediments in the sidewalks and improving the curb ramps to current standards." Similar recommendations are provided in the Norwood Circulation & Infrastructure Plan for adjacent corridors included in the Norwood Mobility Plan. **Table 1** shows recommendations for Norwood Avenue and adjacent roadways from the Norwood Area Circulation & Infrastructure Plan.

Table 1. Recommended Circulation and Roadway Improvements

Norwood Area Roadways	Roadway	Curb/Gutter	Parkway	Sidewalk	Bike Lanes	Bus Stop Improvements	Lighting	Traffic Calming Devices				
								Speed Humps	Stop Signs	Crosswalks	Traffic Signs	Speed Limit
Norwood Avenue					X	X					X	
Morrison Avenue	X	X		X			X			X		X
Morey Avenue	X	X	X	X			X	X	X	X		X
South Avenue	X	X	X	X			X	X	X	X		X
Silver Eagle Road	X	X	X	X	X	X	X			X	X	X
Ford Road	X	X		X		X	X			X	X	
Western Avenue	X	X	X	X	X		X		X			X

Source: Norwood Area Circulation & Infrastructure Plan, 2007.

Literature Review

The City of Sacramento has developed planning studies that overlap with the Norwood Mobility Project corridor. This section provides a brief literature review of several key plans and policies by the City of Sacramento, focusing on their relevance to Norwood Avenue.

Norwood Area Circulation and Infrastructure Plan (2007)

In 2007, the Norwood Area Circulation and Infrastructure Plan was adopted by the City of Sacramento. The Norwood Area Circulation and Infrastructure Plan assessed existing circulation patterns and infrastructure conditions to provide recommendations for improvements for existing and future development.

Vision Zero Action Plan (2018)

In January 2017, the City of Sacramento adopted a goal to eliminate traffic fatalities and serious injuries[4]. Norwood Avenue was identified in the City of Sacramento Visions Zero Action Plan as a High Injury Corridor. The Sacramento Vision Zero Action Plan aims to support the City's General Plan in maintaining safety and health of its residents and visitors. The Vision Zero Action Plan outlines crash trends and patterns in the City while providing a short- and long-term action plan for improving transportation safety and eventually eliminating fatal and severe injury crashes. The Vision Zero Plan is actively updated with new traffic data and progress towards a Vision Zero goal.

Transportation Priorities Plan (2022)

In November 2022, the City of Sacramento adopted a list of priority transportation projects. The Transportation Priorities Plan (TPP) provides the city with a prioritized list of projects and funding needs for improvements. The TPP outlines funding sources for transportation projects, priority areas, and needs of the city. In the TPP, Norwood Avenue and intersecting corridors are identified as medium to high priority corridors for projects that include streetscape, walking improvements, and bike lanes.

2040 General Plan - Environmental Justice Element (2024)

In the 2040 Sacramento General Plan, Norwood Avenue is a designated Disadvantaged Community (DAC) in Sacramento. DAC designation is determined based on several factors such as pollution, income, and food resources.

[4] Resolution NO. 2017-0032

Climate Action & Adaptation Plan (2024)

On February 27, 2024, the City of Sacramento adopted the Climate Action & Adaptation Plan (CAAP). The CAAP includes measures for Sacramento to implement to reduce greenhouse gas emissions (GHG) by 2030. The CAAP builds upon the City's 2012 Climate Action Plan and emphasizes the need for active transportation as a key strategy for reducing GHG.

Streets for People: Sacramento's Active Transportation Plan (Draft 2024-2025)

Streets for People: Sacramento's Active Transportation Plan (S4P) is currently in draft form and aims to improve walking, biking, and rolling in Sacramento. S4P will serve to update the City's 2018 Bicycle Master Plan and 2006 Pedestrian Master Plan. The draft S4P plan will serve as a guide for city staff, local agencies, public officials, residents, and developers to create a balanced and connected transportation system that supports all modes of travel and encourages active transportation. The primary goal of the draft S4P plan is to address active transportation needs and focus on improving infrastructure primarily in areas that are disadvantaged or marginalized.

Description of the Norwood Avenue Corridor

This section provides a physical description of Norwood Avenue and the surrounding community's socio-economic characteristics.

Socio-Economic Characteristics

Norwood Avenue is located in North Sacramento, west of the Del Paso Heights community. As described by the Sacramento Area Council of Governments (SACOG), Norwood Avenue is in an Environmental Justice (EJ) community of low income and minority groups. The Norwood Avenue Mobility Project corridor is also within two SB 535 disadvantaged communities[5]. As illustrated in the City of Sacramento 2040 General Plan[6], Norwood Avenue is in an area with the highest cumulative air pollution burden.

According to the American Community Survey 5-Year Estimates, the four census tracts surrounding the project area contain approximately 17,437[7] people with an average annual median household income of $60,570, whereas the citywide median household income is

[5] These areas represent the 25% highest scoring census tracts in CalEnviroScreen 4.0, census tracts previously identified in the top 25% in CalEnviroScreen 3.0, census tracts with high amounts of pollution and low populations, and federally recognized tribal areas as identified by the Census in the 2021 American Indian Areas Related National Geodatabase. *https://oehha.ca.gov/calenviroscreen/sb535*

[6] City of Sacramento 2040 General Plan, Map EJ-2: Census Tracts with Highest Cumulative Air Pollution Burden

[7] ACS 2023 5-Year Estimates, Table S0101

$83,753[8]. Citywide, 14.4% of the population experience poverty, whereas the population of the four census tracts surrounding the project corridor range between 14.5% to 31.3% of people experiencing poverty[9]. According to the United States Environmental Protection Agency (EPA) Climate and Economic Justice Screening Tool, Norwood Avenue is located in disadvantaged communities that are above the percentile threshold for low income, fine particulate (PM 2.5) exposure, asthma, low life expectancy, housing costs, and wastewater discharge.

Physical Characteristics

Norwood Avenue is a north-south arterial that connects the North Sacramento community to Interstate 80, employment and retail destinations, and other services.

The road profile consists of two general purpose travel lanes per direction with a striped center two way left turn median. However, from Grace Avenue to Main Avenue, the roadway is one travel lane per direction with no two-way left turn lane median. Lane widths throughout the corridor vary from 11 to 12 feet for through travel lanes and 10 to 11 feet for two-way left turn center lanes. Per the City's standards, the minimum lane width for travel lanes is 11 feet unless the City Traffic Engineer deems appropriate otherwise[10].

Norwood Avenue consists of 11 signalized intersections, two of which are at I-80 on and off ramps. The posted speed limit throughout the study corridor is 35 mph. The right-of-way (ROW) of the study corridor varies between 50 to 70 feet, when measured from curb to curb.

Throughout the study corridor, sidewalks are approximately five feet wide. The corridor consists of two major sidewalk gaps on the west side of the road from Berthoud Street to Grace Avenue where there is an informal asphalt path and on the east side of Norwood Avenue from Grace Avenue to Main Avenue there is no sidewalk present. However, the sidewalk gap on the east side of the corridor from Grace Avenue to Main Avenue will be closed with future planned development. Throughout the entire corridor, utility poles are installed in the sidewalk, creating regular obstructions in the sidewalk width. The City has completed recent crosswalk upgrades at the intersection of Norwood Avenue and Bell Avenue. The remaining crosswalk locations along the corridor require some level of improvement to meet City standards including updates to push buttons, curb ramps, accessible pedestrian signal (APS) upgrades, and/or striping. The City Engineering Services team is currently upgrading several intersections on Norwood Avenue to include intelligent transportation systems (ITS) that will improve safety and efficiency.

Norwood Avenue consists of disconnected and incomplete bike lanes and lacks any striped markings or wayfinding signage for existing bicycle facilities. From Main Avenue to Norwood Junior High School, a bike lane exists along the southbound travel lane but drops off 160

[8] ACS 2023 5-Year Estimates, Table S1901
[9] ACS 2023 5-Year Estimates, Table S1701
[10] City of Sacramento, Section 15 - Street Design Standards

feet north of the Norwood Avenue and Grace Avenue intersection. A bike lane begins approximately 200 feet south of the northbound Bell Avenue intersection approach and continues along the northbound travel lanes from Bell Avenue to Grace Avenue. At the southern end of the corridor, from the Arcade Creek overpass to Carroll Avenue, bike lanes are present along the northbound and southbound travel lanes.

The corridor has been broken into four segments for the purposes of this study based on their general characteristics. This segmentation is shown in **Figure 1** and **Table 2** and provides a summary of the existing conditions and characteristics for each road segment. Each segment is further described in the following sections.

Figure 1. Norwood Avenue Roadway Segments

Table 2. Summary of Existing Conditions and Characteristics along Norwood Avenue

	Road Segment 1	Road Segment 2	Road Segment 3	Road Segment 4
Boundaries	Main Avenue to Bell Avenue	Bell Avenue to I-80	I-80 to Carroll Avenue	Carroll Avenue to Arcade Creek
Length (Approx)	2,670 ft	2,300 ft	5,300 ft	1,200 ft
Number of Lanes	2 - 4	4	4	2-3
Lighting	Street Lighting	Street and Pedestrian Lighting	Street Lighting	Street and Pedestrian Lighting
Posted Speed Limit	25 MPH – School Zone 35 MPH	35 MPH	25 MPH – School Zone 35 MPH	35 MPH
Annual Daily Traffic	12,064	19,310	10,772	14,302
Adjacent Land Uses	Standard Single-Family, Single-Family Alternative, Agricultural, and Multi-Family	Multi-Family, Commercial, and Industrial	Multi-Family, Standard Single-Family, Single-Family Alternative, Commercial	Multi-Family and Single-Family Standard

	Road Segment 1	Road Segment 2	Road Segment 3	Road Segment 4
Notable Locations	Norwood Junior High School	Norwood Center	Sacramento County Department of Human Assistance, Dollar General, Robertson Community Center, Del Paso Park	Gateway Park
Major Cross-Streets within Road Segment	Grace Avenue, Bell Avenue	Jessie Avenue	Harris Avenue, Morrison Avenue, Grand Avenue, Silver Eagle Road, Ford Road	Fairbanks Avenue
Median Types	None	None	None	None
Existing Bicycle Facilities	Bike Lanes-SB Lane from Main Avenue to Norwood Jr High parking lot exit and NB lane north of Bell Avenue to Grace Avenue	Bike Lane – NB lane approx. 200 ft prevailing Bell/Norwood intersection	None	Bike Lanes – NB and SB lanes from Arcade Creek overpass to Carroll Avenue

	Road Segment 1	Road Segment 2	Road Segment 3	Road Segment 4
Condition of Walking Facilities	• No sidewalk along NB lane from Grace Ave to Main Ave • Sidewalks are continuous with no obvious deterioration along SB lane from Main Ave to Grace Ave • Sidewalk from Grace Ave to Berthoud St along SB lane is discontinuous in material transitioning from concrete to asphalt and consists of cracks is deteriorating	• Sidewalks are continuous and does not show obvious signs of deteriorating but contains some cracks in the concrete. • Sidewalk lacks buffers from travel lanes	• Sidewalks are continuous but consists of concrete gaps and uneven pavement • Sidewalk lacks buffers from travel lanes • Utility poles within sidewalk width	• Sidewalks is continuous and does not consist of obvious signs of deterioration
Parking	On-street parking along SB lanes from Main Ave to Norwood JHS	On-street parking along NB and SB lanes from Bell Ave to Jessie Ave	No on-street parking	No on-street parking
Bus Shelter Locations	None	1 – Route 19 at Bell/Norwood (SB)	None	None

Segment 1: Norwood Avenue - Main Avenue to Bell Avenue

The northernmost segment on the study corridor as shown in **Figure 2** begins at Main Avenue and ends at Bell Avenue. The adjacent land use is residential, with Norwood Junior High School located south of Main Avenue. This segment of Norwood Avenue has one lane per direction from Grace Avenue to Main Avenue and transitions to two lanes per direction with a center turn-lane from Grace Avenue to Bell Avenue.

On-street parking is permitted from Main Avenue to Norwood Junior High School along the southbound travel lane. Sidewalks along this segment have inconsistent widths with gaps in the network on either side and are in fair to poor condition. Bicycle lanes are present on one side of the roadway (southbound north of Grace Avenue, and northbound south of Grace Avenue). No public transit bus stops are present along Segment 1.

While walking and biking infrastructure does not currently exist at the southeast corner of Norwood Avenue and Main Avenue, a future planned development will incorporate roadway widening and pavement addition for a travel lane, buffered bike lane, on-street parking, curb & gutter, a 6’ wide landscape planer and a 6’ wide sidewalk. The future roadway configuration with the planned development will be two northbound through lanes, one northbound left turn pocket, one right northbound turn lane, and one northbound buffered bike lane.

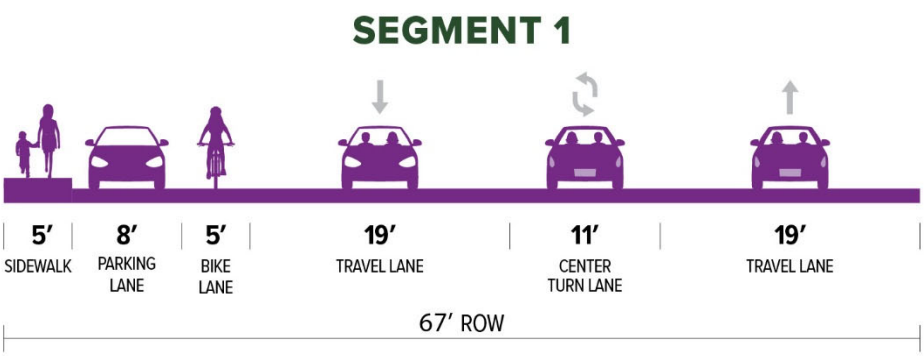


Figure 2. Segment 1: Norwood Avenue (Main Avenue to Bell Avenue)

Segment 2: Norwood Avenue - Bell Avenue to I-80

The second segment stretches from Bell Avenue to I-80 as shown in **Figure 3**. Adjacent land uses include residential and commercial uses, with some parking lot frontage and fast-food restaurants near the freeway. This segment of Norwood Avenue is two lanes per direction with a center turn-lane. Sidewalks are present on both sides of the roadway. The only bike lane that exists in Segment 2 is a 200-foot-long bicycle lane at the northbound Bell Avenue intersection approach. On-street parking is permitted between Bell Avenue and Jessie Avenue along the northbound and southbound travel lanes, in front of adjacent apartments and businesses.

Route 19 operated by SacRT runs along Norwood Avenue, turns onto Bell Avenue and continues onto Rio Linda Boulevard, operating on one-hour headways. There is a bus stop located approximately 250 feet from the Norwood Avenue/Bell Avenue intersection in the eastbound direction on Bell Avenue; along Norwood Avenue in the southbound direction, there is another bus stop located approximately 80 feet south of the intersection. Route 19 bus stops also exist in both directions on Norwood Avenue, 100 feet north of Jessie Avenue.

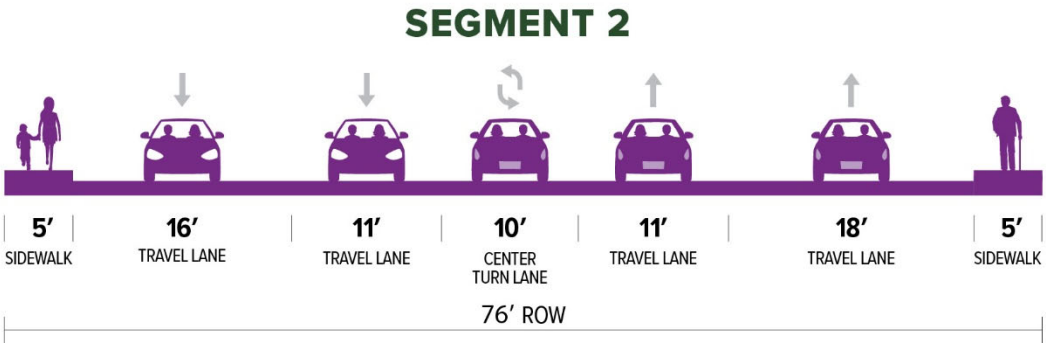


Figure 3. Segment 2: Norwood Avenue (Bell Avenue to I-80)

Segment 3: Norwood Avenue - I-80 to Carroll Avenue

The third segment begins at I-80 and ends at Carroll Avenue, with two travel lanes per direction with a center two-way turn lane as shown in **Figure 4**. There is a mix of single family and multi-family residential adjacent to Norwood Avenue, as well as commercial land use along the segment, including a Dollar General, parks, and the Robertson Community Center. There are consistent sidewalks on both sides but no bike lanes. Route 86 and Route 19 are operated by SacRT and have several stops on this segment near Harris Avenue, Morrison Avenue, Lindsay Avenue, Kesner Avenue, South Avenue, Hayes Avenue, Silver Eagle Road, Ford Road, and Carroll Avenue.

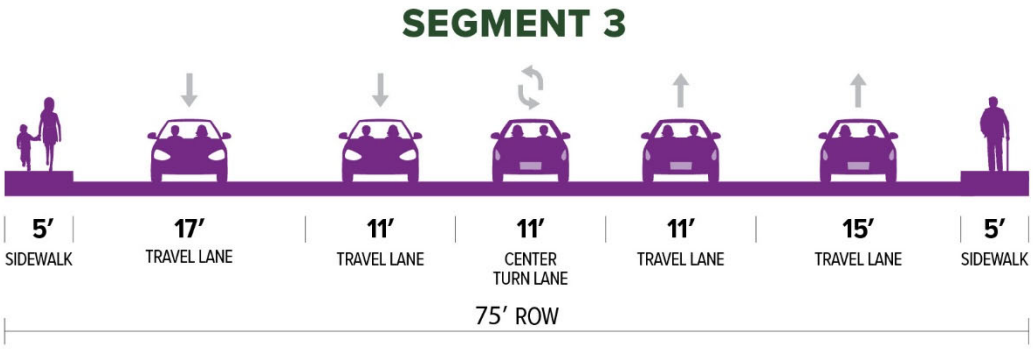


Figure 4. Segment 3: Norwood Avenue (I-80 to Carroll Avenue)

Segment 4: Norwood Avenue - Carroll Avenue to Arcade Creek

Segment 4 starts at Carroll Avenue and ends at Arcade Creek as shown in **Figure 5**. The adjacent land use is made up of single-family and multi-family residential and includes Gateway Park. There are two lanes per direction with a center turn lane from Carroll Avenue to Fairbanks Avenue. From Fairbanks Avenue to Arcade Creek the roadway narrows to one lane per direction across the Arcade Creek bridge. There are consistent sidewalks and bike lanes on both sides of the road in this segment. SacRT Route 19 runs through this segment with a bus stop located at the Caroll Avenue intersection along the northbound travel lanes. Route 19 operates on a one-hour headway.

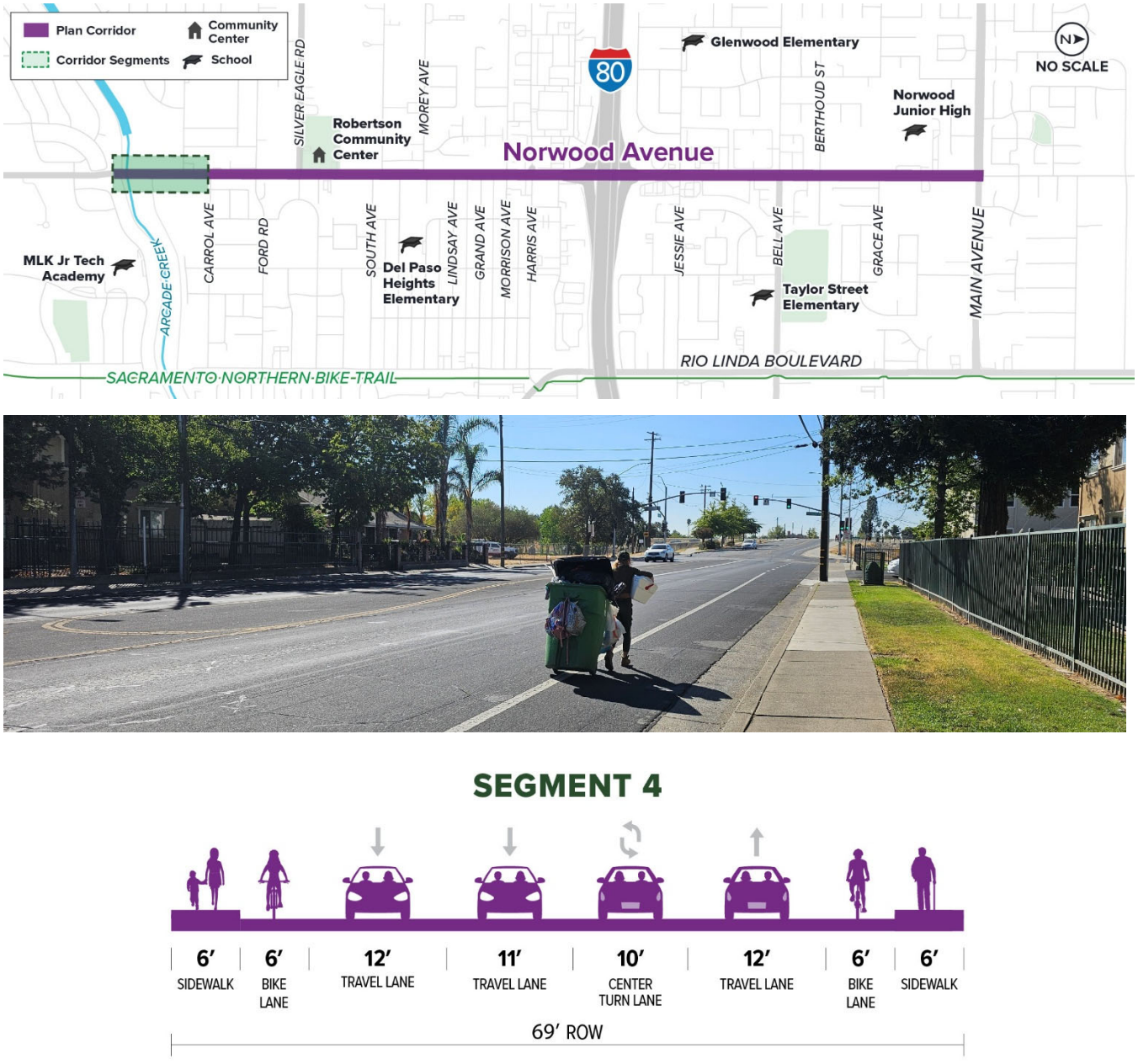


Figure 5. Segment 4: Norwood Avenue (Carroll Avenue to Arcade Creek)

Existing Conditions Multimodal Analysis

This section summarizes the findings of existing multimodal conditions which includes vehicles, people walking, biking, or taking transit. The multimodal findings are further detailed in the following sections.

Study Intersections

Six study intersections were identified and evaluated as part of the analysis of traffic operations. The study area consisted of the following signalized study intersections:

1. Norwood Avenue / Bell Avenue
2. Norwood Avenue / Jessie Avenue
3. Norwood Avenue / WB I-80 Ramps
4. Norwood Avenue / EB I-80 Ramps
5. Norwood Avenue / Harris Avenue
6. Norwood Avenue / Silver Eagle Road

Traffic Volumes

Vehicle, walking, and bicycle counts were collected during weekday a.m. (7:00 a.m. to 9:00 a.m.) and p.m. (4:00 p.m. to 6:00 p.m.) peak hours on Tuesday, October 8, 2024, when school was in session. The peak hours were found to be 7:30 to 8:30 AM and 5:00 to 6:00 PM. Turning Movement Count sheets can be found in *Appendix A.*

The intersection with the highest vehicle traffic was Norwood Avenue and Jessie Avenue. Vehicle traffic at Norwood Avenue and Jessie Avenue during the AM resulted in 3,589 vehicles, 59% of total AM traffic was during the AM peak hour. The PM vehicle traffic was higher than AM traffic with 4,285 total vehicles and 50% of PM traffic occurring during the PM peak hour.

Heavy vehicles such as trailers and other commercial fleets were included in traffic volume counts. Heavy vehicle counts for all intersections ranged from 48 to 226 for AM and PM. The Norwood Avenue and I-80 eastbound ramps and Harris Avenue intersections had the highest number of heavy vehicles with 354 and 310. At both locations, over 42% of heavy vehicle traffic occurred during the AM and PM peak hours.

Walking activity was greatest on the south leg of Norwood Avenue at Bell Avenue and the north leg of Norwood at Jessie Avenue. Both crosswalks at these locations experienced approximately 20 people walking at crossings per hour during the AM peak. The activity of people walking at Bell Avenue and Jessie Avenue can be attributed to adjacent commercial businesses and apartments, the Line 19 bus stops at both intersections, and Glenwood Elementary School.

Bicycle activity was greatest at Norwood Avenue and Silver Eagle Road with 10 people biking during the AM and 21 people biking during the PM. Both AM and PM peak hour bicycle counts accounted for over 54% of daily bicycling activity.

Transit Data Summary

Norwood Avenue is served by SacRT's Route 19 and Route 86. Route 19 connects riders between the Arden/Del Paso Light Rail Station to Elverta Road and Watt Avenue. Route 86 provides connections between Downtown Sacramento and the Marconi/Arcade Light Rail Station. Route 19 and Route 86 overlap for six stops on Norwood Avenue from Silver Eagle Road to Lindsay Avenue. On weekdays and weekends, Route 19 operates on a 60-minute headway for Norwood Avenue bus stops. On weekdays, Route 86 operates Norwood Avenue stops between a 25-to-30-minute headway and a 60-minute headway on weekends.

Through coordination with SacRT, weekday ridership data was collected for the 14 existing transit stops along Norwood Avenue. The data given captures ridership from January to August 2024. As shown in **Figure 6**, the monthly total of all weekday ridership[11] for all stops on Norwood Avenue is relatively steady with an exponential increase occurring in August.

The average monthly ridership from January to August was 195 riders across all stops in 2024. The average weekday ridership for all transit stops on Norwood Avenue is 14 riders per stop. Stops serviced by only Route 19 had a total of 698 riders while stops serviced by both Route 19 and Route 86 had a total of 860 riders during this time period. **Figure 7** shows the average weekday ridership by bus stops along Norwood Avenue. As shown, the southbound Norwood Avenue/Silver Eagle Road bus stop serviced by both Route 19 and Route 86 observed the highest average number of riders (25) on any given weekday from January to August. In contrast, the northbound Norwood Avenue/Carroll Avenue bus stop is serviced by only Route 19 and observed the lowest average number of riders (4) on any given weekday for the same time period.

[11] Includes only boardings at bus stops

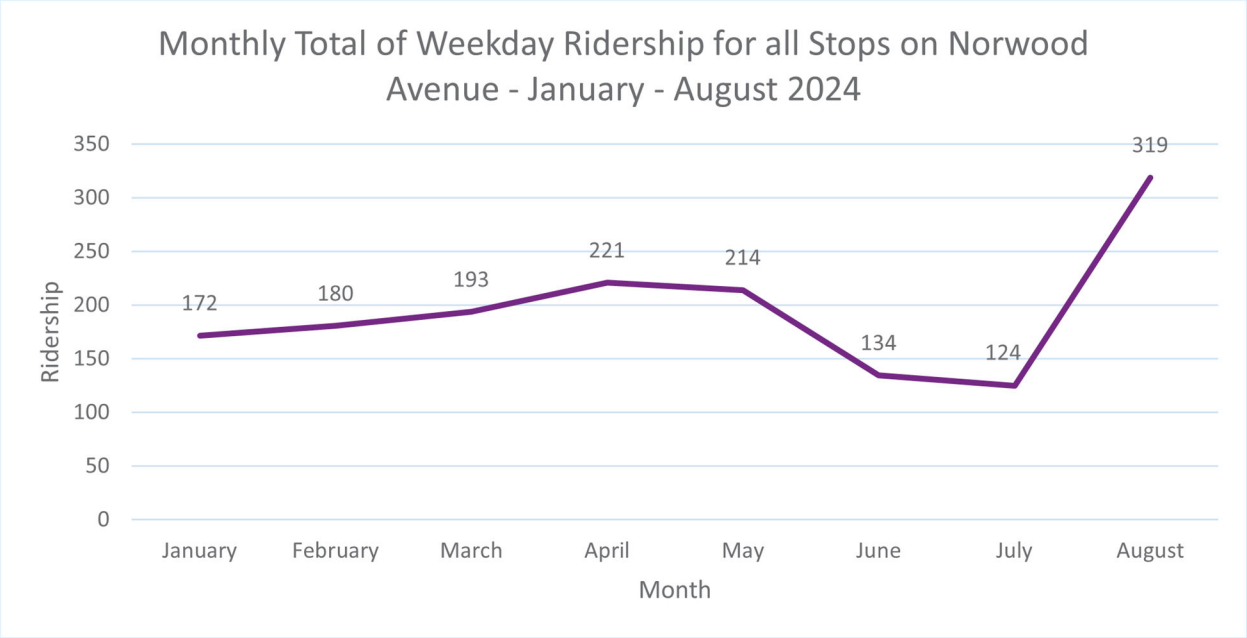


Figure 6. SacRT Monthly Transit Ridership

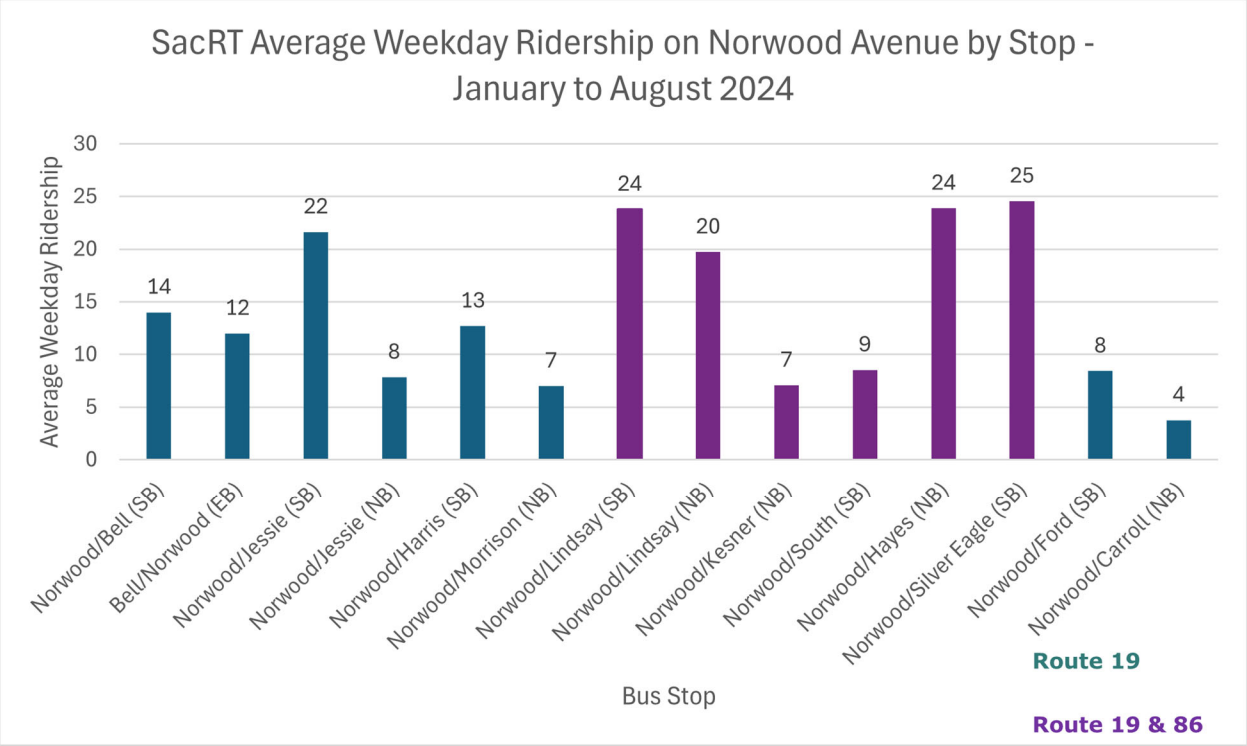


Figure 7. SacRT Transit Ridership by Bus Stop on Norwood Avenue (Segment 1-4)

Level of Traffic Stress/All Ages and Abilities Walking /Bicycle analysis

A Level of Traffic Stress (LTS) analysis has been calculated for people walking and bicycling.

Bicycling LTS

The bicycling LTS analysis was calculated using the methodologies describe in the *Mineta Transportation Institute Report 11-19 Low Stress Bicycling and Network Connectivity* (2012). Bicycling LTS scores quantify the stress level of a roadway segment through a variety of criteria such as street width (number of lanes), speed limit and/or prevailing speed, presence and width of bike lanes, signals, and presence and width of parking lanes. Bicycle LTS is given a score of 1 through 4, with 1 being the most comfortable and 4 being the least comfortable for people bicycling. Typically, a LTS score of 1 indicates that the stress level of a roadway is suitable for most people bicycling regardless of skill such as children, while an LTS of 4 indicates that the stress level is better suited for more skilled bicyclists, as shown in **Figure 8**.

Table 3 lists the criteria for each roadway segment and the associated LTS score. As shown in **Figure 9**, the existing LTS for people bicycling on Norwood Avenue is consistently high stress, often not comfortable for all ages and abilities. The only low stress environment on Norwood Avenue exists from Fairbanks Avenue to Arcade Creek, characterized by marked bike lanes and lower vehicle speeds.

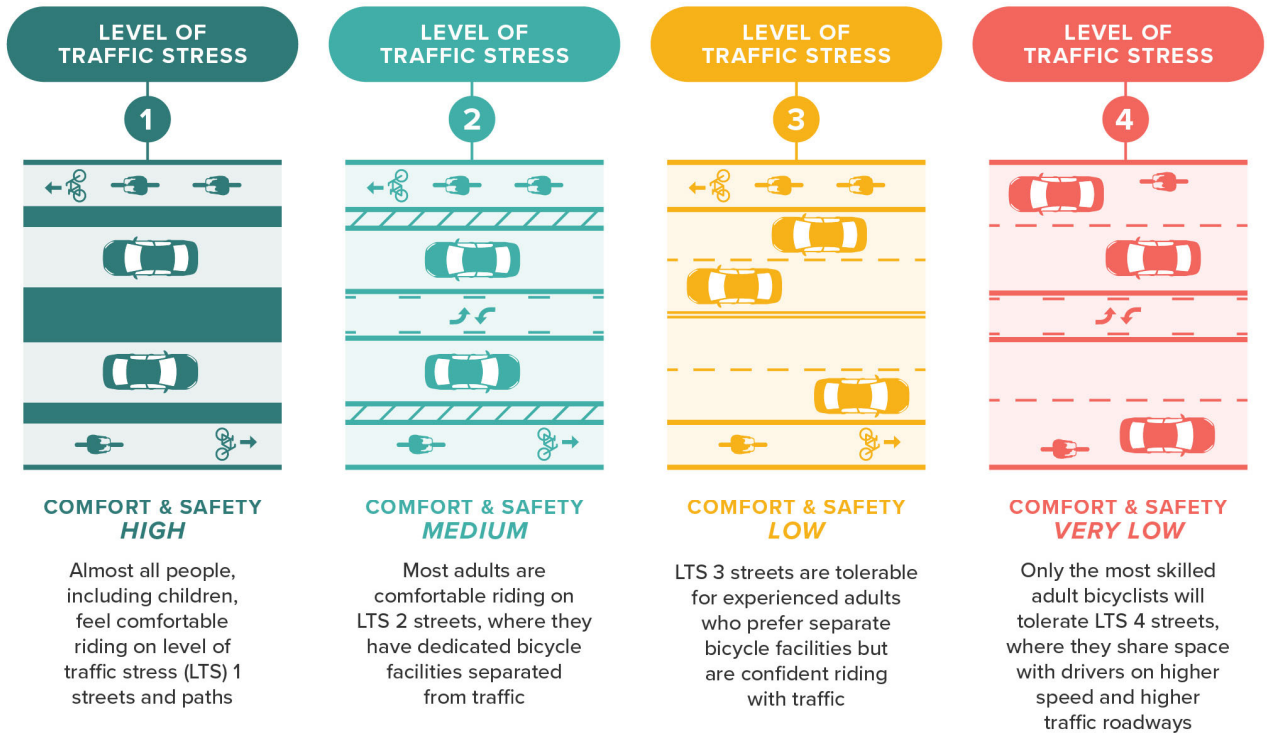


Figure 8. Bicycle Level of Traffic Stress Scores

Table 3. Bicycle Level of Traffic Stress Criteria

SEGMENT	POSTED SPEED (MPH)	BIKE PRESENCE AND TYPE	PARKING LANE	NUMBER OF TRAVEL LANES	LTS SCORE
SEGMENT 1 MAIN AVENUE TO BELL AVENUE	35	Yes Class II Bike Lanes	Yes: SB from Main Ave to Grace Ave No: Grace Ave to Bell Ave	1: Main Ave to Berthoud St 2: Berthoud St to Bell Ave	4
SEGMENT 2 BELL AVENUE TO I-80 EB ON/OFF RAMPS	35	No	Yes: Bell Ave to Jessie Ave No: Jessie Ave to I-80 EB	2	4
SEGMENT 3 I-80 EB ON/OFF RAMPS TO CARROLL AVENUE	35	No	No	2	4: I-80 EB On/Off Ramps to Grand Ave 3: Grand Ave to Carroll Ave
SEGMENT 4 CARROLL AVENUE TO ARCADE CREEK	30	Yes Class II Bike Lanes	No	1	3: Carroll Ave to Fairbanks Ave 1: Fairbanks Ave to Arcade Creek

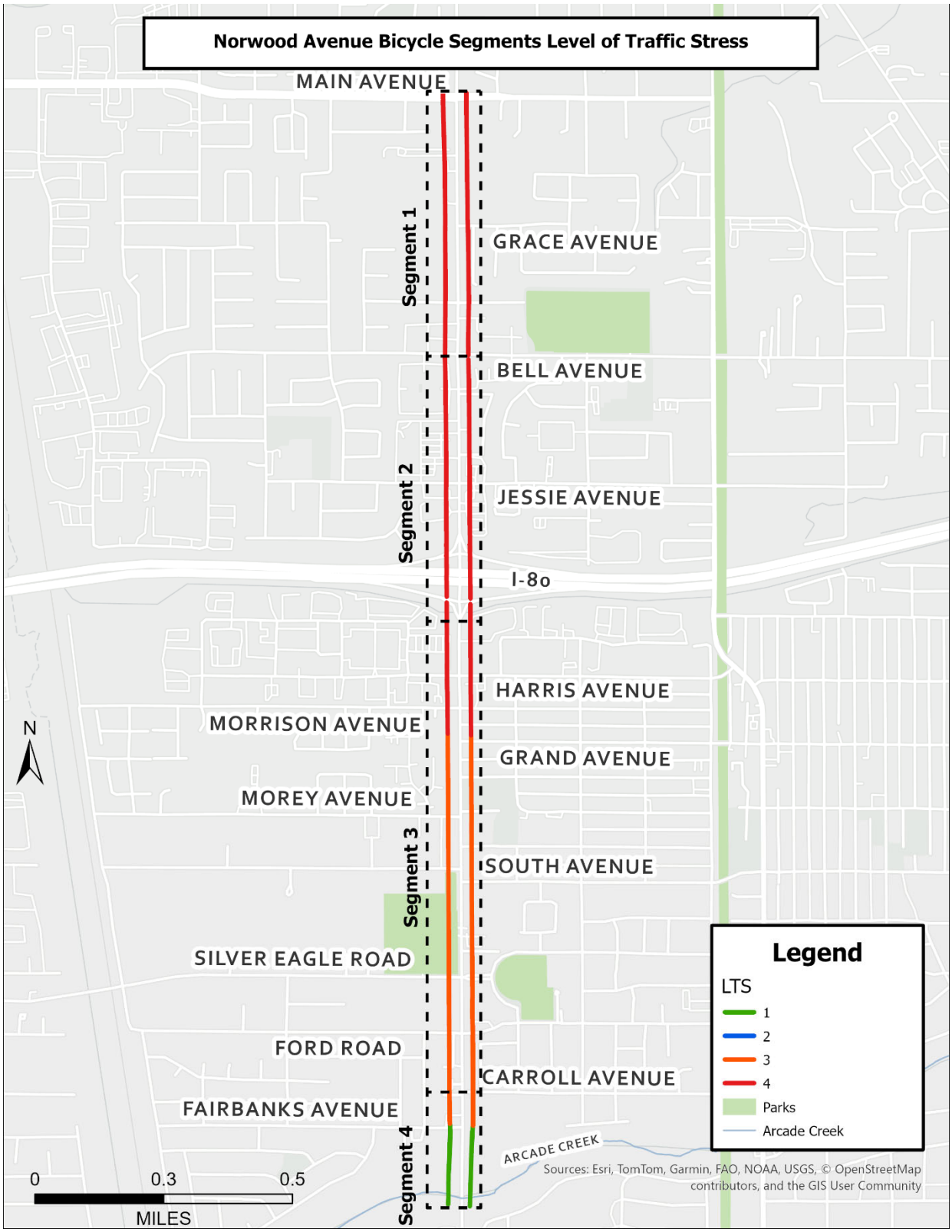


Figure 9. Norwood Avenue Bicycle LTS

Walking LTS

The walking level of traffic stress (LTS) analysis was done using the *Oregon Department of Transportation (ODOT) Level of Traffic Stress Analysis Procedures* (2020). Similar to bicycling LTS methodology, walking LTS also undergoes several criteria to develop a LTS score of 1 through 4 including the presence of sidewalks, crosswalks, median refuges, traffic volume, and current speed limits as shown in **Figure 10**.

Table 4 lists the criteria for each roadway segment and the associated LTS score Similar to the bicycling LTS results, Norwood Avenue also received common LTS scores of 3 and 4 throughout the study limits indicating that the corridor is uncomfortable to traverse for the majority of people walking. As shown in **Figure 11**, walking LTS for people walking along the corridor is a primarily a high stress environment not suitable for all ages and abilities. However, for people walking, low stress pockets exist near Fairbanks Avenue and Main Avenue.

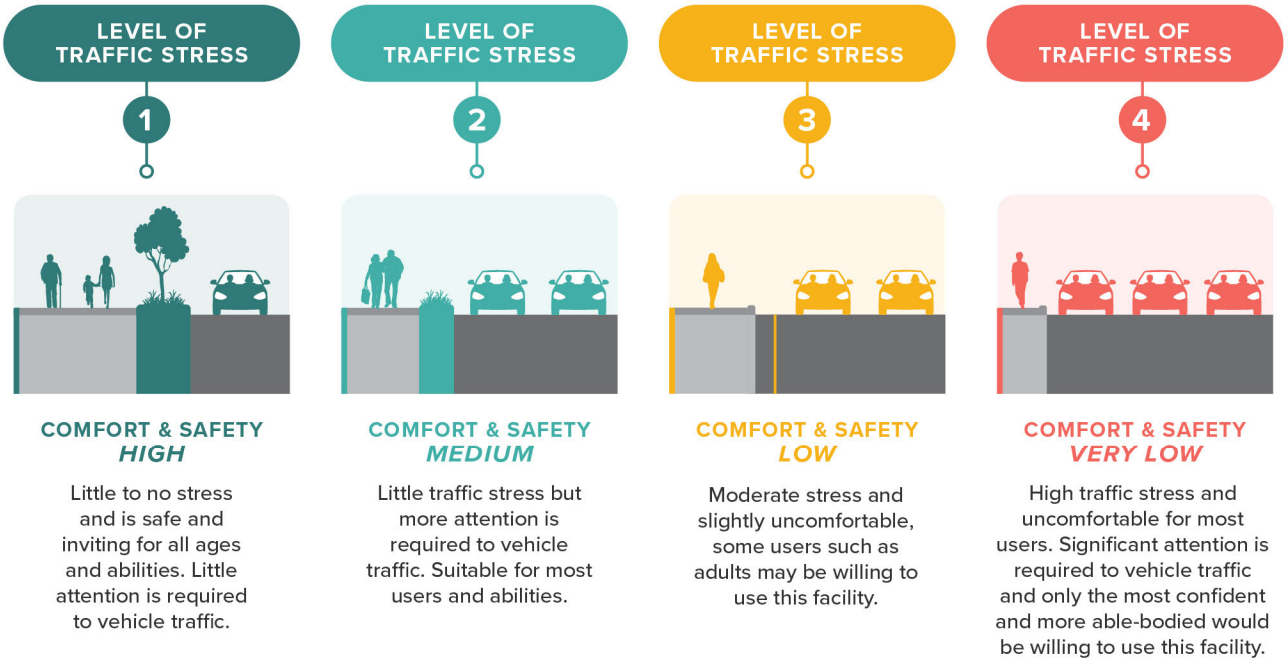


Figure 10. Walking Level of Traffic Stress

Table 4. Walking Level of Traffic Stress Criteria

Segment	Street Width[12] (Number of Lanes)	Buffer Types	Sidewalk Width	Sidewalk Condition	Speed Limit[13]	LTS Score
Segment 1 Main Avenue to Bell Avenue	1: Main Avenue to Grace Avenue 2: Grace Avenue to Bell Avenue	Landscaping Buffer: SB Norwood JHS to Berthoud Street	5 ft: SB Main Avenue to Bell Avenue 5 ft: NB Bell Avenue to Grace Avenue 0 ft: NB Main Avenue to Gace Avenue	Good: SB Main Avenue to Grace Avenue No Sidewalk: Main Avenue to Grace Avenue	35	2: SB Norwood JHS to Grace Avenue 3: SB Grace Avenue to Bell Avenue 4: NB Main Avenue to Bell Avenue
Segment 2 Bell Avenue to I-80 EB On/Off Ramps	3	None	5 ft	Fair	35	4
Segment 3 I-80 EB On/Off Ramps to Carroll Avenue	3	None	5 ft	Fair	35	3: Grand Avenue to Carroll Avenue
Segment 4 Carroll Avenue to Arcade Creek	2: SB Carroll Avenue to Fairbanks Avenue 1: Fairbanks Avenue to Arcade Creek	Landscaping Buffer: NB Fairbanks to South Gateway Park	5 ft	Good	35	2: SB Fairbanks Avenue to South Gateway Park 3: NB Arcade Creek to Gateway Park, Fairbanks Avenue to Carroll Avenue, SB Carroll Avenue to Arcade Creek

[12] Lanes per direction and includes two-way left turn lane.

[13] Posted speed limit or prevailing speed.

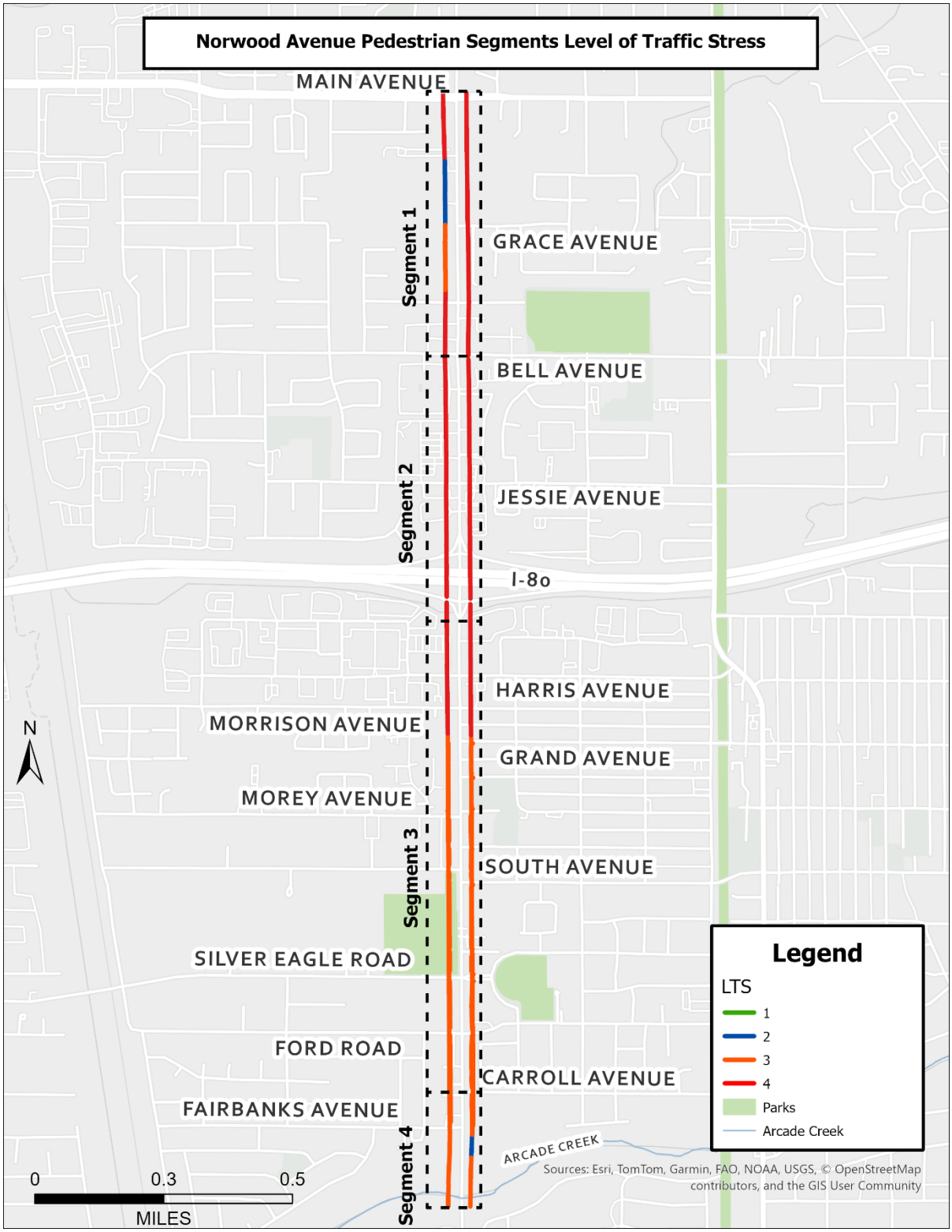


Figure 11. Norwood Avenue Walking LTS

Parking Inventory and Utilization Summary

Parking Context

On-street parking along the study corridor is only permitted on the west side of Norwood Avenue along the SB travel lane between Main Avenue and the southern driveway of Norwood Junior High School (Segment 1) and along the NB and SB travel lanes from Bell Avenue to Jessie Avenue (Segment 2). The areas where on-street parking is permitted are not striped with individual parking spaces. Bell and Jessie Avenues are characterized by multi-family housing and commercial businesses with several driveways into parking lots, creating conflicts with through traffic. From Bell Avenue to Jessie Avenue, "No parking" signs exist within approximately 10 feet of an apartment driveway. Additionally, along the SB lane from Bell Avenue to the first driveway entrance at The Charleston, no parking is permitted at any time.

Given the high frequency and severity of crashes occurring between Bell Avenue and Jessie Avenue, parking data was collected on Tuesday, November 17 at 1:00pm and 8:00pm, to determine midday and evening (overnight) on-street parking capacity and utilization. Due to the area being primarily residential, a low turnover rate of on-street parking spaces was observed.

Parking Capacity

Along the corridor there are several areas where on-street parking is permitted, varying in spots available from two to thirteen spaces for a total of 49 parking spaces. The majority of on-street parking exists on the east side of Norwood Avenue along the NB travel lanes. The parking zones and their associated occupancy are shown in **Figure 12**.

Figure 12. Norwood Avenue Total on-street Parking Spaces

Parking Utilization & Findings

While there are 49 on-street parking spaces provided along Segment 2, not all spaces are filled at any given time. On-street parking utilization is a metric to determine the percentage of occupied spaces at different times of the day over the total number of spaces along the roadway. The midday and evening parking utilization between Bell Avenue and Jessie

Avenue is summarized in **Table 5**. During midday, on-street parking along the NB (east) side of Norwood Avenue approaches capacity at 88% utilized, whereas parking along the SB side is only at 20% of capacity. Evening parking operations along NB Norwood Avenue exceed parking capacity at 108% while the SB parking utilization increases slightly to 24%. During the midday and evening hours, it was observed that NB parking consistently had vehicles that were illegally parked despite No-Parking signage and red curb markings. This can be attributed to the lack of marked crossings, lighting, and high speeds on Norwood Avenue that may influence drivers to illegally park along the NB lanes rather than seek SB side parking and cross on foot.

Table 5. Midday and Evening Parking Utilization

	Northbound	Southbound
Number of Spaces	24	25
Midday Utilization	21	5
Utilization/Spaces	88%	20%
Evening Utilization	26	6
Evening Utilization/Spaces	108%	24%

During the parking observation, it was noted that on-street parking is permitted on Bell Avenue from Norwood Avenue to Rio Linda Boulevard, adjacent to Robla Community Park and Morningside Creek apartments.

Crash Analysis Summary

Crash data was collected for the five-year period (2018-2022) from the Transportation Injury Mapping System (TIMS) maintained by UC Berkeley to conduct an analysis of the corridor. TIMS data only includes injury crashes, so this analysis does not include property damage only crashes. The data consisted of injury crashes on Norwood Avenue from Main Avenue to Arcade Creek. *Appendix B includes the detailed crash data.*

The study corridor experienced a total of 137 injury crashes. Of these, 16 crashes resulted in someone being killed or severely injured (KSI). Of the total injury crashes, 29 crashes involved someone walking or biking.

Table 6 summarizes crashes by year and severity, and **Figure 13** shows the location of crashes on the corridor during the analysis period. The map also shows nearby schools and community centers.

Table 6: Crashes by Severity

Crash Severity	2018	2019	2020	2021	2022	Total
Fatal Injury	1	0	0	1	1	3
Serious Injury	2	3	1	5	2	13
Minor Injury	5	6	5	12	9	37
Possible Injury	12	16	19	14	23	84
Total	20	25	25	32	35	137

Figure 13: Crash Map by Severity

Table 7 summarizes crashes by study segment. 86% of injury crashes and 88% of KSIs occur in Segment 2 and Segment 3, with similar results for bicycle- and pedestrian-involved crashes. As Segment 3 is almost twice the length of Segment 2, the highest density of crashes occur in Segment 2, which is also characterized by high density residential and commercial use, on-street parking, and high-volume uncontrolled access points.

Table 7: Crashes by Segment

Crash Segment	Injury Crashes	KSI Crashes	Bicycle-Involved Crashes	Pedestrian-Involved Crashes
Segment 1	9	1	1	0
Segment 2	60	7	7	9
Segment 3	58	7	8	3
Segment 4	10	1	0	1
Total	137	16	16	13

Citywide, the highest frequency of crashes occurs during weekday afternoons, consistent with the evening commute period[14]. The Howe Avenue study corridor, in comparison, shows the highest frequency of crashes occurring Tuesday late afternoon (3pm-6pm) and the time period with the highest average frequency of crashes across all days to be the early afternoon period (12pm-3pm) as shown in **Table 8**.

Table 8: Study Corridor Crashes by Day of Week and Time of Day

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
00:00-02:59	0	0	0	0	0	1	0
03:00-05:59	0	0	0	1	1	0	1
06:00-08:59	3	3	1	1	2	1	0
09:00-11:59	4	0	4	0	1	2	4
12:00-14:59	**3**	**5**	**7**	**6**	**9**	**3**	**2**
15:00-17:59	4	**14**	2	2	4	3	4
18:00-20:59	5	4	2	1	3	3	5
21:00-23:59	1	2	0	2	2	2	7

[14] Vision Zero Sacramento Action Plan, 2018; Transportation Injury Mapping System, https://safetrec.berkeley.edu/tools/transportation-injury-mapping-system-tims, 2025

Crash Type Summary

Figure 14 shows crashes by type during the five-year data period. Of the 137 crashes, 65 of them were broadside crashes, with the next highest type being rear-end crashes (27 crashes). Both crash types occur primarily at intersections along the corridor, with 108 (79%) of the injury crashes occurring at intersections.

KSI (fatal and serious injury) crashes are also represented in **Figure 14**, showing that the highest crash type resulting in a fatality or serious injury is vehicle/pedestrian crashes, with 6 KSI crashes. Because people walking are more vulnerable without the protection of a vehicle, crashes involving people who walk are more likely to lead to more severe outcomes.

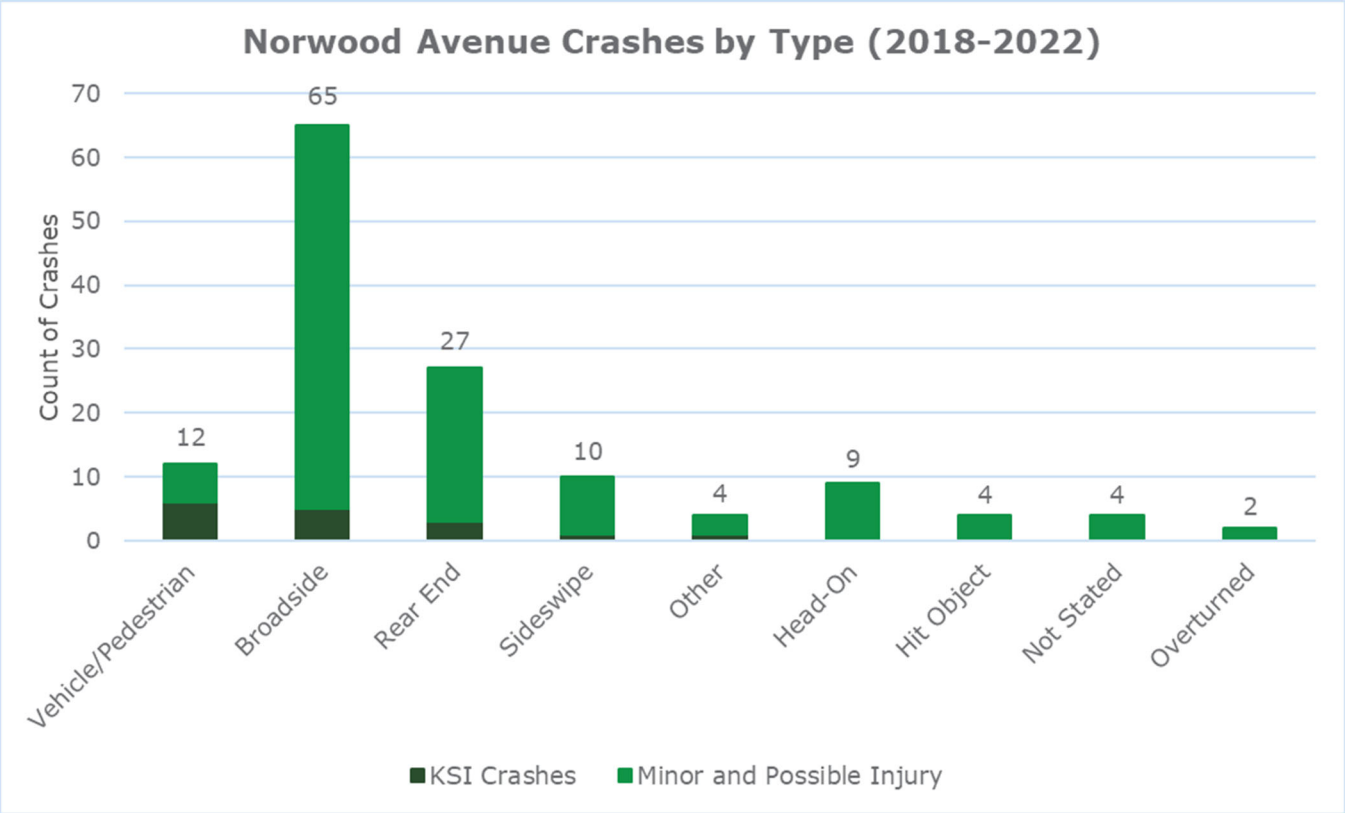


Figure 14: Crashes by Type

Primary Crash Factor Summary

Figure 15 shows the crashes by primary crash factor (PCF) as recorded by the reporting officer. Of the 137 crashes, the top three PCFs are: automobile right of way (36 crashes), unsafe speed (28 crashes), and traffic signals and signs (26 crashes). Automobile right of way generally indicates that a driver enters an intersection when they are not allowed to, such as when the signal is red. Traffic signals and signs may include disobeying traffic signals or road signs, such as red light running or not stopping at a stop sign, but could also include infrastructure, such as confusing or missing signage. Together, these three causes account for 66% of all crashes occurring along the corridor during the study period.

For KSI crashes, pedestrian violations, which are generally defined as events when a pedestrian crosses at an unstriped crossing or against a signal, were the primary crash factor for five of the 16 crashes during the analysis/study period, with the second highest PCF being DUI (driving or cycling under the influence) crashes (4 during the study period).

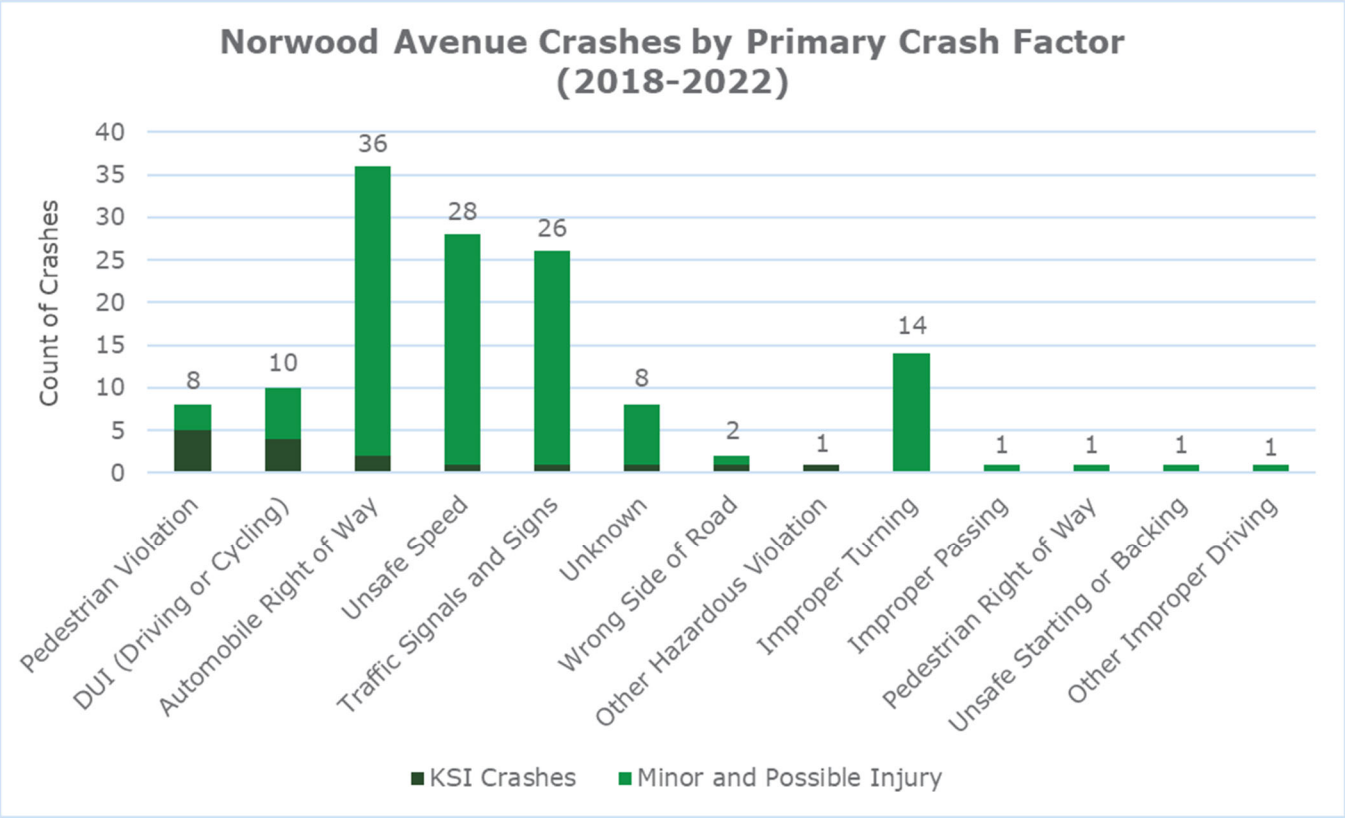


Figure 15: Crashes by Primary Crash Factor

Pedestrian and Bicycle Crashes

The study corridor is located within Environmental Justice (EJ) communities with low income and minority groups where many residents rely on modes of transportation other than private vehicles. Additionally, there are multiple schools, parks, and community centers along the corridor that serve younger and older residents who are reliant on walking, biking, and transit to access key destinations. While the study corridor lacks consistent sidewalks and bicycle lanes, many people were still observed walking and biking along the corridor.

Initial analysis showed that there was a high frequency of crashes involving people walking and biking, many of which resulted in fatalities or severe injuries. Due to these elements, further safety analysis regarding those people walking and biking was determined to be needed. **Table 9** summarizes crashes involving people walking or biking for all severities. During the analysis study period, there were 29 crashes involving someone walking or biking, with 10 crashes resulting in KSI.

Table 9: Pedestrian and Bicycle Crashes

Crash Category	Pedestrian Crashes	Bicycle Crashes
Fatal Injury	2	0
Serious Injury	4	4
Minor Injury	3	4
Possible Injury	4	8
Total	13	16

Of the 13 pedestrian-involved crashes, 6 were KSI crashes, and of the 16 bicycle crashes, 4 were KSI crashes. Of all crashes involving people walking or biking, 16 occurred in Segment 2 between Bell Avenue and I-80 as shown in **Figure 16** and **Figure 17**. In Segment 2, there are apartments on the east side of the road, commercial uses on the west, and on-street parking is allowed, which can reduce visibility for drivers along this segment.

The primary crash factor resulting in the highest number of KSI crashes during the period was pedestrian violations. Of crashes involving people walking, 38% involved someone crossing outside of a marked crosswalk and 31% from walking in the road which includes the roadway shoulder. There is high walking activity on this segment of Norwood, and during the site walk people were observed crossing outside of a marked crosswalk.

Of the 16 bicycle crashes, there were no fatal crashes but four serious injuries. Roughly 44% of crashes involving someone biking were reported as broadside crashes, characterized by a vehicle hitting the side of a person biking. Additionally, 19% of the crashes involving someone biking were reported as sideswipes, where a vehicle collides with the side of someone biking in the same direction as the car. Notably 63% of bicycle crashes were a result of improper turning or automobile right of way as the primary collision factor.

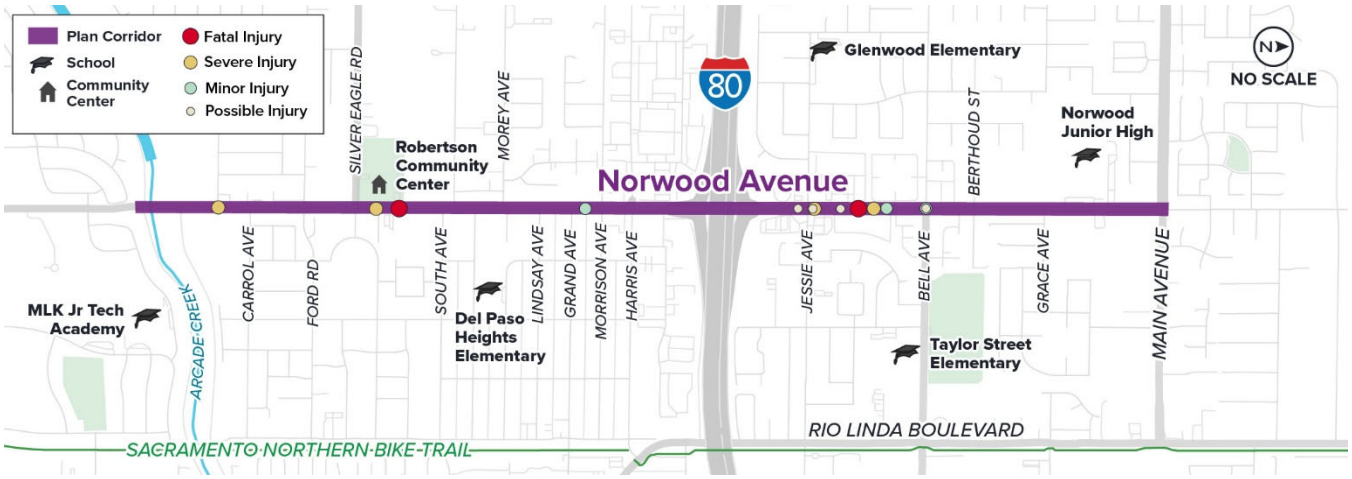


Figure 16: Pedestrian Crash Map

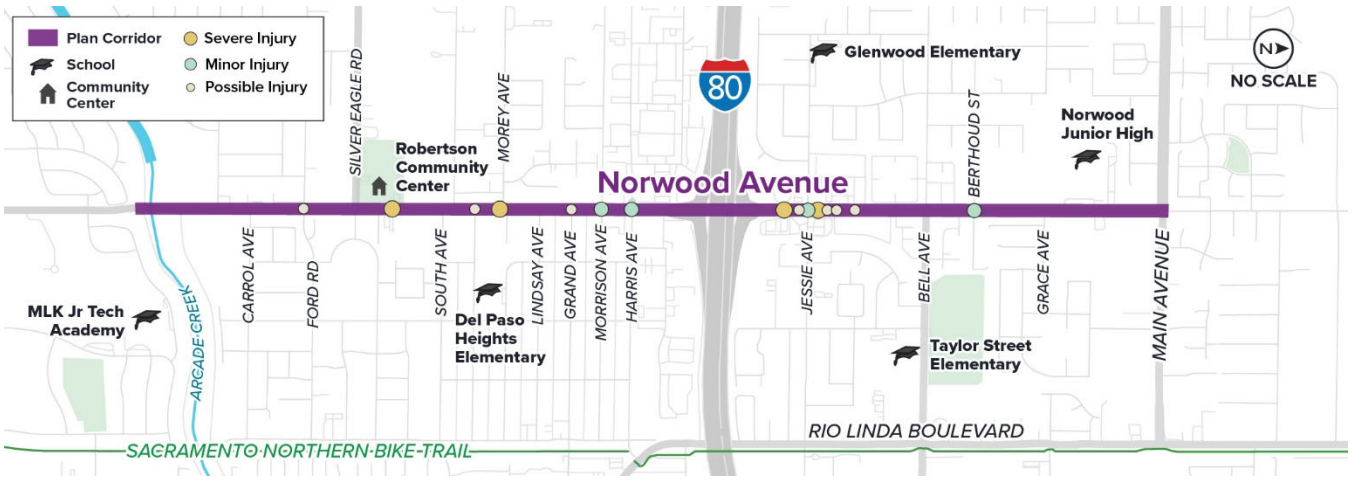


Figure 17: Bicycle Crash Map

Crash Trends by Location

The most frequently occurring primary collision factors and crash types reported for crashes along the study corridor, along with the associated locations, are provided in **Figure 18**.

Broadside crashes were the most common and occurred at most intersections along the corridor. Rear end crashes, unsafe speeds, and signal violations were mostly concentrated between the I-80 interchange and Harris Avenue where congestion during commute periods can occur. Signal violations were also cited at Grand Avenue and Silver Eagle Road. Unsafe speeds were also cited between Silver Eagle Road and Fairbanks Avenue on the southern portion of the corridor.

The highest concentration of crashes along the study corridor was between Belle Avenue and Jessie Avenue in Segment 2 and involves a unique crash profile with the majority of

head-on, sideswipe, and improper turning crashes occurring along this portion of the road. Most of the crashes involving conflicts between cars and people walking or biking occurred on this stretch with people biking being broadsided or sideswept, and people crossing midblock.

The intersection of Norwood Avenue at Grand Avenue was the location of multiple DUIs, hit object crashes, and sideswipes involving someone biking.

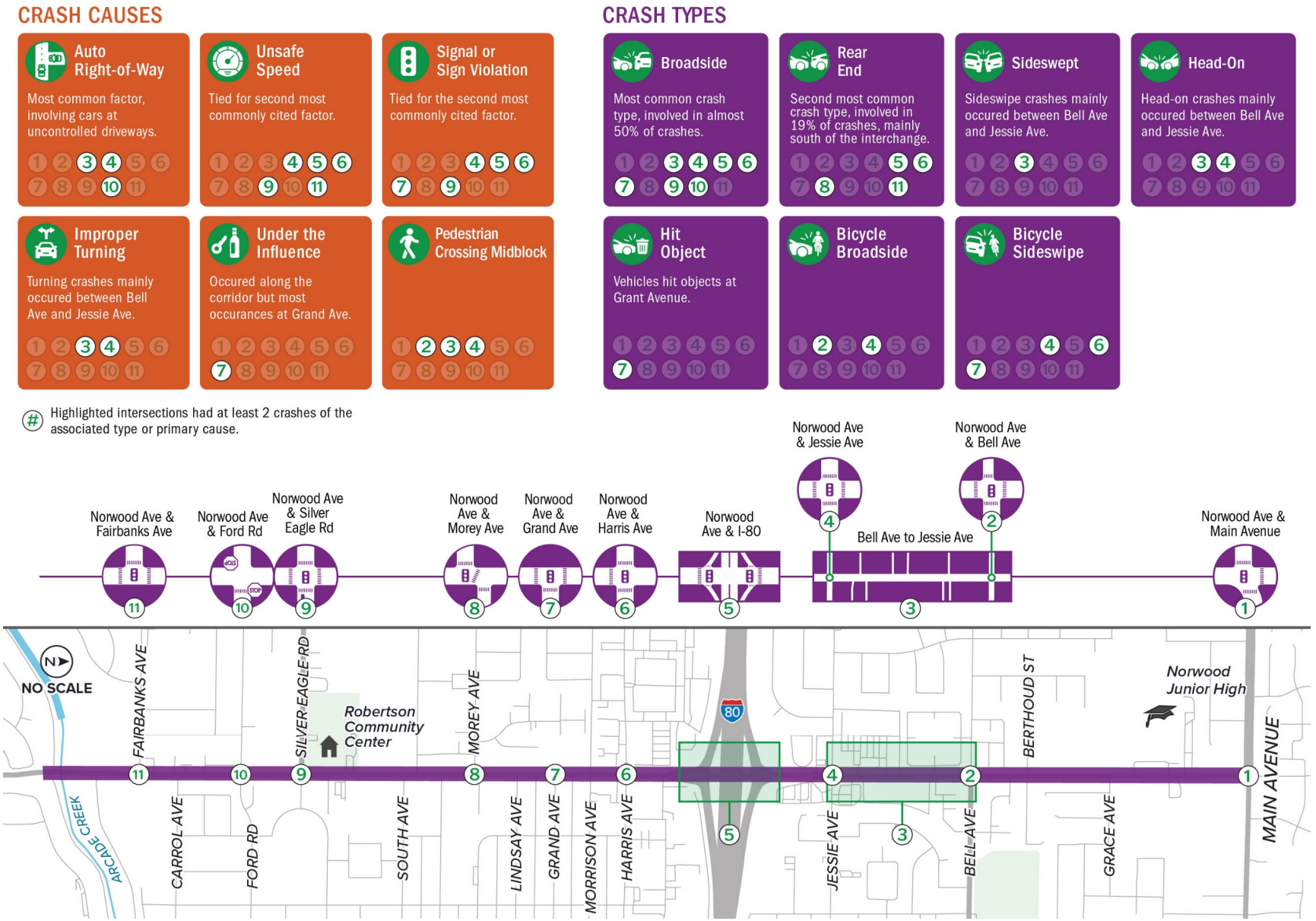


Figure 18: Crash Trends by Location

Existing Conditions Traffic Analysis

Traffic Operations Standards and Methodology

The following section describes the methodology used to analyze and evaluate the traffic conditions at the study intersections and the potential operational effects at the study intersections. The analysis methodologies and level of service standards used to determine effect at study intersections are described.

Signalized Intersections

The study intersections were analyzed using the Synchro 12 software package. A model for existing conditions was developed in Synchro using the existing roadway geometry, signal timing plans, and intersection turn movement volumes for the peak hour within the weekday AM and weekday PM periods. Key performance metrics include average vehicle delay, intersection LOS[15], and 95th percentile queue.

The delay and LOS analysis is based on the latest version of the Transportation Research Board Highway Capacity Manual (HCM) methodology. This methodology assigns an LOS grade to intersection operations based on the average vehicle control delay, ranging from LOS A (free flow) to LOS F (most congested conditions). **Table 10** documents the LOS criteria for signalized intersections. The latest version of the Synchro analysis software was used to report the 95th percentile queue lengths for approach lanes to study intersections.

[15] A Level of Service (LOS) analysis refers to the quantifiable assessment of traffic under various scenarios.

Table 10: Level of Service Criteria Definitions

Level of Service	Description	Signalized Intersection (Delay in Seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤10.0
B	Operations with very low delay occurring with good progression and/or short cycle lengths.	>10.0 to 20.0
C	Operations with very average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	>20.0 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	>35.0 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and V/C ratios. Individual cycle failures are frequent occurrences.	>55.0 to 80.0
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	>80.0

Source: Highway Capacity Manual, 6th Edition

Intersection Operations Analysis

A model for existing conditions was developed in Synchro using the existing roadway geometry, signal timing plans, and intersection turn movement volumes for the weekday AM and weekday PM hours. Intersection geometry was derived from aerial photographs (Google Maps). The latest signal timing information was acquired from the City of Sacramento. *Appendix C contains the Signal Timing Worksheets. Appendix D contains the Existing Conditions Synchro Reports (Lanes/Volumes/Timings, Queues, and delay/LOS)* from Synchro.

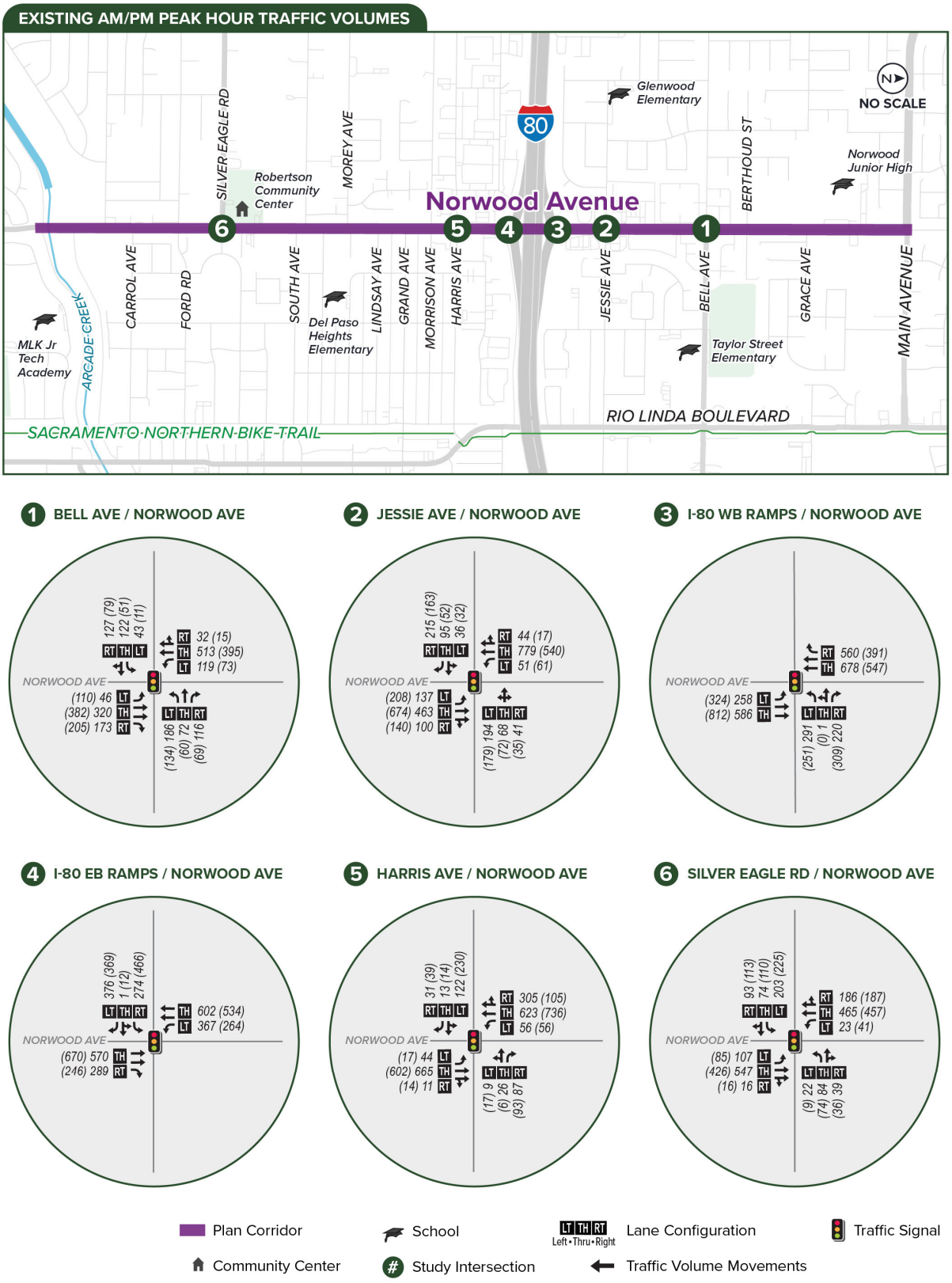
Existing Vehicular Level of Service

Table 11 summarizes the existing peak hour intersection operating conditions. Results indicate that all study intersections operate at LOS C or better during both a.m. and p.m. peak hours. Figure 19 illustrates the AM and PM peak hour turning movement counts at the study intersections.

Table 11: Existing Conditions Operational Analysis Results

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (Seconds)	LOS	Delay (Seconds)	LOS
1. Norwood Avenue / Bell Avenue	20.6	C	17.6	B
2. Norwood Avenue / Jessie Avenue	28.2	C	23.8	C
3. Norwood Avenue / WB 80 ramps	10.9	B	10.3	B
4. Norwood Avenue / EB 80 ramps	12.0	B	12.0	B
5. Norwood Avenue / Harris Avenue	19.7	B	19.2	B
6. Norwood Avenue / Silver Eagle Road	18.6	B	18.2	B

Source: DKS Associates, December 2024.



AM (PM) Peak Hour Volumes, Level of Service, and Delay

Figure 19. Existing Traffic Volumes and Operation Results at Study Intersections

95th Percentile Queueing

The 95th percentile queueing reported by Synchro refers to the queue length (in vehicles) that has only a five percent probability of being exceeded during the analysis time period (the average driver would likely experience shorter queue lengths than what is being reported).

Queue lengths are analyzed to determine if there are any potential safety impacts present, either from blocking side street or driveway access (a moderate safety concern) or extend to the point of creating queue spill-back conditions in the nearest upstream intersection (larger safety concern). Queue overflows are described as the number of additional vehicles that may extend past the available storage, assuming 25 feet per vehicle, rounding up. As shown in **Table 12**, queue overflow can occur at five intersections listed below:

- Norwood Avenue/Bell Avenue
- Norwood Avenue/Jessie Avenue
- Norwood Avenue/ Westbound I-80 Ramps
- Norwood Avenue/ Eastbound I-80 Ramps
- Norwood Avenue/Silver Eagle Road

Table 12. 95th Percentile Queueing Results at Study Intersections

Intersection	Turning Movement	Available Storage Length (Feet)	Existing Conditions	
			95th Percentile Queue (Feet)[1]	
			AM Peak Hour	PM Peak Hour
1. Norwood Avenue / Bell Avenue	NBL	75	66	**112**
	SBL	95	**132**	84
	EBL	150	51	20
	WBL	195	183	131
2. Norwood Avenue / Jessie Avenue	NBL	100	**192**	**242**
	SBL	120	90	96
3. Norwood Avenue / WB 80 Ramps	WBL	435	137	111
	NBL	175	**222**	**259**
4. Norwood Avenue / EB 80 Ramps	EBL	360	118	203
	SBL	180	**295**	**220**
5. Norwood Avenue / Harris Avenue	NBL	85	60	30
	SBL	110	71	71
6. Norwood Avenue / Silver Eagle Road	EBL	110	**208**	**219**
	WBL	210	41	22
	NBL	95	**128**	**105**
	SBL	55	43	**63**

BOLD *represents 95th percentile queueing above the available storage length.*
Source: DKS Associates, December 2024.

Travel Time Reliability and Congestion

Two metrics for measuring traffic operations on a corridor level are congestion and travel time reliability. Congestion can be thought of as typical peak period travel times being significantly slower than the free flowing or desired travel time for the corridor. Travel time reliability is the measure of the variability in travel times and is used to calculate the predictability of how long a specific trip will take at the same time day after day. Typical factors which cause a corridor to have unreliable travel times are:

- Normal travel fluctuations
- Physical bottlenecks
- Special events
- Traffic incidents
- Inclement weather
- Traffic control devices
- Work/construction zones

Congestion is measured by travel time index which is calculated as the corridor travel time at a certain time of day divided by the free flow travel time. Travel time reliability is measured using the buffer time index which is the difference between the average travel time and the 95th percentile travel time normalized to the free flow travel time. Another way to think of the buffer time index is how much additional time does a person need to dedicate to their trip to ensure they arrive to their destination in a timely manner. The relationship between the travel time index, 95th percentile travel time index (also called the planning time index), and the buffer time index is shown in **Figure 20**.

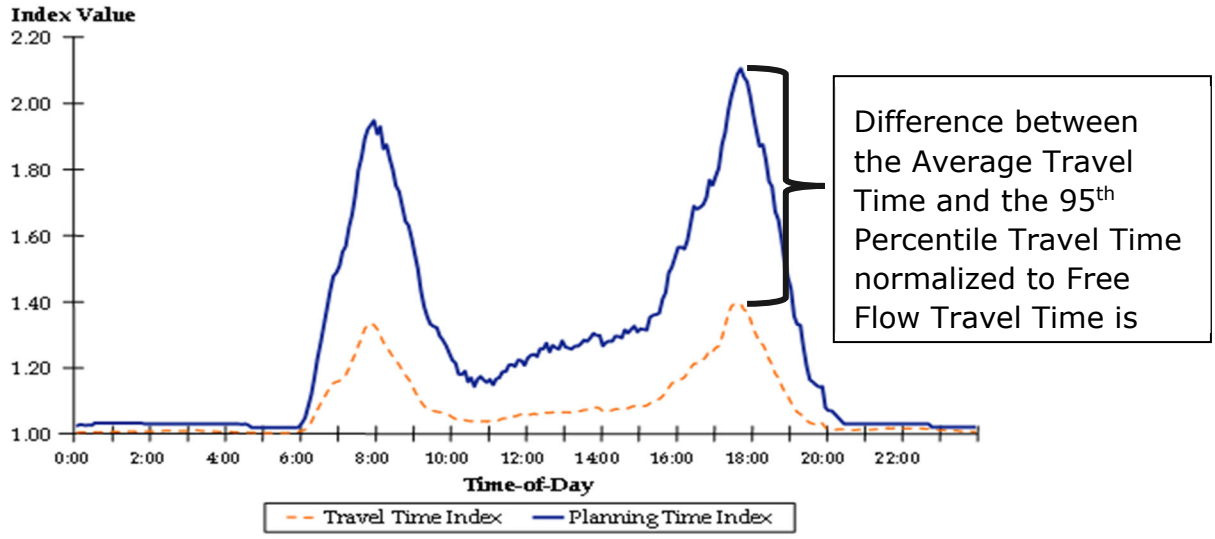


Figure 20: Relationship Between Average Travel Time and 95th Percentile Travel Time which Results in the Buffer Time Index[16]

Policies from the City of Sacramento General Plan indicate that corridor congestion is acceptable. The goal of improvements should be to improve travel for all users and to create a reliable travel experience, even if those improvements result in some increase in travel delays during peak hours. Reliable travel times allow people to consistently plan their driving and transit trips even if those trips are slower than their ideal travel time.

To calculate travel time reliability and congestion for Norwood Avenue, average speed data was obtained from the National Performance Management Research Data Set (NPMRDS) from the Federal Highway Administration (FHWA). Congestion is defined for this data set as peak hour speeds that are 60% or less of free-flow speeds.

To reflect annual average weekday conditions, the data was filtered to isolate average conditions: Tues-Thurs AM/PM peak periods for passenger vehicles and heavy-duty trucks separately and together. The AM and PM peak periods were identified by the highest congestion continuous 60-minute span for both passenger vehicles and trucks. The free flow speed (FFS) of the corridor was determined through analyzing the fastest vehicle speeds recorded which typically occur during the hours of 12:00-3:00am. Additionally, the Highway Capacity Manual 7th Edition defines congestion and reliability through thresholds shown in **Table 13**.

[16] Source: *Traffic Congestion and Reliability: Linking Solutions to Problems,* FHWA, 2004

Table 13. Congestion and Reliability Performance Measures

	Reliable	Moderately Reliable	Unreliable
Buffer Time Index	**BTI < 1.25**	**BTI 1.25-< 1.5**	**BTI >= 1.5**
Uncongested *>= 60% Of Free Flow*	Predictable and efficient	Not always predictable, usually efficient	Unpredictable, not often congested
Congested *<60% Of Free Flow*	Predictable and inefficient	Not always predictable, usually inefficient	Unpredictable, not often congestion

Source: Highway Capacity Manual, 7th Edition.

Travel time reliability and congestion was analyzed for passenger vehicles, trucks, and passenger vehicles and trucks combined during the AM peak hour (8:00-9:00am) and PM peak hour (3:00-4:00pm). The results, as shown in **Figure 21** to **Figure 26**, provide a summary of how reliable speeds and congestion are experienced by users during the AM and PM peak hour periods. The majority of the corridor experiences congested conditions during peak hours, but not consistently, with the exception of a small portion of Segment 2 near the I-80 interchange, which is reliably congested during the weekday PM peak hour.

While the figures show areas of free flow and congestion along the study corridor, the majority of the data along Segment 1, Segment 2, and Segment 3 shows that there is a high amount of variability in travel times along the corridor. The exception to this is a short southbound segment around the I-80 overpass which is reliably congested during the PM peak hour. Segment 4 shows generally reliable free flow travel in the northbound direction and unreliable free flow travel in the southbound direction during the AM and PM peak hours. From these results, it is clear that travel times vary widely along the Norwood Avenue Corridor from day to day. Based on the patterns of congested segments and field observations, it is clear that a majority of this variability in travel time is driven by two factors. The first is concentrated periods of congestion centered around the local school bell schedules. There are five schools either on or near Norwood Avenue which generate short periods of congestion that quickly dissipate outside of the times leading up to and following the school pick up and drop off periods. The second factor is queues coming from demand going to I-80. When the freeway is congested, this congestion spills back onto the local street system at the interchange

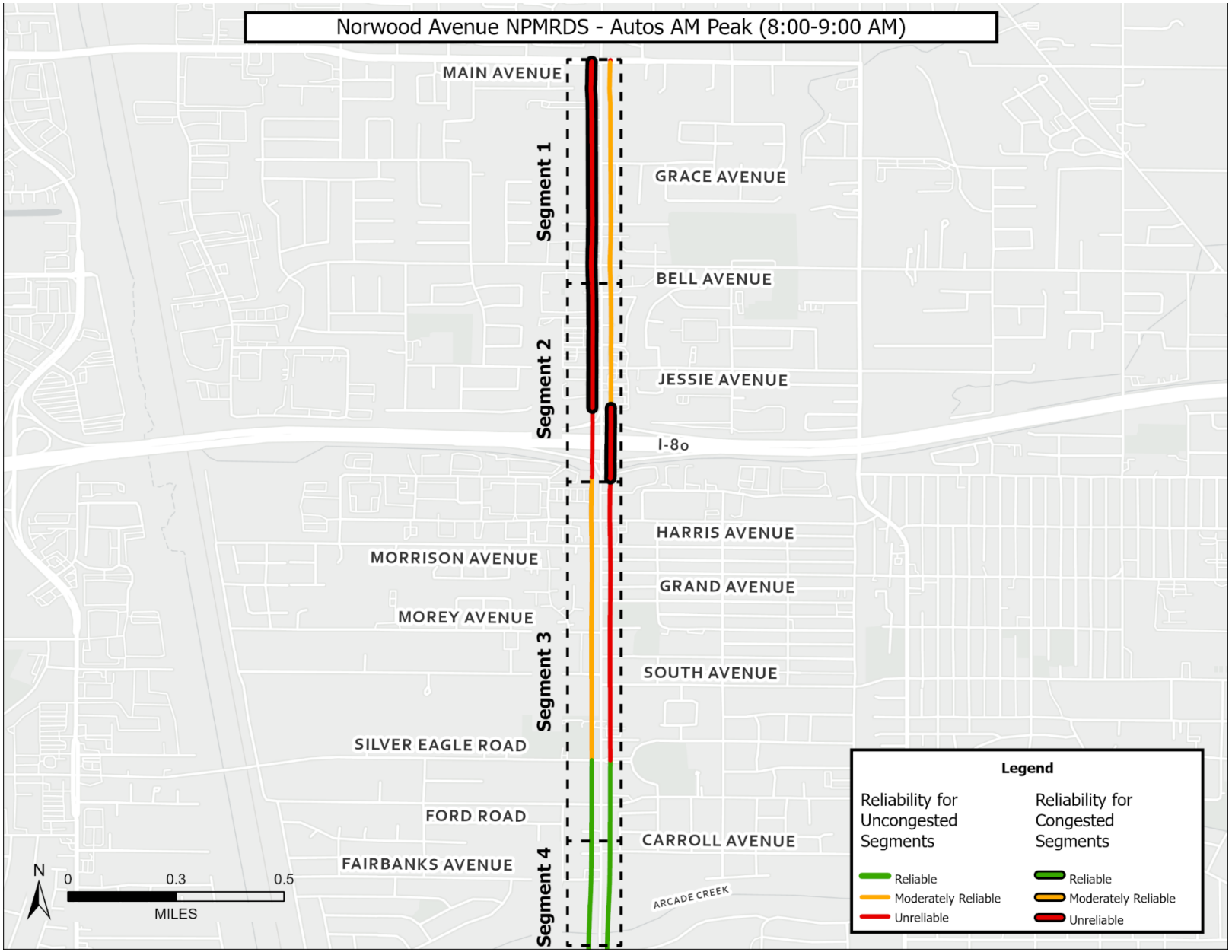


Figure 21. Autos AM Peak Hour Reliability and Congestion

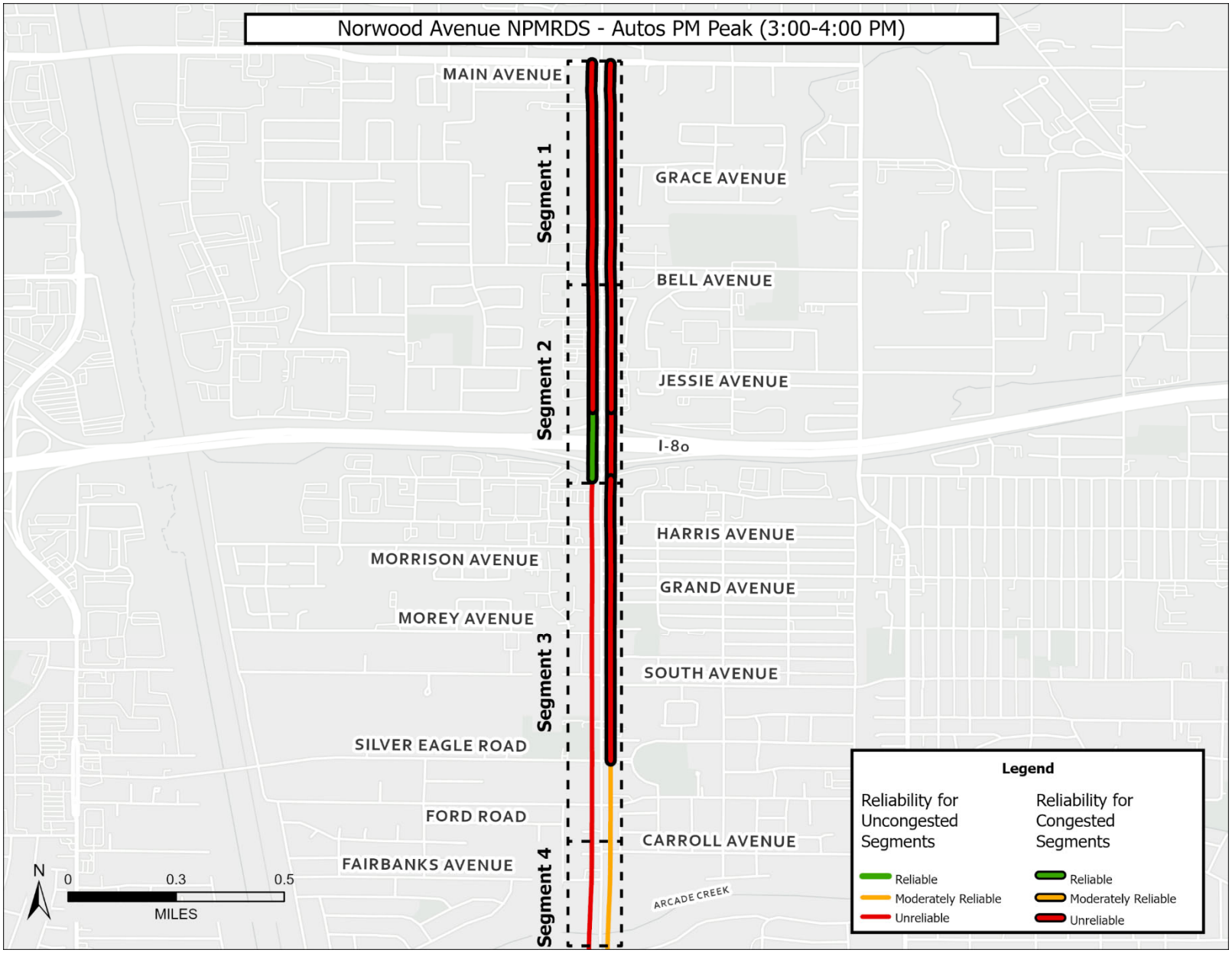


Figure 22. Autos PM Peak Hour Reliability and Congestion

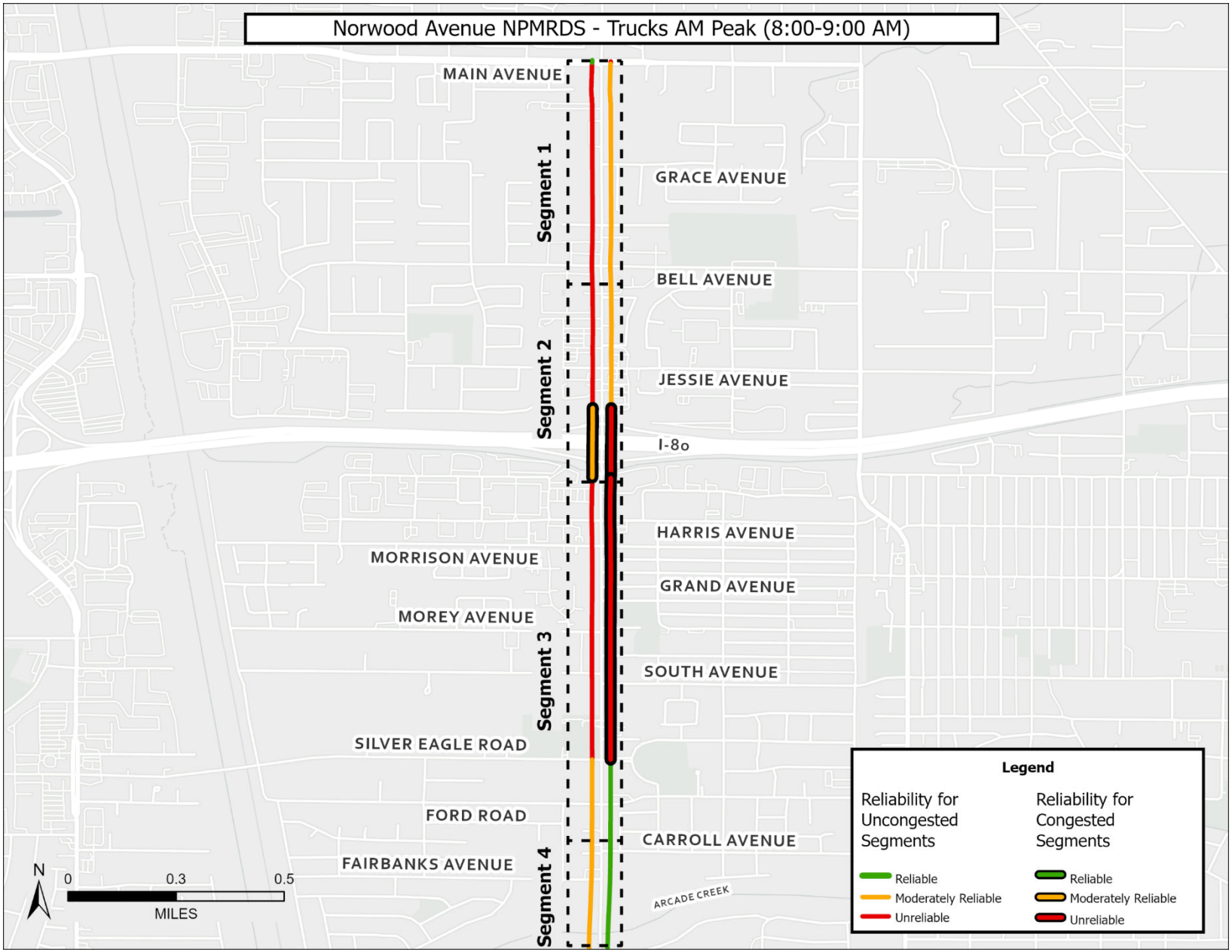


Figure 23. Trucks AM Peak Hour Reliability and Congestion

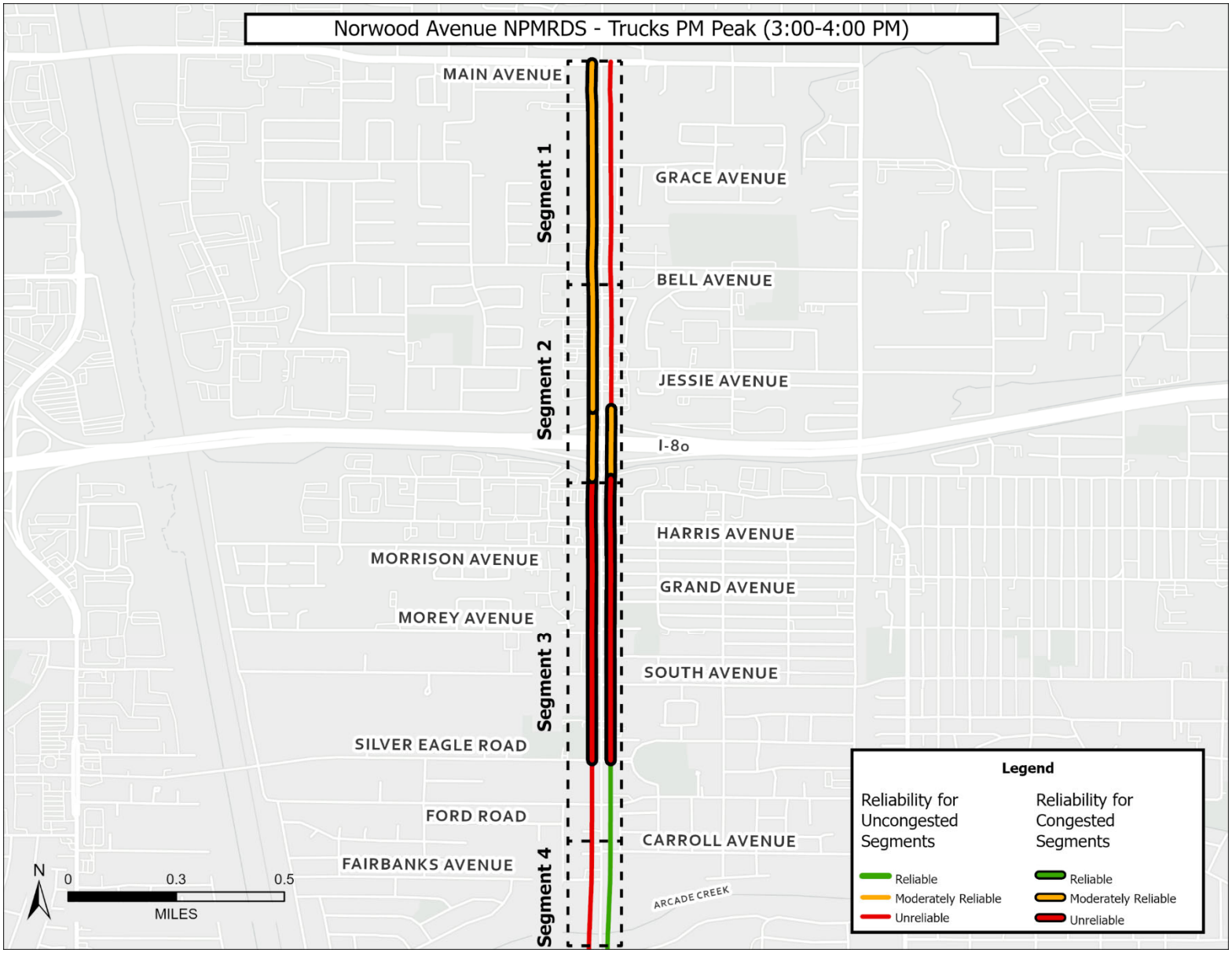


Figure 24. Trucks PM Peak Hour Reliability and Congestion

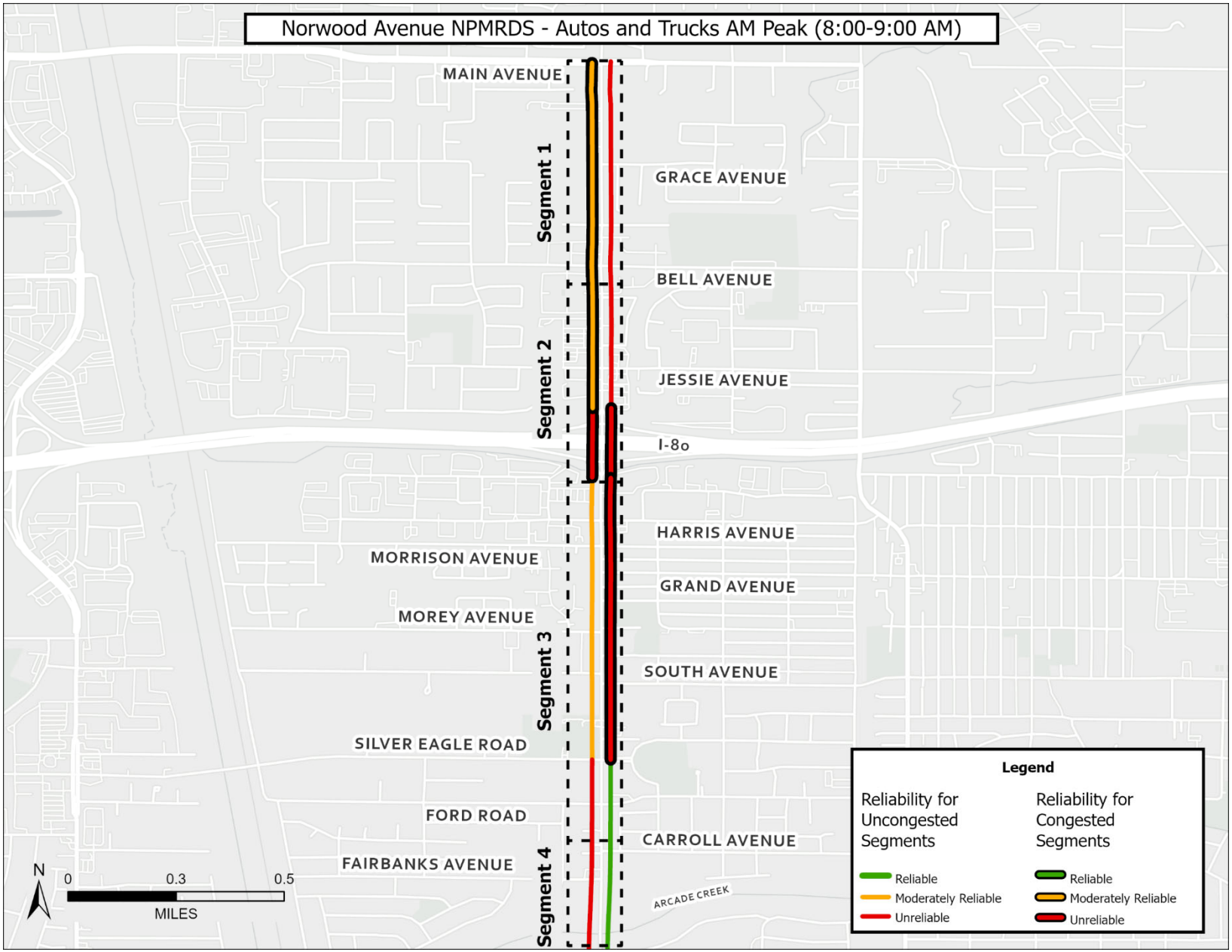


Figure 25. Autos and Trucks AM Peak Hour Reliability and Congestion

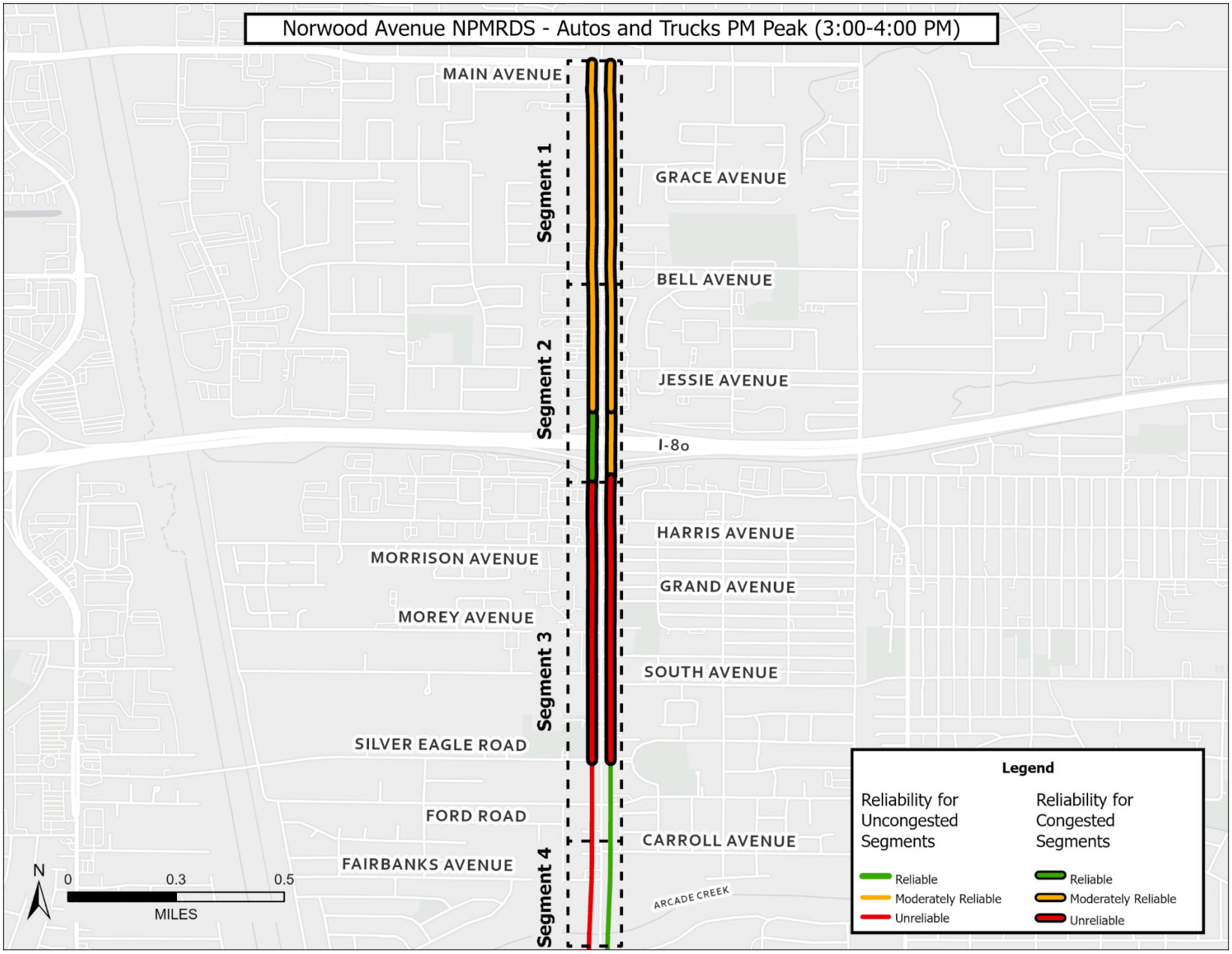


Figure 26. Autos and Trucks PM Peak Hour Reliability and Congestion

Public Engagement Summary

The following section summarizes engagement methods and feedback received during the first round of public engagement.

Public Engagement Events

In-Person Events

The project team attended the Harvest Festival on Saturday, October 26, 2024. The Harvest Festival is a family friendly event that is highly attended and includes vendors, local organizations, and public agencies to promote their services and goods while providing a space for families to "trick or treat". This event was attended by the City to promote awareness of the Norwood Mobility Project, gather public input about current issues along the corridor, and encourage community members to complete a project survey. The project team interacted with over 50 people at the Harvest Festival.

A public workshop was held on Monday, November 18, 2024, from 6:30 to 8:00 pm. The workshop provided residents, employees, business owners, school district officials, parents, and other interested parties an opportunity to learn about the study and the City's efforts to improve corridor conditions. Attendees were introduced to the project's purpose, need, and goals, provided an opportunity to complete a community survey, and/or leave comments on the social pinpoint interactive map. Four comment boards were also provided to gather public input with each board denoting a transportation mode (i.e., walking, biking, driving, or transit). Approximately 10 people from the public attended the workshop. Attendees were engaged and receptive to the project and provided feedback regarding areas of concern on Norwood Avenue and potential improvements they would support.

On December 19, 2024, City staff attended a public workshop hosted by the Neighborhood Development Action Team (NDAT). The NDAT workshop was held at Bella's Boba, east of Norwood Avenue on Eleanor Avenue. This event was attended by approximately 20

members of the community and provided attendees with project information and the opportunity to complete a community survey, provide input on a map board, or discuss corridor issues with project staff.

Virtual Meeting

On Monday, December 9, 2024, a virtual community meeting was held. This virtual meeting served the same purpose as the in-person workshop to raise project awareness, gather public comment, and concerns. The event was held via Zoom from 6:30pm to 7:30pm in an effort to ensure community members could participate in project discussion and provide input. The virtual workshop consisted of a brief presentation to introduce the project purpose, need, and overall goals. During the virtual meeting, attendees were given the opportunity to provide comments, questions, or raise concerns to project staff. Participants were also given the project website information to complete the survey and/or interactive map on their own time.

Engagement Media Methods

Project Website

Integrated into the City of Sacramento website, a project specific webpage was created for the Norwood Mobility Project[17]. As shown in **Figure 27**, information such as project background, corridor extents, project schedule, and input methods are provided. The project webpage offers two forms of public input such as a community survey and interactive Social Pinpoint map (**Figure 28**). The community survey was provided at the in-person workshop in English and Spanish, the online version allows for translation (**Figure** 29).

[17] Norwood Mobility Project

The Norwood Mobility Project

Project overview

Norwood Avenue between Main Avenue and Arcade Creek is a critical corridor serving local neighborhoods, as well as students and businesses. However, it is part of the City's High Injury Network, corridors with a high number of transportation related severe injuries and fatalities, and identified as a high priority project in the City's Transportation Priorities Plan.

The City was awarded a competitive planning grant to review data and work with the community to develop a plan to address safety and mobility on the corridor.

The goal of the plan is to identify a data driven, community supported vision for a future Norwood Avenue, inclusive of all users and reflective of the needs of the community it serves, eliminating barriers to jobs, housing, and services.

Having a Council adopted plan ensures the City is eligible for competitive grant funding for any next phases such as Preliminary Engineering Design, Environmental Clearance, Final Design and Construction.

Project schedule

Fall 2024: Existing conditions analysis

Fall-Winter 2024/2025: Community engagement phase 1, including in-person and virtual workshops and pop-ins

Fall 2024 – Spring 2025: Alternatives analysis

Winter 2025: Community engagement phase 2, including community survey, virtual open house and focus groups

Spring -Fall 2025: Draft plan development and community engagement

Winter 2025: Final Plan

The Norwood Mobility Project Schedule

Share your input

Explore The Norwood Mobility Project interactive map where you can share your comments.

There will be a variety of opportunities for you to get involved and provide your input, including community pop-ins where we will meet with the community where they are, as well as in-person and virtual workshops.

In-Person Workshop

Monday, November 18, 2024 (completed!)

Virtual Workshop

Monday, December 9, 2024

6:30-7:30pm

Registration link

Registration required

You can review our Norwood Mobility Project Phase 1 presentation here.

The Norwood Mobility Project

Figure 27. Norwood Mobility Project Web Page

We need your input!

Use the interactive map to provide comments about locations in the study area.

Follow these instructions to use the map:

- To add a comment > Select the 'Add Marker' button in the lower right corner of the map and click the specific location where you want to leave your comment. Fill out the details of the input form as required and select the 'Submit' button.

  Add Marker

- To view the map legend and/or turn map layer on/off > Select the icon in the upper left corner of the map that looks like a stack of papers. The display box will show the maps layers. Click next to the circle to the right of each layer label to toggle that layer on/off.

- To select an a different base map > Select the icon in the upper left corner of the map that looks like an unfolded map. The display box will show several base map options to choose from.

- To view additional map instructions > Select the question mark icon just above the map in the upper left corner. The display box will include more instruction information.

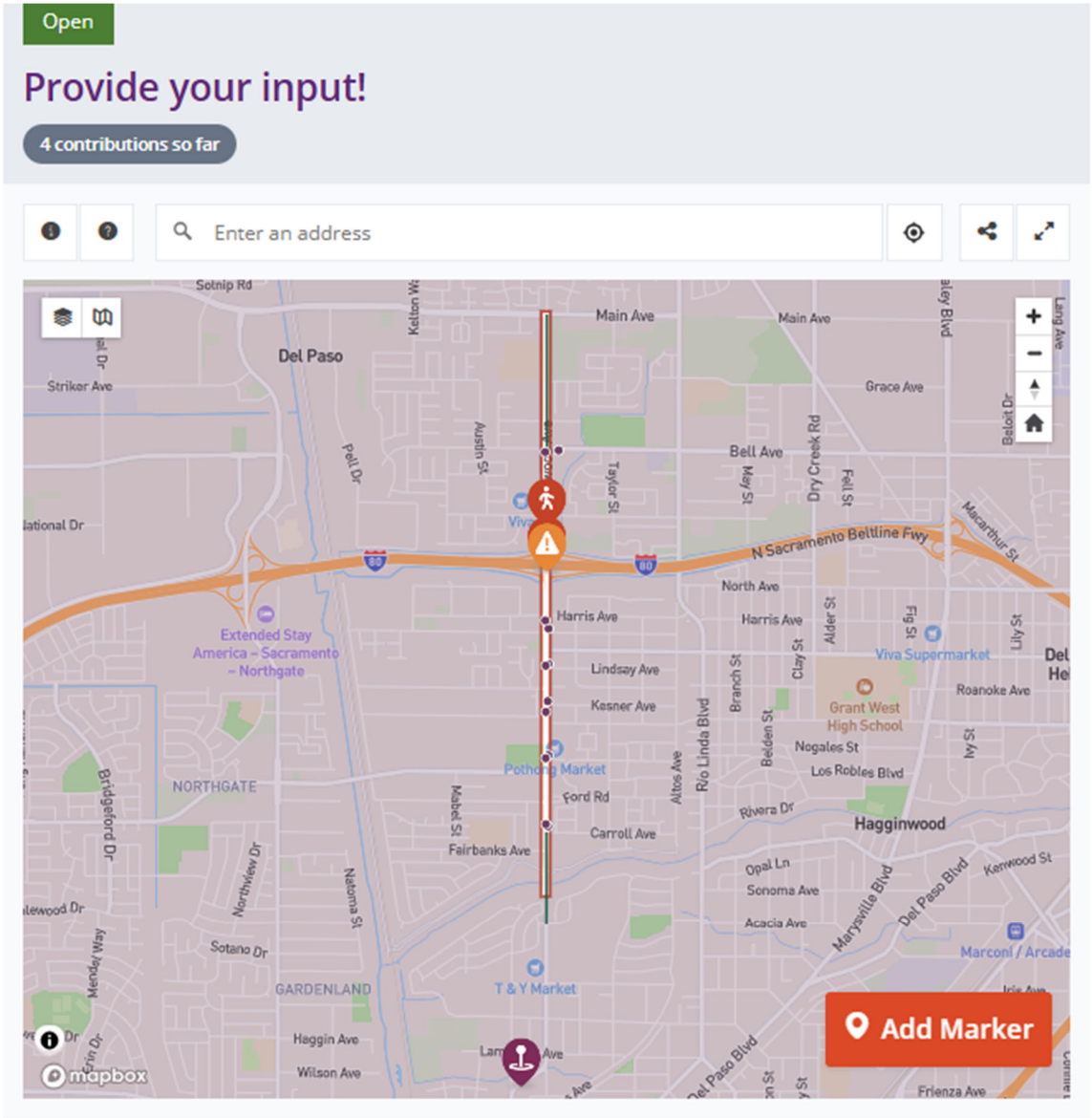
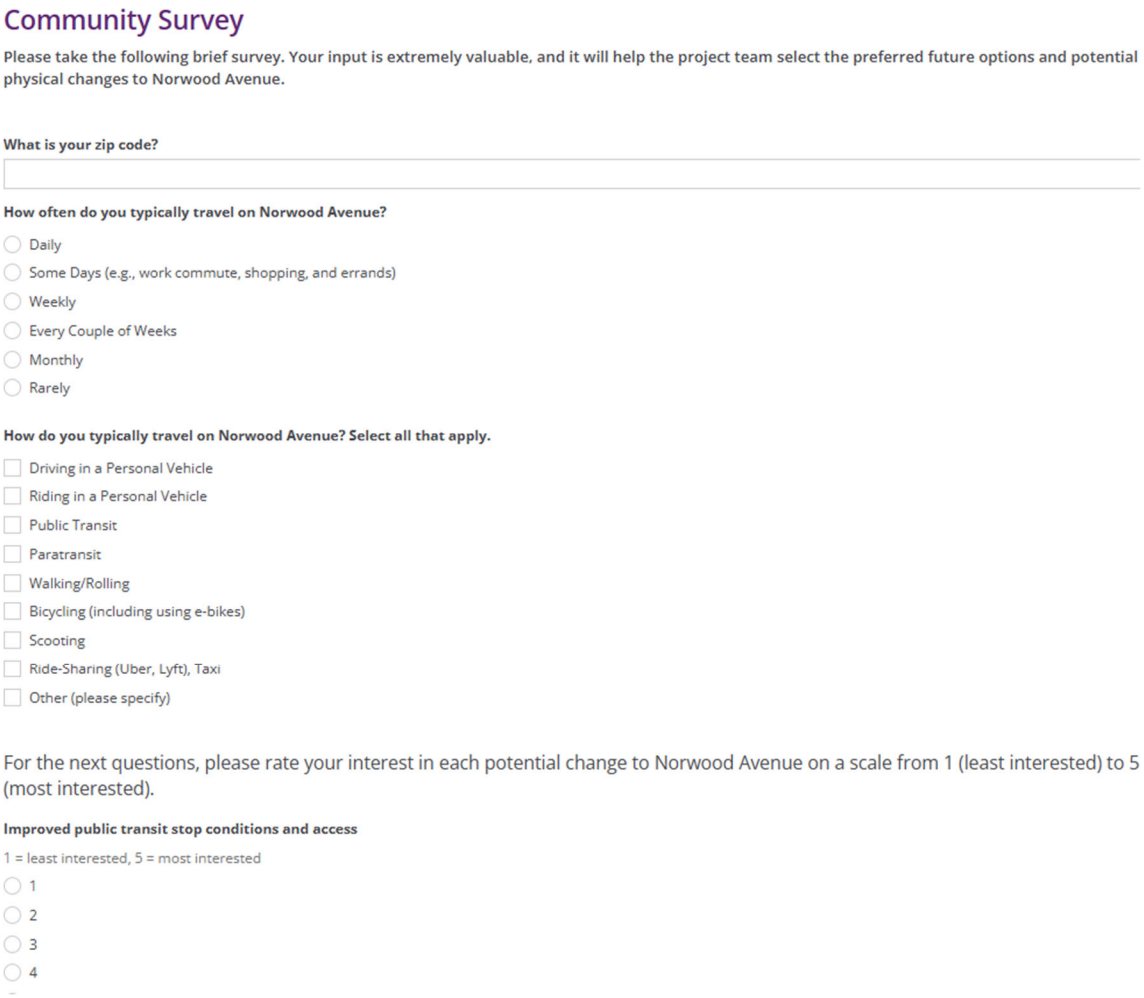


Figure 28. Norwood Avenue Interactive Comment Map



Community Survey

Please take the following brief survey. Your input is extremely valuable, and it will help the project team select the preferred future options and potential physical changes to Norwood Avenue.

What is your zip code?

How often do you typically travel on Norwood Avenue?

- Daily
- Some Days (e.g., work commute, shopping, and errands)
- Weekly
- Every Couple of Weeks
- Monthly
- Rarely

How do you typically travel on Norwood Avenue? Select all that apply.

- Driving in a Personal Vehicle
- Riding in a Personal Vehicle
- Public Transit
- Paratransit
- Walking/Rolling
- Bicycling (including using e-bikes)
- Scooting
- Ride-Sharing (Uber, Lyft), Taxi
- Other (please specify)

For the next questions, please rate your interest in each potential change to Norwood Avenue on a scale from 1 (least interested) to 5 (most interested).

Improved public transit stop conditions and access

1 = least interested, 5 = most interested

- 1
- 2
- 3
- 4

Figure 29. Norwood Avenue Community Survey

Event Flyers

To promote awareness of the public workshop and virtual meeting, a flyer was circulated on the City of Sacramento website, pop-up events, and social media outlets to promote the upcoming events. As shown in **Figure 30**, the event flyer consisted of meeting information, project background, links, and a QR code to route views to the project website, survey, and comment map.

Figure 30. Norwood Avenue Event Flyer

Public Engagement Results

Since the project webpage launch in September up to December 2024, the Norwood Mobility Project received several comments through various outlets such as the interactive map, public survey, and engagement events.

The community survey results are based on 75 respondents, 49 of the survey responses are from in-person events. Survey results indicated that around 76% of survey respondents travel on Norwood Avenue daily; about 75% typically drive in their personal vehicle, approximately 29% walk/roll, and about 16% take public transit on Norwood Avenue.

Survey respondents were mostly interested in improving crossing opportunities for those walking and bicycling on Norwood Avenue, reduced driver speed, improved driver safety, and improved walking conditions such as wider sidewalks and street trees.

Based on 54 comments received via the online interactive map and in-person events, 26 comments were specific to Bell Avenue, Jessie Avenue, and I-80 eastbound and westbound on/off ramps and generated the most concern from those who provided input (**Figure 31**). Walking access, driving operations, and safety were the most prominent concerns for respondents at Bell Avenue, Jessie Avenue and I-80 ramps. Jessie Avenue is one of the primary community focal points along with the Robertson Community Center and Pothong Market. The Jessie Avenue intersection provides key access to the Viva Supermarket, Rite Aid, Arco, and fast-food restaurants. Additionally, I-80 westbound on-off ramps are directly accessed by Jessie Avenue. Bell Avenue is a key intersection for people living in adjacent multi-family housing to access Norwood Avenue.

Figure 32 illustrates the comments stratified by transportation mode on Norwood Avenue. Approximately 43% revolve around walking concerns, such as areas where people walking feel unsafe. As noted, community members would support improved safety for people walking, including high-visibility crosswalks and lighting. The complete list of survey results and comments received are included in *Appendix E*.

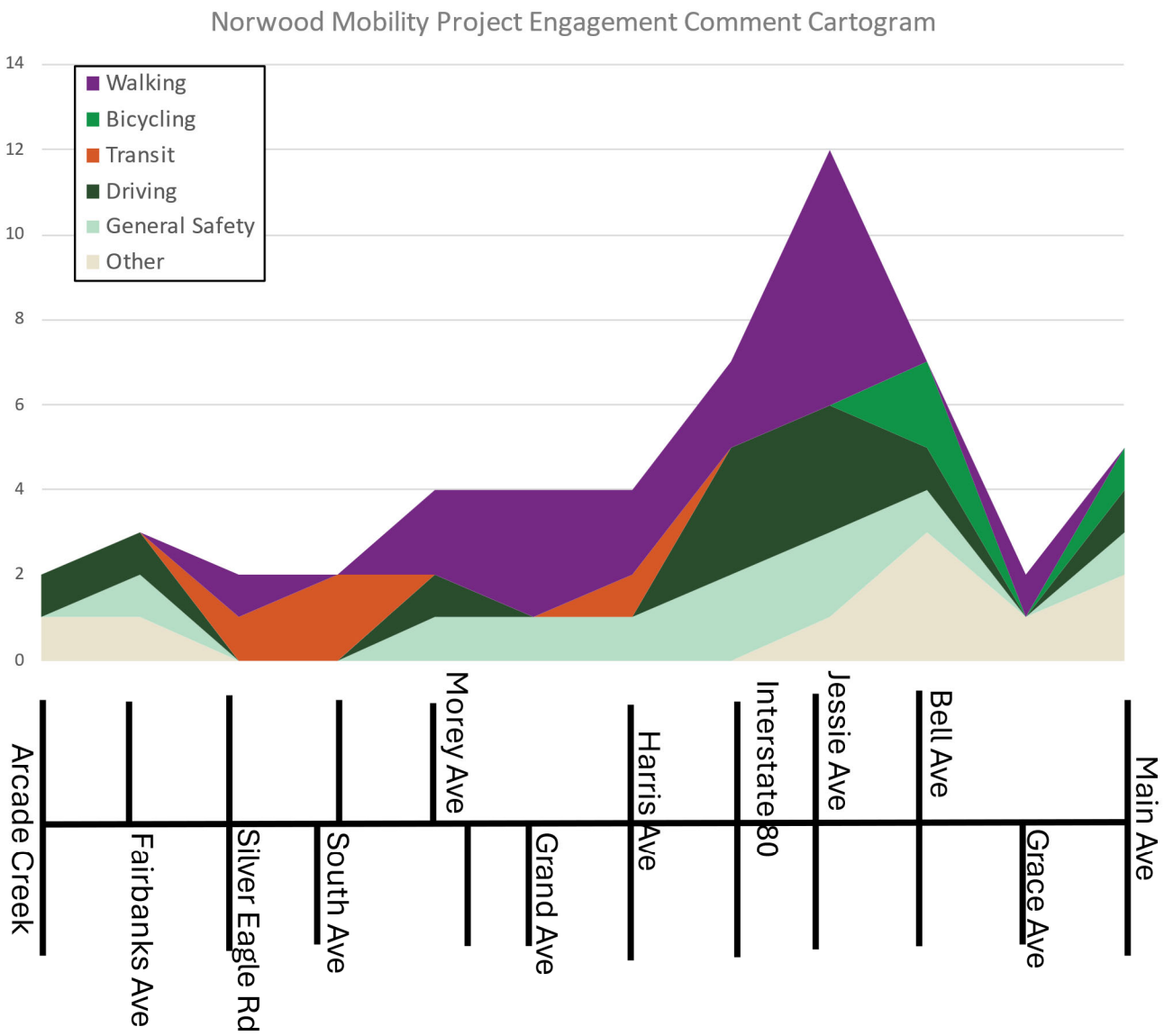


Figure 31. Engagement comments by Major Intersection

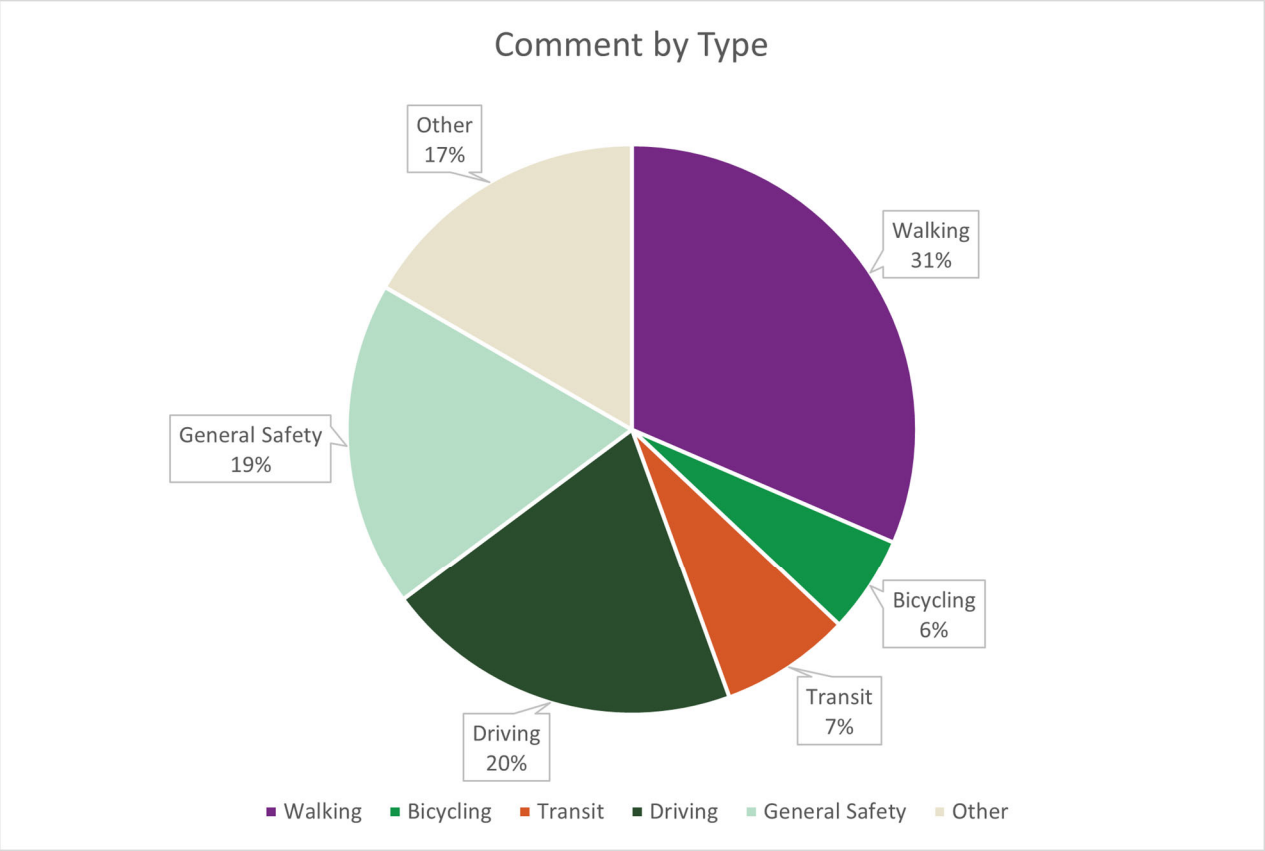


Figure 32. Comments by Type

Existing Transportation Challenges and Constraints

To gain a greater understanding of the challenges presented by this corridor, the primary concerns are outlined below. **Figure 33** illustrates the existing infrastructure along Norwood Avenue and identifies bicycle lanes and sidewalk gaps.

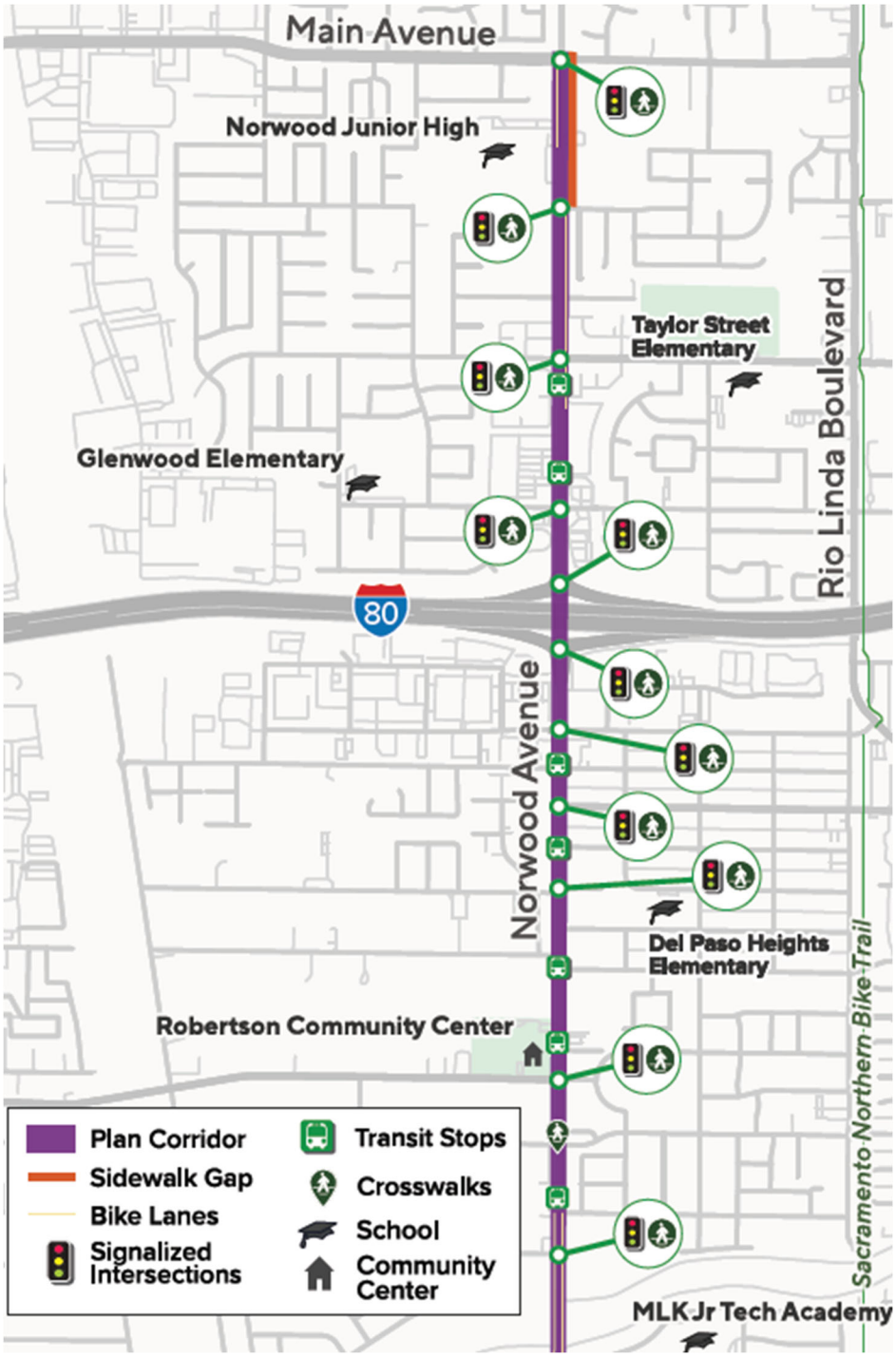


Figure 33. Infrastructure Gaps and Constraints

Walking Infrastructure

Sidewalks exist throughout the study corridor except along the northbound travel lanes from Grace Avenue to Main Avenue and along the southbound travel lanes from Grace Avenue to Berthoud Street. The existing sidewalks along Norwood Avenue do not show significant deterioration but contain some cracks and chipped concrete. In addition to sidewalk conditions, throughout the corridor the sidewalk width is five feet but are obstructed by utility poles placed within the sidewalk, reducing the available sidewalk width.

The sidewalk along the northbound lanes from Grace Avenue to Berthoud Street do not contain significant shade for people walking. Increased shade cover from street trees is prevalent from Berthoud Street to Jessie Avenue, the remainder of the corridor from Jessie Avenue to Arcade Creek consists of substantial tree cover to protect people walking from extreme temperatures.

There are 11 intersections that have controlled marked crosswalks, five are north of I-80 and six are south of I-80. The distance between marked controlled crosswalks can vary between 650 to over 1,500 feet. South of I-80, Morey Avenue is an offset controlled intersection with three marked crosswalks. At uncontrolled intersections south of I-80, there are no Norwood Avenue crossing opportunities which can present non-intuitive crossing needs for people walking, promoting crossing activity at uncontrolled locations.

Additionally, the I-80 freeway ramps can create another barrier to people walking. The lack of control and visibility enhancements at the freeway ramps create a high-stress environment for people walking as vehicles increase speeds to enter the freeway and there is no traffic control for vehicles exiting the freeway and merging onto Norwood Avenue.

Future potential design alternatives will seek to address increasing visibility and improving walking comfortability.

Bicycling Infrastructure

Bicycling infrastructure along Norwood Avenue is inconsistent and disconnected throughout the study corridor. Bike lane widths at the following locations are five feet and do not provide green paint to highlight conflict areas between modes or physical barriers to separate people biking from vehicle traffic. Bike lanes are present at the following locations:

- Northbound and southbound from Arcade Creek to Carroll Avenue
- Northbound Bell Avenue 200 feet south of the intersection approach
- Northbound from Bell Avenue to Grace Avenue.
- Southbound from Main Avenue to Grace Avenue

Having bike parking at locations could increase interest in biking as a form of transportation, allowing people biking to park their bike at commercial and recreational centers. Within the study corridor, there are five locations with bike parking ranging between three to seven spaces listed below:

- Robertson Community Center
- Nuevo Park
- Dollar General
- Department of Human Assistance
- Norwood Center

Future potential design alternatives will seek to address bicycle lane gaps, provide connection to the adjacent Sacramento Northern Bike Trail and Walter S. Ueda Bikeway, and improve access and comfortability for all ages and abilities of people biking.

Transit Infrastructure

Norwood Avenue is served by SacRT Route 19 and Route 86. Route 19 has 60-minute all day headways on weekdays and weekends. Route 86 has 30-minute weekday headways and between 45 and 60-minute headways on weekends.

Norwood Avenue has 14 bus stops with only one providing a bus shelter. The existing shelter is at the Norwood Avenue and Bell Avenue southbound bus stop and includes a bench for seating but does not have a trash bin. Bus stop locations vary along the corridor as being nearside or far-side of signalized intersections. All of the bus stops are located in-lane and, though the lanes are wider than City standards, a bus loading passengers would still block traffic.

Bus stops are heavily concentrated from Silver Eagle Road to Arcade Creek and there are no bus stops north of Bell Avenue. All bus stops along the corridor are identified by a transit sign. None of the bus stops are accessible via a low-stress walking or biking network.

Crashes

The study corridor experienced 137 injury crashes from 2018 to 2022. Of the 137 crashes, 21% were bicycle and pedestrian crashes (29 crashes). Fatal and severe injury crashes accounted for 34% of the 29 bicycle and pedestrian crashes. The highest density of crashes for all modes from 2018 to 2022 occurred between Bell Avenue and I-80, with 43% of all crashes occurring in Segment 2 of the corridor, making it a priority location for safety improvements.

This segment includes a mix of residential and commercial land use, on-street parking, and a high density of driveways. Of the 29 crashes involving people walking and biking, 16 occurred on this same segment between Bell Avenue and I-80.

The issues the design alternatives will seek to address are reducing uncontrolled conflicts between different modes of travel along the corridor, improving visibility and awareness of

potential conflict zones, reducing speeds along the corridor, and creating additional controlled crossing opportunities at high demand locations along the corridor.

OPERATIONS

Much of the corridor experiences unreliable travel times and congestion. Although corridor intersections operate acceptably, many of them experience weekday AM/PM peak hour queue conditions that exceed available storage. The corridor design alternatives will seek to address consistent cross-sections throughout the corridor, efficient signal timing for all users of the corridor including buses, providing sufficient storage for queuing, and operational modifications that improve safety for all roadway users.

Right of Way

Right of way (ROW) along the corridor varies throughout Norwood Avenue. From curb to curb, the ROW varies from 48 to 70 feet wide involving the following components:

- Inside travel lanes are 11 feet.
- Outside travel lane widths vary from 12 to 14 feet.
- Two-way center left turn lane is 10 feet.
- Sidewalks along the study corridor are 5 feet but are the responsibility of the fronting property owner[18]. Utility poles are located within the sidewalk width.
- Along the few segments where on-street parking is allowed, the parking lane is 8 feet.

Additional consideration for ROW will need to be given to the I-80 overpass and Arcade Creek bridge due to reduced roadway width and the structure providing a constrained roadway width. Where the corridor is two lanes per direction with a two-way center left turn lane, design alternatives will seek to use existing roadway space to improve infrastructure for people walking or biking such as widening sidewalks or implementing marked bike lanes or buffered bike lanes.

[18] Sacramento City Code, Section 12.32.020

APPENDIX

DKS

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Appendix A. Turning Movement Counts

National Data & Surveying Services

Intersection Turning Movement Count

Location: Norwood Ave & I-80 EB Ramps
City: Sacramento
Control: Signalized

Project ID: 24-070189-004
Date: 10/8/2024

Data - Total

NS/EW Streets:	Norwood Ave				Norwood Ave				I-80 EB Ramps				I-80 EB Ramps				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	104	55	0	53	103	0	0	56	0	83	0	0	0	0	0	454
7:15 AM	0	127	82	0	69	111	0	0	62	1	74	0	0	0	0	0	526
7:30 AM	0	154	93	0	105	146	0	0	57	1	88	0	0	0	0	0	644
7:45 AM	0	157	78	0	82	161	0	0	85	0	100	0	0	0	0	0	663
8:00 AM	0	133	65	0	95	160	0	0	75	0	89	0	0	0	0	0	617
8:15 AM	0	126	53	0	85	135	0	0	57	0	99	0	0	0	0	0	555
8:30 AM	0	131	62	0	79	122	0	0	54	1	91	0	0	0	0	0	540
8:45 AM	0	144	48	0	61	112	0	0	53	1	73	0	0	0	0	0	492
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1076	536	0	629	1050	0	0	499	4	697	0	0	0	0	0	4491
APPROACH %'s :	0.00%	66.75%	33.25%	0.00%	37.46%	62.54%	0.00%	0.00%	41.58%	0.33%	58.08%	0.00%					
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	570	289	0	367	602	0	0	274	1	376	0	0	0	0	0	2479
PEAK HR FACTOR :	0.000	0.908	0.777	0.000	0.874	0.935	0.000	0.000	0.806	0.250	0.940	0.000	0.000	0.000	0.000	0.000	0.935
		0.869				0.950				0.880							

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	155	82	0	68	138	0	0	110	1	78	0	0	0	0	0	632
4:15 PM	0	161	38	0	72	149	0	0	94	0	80	0	0	0	0	0	594
4:30 PM	0	163	69	0	68	137	0	0	109	0	75	0	0	0	0	0	621
4:45 PM	0	159	53	0	49	131	0	0	111	1	96	0	0	0	0	0	600
5:00 PM	0	185	69	0	64	111	0	0	115	4	88	0	0	0	0	0	636
5:15 PM	0	176	71	0	78	143	0	0	106	4	86	0	0	0	0	0	664
5:30 PM	0	158	57	0	65	141	0	0	125	4	98	0	0	0	0	0	648
5:45 PM	0	150	49	0	57	138	0	0	120	0	97	0	0	0	0	0	611
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1307	488	0	521	1088	0	0	890	14	698	0	0	0	0	0	5006
APPROACH %'s :	0.00%	72.81%	27.19%	0.00%	32.38%	67.62%	0.00%	0.00%	55.56%	0.87%	43.57%	0.00%					
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	0	669	246	0	264	533	0	0	466	12	369	0	0	0	0	0	2559
PEAK HR FACTOR :	0.000	0.904	0.866	0.000	0.846	0.932	0.000	0.000	0.932	0.750	0.941	0.000	0.000	0.000	0.000	0.000	0.963
		0.901				0.902				0.933							

National Data & Surveying Services

Intersection Turning Movement Count

Location: Norwood Ave & Harris Ave
City: Sacramento
Control: Signalized

Project ID: 24-070189-005
Date: 10/8/2024

Data - Total

NS/EW Streets:	Norwood Ave				Norwood Ave				Harris Ave				Harris Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	4	110	0	0	14	98	79	0	35	1	8	0	0	2	13	0	364
7:15 AM	3	164	1	0	13	101	66	0	37	0	7	0	5	5	14	0	416
7:30 AM	3	182	1	0	15	162	65	0	37	2	5	0	3	4	28	0	507
7:45 AM	16	193	3	0	17	143	80	0	30	3	4	0	2	8	17	0	516
8:00 AM	11	156	3	0	11	168	86	0	24	5	7	0	1	9	23	0	504
8:15 AM	14	134	4	0	13	150	74	0	31	3	15	0	3	5	19	0	465
8:30 AM	11	132	2	0	16	115	75	0	62	2	12	0	2	3	18	0	450
8:45 AM	9	94	3	0	16	113	55	0	63	3	17	0	3	9	17	0	402
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	71	1165	17	0	115	1050	580	0	319	19	75	0	19	45	149	0	3624
APPROACH %'s :	5.67%	92.98%	1.36%	0.00%	6.59%	60.17%	33.24%	0.00%	77.24%	4.60%	18.16%	0.00%	8.92%	21.13%	69.95%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	44	665	11	0	56	623	305	0	122	13	31	0	9	26	87	0	1992
PEAK HR FACTOR :	0.688	0.861	0.688	0.000	0.824	0.927	0.887	0.000	0.824	0.650	0.517	0.000	0.750	0.722	0.777	0.000	0.965
	0.849				0.928				0.847				0.871				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	2	132	7	0	20	178	24	0	70	3	14	0	4	5	32	0	491
4:15 PM	5	127	2	0	23	172	26	0	50	4	13	0	3	3	24	0	452
4:30 PM	5	140	4	0	15	182	18	0	57	3	10	0	0	1	29	0	464
4:45 PM	6	146	1	0	15	187	29	0	55	5	7	0	7	2	27	0	487
5:00 PM	4	132	4	0	13	150	28	0	79	4	17	0	2	2	24	0	459
5:15 PM	2	166	5	0	15	195	28	0	58	3	7	0	5	2	26	0	512
5:30 PM	5	158	4	0	13	204	20	0	38	2	8	0	3	0	16	0	471
5:45 PM	3	148	2	0	14	201	21	0	34	4	6	0	6	1	14	0	454
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	32	1149	29	0	128	1469	194	0	441	28	82	0	30	16	192	0	3790
APPROACH %'s :	2.64%	94.96%	2.40%	0.00%	7.15%	82.02%	10.83%	0.00%	80.04%	5.08%	14.88%	0.00%	12.61%	6.72%	80.67%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	17	602	14	0	56	736	105	0	230	14	39	0	17	6	93	0	1929
PEAK HR FACTOR :	0.708	0.907	0.700	0.000	0.933	0.902	0.905	0.000	0.728	0.700	0.574	0.000	0.607	0.750	0.861	0.000	0.942
	0.915				0.942				0.708				0.806				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Norwood Ave & Silver Eagle Rd
City: Sacramento
Control: Signalized

Project ID: 24-070189-006
Date: 10/8/2024

Data - Total

NS/EW Streets:	Norwood Ave				Norwood Ave				Silver Eagle Rd				Silver Eagle Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	9	67	1	0	3	72	19	0	18	5	16	0	3	8	11	0	232
7:15 AM	18	92	3	0	3	95	34	0	28	7	18	0	4	22	9	0	333
7:30 AM	24	131	5	0	6	137	37	0	42	10	31	0	12	17	10	0	462
7:45 AM	34	173	5	0	7	112	46	0	39	21	23	0	4	26	12	0	502
8:00 AM	28	144	3	0	3	109	53	0	63	16	22	0	4	19	9	0	473
8:15 AM	21	99	3	0	7	107	50	0	59	27	17	0	2	22	8	0	422
8:30 AM	10	92	2	0	6	105	67	0	42	26	19	0	6	20	8	0	403
8:45 AM	15	56	1	0	5	82	30	0	30	13	16	0	3	11	6	0	268
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	159	854	23	0	40	819	336	0	321	125	162	0	38	145	73	0	3095
APPROACH %'s :	15.35%	82.43%	2.22%	0.00%	3.35%	68.54%	28.12%	0.00%	52.80%	20.56%	26.64%	0.00%	14.84%	56.64%	28.52%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	107	547	16	0	23	465	186	0	203	74	93	0	22	84	39	0	1859
PEAK HR FACTOR :	0.787	0.790	0.800	0.000	0.821	0.849	0.877	0.000	0.806	0.685	0.750	0.000	0.458	0.808	0.813	0.000	0.926
	0.790				0.936				0.898				0.863				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	21	79	1	0	10	117	49	0	47	28	38	0	2	20	5	0	417
4:15 PM	17	97	4	0	8	110	36	0	51	37	26	0	1	16	4	0	407
4:30 PM	25	94	3	0	3	115	46	0	58	32	24	0	2	13	8	0	423
4:45 PM	25	101	2	0	11	106	51	0	57	36	29	0	2	16	8	0	444
5:00 PM	24	101	6	0	25	104	50	0	56	27	26	0	1	12	8	0	440
5:15 PM	20	98	3	0	6	116	39	0	74	40	24	0	1	20	10	0	451
5:30 PM	16	107	2	0	6	105	50	0	48	22	28	0	2	22	9	0	417
5:45 PM	25	120	5	0	4	132	48	0	47	21	35	0	5	20	9	0	471
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	173	797	26	0	73	905	369	0	438	243	230	0	16	139	61	0	3470
APPROACH %'s :	17.37%	80.02%	2.61%	0.00%	5.42%	67.19%	27.39%	0.00%	48.08%	26.67%	25.25%	0.00%	7.41%	64.35%	28.24%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	85	426	16	0	41	457	187	0	225	110	113	0	9	74	36	0	1779
PEAK HR FACTOR :	0.850	0.888	0.667	0.000	0.410	0.866	0.935	0.000	0.760	0.688	0.807	0.000	0.450	0.841	0.900	0.000	0.944
	0.878				0.931				0.812				0.875				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Norwood Ave & Bell Ave
City: Sacramento
Control: Signalized

Project ID: 24-070189-002
Date: 10/8/2024

Data - Total

NS/EW Streets:	Norwood Ave				Norwood Ave				Bell Ave				Bell Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	3	66	27	0	7	84	0	0	2	10	23	0	20	3	11	0	256
7:15 AM	11	83	28	0	7	109	1	0	0	10	33	0	43	7	18	0	350
7:30 AM	7	78	30	0	27	149	3	0	4	18	41	0	35	4	27	0	423
7:45 AM	17	98	44	0	43	142	14	1	12	23	39	0	40	19	40	0	532
8:00 AM	12	80	52	0	38	125	10	0	19	50	27	0	53	32	29	0	527
8:15 AM	10	64	47	0	10	97	5	0	8	31	20	0	58	17	20	0	387
8:30 AM	12	59	24	0	13	77	8	0	2	9	24	0	55	21	9	0	313
8:45 AM	13	50	17	0	8	79	2	0	1	8	19	0	39	11	14	0	261
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	85	578	269	0	153	862	43	1	48	159	226	0	343	114	168	0	3049
APPROACH %'s :	9.12%	62.02%	28.86%	0.00%	14.45%	81.40%	4.06%	0.09%	11.09%	36.72%	52.19%	0.00%	54.88%	18.24%	26.88%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	46	320	173	0	118	513	32	1	43	122	127	0	186	72	116	0	1869
PEAK HR FACTOR :	0.676	0.816	0.832	0.000	0.686	0.861	0.571	0.250	0.566	0.610	0.774	0.000	0.802	0.563	0.725	0.000	0.878
	0.847				0.830				0.760				0.820				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	28	90	37	0	18	109	3	0	2	8	20	0	40	24	20	0	399
4:15 PM	30	106	33	0	11	98	7	0	5	8	21	0	37	16	9	0	381
4:30 PM	32	103	50	0	23	99	4	0	5	10	19	0	29	16	20	0	410
4:45 PM	18	89	45	0	19	86	4	0	3	14	29	0	21	21	10	0	359
5:00 PM	21	87	57	0	15	98	2	0	5	11	15	0	37	17	18	0	383
5:15 PM	37	98	48	0	19	105	3	0	1	13	22	0	24	12	21	0	403
5:30 PM	29	82	55	0	21	108	7	0	2	15	14	0	38	17	16	0	404
5:45 PM	23	115	45	0	18	84	3	0	3	12	28	0	35	14	14	0	394
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	218	770	370	0	144	787	33	0	26	91	168	0	261	137	128	0	3133
APPROACH %'s :	16.05%	56.70%	27.25%	0.00%	14.94%	81.64%	3.42%	0.00%	9.12%	31.93%	58.95%	0.00%	49.62%	26.05%	24.33%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	110	382	205	0	73	395	15	0	11	51	79	0	134	60	69	0	1584
PEAK HR FACTOR :	0.743	0.830	0.899	0.000	0.869	0.914	0.536	0.000	0.550	0.850	0.705	0.000	0.882	0.882	0.821	0.000	0.980
	0.952				0.888				0.820				0.913				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Norwood Ave & I-80 WB Ramps
City: Sacramento
Control: Signalized

Project ID: 24-070189-003
Date: 10/8/2024

Data - Total

NS/EW Streets:	Norwood Ave				Norwood Ave				I-80 WB Ramps				I-80 WB Ramps				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	57	103	0	0	0	84	108	0	0	0	0	0	71	0	50	0	473
7:15 AM	61	128	0	0	0	131	142	0	0	0	0	0	66	0	53	0	581
7:30 AM	75	135	0	0	0	171	161	0	0	0	0	0	82	0	50	0	674
7:45 AM	54	175	0	0	0	179	138	0	0	0	0	0	76	1	53	0	676
8:00 AM	68	148	0	0	0	157	119	0	0	0	0	0	67	0	64	0	623
8:15 AM	57	130	0	0	0	175	122	0	0	0	0	0	47	2	40	0	573
8:30 AM	69	115	0	0	0	137	100	0	0	0	0	0	65	2	56	0	544
8:45 AM	97	103	0	0	0	127	92	0	0	0	0	0	46	1	46	0	512
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	538	1037	0	0	0	1161	982	0	0	0	0	0	520	6	412	0	4656
APPROACH %'s :	34.16%	65.84%	0.00%	0.00%	0.00%	54.18%	45.82%	0.00%					55.44%	0.64%	43.92%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	258	586	0	0	0	638	560	0	0	0	0	0	291	1	220	0	2554
PEAK HR FACTOR :	0.860	0.837	0.000	0.000	0.000	0.891	0.870	0.000	0.000	0.000	0.000	0.000	0.887	0.250	0.859	0.000	0.945
	0.921				0.902								0.970				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	78	189	0	0	0	145	107	0	0	0	0	0	60	0	93	0	672
4:15 PM	75	181	0	0	0	143	106	0	0	0	0	0	77	0	65	0	647
4:30 PM	89	166	0	0	0	135	107	0	0	0	0	0	71	0	91	0	659
4:45 PM	93	193	0	0	0	122	89	0	0	0	0	0	57	0	77	0	631
5:00 PM	90	207	0	0	0	123	100	0	0	0	0	0	52	0	70	0	642
5:15 PM	78	203	0	0	0	158	88	0	0	0	0	0	65	0	82	0	674
5:30 PM	89	194	0	0	0	142	84	0	0	0	0	0	62	0	77	0	648
5:45 PM	67	208	0	0	0	124	119	0	0	0	0	0	72	0	80	0	670
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	659	1541	0	0	0	1092	800	0	0	0	0	0	516	0	635	0	5243
APPROACH %'s :	29.95%	70.05%	0.00%	0.00%	0.00%	57.72%	42.28%	0.00%					44.83%	0.00%	55.17%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	324	812	0	0	0	547	391	0	0	0	0	0	251	0	309	0	2634
PEAK HR FACTOR :	0.900	0.976	0.000	0.000	0.000	0.866	0.821	0.000	0.000	0.000	0.000	0.000	0.872	0.000	0.942	0.000	0.977
	0.956				0.953								0.921				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Norwood Ave & Jessie Ave
City: Sacramento
Control: Signalized

Project ID: 24-070189-001
Date: 10/8/2024

Data - Total

NS/EW Streets:	Norwood Ave				Norwood Ave				Jessie Ave				Jessie Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	9	103	23	0	6	130	0	0	2	5	28	0	34	1	5	0	346
7:15 AM	25	94	18	0	7	163	1	0	2	7	33	0	44	4	8	0	406
7:30 AM	24	122	24	0	8	226	5	0	4	12	35	0	56	5	8	0	529
7:45 AM	42	120	21	0	14	180	13	0	8	22	70	0	40	27	11	0	568
8:00 AM	48	122	36	0	18	179	21	0	15	33	74	0	39	16	15	0	616
8:15 AM	23	99	19	0	11	154	5	0	9	28	36	0	59	20	7	0	470
8:30 AM	24	93	25	0	6	154	5	0	0	6	26	0	37	10	6	0	392
8:45 AM	17	87	27	0	9	147	2	0	3	8	22	0	32	7	10	0	371
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	212	840	193	0	79	1333	52	0	43	121	324	0	341	90	70	0	3698
APPROACH %'s :	17.03%	67.47%	15.50%	0.00%	5.40%	91.05%	3.55%	0.00%	8.81%	24.80%	66.39%	0.00%	68.06%	17.96%	13.97%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	137	463	100	0	51	739	44	0	36	95	215	0	194	68	41	0	2183
PEAK HR FACTOR :	0.714	0.949	0.694	0.000	0.708	0.817	0.524	0.000	0.600	0.720	0.726	0.000	0.822	0.630	0.683	0.000	0.886
	0.850				0.872				0.709				0.881				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	57	159	32	0	17	152	7	0	7	16	48	0	64	21	9	0	589
4:15 PM	53	161	32	0	12	161	3	0	9	12	36	0	38	13	9	0	539
4:30 PM	46	157	21	0	7	134	5	0	9	10	37	0	50	17	12	0	505
4:45 PM	48	178	39	0	17	129	3	0	9	16	32	0	42	8	6	0	527
5:00 PM	51	170	28	0	12	142	3	0	4	11	39	0	47	23	8	0	538
5:15 PM	49	159	38	0	13	130	3	0	8	11	40	0	36	19	10	0	516
5:30 PM	55	172	36	0	20	130	5	0	12	11	45	0	44	17	9	0	556
5:45 PM	53	173	38	0	16	138	6	0	8	19	39	0	52	13	8	0	563
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	412	1329	264	0	114	1116	35	0	66	106	316	0	373	131	71	0	4333
APPROACH %'s :	20.55%	66.28%	13.17%	0.00%	9.01%	88.22%	2.77%	0.00%	13.52%	21.72%	64.75%	0.00%	64.87%	22.78%	12.35%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	208	674	140	0	61	540	17	0	32	52	163	0	179	72	35	0	2173
PEAK HR FACTOR :	0.945	0.974	0.921	0.000	0.763	0.951	0.708	0.000	0.667	0.684	0.906	0.000	0.861	0.783	0.875	0.000	0.965
	0.968				0.966				0.908				0.917				

Appendix B. Norwood Avenue Collision Data

Study Area Crashes

CASE_ID	COLLISION_DATE	PRIMARY_RD	SECONDARY_RD	DISTANCE	DIRECTION	INTERSECTION	WEATHER_1	COLLISION_SEVERITY	NUMBER_KILL	NUMBER_INJURED	PCF_VIOL_CATEGOR	TYPE_OF_COLLISION	MVIW	PED_ACTION	LIGHTING	CONTROL_DEVICE	PEDESTRIAN_ACCIDENT	BICYCLE_ACCIDENT	MOTORCYCLE_ACCIDENT	TRUCK_ACCIDENT	ALCOHOL_INVOLVED	LONGITUDE	LATITUDE
8619747	4/27/2018	NORWOO	SILVER EA	0		Y	A	3	0	1	12	D	C	A	A	A						-121.457	38.6
8687238	8/22/2018	NORWOO	MOREY AV	0		Y	A	3	0	2	3	C	C	A	A	A						-121.457	38.6
8713991	9/26/2018	NORWOO	JESSIE AV	130	S	N	A	4	0	2	9	D	C	A	A	D						-121.457	38.6
8536722	1/16/2018	NORWOO	HARRIS A	1	S	N	A	3	0	1	8	B	G	A	A	D		Y				-121.457	38.6
8635403	6/6/2018	NORWOO	JESSIE	390	S	N	A	4	0	2	3	C	C	A	A	A						-121.457	38.6
8533477	1/2/2018	NORWOO	JESSIE AV	120	S	N	B	4	0	3	9	D	C	A	C	D						-121.457	38.6
8613904	4/13/2018	NORWOO	GRACE AV	12	S	N	A	4	0	2	1	C	C	A	C	A					Y	-121.457	38.7
8637125	5/29/2018	NORWOO	JESSIE AV	149	S	N	A	3	0	2	3	C	C	A	A	B						-121.457	38.6
8715986	9/17/2018	NORWOO	JESSIE AV	100	S	N	A	4	0	1	8	D	G	A	A	-		Y				-121.457	38.6
8720731	10/17/2018	NORWOO	BELL AV	634	S	N	A	2	0	1	11	G	B	C	C	D	Y					-121.457	38.6
8772973	12/19/2018	NORWOO	MOREY AV	0		Y	-	3	0	2	12	D	C	A	A	A						-121.457	38.6
8565227	2/4/2018	SILVER EA	NORWOO	0		Y	A	4	0	1	3	A	C	A	C	A						-121.457	38.6
8580806	3/11/2018	NORWOO	GRAND A	0		Y	A	4	0	2	12	D	C	A	A	A						-121.457	38.6
8641605	6/12/2018	SILVER EA	NORWOO	0		Y	A	2	0	6	1	D	C	A	A	A					Y	-121.457	38.6
8651187	9/22/2018	NORWOO	HAYES AV	0		Y	A	1	1	0	11	G	B	D	A	D	Y					-121.457	38.6
8688230	8/12/2018	NORWOO	JESSIE AV	27	N	N	A	4	0	1	8	E	I	A	A	A						-121.457	38.6
8695610	9/13/2018	NORWOO	JESSIE AV	792	N	N	A	4	0	2	0	B	C	A	A	A						-121.457	38.6
8705472	9/23/2018	NORWOO	JESSIE AV	21	S	N	A	4	0	1	11	G	B	E	B	A	Y					-121.457	38.6
8711659	10/14/2018	NORWOO	KESNER A	0		Y	A	4	0	1	8	D	G	A	A	A		Y			Y	-121.457	38.6
8760801	12/28/2018	NORWOO	GRAND A	298	S	N	A	4	0	1	9	D	C	A	A	D						-121.457	38.6
8906987	7/28/2019	JESSIE AV	NORWOO	0	E	N	A	3	0	1	9	A	C	A	B	A						-121.457	38.6
8907167	7/8/2019	NORWOO	GRACE AV	0		Y	A	3	0	2	12	D	C	A	A	A						-121.457	38.7
8958359	10/12/2019	NORWOO	BELL AV	0	S	N	A	3	0	1	9	D	C	A	A	D						-121.457	38.6
8980984	10/23/2019	NORWOO	SILVER EA	150	N	N	A	4	0	3	3	C	C	A	C	A				Y		-121.457	38.6
8762124	1/5/2019	NORWOO	RT 80	0		Y	B	4	0	1	12	D	C	A	C	A						-121.457	38.6
8918341	8/11/2019	HARRIS AV	NORWOO	0		Y	A	4	0	3	12	-	C	A	A	A						-121.457	38.6
8816469	2/25/2019	NORWOO	HARRIS A	0		Y	B	4	0	2	12	D	C	A	A	A						-121.457	38.6
8818152	3/11/2019	NORWOO	BELL AV	678	S	N	A	4	0	3	8	A	C	A	C	D						-121.457	38.6
8833021	3/22/2019	NORWOO	BELL AV	32	S	N	A	4	0	1	10	G	B	B	A	A	Y					-121.457	38.6
8845231	4/19/2019	NORWOO	JESSIE AV	351	N	N	A	4	0	3	3	C	C	A	A	A						-121.457	38.6
8859897	5/9/2019	NORWOO	HARRIS A	0		Y	A	4	0	1	12	D	C	A	A	A						-121.457	38.6
8959662	8/6/2019	NORWOO	HAYES AV	148	N	N	A	2	0	1	17	H	G	A	C	D		Y				-121.457	38.6
8975705	11/13/2019	NORWOO	SILVER EA	0		Y	A	3	0	1	12	D	C	A	A	A						-121.457	38.6
8995600	12/1/2019	NORWOO	FAIRBANK	0		Y	C	4	0	1	3	B	C	A	A	D						-121.457	38.6
9006252	12/28/2019	NORWOO	SOUTH AV	3	N	N	A	4	0	1	1	D	C	A	C	A					Y	-121.457	38.6
8781799	1/24/2019	NORWOO	HARRIS A	120	N	N	A	4	0	1	3	C	C	A	A	A						-121.457	38.6
8825701	3/19/2019	NORWOO	BELL AV	794	S	N	A	4	0	1	9	D	G	A	A	D		Y				-121.457	38.6
8838849	4/8/2019	NORWOO	HARRIS A	0		Y	A	4	0	2	12	D	C	A	A	A						-121.457	38.6
8839370	4/7/2019	FORD RD	NORWOO	0		Y	B	4	0	1	0	H	G	A	C	A		Y				-121.457	38.6
8850332	4/5/2019	NORWOO	BERTHOU	0	N	N	B	2	0	3	1	C	C	A	A	D						-121.457	38.6

8903231	7/22/2019	NORWOO	MOREY A	85	S	N	A	2	0	1	1	C	G	A	C	A		Y			Y	-121.457	38.6
8931544	8/26/2019	NORWOO	BERTHOU	0		Y	A	3	0	1	-	D	G	A	A	D		Y				-121.457	38.6
8981212	11/30/2019	NORWOO	BERTHOU	0		Y	A	3	0	3	9	D	C	A	B	A						-121.457	38.6
8995266	12/7/2019	NORWOO	MAIN AV	631	S	N	C	4	0	2	9	C	C	A	C	D						-121.457	38.7
9004881	12/13/2019	NORWOO	JESSIE AV	192	S	N	C	4	0	2	9	D	C	A	A	D						-121.457	38.6
9051125	3/4/2020	NORWOO	FAIRBANI	240	S	N	A	3	0	2	3	C	-	A	A	D						-121.457	38.6
9170901	10/27/2020	NORWOO	JESSIE AV	204	S	N	A	4	0	1	9	D	C	A	A	D						-121.457	38.6
9093413	4/14/2020	NORWOO	FAIRBANI	275	S	N	A	2	0	1	11	G	B	D	A	D	Y					-121.457	38.6
9126821	7/10/2020	GRAND AV	NORWOO	0		Y	A	4	0	2	3	C	C	A	A	A						-121.457	38.6
9149312	9/9/2020	NORWOO	FORD RD	0		Y	A	4	0	1	9	D	C	A	A	A						-121.457	38.6
9018759	1/11/2020	NORWOO	FORD RD	0		Y	A	4	0	2	9	D	C	A	A	A						-121.457	38.6
9031298	1/17/2020	NORWOO	JESSIE AV	300	N	N	A	4	0	1	11	G	B	D	A	D	Y					-121.457	38.6
9051222	2/28/2020	JESSIE AV	NORWOO	12	E	N	A	4	0	1	9	D	C	A	A	D						-121.457	38.6
9074513	5/10/2020	NORWOO	JESSIE AV	21	S	N	A	3	0	3	-	A	C	A	A	A						-121.457	38.6
9122727	7/18/2020	NORWOO	JESSIE AV	100	N	N	A	3	0	4	8	D	C	A	A	A			Y			-121.457	38.6
9126792	7/6/2020	NORWOO	CARROLL	120	N	N	A	4	0	1	3	E	I	A	A	D						-121.457	38.6
9128383	7/21/2020	NORWOO	JESSIE AV	257	S	N	A	4	0	1	9	A	C	A	A	D						-121.457	38.6
9153769	9/3/2020	NORWOO	JESSIE ST	492	N	N	A	4	0	1	8	A	C	A	A	A						-121.457	38.6
9025646	1/24/2020	NORWOO	JESSIE AV	0		-	A	4	0	1	22	D	C	A	A	A						-121.457	38.6
9031282	1/24/2020	NORWOO	JESSIE AV	204	S	N	A	4	0	2	9	D	C	A	A	A						-121.457	38.6
9051185	3/5/2020	NORWOO	FAIR BAN	0		Y	A	4	0	1	3	-	C	A	A	A						-121.457	38.6
9064923	3/16/2020	NORWOO	GRAND A	0		Y	C	4	0	1	12	D	C	A	A	A						-121.457	38.6
9069868	4/7/2020	NORWOO	JESSIE AV	485	N	N	C	4	0	1	9	D	C	A	A	D						-121.457	38.6
9088924	4/10/2020	NORWOO	JESSIE AV	0		Y	A	4	0	1	12	A	C	A	C	A						-121.457	38.6
9140990	8/21/2020	NORWOO	JESSIE AV	476	N	N	A	3	0	1	9	D	C	A	A	D			Y			-121.457	38.6
9140997	8/9/2020	NORWOO	SILVER EA	0		Y	A	4	0	1	12	D	C	A	A	A			Y			-121.457	38.6
9154021	9/3/2020	NORWOO	FORD RD	0		Y	A	3	0	4	12	F	C	A	A	A						-121.457	38.6
9187339	11/21/2020	NORWOO	SILVER EA	0		Y	A	4	0	1	12	D	C	A	A	A						-121.457	38.6
9194158	12/7/2020	NORWOO	JESSIE AV	320	N	N	A	4	0	1	8	B	G	A	A	D		Y				-121.457	38.6
9195834	11/27/2020	NORWOO	FORD RD	0		Y	A	4	0	1	9	D	C	A	A	A						-121.457	38.6
9371846	6/15/2021	NORWOO	RT 80	107	N	N	A	4	0	1	3	C	C	A	A	A						-121.457	38.6
9360464	11/2/2021	NORWOO	HARRIS A	0		Y	A	3	0	1	3	D	C	A	A	A			Y	Y	Y	-121.457	38.6
9256286	5/31/2021	NORWOO	JESSIE AV	506	N	N	A	1	1	0	11	G	B	D	B	D	Y				Y	-121.457	38.6
9234868	3/4/2021	NORWOO	HAYES AV	118	N	N	A	4	0	2	9	D	C	A	A	D					Y	-121.457	38.6
9242987	3/15/2021	NORWOO	JESSIE AV	0		Y	A	3	0	1	3	D	C	A	A	A						-121.457	38.6
9352387	11/2/2021	NORWOO	FAIRBANI	184	N	N	B	4	0	1	3	C	C	A	A	A						-121.457	38.6
9241512	3/16/2021	NORWOO	JESSIE AV	223	N	N	A	4	0	1	9	D	A	A	A	D						-121.457	38.6
9323174	9/11/2021	NORWOO	RT 80	0		Y	A	4	0	1	12	A	C	A	A	A						-121.457	38.6
9341002	9/30/2021	NORWOO	GRAND A	0		Y	A	3	0	1	-	D	C	-	A	A	Y					-121.457	38.6
9245245	3/2/2021	NORWOO	GRAND A	0		Y	A	3	0	2	1	E	I	A	C	A					Y	-121.457	38.6
9250566	3/22/2021	NORWOO	JESSIE AV	208	S	N	A	4	0	1	9	-	C	A	A	D						-121.457	38.6
9291014	7/3/2021	NORWOO	FAIRBANI	0		Y	A	3	0	1	12	D	C	A	A	A						-121.457	38.6
9293418	7/25/2021	NORWOO	HARRIS A	0		Y	A	2	0	6	12	D	C	A	C	A						-121.457	38.6
9293889	7/30/2021	NORWOO	FAIRBANI	200	N	N	A	4	0	1	3	C	C	A	A	A						-121.457	38.6

9299813	8/3/2021	NORWOO	JESSIE AV	686	N	N	A	3	0	1	8	B	E	A	A	A					Y	-121.457	38.6
9316093	8/20/2021	NORWOO	MORRISO	0		Y	A	3	0	1	9	D	G	A	A	B		Y				-121.457	38.6
9324980	9/16/2021	NORWOO	JESSIE AV	158	S	N	A	2	0	2	5	D	C	A	C	A			Y			-121.457	38.6
9325977	9/19/2021	NORWOO	BELL AV	486	S	N	A	3	0	1	11	G	B	D	D	D	Y					-121.457	38.6
9326637	10/4/2021	NORWOO	GRAND A	0		Y	A	3	0	2	1	E	H	A	C	A			Y		Y	-121.457	38.6
9347044	9/26/2021	NORWOO	GRAND A	0		Y	A	3	0	2	12	F	C	A	A	A						-121.457	38.6
9220529	1/24/2021	NORWOO	GRACE AV	0	S	N	A	3	0	1	3	C	C	A	A	A						-121.457	38.7
9242942	3/26/2021	MAIN AV	NORWOO	0		Y	A	4	0	1	1	D	C	A	C	A					Y	-121.457	38.7
9254736	2/25/2021	NORWOO	HARRIS A	44	S	N	A	4	0	1	3	C	C	A	C	A						-121.457	38.6
9270442	5/22/2021	NORWOO	SILVER EA	0		Y	A	2	0	1	0	G	B	E	C	A	Y					-121.457	38.6
9291729	7/12/2021	NORWOO	JESSIE AV	510	N	N	A	3	0	1	9	D	C	A	A	D			Y			-121.457	38.6
9373194	11/21/2021	NORWOO	JESSIE AV	111	N	N	A	2	0	1	3	C	G	A	A	A		Y				-121.457	38.6
9373867	11/30/2021	NORWOO	HARRIS A	0		Y	A	4	0	1	12	D	C	A	A	D						-121.457	38.6
9374589	11/16/2021	NORWOO	JESSIE AV	655	S	N	A	4	0	2	3	C	C	A	C	A				Y		-121.457	38.6
9375036	11/25/2021	NORWOO	JESSIE AV	0		Y	A	2	0	1	11	G	B	E	C	A	Y					-121.457	38.6
9376581	12/7/2021	NORWOO	SOUTH AV	0		Y	A	4	0	2	8	B	C	A	C	A						-121.457	38.6
9376786	12/5/2021	NORWOO	SILVER EA	0		Y	A	4	0	2	9	D	C	A	B	A						-121.457	38.6
9379077	12/19/2021	NORWOO	FAIRBANI	36	S	N	A	4	0	1	9	D	C	A	C	A						-121.457	38.6
8.19E+07	9/13/2022	NORWOO	JESSIE AV	300	S	N	A	3	0	4	9	D	C	A	A	D						-121.457	38.6
8.20E+07	12/13/2022	NORWOO	80 EB	0		Y	A	4	0	2	3	C	C	A	A	A						-121.457	38.6
9380811	1/5/2022	NORWOO	JESSIE AV	174	S	N	A	4	0	2	9	D	C	A	A	A						-121.457	38.6
9413395	2/21/2022	NORWOO	JESSE AV	190	S	N	A	4	0	1	3	G	B	E	C	D	Y					-121.457	38.6
8.19E+07	10/31/2022	NORWOO	80 EB	70	S	N	A	4	0	1	3	C	C	A	A	A						-121.457	38.6
8.20E+07	12/2/2022	NORWOO	GRAND A	0		Y	A	4	0	1	5	-	G	A	A	A		Y				-121.457	38.6
9380916	1/10/2022	NORWOO	GRAND A	0		Y	B	4	0	1	12	D	C	A	A	A						-121.457	38.6
9452448	5/24/2022	NORWOO	LINDSAY	90	S	N	A	4	0	1	3	C	C	A	A	A						-121.457	38.6
8.19E+07	10/19/2022	NORWOO	GRAND A	0		Y	A	4	0	1	8	B	G	A	A	A		Y				-121.457	38.6
8.19E+07	11/11/2022	NORWOO	BELL AVE	33	S	N	A	3	0	1	0	G	B	B	A	A	Y					-121.457	38.6
8.19E+07	12/4/2022	NORWOO	FORD RD	336	S	N	A	4	0	3	-	H	C	A	C	D						-121.457	38.6
9320495	2/10/2022	NORWOO	GRAND A	0		Y	A	1	1	3	1	D	C	A	C	A					Y	-121.457	38.6
9422293	4/5/2022	NORWOO	FORD RD	0		Y	A	4	0	1	9	D	C	A	C	A						-121.457	38.6
9422816	3/7/2022	NORWOO	JESSIE AV	255	S	N	A	3	0	2	9	A	C	A	A	A						-121.457	38.6
9453122	3/14/2022	NORWOO	JESSIE AV	0		Y	A	4	0	1	12	D	C	A	A	A						-121.457	38.6
9462597	7/5/2022	NORWOO	JESSIE AV	0		Y	A	3	0	1	9	D	G	A	A	A		Y			Y	-121.457	38.6
9485934	8/13/2022	NORWOO	JESSIE AV	267	S	N	A	2	0	1	9	D	G	A	A	D		Y				-121.457	38.6
8.19E+07	9/18/2022	NORWOO	FAIRBANI	30	N	N	A	4	0	1	1	C	C	A	C	A					Y	-121.457	38.6
8.19E+07	9/23/2022	NORWOO	HARRIS A	375	N	N	A	4	0	3	8	D	C	A	A	D						-121.457	38.6
8.19E+07	10/6/2022	NORWOO	JESSIE AV	100	S	N	A	2	0	1	9	B	C	A	A	D			Y			-121.457	38.6
8.19E+07	10/12/2022	NORWOO	FORD RD	0		Y	A	4	0	1	9	D	D	A	A	A					Y	-121.457	38.6
8.19E+07	10/28/2022	NORWOO	MOREY AV	0		Y	A	4	0	1	21	C	C	A	C	A						-121.457	38.6
8.19E+07	10/12/2022	NORWOO	HARRIS A	423	N	N	A	4	0	1	3	C	D	A	A	D						-121.457	38.6
8.19E+07	11/16/2022	FORD RD	NORWOO	0		Y	A	4	0	3	9	D	D	A	C	A						-121.457	38.6
8.20E+07	12/21/2022	NORWOO	JESSIE AV	215	N	N	A	4	0	1	9	H	G	A	A	A		Y				-121.457	38.6
9405766	2/2/2022	NORWOO	RT 80	68	S	N	A	4	0	2	3	C	C	A	A	A						-121.457	38.6

9410314	3/12/2022	NORWOO	JESSIE AV	490	N	N	A	4	0	1	9	D	C	A	A	A						-121.457	38.6
9421400	3/8/2022	NORWOO	HARRIS A	0		Y	A	3	0	2	3	C	C	A	C	A						-121.457	38.6
9430466	3/26/2022	MAIN AV	NORWOO	0		Y	A	3	0	2	12	D	C	A	C	A				Y		-121.457	38.7
9446377	5/17/2022	RT 80	NORWOO	0		Y	A	3	0	2	12	D	C	A	A	A						-121.457	38.6
9452619	5/24/2022	NORWOO	MORRISO	0		Y	A	4	0	1	8	D	C	A	A	D						-121.457	38.6
9480992	7/24/2022	NORWOO	SILVER EA	0		Y	A	4	0	1	12	D	C	A	C	A						-121.457	38.6
9482155	8/7/2022	NORWOO	BELL AV	535	S	N	A	4	0	1	8	B	C	A	C	D						-121.457	38.6
9484501	5/17/2022	NORWOO	RT 80	0		Y	A	3	0	2	12	D	C	A	A	A						-121.457	38.6
9491239	8/25/2022	NORWOO	LINDLEY	637	N	N	A	3	0	1	6	B	C	A	A	D			Y	Y	Y	-121.457	38.6
81969294	1/6/2023	NORWOO	BELL AVE	300	S	N	B	3	0	1	8	C	E	A	C	D						-121.457	38.6
81981245	1/13/2023	NORWOO	BELL AVE	300	S	N	C	4	0	1	1	B	E	A	C	D					Y	-121.457	38.6
81988246	1/27/2023	NORWOO	JESSIE AV	434	N	N	A	3	0	1	9	D	C	A	A	D						-121.457	38.6
81993685	1/21/2023	NORWOO	GRAND A	0		Y	B	4	0	1	1	D	C	A	C	A					Y	-121.457	38.6
81994782	2/4/2023	MAIN AVE	NORWOO	8	E	N	A	3	0	1	1	E	I	A	C	A					Y	-121.457	38.7
82028440	1/27/2023	NORWOO	JESSIE AV	27	N	N	A	4	0	1	3	C	C	A	C	A						-121.457	38.6
82028943	3/13/2023	NORWOO	JESSIE AV	0		Y	A	4	0	1	12	D	C	A	A	A						-121.457	38.6
82037229	3/25/2023	NORWOO	JESSIE AV	0		Y	A	4	0	1	12	D	C	A	C	A					Y	-121.457	38.6
82040057	3/19/2023	NORWOO	SOUTH AV	0		Y	A	4	0	1	9	D	C	A	A	D					Y	-121.457	38.6
82053349	4/13/2023	ARDEN WA	ARDEN W	0		Y	A	4	0	1	-	D	C	A	C	A						-122.325	38.3
82057211	4/14/2023	NORWOO	HARRIS A	0		Y	A	4	0	1	12	D	C	A	C	A			Y			-121.457	38.6
82057675	4/17/2023	NORWOO	MAIN AVE	0		Y	A	3	0	2	1	D	C	A	A	A					Y	-121.457	38.7
82069521	4/23/2023	NORWOO	80 EB	25	N	N	A	4	0	1	3	C	C	A	A	A						-121.457	38.6
82076961	5/13/2023	NORWOO	GRAND A	0		Y	A	3	0	3	12	D	C	A	A	A						-121.457	38.6
82086574	4/20/2023	NORWOO	GRAND A	0		Y	A	3	0	4	12	D	C	A	C	A						-121.457	38.6
82097498	6/3/2023	NORWOO	GRAND A	45	S	N	A	3	0	1	3	C	C	A	A	A						-121.457	38.6
82103819	6/16/2023	NORWOO	LINDSAY	0		Y	A	3	0	1	9	D	G	A	A	A		Y				-121.457	38.6
82107864	6/20/2023	NORWOO	80 EB	26	W	N	A	4	0	2	12	D	C	A	A	A						-121.457	38.6
82109175	5/11/2023	FORD RD	NORWOO	15	W	N	A	3	0	1	3	C	C	A	B	A					Y	-121.457	38.6
82114657	7/1/2023	NORWOO	FORD RD	0		Y	A	3	0	2	21	D	C	A	A	A						-121.457	38.6
82119376	6/16/2023	NORWOO	SILVER EA	360	N	N	A	4	0	1	0	C	C	A	C	D						-121.457	38.6
82119386	7/5/2023	NORWOO	BERTHOU	100	N	N	A	4	0	1	3	C	C	A	A	D						-121.457	38.6
82132674	7/20/2023	NORWOO	80 EB	62	S	N	A	4	0	1	3	C	C	A	A	A						-121.457	38.6
82139305	7/21/2023	NORWOO	HARRIS A	168	N	N	A	4	0	2	3	C	C	A	A	A						-121.457	38.6
82142336	7/30/2023	NORWOO	GRAND A	38	N	N	A	4	0	1	3	C	C	A	A	A						-121.457	38.6
82148156	8/7/2023	NORWOO	BELL AVE	0		Y	A	3	0	1	12	D	C	A	A	A						-121.457	38.6
82166422	8/30/2023	NORWOO	JESSIE AV	252	N	N	A	4	0	1	7	D	C	A	A	A						-121.457	38.6
82166667	8/29/2023	NORWOO	HARRIS A	407	N	N	A	3	0	1	3	C	C	A	A	A						-121.457	38.6
82169718	9/1/2023	NORWOO	JESSIE AV	288	N	N	A	3	0	1	8	D	C	A	C	D					Y	-121.457	38.6
82180908	9/9/2023	FORD RD	NORWOO	0		Y	A	3	0	2	12	D	D	A	C	A						-121.457	38.6
82187082	9/19/2023	NORWOO	BELL AVE	465	S	N	A	2	0	1	1	B	C	A	C	D					Y	-121.457	38.6

Appendix C: Signal Timing Sheets

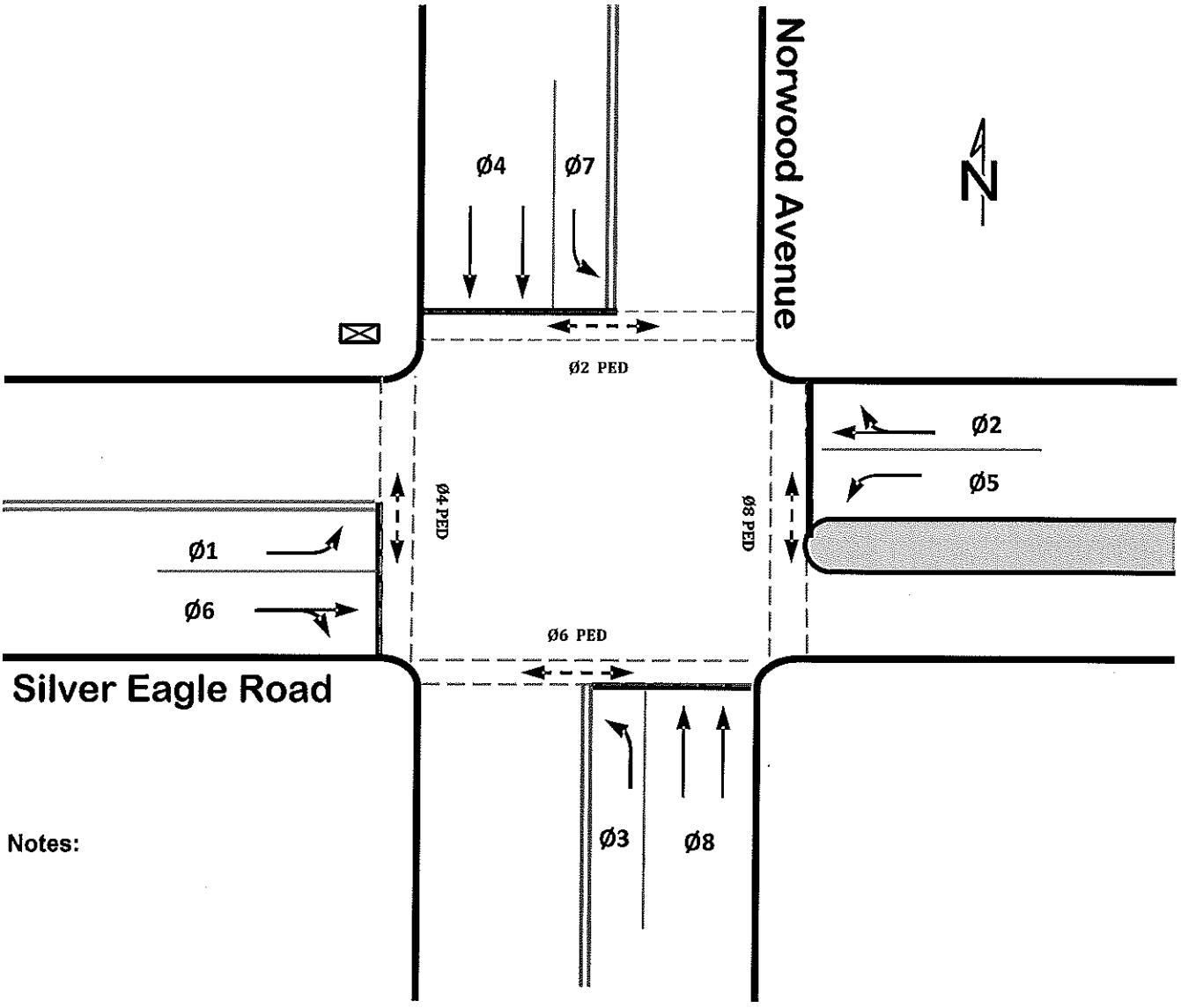
ECONOLITE ASC3

TRAFFIC SIGNAL CONTROLLER PROGRAM CHART

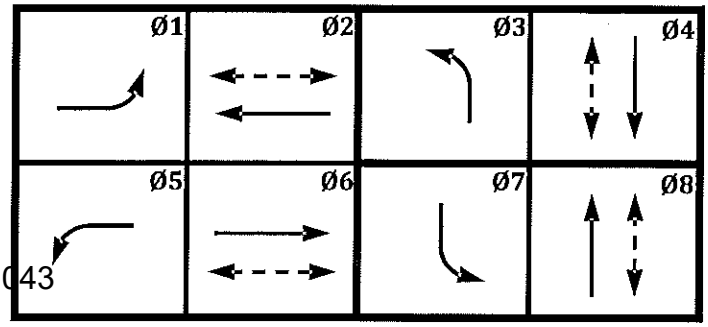
N/S Norwood Avenue **E/W** Silver Eagle Road

INTERSECTION #: 545 SYSTEM: _____ IP Address: _____

Device ID: _____ Channel: _____ Drop #: _____



Notes:



CITY OF SACRAMENTO

Econolite ASC/3 V2.49 and above

PHASE TIMING

I/S #: 545 Location: Norwood Avenue and Silver Eagle Road

Prepared by: [illegible] Approved by: [illegible] Date Implemented: 7-15-14

Controller Timing Data Key: 2-1

Phase	1	2	3	4	5	6	7	8
Min Green	10	10	9	8	10	9	9	8
Walk		7		7		7		7
Ped Clear		17		16		17		12
Yellow	3.5	3.5	3.5	4.3	3.5	3.9	3.5	4.3
Red Clearance				0.3				0.3
Red Rvt	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Vehicle Ext	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Max 1	30	30	30	40	30	30	30	40
Max 2								
Max 3								
Act B4								
Sec/Act								
Max Ini								
Time B4								
Cars Wt								
Steps to Reduce								
Time to Reduce								
Min Gap								
Bike Green								
CndSrv Min Green								
Delay Green								
Walk 2								
Walk Max								
Ped Clear 2								
Ped Clear Max								
Ped CarryOver								
Vehicle Ext 2								
Dym Green								
Dym Step								
Red Max								

Guaranteed Min Time Data Key: 2-4

Phase	1	2	3	4	5	6	7	8
Min Green	10	10	9	8	10	9	9	8
Walk	0	7	0	7	0	7	0	7
Ped Clear	0	17	0	16	0	17	0	12
Red Clear	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3
Overlap	A	B	C	D	E	F	G	H
Overlap Green	5	5	5	5	5	5	5	5

SET SCREEN FORMAT TO BASIC Key: 1-7-2

Controller Start/Flash Data Key: 2-5

Phase	1	2	3	4	5	6	7	8	
Phase (Color)				Y				Y	
Overlap	X	X	X	X					
Flash/Mon	No			Start Flash Time				0	sec
PWR Start Seq	1			All Red				6	sec

Note: Startup phase can be Y, R, G or W

Automatic Flash

Phase	1	2	3	4	5	6	7	8
Entry				4				8
Exit				4				8
Overlap	A	B	C	D	E	F	G	H
Exit	X	X	X	X				

Flash/Mon	No		Exit Flash	R
Min Flash	4	sec	Cycle Thru Phase	Yes
			Min Recall	Yes

Phase Recall Data Key: 2-8

Phase	1	2	3	4	5	6	7	8
Lock Det								
Vehicle Recall								
Ped Recall								
Max Recall								
Soft Recall				4				8
No Rest								
Added Initial Calc								

Controller Options KEY: 2-6-1

Ped Protect	.	Unit Red Revert			2.0	sec			
Phase	1	2	3	4	5	6	7	8	
Flashing Green Phase									
Guar Pass									
Non Act I									
Non Act II									
Dual Entry									
Cond Service									
Cond Reservice									
Ped Reservice									
Rest in Walk									
Flashing Walk									
PED Clear > yellow									
PED Clear > RED									
IG + VEH EXT									

CITY OF SACRAMENTO

CONFIGURATION

Phase Ring Seq and Assignment Key: 1-1-1

Controller Sequence									1
Hardware Alternate Sequance Enable									No
Barrier	B		B		B		B		
Ring 1	1	2	3	4	9	10	13	14	
Ring 2	5	6	7	8	11	12	15	16	
Ring 3									
Ring 4									

Phase in Use/Exclusive Peds Key: 1-2

Phase	1	2	3	4	5	6	7	8
Phases in Use	1	2	3	4	5	6	7	8
Exclusive Ped								

Load Switch Assign (MMU Chan) Key: 1-3

CH	PHASE/ OVLP	type	DIMMING R	Y	G	D	FLASH P	A	TGR
1	1	V				+	A	R	
2	2	V				+	A	R	X
3	3	V				+	A	R	
4	4	V				+	A	R	X
5	5	V				-	A	R	
6	6	V				-	A	R	X
7	7	V				-	A	R	
8	8	V				-	A	R	X
9	2	P				+	A		
10	4	P				+	A		
11	6	P				-	A		
12	8	P				-	A		
13	1	O				+	A	R	
14	2	O				-	A	R	X
15	3	O				+	A	R	
16	4	O				-	A	R	X

Display Options Key: 1-7-2

Key Click Enabled	NO
BackLight Enable	YES
LED Mode	Auto
Main Status Display Mode	Basic
Screen Format	Basic

Ethernet Port Configuration Key: 1-5-1

IP ADDRESS	
ADDRESS MASK	
DEFAULT GATEWAY ADD	
SEVER IP ADDRESS	
LINK SPEED/DUPLEX	AUTO
DROP-OUT TIME	300

Port 1 (SDLC Options) Key: 1-4-1

BIU	1	2	3	4	5	6	7	8
TERM & FACILITY	X	X	.	.	.	.	.	.
DETECTOR	X	X	.	.	.	.	.	.
ENABLE TS2/MMU TYPE CABINET							YES	
ENABLE MMU EXTENDED STATUS							YES	
ENABLE SDLC START TIME							YES	
ENABLE 3 CRITICAL RFE'S LOCKUP							YES	
MMU TO CU SDLC EXTERNAL START							enabled	

Ped Detector Input Key: 6-3

PED DET ASSIGNMENT MODE								NTCIP
PHASE	1	2	3	4	5	6	7	8
DETECTOR	1	2	3	4	5	6	7	8
PHASE	9	10	11	12	13	14	15	16
DETECTOR	9	10	11	12	13	14	15	16

EV PREEMPT/SCP SUBMENU

Preempt Plan 2 KEY: 4-1

Phase	1	2	3	4	5	6	7	8
Track Clr V								
Track Clr O								
Ena Trl								
Dwell Veh	1					6		
Dwell Ped								
Dwell OL								
Cycle Veh								
Cycle Ped								
Cycle OL								
Exit Phase	1					6		
Exit Calls								
Sp Function								

Entrance Times	Walk	Ped Cl	Grn	Yel	Red
	255	255	255	25.5	25.5
Track Clear	Min Gn	Ext Grn	Max G	Yel	Red
	0	0	0	0	0
Dwl/Cyc exit	Min Dwell	Pmt Ext	Mx Tm	Yel	Red
	6	3	55	0	0

Free Dur Prmt	R1	NO	R2	NO	R3	NO	R4	NO

Enable	Yes	Pmt Ovrid	X
Det Lock	X	Delay	0
Override Flash	.	Duration	0
Term Ovlp	NO	PC>Yel	NO
Ped Dark	NO	TC Reserv	NO
Link Pmt	0	Exit Fl Color	GRN
Exit Tm Pln	0	Re-Serv	0
Interlock	NO	Term Ph	NO
Inhibt	0	Dwell Fl	OFF
Clr>Grn	NO	Pmt>Crd	YES
Inhibt Ext Time	0	FLT Type	Hard

Pmt Active Out	OFF	Pmt Active Dwell	OFF
Other-Pri Pmt	OFF	Non-Pri Pmt	OFF

Preempt Plan 3

Phase	1	2	3	4	5	6	7	8
Track Clr V								
Track Clr O								
Ena Trl								
Dwell Veh		2			5			
Dwell Ped								
Dwell OL								
Cycle Veh								
Cycle Ped								
Cycle OL								
Exit Phase		2			5			
Exit Calls								
Sp Function								

Entrance Times	Walk	Ped Cl	Grn	Yel	Red
	255	255	255	25.5	25.5
Track Clear	Min Gn	Ext Grn	Max G	Yel	Red
	0	0	0	0	0
Dwl/Cyc exit	Min Dwell	Pmt Ext	Mx Tm	Yel	Red
	6	3	55	0	0

Free Dur Prmt	R1	NO	R2	NO	R3	NO	R4	NO

Enable	Yes	Pmt Ovrid	X
Det Lock	X	Delay	0
Override Flash	.	Duration	0
Term Ovlp	NO	PC>Yel	NO
Ped Dark	NO	TC Reserv	NO
Link Pmt	0	Exit Fl Color	GRN
Exit Tm Pln	0	Re-Serv	0
Interlock	NO	Term Ph	NO
Inhibt	0	Dwell Fl	OFF
Clr>Grn	NO	Pmt>Crd	YES
Inhibt Ext Time	0	FLT Type	Hard

Pmt Active Out	OFF	Pmt Active Dwell	OFF
Other-Pri Pmt	OFF	Non-Pri Pmt	OFF

Preempt Plan 4

Phase	1	2	3	4	5	6	7	8
Track Clr V								
Track Clr O								
Ena Trl								
Dwell Veh			3					8
Dwell Ped								
Dwell OL								
Cycle Veh								
Cycle Ped								
Cycle OL								
Exit Phase			3					8
Exit Calls								
Sp Function								

Entrance Times	Walk	Ped Cl	Grn	Yel	Red
	255	255	255	25.5	25.5
Track Clear	Min Gn	Ext Grn	Max G	Yel	Red
	0	0	0	0	0
Dwl/Cyc exit	Min Dwell	Pmt Ext	Mx Tm	Yel	Red
	6	3	55	0	0

Free Dur Prmt	R1	NO	R2	NO	R3	NO	R4	NO

Enable	Yes	Pmt Ovrid	X
Det Lock	X	Delay	0
Override Flash	.	Duration	0
Term Ovlp	NO	PC>Yel	NO
Ped Dark	NO	TC Reserv	NO
Link Pmt	0	Exit Fl Color	GRN
Exit Tm Pln	0	Re-Serv	0
Interlock	NO	Term Ph	NO
Inhibt	0	Dwell Fl	OFF
Clr>Grn	NO	Pmt>Crd	YES
Inhibt Ext Time	0	FLT Type	Hard

Pmt Active Out	OFF	Pmt Active Dwell	OFF
Other-Pri Pmt	OFF	Non-Pri Pmt	OFF

Preempt Plan 5

Phase	1	2	3	4	5	6	7	8
Track Clr V								
Track Clr O								
Ena Trl								
Dwell Veh				4			7	
Dwell Ped								
Dwell OL								
Cycle Veh								
Cycle Ped								
Cycle OL								
Exit Phase				4			7	
Exit Calls								
Sp Function								

Entrance Times	Walk	Ped Cl	Grn	Yel	Red
	255	255	255	25.5	25.5
Track Clear	Min Gn	Ext Grn	Max G	Yel	Red
	0	0	0	0	0
Dwl/Cyc exit	Min Dwell	Pmt Ext	Mx Tm	Yel	Red
	6	3	55	0	0

Free Dur Prmt	R1	NO	R2	NO	R3	NO	R4	NO

Enable	Yes	Pmt Ovrid	X
Det Lock	X	Delay	0
Override Flash	.	Duration	0
Term Ovlp	NO	PC>Yel	NO
Ped Dark	NO	TC Reserv	NO
Link Pmt	0	Exit Fl Color	GRN
Exit Tm Pln	0	Re-Serv	0
Interlock	NO	Term Ph	NO
Inhibt	0	Dwell Fl	OFF
Clr>Grn	NO	Pmt>Crd	YES
Inhibt Ext Time	0	FLT Type	Hard

Pmt Active Out	OFF	Pmt Active Dwell	OFF
Other-Pri Pmt	OFF	Non-Pri Pmt	OFF

CITY OF SACRAMENTO

TS2 DETECTION SCHEDULE

Location: Norwood Avenue and Silver Eagle Road

	Phase	Controller Det. Input	Location	Direction	Controller / Detector Type / Function						
					Type	TS-2	Call Option	Ext. Option	Extend Time	Delay Time	Notes
BIU1	Ø1	1	Rear	E-N	S	X					D1
	Ø1	2	Left	E-N	S	X					D2
	Ø1	3									
	Ø1	4									
	Ø6	5	Rear	EB	S	X					D1
	Ø6	6	Mid	EB	S	X					D2
	Ø6	7	Front	EB	S	X					D3
	Ø6	8									
	Ø5	9	Rear	W-S	S	X					D1
	Ø5	10	Front	W-S	S	X					D2
	Ø5	11									
	Ø5	12									
	Ø2	13	Rear	WB	S	X					D1
	Ø2	14	Mid	WB	S	X					D2
	Ø2	15	Front	WB	S	X					D3
	Ø2	16									
BIU2	Ø3	17	Rear	S-E	S	X					D1
	Ø3	18	Front	S-E	S	X					D2
	Ø3	19									
	Ø3	20									
	Ø8	21	Rear	SB	S	X					D1
	Ø8	22	Mid	SB	S	X					D2
	Ø8	23	Front	SB	S	X					D3
	Ø8	24									
	Ø7	25	Rear	N-W	S	X					D1
	Ø7	26	Front	N-W	S	X					D2
	Ø7	27									
	Ø7	28									
	Ø4	29	Rear	NB	S	X					D1
	Ø4	30	Mid	NB	S	X					D2
	Ø4	31	Front	NB	S	X					D3
	Ø4	32									
BIU 3	Ø1	33									
	Ø1	34									
	Ø6	35									
	Ø6	36									
	Ø6	37									
	Ø6	38									
	Ø6	39									
	Ø6	40									
	Ø5	41									
	Ø5	42									
	Ø2	43									
	Ø2	44									
	Ø2	45									
	Ø2	46									
	Ø2	47									
	Ø2	48									
BIU 4	Ø3	49									
	Ø3	50									
	Ø8	51									
	Ø8	52									
	Ø8	53									
	Ø8	54									
	Ø8	55									
	Ø8	56									
	Ø7	57									
	Ø7	58									
	Ø4	59									
	Ø4	60									
	Ø4	61									
	Ø4	62									
	Ø4	63									
	Ø4	64									

Type: N-NTCIP; B-Bike; S-Standard; D-Disconnect; P-Passage; C-Calling; R-Red Extend; G-Green Extend

Ext Option: Passage; Queue; None

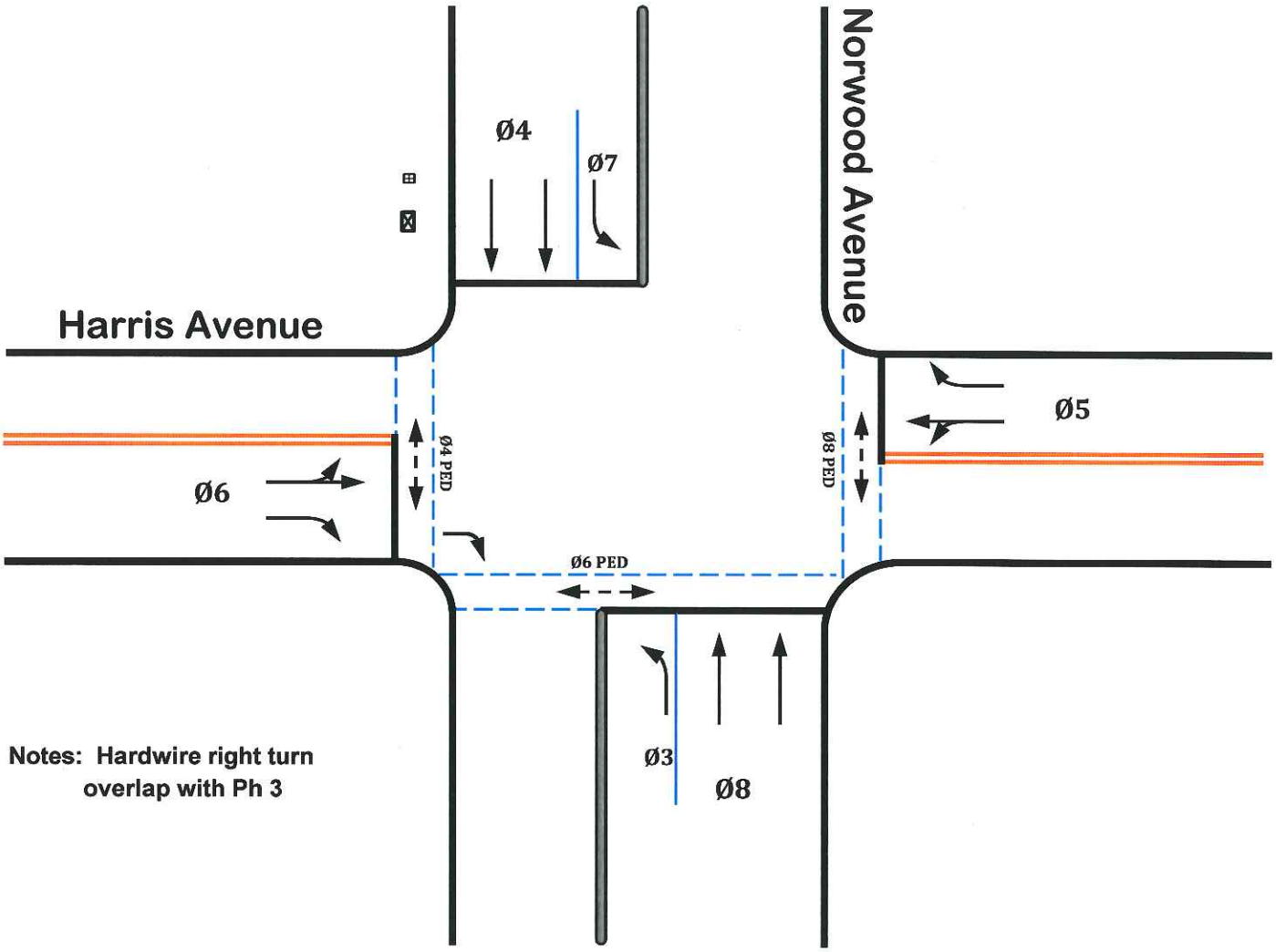
TRACONEX 390 K2c

TRAFFIC SIGNAL CONTROLLER PROGRAM CHART

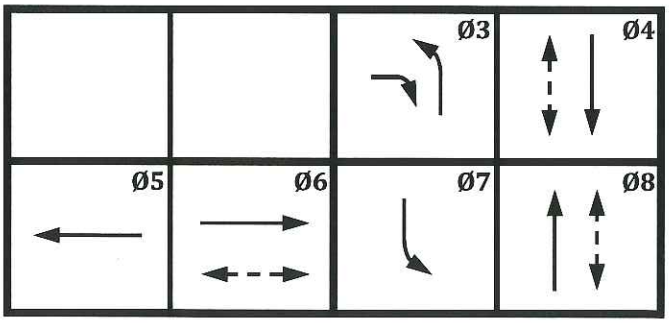
N/S Norwood Avenue **E/W** Harris Avenue

Intersection #: 458 System: _____ IP Address: _____

Device ID: _____ Channel: _____ Drop #: _____



Notes: Hardwire right turn overlap with Ph 3



Traconex TMP 390 K2c

CITY OF SACRAMENTO

Prepared by: ALL **Approved by:** Jen **Date Implemented:** 7-23-13

Phase Timing **Key: 390 - Page - 3 - Enter**

Phase		1	2	3	4	5	6	7	8
Min Green	MIN			10	8	11	10	9	7
Walk	WLK				7		7		7
Ped Clr	WCL				14		18		8
Passage Time	PSG			2.0	2.5	2.0	2.0	2.0	2.5
Max No. 1	MX1			40	40	40	40	40	40
Max No. 2	MX2								
Yellow Clr	YEL			3.5	4.3	3.5	3.5	3.5	4.3
All Red Clr	RED				0.3	0.3	0.1		0.3
Red Revert	RRT			2.0	2.0	2.0	2.0	2.0	2.0
Act. B4 Added	ABA								
Sec / Act	S/A								
Max Initial	MXI								
Time B4 Reduce	TBR								
Time to Reduce	TTR								
Min Gap	MNG			2.0	2.5	2.0	2.0	2.0	2.5
Cond Min Green	CMN								

Options **Key: 390 - Page - 2 - Enter**

Phase		8	7	6	5	4	3	2	1
Phase in Use	USE	8	7	6	5	4	3		
Ped Phases	PED	8		6		4			
Flashing Walk	FWK								
Act Rest in Walk	ARW								
Walk Clr Protect	WCP								
Density Phases	DEN								
Last Car Passage	LCP								
Veh call to NonAct 1	VN1								
Ped call to NonAct 1	PN1								
Veh call to NonAct 2	VN2								
Ped call to NonAct 2	PN2								
Fast Flash Green	FGN								
Enable Menu Scroll	MNU								
Left Turn Yellow Blan	LAB								
Select Anti -Backup	ABU								

Additional Parameters **Key: 390 - Page 4 - Enter**

Phase		8	7	6	5	4	3	2	1
Power Up Flash	PUF			sec					
Start Up Red Time	SAR	6		sec					
Start Up in Red	SUR								
Start up in Yel	SUY	8				4			
Start Up In Green	SUG								
Main ST (MUTCD)	MSF	8				4			
Min MUTCD FL Time	FMN	15		sec					
Dual Entry	DLE								
Sim Gap Out	SGO	8				4			
Min Recall	MNR								
Min Soft Recall	MNS								
Max Recall	MXR								
Ped Recall	PDR								
Lock Detector	LKD	8	7	6	5	4	3		1
Liq Crys Dis Test	LCD	0		0=OFF 1=ON					
Backlight On/Off	LBT	1		0=OFF 1=ON					

CITY OF SACRAMENTO

MORE DATA

Function Enable — **Key: 390 - Page - 6 - Enter**

Frnt Pnl O/L Enable	FOE	1	0 TO 3
Spcl Func Enable	SFE	0	0 OR 1 0=OFF 1=ON
Stop Time Enable	STE	0	0 OR 1 0=OFF 1=ON
Seq Rotat Enable	SQE	0	0 TO 2
Cond Serv Enable	CSE		
Neg OVL Enable	NOE	0	0 OR 1 0=OFF 1=ON
Dimming Enable	DME	0	1=50%, 2=66%, 3=
Pre w/Flsh Dwell	PFE	Preempt 1-5	
Preempt Out Mode	POM	0	0 TO 3
TOD On/Off	TOD	0	0 OR 1 0=OFF 1=ON
Coord On/Off	CRD	0	0 OR 1 0=OFF 1=ON
Diag Test Enable	DIA	1 TO 4	4 3 2 1
Security Code Accs	SCY	0	0-255 0=No Code
Config Control	CFG	0	0 TO 7
Volt Mon off Dur Flsh	FLE	0	0=OFF 1=ON
ime after Init B4 reduc	TBS	0	0 OR 1

More Data — **Key: 390 - Page - 7 - Enter**

Printer Report Enable	PNT	0	0 TO 99
Manual ø Rotate Sel	SQK	0	0 TO 15
Disp ø Seq, Remote	SQC	0	0 TO 15
Disp Effect ø Seq	SQI	0	0 TO 15
Dimming Red Enable	DRD		
Dimming Yello Enable	DYL		
Dimming Grn Enable	DGN		
Dim Ped Walk Enable	DWK		
Dim Ped DWlk Enable	DDW		
Dim Red OVLP's	DOR		
Dim Yello OVLP's	DOY		
Dim Grn OVLP's	DOG		
Clock	CLK	14	READ ONLY
Non Volatile Ram Sel	NVR		1
Active TOD Plan	ACT	0	0 TO 48
Audible Keyboard	AUD	1	0 OR 1 O=OFF 1=ON

CITY OF SACRAMENTO

OPTIONS

Manual Selections

Key: 390 - Page - 11 - Enter

Man Free-Coord	F/C	0	0=Free 1=Coordinated
Man Semi or Fully Act	S/F	0	0=Semi 1=Fully
Man Dwnld Request	DRQ	0	0=OFF 1=ON
Synch Puls Tolerance	SYC	2	0 TO 10 sec
Master/Local Cycle	M/L	1	0=Master 1=Local
Man Cycle Plan	CP	0	0 TO 18
Man Offset Selection	OFF	0	0 TO 5
Man Local/Remote	L/R	1	0=Local 1=Remote
Man TOD Plan	TDP	0	0 TO 48
Det Sample Period	SMP	15	0-255 sec
Divide Vol 4 Report	DVV	1	1 TO 100
Enable Max Coord	CME		
Disable Ped Omit Crd	DPO		
Enable Secdry Coord	SCP		

Manual Offset Set

Key: 390 - Page - 35 - Enter

Select CP to Synch	CP	0	1 TO 6
Select Ofset to Synch	OFF	0	1 TO 5
Synch	SET	0	SET 1,Press ENTER to Synch

System Parameters

Key: 390 - Page - 15 - Enter

System Enable	SYE	1	0 TO 2,1=Traconet 2= TOC
System Det Enable	SDT		
Drop Address	ADD	3	0 TO 31
Inter Plan# Disp	IPL	0	0 TO 48 READ ONLY
Inter Plan Mode	IPM	0	0 TO 2,2=WWV Time Receive
Local Det Fail Time	DFT	255	0-255 sec
Failed Local Det Disp	FDT		
Enable Local Det Mon	DFM		
Disp Local 5min Vol	5MV	9	0 TO 255
Sync Time to Hour	SHR	0	0 TO 23
Sync Time to Min	SMN	0	0 TO 59
Time On-Line B4 Bkup	ONL	5	min 0 TO 255 0=MODE2
Dyn Split Adjust, Glob	DSA	1	0 TO 1
Dyn Split Adjust Max	DS%	25	0 TO 100
DB Change Flag	DBC	NO ACCESS	
Drop Request	DRP	0	0 TO 1

CITY OF SACRAMENTO
DETECTION SCHEDULE

Norwood Avenue at Harris Avenue

	Phase	Controller Det. Input	Location	Direction	Controller / Detector Type / Function			
					Extend	Delay	Passage	Notes
BIU 1	**Loops or Retrofit Video**							
	Ø1	1						
	Ø2	2						
	Ø3	3	Front	N-W				
	Ø4	4	Front	SB				
	Ø5	5	Front	WB				
	Ø6	6	Front	EB				
	Ø7	7	Front	S-E				
	Ø8	8	Front	NB				
	Loops							
	Ø1	9						
	Ø2	10						
	Ø3	11						D1 2 sec delay
	Ø4	12						
	Ø5	13						D1 2 sec delay
	Ø6	14						D1 6 sec delay
	Ø7	15						D1 2 sec delay, D2 6 sec delay
	Ø8	16						
	New Video Detection	**BIU 2 (RESERVED) 17-32**						
BIU 3	Ø1	33						
	Ø1	34						
	Ø6	35						
	Ø6	36						
	Ø6	37						
	Ø6	38						
	Ø6	39						
	Ø6	40						
	Ø5	41						
	Ø5	42						
	Ø2	43						
	Ø2	44						
	Ø2	45						
	Ø2	46						
	Ø2	47						
	Ø2	48						
BIU 4	Ø3	49						
	Ø3	50						
	Ø8	51						
	Ø8	52						
	Ø8	53						
	Ø8	54						
	Ø8	55						
	Ø8	56						
	Ø7	57						
	Ø7	58						
	Ø4	59						
	Ø4	60						
	Ø4	61						
	Ø4	62						
	Ø4	63						
	Ø4	64						

2070 D4

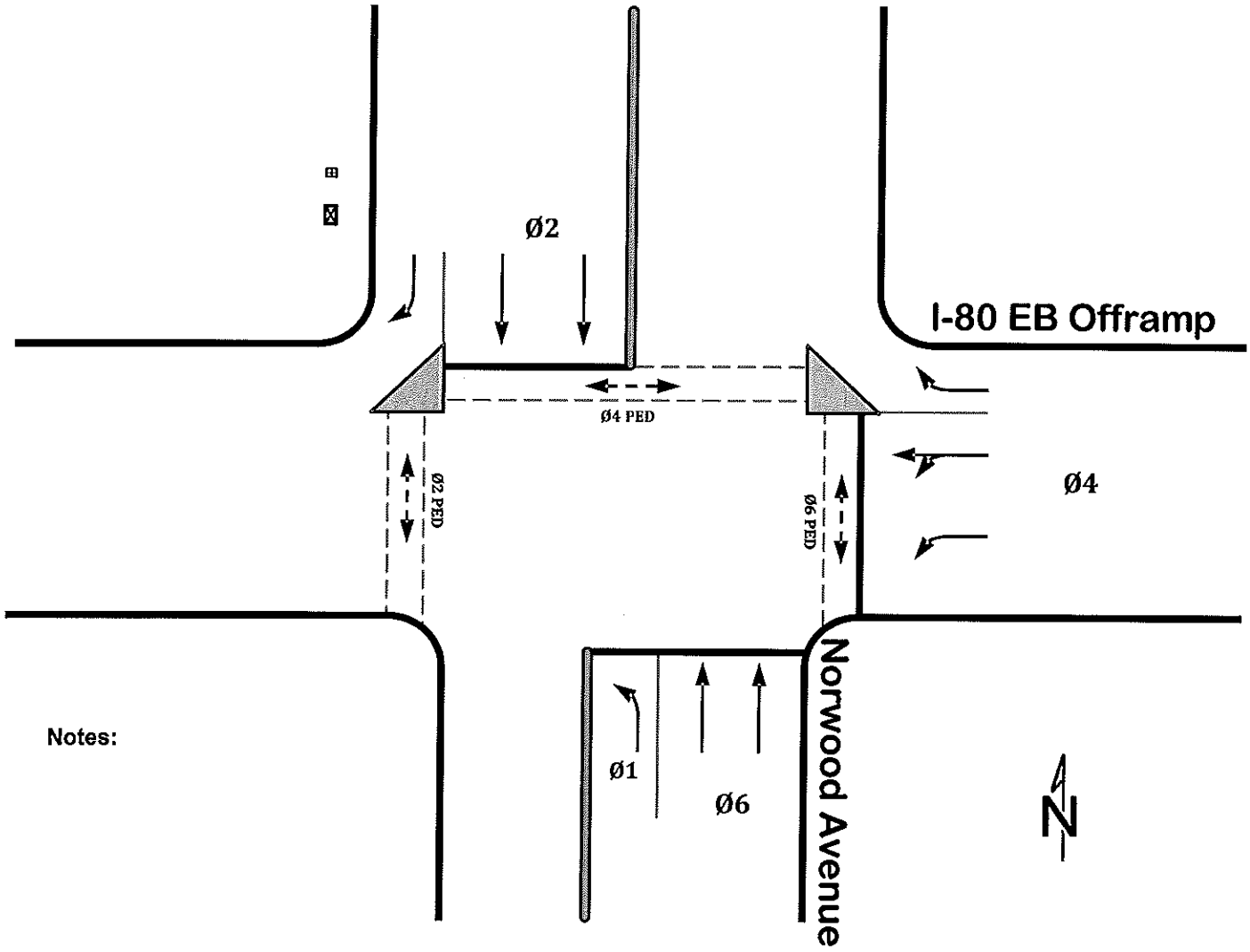
TRAFFIC SIGNAL CONTROLLER PROGRAM CHART

N/S Norwood Avenue **E/W** I-80 WB offramp

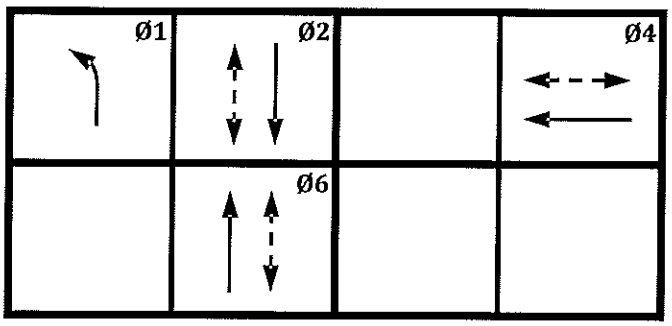
Intersection #: 570 System: _____ IP Address: _____

Device ID: _____ Channel: _____ Drop #: _____

Prepared by: _____ Approved by: _____ Date Implemented: 3-27-14



Notes:



570 - Norwood & I-80 WB offramp

Phase Timing

3/27/2014 11:54:21 AM

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Min Green	8	6	0	8	0	6	0	0	0	0	0	0	0	0	0	0
Veh Ext	2.5	2.5	0.0	2.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Green 1	30	40	0	40	0	40	0	0	0	0	0	0	0	0	0	0
Max Green 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max Green 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max Ext	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow	3.5	4.3	0.0	3.5	0.0	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Clr	0.0	0.5	0.0	0.5	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Walk	0	7	0	7	0	7	0	0	0	0	0	0	0	0	0	0
Ped Clr	0	6	0	18	0	7	0	0	0	0	0	0	0	0	0	0
Sol DW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Early Wlk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Wlk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Added	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Initial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reduce After	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TTReduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Max Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Revert	2.0	2.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Neg Ped	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AP Disc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pmt Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pmt Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pmt Ped Clr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Return Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

570 - Norwood & I-80 WB offramp

Phase Options

3/27/2014 11:54:21 AM

Phases	1-8								9-16							
Min Recalls																
Max Recalls																
Ped Recalls																
Soft Recall		2				6										
Dual Entry		2				6										
Red Rest																
Walk Rest																
Walk Expand																
Ped Recycle																
No Simult Gap																
Yel Lock																
Red Lock																
PhaseNext Lock																
No Term Call																
Cond Serv																
CS Enable																
Cond Reserve																
Reserve																
Veh Omit																
Ped Omit																
Perm Phase																
Protect Calls																
Flash Entry																
Flash Exit																
Flash Exit Yel																
Flash Exit Red																
Ped Scramble																
No Min Yel																
No Min Red Rev																
Max Scramble Walk																
Flash Yellow																
CNA 1																
CNA 2																

570 - Norwood & I-80 WB offramp

Phase Startup Options

3/27/2014 11:54:21 AM

Startup Flash	0	Mode	Red->Yel
Startup All Red	6	Yellow	0.0

Phases	1-8							9-16							
Startup Phases		2			6										
Startup Yellow		2			6										
Startup Red															
Startup No Walk															
Startup Next															
No Veh Call															
No Ped Call															

Phase Startup Timing

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Start Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Start Max Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

570 - Norwood & I-80 WB offramp

Ring Sequence / Conflicting Phases

3/27/2014 11:54:21 AM

Ringgroup 1

Ring 1	1	2	3	4	0	0	0	0	0	0	0	0	0	0	0	0
Ring 2	5	6	7	8	0	0	0	0	0	0	0	0	0	0	0	0

Ringgroup 2

Custom Sequences

Seq 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Conflicting Phases

	1-8	9-16
Phase 1		
Phase 2		
Phase 3		
Phase 4		
Phase 5		
Phase 6		
Phase 7		
Phase 8		
Phase 9		
Phase 10		
Phase 11		
Phase 12		
Phase 13		
Phase 14		
Phase 15		
Phase 16		

570 - Norwood & I-80 WB offramp

MCE Options

3/27/2014 11:54:21 AM

Phases	1-8	9-16
MCE Ped Protect		
MCE Veh Call		
MCE Ped Call		
MCE Veh Omit		
MCE Ped Omit		
MCE Veh Sync		
MCE Ped Sync		
MCE Halt Don't Walk		

LRV Phases	1-8
MCE LRV Term Early	

570 - Norwood & I-80 WB offramp

332/336 Outputs (Connector C1S)

3/27/2014 11:54:21 AM

	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
Output	DntWlk	Walk	VehRed	VehYel	VehGrn	VehRed	VehYel	VehGrn
Index	4	4	4	4	4	3	3	3
	Pin 10	Pin 11	Pin 12	Pin 13	Pin 15	Pin 16	Pin 17	Pin 18
Output	DntWlk	Walk	VehRed	VehYel	VehGrn	VehRed	VehYel	VehGrn
Index	2	2	2	2	2	1	1	1
	Pin 19	Pin 20	Pin 21	Pin 22	Pin 23	Pin 24	Pin 25	Pin 26
Output	DntWlk	Walk	VehRed	VehYel	VehGrn	VehRed	VehYel	VehGrn
Index	8	8	8	8	8	7	7	7
	Pin 27	Pin 28	Pin 29	Pin 30	Pin 31	Pin 32	Pin 33	Pin 34
Output	DntWlk	Walk	VehRed	VehYel	VehGrn	VehRed	VehYel	VehGrn
Index	6	6	6	6	6	5	5	5
	Pin 35	Pin 36	Pin 37	Pin 38	Pin 83	Pin 84	Pin 85	Pin 86
Output	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed
Index	0	0	0	0	0	0	0	0
	Pin 87	Pin 88	Pin 89	Pin 90	Pin 91	Pin 93	Pin 94	Pin 95
Output	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed
Index	0	0	0	0	0	0	0	0
	Pin 96	Pin 97	Pin 98	Pin 99	Pin 100	Pin 101	Pin 102	Pin 103
Output	VehRed	VehRed	VehRed	VehRed	VehRed	Flash	VehRed	VehRed
Index	0	0	0	0	0	1	0	0

332/336 Outputs (Connector C11S)

	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
Output	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed
Index	0	0	0	0	0	0	0	0

570 - Norwood & I-80 WB offramp

332/336 Inputs (Connector C1S)

3/27/2014 11:54:21 AM

	Pin 39	Pin 40	Pin 41	Pin 42	Pin 43	Pin 44	Pin 45	Pin 46
Input	VehDet	VehDet	VehDet	VehDet	VehDet	VehDet	VehDet	VehDet
Index	2	6	4	8	2	6	4	8
	Pin 47	Pin 48	Pin 49	Pin 50	Pin 51	Pin 52	Pin 53	Pin 54
Input	VehDet	VehDet	VehDet	VehDet	None	None	None	None
Index	2	6	4	8	0	0	0	0
	Pin 55	Pin 56	Pin 57	Pin 58	Pin 59	Pin 60	Pin 61	Pin 62
Input	VehDet	VehDet	VehDet	VehDet	VehDet	VehDet	VehDet	VehDet
Index	5	1	7	3	5	1	7	3
	Pin 63	Pin 64	Pin 65	Pin 66	Pin 67	Pin 68	Pin 69	Pin 70
Input	VehDet	VehDet	VehDet	VehDet	PedDet	PedDet	PedDet	PedDet
Index	2	6	4	8	2	6	4	8
	Pin 71	Pin 72	Pin 73	Pin 74	Pin 75	Pin 76	Pin 77	Pin 78
Input	Preempt	Preempt	Preempt	Preempt	None	VehDet	VehDet	VehDet
Index	4	2	5	3	0	2	4	6
	Pin 79	Pin 80	Pin 81	Pin 82				
Input	VehDet	None	LocFlash	StopTm				
Index	8	0	1	1				

332/336 Inputs (Connector C11S)

	Pin 10	Pin 11	Pin 12	Pin 13	Pin 15	Pin 16	Pin 17	Pin 18
Input	None	None	None	None	None	None	None	None
Index	0	0	0	0	0	0	0	0
	Pin 19	Pin 20	Pin 21	Pin 22	Pin 23	Pin 24	Pin 25	Pin 26
Input	None	None	None	None	None	None	None	None
Index	0	0	0	0	0	0	0	0
	Pin 27	Pin 28	Pin 29	Pin 30				
Input	None	None	None	None				
Index	0	0	0	0				

570 - Norwood & I-80 WB offramp

Cabinet / MMU Configuration

3/27/2014 11:54:21 AM

Cabinet Type	332/336
MMU Disable	No

MMU Channel Ignore (1-8, 9-16)

Det BIU 1-No Fail Call (1-8, 9-16)

Det BIU 2-No Fail Call (1-8, 9-16)

Alt LS Flash (1-8, 9-16)

Alt Phase Flash (1-8, 9-16)

Alt Overlap Flash (1-8, 9-16)

Alt LRV Flash (1-8, 9-16)

CMU Channel Ignore (1-8, 9-16; 17-24, 25-32)

Det IASM1-Det Diag (1-8, 9-16; 17-24)

Det IASM2-Det Diag (1-8, 9-16; 17-24)

Phase / Overlap Outputs

	Phase	Overlap
1	Normal	Normal
2	Normal	Normal
3	Normal	Normal
4	Normal	Normal
5	Normal	Normal
6	Normal	Normal
7	Normal	Normal
8	Normal	Normal
9	Normal	Normal
10	Normal	Normal
11	Normal	Normal
12	Normal	Normal
13	Normal	Normal
14	Normal	Normal
15	Normal	Normal
16	Normal	Normal

LRV Outputs

	LRV
1	2 Head
2	2 Head
3	2 Head
4	2 Head
5	2 Head
6	2 Head
7	2 Head
8	2 Head

570 - Norwood & I-80 WB offramp

Vehicle Detector 1

3/27/2014 11:54:21 AM

Delay	2.0	Extend	0.0	Carryover	0.0	Queue Limit	0				
Mode	No Disc	Added	Disabled	System	Disabled						
Fail Mode	None	Max Pres	0	No Act	0	Erratic	0	Fail Time	0		

Phases	1-8							9-16							
Call Phases	1														
Yellow Lock Phases															
Red Lock Phases															
Extend Phases	1														
XSwitch Phases															

Vehicle Detector 2

Delay	0.0	Extend	0.0	Carryover	0.0	Queue Limit	0				
Mode	No Disc	Added	Disabled	System	Disabled						
Fail Mode	None	Max Pres	0	No Act	0	Erratic	0	Fail Time	0		

Phases	1-8							9-16							
Call Phases		2													
Yellow Lock Phases															
Red Lock Phases															
Extend Phases		2													
XSwitch Phases															

570 - Norwood & I-80 WB offramp

Vehicle Detector 3

3/27/2014 11:54:21 AM

Delay	0.0	Extend	0.0	Carryover	0.0	Queue Limit	0
Mode	No Disc	Added	Disabled	System	Disabled		
Fail Mode	None	Max Pres	0	No Act	0	Erratic	0
Fail Time	0						

Phases	1-8	9-16
Call Phases	6	
Yellow Lock Phases		
Red Lock Phases		
Extend Phases	6	
XSwitch Phases		

Vehicle Detector 4

Delay	2.0	Extend	0.0	Carryover	0.0	Queue Limit	0
Mode	No Disc	Added	Disabled	System	Disabled		
Fail Mode	None	Max Pres	0	No Act	0	Erratic	0
Fail Time	0						

Phases	1-8	9-16
Call Phases	4	
Yellow Lock Phases		
Red Lock Phases		
Extend Phases	4	
XSwitch Phases		

570 - Norwood & I-80 WB offramp

Vehicle Detector 5

3/27/2014 11:54:21 AM

Delay	0.0	Extend	0.0	Carryover	0.0	Queue Limit	0
Mode	No Disc	Added	Disabled	System	Disabled		
Fail Mode	None	Max Pres	0	No Act	0	Erratic	0
Fail Time	0						

Phases	1-8	9-16
Call Phases	5	
Yellow Lock Phases		
Red Lock Phases		
Extend Phases	5	
XSwitch Phases		

Vehicle Detector 6

Delay	0.0	Extend	0.0	Carryover	0.0	Queue Limit	0
Mode	No Disc	Added	Disabled	System	Disabled		
Fail Mode	None	Max Pres	0	No Act	0	Erratic	0
Fail Time	0						

Phases	1-8	9-16
Call Phases	6	
Yellow Lock Phases		
Red Lock Phases		
Extend Phases	6	
XSwitch Phases		

570 - Norwood & I-80 WB offramp

Vehicle Detector 7

3/27/2014 11:54:21 AM

Delay	0.0	Extend	0.0	Carryover	0.0	Queue Limit	0
Mode	No Disc	Added	Disabled	System	Disabled		
Fail Mode	None	Max Pres	0	No Act	0	Erratic	0	Fail Time	0

Phases	1-8	9-16
Call Phases	7	
Yellow Lock Phases		
Red Lock Phases		
Extend Phases	7	
XSwitch Phases		

Vehicle Detector 8

Delay	0.0	Extend	0.0	Carryover	0.0	Queue Limit	0
Mode	No Disc	Added	Disabled	System	Disabled		
Fail Mode	None	Max Pres	0	No Act	0	Erratic	0	Fail Time	0

Phases	1-8	9-16
Call Phases	8	
Yellow Lock Phases		
Red Lock Phases		
Extend Phases	8	
XSwitch Phases		

570 - Norwood & I-80 WB offramp

Pedestrian Detector 1

3/27/2014 11:54:21 AM

No Act: 0 | Max Pres: 0 | Erratic: 0 | Fail Mode: None

Phases/Overlaps	1-8	9-16
Call Ped Phases	1	
Call Ped Olaps		
Call Phases		
Locked Call Phases		
Ped Entry Phases		
Olap Ped Entry Phases		
Ped Cascade Phases		

Pedestrian Detector 2

No Act: 0 | Max Pres: 0 | Erratic: 0 | Fail Mode: None

Phases/Overlaps	1-8	9-16
Call Ped Phases	2	
Call Ped Olaps		
Call Phases		
Locked Call Phases		
Ped Entry Phases		
Olap Ped Entry Phases		
Ped Cascade Phases		

Pedestrian Detector 3

No Act: 0 | Max Pres: 0 | Erratic: 0 | Fail Mode: None

Phases/Overlaps	1-8	9-16
Call Ped Phases	3	
Call Ped Olaps		
Call Phases		
Locked Call Phases		
Ped Entry Phases		
Olap Ped Entry Phases		
Ped Cascade Phases		

Pedestrian Detector 4

No Act: 0 | Max Pres: 0 | Erratic: 0 | Fail Mode: None

Phases/Overlaps	1-8	9-16
Call Ped Phases	4	
Call Ped Olaps		
Call Phases		
Locked Call Phases		
Ped Entry Phases		
Olap Ped Entry Phases		
Ped Cascade Phases		

570 - Norwood & I-80 WB offramp

Pedestrian Detector 5

3/27/2014 11:54:21 AM

No Act	Max Pres	Erratic	Fail Mode
0	0	0	None

Phases/Overlaps	1-8	9-16
Call Ped Phases	5	
Call Ped Olaps		
Call Phases		
Locked Call Phases		
Ped Entry Phases		
Olap Ped Entry Phases		
Ped Cascade Phases		

Pedestrian Detector 6

No Act	Max Pres	Erratic	Fail Mode
0	0	0	None

Phases/Overlaps	1-8	9-16
Call Ped Phases	6	
Call Ped Olaps		
Call Phases		
Locked Call Phases		
Ped Entry Phases		
Olap Ped Entry Phases		
Ped Cascade Phases		

Pedestrian Detector 7

No Act	Max Pres	Erratic	Fail Mode
0	0	0	None

Phases/Overlaps	1-8	9-16
Call Ped Phases	7	
Call Ped Olaps		
Call Phases		
Locked Call Phases		
Ped Entry Phases		
Olap Ped Entry Phases		
Ped Cascade Phases		

Pedestrian Detector 8

No Act	Max Pres	Erratic	Fail Mode
0	0	0	None

Phases/Overlaps	1-8	9-16
Call Ped Phases	8	
Call Ped Olaps		
Call Phases		
Locked Call Phases		
Ped Entry Phases		
Olap Ped Entry Phases		
Ped Cascade Phases		

570 - Norwood & I-80 WB offramp

Control / Config

3/27/2014 11:54:21 AM

Pattern Mode: Free

Manual Pattern: 0 Manual Offset: 0

Stop Time Input: Disabled

Aux Switch: None 0

DLS Mode: Off Time Zone: Pac (UTC-8)

Password Timeout: 5

	1-8	9-16
Maint Phs Recalls		
Maint Ped Recalls		

Serial 1 Port Configuration

Broadcast Plan/Sync: Disabled Broadcast Time: 00:00

Serial Rebroadcast: Disabled Response: None

Serial 2 Port Configuration

Broadcast Plan/Sync: Disabled Broadcast Time: 00:00

Ethernet Port Configuration

Broadcast Plan/Sync: Disabled Broadcast Time: 00:00

Serial Rebroadcast: Disabled

Peer Configuration

Peer 1: 0

Peer 2: 0

Peer 3: 0

Peer 4: 0

Peer 5: 0

Peer 6: 0

Peer 7: 0

Peer 8: 0

570 - Norwood & I-80 WB offramp

Logging

3/27/2014 11:54:21 AM

Power On	Disabled	1 of 2 Hits (Det BIU 1)	
Ext Start	Disabled	1 of 2 Hits (Det BIU 2)	
Man Control	Disabled	1 of 2 Hits (Det BIU 3)	
Cabinet Door	Disabled	1 of 2 Hits (Det BIU 4)	
MMU Faults	Disabled	SPmt 1 Req Switch	
BIU Faults	Disabled	SPmt 2 Req Switch	
Det Faults	Disabled	SPmt 3 Req Switch	
Coordination	Disabled	SPmt 4 Req Switch	
Preempt	Disabled	Zone 1 Req Switch	
Soft Preempt	Disabled	Zone 2 Req Switch	
Zone	Disabled	Zone 3 Req Switch	
Speed Traps	Disabled	Zone 4 Req Switch	
		Zone 5 Req Switch	
		Zone 6 Req Switch	
		Zone 7 Req Switch	
		Zone 8 Req Switch	
		Trap Grp 1 Req Switch	
		Trap Grp 2 Req Switch	
		Trap Grp 3 Req Switch	
		Trap Grp 4 Req Switch	

570 - Norwood & I-80 WB offramp

Restricted Data 3/27/2014 11:54:21 AM

(Serial Ports)

Serial Port 1: 4

Baud Rate: 9600 | 8N1 RTS On: 0 RTS Off: 0

Serial Port 2: 0

Baud Rate: 9600 | 8N1 RTS On: 0 RTS Off: 0

(Ethernet)

IP Address: 160. 72. 44. 1

Netmask: 255. 255. 0. 0

Broadcast Address: 0. 0. 0. 0

Gateway: 192. 167. 4. 1

Port: 161 Reply Mode: Host

Broadcast Port: 0 Response: Time/Plan

Time Port: 0

(General)

Controller Address: 1 Timeout: 0

Peer Address: 0 Timeout: 0

Remote Calls: Disabled

Remote Preempt: Disabled

Remote Soft Preempt: Disabled

Remote Priority: Disabled

Remote MCE: Disabled MCE Max: 0

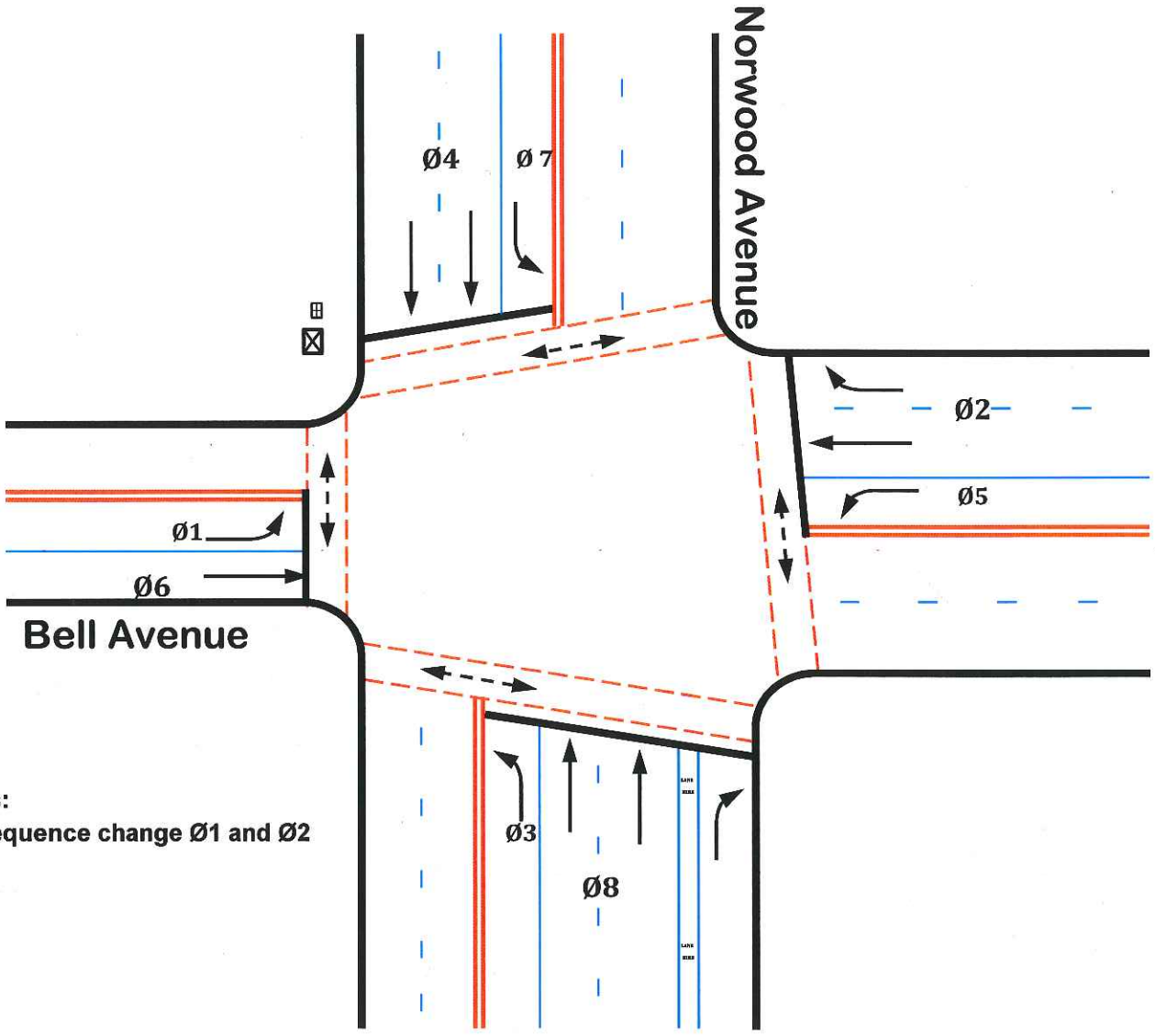
ECONOLITE ASC/2

TRAFFIC SIGNAL CONTROLLER PROGRAM CHART

N/S Norwood Avenue **E/W** Bell Avenue

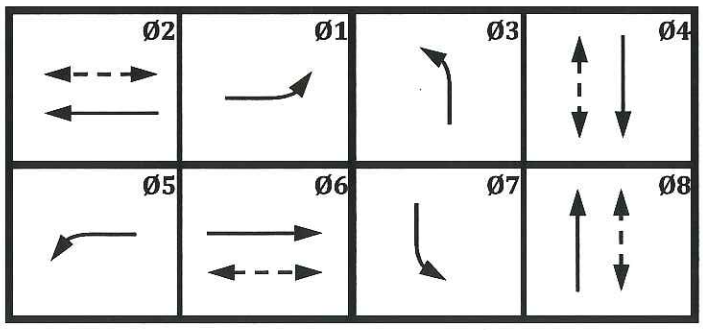
Intersection #: 584 System: _____ IP Address: _____

Device ID: _____ Channel: _____ Drop #: _____



Notes:

Sequence change Ø1 and Ø2



CITY OF SACRAMENTO

PHASE TIMING

Prepared by: MLL Approved by: [signature] Date Implemented: 3/22/13

Controller Timing Data

Key: (F1)-2-1

Phase	1	2	3	4	5	6	7	8	9	10	11	12
Min Green	11	9	10	8	11	9	11	9				
Bike Green												
CndSrv MinGrn												
Walk		7		7		7		7				
Ped Clr		16		10		20		16				
Veh Ext	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Veh Ext 2												
Max Ext												
Max1	30	50	30	50	30	50	30	50				
Max2												
Max3												
Det Max												
Yellow	3.5	4.3	3.5	4.3	3.5	4.3	3.5	4.3				
Red Clr	0.3	0.3	0.1	0.3	0.3	0.3	0.4	0.3				
Red Rvt	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Act B4 Init												
Sec/Actuation												
Max Initial												
Time B4 Reduct												
Cars Wt												
Time To Reduce												
Min Gap												

Controller Option Data

Key: (F1)-2-9

Phase	1	2	3	4	5	6	7	8	9	10	11	12
Guar Passage												
NonActuated I												
NonActuated II												
Dual Entry				4				8				
Cond Service												
Cond Reservice												
Rest in Walk												
Flashing Walk												

Five Section Left Turn Heads	5-2:		7-4:		1-6:	
	3-8:		11-10:		9-12:	

Dual Entry	ON	Backup Protection Grp 1	OFF
Cond Service Enable	NO	Backup Protection Grp 2	OFF
Cond Service Det X Switch	NO	Backup Protection Grp 3	OFF
Ped Clr Protect	NO	Simul Gap Grp 1	OFF
Spec Pre OVL Flash	OFF	Simul Gap Grp 2	OFF
Lock Det in Red		Simul Gap Grp 3	OFF
Reserved		unitBackup Time	
Reserved		unitRed Revert	

Controller Recall Data

Key: (F1)-2-4

Phase	1	2	3	4	5	6	7	8	9	10	11	12
Locking Memory												
Vehicle Recall				4				8				
Ped Recall												
Recall to Max												
Soft Recall												
Don't Rest Here												
Ped Dark N/Call												

Controller Start/Flash Data

Key: (F1)-2-6

Phase	1	2	3	4	5	6	7	8	9	10	11	12
ø's Startup				4				8				
Entry Rem Flash				4				8				
Exit Rem Flash				4				8				
Rem Flash Yello												
Flsh Together ø		2		4		6		8		10		12
Flsh Tgther OV	A:		B:		C:		D:					

Startup Intvl Rng1	Yellow
Startup Intvl Rng2	Yellow
Power Start All Red	6 sec
Power Start Flash	
Remote Flash Options	
Out of Flash Yellow	Yes
Out of Flash All Red	
Minimum Recall	Yes
Spare	
Flash Thru Ld Switch	
Cycle Thru Phases	

CONFIGURATION

Controller Sequence

Key: (F1)-1-1

Priority	1	2	3	4	5	6	7	8	9	10	11	12
Ring 1	2	1	3	4	9	10	0	0	0	0	0	0
Ring 2	5	6	7	8	11	12	0	0	0	0	0	0
CG Barrier		^		^		^						

Phases in Use

Key: (F1)-1-2

Phase	1	2	3	4	5	6	7	8	9	10	11	12
Phases in Use	1	2	3	4	5	6	7	8				
Exclusive Ped												

SDLC Options

Key: (F1)-1-4

BIU Number	1	2	3	4	5	6	7	8
Term & Facil								
Detector Rack								

Type 2 Runs as Type 1	
MMU Disable	X
Diagnostic Enable	
Peer to Peer Enable	

Peer to Peer Addresses									
1)	255	2)	255	3)	255	4)	255	5)	255
6)	255	7)	255	8)	255	9)	255	10)	255

NEW CONTROLLER SHOULD BE DEFAULTED BEFORE INSTALLATION

To Default Controller: (F1)-8-2 Select All Press ENTER

(F1)-8-1-3 Select All Press ENTER

Ped Timing Carryover

Key: (F1)-2-3

Phase	Carryover
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0

Port 2

Key: (F1)-1-5

Port 2 Protocol	TERMNL
Port 2 Enable	NO
Data Rate (bps)	9600
Data, Parity, Stop	8, N, 1
NTCIP Address	0
NTCIP Grp Address	0
NTCIP Resp Delay	0
NTCIP Sgl Flg Enal	NO
NTCIP BackUp Tim	0
NTCIP Drop-Out Time	0
Port2 Drop-Out Tim	0
NTCIP RTS Timing	NO
NTCIP RTS to CTS Dlay	0
NTCIP RTS TurnOff Dla	0
NTCIP Early RTS	NO

Port 3

Key: (F1)-1-6

Port 3 Protocol	TELEM
Port 3 Enable	YES
Port 3 millisec Timing	NO
Port 3 RTS to CTS Delay	0
Port 3 RTS TurnOff Delay	0
Duplex -Half or Full	FULL
Modem Data Rate (bps)	1200
Data, Parity, Stop	8, N, 1
Telemetry Address	1
System Detector 9-16 Add	
Telemtry Response Delay	1
NTCIP Address	0
NTCIP Grp Address	0
NTCIP Resp Delay	0
NTCIP Single Flag Enable	NO
NTCIP BackUp Time	0
Port 3 Drop-Out Time	0
NTCIP Early RTS	NO

Options

Key: (F1)-1-8

Supervisor Access Code	0
Data Change Acces Code	0
Key Click Enable	NO
Backlight Enable	YES
Request Download	NO

CITY OF SACRAMENTO

PREEMPTION TABLES

Priority Preemptor 2

Key: (F1)-4-1

Phase	1	2	3	4	5	6	7	8	9	10	11	12
Term Phase Ovlp												
Trk Clr Phase												
Hold Phases	1					6						
Exit Phases												
Exit Calls												
Spare												
Term Overlaps	A:	.	B:	.	C:	.	D:	.				

Active	YES	Ped Dark	
Priority		Ped Active	
Det Lock		Zero PC Time	
Hold Flash		PC Thru Yellow	
Term Ovlp ASAP		Term Phases	
Don't Override Flash		X	
Flash all Outputs			
Yellow-Red goes Green			
Enable Max Preempt Time			
Active only During Hold			
No CVM in Flash			
Fast Flash GRN on Hold			
Out of Flash		GREEN	

					GRN	YEL	RED
Max Time	55	Duration Time					
Min Hold Time	6	Delay Time		Minimum			
Min Ped Clear		Inhibit Time		Track Clear			
Exit Max		Hld Delay Tim		Hold			

Priority Preemptor 3

Key: (F1)-4-2

Phase	1	2	3	4	5	6	7	8	9	10	11	12
Term Phase Ovlp												
Trk Clr Phase												
Hold Phases		2			5							
Exit Phases												
Exit Calls												
Spare												
Term Overlaps	A:	.	B:	.	C:	.	D:	.				

Active	YES	Ped Dark	
Priority		Ped Active	
Det Lock		Zero PC Time	
Hold Flash		PC Thru Yellow	
Term Ovlp ASAP		Term Phases	
Don't Override Flash		X	
Flash all Outputs			
Yellow-Red goes Green			
Enable Max Preempt Time			
Active only During Hold			
No CVM in Flash			
Fast Flash GRN on Hold			
Out of Flash			

					GRN	YEL	RED
Max Time	55	Duration Time					
Min Hold Time	6	Delay Time		Minimum			
Min Ped Clear		Inhibit Time		Track Clear			
Exit Max		Hld Delay Tim		Hold			

Priority Preemptor 4

Key: (F1)-4-3

Phase	1	2	3	4	5	6	7	8	9	10	11	12
Term Phase Ovlp												
Trk Clr Phase												
Hold Phases			3					8				
Exit Phases												
Exit Calls												
Spare												
Term Overlaps	A:	.	B:	.	C:	.	D:	.				

Active	YES	Ped Dark	
Priority		Ped Active	
Det Lock		Zero PC Time	
Hold Flash		PC Thru Yellow	
Term Ovlp ASAP		Term Phases	
Don't Override Flash		X	
Flash all Outputs			
Yellow-Red goes Green			
Enable Max Preempt Time			
Active only During Hold			
No CVM in Flash			
Fast Flash GRN on Hold			
Out of Flash		GREEN	

					GRN	YEL	RED
Max Time	55	Duration Time					
Min Hold Time	6	Delay Time		Minimum			
Min Ped Clear		Inhibit Time		Track Clear			
Exit Max		Hld Delay Tim		Hold			

Priority Preemptor 5

Key: (F1)-4-4

Phase	1	2	3	4	5	6	7	8	9	10	11	12
Term Phase Ovlp												
Trk Clr Phase												
Hold Phases				4			7					
Exit Phases												
Exit Calls												
Spare												
Term Overlaps	A:	.	B:	.	C:	.	D:	.				

Active	YES	Ped Dark	
Priority		Ped Active	
Det Lock		Zero PC Time	
Hold Flash		PC Thru Yellow	
Term Ovlp ASAP		Term Phases	
Don't Override Flash		X	
Flash all Outputs			
Yellow-Red goes Green			
Enable Max Preempt Time			
Active only During Hold			
No CVM in Flash			
Fast Flash GRN on Hold			
Out of Flash		GREEN	

					GRN	YEL	RED
Max Time	55	Duration Time					
Min Hold Time	6	Delay Time		Minimum			
Min Ped Clear		Inhibit Time		Track Clear			
Exit Max		Hld Delay Tim		Hold			

CITY OF SACRAMENTO

DETECTION SCHEDULE

Norwood Avenue at Bell Avenue

	Phase	Controller Det. Input	Location	Direction	Controller / Detector Type / Function			
					Extend	Delay	Passage	Notes
BIU 1	**Loops or Retrofit Video**							
	Ø1	1	Left	E-N			x	Ø1D2 2 sec delay
	Ø2	2	Front	WB			x	Ø2D4 6 sec delay
	Ø3	3	Left	N-W			x	Ø3D2 2 sec delay
	Ø4	4	Front	SB			x	
	Ø5	5	Left	W-S			x	Ø5D2 2 sec delay
	Ø6	6	Front	EB			x	
	Ø7	7	Left	S-E			x	Ø7D2 2 sec delay
	Ø8	8	Front	NB			x	
	Loops							
	Ø1	9						Ø1D1
	Ø2	10	Rear	WB			x	Ø2D1, D2
	Ø3	11						Ø3D1
	Ø4	12	Rear	SB			x	Ø4D1, D2
	Ø5	13						Ø5D1
	Ø6	14	Rear	EB			x	Ø6D1
	Ø7	15						Ø7D1
	Ø8	16	Rear	NB			x	Ø8D1
	New Video Detection		**BIU 2 (RESERVED)**	**17-32**				
BIU 3	Ø1	33						
	Ø1	34						
	Ø6	35						
	Ø6	36						
	Ø6	37						
	Ø6	38						
	Ø6	39						
	Ø6	40						
	Ø5	41						
	Ø5	42						
	Ø2	43						
	Ø2	44						
	Ø2	45						
	Ø2	46						
	Ø2	47						
	Ø2	48						
BIU 4	Ø3	49						
	Ø3	50						
	Ø8	51						
	Ø8	52						
	Ø8	53						
	Ø8	54						
	Ø8	55						
	Ø8	56						
	Ø7	57						
	Ø7	58						
	Ø4	59						
	Ø4	60						
	Ø4	61						
	Ø4	62						
	Ø4	63						
	Ø4	64						

2070 D4

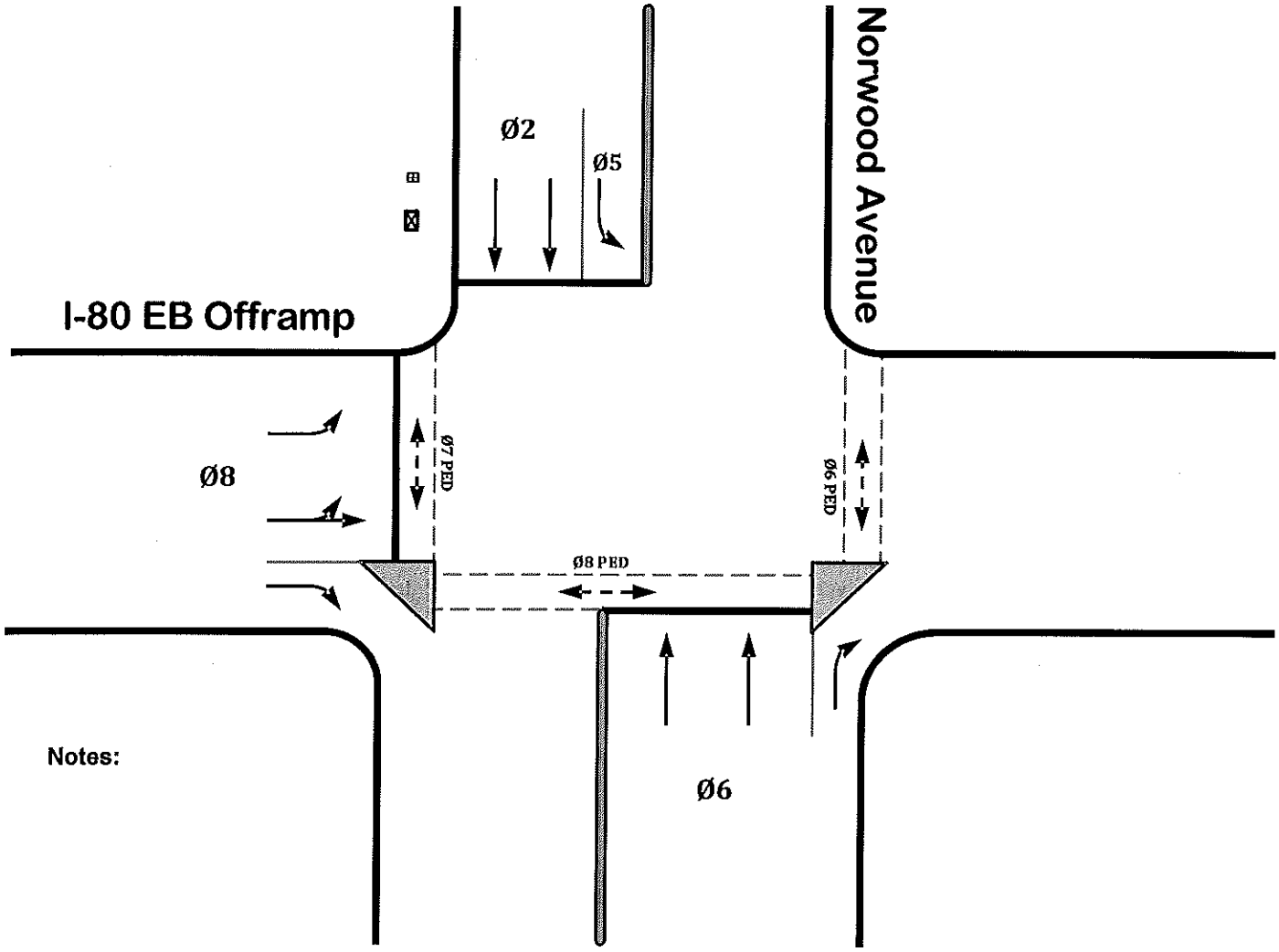
TRAFFIC SIGNAL CONTROLLER PROGRAM CHART

N/S Norwood Avenue **E/W** I-80 EB off ramp

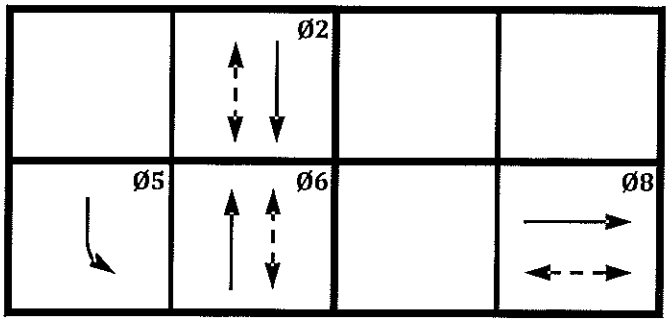
Intersection #: 571 System: _____ IP Address: _____

Device ID: _____ Channel: _____ Drop #: _____

Prepared by: ALL Approved by: JEN Date Implemented: 3-27-14



Notes:



571 - Norwood & I-80 EB offramp

Phase Timing

3/27/2014 11:55:09 AM

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Min Green	0	6	0	0	8	6	0	9	0	0	0	0	0	0	0	0
Veh Ext	0.0	2.5	0.0	0.0	2.5	2.5	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Green 1	0	40	0	0	30	40	0	40	0	0	0	0	0	0	0	0
Max Green 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max Green 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max Ext	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow	0.0	4.3	0.0	0.0	3.5	4.3	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Clr	0.0	0.5	0.0	0.0	0.0	0.5	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Walk	0	7	0	0	0	7	0	7	0	0	0	0	0	0	0	0
Ped Clr	0	7	0	0	0	6	0	18	0	0	0	0	0	0	0	0
Sol DW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Early Wlk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Wlk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Added	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Initial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reduce After	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TTReduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Max Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Revert	2.0	2.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Neg Ped	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AP Disc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pmt Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pmt Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pmt Ped Clr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Return Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Phase Options

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Phases	1-8								9-16							
Min Recalls																
Max Recalls																
Ped Recalls																
Soft Recall		2			6											
Dual Entry		2			6											
Red Rest																
Walk Rest																
Walk Expand																
Ped Recycle																
No Simult Gap																
Yel Lock																
Red Lock																
PhaseNext Lock																
No Term Call																
Cond Serv																
CS Enable																
Cond Reserve																
Reserve																
Veh Omit																
Ped Omit																
Perm Phase																
Protect Calls																
Flash Entry																
Flash Exit																
Flash Exit Yel																
Flash Exit Red																
Ped Scramble																
No Min Yel																
No Min Red Rev																
Max Scramble Walk																
Flash Yellow																
CNA 1																
CNA 2																

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Phase Startup Options

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Startup Flash	0	Mode	Red->Yel
Startup All Red	6	Yellow	0.0

Phases	1-8							9-16							
Startup Phases		2				6										
Startup Yellow		2				6										
Startup Red																
Startup No Walk																
Startup Next																
No Veh Call																
No Ped Call																

Phase Startup Timing

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Start Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Start Max Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Ring Sequence / Conflicting Phases

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Ringgroup 1

Ring 1	1	2	3	4	0	0	0	0	0	0	0	0	0	0	0	0
Ring 2	5	6	7	8	0	0	0	0	0	0	0	0	0	0	0	0

Ringgroup 2

Custom Sequences

Seq 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Conflicting Phases

	1-8	9-16
Phase 1		
Phase 2		
Phase 3		
Phase 4		
Phase 5		
Phase 6		
Phase 7		
Phase 8		
Phase 9		
Phase 10		
Phase 11		
Phase 12		
Phase 13		
Phase 14		
Phase 15		
Phase 16		

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MCE Options

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Phases	1-8	9-16
MCE Ped Protect	☐☐☐☐☐☐☐☐	☐☐☐☐☐☐☐☐
MCE Veh Call	☐☐☐☐☐☐☐☐	☐☐☐☐☐☐☐☐
MCE Ped Call	☐☐☐☐☐☐☐☐	☐☐☐☐☐☐☐☐
MCE Veh Omit	☐☐☐☐☐☐☐☐	☐☐☐☐☐☐☐☐
MCE Ped Omit	☐☐☐☐☐☐☐☐	☐☐☐☐☐☐☐☐
MCE Veh Sync	☐☐☐☐☐☐☐☐	☐☐☐☐☐☐☐☐
MCE Ped Sync	☐☐☐☐☐☐☐☐	☐☐☐☐☐☐☐☐
MCE Halt Don't Walk	☐☐☐☐☐☐☐☐	☐☐☐☐☐☐☐☐

LRV Phases	1-8
MCE LRV Term Early	☐☐☐☐☐☐☐☐

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332/336 Outputs (Connector C1S)

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	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
Output	DntWlk	Walk	VehRed	VehYel	VehGrn	VehRed	VehYel	VehGrn
Index	4	4	4	4	4	3	3	3
	Pin 10	Pin 11	Pin 12	Pin 13	Pin 15	Pin 16	Pin 17	Pin 18
Output	DntWlk	Walk	VehRed	VehYel	VehGrn	VehRed	VehYel	VehGrn
Index	2	2	2	2	2	1	1	1
	Pin 19	Pin 20	Pin 21	Pin 22	Pin 23	Pin 24	Pin 25	Pin 26
Output	DntWlk	Walk	VehRed	VehYel	VehGrn	VehRed	VehYel	VehGrn
Index	8	8	8	8	8	7	7	7
	Pin 27	Pin 28	Pin 29	Pin 30	Pin 31	Pin 32	Pin 33	Pin 34
Output	DntWlk	Walk	VehRed	VehYel	VehGrn	VehRed	VehYel	VehGrn
Index	6	6	6	6	6	5	5	5
	Pin 35	Pin 36	Pin 37	Pin 38	Pin 83	Pin 84	Pin 85	Pin 86
Output	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed
Index	0	0	0	0	0	0	0	0
	Pin 87	Pin 88	Pin 89	Pin 90	Pin 91	Pin 93	Pin 94	Pin 95
Output	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed
Index	0	0	0	0	0	0	0	0
	Pin 96	Pin 97	Pin 98	Pin 99	Pin 100	Pin 101	Pin 102	Pin 103
Output	VehRed	VehRed	VehRed	VehRed	VehRed	Flash	VehRed	VehRed
Index	0	0	0	0	0	1	0	0

332/336 Outputs (Connector C11S)

	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
Output	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed	VehRed
Index	0	0	0	0	0	0	0	0

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332/336 Inputs (Connector C1S)

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	Pin 39	Pin 40	Pin 41	Pin 42	Pin 43	Pin 44	Pin 45	Pin 46
Input	VehDet	VehDet	VehDet	VehDet	VehDet	VehDet	VehDet	VehDet
Index	2	6	4	8	2	6	4	8

	Pin 47	Pin 48	Pin 49	Pin 50	Pin 51	Pin 52	Pin 53	Pin 54
Input	VehDet	VehDet	VehDet	VehDet	None	None	None	None
Index	2	6	4	8	0	0	0	0

	Pin 55	Pin 56	Pin 57	Pin 58	Pin 59	Pin 60	Pin 61	Pin 62
Input	VehDet	VehDet	VehDet	VehDet	VehDet	VehDet	VehDet	VehDet
Index	5	1	7	3	5	1	7	3

	Pin 63	Pin 64	Pin 65	Pin 66	Pin 67	Pin 68	Pin 69	Pin 70
Input	VehDet	VehDet	VehDet	VehDet	PedDet	PedDet	PedDet	PedDet
Index	2	6	4	8	2	6	4	8

	Pin 71	Pin 72	Pin 73	Pin 74	Pin 75	Pin 76	Pin 77	Pin 78
Input	Preempt	Preempt	Preempt	Preempt	None	VehDet	VehDet	VehDet
Index	4	2	5	3	0	2	4	6

	Pin 79	Pin 80	Pin 81	Pin 82
Input	VehDet	None	LocFlash	StopTm
Index	8	0	1	1

332/336 Inputs (Connector C11S)

	Pin 10	Pin 11	Pin 12	Pin 13	Pin 15	Pin 16	Pin 17	Pin 18
Input	None	None	None	None	None	None	None	None
Index	0	0	0	0	0	0	0	0

	Pin 19	Pin 20	Pin 21	Pin 22	Pin 23	Pin 24	Pin 25	Pin 26
Input	None	None	None	None	None	None	None	None
Index	0	0	0	0	0	0	0	0

	Pin 27	Pin 28	Pin 29	Pin 30
Input	None	None	None	None
Index	0	0	0	0

571 - Norwood & I-80 EB offramp

Cabinet / MMU Configuration

3/27/2014 11:55:09 AM

Cabinet Type	332/336
MMU Disable	No

MMU Channel Ignore (1-8, 9-16)
Det BIU 1-No Fail Call (1-8, 9-16)
Det BIU 2-No Fail Call (1-8, 9-16)
Alt LS Flash (1-8, 9-16)
Alt Phase Flash (1-8, 9-16)
Alt Overlap Flash (1-8, 9-16)
Alt LRV Flash (1-8, 9-16)

CMU Channel Ignore (1-8, 9-16, 17-24, 25-32)

Det IASM1-Det Diag (1-8, 9-16, 17-24)

Det IASM2-Det Diag (1-8, 9-16, 17-24)

Phase / Overlap Outputs

	Phase	Overlap
1	Normal	Normal
2	Normal	Normal
3	Normal	Normal
4	Normal	Normal
5	Normal	Normal
6	Normal	Normal
7	Normal	Normal
8	Normal	Normal
9	Normal	Normal
10	Normal	Normal
11	Normal	Normal
12	Normal	Normal
13	Normal	Normal
14	Normal	Normal
15	Normal	Normal
16	Normal	Normal

LRV Outputs

	LRV
1	2 Head
2	2 Head
3	2 Head
4	2 Head
5	2 Head
6	2 Head
7	2 Head
8	2 Head

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Vehicle Detector 1

3/27/2014 11:55:09 AM

Delay 0.0 Extend 0.0 Carryover 0.0 Queue Limit 0

Mode No Disc Added Disabled System Disabled

Fail Mode None Max Pres 0 No Act 0 Erratic 0 Fail Time 0

Phases	1-8	9-16
Call Phases	1	
Yellow Lock Phases		
Red Lock Phases		
Extend Phases	1	
XSwitch Phases		

Vehicle Detector 2

Delay 0.0 Extend 0.0 Carryover 0.0 Queue Limit 0

Mode No Disc Added Disabled System Disabled

Fail Mode None Max Pres 0 No Act 0 Erratic 0 Fail Time 0

Phases	1-8	9-16
Call Phases	2	
Yellow Lock Phases		
Red Lock Phases		
Extend Phases	2	
XSwitch Phases		

571 - Norwood & I-80 EB offramp

Vehicle Detector 3

3/27/2014 11:55:09 AM

Delay	0.0	Extend	0.0	Carryover	0.0	Queue Limit	0
Mode	No Disc	Added	Disabled	System	Disabled		
Fail Mode	None	Max Pres	0	No Act	0	Erratic	0	Fail Time	0

Phases	1-8	9-16
Call Phases	3	
Yellow Lock Phases		
Red Lock Phases		
Extend Phases	3	
XSwitch Phases		

Vehicle Detector 4

Delay	0.0	Extend	0.0	Carryover	0.0	Queue Limit	0
Mode	No Disc	Added	Disabled	System	Disabled		
Fail Mode	None	Max Pres	0	No Act	0	Erratic	0	Fail Time	0

Phases	1-8	9-16
Call Phases	4	
Yellow Lock Phases		
Red Lock Phases		
Extend Phases	4	
XSwitch Phases		

571 - Norwood & I-80 EB offramp

Vehicle Detector 5

3/27/2014 11:55:09 AM

Delay	Extend	Carryover	Queue Limit
2.0	0.0	0.0	0

Mode	Added	System
No Disc	Disabled	Disabled

Fail Mode	Max Pres	No Act	Erratic	Fail Time
None	0	0	0	0

Phases	1-8	9-16
Call Phases	5	
Yellow Lock Phases		
Red Lock Phases		
Extend Phases	5	
XSwitch Phases		

Vehicle Detector 6

Delay	Extend	Carryover	Queue Limit
0.0	0.0	0.0	0

Mode	Added	System
No Disc	Disabled	Disabled

Fail Mode	Max Pres	No Act	Erratic	Fail Time
None	0	0	0	0

Phases	1-8	9-16
Call Phases	6	
Yellow Lock Phases		
Red Lock Phases		
Extend Phases	6	
XSwitch Phases		

571 - Norwood & I-80 EB offramp

Vehicle Detector 7

3/27/2014 11:55:09 AM

Delay 0.0 Extend 0.0 Carryover 0.0 Queue Limit 0

Mode No Disc Added Disabled System Disabled

Fail Mode None Max Pres 0 No Act 0 Erratic 0 Fail Time 0

Phases	1-8	9-16
Call Phases	2	
Yellow Lock Phases		
Red Lock Phases		
Extend Phases	2	
XSwitch Phases		

Vehicle Detector 8

Delay 2.0 Extend 0.0 Carryover 0.0 Queue Limit 0

Mode No Disc Added Disabled System Disabled

Fail Mode None Max Pres 0 No Act 0 Erratic 0 Fail Time 0

Phases	1-8	9-16
Call Phases	8	
Yellow Lock Phases		
Red Lock Phases		
Extend Phases	8	
XSwitch Phases		

571 - Norwood & I-80 EB offramp

Pedestrian Detector 1

3/27/2014 11:55:09 AM

No Act: 0 | Max Pres: 0 | Erratic: 0 | Fail Mode: None

Phases/Overlaps	1-8	9-16
Call Ped Phases	1	
Call Ped Olaps		
Call Phases		
Locked Call Phases		
Ped Entry Phases		
Olap Ped Entry Phases		
Ped Cascade Phases		

Pedestrian Detector 2

No Act: 0 | Max Pres: 0 | Erratic: 0 | Fail Mode: None

Phases/Overlaps	1-8	9-16
Call Ped Phases	2	
Call Ped Olaps		
Call Phases		
Locked Call Phases		
Ped Entry Phases		
Olap Ped Entry Phases		
Ped Cascade Phases		

Pedestrian Detector 3

No Act: 0 | Max Pres: 0 | Erratic: 0 | Fail Mode: None

Phases/Overlaps	1-8	9-16
Call Ped Phases	3	
Call Ped Olaps		
Call Phases		
Locked Call Phases		
Ped Entry Phases		
Olap Ped Entry Phases		
Ped Cascade Phases		

Pedestrian Detector 4

No Act: 0 | Max Pres: 0 | Erratic: 0 | Fail Mode: None

Phases/Overlaps	1-8	9-16
Call Ped Phases	4	
Call Ped Olaps		
Call Phases		
Locked Call Phases		
Ped Entry Phases		
Olap Ped Entry Phases		
Ped Cascade Phases		

571 - Norwood & I-80 EB offramp

Pedestrian Detector 5

3/27/2014 11:55:09 AM

No Act: 0 | Max Pres: 0 | Erratic: 0 | Fail Mode: None

Phases/Overlaps	1-8	9-16
Call Ped Phases	5	
Call Ped Olaps		
Call Phases		
Locked Call Phases		
Ped Entry Phases		
Olap Ped Entry Phases		
Ped Cascade Phases		

Pedestrian Detector 6

No Act: 0 | Max Pres: 0 | Erratic: 0 | Fail Mode: None

Phases/Overlaps	1-8	9-16
Call Ped Phases	6	
Call Ped Olaps		
Call Phases		
Locked Call Phases		
Ped Entry Phases		
Olap Ped Entry Phases		
Ped Cascade Phases		

Pedestrian Detector 7

No Act: 0 | Max Pres: 0 | Erratic: 0 | Fail Mode: None

Phases/Overlaps	1-8	9-16
Call Ped Phases	7	
Call Ped Olaps		
Call Phases		
Locked Call Phases		
Ped Entry Phases		
Olap Ped Entry Phases		
Ped Cascade Phases		

Pedestrian Detector 8

No Act: 0 | Max Pres: 0 | Erratic: 0 | Fail Mode: None

Phases/Overlaps	1-8	9-16
Call Ped Phases	8	
Call Ped Olaps		
Call Phases		
Locked Call Phases		
Ped Entry Phases		
Olap Ped Entry Phases		
Ped Cascade Phases		

571 - Norwood & I-80 EB offramp

Control / Config

3/27/2014 11:55:09 AM

Pattern Mode: Free

Manual Pattern: 0 Manual Offset: 0

Stop Time Input: Disabled

Aux Switch: None 0

DLS Mode: Off Time Zone: Pac (UTC-8)

Password Timeout: 5

	1-8	9-16
Maint Phs Recalls		
Maint Ped Recalls		

Serial 1 Port Configuration

Broadcast Plan/Sync: Disabled Broadcast Time: 00:00

Serial Rebroadcast: Disabled Response: None

Serial 2 Port Configuration

Broadcast Plan/Sync: Disabled Broadcast Time: 00:00

Ethernet Port Configuration

Broadcast Plan/Sync: Disabled Broadcast Time: 00:00

Serial Rebroadcast: Disabled

Peer Configuration

Peer 1: 0

Peer 2: 0

Peer 3: 0

Peer 4: 0

Peer 5: 0

Peer 6: 0

Peer 7: 0

Peer 8: 0

571 - Norwood & I-80 EB offramp

Logging

3/27/2014 11:55:09 AM

Power On	Disabled	1 of 2 Hits (Det BIU 1)	
Ext Start	Disabled	1 of 2 Hits (Det BIU 2)	
Man Control	Disabled	1 of 2 Hits (Det BIU 3)	
Cabinet Door	Disabled	1 of 2 Hits (Det BIU 4)	
MMU Faults	Disabled	SPmt 1 Req Switch	
BIU Faults	Disabled	SPmt 2 Req Switch	
Det Faults	Disabled	SPmt 3 Req Switch	
Coordination	Disabled	SPmt 4 Req Switch	
Preempt	Disabled	Zone 1 Req Switch	
Soft Preempt	Disabled	Zone 2 Req Switch	
Zone	Disabled	Zone 3 Req Switch	
Speed Traps	Disabled	Zone 4 Req Switch	
		Zone 5 Req Switch	
		Zone 6 Req Switch	
		Zone 7 Req Switch	
		Zone 8 Req Switch	
		Trap Grp 1 Req Switch	
		Trap Grp 2 Req Switch	
		Trap Grp 3 Req Switch	
		Trap Grp 4 Req Switch	

571 - Norwood & I-80 EB offramp

Restricted Data 3/27/2014 11:55:09 AM

(Serial Ports)

Serial Port 1: 4

Baud Rate: 9600 | 8N1 RTS On: 0 RTS Off: 0

Serial Port 2: 0

Baud Rate: 9600 | 8N1 RTS On: 0 RTS Off: 0

(Ethernet)

IP Address: 160. 72. 44. 1

Netmask: 255. 255. 0. 0

Broadcast Address: 0. 0. 0. 0

Gateway: 192. 167. 4. 1

Port: 161 Reply Mode: Host

Broadcast Port: 0 Response: Time/Plan

Time Port: 0

(General)

Controller Address: 1 Timeout: 0

Peer Address: 0 Timeout: 0

Remote Calls: Disabled

Remote Preempt: Disabled

Remote Soft Preempt: Disabled

Remote Priority: Disabled

Remote MCE: Disabled MCE Max: 0

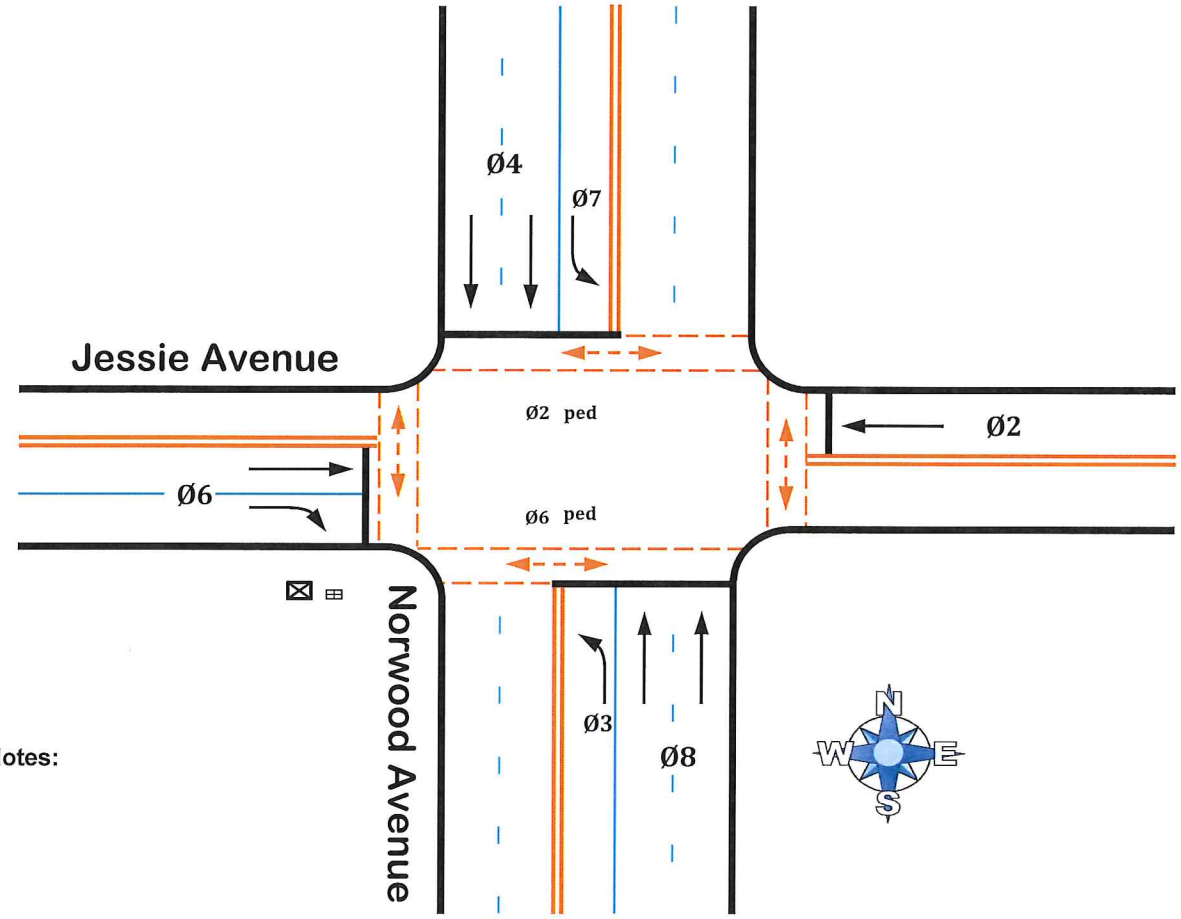
ECONOLITE ASC/3

TRAFFIC SIGNAL CONTROLLER PROGRAM CHART

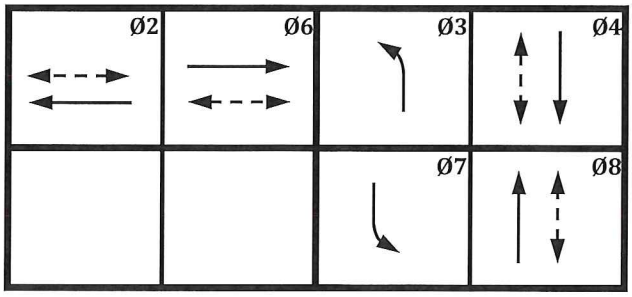
N/S Norwood Avenue **E/W** Jessie Avenue

Intersection #: 576 System: _____ IP Address: _____

Device ID: _____ Channel: _____ Drop #: _____



Notes:



PHASE TIMING

Prepared by: MC Approved by: RJB Date Implemented: 4/16/2015

Controller Timing Data

Key: 2-1

Phase	1	2	3	4	5	6	7	8
Min Green		10	9	6		10	9	7
Walk		7		7		7		7
Ped Clear		18		8		17		9
Yellow		3.5	3.5	4.3		3.5	3.5	4.3
Red Clearance				0.3				0.3
Red Rvt		2.0	2.0	2.0		2.0	2.0	2.0
Vehicle Ext		2.0	2.0	2.0		2.0	2.0	2.0
Max 1		40	30	50		40	30	50
Max 2								
Max 3								
Act B4								
Sec/Act								
Max Ini								
Time B4								
Cars Wt								
Steps to Reduce								
Time to Reduce								
Min Gap								
Bike Green								
CndSrv Min Green								
Delay Green								
Walk 2								
Walk Max								
Ped Clear 2								
Ped Clear Max								
Ped CarryOver								
Vehicle Ext 2								
Dym Green								
Dym Step								
Red Max								

Guaranteed Min Time Data

Key: 2-4

Phase	1	2	3	4	5	6	7	8
Min Green		10	9	6		10	9	7
Walk		7		7		7		7
Ped Clear		18		8		17		9
Yellow Clear		3.5	3.5	4.3		3.5	3.5	4.3
Red Clear				0.3				0.3
Overlap	A	B	C	D	E	F	G	H
Overlap Green								

SET SCREEN FORMAT TO BASIC Key: 1-7-2

Controller Start/Flash Data

Key: 2-5

Phase	1	2	3	4	5	6	7	8
Phase (Color)				Y				Y
Overlap								

Flash/Mon	No	Start Flash Time	0	sec
PWR Start Seq	1	All Red	6	sec

Note: Startup phase can be Y, R, G or W

Automatic Flash

Phase	1	2	3	4	5	6	7	8
Entry				4				8
Exit				4				8

Overlap	A	B	C	D	E	F	G	H
Exit	X	X	X	X				

Flash/Mon	No		Exit Flash	W
Min Flash	0	sec	Min Recall	Yes
Cycle Thru Phase	No			

Phase Recall Data

Key: 2-8

Phase	1	2	3	4	5	6	7	8
Lock Det								
Vehicle Recall								
Ped Recall								
Max Recall								
Soft Recall				4				8
No Rest								
Added Initial Calc								

Controller Options

KEY: 2-6-1

Ped Protect	.	Unit Red Revert				.		sec
Phase		1	2	3	4	5	6	7	8
Flashing Green Phase									
Guar Pass									
Non Act I									
Non Act II									
Dual Entry									
Cond Service									
Cond Reservice									
Ped Reservice			2		4		6		8
Rest in Walk									
Flashing Walk									
PED Clear > yellow									
PED Clear > RED									
IG + VEH EXT									

CONFIGURATION

Phase Ring Seq and Assignment — Key: 1-1-1

Controller Sequence									1
Hardware Alternate Sequance Enable									No
Barrier	B		B		B		B		
Ring 1	2	6	3	4	9	10	13	14	
Ring 2			7	8	11	12	15	16	
Ring 3									
Ring 4									

Phase in Use/Exclusive Peds — Key: 1-2

Phase	1	2	3	4	5	6	7	8
Phases in Use		2	3	4		6	7	8
Exclusive Ped								

Load Switch Assign (MMU Chan) — Key: 1-3

CH	PHASE/ OVLP	type	DIMMING R	Y	G	D	FLASH P	A	TGR
1	1	V				+	A	R	
2	2	V				+	A	R	X
3	3	V				+	A	R	
4	4	V				+	A	R	X
5	5	V				-	A	R	
6	6	V				-	A	R	X
7	7	V				-	A	R	
8	8	V				-	A	R	X
9	2	P				+	A		
10	4	P				+	A		
11	1	P				-	A		
12	8	P				-	A		
13	1	O				+	A	R	
14	2	O				-	A	R	X
15	3	O				+	A	R	
16	4	O				-	A	R	X

Display Options — Key: 1-7-2

Key Click Enabled	YES
BackLight Enable	YES
LED Mode	Auto
Main Status Display Mode	Basic
Screen Format	Basic

Ethernet Port Configuration — Key: 1-5-1

IP ADDRESS	
ADDRESS MASK	
DEFAULT GATEWAY ADD	
SEVER IP ADDRESS	
LINK SPEED/DUPLEX	AUTO
DROP-OUT TIME	300

Port 1 (SDLC Options) — Key: 1-4-1

BIU	1	2	3	4	5	6	7	8
TERM & FACILITY	.	.	.	.	.	.	.	.
DETECTOR	.	.	.	.	.	.	.	.

ENABLE TS2/MMU TYPE CABINET	NO
ENABLE MMU EXTENDED STATUS	NO
ENABLE SDLC START TIME	NO
ENABLE 3 CRITICAL RFE'S LOCKUP	YES
MMU TO CU SDLC EXTERNAL START	enabled

Ped Detector Input — Key: 6-3

PED DET ASSIGNMENT MODE								NTCIP
PHASE	1	2	3	4	5	6	7	8
DETECTOR	1	2	3	4	5	6	7	8
PHASE	9	10	11	12	13	14	15	16
DETECTOR	9	10	11	12	13	14	15	16

CONFIGURATION

Simultaneous Gap Phases **Key: 1-1-4**

CHANNEL CAN SERVE WITH																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.
3	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.
4	.	.	.		.	.	.	X	.	.	.	.	.	.	.	.
5	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.
6	.	.	.	.	.		.	.	.	.	.	.	.	.	.	.
7	.	.	.	.	.	.		.	.	.	.	.	.	.	.	.
8	.	.	.	X	.	.	.		.	.	.	.	.	.	.	.
9	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.
10	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.
11	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.
12	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.
13	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.
14	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.
15	.	.	.	.	.	.	.	.	.	.	.	.	.	.		.
16	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
D	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

MMU Program **Key: 1-4-2**

CHANNEL CAN SERVE WITH															
	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
3	.	.	.	.	.	.	.	.	.	.	.	.	.		
4	.	.	.	.	.	.	.	.	.	.	.	.			
5	.	.	.	.	.	.	.	.	.	.	.				
6	.	.	.	.	.	.	.	.	.	.					
7	.	.	.	.	.	.	.	.	.						
8	.	.	.	.	.	.	.	.							
9	.	.	.	.	.	.	.								
10	.	.	.	.	.	.									
11	.	.	.	.	.										
12	.	.	.	.											
13	.	.	.												
14	.	.													

EV PREEMPT/SCP SUBMENU

Preempt Plan 2 KEY: 4-1

Phase	1	2	3	4	5	6	7	8
Track Clr V								
Track Clr O								
Ena Trl								
Dwell Veh						6		
Dwell Ped								
Dwell OL								
Cycle Veh								
Cycle Ped								
Cycle OL								
Exit Phase						6		
Exit Calls								
Sp Function								

Entrance Times	Walk	Ped Cl	Grn	Yel	Red
	255	255	255	25.5	25.5
Track Clear	Min Gn	Ext Grn	Max G	Yel	Red
	0	0	0	0	0
Dwl/Cyc exit	Min Dwell	Pmt Ext	Mx Tm	Yel	Red
	6	3	55	0	0

Free Dur Prmt	R1	NO	R2	NO	R3	NO	R4	NO

Enable	Yes	Pmt Ovrid	X
Det Lock	X	Delay	0
Override Flash	.	Duration	0
Term Ovlp	NO	PC>Yel	NO
Ped Dark	NO	TC Reserv	NO
Link Pmt	0	Exit Fl Color	GRN
Exit Tm Pln	0	Re-Serv	0
Interlock	NO	Term Ph	NO
Inhibt	0	Dwell Fl	OFF
Clr>Grn	NO	Pmt>Crd	YES
Inhibt Ext Time	0	FLT Type	Hard
Pmt Active Out	OFF	Pmt Active Dwell	OFF
Other-Pri Pmt	OFF	Non-Pri Pmt	OFF

Preempt Plan 3

Phase	1	2	3	4	5	6	7	8
Track Clr V								
Track Clr O								
Ena Trl								
Dwell Veh		2						
Dwell Ped								
Dwell OL								
Cycle Veh								
Cycle Ped								
Cycle OL								
Exit Phase		2						
Exit Calls								
Sp Function								

Entrance Times	Walk	Ped Cl	Grn	Yel	Red
	255	255	255	25.5	25.5
Track Clear	Min Gn	Ext Grn	Max G	Yel	Red
	0	0	0	0	0
Dwl/Cyc exit	Min Dwell	Pmt Ext	Mx Tm	Yel	Red
	6	3	55	0	0

Free Dur Prmt	R1	NO	R2	NO	R3	NO	R4	NO

Enable	Yes	Pmt Ovrid	X
Det Lock	X	Delay	0
Override Flash	.	Duration	0
Term Ovlp	NO	PC>Yel	NO
Ped Dark	NO	TC Reserv	NO
Link Pmt	0	Exit Fl Color	GRN
Exit Tm Pln	0	Re-Serv	0
Interlock	NO	Term Ph	NO
Inhibt	0	Dwell Fl	OFF
Clr>Grn	NO	Pmt>Crd	YES
Inhibt Ext Time	0	FLT Type	Hard
Pmt Active Out	OFF	Pmt Active Dwell	OFF
Other-Pri Pmt	OFF	Non-Pri Pmt	OFF

Preempt Plan 4

Phase	1	2	3	4	5	6	7	8
Track Clr V								
Track Clr O								
Ena Trl								
Dwell Veh			3					8
Dwell Ped								
Dwell OL								
Cycle Veh								
Cycle Ped								
Cycle OL								
Exit Phase			3					8
Exit Calls								
Sp Function								

Entrance Times	Walk	Ped Cl	Grn	Yel	Red
	255	255	255	25.5	25.5
Track Clear	Min Gn	Ext Grn	Max G	Yel	Red
	0	0	0	0	0
Dwl/Cyc exit	Min Dwell	Pmt Ext	Mx Tm	Yel	Red
	6	3	55	0	0

Free Dur Prmt	R1	NO	R2	NO	R3	NO	R4	NO

Enable	Yes	Pmt Ovrid	X
Det Lock	X	Delay	0
Override Flash	.	Duration	0
Term Ovlp	NO	PC>Yel	NO
Ped Dark	NO	TC Reserv	NO
Link Pmt	0	Exit Fl Color	GRN
Exit Tm Pln	0	Re-Serv	0
Interlock	NO	Term Ph	NO
Inhibt	0	Dwell Fl	OFF
Clr>Grn	NO	Pmt>Crd	YES
Inhibt Ext Time	0	FLT Type	Hard
Pmt Active Out	OFF	Pmt Active Dwell	OFF
Other-Pri Pmt	OFF	Non-Pri Pmt	OFF

Preempt Plan 5

Phase	1	2	3	4	5	6	7	8
Track Clr V								
				4			7	
Cycle Veh								
Cycle Ped								
Cycle OL								
Exit Phase				4			7	
Exit Calls								
Sp Function								

Entrance Times	Walk	Ped Cl	Grn	Yel	Red
	255	255	255	25.5	25.5
Track Clear	Min Gn	Ext Grn	Max G	Yel	Red
	0	0	0	0	0
Dwl/Cyc exit	Min Dwell	Pmt Ext	Mx Tm	Yel	Red
	6	3	55	0	0

Free Dur Prmt	R1	NO	R2	NO	R3	NO	R4	NO

Enable	Yes	Pmt Ovrid	X
Det Lock	X	Delay	0
Override Flash	.	Duration	0
Term Ovlp	NO	PC>Yel	NO
Ped Dark	NO	TC Reserv	NO
Link Pmt	0	Exit Fl Color	GRN
Exit Tm Pln	0	Re-Serv	0
Interlock	NO	Term Ph	NO
Inhibt	0	Dwell Fl	OFF
Clr>Grn	NO	Pmt>Crd	YES
Inhibt Ext Time	0	FLT Type	Hard
Pmt Active Out	OFF	Pmt Active Dwell	OFF
Other-Pri Pmt	OFF	Non-Pri Pmt	OFF

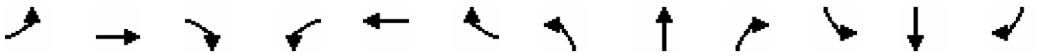
DETECTION SCHEDULE

Norwood Avenue at Jessie Avenue

	Phase	Controller Det. Input	Location	Direction	Controller / Detector Type / Function			
					Extend	Delay	Passage	Notes
BIU 1	**Loops or Retrofit Video**							
	Ø1	1						
	Ø2	2	Front	WB			x	D2, D3
	Ø3	3	Left	N-W			x	D2, D3
	Ø4	4	Front	SB			x	D3, D4
	Ø5	5						
	Ø6	6	Front	EB			x	D2, D3
	Ø7	7	Left	S-E			x	D2, D3
	Ø8	8	Front	NB			x	D3, D4
	Loops							
	Ø2	9	Right	E-S			x	D4
	Ø2	10	Rear	WB			x	D1
	Ø3	11	Rear	N-W			x	D1
	Ø4	12	Rear	SB			x	D1, D2
	Ø6	13	WALK				x	
	Ø6	14	Rear	EB			x	D1
	Ø7	15	Rear	S-E			x	D1
	Ø8	16	Rear	EB			x	D1, D2
	Ø5	-	count	WB			x	D1
	Ø1	-	count	EB			x	D1
	New Video Detection		**BIU 2 (RESERVED) 17-32**					
BIU 3	Ø1	33						
	Ø1	34						
	Ø6	35						
	Ø6	36						
	Ø6	37						
	Ø6	38						
	Ø6	39						
	Ø6	40						
	Ø5	41						
	Ø5	42						
	Ø2	43						
	Ø2	44						
	Ø2	45						
	Ø2	46						
	Ø2	47						
	Ø2	48						
BIU 4	Ø3	49						
	Ø3	50						
	Ø8	51						
	Ø8	52						
	Ø8	53						
	Ø8	54						
	Ø8	55						
	Ø8	56						
	Ø7	57						
	Ø7	58						
	Ø4	59						
	Ø4	60						
	Ø4	61						
	Ø4	62						
	Ø4	63						
	Ø4	64						

Appendix D: Existing Conditions Synchro Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	122	127	186	72	116	46	320	173	119	513	32
Future Volume (vph)	43	122	127	186	72	116	46	320	173	119	513	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	195		200	70		200	90		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	35			50			70			45		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	0.97		0.97		0.97	0.99		0.96	0.99	0.99	
Frt		0.923				0.850			0.850		0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1694	0	1736	1827	1553	1752	3505	1568	1752	3465	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1694	0	1694	1827	1516	1737	3505	1517	1741	3465	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33				116			173		4	
Link Speed (mph)		25			40			40			30	
Link Distance (ft)		958			1056			1318			533	
Travel Time (s)		26.1			18.0			22.5			12.1	
Confl. Peds. (#/hr)	5		19	19		5	4		3	3		4
Confl. Bikes (#/hr)			4			2			2			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	43	122	127	186	72	116	46	320	173	119	513	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	249	0	186	72	116	46	320	173	119	545	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

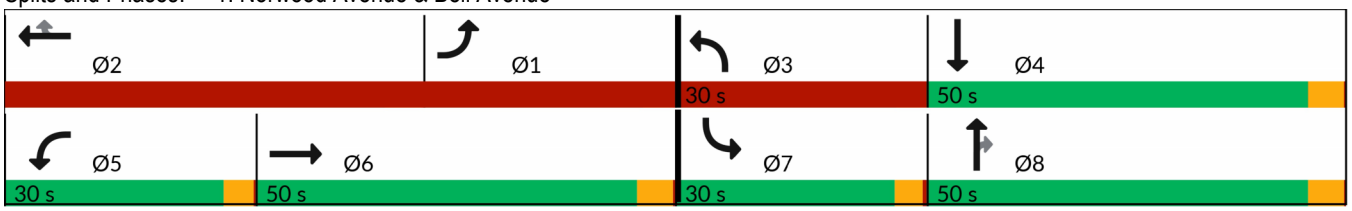


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases						2			8			
Detector Phase	1	6		5	2	2	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	11.0	9.0		11.0	9.0	9.0	10.0	9.0	9.0	11.0	8.0	
Minimum Split (s)	14.8	31.6		14.8	27.6	27.6	13.6	27.6	27.6	14.9	21.6	
Total Split (s)	30.0	50.0		30.0	50.0	50.0	30.0	50.0	50.0	30.0	50.0	
Total Split (%)	18.8%	31.3%		18.8%	31.3%	31.3%	18.8%	31.3%	31.3%	18.8%	31.3%	
Maximum Green (s)	26.2	45.4		26.2	45.4	45.4	26.4	45.4	45.4	26.1	45.4	
Yellow Time (s)	3.5	4.3		3.5	4.3	4.3	3.5	4.3	4.3	3.5	4.3	
All-Red Time (s)	0.3	0.3		0.3	0.3	0.3	0.1	0.3	0.3	0.4	0.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.8	4.6		3.8	4.6	4.6	3.6	4.6	4.6	3.9	4.6	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		20.0			16.0	16.0		16.0	16.0		10.0	
Pedestrian Calls (#/hr)		2			2	2		2	2		2	
Act Effct Green (s)	18.5	16.3		14.8	20.3	20.3	10.5	15.1	15.1	12.7	24.6	
Actuated g/C Ratio	0.24	0.21		0.19	0.26	0.26	0.14	0.20	0.20	0.17	0.32	
v/c Ratio	0.09	0.64		0.55	0.14	0.23	0.19	0.46	0.39	0.41	0.48	
Control Delay (s/veh)	25.6	33.5		37.7	31.7	8.5	38.5	30.9	8.2	38.2	26.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay (s/veh)	25.6	33.5		37.7	31.7	8.5	38.5	30.9	8.2	38.2	26.0	
LOS	C	C		D	C	A	D	C	A	D	C	
Approach Delay (s/veh)		32.4			27.5			24.3			28.2	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	15	90		79	31	0	19	66	0	50	117	
Queue Length 95th (ft)	51	208		183	80	46	66	141	54	132	220	
Internal Link Dist (ft)		878			976			1238			453	
Turn Bay Length (ft)	150			195		200	70		200	90		
Base Capacity (vph)	642	1065		622	1135	985	632	2177	1007	625	2154	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.07	0.23		0.30	0.06	0.12	0.07	0.15	0.17	0.19	0.25	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 76.7			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay (s/veh): 27.6		Intersection LOS: C	

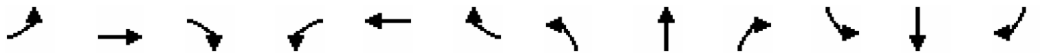
Intersection Capacity Utilization 66.8% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: Norwood Avenue & Bell Avenue



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	43	249	186	72	116	46	320	173	119	545
v/c Ratio	0.09	0.64	0.55	0.14	0.23	0.19	0.46	0.39	0.41	0.48
Control Delay (s/veh)	25.6	33.5	37.7	31.7	8.5	38.5	30.9	8.2	38.2	26.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.6	33.5	37.7	31.7	8.5	38.5	30.9	8.2	38.2	26.0
Queue Length 50th (ft)	15	90	79	31	0	19	66	0	50	117
Queue Length 95th (ft)	51	208	183	80	46	66	141	54	132	220
Internal Link Dist (ft)		878		976			1238			453
Turn Bay Length (ft)	150		195		200	70		200	90	
Base Capacity (vph)	642	1065	622	1135	985	632	2177	1007	625	2154
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.23	0.30	0.06	0.12	0.07	0.15	0.17	0.19	0.25

Intersection Summary



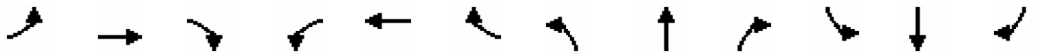
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	122	127	186	72	116	46	320	173	119	513	32
Future Volume (veh/h)	43	122	127	186	72	116	46	320	173	119	513	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.95	1.00		0.96	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1841	1841	1841	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	43	122	127	186	72	116	46	320	173	119	513	32
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	4	4	4	3	3	3	3	3	3
Cap, veh/h	373	183	191	305	328	265	157	579	249	278	798	50
Arrive On Green	0.21	0.23	0.23	0.17	0.18	0.18	0.09	0.16	0.16	0.16	0.24	0.24
Sat Flow, veh/h	1795	813	847	1753	1841	1489	1767	3526	1515	1767	3363	209
Grp Volume(v), veh/h	43	0	249	186	72	116	46	320	173	119	268	277
Grp Sat Flow(s),veh/h/ln	1795	0	1660	1753	1841	1489	1767	1763	1515	1767	1763	1810
Q Serve(g_s), s	1.2	0.0	8.3	5.9	2.0	3.1	1.5	5.0	3.7	3.7	8.3	8.3
Cycle Q Clear(g_c), s	1.2	0.0	8.3	5.9	2.0	3.1	1.5	5.0	3.7	3.7	8.3	8.3
Prop In Lane	1.00		0.51	1.00		1.00	1.00		1.00	1.00		0.12
Lane Grp Cap(c), veh/h	373	0	374	305	328	265	157	579	249	278	418	430
V/C Ratio(X)	0.12	0.00	0.67	0.61	0.22	0.44	0.29	0.55	0.70	0.43	0.64	0.64
Avail Cap(c_a), veh/h	778	0	1246	759	1382	1117	771	2646	1137	763	1323	1358
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.4	0.0	21.3	23.1	21.3	11.7	25.8	23.2	7.7	23.0	20.8	20.8
Incr Delay (d2), s/veh	0.1	0.0	0.8	0.7	0.1	0.4	0.4	0.3	1.3	0.4	0.6	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	3.1	2.3	0.8	1.3	0.6	1.9	2.0	1.5	3.2	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	19.5	0.0	22.1	23.8	21.4	12.1	26.2	23.5	9.0	23.4	21.4	21.4
LnGrp LOS	B		C	C	C	B	C	C	A	C	C	C
Approach Vol, veh/h		292			374			539			664	
Approach Delay, s/veh		21.7			19.7			19.1			21.7	
Approach LOS		C			B			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.2	15.4	9.0	19.0	14.3	18.2	13.4	14.5
Change Period (Y+Rc), s	* 4.6	* 4.6	3.6	* 4.6	3.8	* 4.6	3.9	* 4.6
Max Green Setting (Gmax), s	* 26	* 45	26.4	* 45	26.2	* 45	26.1	* 45
Max Q Clear Time (g_c+I1), s	3.2	5.1	3.5	10.3	7.9	10.3	5.7	7.0
Green Ext Time (p_c), s	0.0	0.4	0.0	2.2	0.2	1.2	0.1	1.6

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	20.6
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	122	127	186	72	116	46	320	173	119	513	32
Future Volume (veh/h)	43	122	127	186	72	116	46	320	173	119	513	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.95	1.00		0.96	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1841	1841	1841	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	43	122	127	186	72	116	46	320	173	119	513	32
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	4	4	4	3	3	3	3	3	3
Cap, veh/h	373	183	191	305	328	265	157	579	249	278	798	50
Arrive On Green	0.21	0.23	0.23	0.17	0.18	0.18	0.09	0.16	0.16	0.16	0.24	0.24
Sat Flow, veh/h	1795	813	847	1753	1841	1489	1767	3526	1515	1767	3363	209
Grp Volume(v), veh/h	43	0	249	186	72	116	46	320	173	119	268	277
Grp Sat Flow(s),veh/h/ln	1795	0	1660	1753	1841	1489	1767	1763	1515	1767	1763	1810
Q Serve(g_s), s	1.2	0.0	8.3	5.9	2.0	3.1	1.5	5.0	3.7	3.7	8.3	8.3
Cycle Q Clear(g_c), s	1.2	0.0	8.3	5.9	2.0	3.1	1.5	5.0	3.7	3.7	8.3	8.3
Prop In Lane	1.00		0.51	1.00		1.00	1.00		1.00	1.00		0.12
Lane Grp Cap(c), veh/h	373	0	374	305	328	265	157	579	249	278	418	430
V/C Ratio(X)	0.12	0.00	0.67	0.61	0.22	0.44	0.29	0.55	0.70	0.43	0.64	0.64
Avail Cap(c_a), veh/h	778	0	1246	759	1382	1117	771	2646	1137	763	1323	1358
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.4	0.0	21.3	23.1	21.3	11.7	25.8	23.2	7.7	23.0	20.8	20.8
Incr Delay (d2), s/veh	0.1	0.0	0.8	0.7	0.1	0.4	0.4	0.3	1.3	0.4	0.6	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	3.1	2.3	0.8	1.3	0.6	1.9	2.0	1.5	3.2	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	19.5	0.0	22.1	23.8	21.4	12.1	26.2	23.5	9.0	23.4	21.4	21.4
LnGrp LOS	B		C	C	C	B	C	C	A	C	C	C
Approach Vol, veh/h		292			374			539			664	
Approach Delay, s/veh		21.7			19.7			19.1			21.7	
Approach LOS		C			B			B			C	

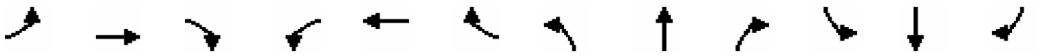
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.2	15.4	9.0	19.0	14.3	18.2	13.4	14.5
Change Period (Y+Rc), s	* 4.6	* 4.6	3.6	* 4.6	3.8	* 4.6	3.9	* 4.6
Max Green Setting (Gmax), s	* 26	* 45	26.4	* 45	26.2	* 45	26.1	* 45
Max Q Clear Time (g_c+I1), s	3.2	5.1	3.5	10.3	7.9	10.3	5.7	7.0
Green Ext Time (p_c), s	0.0	0.4	0.0	2.2	0.2	1.2	0.1	1.6

Intersection Summary	
HCM 7th Control Delay, s/veh	20.6
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	95	215	194	68	41	137	463	100	51	779	44
Future Volume (vph)	36	95	215	194	68	41	137	463	100	51	779	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	0		0	100		0	120		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			65			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			0.99		0.99	0.99		0.98	0.99	
Frt			0.850		0.982			0.973			0.992	
Flt Protected		0.986			0.969		0.950			0.950		
Satd. Flow (prot)	0	1837	1583	0	1742	0	1752	3377	0	1752	3471	0
Flt Permitted		0.986			0.969		0.950			0.950		
Satd. Flow (perm)	0	1822	1583	0	1742	0	1746	3377	0	1724	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			215		5			16			4	
Link Speed (mph)		30			30			40			30	
Link Distance (ft)		838			627			712			1318	
Travel Time (s)		19.0			14.3			12.1			30.0	
Confl. Peds. (#/hr)	23					23	2		7	7		2
Confl. Bikes (#/hr)									1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	36	95	215	194	68	41	137	463	100	51	779	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	131	215	0	303	0	137	563	0	51	823	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

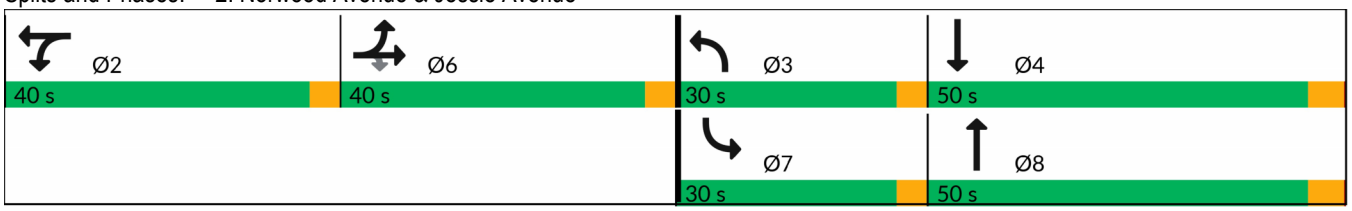


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Perm	Split	NA		Prot	NA		Prot	NA	
Protected Phases	6	6		2	2		3	8		7	4	
Permitted Phases			6									
Detector Phase	6	6	6	2	2		3	8		7	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		9.0	7.0		9.0	6.0	
Minimum Split (s)	28.5	28.5	28.5	28.5	28.5		12.5	20.6		13.5	19.6	
Total Split (s)	40.0	40.0	40.0	40.0	40.0		30.0	50.0		30.0	50.0	
Total Split (%)	25.0%	25.0%	25.0%	25.0%	25.0%		18.8%	31.3%		18.8%	31.3%	
Maximum Green (s)	36.5	36.5	36.5	36.5	36.5		26.5	45.4		26.5	45.4	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	4.3		3.5	4.3	
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.3		0.0	0.3	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		3.5	3.5		3.5		3.5	4.6		3.5	4.6	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	17.0	17.0	17.0	18.0	18.0			9.0			8.0	
Pedestrian Calls (#/hr)	2	2	2	2	2			2			2	
Act Effct Green (s)		14.2	14.2		23.6		14.0	38.6		10.2	31.1	
Actuated g/C Ratio		0.14	0.14		0.24		0.14	0.39		0.10	0.31	
v/c Ratio		0.49	0.52		0.72		0.55	0.42		0.28	0.75	
Control Delay (s/veh)		51.1	11.4		47.5		54.1	24.7		54.8	37.0	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)		51.1	11.4		47.5		54.1	24.7		54.8	37.0	
LOS		D	B		D		D	C		D	D	
Approach Delay (s/veh)		26.5			47.5			30.5			38.1	
Approach LOS		C			D			C			D	
Queue Length 50th (ft)		75	0		166		79	129		29	230	
Queue Length 95th (ft)		178	73		357		192	249		90	435	
Internal Link Dist (ft)		758			547			632			1238	
Turn Bay Length (ft)			100				100			120		
Base Capacity (vph)		725	755		691		502	1710		502	1708	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		0.18	0.28		0.44		0.27	0.33		0.10	0.48	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 99.1			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay (s/veh): 35.2		Intersection LOS: D	

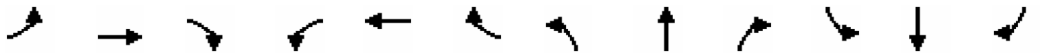
Intersection Capacity Utilization 65.9% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Norwood Avenue & Jessie Avenue



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	131	215	303	137	563	51	823
v/c Ratio	0.49	0.52	0.72	0.55	0.42	0.28	0.75
Control Delay (s/veh)	51.1	11.4	47.5	54.1	24.7	54.8	37.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	51.1	11.4	47.5	54.1	24.7	54.8	37.0
Queue Length 50th (ft)	75	0	166	79	129	29	230
Queue Length 95th (ft)	178	73	357	192	249	90	435
Internal Link Dist (ft)	758		547		632		1238
Turn Bay Length (ft)		100		100		120	
Base Capacity (vph)	725	755	691	502	1710	502	1708
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.28	0.44	0.27	0.33	0.10	0.48

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	95	215	194	68	41	137	463	100	51	779	44
Future Volume (veh/h)	36	95	215	194	68	41	137	463	100	51	779	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	36	95	215	194	68	41	137	463	100	51	779	44
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	3	3	3	3	3	3	3	3	3
Cap, veh/h	100	263	301	253	89	54	188	899	193	134	960	54
Arrive On Green	0.20	0.20	0.20	0.23	0.23	0.23	0.11	0.31	0.31	0.08	0.28	0.28
Sat Flow, veh/h	507	1338	1530	1119	392	237	1767	2869	615	1767	3390	191
Grp Volume(v), veh/h	131	0	215	303	0	0	137	283	280	51	405	418
Grp Sat Flow(s),veh/h/ln	1845	0	1530	1748	0	0	1767	1763	1721	1767	1763	1818
Q Serve(g_s), s	5.0	0.0	10.6	13.1	0.0	0.0	6.1	10.6	10.8	2.2	17.3	17.3
Cycle Q Clear(g_c), s	5.0	0.0	10.6	13.1	0.0	0.0	6.1	10.6	10.8	2.2	17.3	17.3
Prop In Lane	0.27		1.00	0.64		0.14	1.00		0.36	1.00		0.11
Lane Grp Cap(c), veh/h	363	0	301	396	0	0	188	553	539	134	499	515
V/C Ratio(X)	0.36	0.00	0.71	0.77	0.00	0.00	0.73	0.51	0.52	0.38	0.81	0.81
Avail Cap(c_a), veh/h	835	0	692	791	0	0	581	992	968	581	992	1023
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.0	0.0	30.3	29.2	0.0	0.0	34.9	22.6	22.7	35.5	26.9	26.9
Incr Delay (d2), s/veh	0.2	0.0	1.2	1.2	0.0	0.0	2.0	0.3	0.3	0.7	1.2	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	3.8	5.4	0.0	0.0	2.6	4.1	4.1	1.0	7.1	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	28.2	0.0	31.5	30.4	0.0	0.0	36.9	22.9	23.0	36.1	28.1	28.1
LnGrp LOS	C		C	C			D	C	C	D	C	C
Approach Vol, veh/h		346			303			700			874	
Approach Delay, s/veh		30.2			30.4			25.7			28.6	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	21.8	12.1	27.4	19.4	9.6	29.9
Change Period (Y+Rc), s	3.5	3.5	* 4.6	3.5	3.5	* 4.6
Max Green Setting (Gmax), s	36.5	26.5	* 45	36.5	26.5	* 45
Max Q Clear Time (g_c+I1), s	15.1	8.1	19.3	12.6	4.2	12.8
Green Ext Time (p_c), s	1.2	0.1	3.6	0.9	0.0	2.1

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	28.2
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

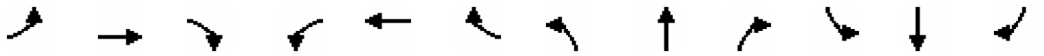
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	95	215	194	68	41	137	463	100	51	779	44
Future Volume (veh/h)	36	95	215	194	68	41	137	463	100	51	779	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	36	95	215	194	68	41	137	463	100	51	779	44
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	3	3	3	3	3	3	3	3	3
Cap, veh/h	100	263	301	253	89	54	188	899	193	134	960	54
Arrive On Green	0.20	0.20	0.20	0.23	0.23	0.23	0.11	0.31	0.31	0.08	0.28	0.28
Sat Flow, veh/h	507	1338	1530	1119	392	237	1767	2869	615	1767	3390	191
Grp Volume(v), veh/h	131	0	215	303	0	0	137	283	280	51	405	418
Grp Sat Flow(s),veh/h/ln	1845	0	1530	1748	0	0	1767	1763	1721	1767	1763	1818
Q Serve(g_s), s	5.0	0.0	10.6	13.1	0.0	0.0	6.1	10.6	10.8	2.2	17.3	17.3
Cycle Q Clear(g_c), s	5.0	0.0	10.6	13.1	0.0	0.0	6.1	10.6	10.8	2.2	17.3	17.3
Prop In Lane	0.27		1.00	0.64		0.14	1.00		0.36	1.00		0.11
Lane Grp Cap(c), veh/h	363	0	301	396	0	0	188	553	539	134	499	515
V/C Ratio(X)	0.36	0.00	0.71	0.77	0.00	0.00	0.73	0.51	0.52	0.38	0.81	0.81
Avail Cap(c_a), veh/h	835	0	692	791	0	0	581	992	968	581	992	1023
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.0	0.0	30.3	29.2	0.0	0.0	34.9	22.6	22.7	35.5	26.9	26.9
Incr Delay (d2), s/veh	0.2	0.0	1.2	1.2	0.0	0.0	2.0	0.3	0.3	0.7	1.2	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	3.8	5.4	0.0	0.0	2.6	4.1	4.1	1.0	7.1	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	28.2	0.0	31.5	30.4	0.0	0.0	36.9	22.9	23.0	36.1	28.1	28.1
LnGrp LOS	C		C	C			D	C	C	D	C	C
Approach Vol, veh/h		346			303			700			874	
Approach Delay, s/veh		30.2			30.4			25.7			28.6	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	21.8	12.1	27.4	19.4	9.6	29.9
Change Period (Y+Rc), s	3.5	3.5	* 4.6	3.5	3.5	* 4.6
Max Green Setting (Gmax), s	36.5	26.5	* 45	36.5	26.5	* 45
Max Q Clear Time (g_c+I1), s	15.1	8.1	19.3	12.6	4.2	12.8
Green Ext Time (p_c), s	1.2	0.1	3.6	0.9	0.0	2.1

Intersection Summary	
HCM 7th Control Delay, s/veh	28.2
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



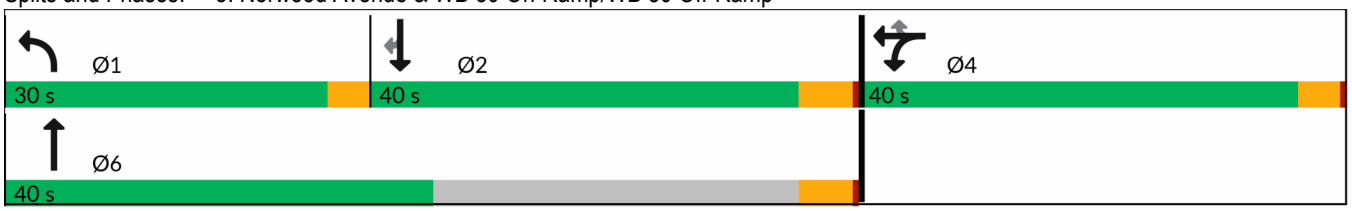
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	291	1	220	258	586	0	0	678	560
Future Volume (vph)	0	0	0	291	1	220	258	586	0	0	678	560
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		50	200		0	0		75
Storage Lanes	0		0	1		1	1		0	0		1
Taper Length (ft)	25			25			35			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor						0.98	0.99					0.97
Frt						0.850						0.850
Flt Protected				0.950	0.953		0.950					
Satd. Flow (prot)	0	0	0	1649	1654	1553	1736	3471	0	0	3539	1583
Flt Permitted				0.950	0.953		0.950					
Satd. Flow (perm)	0	0	0	1649	1654	1532	1733	3471	0	0	3539	1541
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						218						302
Link Speed (mph)		30			30			40			30	
Link Distance (ft)		1264			954			526			712	
Travel Time (s)		28.7			21.7			9.0			16.2	
Confl. Peds. (#/hr)	1					1	1		4	4		1
Confl. Bikes (#/hr)												2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	4%	4%	4%	4%	4%	2%	2%	2%
Adj. Flow (vph)	0	0	0	291	1	220	258	586	0	0	678	560
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	145	147	220	258	586	0	0	678	560
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				4	4		1	6			2	
Permitted Phases						4						2
Detector Phase				4	4	4	1	6			2	2
Switch Phase												
Minimum Initial (s)				8.0	8.0	8.0	8.0	6.0			6.0	6.0
Minimum Split (s)				29.0	29.0	29.0	11.5	18.8			17.8	17.8
Total Split (s)				40.0	40.0	40.0	30.0	40.0			40.0	40.0
Total Split (%)				36.4%	36.4%	36.4%	27.3%	36.4%			36.4%	36.4%
Maximum Green (s)				36.0	36.0	36.0	26.5	35.2			35.2	35.2
Yellow Time (s)				3.5	3.5	3.5	3.5	4.3			4.3	4.3
All-Red Time (s)				0.5	0.5	0.5	0.0	0.5			0.5	0.5
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				4.0	4.0	4.0	3.5	4.8			4.8	4.8
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				2.0	2.0	2.0	2.5	2.5			2.5	2.5
Recall Mode				None	None	None	None	Min			Min	Min
Walk Time (s)				7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)				18.0	18.0	18.0		7.0			6.0	6.0
Pedestrian Calls (#/hr)				2	2	2		2			2	2
Act Effct Green (s)				12.9	12.9	12.9	15.7	43.9			24.4	24.4
Actuated g/C Ratio				0.19	0.19	0.19	0.24	0.66			0.37	0.37
v/c Ratio				0.45	0.45	0.46	0.62	0.25			0.52	0.74
Control Delay (s/veh)				31.9	32.0	8.1	33.0	5.1			19.2	16.0
Queue Delay				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay (s/veh)				31.9	32.0	8.1	33.0	5.1			19.2	16.0
LOS				C	C	A	C	A			B	B
Approach Delay (s/veh)					21.8			13.7			17.8	
Approach LOS					C			B			B	
Queue Length 50th (ft)				52	53	1	87	35			100	72
Queue Length 95th (ft)				137	138	57	222	96			230	283
Internal Link Dist (ft)		1184			874			446			632	
Turn Bay Length (ft)						50	200					75
Base Capacity (vph)				976	979	996	756	3116			2049	1019
Starvation Cap Reductn				0	0	0	0	0			0	0
Spillback Cap Reductn				0	0	0	0	0			0	0
Storage Cap Reductn				0	0	0	0	0			0	0
Reduced v/c Ratio				0.15	0.15	0.22	0.34	0.19			0.33	0.55

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 66.5			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay (s/veh): 17.2		Intersection LOS: B	

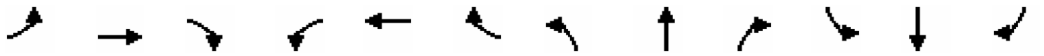
Intersection Capacity Utilization 68.3% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 3: Norwood Avenue & WB 80 On-Ramp/WB 80 Off-Ramp



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	145	147	220	258	586	678	560
v/c Ratio	0.45	0.45	0.46	0.62	0.25	0.52	0.74
Control Delay (s/veh)	31.9	32.0	8.1	33.0	5.1	19.2	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	31.9	32.0	8.1	33.0	5.1	19.2	16.0
Queue Length 50th (ft)	52	53	1	87	35	100	72
Queue Length 95th (ft)	137	138	57	222	96	230	283
Internal Link Dist (ft)		874			446	632	
Turn Bay Length (ft)			50	200			75
Base Capacity (vph)	976	979	996	756	3116	2049	1019
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.15	0.22	0.34	0.19	0.33	0.55

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	291	1	220	258	586	0	0	678	560
Future Volume (veh/h)	0	0	0	291	1	220	258	586	0	0	678	560
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1841	1841	1841	1841	1841	0	0	1870	1870
Adj Flow Rate, veh/h				292	0	0	258	586	0	0	678	0
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				4	4	4	4	4	0	0	2	2
Cap, veh/h				675	0		333	2064	0	0	1115	
Arrive On Green				0.19	0.00	0.00	0.19	0.59	0.00	0.00	0.31	0.00
Sat Flow, veh/h				3506	0	1560	1753	3589	0	0	3647	1585
Grp Volume(v), veh/h				292	0	0	258	586	0	0	678	0
Grp Sat Flow(s),veh/h/ln				1753	0	1560	1753	1749	0	0	1777	1585
Q Serve(g_s), s				3.0	0.0	0.0	5.7	3.3	0.0	0.0	6.6	0.0
Cycle Q Clear(g_c), s				3.0	0.0	0.0	5.7	3.3	0.0	0.0	6.6	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				675	0		333	2064	0	0	1115	
V/C Ratio(X)				0.43	0.00		0.77	0.28	0.00	0.00	0.61	
Avail Cap(c_a), veh/h				3115	0		1147	3039	0	0	3088	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				14.4	0.0	0.0	15.6	4.1	0.0	0.0	11.8	0.0
Incr Delay (d2), s/veh				0.2	0.0	0.0	2.9	0.1	0.0	0.0	0.4	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.0	0.0	0.0	2.0	0.5	0.0	0.0	2.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				14.6	0.0	0.0	18.5	4.1	0.0	0.0	12.2	0.0
LnGrp LOS				B			B	A			B	
Approach Vol, veh/h					292			844			678	
Approach Delay, s/veh					14.6			8.5			12.2	
Approach LOS					B			A			B	

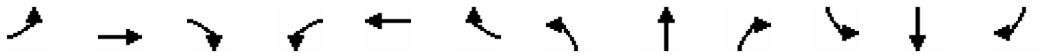
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	11.2	17.5		11.8		28.7						
Change Period (Y+Rc), s	3.5	4.8		4.0		4.8						
Max Green Setting (Gmax), s	26.5	35.2		36.0		35.2						
Max Q Clear Time (g_c+I1), s	7.7	8.6		5.0		5.3						
Green Ext Time (p_c), s	0.5	4.2		0.5		3.2						

Intersection Summary		
HCM 6th Ctrl Delay, s/veh		10.9
HCM 6th LOS		B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



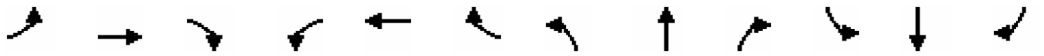
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	291	1	220	258	586	0	0	678	560
Future Volume (veh/h)	0	0	0	291	1	220	258	586	0	0	678	560
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1841	1841	1841	1841	1841	0	0	1870	1870
Adj Flow Rate, veh/h				292	0	0	258	586	0	0	678	0
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				4	4	4	4	4	0	0	2	2
Cap, veh/h				675	0		333	2064	0	0	1115	
Arrive On Green				0.19	0.00	0.00	0.19	0.59	0.00	0.00	0.31	0.00
Sat Flow, veh/h				3506	0	1560	1753	3589	0	0	3647	1585
Grp Volume(v), veh/h				292	0	0	258	586	0	0	678	0
Grp Sat Flow(s),veh/h/ln				1753	0	1560	1753	1749	0	0	1777	1585
Q Serve(g_s), s				3.0	0.0	0.0	5.7	3.3	0.0	0.0	6.6	0.0
Cycle Q Clear(g_c), s				3.0	0.0	0.0	5.7	3.3	0.0	0.0	6.6	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				675	0		333	2064	0	0	1115	
V/C Ratio(X)				0.43	0.00		0.77	0.28	0.00	0.00	0.61	
Avail Cap(c_a), veh/h				3115	0		1147	3039	0	0	3088	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				14.4	0.0	0.0	15.6	4.1	0.0	0.0	11.8	0.0
Incr Delay (d2), s/veh				0.2	0.0	0.0	2.9	0.1	0.0	0.0	0.4	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.0	0.0	0.0	2.0	0.5	0.0	0.0	2.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				14.6	0.0	0.0	18.5	4.1	0.0	0.0	12.2	0.0
LnGrp LOS				B			B	A			B	
Approach Vol, veh/h					292			844			678	
Approach Delay, s/veh					14.6			8.5			12.2	
Approach LOS					B			A			B	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	11.2	17.5		11.8		28.7						
Change Period (Y+Rc), s	3.5	4.8		4.0		4.8						
Max Green Setting (Gmax), s	26.5	35.2		36.0		35.2						
Max Q Clear Time (g_c+I1), s	7.7	8.6		5.0		5.3						
Green Ext Time (p_c), s	0.5	4.2		0.5		3.2						

Intersection Summary		
HCM 7th Control Delay, s/veh		10.9
HCM 7th LOS		B

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



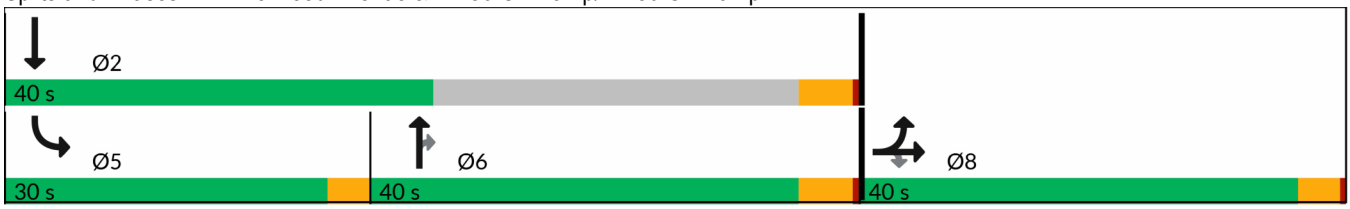
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	274	1	376	0	0	0	0	570	289	367	602	0
Future Volume (vph)	274	1	376	0	0	0	0	570	289	367	602	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		0	0		220	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			35		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98						0.97	0.99		
Frt			0.850						0.850			
Flt Protected	0.950	0.953								0.950		
Satd. Flow (prot)	1633	1638	1538	0	0	0	0	3471	1553	1736	3471	0
Flt Permitted	0.950	0.953								0.950		
Satd. Flow (perm)	1633	1638	1518	0	0	0	0	3471	1517	1728	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			282						289			
Link Speed (mph)		30			30			40			30	
Link Distance (ft)		759			1046			737			526	
Travel Time (s)		17.3			23.8			12.6			12.0	
Confl. Peds. (#/hr)			1	1			7		4	4		7
Confl. Bikes (#/hr)									2			3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	274	1	376	0	0	0	0	570	289	367	602	0
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	137	138	376	0	0	0	0	570	289	367	602	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	8	8						6		5	2	
Permitted Phases			8						6			
Detector Phase	8	8	8					6	6	5	2	
Switch Phase												
Minimum Initial (s)	9.0	9.0	9.0					6.0	6.0	8.0	6.0	
Minimum Split (s)	29.0	29.0	29.0					17.8	17.8	11.5	18.8	
Total Split (s)	40.0	40.0	40.0					40.0	40.0	30.0	40.0	
Total Split (%)	36.4%	36.4%	36.4%					36.4%	36.4%	27.3%	36.4%	
Maximum Green (s)	36.0	36.0	36.0					35.2	35.2	26.5	35.2	
Yellow Time (s)	3.5	3.5	3.5					4.3	4.3	3.5	4.3	
All-Red Time (s)	0.5	0.5	0.5					0.5	0.5	0.0	0.5	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0					4.8	4.8	3.5	4.8	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	2.0	2.0	2.0					2.5	2.5	2.5	2.5	
Recall Mode	None	None	None					Min	Min	None	Min	
Walk Time (s)	7.0	7.0	7.0					7.0	7.0		7.0	
Flash Dont Walk (s)	18.0	18.0	18.0					6.0	6.0		7.0	
Pedestrian Calls (#/hr)	2	2	2					2	2		2	
Act Effct Green (s)	13.3	13.3	13.3					17.6	17.6	20.4	41.8	
Actuated g/C Ratio	0.21	0.21	0.21					0.27	0.27	0.32	0.65	
v/c Ratio	0.40	0.40	0.70					0.60	0.46	0.66	0.26	
Control Delay (s/veh)	28.3	28.4	15.2					24.4	5.8	28.2	5.5	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay (s/veh)	28.3	28.4	15.2					24.4	5.8	28.2	5.5	
LOS	C	C	B					C	A	C	A	
Approach Delay (s/veh)		20.8						18.2			14.1	
Approach LOS		C						B			B	
Queue Length 50th (ft)	48	49	31					95	0	114	37	
Queue Length 95th (ft)	118	120	132					196	57	#295	100	
Internal Link Dist (ft)		679			966			657			446	
Turn Bay Length (ft)			50						220	180		
Base Capacity (vph)	968	971	1014					2012	1001	757	3211	
Starvation Cap Reductn	0	0	0					0	0	0	0	
Spillback Cap Reductn	0	0	0					0	0	0	0	
Storage Cap Reductn	0	0	0					0	0	0	0	
Reduced v/c Ratio	0.14	0.14	0.37					0.28	0.29	0.48	0.19	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 64.4			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay (s/veh): 17.3		Intersection LOS: B	

Intersection Capacity Utilization 68.3% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

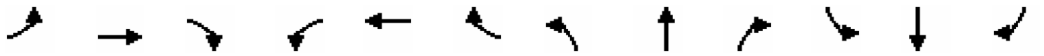
Splits and Phases: 4: Norwood Avenue & EB 80 Off-Ramp/EB 80 On-Ramp



Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	137	138	376	570	289	367	602
v/c Ratio	0.40	0.40	0.70	0.60	0.46	0.66	0.26
Control Delay (s/veh)	28.3	28.4	15.2	24.4	5.8	28.2	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	28.3	28.4	15.2	24.4	5.8	28.2	5.5
Queue Length 50th (ft)	48	49	31	95	0	114	37
Queue Length 95th (ft)	118	120	132	196	57	#295	100
Internal Link Dist (ft)		679		657			446
Turn Bay Length (ft)			50		220	180	
Base Capacity (vph)	968	971	1014	2012	1001	757	3211
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.14	0.37	0.28	0.29	0.48	0.19

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	274	1	376	0	0	0	0	570	289	367	602	0
Future Volume (veh/h)	274	1	376	0	0	0	0	570	289	367	602	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826				0	1841	1841	1841	1841	0
Adj Flow Rate, veh/h	275	0	0				0	570	0	367	602	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	5	5				0	4	4	4	4	0
Cap, veh/h	698	0					0	915		450	2092	0
Arrive On Green	0.20	0.00	0.00				0.00	0.26	0.00	0.26	0.60	0.00
Sat Flow, veh/h	3478	0	1547				0	3589	1560	1753	3589	0
Grp Volume(v), veh/h	275	0	0				0	570	0	367	602	0
Grp Sat Flow(s),veh/h/ln	1739	0	1547				0	1749	1560	1753	1749	0
Q Serve(g_s), s	3.0	0.0	0.0				0.0	6.3	0.0	8.6	3.7	0.0
Cycle Q Clear(g_c), s	3.0	0.0	0.0				0.0	6.3	0.0	8.6	3.7	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	698	0					0	915		450	2092	0
V/C Ratio(X)	0.39	0.00					0.00	0.62		0.82	0.29	0.00
Avail Cap(c_a), veh/h	2862	0					0	2814		1062	2814	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.2	0.0	0.0				0.0	14.3	0.0	15.3	4.3	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0				0.0	0.5	0.0	2.7	0.1	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0				0.0	2.0	0.0	3.2	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	15.3	0.0	0.0				0.0	14.8	0.0	18.0	4.3	0.0
LnGrp LOS	B							B		B	A	
Approach Vol, veh/h		275						570			969	
Approach Delay, s/veh		15.3						14.8			9.5	
Approach LOS		B						B			A	

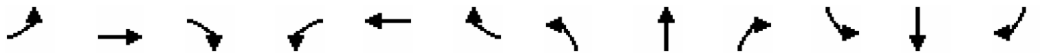
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		31.0			14.7	16.2		12.8				
Change Period (Y+Rc), s		4.8			3.5	4.8		4.0				
Max Green Setting (Gmax), s		35.2			26.5	35.2		36.0				
Max Q Clear Time (g_c+I1), s		5.7			10.6	8.3		5.0				
Green Ext Time (p_c), s		3.7			0.7	3.1		0.5				

Intersection Summary												
HCM 6th Ctrl Delay, s/veh			12.0									
HCM 6th LOS			B									

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	274	1	376	0	0	0	0	570	289	367	602	0
Future Volume (veh/h)	274	1	376	0	0	0	0	570	289	367	602	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826				0	1841	1841	1841	1841	0
Adj Flow Rate, veh/h	275	0	0				0	570	0	367	602	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	5	5				0	4	4	4	4	0
Cap, veh/h	698	0					0	915		450	2092	0
Arrive On Green	0.20	0.00	0.00				0.00	0.26	0.00	0.26	0.60	0.00
Sat Flow, veh/h	3478	0	1547				0	3589	1560	1753	3589	0
Grp Volume(v), veh/h	275	0	0				0	570	0	367	602	0
Grp Sat Flow(s),veh/h/ln	1739	0	1547				0	1749	1560	1753	1749	0
Q Serve(g_s), s	3.0	0.0	0.0				0.0	6.3	0.0	8.6	3.7	0.0
Cycle Q Clear(g_c), s	3.0	0.0	0.0				0.0	6.3	0.0	8.6	3.7	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	698	0					0	915		450	2092	0
V/C Ratio(X)	0.39	0.00					0.00	0.62		0.82	0.29	0.00
Avail Cap(c_a), veh/h	2862	0					0	2814		1062	2814	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.2	0.0	0.0				0.0	14.3	0.0	15.3	4.3	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0				0.0	0.5	0.0	2.7	0.1	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0				0.0	2.0	0.0	3.2	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	15.3	0.0	0.0				0.0	14.8	0.0	18.0	4.3	0.0
LnGrp LOS	B							B		B	A	
Approach Vol, veh/h		275						570			969	
Approach Delay, s/veh		15.3						14.8			9.5	
Approach LOS		B						B			A	

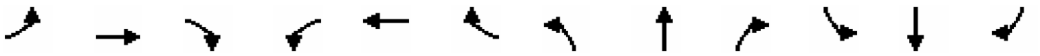
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		31.0			14.7	16.2		12.8				
Change Period (Y+Rc), s		4.8			3.5	4.8		4.0				
Max Green Setting (Gmax), s		35.2			26.5	35.2		36.0				
Max Q Clear Time (g_c+I1), s		5.7			10.6	8.3		5.0				
Green Ext Time (p_c), s		3.7			0.7	3.1		0.5				

Intersection Summary			
HCM 7th Control Delay, s/veh		12.0	
HCM 7th LOS		B	

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	13	31	9	26	87	44	665	11	56	623	305
Future Volume (vph)	122	13	31	9	26	87	44	665	11	56	623	305
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		140	100		0	85		0	110		0
Storage Lanes	0		1	1		1	1		0	1		0
Taper Length (ft)	25			35			40			30		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor			0.97		0.99	0.98	0.99	0.99			0.99	
Frt			0.850			0.850		0.998			0.951	
Flt Protected		0.957			0.987		0.950			0.950		
Satd. Flow (prot)	0	1609	1429	0	1786	1538	1770	3531	0	1736	3272	0
Flt Permitted		0.957			0.987		0.950			0.950		
Satd. Flow (perm)	0	1609	1398	0	1782	1518	1768	3531	0	1736	3272	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			37			87		1			48	
Link Speed (mph)		30			30			40			30	
Link Distance (ft)		735			595			331			737	
Travel Time (s)		16.7			13.5			5.6			16.8	
Confl. Peds. (#/hr)			5	5			1					1
Confl. Bikes (#/hr)			1			1			2			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	13%	13%	5%	5%	5%	2%	2%	2%	4%	4%	4%
Adj. Flow (vph)	122	13	31	9	26	87	44	665	11	56	623	305
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	135	31	0	35	87	44	676	0	56	928	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

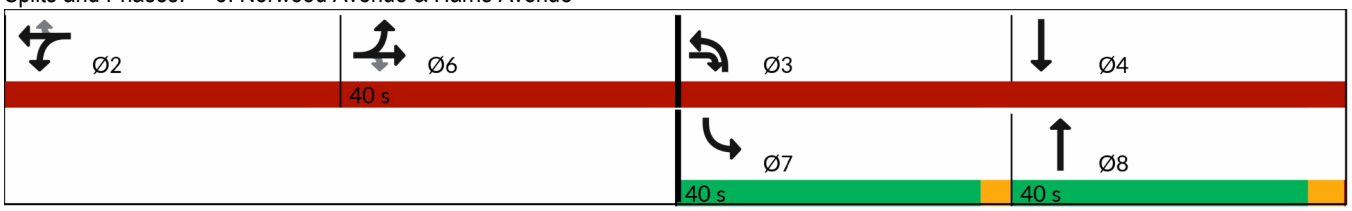


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	pm+ov	Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	6	6	3	2	2		3	8		7	4	
Permitted Phases			6			2						
Detector Phase	6	6	3	2	2	2	3	8		7	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	11.0	11.0	11.0	10.0	7.0		9.0	8.0	
Minimum Split (s)	28.6	28.6	13.5	14.8	14.8	14.8	13.5	19.6		12.5	25.6	
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0		40.0	40.0	
Total Split (%)	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%		25.0%	25.0%	
Maximum Green (s)	36.4	36.4	36.5	36.2	36.2	36.2	36.5	35.4		36.5	35.4	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.3		3.5	4.3	
All-Red Time (s)	0.1	0.1	0.0	0.3	0.3	0.3	0.0	0.3		0.0	0.3	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		3.6	3.5		3.8	3.8	3.5	4.6		3.5	4.6	
Lead/Lag			Lead				Lead	Lag		Lead	Lag	
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.5		2.0	2.5	
Recall Mode	None	None	None	None	None	None	None	None		None	None	
Walk Time (s)	7.0	7.0						7.0			7.0	
Flash Dont Walk (s)	18.0	18.0						8.0			14.0	
Pedestrian Calls (#/hr)	2	2						2			2	
Act Effct Green (s)		13.7	24.2		11.5	11.5	10.4	37.4		9.5	36.9	
Actuated g/C Ratio		0.17	0.30		0.14	0.14	0.13	0.47		0.12	0.46	
v/c Ratio		0.49	0.06		0.13	0.29	0.19	0.40		0.27	0.60	
Control Delay (s/veh)		38.7	5.9		36.8	12.0	38.5	18.1		40.6	20.6	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay (s/veh)		38.7	5.9		36.8	12.0	38.5	18.1		40.6	20.6	
LOS		D	A		D	B	D	B		D	C	
Approach Delay (s/veh)		32.6			19.2			19.4			21.8	
Approach LOS		C			B			B			C	
Queue Length 50th (ft)		67	0		16	0	21	124		27	186	
Queue Length 95th (ft)		120	15		50	44	60	224		71	324	
Internal Link Dist (ft)		655			515			251			657	
Turn Bay Length (ft)			140				85			110		
Base Capacity (vph)		761	931		840	760	839	1650		823	1531	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.18	0.03		0.04	0.11	0.05	0.41		0.07	0.61	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 80.1			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay (s/veh): 21.7		Intersection LOS: C	

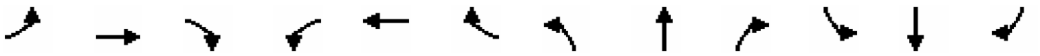
Intersection Capacity Utilization 61.0% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 5: Norwood Avenue & Harris Avenue



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	135	31	35	87	44	676	56	928
v/c Ratio	0.49	0.06	0.13	0.29	0.19	0.40	0.27	0.60
Control Delay (s/veh)	38.7	5.9	36.8	12.0	38.5	18.1	40.6	20.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	38.7	5.9	36.8	12.0	38.5	18.1	40.6	20.6
Queue Length 50th (ft)	67	0	16	0	21	124	27	186
Queue Length 95th (ft)	120	15	50	44	60	224	71	324
Internal Link Dist (ft)	655		515			251		657
Turn Bay Length (ft)		140			85		110	
Base Capacity (vph)	761	931	840	760	839	1650	823	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.03	0.04	0.11	0.05	0.41	0.07	0.61

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	13	31	9	26	87	44	665	11	56	623	305
Future Volume (veh/h)	122	13	31	9	26	87	44	665	11	56	623	305
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1707	1707	1826	1826	1826	1870	1870	1870	1841	1841	1841
Adj Flow Rate, veh/h	122	13	31	9	26	87	44	665	11	56	623	305
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	13	13	13	5	5	5	2	2	2	4	4	4
Cap, veh/h	236	25	350	71	205	229	152	1261	21	156	804	394
Arrive On Green	0.16	0.16	0.16	0.15	0.15	0.15	0.09	0.35	0.35	0.09	0.36	0.36
Sat Flow, veh/h	1476	157	1414	464	1339	1491	1781	3576	59	1753	2255	1104
Grp Volume(v), veh/h	135	0	31	35	0	87	44	330	346	56	483	445
Grp Sat Flow(s),veh/h/ln	1634	0	1414	1803	0	1491	1781	1777	1858	1753	1749	1611
Q Serve(g_s), s	4.8	0.0	1.1	1.1	0.0	3.3	1.5	9.4	9.4	1.9	15.5	15.6
Cycle Q Clear(g_c), s	4.8	0.0	1.1	1.1	0.0	3.3	1.5	9.4	9.4	1.9	15.5	15.6
Prop In Lane	0.90		1.00	0.26		1.00	1.00		0.03	1.00		0.69
Lane Grp Cap(c), veh/h	262	0	350	277	0	229	152	627	655	156	624	574
V/C Ratio(X)	0.52	0.00	0.09	0.13	0.00	0.38	0.29	0.53	0.53	0.36	0.77	0.77
Avail Cap(c_a), veh/h	939	0	936	1030	0	852	1027	993	1039	1010	977	900
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.3	0.0	18.4	23.1	0.0	24.1	27.2	16.3	16.3	27.1	18.1	18.1
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.1	0.0	0.4	0.4	0.5	0.5	0.5	1.6	1.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.3	0.4	0.0	1.1	0.6	3.3	3.5	0.8	5.9	5.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	24.9	0.0	18.5	23.2	0.0	24.5	27.6	16.8	16.8	27.7	19.7	19.8
LnGrp LOS	C		B	C		C	C	B	B	C	B	B
Approach Vol, veh/h		166			122			720			984	
Approach Delay, s/veh		23.7			24.1			17.5			20.2	
Approach LOS		C			C			B			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		13.5	8.9	27.2		13.7	9.1	26.9				
Change Period (Y+Rc), s		3.8	3.5	* 4.6		3.6	3.5	* 4.6				
Max Green Setting (Gmax), s		36.2	36.5	* 35		36.4	36.5	* 35				
Max Q Clear Time (g_c+I1), s		5.3	3.5	17.6		6.8	3.9	11.4				
Green Ext Time (p_c), s		0.3	0.0	5.0		0.6	0.1	3.1				

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	19.7
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	13	31	9	26	87	44	665	11	56	623	305
Future Volume (veh/h)	122	13	31	9	26	87	44	665	11	56	623	305
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1707	1707	1826	1826	1826	1870	1870	1870	1841	1841	1841
Adj Flow Rate, veh/h	122	13	31	9	26	87	44	665	11	56	623	305
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	13	13	13	5	5	5	2	2	2	4	4	4
Cap, veh/h	236	25	350	71	205	229	152	1261	21	156	804	394
Arrive On Green	0.16	0.16	0.16	0.15	0.15	0.15	0.09	0.35	0.35	0.09	0.36	0.36
Sat Flow, veh/h	1476	157	1414	464	1339	1491	1781	3576	59	1753	2255	1104
Grp Volume(v), veh/h	135	0	31	35	0	87	44	330	346	56	483	445
Grp Sat Flow(s),veh/h/ln	1634	0	1414	1803	0	1491	1781	1777	1858	1753	1749	1611
Q Serve(g_s), s	4.8	0.0	1.1	1.1	0.0	3.3	1.5	9.4	9.4	1.9	15.5	15.6
Cycle Q Clear(g_c), s	4.8	0.0	1.1	1.1	0.0	3.3	1.5	9.4	9.4	1.9	15.5	15.6
Prop In Lane	0.90		1.00	0.26		1.00	1.00		0.03	1.00		0.69
Lane Grp Cap(c), veh/h	262	0	350	277	0	229	152	627	655	156	624	574
V/C Ratio(X)	0.52	0.00	0.09	0.13	0.00	0.38	0.29	0.53	0.53	0.36	0.77	0.77
Avail Cap(c_a), veh/h	939	0	936	1030	0	852	1027	993	1039	1010	977	900
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.3	0.0	18.4	23.1	0.0	24.1	27.2	16.3	16.3	27.1	18.1	18.1
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.1	0.0	0.4	0.4	0.5	0.5	0.5	1.6	1.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.3	0.4	0.0	1.1	0.6	3.3	3.5	0.8	5.9	5.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	24.9	0.0	18.5	23.2	0.0	24.5	27.6	16.8	16.8	27.7	19.7	19.8
LnGrp LOS	C		B	C		C	C	B	B	C	B	B
Approach Vol, veh/h		166			122			720			984	
Approach Delay, s/veh		23.7			24.1			17.5			20.2	
Approach LOS		C			C			B			C	

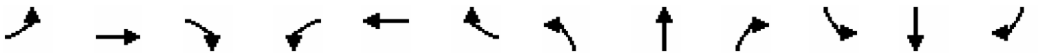
Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	13.5	8.9	27.2	13.7	9.1	26.9
Change Period (Y+Rc), s	3.8	3.5	* 4.6	3.6	3.5	* 4.6
Max Green Setting (Gmax), s	36.2	36.5	* 35	36.4	36.5	* 35
Max Q Clear Time (g_c+I1), s	5.3	3.5	17.6	6.8	3.9	11.4
Green Ext Time (p_c), s	0.3	0.0	5.0	0.6	0.1	3.1

Intersection Summary	
HCM 7th Control Delay, s/veh	19.7
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	203	74	93	22	84	39	107	547	16	23	465	186
Future Volume (vph)	203	74	93	22	84	39	107	547	16	23	465	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	105		0	0		0	90		0	50		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			35			55		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.99	0.99		0.99	0.99		0.99	0.99		0.99	0.99	
Frt		0.916			0.952			0.996			0.957	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1641	0	1752	1746	0	1770	3522	0	1752	3324	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1712	1641	0	1748	1746	0	1764	3522	0	1741	3324	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		44			16			2			45	
Link Speed (mph)		30			30			40			30	
Link Distance (ft)		790			308			560			983	
Travel Time (s)		18.0			7.0			9.5			22.3	
Confl. Peds. (#/hr)	3		2	2		3	3		4	4		3
Confl. Bikes (#/hr)			2			2						2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	3%	3%	3%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	203	74	93	22	84	39	107	547	16	23	465	186
Shared Lane Traffic (%)												
Lane Group Flow (vph)	203	167	0	22	123	0	107	563	0	23	651	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

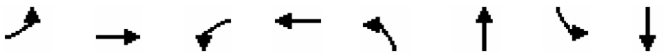


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases												
Detector Phase	1	6		5	2		3	8		7	4	
Switch Phase												
Minimum Initial (s)	10.0	9.0		10.0	10.0		9.0	8.0		9.0	8.0	
Minimum Split (s)	13.5	27.9		13.5	27.5		12.5	23.6		12.5	27.6	
Total Split (s)	30.0	30.0		30.0	30.0		30.0	40.0		30.0	40.0	
Total Split (%)	23.1%	23.1%		23.1%	23.1%		23.1%	30.8%		23.1%	30.8%	
Maximum Green (s)	26.5	26.1		26.5	26.5		26.5	35.4		26.5	35.4	
Yellow Time (s)	3.5	3.9		3.5	3.5		3.5	4.3		3.5	4.3	
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.3		0.0	0.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.5	3.9		3.5	3.5		3.5	4.6		3.5	4.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		17.0			17.0			12.0			16.0	
Pedestrian Calls (#/hr)		2			2			2			2	
Act Effct Green (s)	15.1	27.3		11.0	13.1		11.3	27.2		9.9	20.1	
Actuated g/C Ratio	0.21	0.38		0.15	0.18		0.16	0.38		0.14	0.28	
v/c Ratio	0.56	0.25		0.08	0.37		0.38	0.42		0.09	0.67	
Control Delay (s/veh)	36.5	17.6		37.7	31.1		38.2	19.5		38.7	27.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	36.5	17.6		37.7	31.1		38.2	19.5		38.7	27.1	
LOS	D	B		D	C		D	B		D	C	
Approach Delay (s/veh)		28.0			32.2			22.5			27.6	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	75	31		8	40		41	71		8	114	
Queue Length 95th (ft)	208	119		41	120		128	213		43	264	
Internal Link Dist (ft)		710			228			480			903	
Turn Bay Length (ft)	105						90			50		
Base Capacity (vph)	695	715		708	715		715	1930		708	1816	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.29	0.23		0.03	0.17		0.15	0.29		0.03	0.36	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 72.1			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay (s/veh): 26.2		Intersection LOS: C	

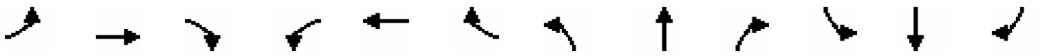
Intersection Capacity Utilization 60.9% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 6: Norwood Avenue & Silver Eagle Road



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	203	167	22	123	107	563	23	651
v/c Ratio	0.56	0.25	0.08	0.37	0.38	0.42	0.09	0.67
Control Delay (s/veh)	36.5	17.6	37.7	31.1	38.2	19.5	38.7	27.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	36.5	17.6	37.7	31.1	38.2	19.5	38.7	27.1
Queue Length 50th (ft)	75	31	8	40	41	71	8	114
Queue Length 95th (ft)	208	119	41	120	128	213	43	264
Internal Link Dist (ft)		710		228		480		903
Turn Bay Length (ft)	105				90		50	
Base Capacity (vph)	695	715	708	715	715	1930	708	1816
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.23	0.03	0.17	0.15	0.29	0.03	0.36

Intersection Summary



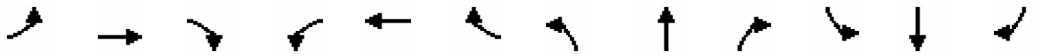
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	203	74	93	22	84	39	107	547	16	23	465	186
Future Volume (veh/h)	203	74	93	22	84	39	107	547	16	23	465	186
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1856	1856	1856	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	203	74	93	22	84	39	107	547	16	23	465	186
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	5	5	3	3	3	2	2	2	3	3	3
Cap, veh/h	297	200	252	91	188	87	232	1221	36	85	646	256
Arrive On Green	0.17	0.28	0.28	0.05	0.16	0.16	0.13	0.35	0.35	0.05	0.26	0.26
Sat Flow, veh/h	1739	723	909	1767	1185	550	1781	3525	103	1767	2441	968
Grp Volume(v), veh/h	203	0	167	22	0	123	107	275	288	23	335	316
Grp Sat Flow(s),veh/h/ln	1739	0	1632	1767	0	1735	1781	1777	1851	1767	1763	1646
Q Serve(g_s), s	6.2	0.0	4.6	0.7	0.0	3.6	3.1	6.7	6.7	0.7	9.7	9.8
Cycle Q Clear(g_c), s	6.2	0.0	4.6	0.7	0.0	3.6	3.1	6.7	6.7	0.7	9.7	9.8
Prop In Lane	1.00		0.56	1.00		0.32	1.00		0.06	1.00		0.59
Lane Grp Cap(c), veh/h	297	0	452	91	0	275	232	616	641	85	467	436
V/C Ratio(X)	0.68	0.00	0.37	0.24	0.00	0.45	0.46	0.45	0.45	0.27	0.72	0.73
Avail Cap(c_a), veh/h	821	0	758	834	0	819	841	1120	1167	834	1112	1038
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.9	0.0	16.3	25.6	0.0	21.4	22.6	14.2	14.2	25.8	18.7	18.8
Incr Delay (d2), s/veh	1.0	0.0	0.2	0.5	0.0	0.4	0.5	0.2	0.2	0.6	0.8	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	1.6	0.3	0.0	1.4	1.2	2.3	2.4	0.3	3.6	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	22.9	0.0	16.5	26.1	0.0	21.8	23.1	14.4	14.4	26.4	19.5	19.7
LnGrp LOS	C		B	C		C	C	B	B	C	B	B
Approach Vol, veh/h		370			145			670			674	
Approach Delay, s/veh		20.0			22.5			15.8			19.8	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.1	12.8	10.8	19.5	6.4	19.5	6.2	24.1
Change Period (Y+Rc), s	3.5	* 3.9	3.5	* 4.6	3.5	3.9	3.5	* 4.6
Max Green Setting (Gmax), s	26.5	* 27	26.5	* 35	26.5	26.1	26.5	* 35
Max Q Clear Time (g_c+I1), s	8.2	5.6	5.1	11.8	2.7	6.6	2.7	8.7
Green Ext Time (p_c), s	0.3	0.4	0.1	2.8	0.0	0.6	0.0	2.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	18.6
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	203	74	93	22	84	39	107	547	16	23	465	186
Future Volume (veh/h)	203	74	93	22	84	39	107	547	16	23	465	186
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1856	1856	1856	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	203	74	93	22	84	39	107	547	16	23	465	186
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	5	5	3	3	3	2	2	2	3	3	3
Cap, veh/h	297	200	252	91	188	87	232	1221	36	85	646	256
Arrive On Green	0.17	0.28	0.28	0.05	0.16	0.16	0.13	0.35	0.35	0.05	0.26	0.26
Sat Flow, veh/h	1739	723	909	1767	1185	550	1781	3525	103	1767	2441	968
Grp Volume(v), veh/h	203	0	167	22	0	123	107	275	288	23	335	316
Grp Sat Flow(s),veh/h/ln	1739	0	1632	1767	0	1735	1781	1777	1851	1767	1763	1646
Q Serve(g_s), s	6.2	0.0	4.6	0.7	0.0	3.6	3.1	6.7	6.7	0.7	9.7	9.8
Cycle Q Clear(g_c), s	6.2	0.0	4.6	0.7	0.0	3.6	3.1	6.7	6.7	0.7	9.7	9.8
Prop In Lane	1.00		0.56	1.00		0.32	1.00		0.06	1.00		0.59
Lane Grp Cap(c), veh/h	297	0	452	91	0	275	232	616	641	85	467	436
V/C Ratio(X)	0.68	0.00	0.37	0.24	0.00	0.45	0.46	0.45	0.45	0.27	0.72	0.73
Avail Cap(c_a), veh/h	821	0	758	834	0	819	841	1120	1167	834	1112	1038
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.9	0.0	16.3	25.6	0.0	21.4	22.6	14.2	14.2	25.8	18.7	18.8
Incr Delay (d2), s/veh	1.0	0.0	0.2	0.5	0.0	0.4	0.5	0.2	0.2	0.6	0.8	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	1.6	0.3	0.0	1.4	1.2	2.3	2.4	0.3	3.6	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	22.9	0.0	16.5	26.1	0.0	21.8	23.1	14.4	14.4	26.4	19.5	19.7
LnGrp LOS	C		B	C		C	C	B	B	C	B	B
Approach Vol, veh/h		370			145			670			674	
Approach Delay, s/veh		20.0			22.5			15.8			19.8	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.1	12.8	10.8	19.5	6.4	19.5	6.2	24.1
Change Period (Y+Rc), s	3.5	* 3.9	3.5	* 4.6	3.5	3.9	3.5	* 4.6
Max Green Setting (Gmax), s	26.5	* 27	26.5	* 35	26.5	26.1	26.5	* 35
Max Q Clear Time (g_c+I1), s	8.2	5.6	5.1	11.8	2.7	6.6	2.7	8.7
Green Ext Time (p_c), s	0.3	0.4	0.1	2.8	0.0	0.6	0.0	2.0

Intersection Summary	
HCM 7th Control Delay, s/veh	18.6
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

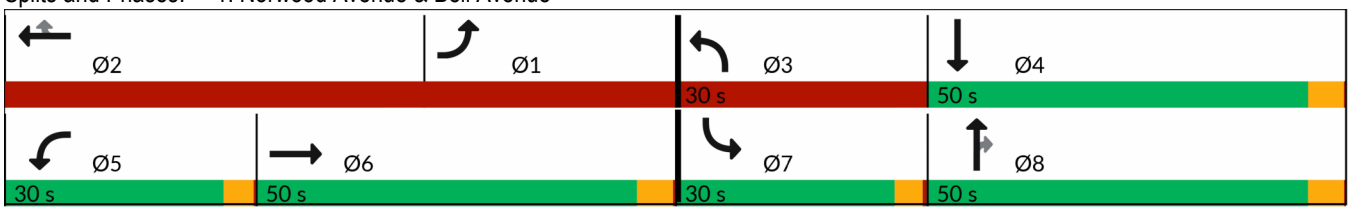
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	51	79	134	60	69	110	382	205	73	395	15
Future Volume (vph)	11	51	79	134	60	69	110	382	205	73	395	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	195		200	70		200	90		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	35			50			70			45		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	0.98		0.99		0.97	0.99		0.97		0.99	
Frt		0.909				0.850			0.850		0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1687	0	1770	1863	1583	1787	3574	1599	1787	3552	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1777	1687	0	1756	1863	1548	1778	3574	1561	1787	3552	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49				69			205		2	
Link Speed (mph)		25			40			40			30	
Link Distance (ft)		958			1056			1318			533	
Travel Time (s)		26.1			18.0			22.5			12.1	
Confl. Peds. (#/hr)	3		5	5		3	2					2
Confl. Bikes (#/hr)			2			5			3			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	11	51	79	134	60	69	110	382	205	73	395	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	130	0	134	60	69	110	382	205	73	410	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases						2			8			
Detector Phase	1	6		5	2	2	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	11.0	9.0		11.0	9.0	9.0	10.0	9.0	9.0	11.0	8.0	
Minimum Split (s)	14.8	31.6		14.8	27.6	27.6	13.6	27.6	27.6	14.9	21.6	
Total Split (s)	30.0	50.0		30.0	50.0	50.0	30.0	50.0	50.0	30.0	50.0	
Total Split (%)	18.8%	31.3%		18.8%	31.3%	31.3%	18.8%	31.3%	31.3%	18.8%	31.3%	
Maximum Green (s)	26.2	45.4		26.2	45.4	45.4	26.4	45.4	45.4	26.1	45.4	
Yellow Time (s)	3.5	4.3		3.5	4.3	4.3	3.5	4.3	4.3	3.5	4.3	
All-Red Time (s)	0.3	0.3		0.3	0.3	0.3	0.1	0.3	0.3	0.4	0.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.8	4.6		3.8	4.6	4.6	3.6	4.6	4.6	3.9	4.6	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		20.0			16.0	16.0		16.0	16.0		10.0	
Pedestrian Calls (#/hr)		2			2	2		2	2		2	
Act Effct Green (s)	13.0	12.2		12.6	21.2	21.2	11.4	13.2	13.2	11.9	13.6	
Actuated g/C Ratio	0.21	0.19		0.20	0.33	0.33	0.18	0.21	0.21	0.19	0.21	
v/c Ratio	0.03	0.35		0.38	0.09	0.12	0.34	0.51	0.42	0.21	0.53	
Control Delay (s/veh)	25.8	19.5		30.6	18.8	7.1	31.2	26.6	7.3	29.9	26.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay (s/veh)	25.8	19.5		30.6	18.8	7.1	31.2	26.6	7.3	29.9	26.8	
LOS	C	B		C	B	A	C	C	A	C	C	
Approach Delay (s/veh)		20.0			21.8			21.7			27.4	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	3	26		42	13	0	35	65	0	22	68	
Queue Length 95th (ft)	20	83		131	61	33	112	147	54	84	163	
Internal Link Dist (ft)		878			976			1238			453	
Turn Bay Length (ft)	150			195		200	70		200	90		
Base Capacity (vph)	790	1278		782	1398	1178	796	2681	1222	787	2666	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.01	0.10		0.17	0.04	0.06	0.14	0.14	0.17	0.09	0.15	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 63.4			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay (s/veh): 23.3		Intersection LOS: C	

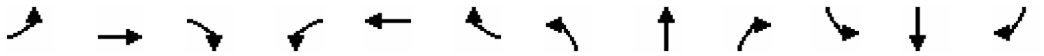
Intersection Capacity Utilization 53.5% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Norwood Avenue & Bell Avenue



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	11	130	134	60	69	110	382	205	73	410
v/c Ratio	0.03	0.35	0.38	0.09	0.12	0.34	0.51	0.42	0.21	0.53
Control Delay (s/veh)	25.8	19.5	30.6	18.8	7.1	31.2	26.6	7.3	29.9	26.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.8	19.5	30.6	18.8	7.1	31.2	26.6	7.3	29.9	26.8
Queue Length 50th (ft)	3	26	42	13	0	35	65	0	22	68
Queue Length 95th (ft)	20	83	131	61	33	112	147	54	84	163
Internal Link Dist (ft)		878		976			1238			453
Turn Bay Length (ft)	150		195		200	70		200	90	
Base Capacity (vph)	790	1278	782	1398	1178	796	2681	1222	787	2666
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.10	0.17	0.04	0.06	0.14	0.14	0.17	0.09	0.15

Intersection Summary



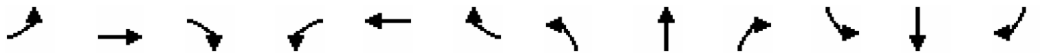
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	51	79	134	60	69	110	382	205	73	395	15
Future Volume (veh/h)	11	51	79	134	60	69	110	382	205	73	395	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	11	51	79	134	60	69	110	382	205	73	395	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	1	1	1
Cap, veh/h	305	105	162	325	296	244	277	676	292	249	629	24
Arrive On Green	0.17	0.16	0.16	0.18	0.16	0.16	0.15	0.19	0.19	0.14	0.18	0.18
Sat Flow, veh/h	1795	650	1007	1781	1870	1543	1795	3582	1548	1795	3515	133
Grp Volume(v), veh/h	11	0	130	134	60	69	110	382	205	73	201	209
Grp Sat Flow(s),veh/h/ln	1795	0	1657	1781	1870	1543	1795	1791	1548	1795	1791	1857
Q Serve(g_s), s	0.3	0.0	3.7	3.4	1.4	1.3	2.8	5.0	3.6	1.9	5.3	5.4
Cycle Q Clear(g_c), s	0.3	0.0	3.7	3.4	1.4	1.3	2.8	5.0	3.6	1.9	5.3	5.4
Prop In Lane	1.00		0.61	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	305	0	267	325	296	244	277	676	292	249	321	333
V/C Ratio(X)	0.04	0.00	0.49	0.41	0.20	0.28	0.40	0.56	0.70	0.29	0.63	0.63
Avail Cap(c_a), veh/h	915	0	1464	908	1653	1363	922	3165	1368	912	1582	1641
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.8	0.0	19.6	18.6	18.8	7.5	19.6	18.9	6.3	19.9	19.5	19.5
Incr Delay (d2), s/veh	0.0	0.0	0.5	0.3	0.1	0.2	0.3	0.3	1.2	0.2	0.8	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	1.3	1.2	0.5	0.6	1.0	1.8	1.9	0.7	2.1	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	17.8	0.0	20.1	18.9	18.9	7.7	19.9	19.2	7.5	20.1	20.2	20.2
LnGrp LOS	B		C	B	B	A	B	B	A	C	C	C
Approach Vol, veh/h		141			263			697			483	
Approach Delay, s/veh		19.9			16.0			15.9			20.2	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	12.7	11.5	13.8	13.2	12.9	11.0	14.3
Change Period (Y+Rc), s	* 4.6	* 4.6	3.6	* 4.6	3.8	* 4.6	3.9	* 4.6
Max Green Setting (Gmax), s	* 26	* 45	26.4	* 45	26.2	* 45	26.1	* 45
Max Q Clear Time (g_c+I1), s	2.3	3.4	4.8	7.4	5.4	5.7	3.9	7.0
Green Ext Time (p_c), s	0.0	0.3	0.1	1.6	0.2	0.6	0.1	1.9

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	17.6
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	51	79	134	60	69	110	382	205	73	395	15
Future Volume (veh/h)	11	51	79	134	60	69	110	382	205	73	395	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	11	51	79	134	60	69	110	382	205	73	395	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	1	1	1
Cap, veh/h	305	105	162	325	296	244	277	676	292	249	629	24
Arrive On Green	0.17	0.16	0.16	0.18	0.16	0.16	0.15	0.19	0.19	0.14	0.18	0.18
Sat Flow, veh/h	1795	650	1007	1781	1870	1543	1795	3582	1548	1795	3515	133
Grp Volume(v), veh/h	11	0	130	134	60	69	110	382	205	73	201	209
Grp Sat Flow(s),veh/h/ln	1795	0	1657	1781	1870	1543	1795	1791	1548	1795	1791	1857
Q Serve(g_s), s	0.3	0.0	3.7	3.4	1.4	1.3	2.8	5.0	3.6	1.9	5.3	5.4
Cycle Q Clear(g_c), s	0.3	0.0	3.7	3.4	1.4	1.3	2.8	5.0	3.6	1.9	5.3	5.4
Prop In Lane	1.00		0.61	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	305	0	267	325	296	244	277	676	292	249	321	333
V/C Ratio(X)	0.04	0.00	0.49	0.41	0.20	0.28	0.40	0.56	0.70	0.29	0.63	0.63
Avail Cap(c_a), veh/h	915	0	1464	908	1653	1363	922	3165	1368	912	1582	1641
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.8	0.0	19.6	18.6	18.8	7.5	19.6	18.9	6.3	19.9	19.5	19.5
Incr Delay (d2), s/veh	0.0	0.0	0.5	0.3	0.1	0.2	0.3	0.3	1.2	0.2	0.8	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	1.3	1.2	0.5	0.6	1.0	1.8	1.9	0.7	2.1	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	17.8	0.0	20.1	18.9	18.9	7.7	19.9	19.2	7.5	20.1	20.2	20.2
LnGrp LOS	B		C	B	B	A	B	B	A	C	C	C
Approach Vol, veh/h		141			263			697			483	
Approach Delay, s/veh		19.9			16.0			15.9			20.2	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	12.7	11.5	13.8	13.2	12.9	11.0	14.3
Change Period (Y+Rc), s	* 4.6	* 4.6	3.6	* 4.6	3.8	* 4.6	3.9	* 4.6
Max Green Setting (Gmax), s	* 26	* 45	26.4	* 45	26.2	* 45	26.1	* 45
Max Q Clear Time (g_c+I1), s	2.3	3.4	4.8	7.4	5.4	5.7	3.9	7.0
Green Ext Time (p_c), s	0.0	0.3	0.1	1.6	0.2	0.6	0.1	1.9

Intersection Summary	
HCM 7th Control Delay, s/veh	17.6
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

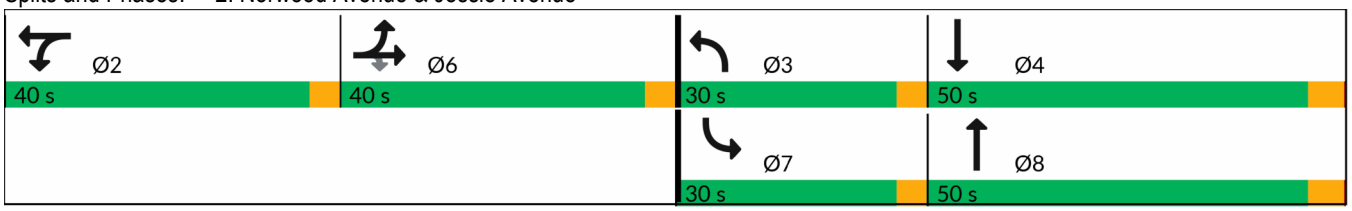
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	52	163	179	72	35	208	674	140	61	540	17
Future Volume (vph)	32	52	163	179	72	35	208	674	140	61	540	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	0		0	100		0	120		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			65			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99	0.97		0.99		0.99	0.99		0.99	0.99	
Frt			0.850		0.983			0.974			0.995	
Flt Protected		0.981			0.970		0.950			0.950		
Satd. Flow (prot)	0	1845	1599	0	1787	0	1787	3461	0	1787	3552	0
Flt Permitted		0.981			0.970		0.950			0.950		
Satd. Flow (perm)	0	1837	1563	0	1777	0	1774	3461	0	1781	3552	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			163		4			15			2	
Link Speed (mph)		30			30			40			30	
Link Distance (ft)		838			627			712			1318	
Travel Time (s)		19.0			14.3			12.1			30.0	
Confl. Peds. (#/hr)	9		5	5		9	3		2	2		3
Confl. Bikes (#/hr)			1			2			3			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	32	52	163	179	72	35	208	674	140	61	540	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	84	163	0	286	0	208	814	0	61	557	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Perm	Split	NA		Prot	NA		Prot	NA	
Protected Phases	6	6		2	2		3	8		7	4	
Permitted Phases			6									
Detector Phase	6	6	6	2	2		3	8		7	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		9.0	7.0		9.0	6.0	
Minimum Split (s)	28.5	28.5	28.5	28.5	28.5		12.5	20.6		13.5	19.6	
Total Split (s)	40.0	40.0	40.0	40.0	40.0		30.0	50.0		30.0	50.0	
Total Split (%)	25.0%	25.0%	25.0%	25.0%	25.0%		18.8%	31.3%		18.8%	31.3%	
Maximum Green (s)	36.5	36.5	36.5	36.5	36.5		26.5	45.4		26.5	45.4	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	4.3		3.5	4.3	
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.3		0.0	0.3	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		3.5	3.5		3.5		3.5	4.6		3.5	4.6	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	17.0	17.0	17.0	18.0	18.0			9.0			8.0	
Pedestrian Calls (#/hr)	2	2	2	2	2			2			2	
Act Effct Green (s)		12.8	12.8		20.0		16.2	30.4		10.2	20.7	
Actuated g/C Ratio		0.15	0.15		0.23		0.19	0.35		0.12	0.24	
v/c Ratio		0.30	0.43		0.68		0.61	0.65		0.28	0.65	
Control Delay (s/veh)		41.3	10.9		41.1		43.8	28.0		46.4	35.3	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)		41.3	10.9		41.1		43.8	28.0		46.4	35.3	
LOS		D	B		D		D	C		D	D	
Approach Delay (s/veh)		21.3			41.2			31.3			36.4	
Approach LOS		C			D			C			D	
Queue Length 50th (ft)		38	0		125		94	180		28	128	
Queue Length 95th (ft)		111	61		311		242	371		96	285	
Internal Link Dist (ft)		758			547			632			1238	
Turn Bay Length (ft)			100				100			120		
Base Capacity (vph)		841	801		816		591	1968		591	2014	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		0.10	0.20		0.35		0.35	0.41		0.10	0.28	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 86			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay (s/veh): 32.9		Intersection LOS: C	

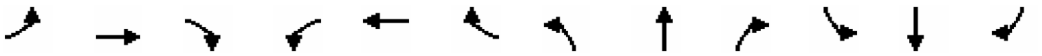
Intersection Capacity Utilization 63.7% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Norwood Avenue & Jessie Avenue



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	84	163	286	208	814	61	557
v/c Ratio	0.30	0.43	0.68	0.61	0.65	0.28	0.65
Control Delay (s/veh)	41.3	10.9	41.1	43.8	28.0	46.4	35.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	41.3	10.9	41.1	43.8	28.0	46.4	35.3
Queue Length 50th (ft)	38	0	125	94	180	28	128
Queue Length 95th (ft)	111	61	311	242	371	96	285
Internal Link Dist (ft)	758		547		632		1238
Turn Bay Length (ft)		100		100		120	
Base Capacity (vph)	841	801	816	591	1968	591	2014
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.20	0.35	0.35	0.41	0.10	0.28

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	52	163	179	72	35	208	674	140	61	540	17
Future Volume (veh/h)	32	52	163	179	72	35	208	674	140	61	540	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	32	52	163	179	72	35	208	674	140	61	540	17
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	120	195	264	237	95	46	257	856	178	166	853	27
Arrive On Green	0.17	0.17	0.17	0.21	0.21	0.21	0.14	0.29	0.29	0.09	0.24	0.24
Sat Flow, veh/h	705	1145	1552	1116	449	218	1795	2936	609	1795	3541	111
Grp Volume(v), veh/h	84	0	163	286	0	0	208	411	403	61	273	284
Grp Sat Flow(s),veh/h/ln	1850	0	1552	1783	0	0	1795	1791	1754	1795	1791	1861
Q Serve(g_s), s	2.6	0.0	6.3	9.7	0.0	0.0	7.3	13.7	13.7	2.1	8.8	8.9
Cycle Q Clear(g_c), s	2.6	0.0	6.3	9.7	0.0	0.0	7.3	13.7	13.7	2.1	8.8	8.9
Prop In Lane	0.38		1.00	0.63		0.12	1.00		0.35	1.00		0.06
Lane Grp Cap(c), veh/h	314	0	264	379	0	0	257	522	512	166	431	448
V/C Ratio(X)	0.27	0.00	0.62	0.75	0.00	0.00	0.81	0.79	0.79	0.37	0.63	0.63
Avail Cap(c_a), veh/h	1043	0	875	1005	0	0	735	1256	1230	735	1256	1305
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	24.9	23.9	0.0	0.0	26.9	21.1	21.1	27.6	22.0	22.0
Incr Delay (d2), s/veh	0.2	0.0	0.9	1.2	0.0	0.0	2.3	1.0	1.0	0.5	0.6	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	2.2	4.0	0.0	0.0	3.0	5.1	5.1	0.9	3.5	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	23.5	0.0	25.8	25.1	0.0	0.0	29.2	22.1	22.1	28.1	22.6	22.6
LnGrp LOS	C		C	C			C	C	C	C	C	C
Approach Vol, veh/h		247			286			1022			618	
Approach Delay, s/veh		25.0			25.1			23.5			23.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	17.3	12.8	20.2	14.5	9.5	23.5
Change Period (Y+Rc), s	3.5	3.5	* 4.6	3.5	3.5	* 4.6
Max Green Setting (Gmax), s	36.5	26.5	* 45	36.5	26.5	* 45
Max Q Clear Time (g_c+I1), s	11.7	9.3	10.9	8.3	4.1	15.7
Green Ext Time (p_c), s	1.1	0.2	2.3	0.6	0.1	3.2

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	23.8
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	52	163	179	72	35	208	674	140	61	540	17
Future Volume (veh/h)	32	52	163	179	72	35	208	674	140	61	540	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	32	52	163	179	72	35	208	674	140	61	540	17
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	120	195	264	237	95	46	257	856	178	166	853	27
Arrive On Green	0.17	0.17	0.17	0.21	0.21	0.21	0.14	0.29	0.29	0.09	0.24	0.24
Sat Flow, veh/h	705	1145	1552	1116	449	218	1795	2936	609	1795	3541	111
Grp Volume(v), veh/h	84	0	163	286	0	0	208	411	403	61	273	284
Grp Sat Flow(s),veh/h/ln	1850	0	1552	1783	0	0	1795	1791	1754	1795	1791	1861
Q Serve(g_s), s	2.6	0.0	6.3	9.7	0.0	0.0	7.3	13.7	13.7	2.1	8.8	8.9
Cycle Q Clear(g_c), s	2.6	0.0	6.3	9.7	0.0	0.0	7.3	13.7	13.7	2.1	8.8	8.9
Prop In Lane	0.38		1.00	0.63		0.12	1.00		0.35	1.00		0.06
Lane Grp Cap(c), veh/h	314	0	264	379	0	0	257	522	512	166	431	448
V/C Ratio(X)	0.27	0.00	0.62	0.75	0.00	0.00	0.81	0.79	0.79	0.37	0.63	0.63
Avail Cap(c_a), veh/h	1043	0	875	1005	0	0	735	1256	1230	735	1256	1305
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	24.9	23.9	0.0	0.0	26.9	21.1	21.1	27.6	22.0	22.0
Incr Delay (d2), s/veh	0.2	0.0	0.9	1.2	0.0	0.0	2.3	1.0	1.0	0.5	0.6	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	2.2	4.0	0.0	0.0	3.0	5.1	5.1	0.9	3.5	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	23.5	0.0	25.8	25.1	0.0	0.0	29.2	22.1	22.1	28.1	22.6	22.6
LnGrp LOS	C		C	C			C	C	C	C	C	C
Approach Vol, veh/h		247			286			1022			618	
Approach Delay, s/veh		25.0			25.1			23.5			23.1	
Approach LOS		C			C			C			C	

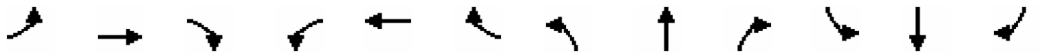
Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	17.3	12.8	20.2	14.5	9.5	23.5
Change Period (Y+Rc), s	3.5	3.5	* 4.6	3.5	3.5	* 4.6
Max Green Setting (Gmax), s	36.5	26.5	* 45	36.5	26.5	* 45
Max Q Clear Time (g_c+I1), s	11.7	9.3	10.9	8.3	4.1	15.7
Green Ext Time (p_c), s	1.1	0.2	2.3	0.6	0.1	3.2

Intersection Summary	
HCM 7th Control Delay, s/veh	23.8
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	251	0	309	324	812	0	0	547	391
Future Volume (vph)	0	0	0	251	0	309	324	812	0	0	547	391
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		50	200		0	0		75
Storage Lanes	0		0	1		1	1		0	0		1
Taper Length (ft)	25			25			35			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor						0.98	0.98					0.95
Frt						0.850						0.850
Flt Protected				0.950	0.950		0.950					
Satd. Flow (prot)	0	0	0	1698	1698	1599	1787	3574	0	0	3574	1599
Flt Permitted				0.950	0.950		0.950					
Satd. Flow (perm)	0	0	0	1698	1698	1574	1766	3574	0	0	3574	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						174						261
Link Speed (mph)		30			30			40			30	
Link Distance (ft)		1264			954			526			712	
Travel Time (s)		28.7			21.7			9.0			16.2	
Confl. Peds. (#/hr)	3					3	6		9	9		6
Confl. Bikes (#/hr)									4			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	0	0	0	251	0	309	324	812	0	0	547	391
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	0	0	0	125	126	309	324	812	0	0	547	391
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

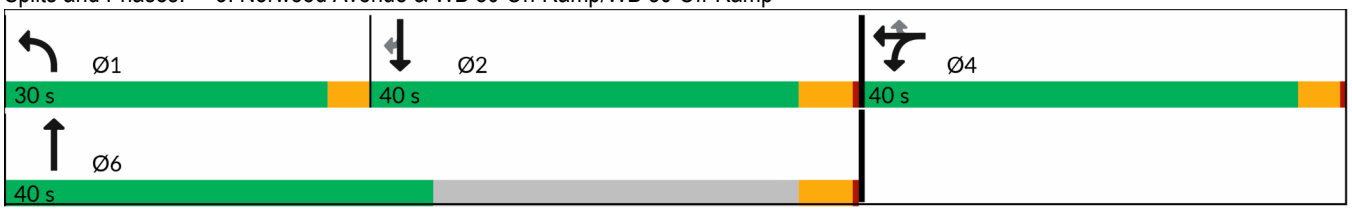


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				4	4		1	6			2	
Permitted Phases						4						2
Detector Phase				4	4	4	1	6			2	2
Switch Phase												
Minimum Initial (s)				8.0	8.0	8.0	8.0	6.0			6.0	6.0
Minimum Split (s)				29.0	29.0	29.0	11.5	18.8			17.8	17.8
Total Split (s)				40.0	40.0	40.0	30.0	40.0			40.0	40.0
Total Split (%)				36.4%	36.4%	36.4%	27.3%	36.4%			36.4%	36.4%
Maximum Green (s)				36.0	36.0	36.0	26.5	35.2			35.2	35.2
Yellow Time (s)				3.5	3.5	3.5	3.5	4.3			4.3	4.3
All-Red Time (s)				0.5	0.5	0.5	0.0	0.5			0.5	0.5
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				4.0	4.0	4.0	3.5	4.8			4.8	4.8
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				2.0	2.0	2.0	2.5	2.5			2.5	2.5
Recall Mode				None	None	None	None	Min			Min	Min
Walk Time (s)				7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)				18.0	18.0	18.0		7.0			6.0	6.0
Pedestrian Calls (#/hr)				2	2	2		2			2	2
Act Effct Green (s)				13.0	13.0	13.0	17.1	39.1			18.1	18.1
Actuated g/C Ratio				0.21	0.21	0.21	0.28	0.63			0.29	0.29
v/c Ratio				0.35	0.35	0.66	0.65	0.35			0.51	0.61
Control Delay (s/veh)				26.4	26.4	18.8	28.9	6.1			21.4	12.4
Queue Delay				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay (s/veh)				26.4	26.4	18.8	28.9	6.1			21.4	12.4
LOS				C	C	B	C	A			C	B
Approach Delay (s/veh)					22.3			12.6			17.7	
Approach LOS					C			B			B	
Queue Length 50th (ft)				40	40	41	95	53			79	33
Queue Length 95th (ft)				111	112	149	259	140			186	152
Internal Link Dist (ft)		1184			874			446			632	
Turn Bay Length (ft)						50	200					75
Base Capacity (vph)				1079	1079	1064	836	3359			2222	1046
Starvation Cap Reductn				0	0	0	0	0			0	0
Spillback Cap Reductn				0	0	0	0	0			0	0
Storage Cap Reductn				0	0	0	0	0			0	0
Reduced v/c Ratio				0.12	0.12	0.29	0.39	0.24			0.25	0.37

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 61.6			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay (s/veh): 16.5		Intersection LOS: B	

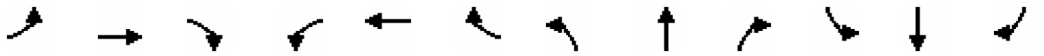
Intersection Capacity Utilization 61.7% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 3: Norwood Avenue & WB 80 On-Ramp/WB 80 Off-Ramp



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	125	126	309	324	812	547	391
v/c Ratio	0.35	0.35	0.66	0.65	0.35	0.51	0.61
Control Delay (s/veh)	26.4	26.4	18.8	28.9	6.1	21.4	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	26.4	26.4	18.8	28.9	6.1	21.4	12.4
Queue Length 50th (ft)	40	40	41	95	53	79	33
Queue Length 95th (ft)	111	112	149	259	140	186	152
Internal Link Dist (ft)		874			446	632	
Turn Bay Length (ft)			50	200			75
Base Capacity (vph)	1079	1079	1064	836	3359	2222	1046
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.12	0.29	0.39	0.24	0.25	0.37

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	251	0	309	324	812	0	0	547	391
Future Volume (veh/h)	0	0	0	251	0	309	324	812	0	0	547	391
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	1885	1885	1885	1885	0	0	1885	1885
Adj Flow Rate, veh/h				251	0	0	324	812	0	0	547	0
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				1	1	1	1	1	0	0	1	1
Cap, veh/h				702	0		411	2093	0	0	959	
Arrive On Green				0.20	0.00	0.00	0.23	0.58	0.00	0.00	0.27	0.00
Sat Flow, veh/h				3591	0	1598	1795	3676	0	0	3676	1598
Grp Volume(v), veh/h				251	0	0	324	812	0	0	547	0
Grp Sat Flow(s),veh/h/ln				1795	0	1598	1795	1791	0	0	1791	1598
Q Serve(g_s), s				2.4	0.0	0.0	6.8	4.9	0.0	0.0	5.3	0.0
Cycle Q Clear(g_c), s				2.4	0.0	0.0	6.8	4.9	0.0	0.0	5.3	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				702	0		411	2093	0	0	959	
V/C Ratio(X)				0.36	0.00		0.79	0.39	0.00	0.00	0.57	
Avail Cap(c_a), veh/h				3238	0		1192	3158	0	0	3158	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				13.9	0.0	0.0	14.5	4.5	0.0	0.0	12.6	0.0
Incr Delay (d2), s/veh				0.1	0.0	0.0	2.5	0.1	0.0	0.0	0.4	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.8	0.0	0.0	2.3	0.7	0.0	0.0	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				14.0	0.0	0.0	17.0	4.5	0.0	0.0	13.0	0.0
LnGrp LOS				B			B	A			B	
Approach Vol, veh/h					251			1136			547	
Approach Delay, s/veh					14.0			8.1			13.0	
Approach LOS					B			A			B	

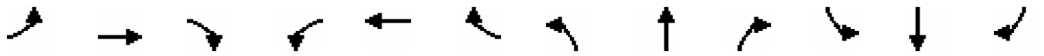
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	12.6	15.5		11.8		28.1						
Change Period (Y+Rc), s	3.5	4.8		4.0		4.8						
Max Green Setting (Gmax), s	26.5	35.2		36.0		35.2						
Max Q Clear Time (g_c+I1), s	8.8	7.3		4.4		6.9						
Green Ext Time (p_c), s	0.6	3.3		0.5		4.7						

Intersection Summary		
HCM 6th Ctrl Delay, s/veh		10.3
HCM 6th LOS		B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



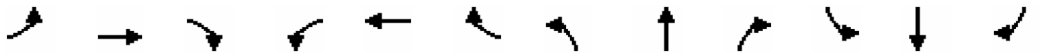
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	251	0	309	324	812	0	0	547	391
Future Volume (veh/h)	0	0	0	251	0	309	324	812	0	0	547	391
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	1885	1885	1885	1885	0	0	1885	1885
Adj Flow Rate, veh/h				251	0	0	324	812	0	0	547	0
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				1	1	1	1	1	0	0	1	1
Cap, veh/h				702	0		411	2093	0	0	959	
Arrive On Green				0.20	0.00	0.00	0.23	0.58	0.00	0.00	0.27	0.00
Sat Flow, veh/h				3591	0	1598	1795	3676	0	0	3676	1598
Grp Volume(v), veh/h				251	0	0	324	812	0	0	547	0
Grp Sat Flow(s),veh/h/ln				1795	0	1598	1795	1791	0	0	1791	1598
Q Serve(g_s), s				2.4	0.0	0.0	6.8	4.9	0.0	0.0	5.3	0.0
Cycle Q Clear(g_c), s				2.4	0.0	0.0	6.8	4.9	0.0	0.0	5.3	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				702	0		411	2093	0	0	959	
V/C Ratio(X)				0.36	0.00		0.79	0.39	0.00	0.00	0.57	
Avail Cap(c_a), veh/h				3238	0		1192	3158	0	0	3158	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				13.9	0.0	0.0	14.5	4.5	0.0	0.0	12.6	0.0
Incr Delay (d2), s/veh				0.1	0.0	0.0	2.5	0.1	0.0	0.0	0.4	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.8	0.0	0.0	2.3	0.7	0.0	0.0	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh				14.0	0.0	0.0	17.0	4.5	0.0	0.0	13.0	0.0
LnGrp LOS				B			B	A			B	
Approach Vol, veh/h					251			1136			547	
Approach Delay, s/veh					14.0			8.1			13.0	
Approach LOS					B			A			B	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	12.6	15.5		11.8		28.1						
Change Period (Y+Rc), s	3.5	4.8		4.0		4.8						
Max Green Setting (Gmax), s	26.5	35.2		36.0		35.2						
Max Q Clear Time (g_c+I1), s	8.8	7.3		4.4		6.9						
Green Ext Time (p_c), s	0.6	3.3		0.5		4.7						

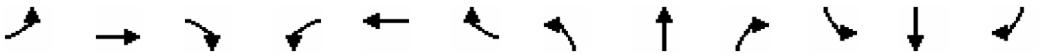
Intersection Summary		
HCM 7th Control Delay, s/veh		10.3
HCM 7th LOS		B

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	466	12	369	0	0	0	0	670	246	264	534	0
Future Volume (vph)	466	12	369	0	0	0	0	670	246	264	534	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		0	0		220	180		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	25			25			25			35		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98						0.97	0.99		
Frt			0.850						0.850			
Flt Protected	0.950	0.955								0.950		
Satd. Flow (prot)	1665	1674	1568	0	0	0	0	3539	1583	1787	3574	0
Flt Permitted	0.950	0.955								0.950		
Satd. Flow (perm)	1665	1674	1547	0	0	0	0	3539	1540	1776	3574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			224						246			
Link Speed (mph)		30			30			40			30	
Link Distance (ft)		759			1046			737			526	
Travel Time (s)		17.3			23.8			12.6			12.0	
Confl. Peds. (#/hr)			1	1			8		6	6		8
Confl. Bikes (#/hr)									4			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	2%	2%	2%	1%	1%	1%
Adj. Flow (vph)	466	12	369	0	0	0	0	670	246	264	534	0
Shared Lane Traffic (%)	49%											
Lane Group Flow (vph)	238	240	369	0	0	0	0	670	246	264	534	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												

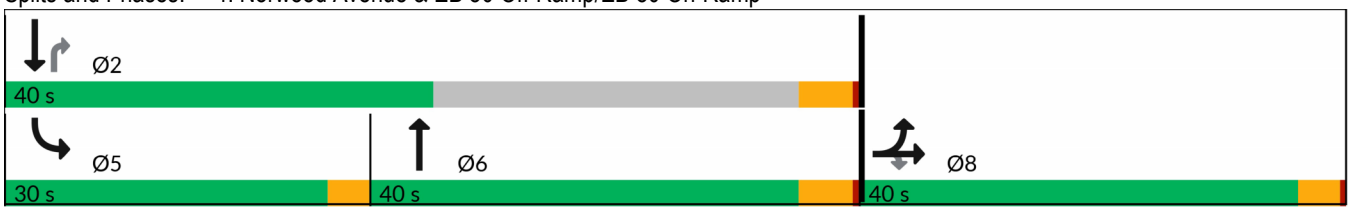


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Split	NA	Perm					NA	custom	Prot	NA	
Protected Phases	8	8						6		5	2	
Permitted Phases			8						2			
Detector Phase	8	8	8					6	2	5	2	
Switch Phase												
Minimum Initial (s)	9.0	9.0	9.0					6.0	6.0	8.0	6.0	
Minimum Split (s)	29.0	29.0	29.0					17.8	18.8	11.5	18.8	
Total Split (s)	40.0	40.0	40.0					40.0	40.0	30.0	40.0	
Total Split (%)	36.4%	36.4%	36.4%					36.4%	36.4%	27.3%	36.4%	
Maximum Green (s)	36.0	36.0	36.0					35.2	35.2	26.5	35.2	
Yellow Time (s)	3.5	3.5	3.5					4.3	4.3	3.5	4.3	
All-Red Time (s)	0.5	0.5	0.5					0.5	0.5	0.0	0.5	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0					4.8	4.8	3.5	4.8	
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	2.0	2.0	2.0					2.5	2.5	2.5	2.5	
Recall Mode	None	None	None					Min	Min	None	Min	
Walk Time (s)	7.0	7.0	7.0					7.0	7.0		7.0	
Flash Dont Walk (s)	18.0	18.0	18.0					6.0	7.0		7.0	
Pedestrian Calls (#/hr)	2	2	2					2	2		2	
Act Effct Green (s)	16.9	16.9	16.9					19.2	38.6	15.7	38.6	
Actuated g/C Ratio	0.26	0.26	0.26					0.29	0.59	0.24	0.59	
v/c Ratio	0.55	0.55	0.65					0.64	0.24	0.61	0.25	
Control Delay (s/veh)	28.3	28.3	15.8					24.7	1.7	31.3	7.0	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay (s/veh)	28.3	28.3	15.8					24.7	1.7	31.3	7.0	
LOS	C	C	B					C	A	C	A	
Approach Delay (s/veh)		22.9						18.5			15.1	
Approach LOS		C						B			B	
Queue Length 50th (ft)	81	82	44					113	0	89	44	
Queue Length 95th (ft)	203	204	166					243	28	220	97	
Internal Link Dist (ft)		679			966			657			446	
Turn Bay Length (ft)			50						220	180		
Base Capacity (vph)	1001	1007	1020					2082	1425	791	3256	
Starvation Cap Reductn	0	0	0					0	0	0	0	
Spillback Cap Reductn	0	0	0					0	0	0	0	
Storage Cap Reductn	0	0	0					0	0	0	0	
Reduced v/c Ratio	0.24	0.24	0.36					0.32	0.17	0.33	0.16	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 65.1			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay (s/veh): 18.9		Intersection LOS: B	

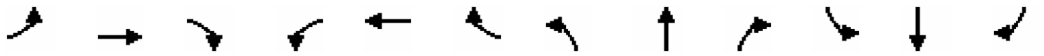
Intersection Capacity Utilization 61.7% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 4: Norwood Avenue & EB 80 Off-Ramp/EB 80 On-Ramp



Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	238	240	369	670	246	264	534
v/c Ratio	0.55	0.55	0.65	0.64	0.24	0.61	0.25
Control Delay (s/veh)	28.3	28.3	15.8	24.7	1.7	31.3	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	28.3	28.3	15.8	24.7	1.7	31.3	7.0
Queue Length 50th (ft)	81	82	44	113	0	89	44
Queue Length 95th (ft)	203	204	166	243	28	220	97
Internal Link Dist (ft)		679		657			446
Turn Bay Length (ft)			50		220	180	
Base Capacity (vph)	1001	1007	1020	2082	1425	791	3256
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.24	0.36	0.32	0.17	0.33	0.16

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	466	12	369	0	0	0	0	670	246	264	534	0
Future Volume (veh/h)	466	12	369	0	0	0	0	670	246	264	534	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1870	1870	1885	1885	0
Adj Flow Rate, veh/h	475	0	0				0	670	0	264	534	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3				0	2	2	1	1	0
Cap, veh/h	765	0					0	1064		342	2054	0
Arrive On Green	0.22	0.00	0.00				0.00	0.30	0.00	0.19	0.57	0.00
Sat Flow, veh/h	3534	0	1572				0	3647	1585	1795	3676	0
Grp Volume(v), veh/h	475	0	0				0	670	0	264	534	0
Grp Sat Flow(s),veh/h/ln	1767	0	1572				0	1777	1585	1795	1791	0
Q Serve(g_s), s	5.1	0.0	0.0				0.0	6.8	0.0	5.8	3.1	0.0
Cycle Q Clear(g_c), s	5.1	0.0	0.0				0.0	6.8	0.0	5.8	3.1	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	765	0					0	1064		342	2054	0
V/C Ratio(X)	0.62	0.00					0.00	0.63		0.77	0.26	0.00
Avail Cap(c_a), veh/h	3039	0					0	2987		1136	3011	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	14.9	0.0	0.0				0.0	12.7	0.0	16.1	4.5	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.0				0.0	0.5	0.0	2.8	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	0.0				0.0	2.1	0.0	2.3	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	15.2	0.0	0.0				0.0	13.1	0.0	18.9	4.5	0.0
LnGrp LOS	B							B		B	A	
Approach Vol, veh/h		475						670			798	
Approach Delay, s/veh		15.2						13.1			9.3	
Approach LOS		B						B			A	

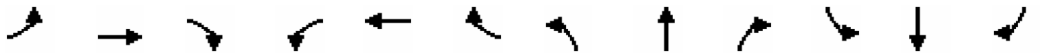
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		28.8			11.5	17.3		13.1				
Change Period (Y+Rc), s		4.8			3.5	4.8		4.0				
Max Green Setting (Gmax), s		35.2			26.5	35.2		36.0				
Max Q Clear Time (g_c+I1), s		5.1			7.8	8.8		7.1				
Green Ext Time (p_c), s		3.2			0.5	3.7		0.9				

Intersection Summary			
HCM 6th Ctrl Delay, s/veh		12.0	
HCM 6th LOS		B	

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	466	12	369	0	0	0	0	670	246	264	534	0
Future Volume (veh/h)	466	12	369	0	0	0	0	670	246	264	534	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1870	1870	1885	1885	0
Adj Flow Rate, veh/h	475	0	0				0	670	0	264	534	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3				0	2	2	1	1	0
Cap, veh/h	765	0					0	1064		342	2054	0
Arrive On Green	0.22	0.00	0.00				0.00	0.30	0.00	0.19	0.57	0.00
Sat Flow, veh/h	3534	0	1572				0	3647	1585	1795	3676	0
Grp Volume(v), veh/h	475	0	0				0	670	0	264	534	0
Grp Sat Flow(s),veh/h/ln	1767	0	1572				0	1777	1585	1795	1791	0
Q Serve(g_s), s	5.1	0.0	0.0				0.0	6.8	0.0	5.8	3.1	0.0
Cycle Q Clear(g_c), s	5.1	0.0	0.0				0.0	6.8	0.0	5.8	3.1	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	765	0					0	1064		342	2054	0
V/C Ratio(X)	0.62	0.00					0.00	0.63		0.77	0.26	0.00
Avail Cap(c_a), veh/h	3039	0					0	2987		1136	3011	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	14.9	0.0	0.0				0.0	12.7	0.0	16.1	4.5	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.0				0.0	0.5	0.0	2.8	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	0.0				0.0	2.1	0.0	2.3	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	15.2	0.0	0.0				0.0	13.1	0.0	18.9	4.5	0.0
LnGrp LOS	B							B		B	A	
Approach Vol, veh/h		475						670			798	
Approach Delay, s/veh		15.2						13.1			9.3	
Approach LOS		B						B			A	

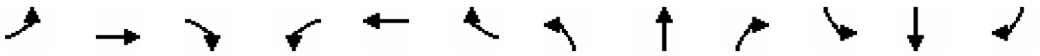
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		28.8			11.5	17.3		13.1				
Change Period (Y+Rc), s		4.8			3.5	4.8		4.0				
Max Green Setting (Gmax), s		35.2			26.5	35.2		36.0				
Max Q Clear Time (g_c+I1), s		5.1			7.8	8.8		7.1				
Green Ext Time (p_c), s		3.2			0.5	3.7		0.9				

Intersection Summary			
HCM 7th Control Delay, s/veh		12.0	
HCM 7th LOS		B	

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	230	14	39	17	6	93	17	602	14	56	736	105
Future Volume (vph)	230	14	39	17	6	93	17	602	14	56	736	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		140	100		0	85		0	110		0
Storage Lanes	0		1	1		1	1		0	1		0
Taper Length (ft)	25			35			40			30		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor			0.97		0.99	0.98	0.98	0.99		0.99	0.99	
Frt			0.850			0.850		0.997			0.981	
Flt Protected		0.955			0.964		0.950			0.950		
Satd. Flow (prot)	0	1762	1568	0	1778	1568	1787	3559	0	1752	3415	0
Flt Permitted		0.955			0.964		0.950			0.950		
Satd. Flow (perm)	0	1762	1533	0	1769	1546	1768	3559	0	1737	3415	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			39			93		1			9	
Link Speed (mph)		30			30			40			30	
Link Distance (ft)		735			595			331			737	
Travel Time (s)		16.7			13.5			5.6			16.8	
Confl. Peds. (#/hr)			5	5			9		4	4		9
Confl. Bikes (#/hr)			2			2			7			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	1%	1%	1%	3%	3%	3%
Adj. Flow (vph)	230	14	39	17	6	93	17	602	14	56	736	105
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	244	39	0	23	93	17	616	0	56	841	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

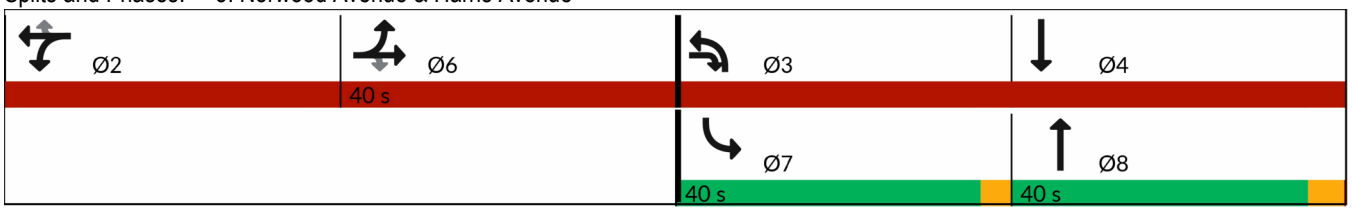


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	pm+ov	Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	6	6	3	2	2		3	8		7	4	
Permitted Phases			6			2						
Detector Phase	6	6	3	2	2	2	3	8		7	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	11.0	11.0	11.0	10.0	7.0		9.0	8.0	
Minimum Split (s)	28.6	28.6	13.5	14.8	14.8	14.8	13.5	19.6		12.5	25.6	
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0		40.0	40.0	
Total Split (%)	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%		25.0%	25.0%	
Maximum Green (s)	36.4	36.4	36.5	36.2	36.2	36.2	36.5	35.4		36.5	35.4	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.3		3.5	4.3	
All-Red Time (s)	0.1	0.1	0.0	0.3	0.3	0.3	0.0	0.3		0.0	0.3	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		3.6	3.5		3.8	3.8	3.5	4.6		3.5	4.6	
Lead/Lag			Lead				Lead	Lag		Lead	Lag	
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.5		2.0	2.5	
Recall Mode	None	None	None	None	None	None	None	None		None	None	
Walk Time (s)	7.0	7.0						7.0			7.0	
Flash Dont Walk (s)	18.0	18.0						8.0			14.0	
Pedestrian Calls (#/hr)	2	2						2			2	
Act Effct Green (s)		16.7	27.2		11.5	11.5	10.5	37.5		9.7	37.0	
Actuated g/C Ratio		0.20	0.33		0.14	0.14	0.13	0.45		0.12	0.45	
v/c Ratio		0.69	0.07		0.09	0.31	0.07	0.38		0.27	0.55	
Control Delay (s/veh)		43.4	6.5		37.7	12.1	38.5	19.4		42.1	21.9	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay (s/veh)		43.4	6.5		37.7	12.1	38.5	19.4		42.1	21.9	
LOS		D	A		D	B	D	B		D	C	
Approach Delay (s/veh)		38.4			17.2			19.9			23.2	
Approach LOS		D			B			B			C	
Queue Length 50th (ft)		130	0		12	0	9	124		29	188	
Queue Length 95th (ft)		208	20		37	46	30	204		71	292	
Internal Link Dist (ft)		655			515			251			657	
Turn Bay Length (ft)			140				85			110		
Base Capacity (vph)		806	1043		809	754	820	1610		804	1526	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.30	0.04		0.03	0.12	0.02	0.38		0.07	0.55	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 83.1			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay (s/veh): 24.0		Intersection LOS: C	

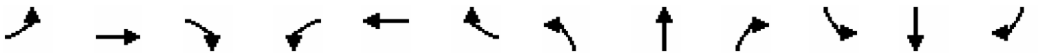
Intersection Capacity Utilization 62.9% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 5: Norwood Avenue & Harris Avenue



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	244	39	23	93	17	616	56	841
v/c Ratio	0.69	0.07	0.09	0.31	0.07	0.38	0.27	0.55
Control Delay (s/veh)	43.4	6.5	37.7	12.1	38.5	19.4	42.1	21.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	43.4	6.5	37.7	12.1	38.5	19.4	42.1	21.9
Queue Length 50th (ft)	130	0	12	0	9	124	29	188
Queue Length 95th (ft)	208	20	37	46	30	204	71	292
Internal Link Dist (ft)	655		515			251		657
Turn Bay Length (ft)		140			85		110	
Base Capacity (vph)	806	1043	809	754	820	1610	804	1526
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.04	0.03	0.12	0.02	0.38	0.07	0.55

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	14	39	17	6	93	17	602	14	56	736	105
Future Volume (veh/h)	230	14	39	17	6	93	17	602	14	56	736	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.95	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1885	1885	1885	1856	1856	1856
Adj Flow Rate, veh/h	230	14	39	17	6	93	17	602	14	56	736	105
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3	3	3	3	1	1	1	3	3	3
Cap, veh/h	319	19	359	216	76	247	74	995	23	165	1017	145
Arrive On Green	0.19	0.19	0.19	0.16	0.16	0.16	0.04	0.28	0.28	0.09	0.33	0.33
Sat Flow, veh/h	1670	102	1538	1323	467	1515	1795	3573	83	1767	3081	439
Grp Volume(v), veh/h	244	0	39	23	0	93	17	301	315	56	421	420
Grp Sat Flow(s),veh/h/ln	1772	0	1538	1789	0	1515	1795	1791	1866	1767	1763	1758
Q Serve(g_s), s	7.3	0.0	1.1	0.6	0.0	3.1	0.5	8.2	8.3	1.7	11.9	11.9
Cycle Q Clear(g_c), s	7.3	0.0	1.1	0.6	0.0	3.1	0.5	8.2	8.3	1.7	11.9	11.9
Prop In Lane	0.94		1.00	0.74		1.00	1.00		0.04	1.00		0.25
Lane Grp Cap(c), veh/h	338	0	359	292	0	247	74	499	519	165	582	580
V/C Ratio(X)	0.72	0.00	0.11	0.08	0.00	0.38	0.23	0.60	0.61	0.34	0.72	0.72
Avail Cap(c_a), veh/h	1142	0	1057	1147	0	971	1161	1123	1170	1142	1105	1102
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.4	0.0	17.1	20.0	0.0	21.1	26.2	17.7	17.7	24.0	16.6	16.7
Incr Delay (d2), s/veh	1.1	0.0	0.0	0.0	0.0	0.4	0.6	0.9	0.8	0.5	1.3	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	0.4	0.2	0.0	1.0	0.2	3.0	3.1	0.7	4.4	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	22.5	0.0	17.1	20.1	0.0	21.4	26.8	18.6	18.5	24.4	17.9	17.9
LnGrp LOS	C		B	C		C	C	B	B	C	B	B
Approach Vol, veh/h		283			116			633			897	
Approach Delay, s/veh		21.8			21.1			18.8			18.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		13.0	5.8	23.2		14.4	8.8	20.3				
Change Period (Y+Rc), s		3.8	3.5	* 4.6		3.6	3.5	* 4.6				
Max Green Setting (Gmax), s		36.2	36.5	* 35		36.4	36.5	* 35				
Max Q Clear Time (g_c+I1), s		5.1	2.5	13.9		9.3	3.7	10.3				
Green Ext Time (p_c), s		0.2	0.0	4.6		1.0	0.1	2.8				

Intersection Summary												
HCM 6th Ctrl Delay, s/veh			19.2									
HCM 6th LOS			B									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	14	39	17	6	93	17	602	14	56	736	105
Future Volume (veh/h)	230	14	39	17	6	93	17	602	14	56	736	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.95	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1885	1885	1885	1856	1856	1856
Adj Flow Rate, veh/h	230	14	39	17	6	93	17	602	14	56	736	105
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3	3	3	3	1	1	1	3	3	3
Cap, veh/h	319	19	359	216	76	247	74	995	23	165	1017	145
Arrive On Green	0.19	0.19	0.19	0.16	0.16	0.16	0.04	0.28	0.28	0.09	0.33	0.33
Sat Flow, veh/h	1670	102	1538	1323	467	1515	1795	3573	83	1767	3081	439
Grp Volume(v), veh/h	244	0	39	23	0	93	17	301	315	56	421	420
Grp Sat Flow(s),veh/h/ln	1772	0	1538	1789	0	1515	1795	1791	1866	1767	1763	1758
Q Serve(g_s), s	7.3	0.0	1.1	0.6	0.0	3.1	0.5	8.2	8.3	1.7	11.9	11.9
Cycle Q Clear(g_c), s	7.3	0.0	1.1	0.6	0.0	3.1	0.5	8.2	8.3	1.7	11.9	11.9
Prop In Lane	0.94		1.00	0.74		1.00	1.00		0.04	1.00		0.25
Lane Grp Cap(c), veh/h	338	0	359	292	0	247	74	499	519	165	582	580
V/C Ratio(X)	0.72	0.00	0.11	0.08	0.00	0.38	0.23	0.60	0.61	0.34	0.72	0.72
Avail Cap(c_a), veh/h	1142	0	1057	1147	0	971	1161	1123	1170	1142	1105	1102
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.4	0.0	17.1	20.0	0.0	21.1	26.2	17.7	17.7	24.0	16.6	16.7
Incr Delay (d2), s/veh	1.1	0.0	0.0	0.0	0.0	0.4	0.6	0.9	0.8	0.5	1.3	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	0.4	0.2	0.0	1.0	0.2	3.0	3.1	0.7	4.4	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	22.5	0.0	17.1	20.1	0.0	21.4	26.8	18.6	18.5	24.4	17.9	17.9
LnGrp LOS	C		B	C		C	C	B	B	C	B	B
Approach Vol, veh/h		283			116			633			897	
Approach Delay, s/veh		21.8			21.1			18.8			18.3	
Approach LOS		C			C			B			B	

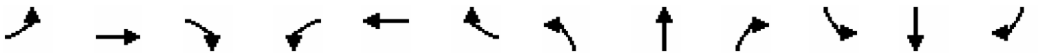
Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	13.0	5.8	23.2	14.4	8.8	20.3
Change Period (Y+Rc), s	3.8	3.5	* 4.6	3.6	3.5	* 4.6
Max Green Setting (Gmax), s	36.2	36.5	* 35	36.4	36.5	* 35
Max Q Clear Time (g_c+I1), s	5.1	2.5	13.9	9.3	3.7	10.3
Green Ext Time (p_c), s	0.2	0.0	4.6	1.0	0.1	2.8

Intersection Summary	
HCM 7th Control Delay, s/veh	19.2
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	110	113	9	74	36	85	426	16	41	457	187
Future Volume (vph)	225	110	113	9	74	36	85	426	16	41	457	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	105		0	0		0	90		0	50		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			35			55		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			0.99		0.99	0.99		0.98	0.99	
Frt		0.924			0.951			0.995			0.956	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1726	0	1787	1781	0	1770	3515	0	1787	3388	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1787	1726	0	1787	1781	0	1768	3515	0	1764	3388	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36			17			3			47	
Link Speed (mph)		30			30			40			30	
Link Distance (ft)		790			308			560			983	
Travel Time (s)		18.0			7.0			9.5			22.3	
Confl. Peds. (#/hr)							1		7	7		1
Confl. Bikes (#/hr)			2			1			3			5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Adj. Flow (vph)	225	110	113	9	74	36	85	426	16	41	457	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	225	223	0	9	110	0	85	442	0	41	644	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

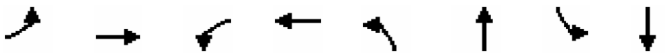


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases												
Detector Phase	1	6		5	2		3	8		7	4	
Switch Phase												
Minimum Initial (s)	10.0	9.0		10.0	10.0		9.0	8.0		9.0	8.0	
Minimum Split (s)	13.5	27.9		13.5	27.5		12.5	23.6		12.5	27.6	
Total Split (s)	30.0	30.0		30.0	30.0		30.0	40.0		30.0	40.0	
Total Split (%)	23.1%	23.1%		23.1%	23.1%		23.1%	30.8%		23.1%	30.8%	
Maximum Green (s)	26.5	26.1		26.5	26.5		26.5	35.4		26.5	35.4	
Yellow Time (s)	3.5	3.9		3.5	3.5		3.5	4.3		3.5	4.3	
All-Red Time (s)	0.0	0.0		0.0	0.0		0.0	0.3		0.0	0.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.5	3.9		3.5	3.5		3.5	4.6		3.5	4.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		17.0			17.0			12.0			16.0	
Pedestrian Calls (#/hr)		2			2			2			2	
Act Effct Green (s)	16.3	25.9		12.2	14.0		11.7	22.8		11.1	19.4	
Actuated g/C Ratio	0.24	0.39		0.18	0.21		0.17	0.34		0.17	0.29	
v/c Ratio	0.52	0.32		0.02	0.28		0.27	0.36		0.13	0.63	
Control Delay (s/veh)	32.8	16.3		36.5	28.1		36.0	20.9		36.5	25.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	32.8	16.3		36.5	28.1		36.0	20.9		36.5	25.4	
LOS	C	B		D	C		D	C		D	C	
Approach Delay (s/veh)		24.6			28.7			23.4			26.1	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	82	48		3	34		31	76		15	111	
Queue Length 95th (ft)	219	159		22	104		105	169		63	255	
Internal Link Dist (ft)		710			228			480			903	
Turn Bay Length (ft)	105						90			50		
Base Capacity (vph)	857	896		857	863		849	2065		857	2009	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.26	0.25		0.01	0.13		0.10	0.21		0.05	0.32	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 67.2			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay (s/veh): 25.1		Intersection LOS: C	

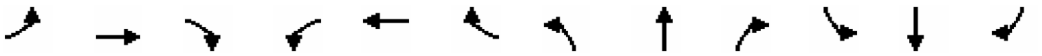
Intersection Capacity Utilization 55.8% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 6: Norwood Avenue & Silver Eagle Road



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	225	223	9	110	85	442	41	644
v/c Ratio	0.52	0.32	0.02	0.28	0.27	0.36	0.13	0.63
Control Delay (s/veh)	32.8	16.3	36.5	28.1	36.0	20.9	36.5	25.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	32.8	16.3	36.5	28.1	36.0	20.9	36.5	25.4
Queue Length 50th (ft)	82	48	3	34	31	76	15	111
Queue Length 95th (ft)	219	159	22	104	105	169	63	255
Internal Link Dist (ft)		710		228		480		903
Turn Bay Length (ft)	105				90		50	
Base Capacity (vph)	857	896	857	863	849	2065	857	2009
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.25	0.01	0.13	0.10	0.21	0.05	0.32

Intersection Summary



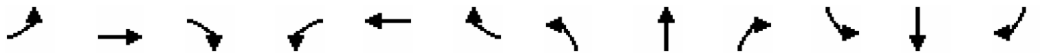
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	225	110	113	9	74	36	85	426	16	41	457	187
Future Volume (veh/h)	225	110	113	9	74	36	85	426	16	41	457	187
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1870	1870	1870	1885	1885	1885
Adj Flow Rate, veh/h	225	110	113	9	74	36	85	426	16	41	457	187
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	1	1	1	2	2	2	1	1	1
Cap, veh/h	320	256	263	42	177	86	214	1081	40	137	654	265
Arrive On Green	0.18	0.30	0.30	0.02	0.15	0.15	0.12	0.31	0.31	0.08	0.27	0.27
Sat Flow, veh/h	1795	842	865	1795	1188	578	1781	3487	131	1795	2454	994
Grp Volume(v), veh/h	225	0	223	9	0	110	85	217	225	41	332	312
Grp Sat Flow(s),veh/h/ln	1795	0	1706	1795	0	1766	1781	1777	1841	1795	1791	1658
Q Serve(g_s), s	6.4	0.0	5.7	0.3	0.0	3.1	2.4	5.2	5.2	1.2	9.1	9.2
Cycle Q Clear(g_c), s	6.4	0.0	5.7	0.3	0.0	3.1	2.4	5.2	5.2	1.2	9.1	9.2
Prop In Lane	1.00		0.51	1.00		0.33	1.00		0.07	1.00		0.60
Lane Grp Cap(c), veh/h	320	0	519	42	0	264	214	551	571	137	477	442
V/C Ratio(X)	0.70	0.00	0.43	0.21	0.00	0.42	0.40	0.39	0.40	0.30	0.70	0.71
Avail Cap(c_a), veh/h	878	0	822	878	0	864	871	1161	1203	878	1170	1083
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.9	0.0	15.1	26.0	0.0	20.9	22.0	14.7	14.7	23.6	17.9	18.0
Incr Delay (d2), s/veh	1.1	0.0	0.2	0.9	0.0	0.4	0.4	0.2	0.2	0.4	0.7	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	2.0	0.1	0.0	1.2	0.9	1.8	1.8	0.5	3.4	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	22.0	0.0	15.3	26.9	0.0	21.3	22.5	14.9	14.9	24.1	18.6	18.7
LnGrp LOS	C		B	C		C	C	B	B	C	B	B
Approach Vol, veh/h		448			119			527			685	
Approach Delay, s/veh		18.6			21.7			16.1			19.0	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.2	12.0	10.0	19.0	4.8	20.4	7.6	21.4
Change Period (Y+Rc), s	3.5	* 3.9	3.5	* 4.6	3.5	3.9	3.5	* 4.6
Max Green Setting (Gmax), s	26.5	* 27	26.5	* 35	26.5	26.1	26.5	* 35
Max Q Clear Time (g_c+I1), s	8.4	5.1	4.4	11.2	2.3	7.7	3.2	7.2
Green Ext Time (p_c), s	0.3	0.3	0.1	2.8	0.0	0.8	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	18.2
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	225	110	113	9	74	36	85	426	16	41	457	187
Future Volume (veh/h)	225	110	113	9	74	36	85	426	16	41	457	187
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1870	1870	1870	1885	1885	1885
Adj Flow Rate, veh/h	225	110	113	9	74	36	85	426	16	41	457	187
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	1	1	1	2	2	2	1	1	1
Cap, veh/h	320	256	263	42	177	86	214	1081	40	137	654	265
Arrive On Green	0.18	0.30	0.30	0.02	0.15	0.15	0.12	0.31	0.31	0.08	0.27	0.27
Sat Flow, veh/h	1795	842	865	1795	1188	578	1781	3487	131	1795	2454	994
Grp Volume(v), veh/h	225	0	223	9	0	110	85	217	225	41	332	312
Grp Sat Flow(s),veh/h/ln	1795	0	1706	1795	0	1766	1781	1777	1841	1795	1791	1658
Q Serve(g_s), s	6.4	0.0	5.7	0.3	0.0	3.1	2.4	5.2	5.2	1.2	9.1	9.2
Cycle Q Clear(g_c), s	6.4	0.0	5.7	0.3	0.0	3.1	2.4	5.2	5.2	1.2	9.1	9.2
Prop In Lane	1.00		0.51	1.00		0.33	1.00		0.07	1.00		0.60
Lane Grp Cap(c), veh/h	320	0	519	42	0	264	214	551	571	137	477	442
V/C Ratio(X)	0.70	0.00	0.43	0.21	0.00	0.42	0.40	0.39	0.40	0.30	0.70	0.71
Avail Cap(c_a), veh/h	878	0	822	878	0	864	871	1161	1203	878	1170	1083
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.9	0.0	15.1	26.0	0.0	20.9	22.0	14.7	14.7	23.6	17.9	18.0
Incr Delay (d2), s/veh	1.1	0.0	0.2	0.9	0.0	0.4	0.4	0.2	0.2	0.4	0.7	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	2.0	0.1	0.0	1.2	0.9	1.8	1.8	0.5	3.4	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	22.0	0.0	15.3	26.9	0.0	21.3	22.5	14.9	14.9	24.1	18.6	18.7
LnGrp LOS	C		B	C		C	C	B	B	C	B	B
Approach Vol, veh/h		448			119			527			685	
Approach Delay, s/veh		18.6			21.7			16.1			19.0	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.2	12.0	10.0	19.0	4.8	20.4	7.6	21.4
Change Period (Y+Rc), s	3.5	* 3.9	3.5	* 4.6	3.5	3.9	3.5	* 4.6
Max Green Setting (Gmax), s	26.5	* 27	26.5	* 35	26.5	26.1	26.5	* 35
Max Q Clear Time (g_c+I1), s	8.4	5.1	4.4	11.2	2.3	7.7	3.2	7.2
Green Ext Time (p_c), s	0.3	0.3	0.1	2.8	0.0	0.8	0.0	1.5

Intersection Summary	
HCM 7th Control Delay, s/veh	18.2
HCM 7th LOS	B

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Appendix E: Community Survey Results & Comments

Entry #	Q1. What is your zip code?	Q2. Daily	Q2. Some Days	Q2. Weekly	Q2. Every Couple of Weeks	Q2. Monthly	Q2. Rarely	Q3. Driving in a Personal Vehicle	Q3. Riding in a Personal Vehicle	Q3. Public Transit	Q3. Paratransit	Q3. Walking/Rolling	Q3. Bicycling	Q3. Scooting	Q3. Rider-Sharing	Q3. Other
1	95828	YES										YES				
2	95831						YES									CAR
3	95815	YES						YES								
4	95815		YES					YES								
5	95825	YES						YES								
6	95815	YES										YES	YES			
7	95834		YES	YES				YES				YES				
8	95838	YES						YES		YES		YES				
9	95833	YES						YES		YES		YES				
10	95838	YES						YES								
11	9532	YES							YES	YES						
12	95838		YES					YES								
13	95815	YES						YES								
14	95838	YES						YES								
15	958608				YES			YES								
16	95838	YES						YES								
17	95811	YES						YES								
18	95673	YES						YES		YES						
19	95815	YES						YES								
20	95838	YES									YES					
21	95838	YES						YES								
22	95838	YES	YES									YES			YES	
23	958115	YES						YES								
24	95838				YES			YES		YES		YES				
25	95815	YES										YES				YES
26	95673						YES	YES								
27	95888	YES								YES					YES	
28	95833	YES														
29	95823	YES						YES		YES						
30	95838	YES						YES	YES	YES	YES	YES	YES	YES	YES	
31	95838	YES								YES		YES	YES			
32	95838	YES											YES			
33	95838	YES						YES								
34	95815	YES						YES								
35	95815	YES						YES	YES							
36	95815	YES						YES								
37	95834	YES						YES					YES			
38	8538	YES						YES	YES	YES		YES				

| | | |

Q4. 1	Q4. 2	Q4. 3	Q4. 4	Q4. 5	Q5. 1	Q5. 2	Q5. 3	Q5. 4	Q5. 5	Q6. 1	Q6. 2	Q6. 3	Q6. 4	Q6. 5	Q7. 1	Q7. 2	Q7. 3	Q7. 4	Q7. 5	Q8. 1
			YES					YES				YES						YES		
				YES					YES					YES					YES	
		YES				YES							YES				YES			
				YES					YES					YES				YES		
	YES					YES					YES					YES				
				YES			YES							YES					YES	
			YES					YES					YES					YES		
				YES					YES					YES					YES	
		YES					YES							YES					YES	
				YES			YES							YES					YES	
				YES					YES					YES					YES	
				YES					YES					YES					YES	
				YES					YES					YES					YES	
YES					YES					YES					YES					YES
				YES					YES					YES					YES	
		YES							YES					YES				YES		
				YES			YES							YES					YES	
				YES			YES					YES					YES			
				YES					YES					YES					YES	
				YES					YES					YES					YES	
				YES					YES					YES					YES	
				YES					YES					YES					YES	
		YES						YES			YES						YES			
				YES					YES					YES			YES			
				YES					YES					YES					YES	
			YES			YES						YES							YES	
				YES					YES					YES					YES	
				YES					YES					YES					YES	
				YES					YES					YES					YES	
YES									YES					YES					YES	
			YES				YES					YES					YES			
			YES					YES					YES						YES	
			YES						YES					YES					YES	
				YES					YES					YES					YES	
		YES							YES					YES					YES	
YES									YES				YES			YES				

				YES				YES				YES						YES					
				YES				YES				YES						YES					
				YES				YES							YES								
				YES				YES				YES						YES					
					1				1				1							1			
					1				1				1							1			
			1						1			1						1					
					1				1				1							1			
1									1				1							1			
					1				1				1							1			
			1					1				1						1					

Q8. 2	Q8. 3	Q8. 4	Q8. 5	Q9. 1	Q9. 2	Q9. 3	Q9. 4	Q9. 5	Q10. 1	Q10. 2	Q10. 3	Q10. 4	Q10. 5	Q11. Asian	Q11. Black	Q11. Hispanic	Q11. Middle Eastern	Q11. Native	Q11. Pacific Islander	Q11. White
			YES				YES							YES						
	YES					YES					YES					YES				
	YES					YES					YES					YES		YES		
			YES					YES					YES							
YES					YES					YES					YES					
			YES					YES					YES			YES		YES		
YES					YES							YES		YES	YES					
			YES					YES					YES			YES				
		YES						YES				YES			YES					
			YES					YES							YES					
			YES					YES												YES
			YES					YES					YES			YES				
	YES					YES									YES					
				YES						YES				YES						
			YES					YES												
			YES					YES												
			YES					YES					

| | | |

Q11. Prefer not to say	Q11. Other	Q12. <18	Q12. 18 to 24	Q12. 25 to 34	Q12.35 to 44	Q12.45 to 64	Q12.65 to 84	Q12. 85 to 99	Q12. 100+	Q13. Yes	Q13. No	Q13. Prefer not to say
				YES						YES		
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Comments
CROSSWALKS
NEED MORE PUBLIC HELP AROUND AREA FOR KIDS AND ELDERLY, MAYBE SECURITY
NEED MORE ORDER ON THE ROAD
ROAD REPAIR
RRFB
GOOD
PREGNANCY A LITTLE BIT HARDER TO GET AROUND ON PUBLIC TRANSPORTATION PREGNANT WITH KIDS
CROSSWALK HELP
MORE HELP PLEASE
ANOTHER STOP LIGHT
ADDITIONAL STOP LIGHT, RED LIGHT CAM ON LIGHT ON NORWOOD +GRAND
GRAND/RIO LINDA,STREET TRANSPORTATION IS STILL AROUND?
ACCIDENTS ON NORWOOD, INCLUDING ME REAR ENDED
*SPANISH
WIDER BIKE LANES
SHOULD BE ABLE TO HAVE MORE DESTINATION TO GO TO THEN HAVE TO WALK OR TAKE TRAIN
ACROSS FROM PARK, 15MPH COVERED BY TREE. PEOPLE ARE SPEEDING. MORE TRANSPORTATION SERVICE AND
PEOPLE NEED TO LEARN HOW TO LET THE PEDESTRIANS WALK ALL THE WAY ACROSS BECAUSE I ALMOST GOT HIT
PLEASE LOOK INTO ROBLA ELEMENTARY SCHOOL. THE SCHOOL NEED SIDEWALK FOR THE KIDS AND FAMILIES. WE SPOKE WITH THE DISTRICT AND THEY THERE NO ARE FUNDS! PLEASE CONSIDER FOR THE SAFETY OF THE
Center mediums. Ways to slow down vehiclar traffic. Vehicles routinely speed over 40 mph. Add a traffic signal light
Post no parking signs on both sides of the street by the Viva Market.
Keep lanes narrow and only one lane in each direction. This will keep the speed down. There’s not actually that much traffic, so one lane is enough. Use roundabouts. Use them at each intersection and the major shopping entrances. Don’t use traffic lights. The cars back up waiting for the lights to change when there’s no oncoming traffic. Roundabouts prevent this. Separate pedestrian traffic with a parallel protected bike path. Don’t put side walks on either side of the road, use protected bike/pedestrian paths. Reducing to one lane will free up plenty of space for this. Plant trees in the protection buffer.

The Norwood
Mobility Project

B - Alternatives Development Report, July 2025

Norwood Avenue Mobility Project – Alternatives Development Report

July 2025

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Glossary of Terms

95th Percentile Queue: A queue is a line of vehicles waiting to be served, such as at a traffic signal, that occurs due to demand exceeding the available capacity. The 95th percentile queue is the length of the queue which is exceeded five percent of the time during the analysis time period. The 95th percentile queue is useful in determining the appropriate storage requirements such as length of turn pockets but is not representative of what an average driver would typically experience during their commute.

Accessible Pedestrian Signal Systems (APS): A device that uses audible tones or vibrations to help people with vision or hearing impairments safely cross the street at signalized intersections.

Average Annual Daily Traffic (AADT): The average number of vehicles that travel on a street per day over the course of a year.

Bicycle Detection: Passive traffic signal system that detects the presence of a person bicycling to trigger a green light without requiring the person bicycling to press a button.

Bicycle Level of Traffic Stress (BLTS): A numeric suitability rating (1 = low stress, 4 = high stress) that assesses how safe and comfortable a bike route feels to a person bicycling, accounting for factors like lane separation, width, and traffic speed.

Bike Box: A painted area at a traffic signal that gives people on bicycles a designated and visible space to wait in front of cars during a red light.

Bus Bulb-Out: A sidewalk extension at bus stops allowing buses to load/unload passengers without leaving the travel lane, improving accessibility and reducing dwell time.

Cantilevered Bike Lane: A bike lane built onto the side of a bridge, extending out from the structure to create more space for people biking without removing vehicle lanes.

Channelized Right Turn: A dedicated turning lane at an intersection that separates right-turning traffic from through lanes and allows turning traffic to either bypass or experience different traffic control than the adjacent through traffic. Channelized turn lanes often pose challenges for pedestrians due to higher vehicle speeds.

Class I Shared Use Path : A fully separated shared use path shared by people walking and biking. A Class I shared use path is defined separately from a Class IV bikeway by its width and the requirement that it have wider horizontal separation from vehicle traffic.

Class II Bikeway – Bike Lane and Buffered Bike Lane: A bike lane at street level separated by a painted line (Bike Lane) or a painted or physical buffer space between it and adjacent vehicle travel lanes (Buffered Bike Lane), increasing cyclist comfort and safety.

Class IV Bikeway – Separated Bikeway: A fully separated facility for bicycles, often at sidewalk level and protected by landscaping or physical barriers from vehicle travel lanes.

Conflict Zone: Area where multiple travel modes cross each other and are in conflict. A few examples are where driveways cross sidewalks or bikeways, where bikeways cross with transit vehicles at bus stops, or at intersections where those walking, rolling, or biking cross with vehicle paths.

Controlled Pedestrian Crossings: A designated area for people bicycling, walking, or rolling to cross a street where traffic is controlled (where a traffic signal, stop sign, or yield sign directs driver movement) to allow people a safer opportunity to cross.

Dilemma Zone Detection: A type of traffic signal technology that helps reduce crashes by detecting vehicles approaching an intersection near the end of the signal phase and can adjust timing to reduce the likelihood of a collision if it is likely that a driver would enter the intersection on red.

High Injury Network: Streets or intersections where a high number of severe or fatal crashes have occurred, as identified by the City in its Vision Zero Plan.

Leading Pedestrian Interval (LPI): A traffic signal timing strategy that gives pedestrians a head start to cross the street before vehicles get a green light.

Level of Service (LOS): The LOS is a measure of street performance when compared to user's expectations. Streets are given a "letter grade" of "A" through "F" where "A" represents little to no experienced delay or travel congestion and "F" represents high delay or travel congestion. The calculation of LOS is based on the methodologies as outlined in the Highway Capacity Manual 7th Edition published by the Transportation Research Board. The calculation of LOS varies by the type of facility or intersection being reviewed.

On-Street Parking: Parking of vehicles along the sides of public streets, often in designated spaces marked by painted lines, signs, or meters.

Pedestrian/Walking Level of Traffic Stress (PLTS): A numeric suitability rating (1 = low stress, 4 = high stress) that indicates how safe and comfortable walking conditions are, considering sidewalk width, speed limits, and buffer zones.

Queue: A queue is a line of vehicles waiting to be served, such as at a traffic signal.

Right-of-Way (ROW): Space designated for use by the public for travel. This typically includes the street, landscaping, and sidewalks. The right-of-way includes land which may be owned by the City, other public agencies, utility companies, or private citizens and includes land which has an easement for use by the public for the purposes of travel infrastructure.

Roundabout: A circular intersection, used as an alternative to stop-sign or signal-controlled intersections, designed to improve traffic flow and reduce crash severity by slowing vehicles and eliminating left-turn conflicts.

Sacramento Regional Transit District (SacRT): The Sacramento Regional Transit District operates public transit services and collaborates on transit stop modifications and pedestrian access enhancements.

SacSim-19 Model: A travel demand forecasting tool developed by the Sacramento Area Council of Governments (SACOG) used to simulate and predict future traffic patterns, volumes, and vehicle miles traveled under different development scenarios.

Safety Corridor: A designation street under California Vehicle Code Section 22358.7 which allows local authorities to designate a reduced speed limit from the one that would typically be applied based on an engineering and traffic survey. Safety corridors are designated based on a history of serious injuries and fatalities on a given street. No more than one-fifth of streets may be designated as safety corridors

Sidewalk Scale Lighting: Lower height lighting installed along sidewalks to enhance visibility and safety for people walking, especially at night. It is designed specifically to illuminate the sidewalk rather than the vehicle travel lanes and typically includes shorter poles and may include decorative elements.

Signal Modifications: Upgrades to traffic signals to meet modern standards, including pedestrian countdown timers, improved visibility, and transit signal priority features.

Turn Pocket: Vehicle storage lane at an intersection which does not extend to the previous intersection. Typically used to accommodate turning vehicles at an intersection.

Vehicle Miles Traveled (VMT): A metric representing the total distance driven by all vehicles in a specified area and timeframe, used to evaluate environmental and land use impacts.

Wayfinding: Signage and visual cues placed along transportation routes to guide people to key destinations, like parks, community centers, or transit stops.

Introduction

The purpose of this report is to summarize the initially proposed project alternatives for the Norwood Mobility Project. The following conditions were determined from the existing conditions analysis that the project alternatives are to address:

- There are gaps in the walking infrastructure and most of the existing sidewalks on the corridor are 5’ in width without separation between the sidewalk and the vehicle travel lanes. Community input identified enhancements to the walking infrastructure as a top priority.
- Only a small portion of the corridor has dedicated space for people riding bicycles.
- There is a trend of injury collisions involving people walking and biking, particularly near the Robertson Community Center and in the block between Bell Avenue and Jessie Avenue. The collision trends, field observations, and community input show that people are crossing where infrastructure does not exist to support them and that additional infrastructure is needed.
- There is a trend of broadside collisions at the majority of intersections along the corridor. Rear end crashes, driving at unsafe speeds, and signal violations were mostly concentrated between the I-80 Interchange and Harris Avenue where congestion during commute periods can occur. The most common cited causes of collisions were:
  - Auto right-of-way (violations involve a street user failing to yield the legal right-of-way to another vehicle when required under the California Vehicle Code (CVC), generally by failing to yield when entering a roadway, intersection, or when merging.);
  - Unsafe speed (a street user travelling faster than is safe for street or weather conditions), and;
  - Signal and sign violations (a street user not following the direction provided by a sign or traffic signal).
- All intersections operate at Level of Service (LOS) C or better during peak hours, but some locations have turn movement queues which extend beyond the available turn pockets. Related to this, travel times along the corridor are highly variable, primarily driven by operations at the I-80 interchange especially during commute periods. Outside commute periods, travel times along the corridor are consistent and uncongested.
- There is limited right of way (ROW) throughout the corridor for modifications. Generally, the corridor varies between 48 and 78 feet in width with limited to no space to widen the paved street without impacting the use of adjacent properties. There is no room to modify the street on the bridge over I-80 without widening the structure.

From these findings, the following priorities were considered when developing project alternatives:

- Improve walking infrastructure including the addition of striped and signal-protected crossing opportunities, wherever feasible.
- Create low stress facilities that improve safety for people biking, walking, and rolling.
- Improve corridor safety, particularly between Jessie Avenue and Bell Avenue and between Silver Eagle Road and Harris Avenue.
- Create low stress, accessible travel paths for people biking, walking, and rolling to reach transit
- Ensure project implementation does not negatively impact the operations and values of any private properties along Norwood Avenue.

The city currently has an Intelligent Transportation System (ITS) project underway for the Norwood corridor. The project would upgrade traffic signal controllers and communications by replacing existing end-of-life equipment and outdated communication systems with fiber optic cable-based systems, network switches, new cabinets and controllers, and traffic monitoring cameras. The project would also provide significant multi-modal safety benefits with updated vehicle and bicycle detection, adding yellow reflective border signal heads, pedestrian countdown signal heads, and accessible pedestrian signal push buttons.

The remainder of this report describes several alternatives for consideration for the Norwood Mobility Project. All alternatives contained herein are draft concepts and subject to change based on input from the community and project partners.

Feasibility Analysis Methodology

To determine the feasibility of each proposed alternative, several forms of analysis were conducted. This analysis includes:

- Travel Demand Forecasting
- Right-Of-Way Assessment
- Walking Level of Traffic Stress Analysis
- Bicycle Level of Traffic Stress Analysis
- Traffic Operations Analysis
- Safety Benefit Assessment
- Transit Assessment

The analysis methodology for each of these assessments is described in further detail in the following sections.

Travel Demand Forecasting

A modified version of the SACOG SacSim-19 Travel Demand Model was used to develop future year vehicle travel demand along Norwood Avenue. This model is consistent with the modeling used for the City's 2040 General Plan Update with only minor revisions made in the vicinity of the study area to better reflect local streets which are part of the project. The model is generally only sensitive to major changes in street design which affect either vehicle capacity or transit capacity. For this reason, changes in future vehicle demand for Norwood Avenue are only shown when the number of vehicle travel lanes is changed in an alternative.

The travel demand model was used to develop future year AADT and future year vehicle turning movement demand. Model outputs for AADT and vehicle turning movement demand were adjusted using the post processing methodology described in the National Cooperative Highway Research Program Report 765 (NCHRP-765) Analytical Travel Forecasting Approaches for Project-Level Planning and Design.

Estimates for VMT were derived from the travel demand model and made in accordance with the California Environmental Quality Act (CEQA) as updated by California Senate Bill 743 (SB 743) based on the Guidelines published by the Natural Resources Agency. VMT is a systemic metric and is a useful indicator of overall land use and transportation efficiency, where the most efficient system is one that minimizes VMT by encouraging shorter vehicle trip lengths, more walking and biking, or increased carpooling and transit. VMT is not a good indicator of congestion nor is it useful for identifying hot-spot locations or infrastructure deficiencies. Measuring VMT requires estimating or measuring the full length of vehicle trips by purpose, such as commutes, deliveries, or shopping trips that often cross between cities, counties, or states. For this reason, regional travel demand models, "big data," and household travel surveys that are less limited by local agency boundaries are the preferred tools to estimate VMT under SB 743. VMT is reported by travel speed for all vehicles on all streets within the region for each alternative.

Right-of-Way Assessment

The existing right-of-way was measured on publicly available aerial imagery at multiple points along Norwood Avenue to determine the smallest common cross section, from back of sidewalk to back of sidewalk, along the corridor. From this analysis, it was determined that there is generally 72 feet or more of current right-of-way along Norwood Avenue. The exceptions to this are:

- The bridge structure over I-80 (Where Caltrans requires additional lane width between vehicle travel lanes and sidewalks);
- The southern end of the corridor south of Fairbanks Avenue (55 feet), and;
- The Northern end of the corridor north of Berthoud Street (66 feet).

For the bridge over I-80, the plan alternatives specifically avoid making recommendations for changing the allocation of right-of-way as there are limited options available without needing to widen the bridge structure. At the southern end of the corridor, the plan alternatives do not propose any changes, as this section is already two vehicle travel lanes with a Class II bikeway in each direction and seven-foot sidewalks. At the north end of the corridor, the plan alternatives continue with their standard cross sections as there are undeveloped and soon to be developed parcels fronting Norwood Avenue which can implement the plan improvements when they move forward with construction.

Level of Traffic Stress Analysis

Bicycling LTS

The bicycling LTS analysis was calculated using the methodologies describe in the Mineta Transportation Institute Report 11-19 Low Stress Bicycling and Network Connectivity (2012). Bicycling LTS scores quantify the stress level of a street segment through a variety of criteria such as street width (number of lanes), speed limit and/or prevailing speed, presence and width of bike lanes, signals, and presence and width of parking lanes. Bicycle LTS is given a score of 1 through 4, with 1 being the most comfortable and 4 being the least comfortable for people bicycling. Typically, a LTS score of 1 indicates that the stress level of a street is suitable for most people bicycling regardless of skill such as children, while an LTS of 4 indicates that the stress level is better suited for more skilled bicyclists, as shown in **Figure 1**.

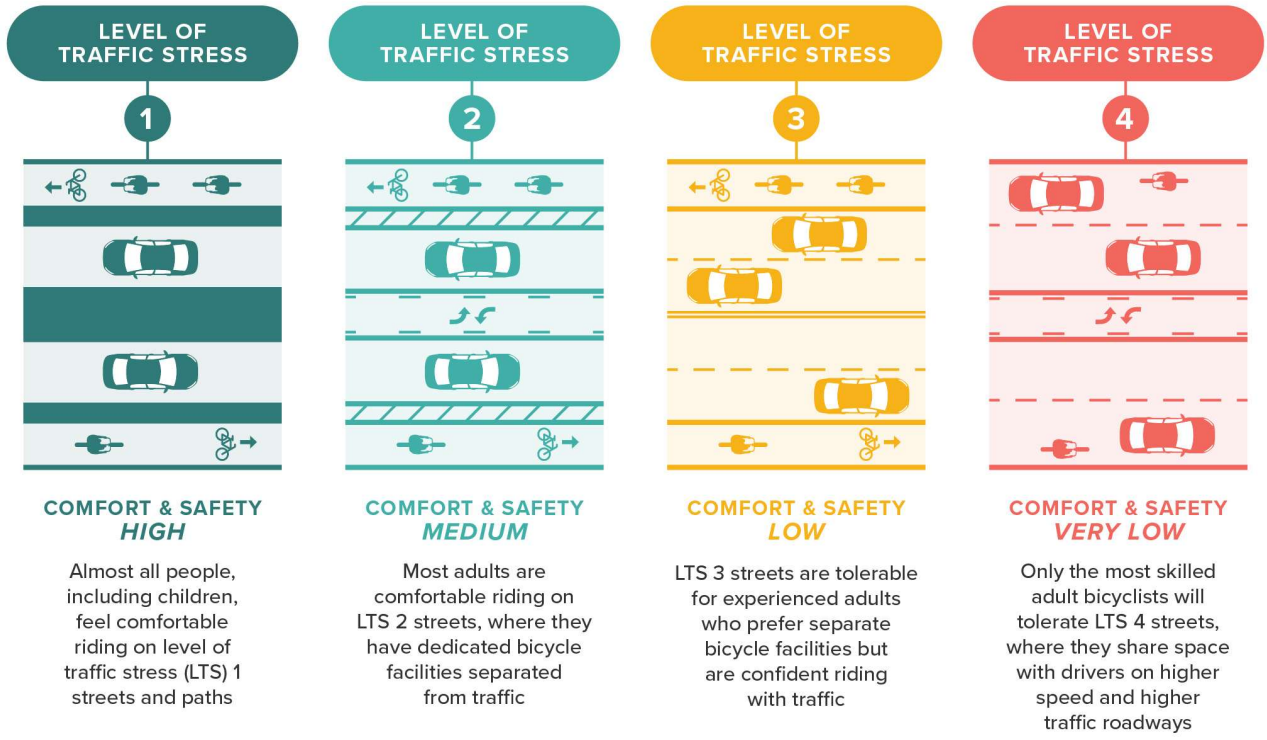

Figure 1. Bicycle Level of Traffic Stress Scores

Walking LTS

The walking level of traffic stress (LTS) analysis was done using the Oregon Department of Transportation (ODOT) Level of Traffic Stress Analysis Procedures (2020). Similar to bicycling LTS methodology, walking LTS also undergoes several criteria to develop a LTS score of 1 through 4 including the presence of sidewalks, crosswalks, median refuges, traffic volume, and current speed limits as shown in **Figure 2**.

Figure 2. Walking Level of Traffic Stress

Traffic Operations Analysis

The study intersections were analyzed using the Synchro 12 software package for signalized intersections and Sidra 9.1 software package for roundabouts. Each study intersection was evaluated for operational performance during typical weekday AM and PM peak hour operations. Key performance metrics include average vehicle delay, intersection LOS[1], and 95th percentile queue.

The delay and LOS analysis is based on the latest version of the Transportation Research Board Highway Capacity Manual (HCM) methodology. This methodology assigns an LOS grade to intersection operations based on the average vehicle control delay, ranging from LOS A (free flow) to LOS F (most congested conditions). **Table 1** documents the LOS criteria for signalized intersections and roundabouts. The latest version of the Synchro analysis software was used to report the 95th percentile queue lengths for approach lanes to signalized study intersections. Sidra 9.1 was used to perform this same analysis for study roundabouts.

[1] A Level of Service (LOS) analysis refers to the quantifiable assessment of traffic under various scenarios.

Table 1: Level of Service Criteria Definitions

Level of Service	Description	Signalized Intersection (Delay in Seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤10.0
B	Operations with very low delay occurring with good progression and/or short cycle lengths.	>10.0 to 20.0
C	Operations with very average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	>20.0 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	>35.0 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and V/C ratios. Individual cycle failures are frequent occurrences.	>55.0 to 80.0
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	>80.0

Source: Highway Capacity Manual, 7th Edition

Safety Assessment

Each alternative was qualitatively reviewed for improvements which directly affect collision trends which were identified in the Existing Conditions Report. This includes looking at elements which reduce travel speeds, reduce potential conflicts between vehicles or between vehicles and those walking, biking, or rolling, or better alert people to these potential conflicts. As this project is still in the planning phase, there is not sufficient design data at this time in the project alternatives to quantify collision reductions associated with the proposed improvements.

Transit Assessment

Each alternative was qualitatively reviewed for its compatibility with future transit enhancements. Sacramento Regional Transit (SacRT) owns, operates, and maintains

transit facilities and services along Norwood Avenue and has identified planned and desired improvements to stops along the corridor in their 2023 Bus Stop Improvement Plan. The Norwood Mobility Project is supportive of these proposed improvements and the transit assessment of each alternative will identify if the project option meets or exceeds the planned improvements from SacRT

Community Priority Alignment

Based on community feedback from the Community Advisory Committee, during the in-person and virtual community workshops, and from the project website, the following community priorities for the project were identified:

- Improve corridor safety, particularly between Jessie Avenue and Bell Avenue, and between Silver Eagle Road and Harris Avenue
- Improve walking infrastructure, including the addition of signal-protected crossing opportunities, wherever feasible
- Create low-stress facilities that improve safety and comfort for people walking, rolling, and bicycling to reach transit
- Create low-stress facilities that improve safety and comfort for people biking

Each alternative will be qualitatively evaluated for alignment with these priorities.

Alternatives Evaluation

Common Elements for All Alternatives

This section lists the common elements that are proposed for all alternatives. The project elements in this section are compatible with all of the major project alternatives and have major safety and functionality benefits without affecting the corridor's vehicle operating capacity.

Remove On-Street Parking between Jessie Avenue and Bell Avenue

Norwood Avenue is one of the few arterial streets in Sacramento, outside of the Central City, that has on-street parking. This condition does not align with current City standards. Over the past five years, collision trends have shown more collisions in this segment with on-street parking compared to the rest of the corridor. Many of these collisions involve people walking or biking. From site observations, people frequently cross the street in this section outside of designated crossing locations, after parking their vehicle. The parked vehicles create sight distance issues for drivers to see these people crossing, particularly in this section where the driver is not alerted to be searching for people crossing the

street. Similarly, there are no bike lanes in this section and bicyclists frequently have to avoid the door zone of parked vehicles by shifting into the path of vehicles traveling at 35 miles per hour.

Install Sidewalks

There are two locations that lack sidewalks along Norwood Avenue. One is on the west side of the street from approximately Berthoud Street to Grace Avenue. In this section, there is an informal asphalt path which is overgrown in places and shows cracking and degradation. The second gap is on the east side of the street from Grace Avenue to Main Avenue. The northern portion of this gap will be constructed by planned housing development in the near future. The Norwood Mobility Project ensures that the corridor has sidewalks along the entire corridor.

Signalize Channelized Right Turns at the I-80 Interchange

Interchanges generally pose a challenge to people walking or biking to cross. At the I-80/Norwood Avenue Interchange there is no dedicated space for people or bicycling and people walking are required to cross channelized uncontrolled right-turn movements at both intersections where people driving enter and exit the freeway. Three out of four of these crossings are currently unmarked (no crosswalk) which creates a higher stress environment for those walking to cross the vehicle lane. Additionally, the lack of marked crosswalks reduces visibility and awareness of someone walking to cross their path. Current Caltrans and City standards support signalizing. Converting the sweeping right turn to an appropriately designed slip lane, with a straight approach, with a pedestrian and bike crossing perpendicular to the lane, placed before the vehicles turning movement, increases driver focus and attention on persons crossing the lane, which can reduce conflicts. It also improves the ability to signalize the approach.

Signalize Midblock Pedestrian Crossings

From both anecdotal evidence during the community workshops and observation during the project site walk, people who walk along Norwood Avenue are looking for additional protected crossing opportunities. People regularly cross Norwood Avenue at unmarked locations which has contributed to a concentration of collisions between Jessie Avenue and Bell Avenue and between Silver Eagle Road and Morey Avenue. There is approximately 1,200 feet and 1,600 feet between signalized crossing opportunities in these two cases respectively. Based on observations and collision data, it is recommended that a signalized crossing be added near the north end of the Robertson Community Center, and another be added near the north end of the Norwood Center shopping plaza. SacRT also identified the need for a pedestrian crossing at Kesner Avenue in their 2023 Bus Stop Improvement Plan to enhance access to transit.

Shorten Pedestrian Crossing Distances

For all alternatives, it is recommended that the project try to achieve the shortest crossing distance feasible to reduce pedestrian exposure to traffic. Reducing lane widths and adding intersection curb extensions are a few ways this may be achieved. Curb extension additionally helps the person walking be more visible and helps drivers determine that the person walking is committed to that crossing, improving the driver's recognition of the person intending to cross.

Modify Signal Operations

For all alternatives, it is recommended that the traffic signals be brought up to current City standards. This process has already started with upgrades at Bell Avenue and Silver Eagle Road. Upgrades at a minimum should include retro-reflective back plates for signal heads, advanced dilemma zone detection, accessible pedestrian signal upgrades, leading pedestrian interval signal timing per city policies and guidelines, curb ramp upgrades to current standards, and crosswalk restriping for high visibility. Consideration should also be given to implementing transit signal priority, especially for alternatives which reallocate ROW away from vehicle travel lanes.

Implement Bus Stop Infrastructure and Stop Amenities

SacRT completed their Bus Stop Improvement Plan in February 2023 which identified several stops along Norwood Avenue for enhancements, including:

- SB Norwood Avenue north of Jessie Street – construct a new concrete pad behind the sidewalk and add a transit shelter and bench
- NB Norwood Avenue north of Jessie Street – construct a new concrete pad behind the sidewalk
- NB Norwood Avenue north of Morrison Avenue – construct a new concrete pad behind the sidewalk with a retaining wall
- NB Norwood Avenue south of Lindsay Avenue – construct a new concrete pad behind the sidewalk and add a transit shelter and bench
- SB Norwood Avenue south of Grand Avenue – construct a new concrete pad behind the sidewalk and add a transit shelter and bench
- NB Norwood Avenue north of Kesner Avenue – construct a new concrete pad behind the sidewalk with a retaining wall
- NB Norwood Avenue north of Hayes Avenue – construct a new concrete pad behind the sidewalk with retaining curbs and add a transit shelter and bench
- SB Norwood Avenue north of Silver Eagle Road (Robertson Community Center) – construct a new concrete pad behind the sidewalk with retaining curbs and add a transit shelter and bench

- SB Norwood Avenue north of Carroll Avenue – construct a new concrete pad behind the sidewalk with a retaining wall
- NB Norwood Avenue north of Carroll Avenue – construct a new concrete pad behind the sidewalk with a retaining wall

The Norwood Mobility Project is an opportunity for the City to support these SacRT efforts.

Reduce Posted Speed Limits

Assembly Bills 43 and 1938 updated the California Vehicle Code to allow for a five mile per hour reduction of posted speed limits below what would be recommended based on 85th percentile observed speeds on streets that are designated as Safety Corridors or on streets adjacent to land uses that generate a high number of people walking or biking. Only one speed limit reduction is allowed to be applied on each street. Norwood Avenue is eligible to be designated as a Safety Corridor. Norwood Avenue is also eligible to be designated as a high activity walking or biking corridor based on local land use patterns if it is not designated as a Safety Corridor. Streets in front of and up to ¼ mile from schools, public parks, houses of worship, community centers, and other facilities which encourage walking or biking may be designated as high walking and biking activity areas. Enough of these uses exist along Norwood Avenue that virtually all of the study area is within ¼ mile of one of these land uses.

Provide Additional Storage Lanes for the I-80 Westbound On-Ramp

The City should coordinate with Caltrans to add a second queue storage lane to the I-80 Westbound On-Ramp before the ramp meter. Currently it is the only ramp of four at this interchange which does not have two lanes of travel. The current design provides approximately 550 feet of storage between the ramp meter and Norwood Avenue. Based on vehicle speed and travel time data collected for Norwood Avenue, travel times on the corridor are highly variable and appear to be tied in part to queues at this on-ramp during peak hours. The additional lane could be designed as a high occupancy vehicle preference lane or a standard storage lane and would require additional operational study beyond this plan to determine the specifics of its design. This is not a currently planned Caltrans project and is outside of the City's jurisdiction. This modification would require coordination between the City and Caltrans.

Add Wayfinding for People Walking and Biking

Installation of wayfinding signs placed at key locations along the corridor such as bus stops and high-volume areas will direct people to popular destinations, such as the community center, shopping opportunities, and the Sacramento Northern Parkway shared use path.

Alternative 1

Description

The majority of items included in Alternative 1 are consistent across all alternatives and presented in the previous section. This alternative is the only one that does not propose a right-of-way reallocation on Norwood Avenue. Elements unique to this alternative include:

Widen Sidewalks

Norwood Avenue is generally not wide enough to include standard bikeways without reducing the number of vehicle travel lanes. City Ordinance 10.76.010[2] allows people to bicycle on sidewalk under certain requirements. In lieu of providing on-street bicycle infrastructure, this alternative widens the sidewalk on the west side of the street to allow people bicycling, walking, and rolling to navigate potential conflicts between users.

Figure 3 shows the general cross section proposed for this alternative. **Figure 4** shows a representative map view of Norwood Avenue and where improvements would be applied.

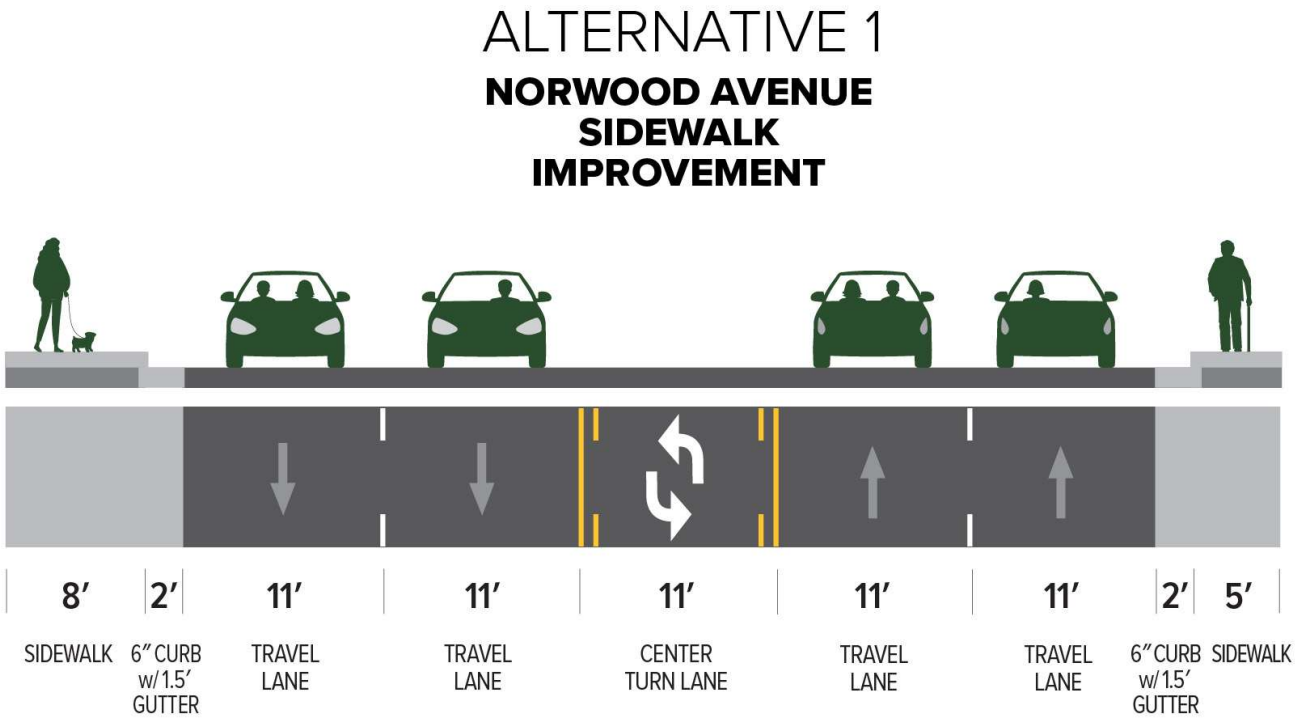

Figure 3: Alternative 1 Cross-Section

[2] City of Sacramento Ordinance 10.76.010

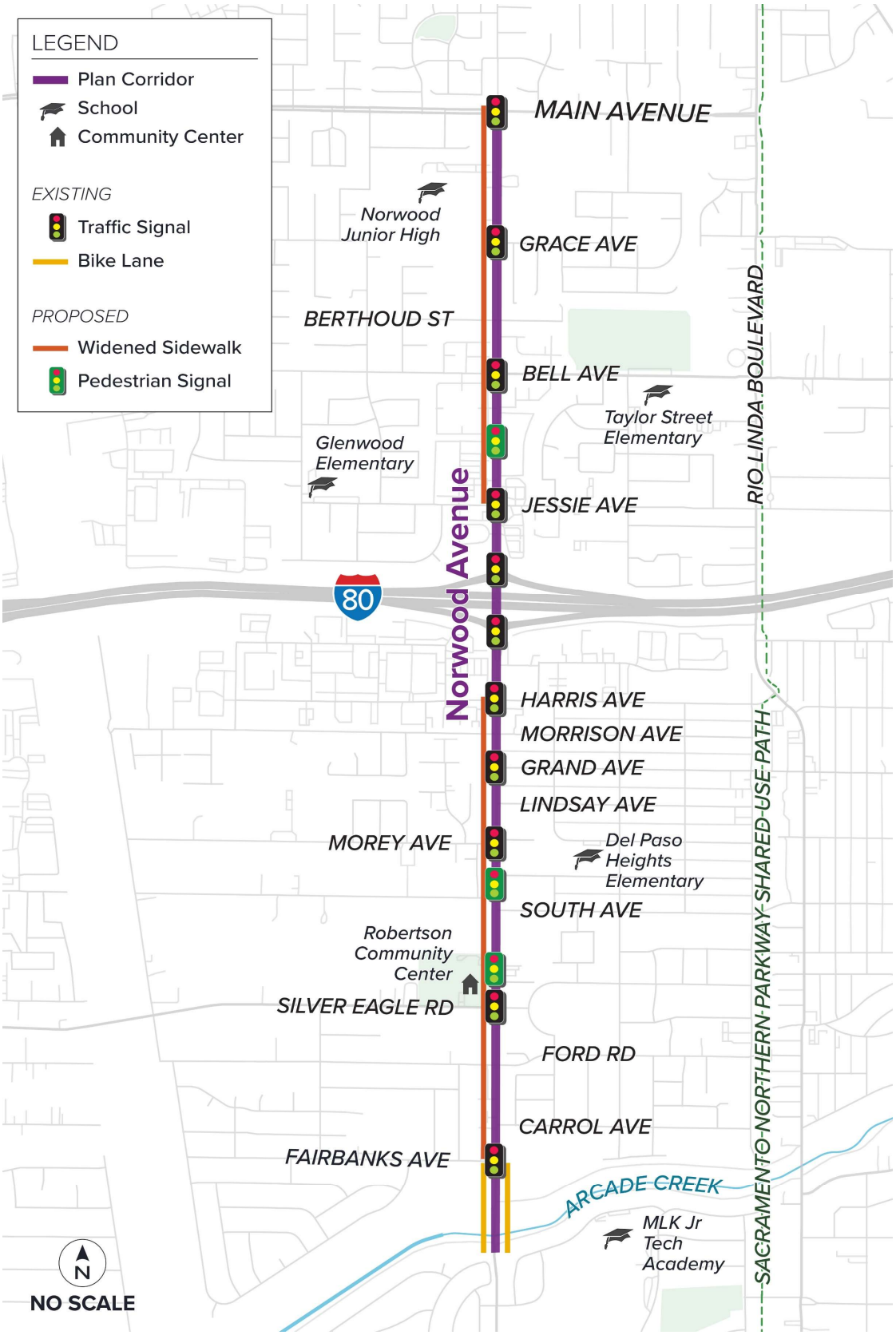

Figure 4: Alternative 1 Plan View of Proposed Improvements

Feasibility Analysis

Travel Demand Forecasting

Based on the SacSim-19 travel demand model as modified for the City of Sacramento 2040 General Plan Update, future volumes on Norwood Avenue range between 19,000 and 41,000 AADT for Alternative 1. The highest volumes are on the segment between Jessie Avenue and Harris Avenue. These volumes drop to the 26,000-30,000 AADT range between Jessie Avenue and Bell Avenue and between Harris Avenue and Grand Avenue. North of Bell Avenue and south of Grand Avenue, volumes drop to the 19,000-22,000 AADT range. The Travel demand model was also used to forecast future turning movement demand volumes at study intersection along the corridor. These volumes are shown in **Figure 5**. Because Alternative 1 does not change the vehicle capacity of Norwood Avenue, no net change in future VMT is expected.

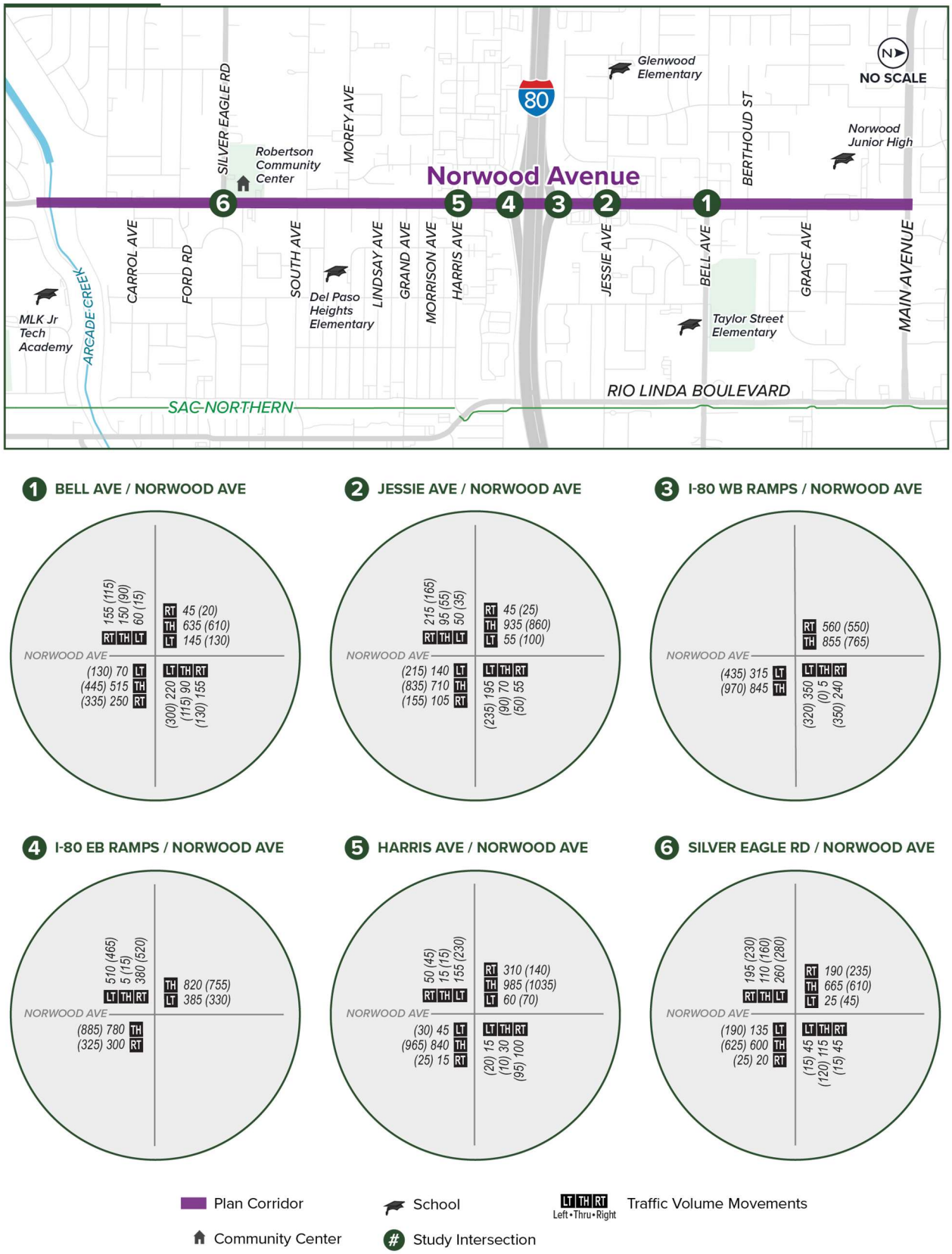

Figure 5: Future (2045) Turning Movement Volumes Alternative 1

Level of Traffic Stress Analysis

The focus of Alternative 1 is to provide some improvements for those walking, biking, and rolling without significantly altering the vehicle capacity of Norwood Avenue. This alternative adds new crossing opportunities and widens the sidewalk on the west side of Norwood Avenue, but the improvements made do not significantly alter the walking and biking environment. **Table 2** and **Table 3** show the evaluation of the walking and biking level of traffic stress. **Figure 6** and **Figure 7** show the results of this evaluation in a map form.

Table 2: Analysis of Pedestrian Level of Traffic Stress –Alternative 1

	Main Avenue to Bell Avenue	Bell Avenue to I-80 WB Ramps	I-80 EB Ramps to Fairbanks Avenue	Fairbank Avenue to Arcade Creek
Street Width (Through Lanes per Direction)	2	2	2	1
Buffer Type	None	None	None	None
Total Buffer Width (Ft)	0	0	0	0
Sidewalk Width (Ft)	5ft	5ft	5ft	5ft
Speed Limit Or Prevailing Speed[A] (MPH)	30	30	30	25
Existing PLTS Score[B]	4	4	4	3
Alternative 1 PLTS Score	3	3	3	2

Source: DKS Associates, 2025. ODOT Level of Traffic Stress Analysis Procedures.

A Alternative 1 recommends speed limit reductions throughout the corridor. This analysis was conducted under the assumption that existing speed limits have been reduced by 5 mph.

B Existing PLTS has variability in score for each segment as the analysis was done bi-directional. The Existing PLTS Score included in Table 4 is the highest existing score per segment for purposes of this analysis.

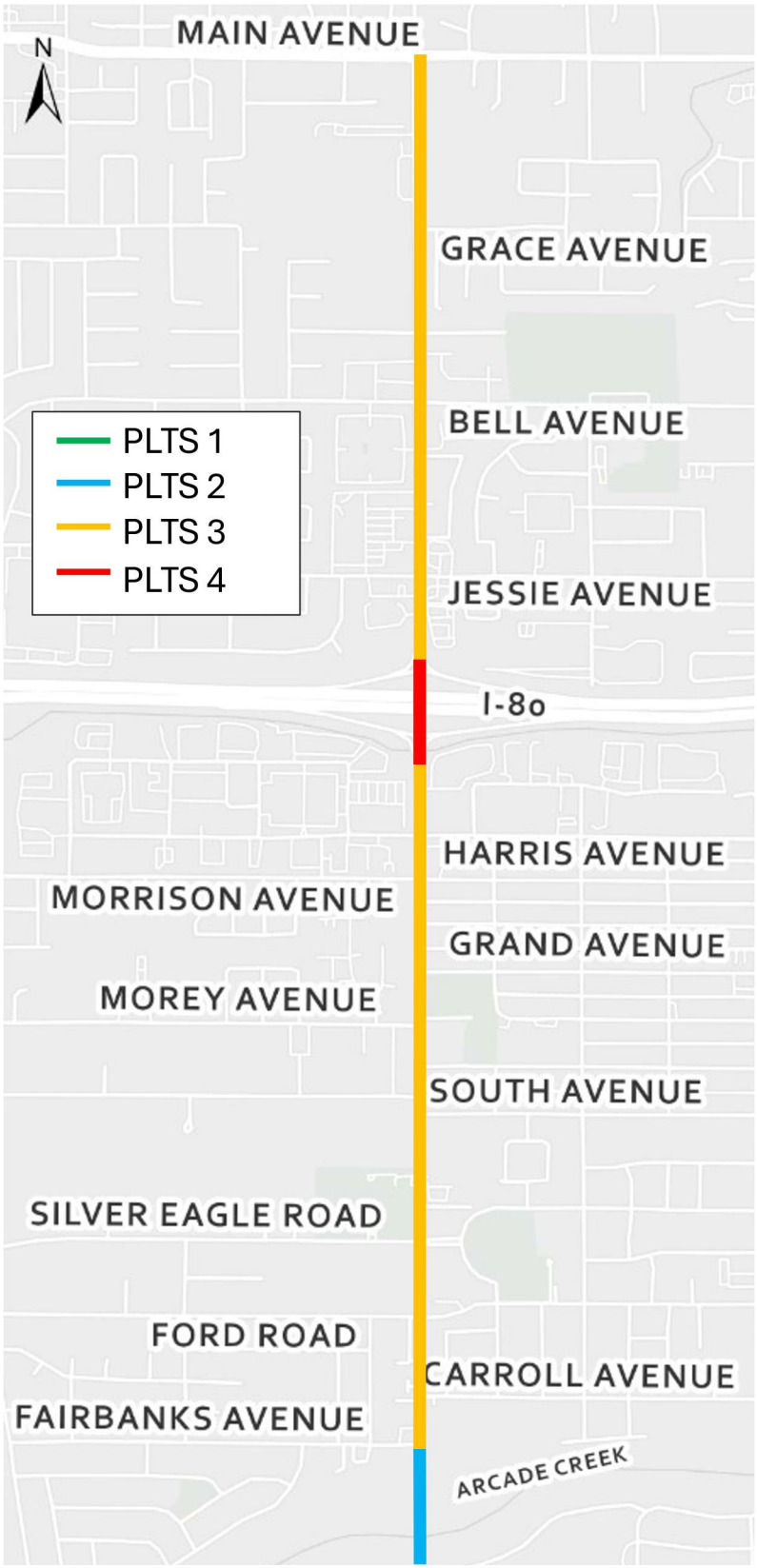

Figure 6: Walking Level of Traffic Stress – Alternative 1

Table 3. Analysis of Bicycle Level of Traffic Stress – Alternative1

	Main Avenue to Bell Avenue	Bell Avenue to I-80 EB Ramps	I-80 EB Ramps to Fairbanks Avenue	Fairbanks Avenue to Arcade Creek
Street Width (Through Lanes per Direction)	2	2	2	1
Bike Lane Width (Inc. Bike Lane, Buffer Width, Gutter) (Ft)	0	0	0	5
Speed Limit or Prevailing Speed[A] (MPH)	30	30	30	25
Physically Separated Bike Lane?	No	No	No	No
Existing BLTS Score[B]	4	4	4	3
Alternative 1 BLTS Score	3	3	3	2

Source: DKS Associates, 2025. Mineta Transportation Institute, Low Stress Bicycling and Network Connectivity.

A Alternative 1 recommends speed limit reductions throughout the corridor. This analysis was conducted under the assumption that existing speed limits have been reduced by 5 mph.

B Existing BLTS has variability in score for Segment 3 and Segment 4 as the analysis was done bi-directional. The Existing BLTS Score included in Table 7 is the highest existing score per segment for the purpose of this analysis.

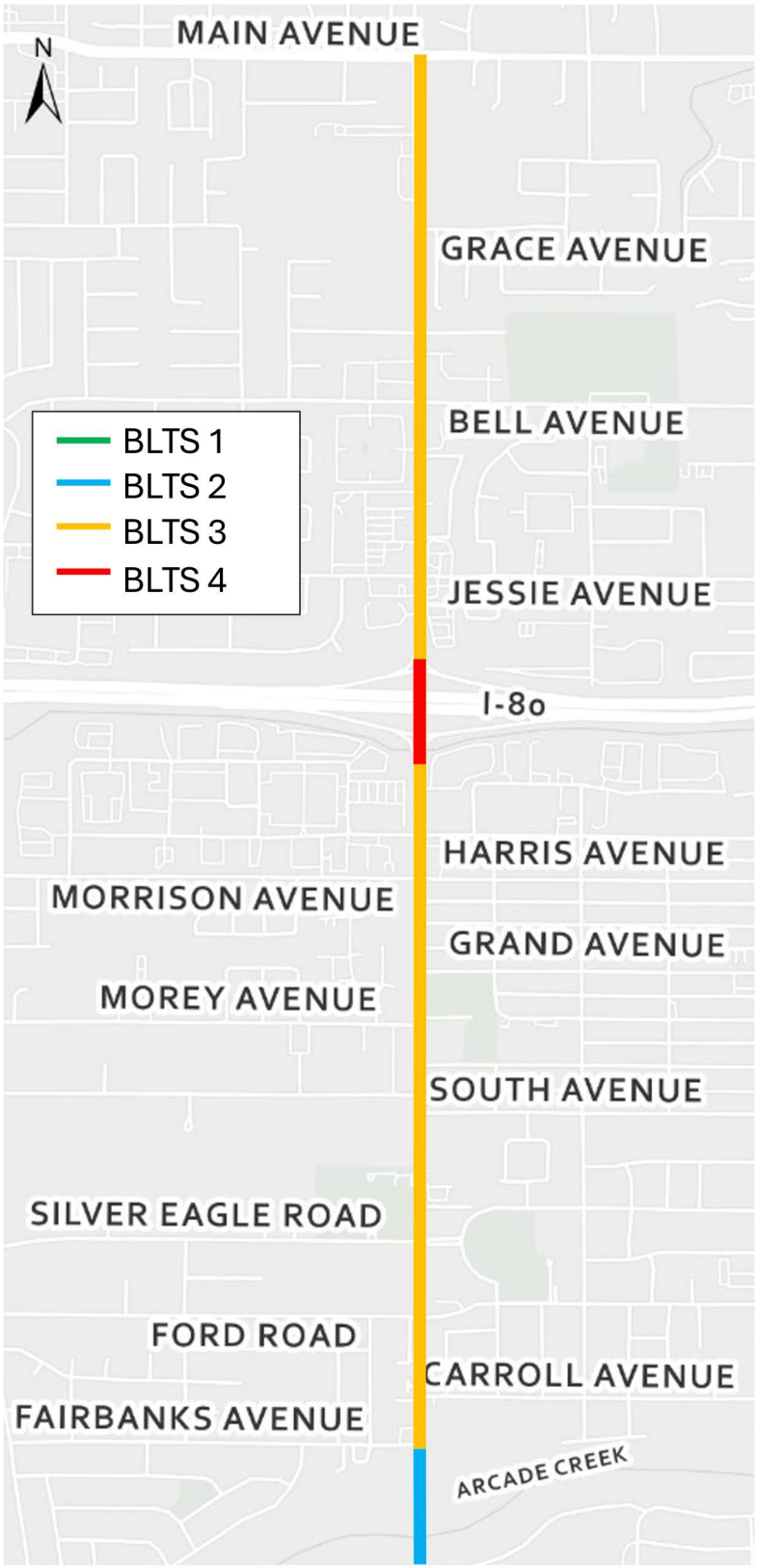

Figure 7: Bicycle Level of Traffic Stress – Alternative 1

Traffic Operations Analysis

The analysis for Alternative 1 assumed minimal changes from the current operating conditions along the corridor. Signal timing adjustments were made in relation to the proposed improvements and to accommodate higher traffic volumes associated with future growth. All signals were assumed to operate without coordination, but signal coordination would likely improve operations from the results shown. Table 4 shows a comparison of anticipated future intersection delays compared to existing operations.

95th percentile queues were also evaluated for Alternative 1. The AM and PM peak hour queues are shown in Figure 8 and Figure 9 respectively. In these figures, lines are shown on each approach to the intersection representing the queue for the left turn lane (if one exists), the through movements, and the right turn lane (if one exists). These queues are generally color coded as green if they are less than the available vehicle storage, yellow if they are at or near the available vehicle storage, and red if they exceed the available vehicle storage or block access to adjacent lanes. Note that 95th percentile queues represent the longest queue that is likely to be observed during the peak hour and most queues would be shorter. From this analysis, the key finding is that queues are longest at the intersections which comprise the I-80 interchange. There are other locations where queues exceed their available storage along Norwood Avenue, but in most cases it is due to short formal turn pockets being blocked by through movement queues.

Table 4: Future (2045) Alternative 1 Intersection Operational Analysis Results

Intersection	AM Peak Hour [A]		PM Peak Hour [A]	
	Existing	Future	Existing	Future
1. Norwood Avenue / Bell Avenue	20.6 (C)	23.9 (C)	17.6 (B)	23.7 (C)
2. Norwood Avenue / Jessie Avenue	28.2 (C)	29.3 (C)	23.8 (C)	30.7 (C)
3. Norwood Avenue / WB 80 Ramps	10.9 (B)	13.6 (B)	10.3 (B)	16.0 (B)
4. Norwood Avenue / EB 80 Ramps	12.0 (B)	16.3 (B)	12.0 (B)	16.0 (B)
5. Norwood Avenue / Harris Avenue	19.7 (B)	25.8 (C)	19.2 (B)	24.4 (C)
Norwood Avenue / Morey Avenue[B]	-	22.1 (C)	-	9.7 (A)
6. Norwood Avenue / Silver Eagle Road	18.6 (B)	11.4 (B)	18.2 (B)	23.1 (C)

Source: DKS Associates, March 2025.

Notes:

A. 20.6 (C) = Delay (LOS)

B. Not a study intersection, provided for informational purposes because of recommended control modifications

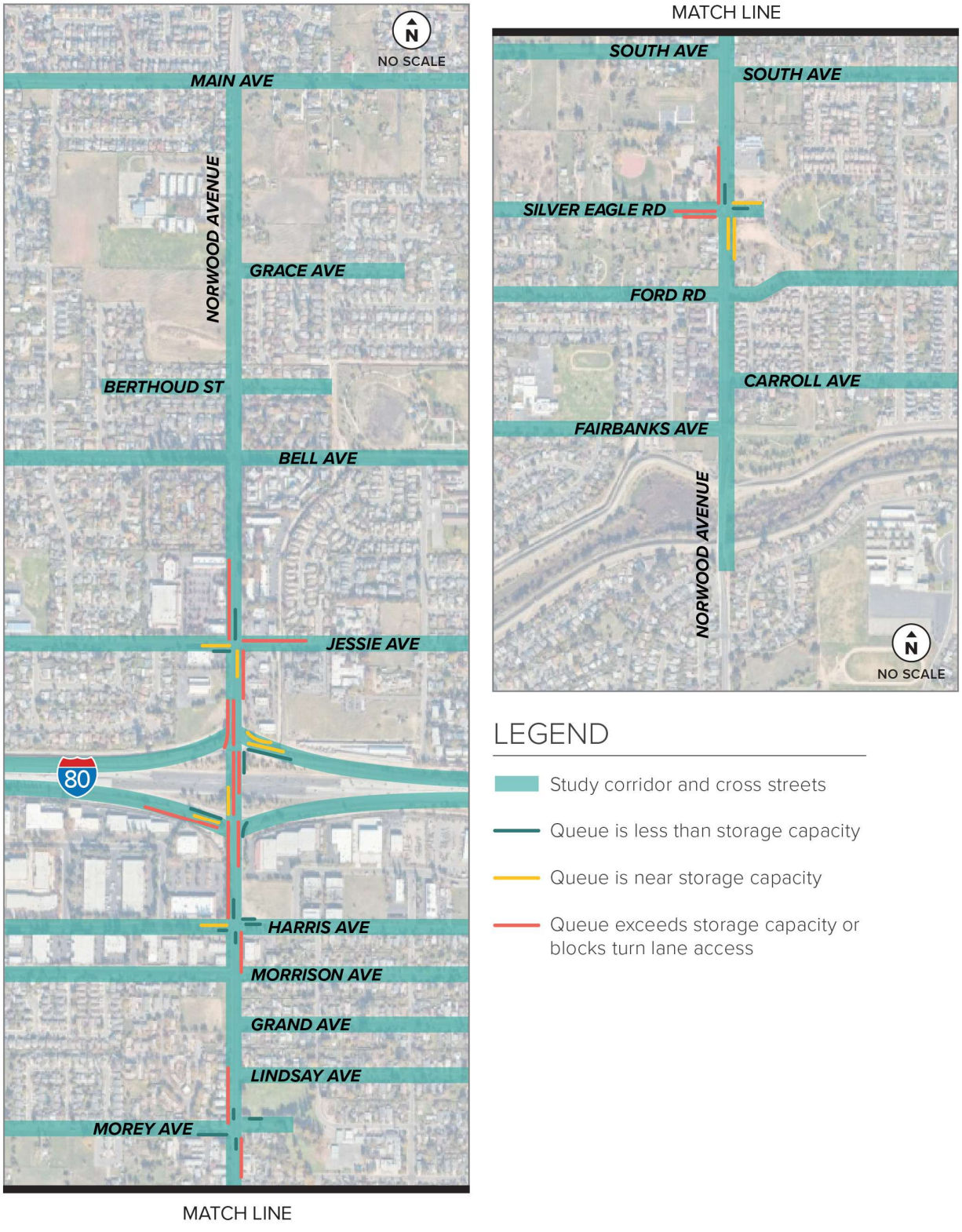

Figure 8: Future (2045) AM Peak Hour 95th Percentile Intersection Queues Alternative 1

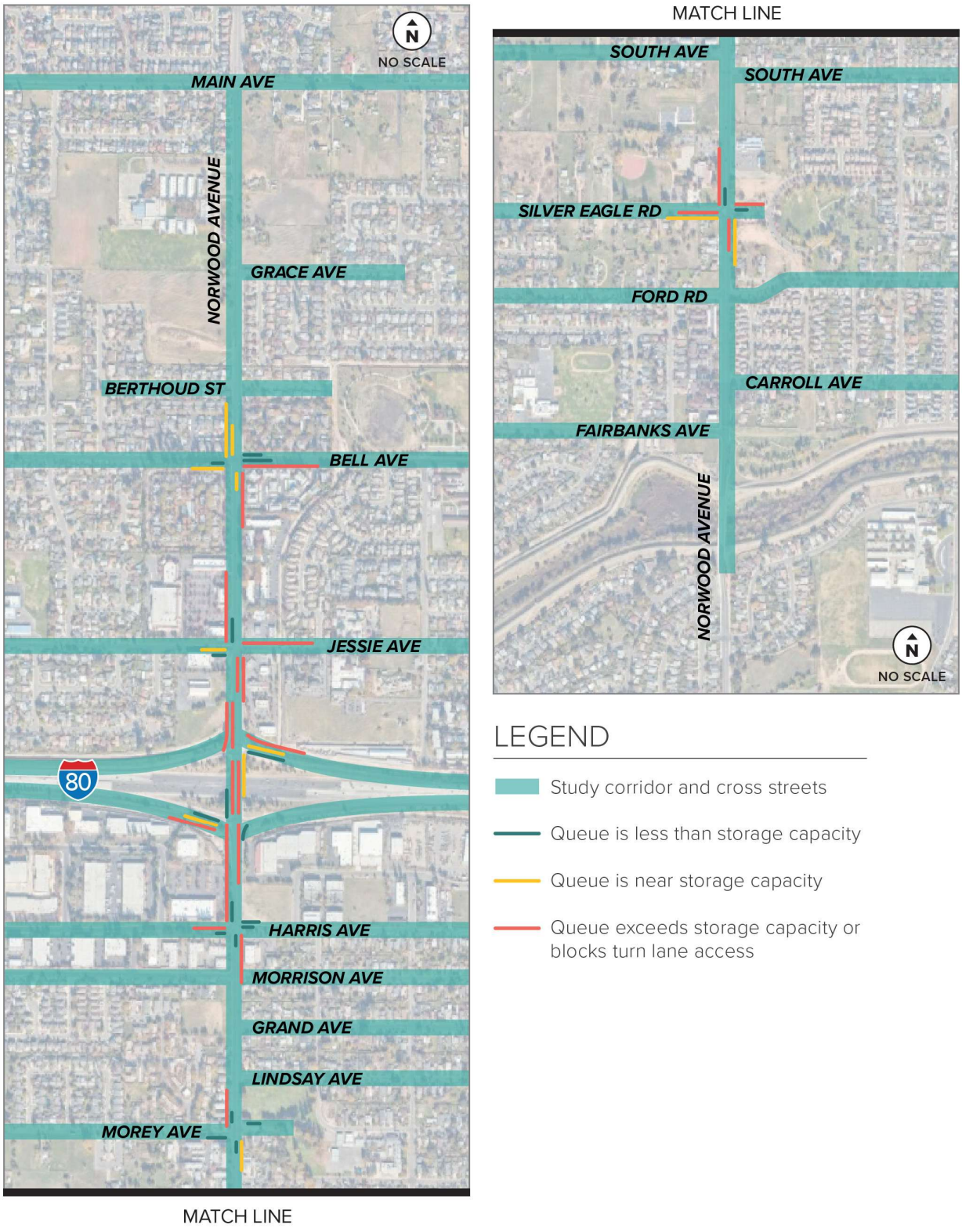

Figure 9: Future (2045) PM Peak Hour 95th Percentile Intersection Queues Alternative 1

Safety Benefit Assessment

Alternative 1 addresses some of the corridor-wide safety concerns by reducing the speed limit, removing on-street parking between Bell Avenue and Jesse Avenue, adding additional controlled crossing locations, and improving visibility of signals. An additional metered lane on the WB I-80 on-ramp would also help address congestion-based crashes. These safety upgrades come from elements common across all alternatives and are not unique to Alternative 1.

Transit Assessment

Alternative 1 provides only minimal potential benefits for transit operations. This alternative would provide the least amount of improvement by supporting stop enhancements identified by SacRT and closing sidewalk gaps. The wider sidewalk on the west side of the street would provide some additional waiting area for transit stops used by people traveling in the southbound direction.

Community Priority Alignment

Alternative 1 improves corridor safety by removing on-street parking between Jessie Avenue and Bell Avenue and by reducing speed limits along the corridor. It also includes the addition of three new marked and signalized pedestrian crosswalks and signalizes pedestrian crossings at the freeway ramps. Alternative 1, while reducing the level of traffic stress slightly for people walking and biking by reducing traffic speeds, still does not provide any low stress segments or connections to transit.

Alternative 2

Description

Alternative 2 proposes installing a Class IV separated bikeway along Norwood Avenue by reallocating space from one of the vehicle travel lanes in each direction. There are multiple ways in which this alternative can be achieved and thus three sub alternatives (2A, 2B, and 2C) are included under Alternative 2. The primary way these sub alternatives are differentiated is in how they place the separated bikeway within the proposed cross section. The proposed cross sections for Alternatives 2A, 2B, and 2C are shown in **Figure 10**, **Figure 11**, and **Figure 12** respectively. All other elements in the alternative description are shared between the three sub-alternatives. **Figure 4** shows a representative map view of Norwood Avenue and where improvements would be applied for Alternative 2. The elements in this alternative include:

Reallocate Street Space from Driving to Walking and Bicycling: Fairbanks Avenue to Grand Avenue and from Bell Avenue to Grace Avenue

In order to create space for walking and bicycling enhancements along the lower volume segments of the corridor, the number of vehicle travel lanes would be reduced from two per direction with a center turn lane to one per direction with a center turn lane. Sections south of Fairbanks Avenue and north of Grace Avenue would maintain their current cross-sections. The section between Harris Avenue to Jessie Avenue would be maintained as two lanes per direction to provide capacity for higher car and truck volumes and demands at the I-80 Interchange.

Install Roundabouts at Silver Eagle Road, Morey Avenue, and Bell Avenue

A single lane roundabout at Silver Eagle Road and at Morey Avenue would slow traffic in the vicinity of the Robertson Community Center and two nearby parks.

A single lane roundabout at Morey Avenue would also provide a direct path for people wanting to cross the street at Morey Avenue, which is currently an offset intersection with a marked crossing in the middle of the intersection.

A single lane roundabout at Bell Avenue would slow southbound vehicles as they approach the higher residential density and commercial portion of the corridor. It would also reduce conflict points at this high crash location.

All three roundabout locations have undergone a preliminary review for right-of-way requirements to install a single lane roundabout, and it was found that a roundabout could be installed at each location without impacting existing structures or causing a loss of use for adjacent developed properties.

Install Separated Bikeway

Removing an existing vehicle travel lane in each direction would provide sufficient space to add separated bikeways to the corridor. In Alternatives 2A and 2B, the separated bikeway would be kept at the same level as the vehicle travel lanes and separated with a painted buffer and raised elements separating the bikeway from vehicle lanes (precise design to be determined at a later date). In Alternative 2C, the separated bikeway is brought to sidewalk level and would be separated from the vehicle travel lanes by a landscaping strip. An additional one-foot buffer with visually and texturally unique elements placed parallel to the bikeway would be placed between the bikeway and the sidewalk to reduce potential conflicts between people walking and people biking. Due to lack of physical width available on the interchange, people riding bikes seeking to cross I-80 would still need to ride on the sidewalk.

Add Bicycle Detection

The remaining signalized intersections (those not updated to roundabouts) would be updated to include bicycle detection. This would allow the signals to react to people on bicycles and change signal phases without requiring the person riding to dismount and cross the intersection as a pedestrian or wait for a vehicle trigger the signal phase change.

Widen Sidewalks and Add Landscape Buffer

Existing sidewalks along Norwood Avenue would be widened to more than five feet to allow for a more comfortable and low stress walking environment, regardless of existing utility and signal poles. Landscape buffers would be installed between traffic and the sidewalk north of Jessie Avenue and south of Harris Avenue to expand the low-stress walking network while keeping right-of-way acquisition minor and constrained to landscaping. Alternatives 2A, 2B, and 2C allocate this landscaping buffer differently which changes what can ultimately be planted in this space. Alternative 2A would allow for grasses and small bushes to be planted in this space. Alternative 2B eliminates to landscape buffer on the east side of the street to allow for small to medium sized trees to be planted on the west side of the street. Alternative 2C moves the bikeway to sidewalk level eliminating the need for the buffer area between people riding bikes and vehicles and reallocates this space to the planted buffers. This would allow for large trees to be planted on the west side of the street and grasses and small bushes to be planted on the east side of the street.

Install Sidewalk Scale Lighting

Sidewalk scale lighting would ensure the area where people are walking is illuminated, increasing comfort and feelings of security and safety.

Relocate Utilities

The installation of a landscape buffer and wider sidewalks would allow for an opportunity to relocate utility poles either outside of the walkway or underground to provide appropriate sidewalk widths. This would require collaboration with and support from utility providers.

Install Bus Bulb-Outs with In-Lane Bus Stops

The sidewalk would be extended to allow for the bus to load passengers directly from the vehicle travel lane, with the bikeway continuing behind the bus stop. This treatment would also allow some stops to be turned to allow for better protection from the sun. By allowing buses to stop in-lane, transit time reliability is improved by not requiring the bus to seek gaps in traffic to re-enter the travel lane. This is recommended as the default treatment for all bus stops along the corridor, but design specifics would have to be determined in coordination with SacRT, such as those requiring space for a bus to dwell for schedule adherence.

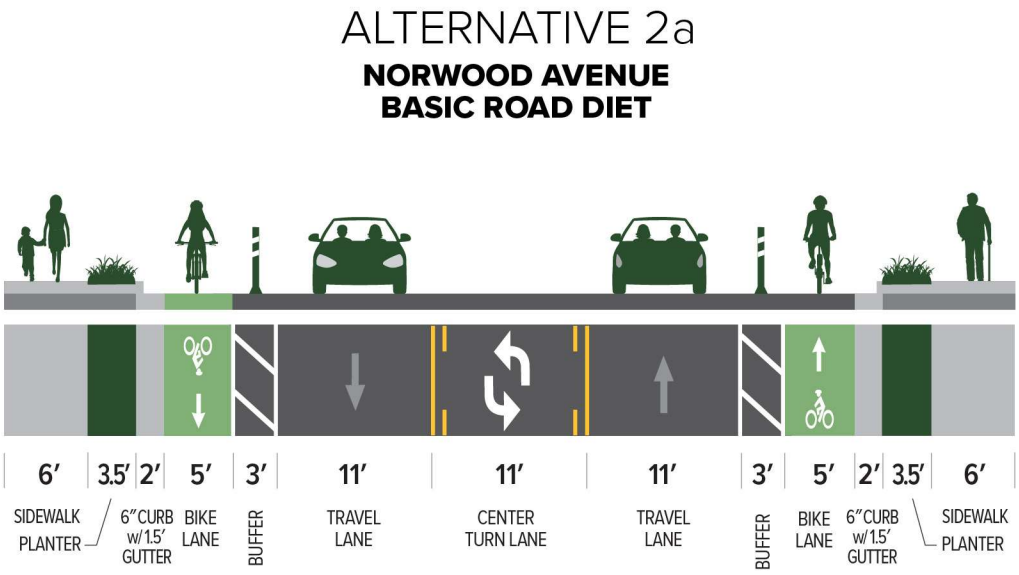

Figure 10: Alternative 2A Cross-Section

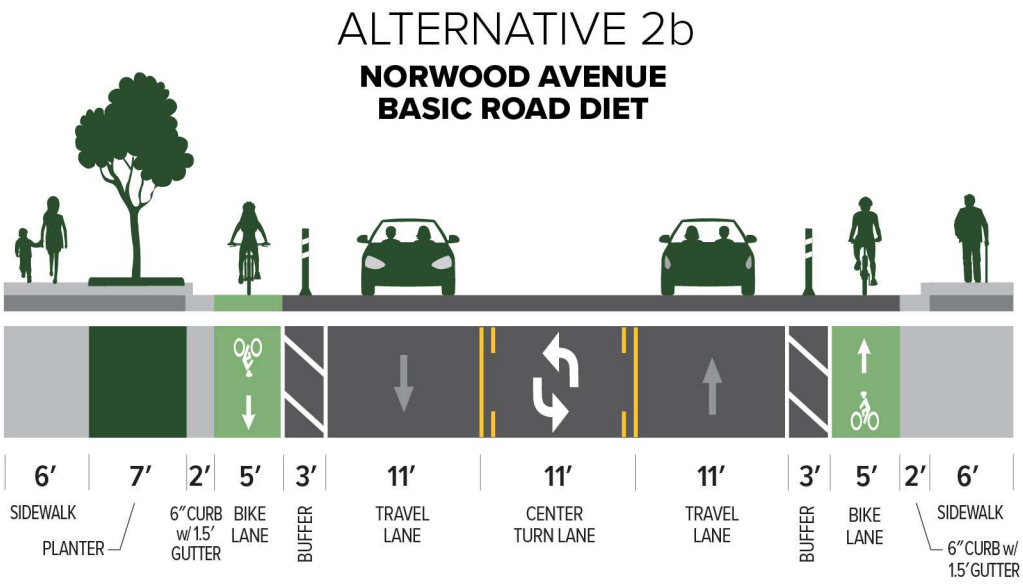

Figure 11: Alternative 2B Cross-Section

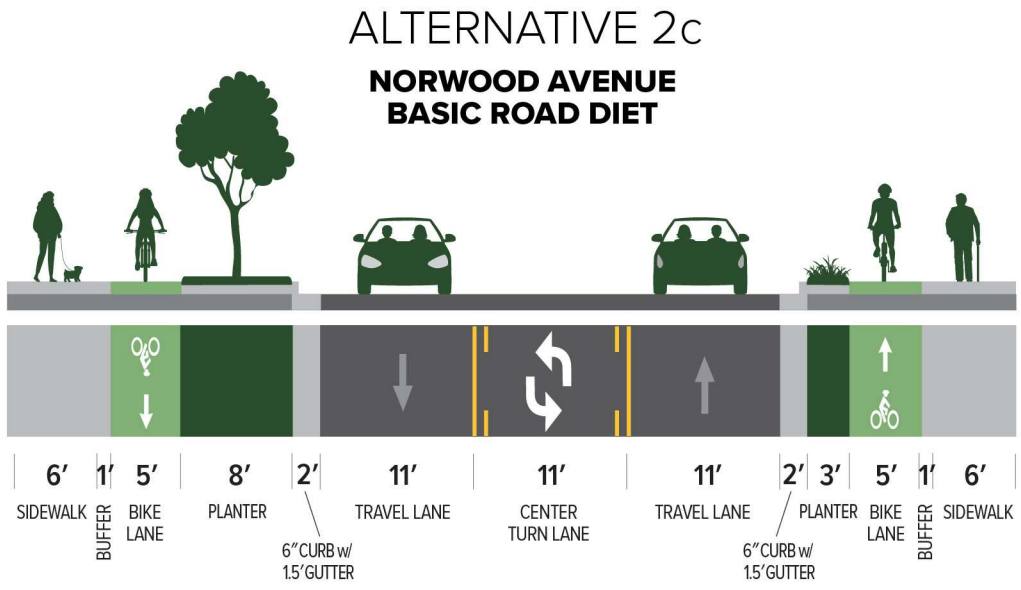

Figure 12: Alternative 2C Cross-Section

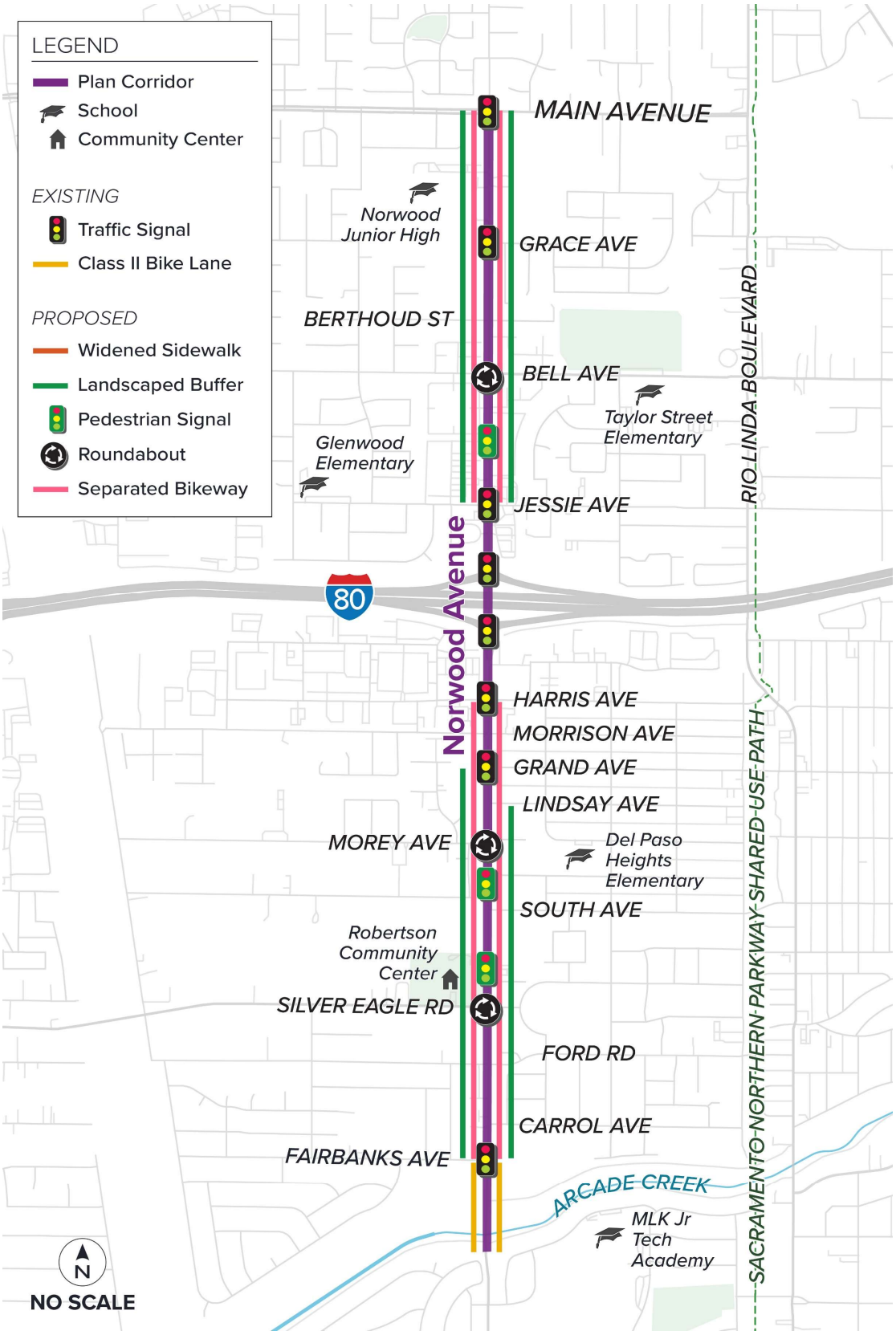

Figure 13: Alternative 2 Plan View of Proposed Improvements

Feasibility Analysis

Travel Demand Forecasting

Based on the SacSim-19 travel demand model as modified for the City of Sacramento 2040 General Plan Update, future volumes on Norwood Avenue range between 17,000 and 37,000 AADT for Alternative 2. The highest volumes are on the segment between Jessie Avenue and Harris Avenue. These volumes drop to the 21,000-25,000 AADT range between Jessie Avenue and Bell Avenue and between Harris Avenue and Grand Avenue. North of Bell Avenue and south of Grand Avenue, volumes drop to the 17,000-20,000 AADT range. These daily volumes are lower than those in Alternative 1 due to the reduction in travel lanes. A portion of the volume which was using Norwood Avenue before the reduction in travel lanes would instead use parallel roads such as Northgate Boulevard and Rio Linda Boulevard. The Travel demand model was also used to forecast future turning movement demand volumes at study intersections along the corridor. These volumes are shown in **Figure 14**.

Alternative 2 reduces the total number of vehicle travel lanes on Norwood Avenue which could potentially cause an increase in VMT related to the infrastructure project. Based on the Transportation Analysis under CEQA for Projects on the State Highway System guidelines published by Caltrans, projects which reduce the number of through lanes and projects which add or enhance bikeways and walking facilities would not likely lead to a measurable increase in VMT. All elements which are proposed under Alternative 2 would meet the State's screening criteria guidance for VMT analysis and do not require further evaluation for VMT impacts.

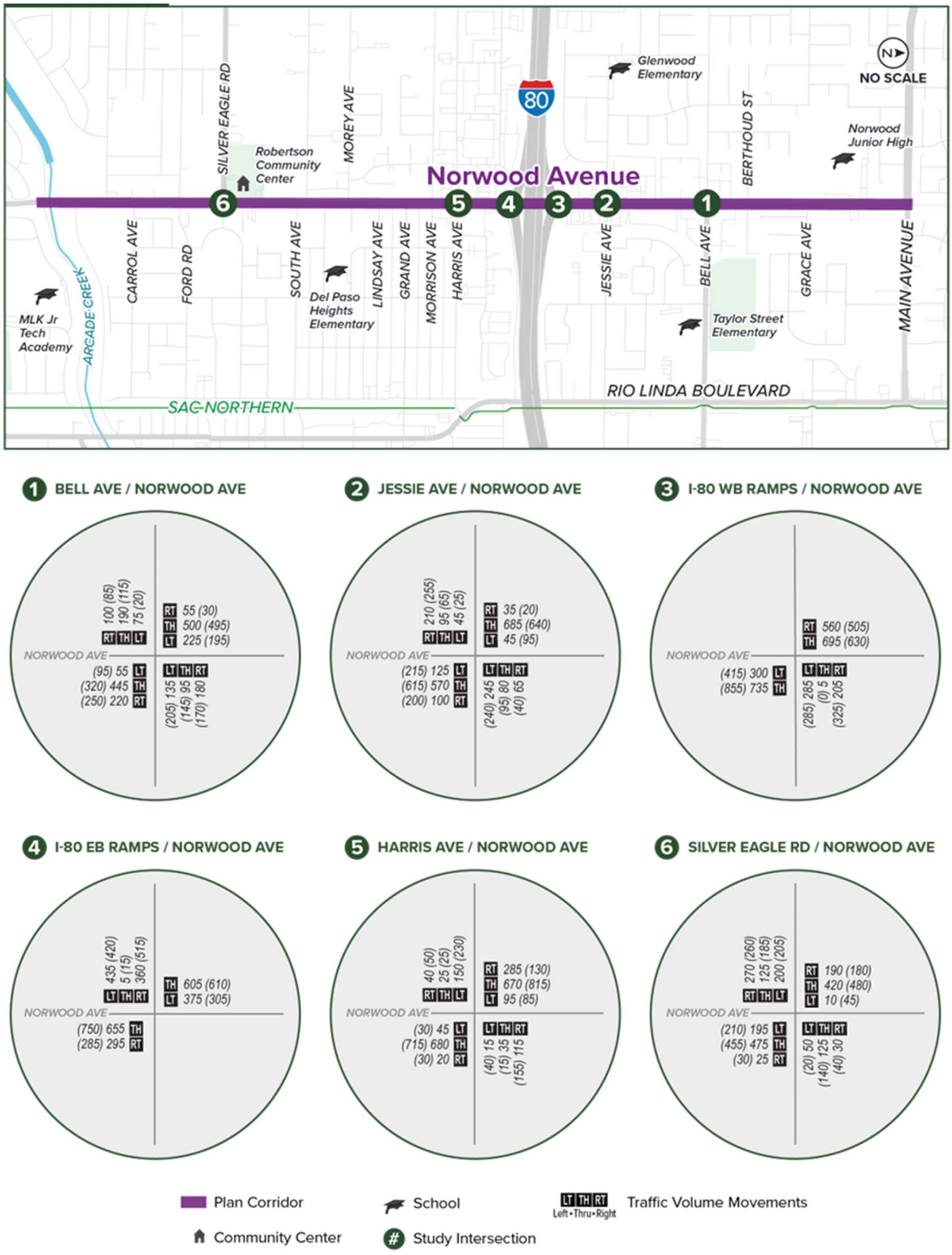

Figure 14: Future (2045) Turning Movement Volumes Alternative 2

Level of Traffic Stress Analysis

The focus of Alternative 2 is to provide significant improvements for those walking, biking, and rolling by reallocating existing right-of-way away from vehicles and towards walking and biking. This alternative adds new crossing opportunities and widens the sidewalks on Norwood Avenue. Additionally, this alternative provides a separated bikeway to enhance safety and comfort for those biking. **Table 2** and **Table 3** show the evaluation of the walking and biking level of traffic stress. **Figure 6** and **Figure 7** show the results of this evaluation in a map form.

Table 5: Analysis of Walking Level of Traffic Stress –Alternative 2

	Main Avenue to Bell Avenue	Bell Avenue to I-80 WB Ramps	I-80 EB Ramps to Fairbanks Avenue	Fairbank Avenue to Arcade Creek
Street Width (Through Lanes per Direction)	1	1	1	1
Buffer Type	Landscaped Buffer	Landscaped Buffer	Landscaped Buffer	None
Total Buffer Width (Ft)	13.5ft	13.5ft	13.5ft	0
Sidewalk Width (Ft)	6	6	6	6
Speed Limit or Prevailing Speed[A] (MPH)	30	30	30	25
Existing PLTS Score[B]	4	4	4	3
Alternative 2 PLTS Score	1	1	1	2

Source: DKS Associates, 2025. ODOT Level of Traffic Stress Analysis Procedures.

A Alternative 1 recommends speed limit reductions throughout the corridor. This analysis was conducted under the assumption that existing speed limits have been reduced by 5 mph.

B Existing PLTS has variability in score for each segment as the analysis was done bi-directional. The Existing PLTS Score included in Table 4 is the highest existing score per segment for the purpose of this analysis.

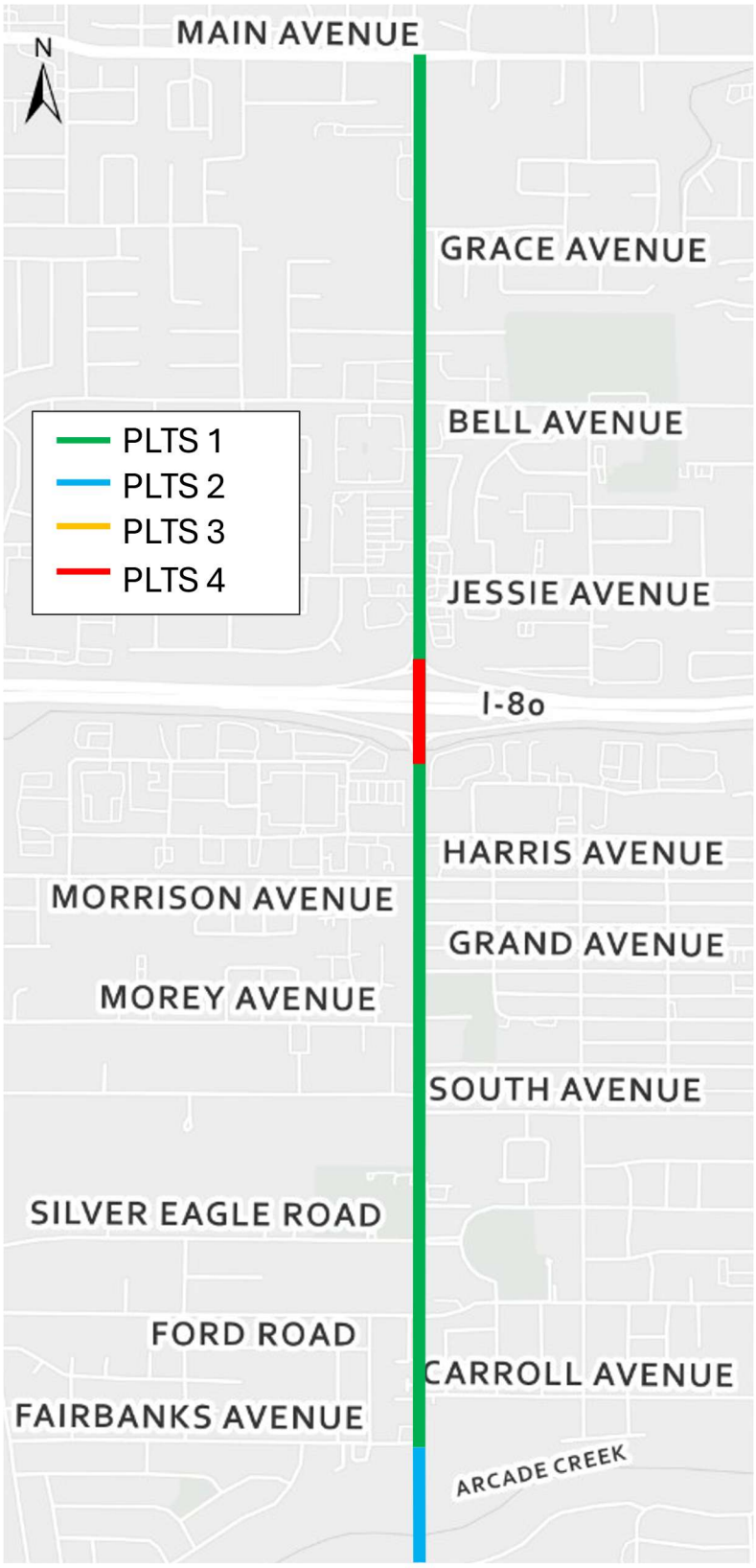

Figure 15: Walking Level of Traffic Stress – Alternative 2

Table 6. Analysis of Bicycle Level of Traffic Stress – Alternative 2

	Main Avenue to Bell Avenue	Bell Avenue to I-80 EB Ramps	I-80 EB Ramps to Fairbanks Avenue	Fairbanks Avenue to Arcade Creek
Street Width (Through Lanes per Direction)	1	1	1	1
Bike Lane Width (Inc. Bike Lane, Buffer Width, Gutter) (Ft)	9ft to 12ft	9ft to 12ft	9ft to 12ft	5
Speed Limit or Prevailing Speed[A] (MPH)	30	30	30	25
Physically Separated Bike Lane?	Yes	Yes	Yes	No
Existing BLTS Score[B]	4	4	4	3
Alternative 2 BLTS Score	1	1	1	2

Source: DKS Associates, 2025. Mineta Transportation Institute, Low Stress Bicycling and Network Connectivity.

A Alternative 1 recommends speed limit reductions throughout the corridor. This analysis was conducted under the assumption that existing speed limits have been reduced by 5 mph.

B Existing BLTS has variability in score for Segment 3 and Segment 4 as the analysis was done bi-directional. The Existing BLTS Score included in Table 7 is the highest existing score per segment for the purpose of this analysis.

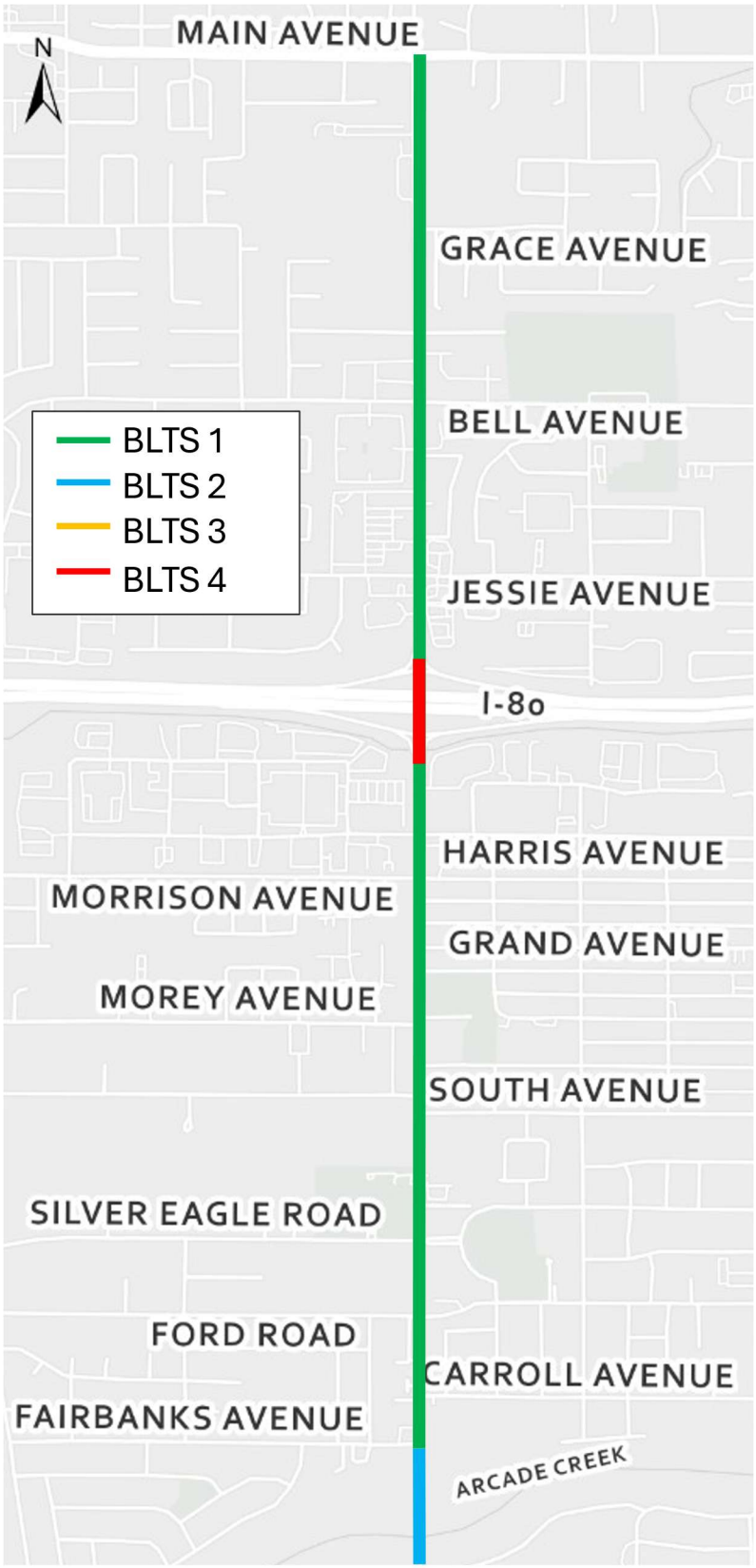

Figure 16: Bicycle Level of Traffic Stress – Alternative 2

Traffic Operations Analysis

The analysis for Alternative 2 includes adjustments to the number of vehicle lanes on Norwood Avenue and basic changes to intersection operational characteristics that would be associated with this lane removal. Signal timing adjustments were made in relation to the proposed improvements and to accommodate higher traffic volumes associated with future growth. All signals were assumed to operate without coordination, but signal coordination would likely improve operations from the results shown. Due to limitations in the analysis software, dedicated bicycle phases were not evaluated at the study intersections, but it is likely that there is sufficient vehicle capacity based on these results to incorporate dedicated bicycle phasing into the design at select locations. Table 7 shows a comparison of anticipated future intersection delays compared to existing operations. Note that for the purposes of the traffic operations analysis that Alternatives 2A, 2B, and 2C are effectively the same so only one analysis was completed.

95th percentile queues were also evaluated for Alternative 2. The AM and PM peak hour queues are shown in Figure 17 and Figure 18 respectively. In these figures, lines are shown on each approach to the intersection representing the queue for the left turn lane (if one exists), the through movements, and the right turn lane (if one exists). These queues are generally color coded as green if they are less than the available vehicle storage, yellow if they are at or near the available vehicle storage, and red if they exceed the available vehicle storage or block access to adjacent lanes. Note that 95th percentile queues represent the longest queue that is likely to be observed during the peak hour and most queues would be shorter. From this analysis, the key finding is that queues are longest at the intersections which comprise the I-80 interchange. There are other locations where queues exceed their available storage along Norwood Avenue, but in most cases it is due to short formal turn pockets being blocked by through movement queues. When compared to Alternative 1, queues are shorter in Alternative 2 at Bell Avenue, Morey Avenue, and Silver Eagle Road where the roundabouts would be installed with this alternative. Queues are longer at Harris Avenue and Jessie Avenue due to the reduction in travel lanes through the intersection. At Harris Avenue, this could be an issue as northbound queues would extend back to Grand Avenue. This could be addressed by adjusting the proposed design at Harris Avenue to maintain two through lanes in the northbound direction and should be evaluated further at the project design phase if Alternative 2 is selected as the preferred Alternative.

Table 7: Future (2045) Alternative 2 Intersection Operational Analysis Results

Intersection	AM Peak Hour [A]		PM Peak Hour [A]	
	Existing	Future Alt. 2	Existing	Future Alt. 2
1. Norwood Avenue / Bell Avenue	20.6 (C)	16.2 (B)	17.6 (B)	15.4 (B)
2. Norwood Avenue / Jessie Avenue	28.2 (C)	53.1 (D)	23.8 (C)	44.6 (D)
3. Norwood Avenue / WB 80 Ramps	10.9 (B)	12.6 (B)	10.3 (B)	14.2 (B)
4. Norwood Avenue / EB 80 Ramps	12.0 (B)	14.4 (B)	12.0 (B)	14.2 (B)
5. Norwood Avenue / Harris Avenue	19.7 (B)	29.1 (C)	19.2 (B)	36.1 (D)
Norwood Avenue / Morey Avenue[B]	-	8.5 (A)	-	9.9 (A)
6. Norwood Avenue / Silver Eagle Road	18.6 (B)	13.9 (B)	18.2 (B)	18.0 (B)

Source: DKS Associates, March 2025.

Notes:

A. 20.6 (C) = Delay (LOS)

B. Not a study intersection, provided for informational purposes because of recommended control modifications

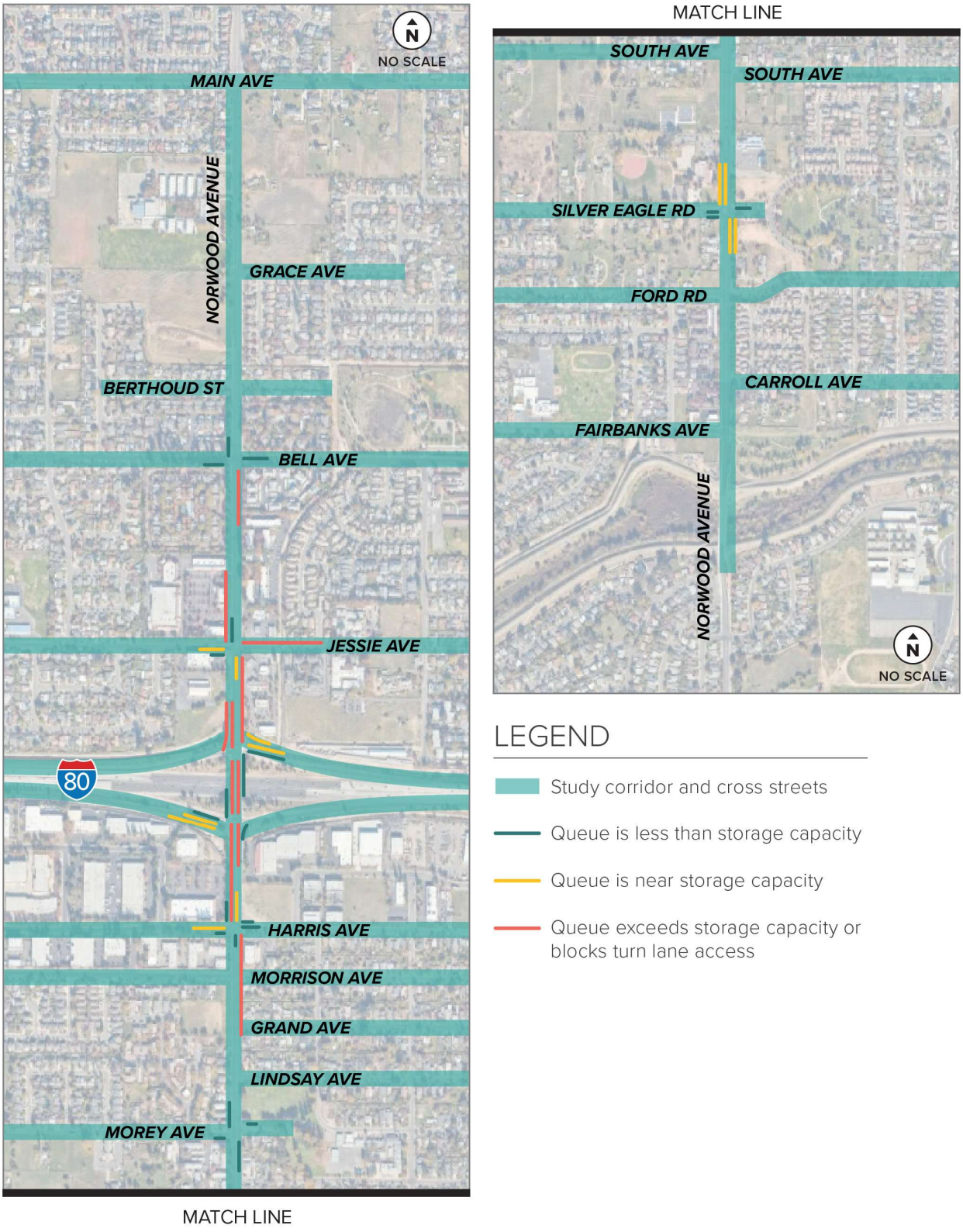

Figure 17: Future (2045) AM Peak Hour 95th Percentile Intersection Queues Alternative 2

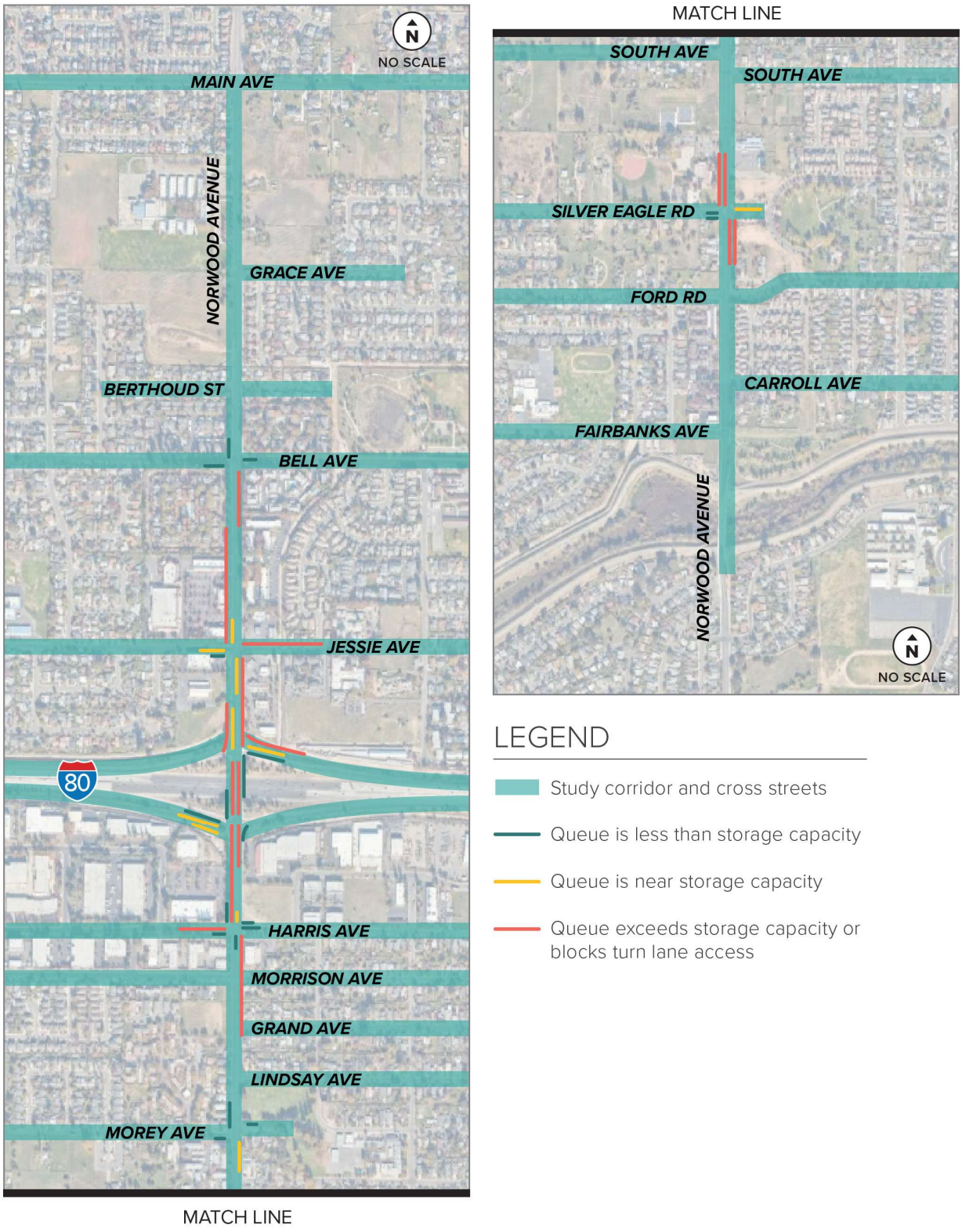

Figure 18: Future (2045) PM Peak Hour 95th Percentile Intersection Queues Alternative 2

Safety Benefit Assessment

Alternative 2 provides safety benefits through traffic calming and separation of travel modes. This alternative would reduce speeds by narrowing vehicle travel lanes, removing a vehicle travel lane per direction, adding roundabouts at Bell Avenue, Morey Avenue, and Silver Eagle Road, and by reducing the speed limit on Norwood Avenue. The roundabouts at Bell Avenue and Silver Eagle Road also address the collision trends observed at these intersections by lowering speeds and eliminating several vehicle conflicts within the intersections.

The addition of a separated bikeway would separate those riding bicycles from vehicle traffic, reducing the observed trend of bicycle involved collisions. Added crossing opportunities would help address the observed trend of pedestrian involved collisions along Norwood Avenue at unmarked crossing locations.

Transit Assessment

Alternatives 2A and 2B provide opportunities for transit stop enhancements beyond the improvements identified by SacRT. The landscaping strip included with these alternatives gives space for expanding loading platforms and adding stop amenities such as benches and shade structures. Alternative 2B eliminates the landscape strip on the east side of the street to allow for a wider landscape strip on the west side of the street which can include tree planting. This modification means there would be fewer opportunities for enhanced bus stops with Alternative 2B when compared with Alternative 2A. In Alternatives 2A and 2B, the conflicts between the bus and people on bicycles would need to be handled at each stop and would follow SacRTs standard design plans.

Alternative 2C provides the same benefits as Alternative 2A, but because the bike path starts at sidewalk level, it would be easier to address the conflicts between those riding bicycles and those boarding transit. Additionally, the wider landscaping strips would allow for greater space at transit stops for amenities.

Community Priority Alignment

In addition to the safety benefits described above, Alternative 2 includes the addition of three new marked and signalized pedestrian crosswalks and signalizes pedestrian crossings at the freeway ramps. Alternative 2 also provides a low stress environment for people walking, biking, and accessing transit along most of the corridor by reducing traffic speeds and separating travel modes with physical buffers. The only gap in the low stress environment is across the freeway interchange.

Alternative 3

Description

Alternative 3 proposes installing a Class I shared use path along Norwood Avenue by reallocating space from one of the vehicle travel lanes in each direction. The proposed cross section for Alternative 3 is shown in Figure 19. Figure 20 shows a representative map view of Norwood Avenue and where improvements would be applied for Alternative 3. The elements in this alternative include:

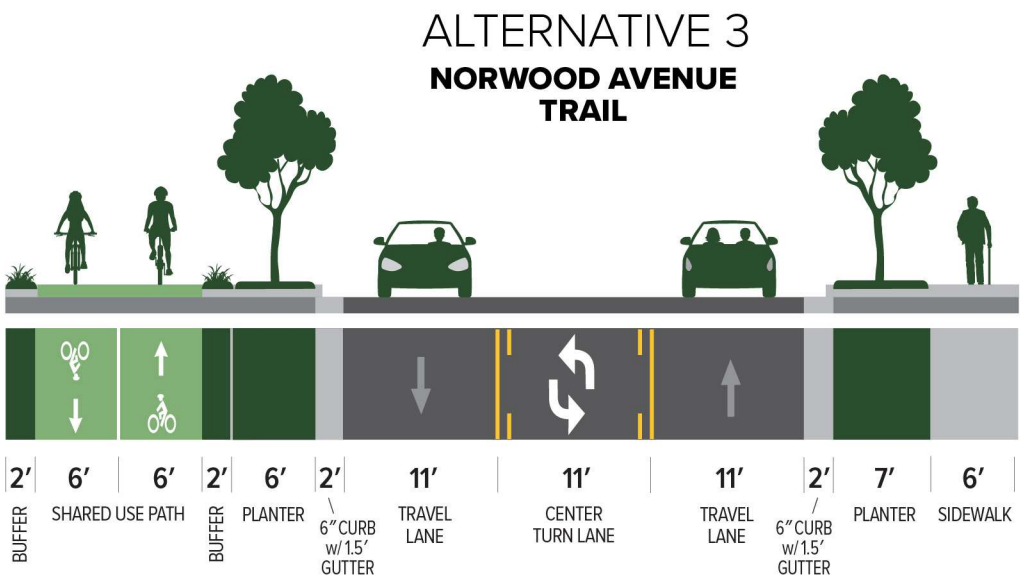

Figure 19: Alternative 3 Cross-Section

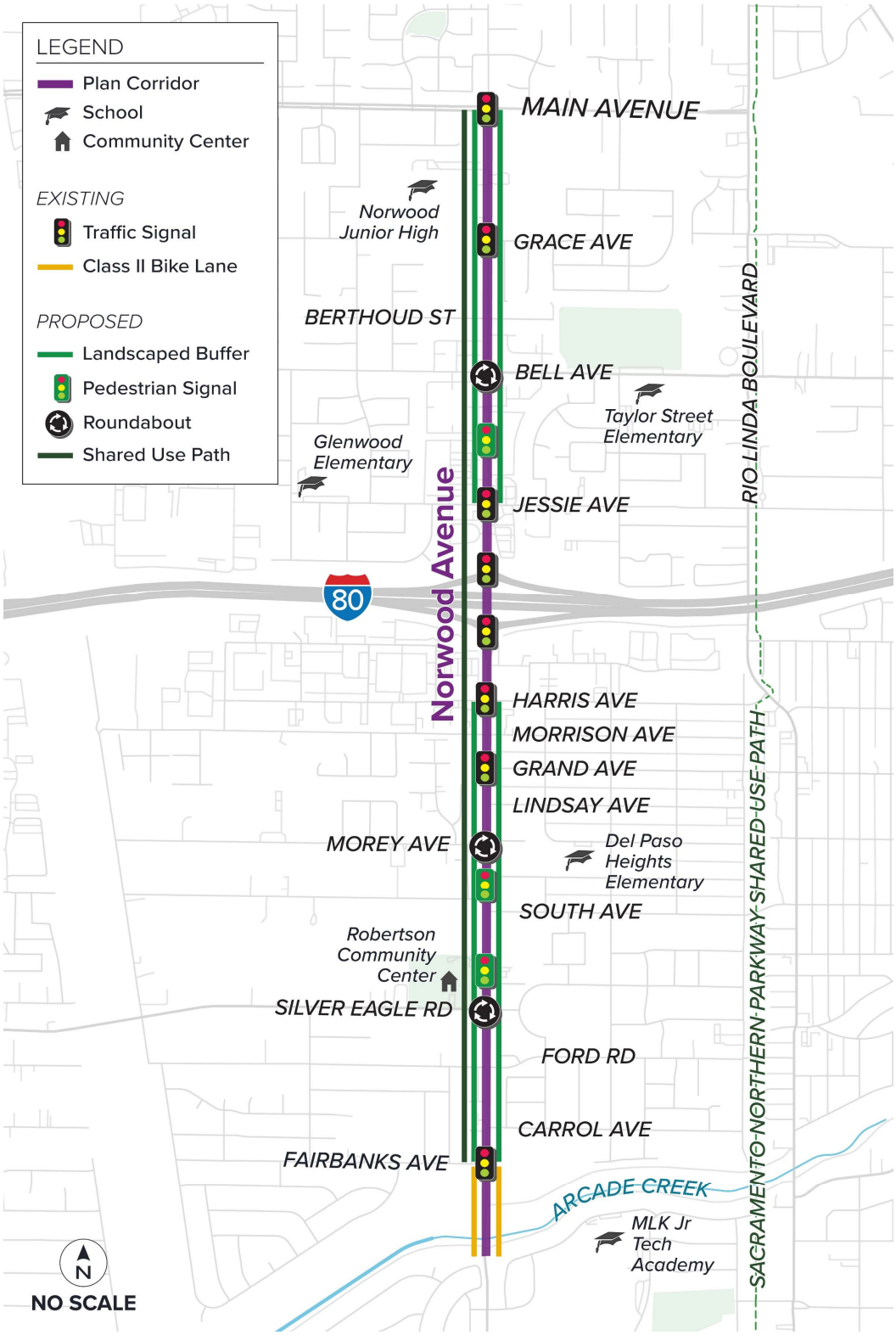

Figure 20: Alternative 3 Plan View of Proposed Improvements

Reallocate Street Space from Driving to Walking and Bicycling: Fairbanks Avenue to Harris Avenue and from Jessie Avenue to Grace Avenue

In order to create space for walking and bicycling improvements along the majority of the corridor, the number of vehicle travel lanes would be reduced from two per direction with a center running two way left turn lane to one per direction with a center running two way left turn lane. Sections south of Fairbanks Avenue and north of Grace Avenue would maintain their current cross-sections. The section from Harris Avenue to Jessie Avenue would be maintained as two lanes per direction to provide capacity for higher car and truck volumes and demands at the I-80 Interchange.

Install Roundabouts at Silver Eagle Road, Morey Avenue, and Bell Avenue

A single lane roundabout at Silver Eagle Road and Morey Avenue would slow traffic in the vicinity of the Robertson Community Center and two nearby parks.

A single lane roundabout at Morey Avenue would also provide better pathing for people wanting to cross the street at Morey Avenue, which is currently an offset intersection with a marked crossing in the middle of the intersection.

A single lane roundabout at Bell Avenue would slow southbound vehicles as they approach the higher residential density and commercial portion of the corridor. It would also reduce conflict points at a high crash frequency location.

All three roundabout locations have undergone a preliminary review for right-of-way requirements to install a single lane roundabout and it was found that a roundabout could be installed at each location without impacting existing structures or causing a loss of use for adjacent developed properties.

Install Shared Use Path

Removing an existing vehicle travel lane in each direction would provide sufficient space to add a shared use path to the western side of the corridor. This would be at sidewalk level and be separated from vehicle traffic by a planted buffer. Street and driveway crossings of the path would have conflict zone striping to alert people driving and people using the path of the crossing conflict. North of Grace Avenue, this design should be coordinated with developers so right-of-way can be preserved for this future improvement. The shared use path should end at Fairbanks Avenue with wayfinding directing people on bicycles to the Sacramento Northern Parkway shared use path.

Install Shared Use Path over I-80

There is insufficient width on the existing Norwood Avenue overcrossing structure over I-80 to provide a lower stress crossing of the freeway. To create a lower stress method to connect people walking, rolling, and biking over I-80, a separated facility using either a cantilevered structure attached to the overpass or an independent structure would need to

be constructed between Jessie Avenue and Harris Avenue on the west side of Norwood Avenue. This would require significant design work and right-of-way acquisition beyond the scope of the current study so a specific alignment is not included. The goal should be to place this new facility on the west side of the street to align with the proposed shared use path. An alternative option to a fully separated structure could be a cantilevered path off of the existing bridge structure. This would be a lower cost option but may not be structurally feasible. Both options should be reviewed during the design process should Alternative 3 be selected as the preferred alternative.

Widen Sidewalks and Add Landscape Buffer

Similar to other alternatives, Alternative 3 includes wider sidewalks and a landscape buffer. Sidewalks would be widened to greater than five feet in width along the full corridor. The specific width of the landscaped buffer would vary throughout the corridor based on available right-of-way. Generally, the landscaped buffer would be at least eight feet (six feet dedicated landscaping plus two feet shoulder of shared use path) on the west side of the street and seven feet on the east side of the street. This would allow for larger shade trees to be planted on the west side of the street and small to medium sized trees to be planted on the east side of the street.

Install Sidewalk Scale Lighting

Sidewalk scale lighting along the entire length of the corridor would ensure the area where people are walking is illuminated and increase comfort and feelings of security and safety.

Relocate Utilities

The installation of a landscape buffer and wider sidewalks would allow for an opportunity to relocate utility poles either outside of the walkway or underground to provide appropriate sidewalk widths. This would require collaboration with and support from utility providers.

Install In-Lane Bus Stops

The sidewalk would be extended to allow for the bus to load passengers directly from the vehicle travel lane, with the shared use path continuing behind the bus stop. By allowing buses to stop in-lane, transit time reliability is improved by not requiring the bus to seek gaps in traffic to re-enter the travel lane. This is recommended as the default treatment for all bus stops along the corridor, but design specifics would have to be determined in coordination with SacRT , such as those requiring space for a bus to dwell for schedule adherence.

Feasibility Analysis

Travel Demand Forecasting

For the purposes of travel demand forecasting, Alternative 3 is effectively the same as Alternative 2 and thus the results in this section match those reported under Alternative 2. Based on the SacSim-19 travel demand model as modified for the City of Sacramento 2040 General Plan Update, future volumes on Norwood Avenue range between 17,000 and 37,000 AADT for Alternative 3. The highest volumes are on the segment between Jessie Avenue and Harris Avenue. These volumes drop to the 21,000-25,000 AADT range between Jessie Avenue and Bell Avenue and between Harris Avenue and Grand Avenue. North of Bell Avenue and south of Grand Avenue, volumes drop to the 17,000-20,000 AADT range. These daily volumes are lower than Alternative 1 due to the reduction in travel lanes. A portion of the volume which were using Norwood Avenue before the reduction in travel lanes would instead use parallel streets such as Northgate Boulevard and Rio Linda Boulevard. The Travel demand model was also used to forecast future turning movement demand volumes at study intersection along the corridor. These volumes are shown in **Figure 14**.

Alternative 3 does reduce the total number of vehicle travel lanes on Norwood Avenue which could potentially cause an increase in VMT related to the infrastructure project. Based on the Transportation Analysis under CEQA for Projects on the State Highway System guidelines published by Caltrans, projects which reduce the number of through lanes and projects which add or enhance bikeways and walking facilities would not likely lead to a measurable increase in VMT. All elements which are proposed under Alternative 3 would meet the State's screening criteria guidance for VMT analysis and do not require further evaluation for VMT impacts.

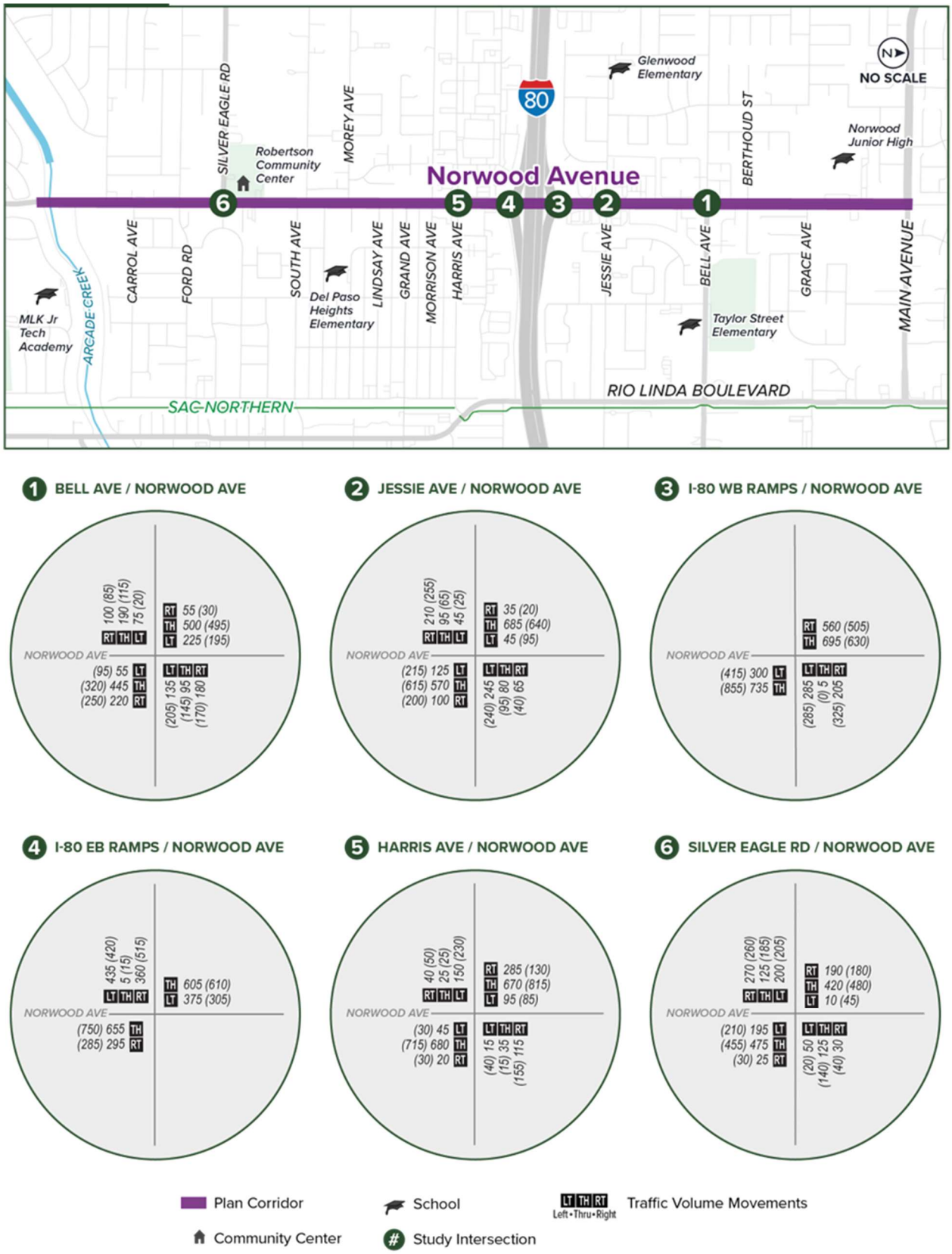

Figure 21: Future (2045) Turning Movement Volumes Alternative 3

Level of Traffic Stress Analysis

The focus of Alternative 3 is to provide significant improvements for those walking, biking, and rolling by reallocating existing right-of-way away from vehicles and towards walking and biking. This alternative adds new crossing opportunities and widens the sidewalks on Norwood Avenue. Additionally, this alternative provides a shared use path on the west side of the street to enhance safety and comfort for those walking, biking, and rolling. Table 8 and Table 9 show the evaluation of the walking and biking level of traffic stress. Figure 22 and Figure 23 show the results of this evaluation in a map form.

Table 8: Analysis of Walking Level of Traffic Stress –Alternative 3

	Main Avenue to Bell Avenue	Bell Avenue to I-80 WB Ramps	I-80 EB Ramps to Fairbanks Avenue	Fairbank Avenue to Arcade Creek
Street Width (Through Lanes per Direction)	1	1	1	1
Buffer Type	Landscaped Buffer	Landscaped Buffer	Landscaped Buffer	None
Total Buffer Width (Ft)	16 ft	16 ft	16 ft	0
Sidewalk Width (Ft)	6	6	6	6
Speed Limit Or Prevailing Speed[A] (MPH)	30	30	30	25
Existing PLTS Score[B]	4	4	4	3
Alternative 3 PLTS Score	1	1	1	2

Source: DKS Associates, 2025. ODOT Level of Traffic Stress Analysis Procedures.

A Alternative 1 recommends speed limit reductions throughout the corridor. This analysis was conducted under the assumption that existing speed limits have been reduced by 5 mph.

B Existing PLTS has variability in score for each segment as the analysis was done bi-directional. The Existing PLTS Score included in Table 4 is the highest existing score per segment for purpose of this analysis.

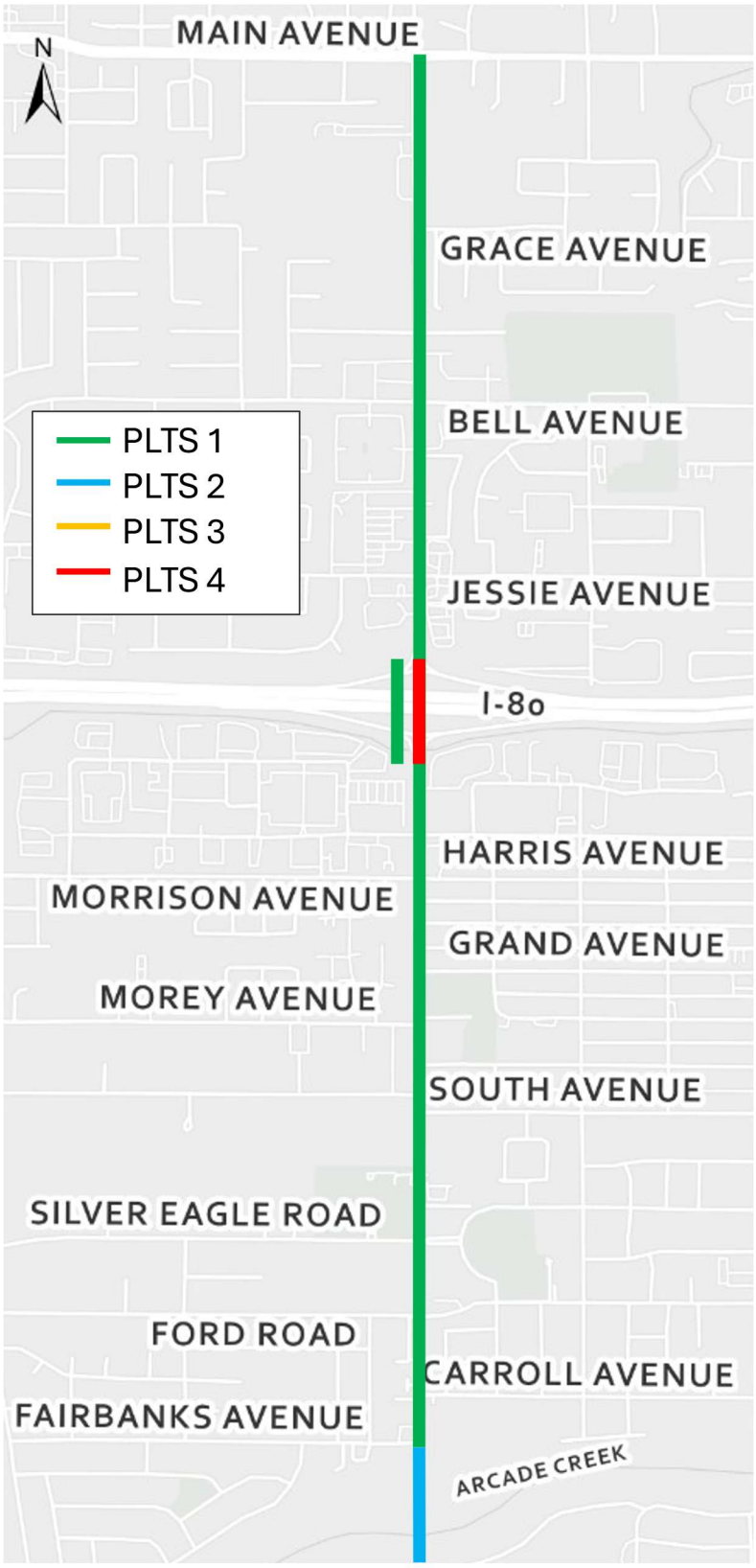

Figure 22: Walking Level of Traffic Stress – Alternative 3

Table 9. Analysis of Bicycle Level of Traffic Stress – Alternative 3

	Main Avenue to Bell Avenue	Bell Avenue to I-80 EB Ramps	I-80 EB Ramps to Fairbanks Avenue	Fairbanks Avenue to Arcade Creek
Street Width (Through Lanes per Direction)	1	1	1	1
Bike Lane Width (Inc. Bike Lane, Buffer Width, Gutter) (Ft)	16ft	16ft	16ft	5ft
Speed Limit Or Prevailing Speed[A] (MPH)	30	30	30	25
Physically Separated Bike Lane?	Yes	Yes	Yes	No
Existing BLTS Score[B]	4	4	4	3
Alternative 3 BLTS Score	1	1	1	2

Source: DKS Associates, 2025. Mineta Transportation Institute, Low Stress Bicycling and Network Connectivity.

A Alternative 1 recommends speed limit reductions throughout the corridor. This analysis was conducted under the assumption that existing speed limits have been reduced by 5 mph.

B Existing BLTS has variability in score for Segment 3 and Segment 4 as the analysis was done bi-directional. The Existing BLTS Score included in Table 7 is the highest existing score per segment for purpose of this analysis.

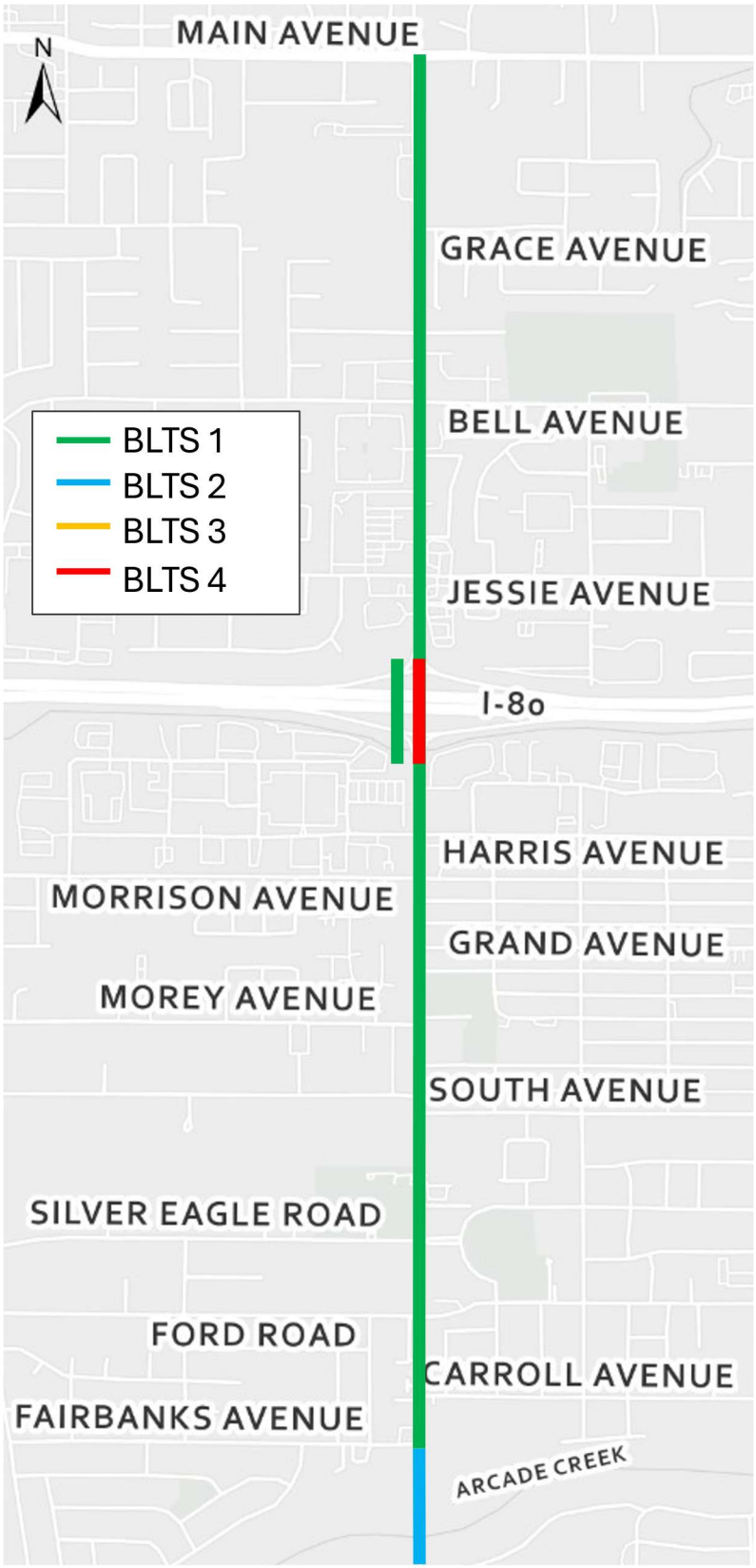

Figure 23: Bicycle Level of Traffic Stress – Alternative 3

Traffic Operations Analysis

This analysis matches the analysis done for Alternative 2 as from a traffic operations perspective, the two options are nearly identical. Where they differ is in how dedicated bicycle signal phasing would be implemented, but this analysis is beyond the capabilities of the analysis software used for this study. Additionally, more detailed analysis should be conducted on signal operations at a later project phase if Alternative 3 is selected as the preferred alternative.

The analysis for Alternative 3 includes adjustments to the number of vehicle lanes on Norwood Avenue and basic changes to intersection operational characteristics that would be associated with this lane removal. Signal timing adjustments were made in relation to the proposed improvements and to accommodate higher traffic volumes associated with future growth. All signals were assumed to operate without coordination, but signal coordination would likely improve operations from the results shown. Due to limitations in the analysis software, dedicated bicycle phases were not evaluated at the study intersections, but it is likely that there is sufficient vehicle capacity based on these results to incorporate dedicated bicycle phasing into the design at select locations. Table 10 shows a comparison of anticipated future intersection delays compared to existing operations.

95th percentile queues were also evaluated for Alternative 2. The AM and PM peak hour queues are shown in Figure 24 and Figure 25 respectively. In these figures, lines are shown on each approach to the intersection representing the queue for the left turn lane (if one exists), the through movements, and the right turn lane (if one exists). These queues are generally color coded as green if they are less than the available vehicle storage, yellow if they are at or near the available vehicle storage, and red if they exceed the available vehicle storage or block access to adjacent lanes. Note that 95th percentile queues represent the longest queue that is likely to be observed during the peak hour and most queues would be shorter.

From this analysis, the key finding is that queues are longest at the intersections which comprise the I-80 interchange. There are other locations where queues exceed their available storage along Norwood Avenue, but in most cases it is due to short formal turn pockets being blocked by through movement queues. When compared to Alternative 1, queues are shorter in Alternative 3 at Bell Avenue, Morey Avenue, and Silver Eagle Road where the roundabouts would be installed with this alternative. Queues are longer at Harris Avenue and Jessie Avenue due to the reduction in travel lanes through the intersection. At Harris Avenue, this could be an issue as northbound queues would extend back to Grand Avenue. This could be addressed by adjusting the proposed design at Harris Avenue to maintain two through lanes in the northbound direction and should be evaluated further at the project design phase if Alternative 3 is selected as the preferred Alternative.

Table 10: Future (2045) Alternative 3 Intersection Operational Analysis Results

Intersection	AM Peak Hour [A]		PM Peak Hour [A]	
	Existing	Future Alt. 3	Existing	Future Alt. 3
1. Norwood Avenue / Bell Avenue	20.6 (C)	16.2 (B)	17.6 (B)	15.4 (B)
2. Norwood Avenue / Jessie Avenue	28.2 (C)	53.1 (D)	23.8 (C)	44.6 (D)
3. Norwood Avenue / WB 80 Ramps	10.9 (B)	12.6 (B)	10.3 (B)	14.2 (B)
4. Norwood Avenue / EB 80 Ramps	12.0 (B)	14.4 (B)	12.0 (B)	14.2 (B)
5. Norwood Avenue / Harris Avenue	19.7 (B)	29.1 (C)	19.2 (B)	36.1 (D)
Norwood Avenue / Morey Avenue[B]	-	8.5 (A)	-	9.9 (A)
6. Norwood Avenue / Silver Eagle Road	18.6 (B)	13.9 (B)	18.2 (B)	18.0 (B)

Source: DKS Associates, March 2025.

Notes:

A. 20.6 (C) = Delay (LOS)

B. Not a study intersection, provided for informational purposes because of recommended control modifications

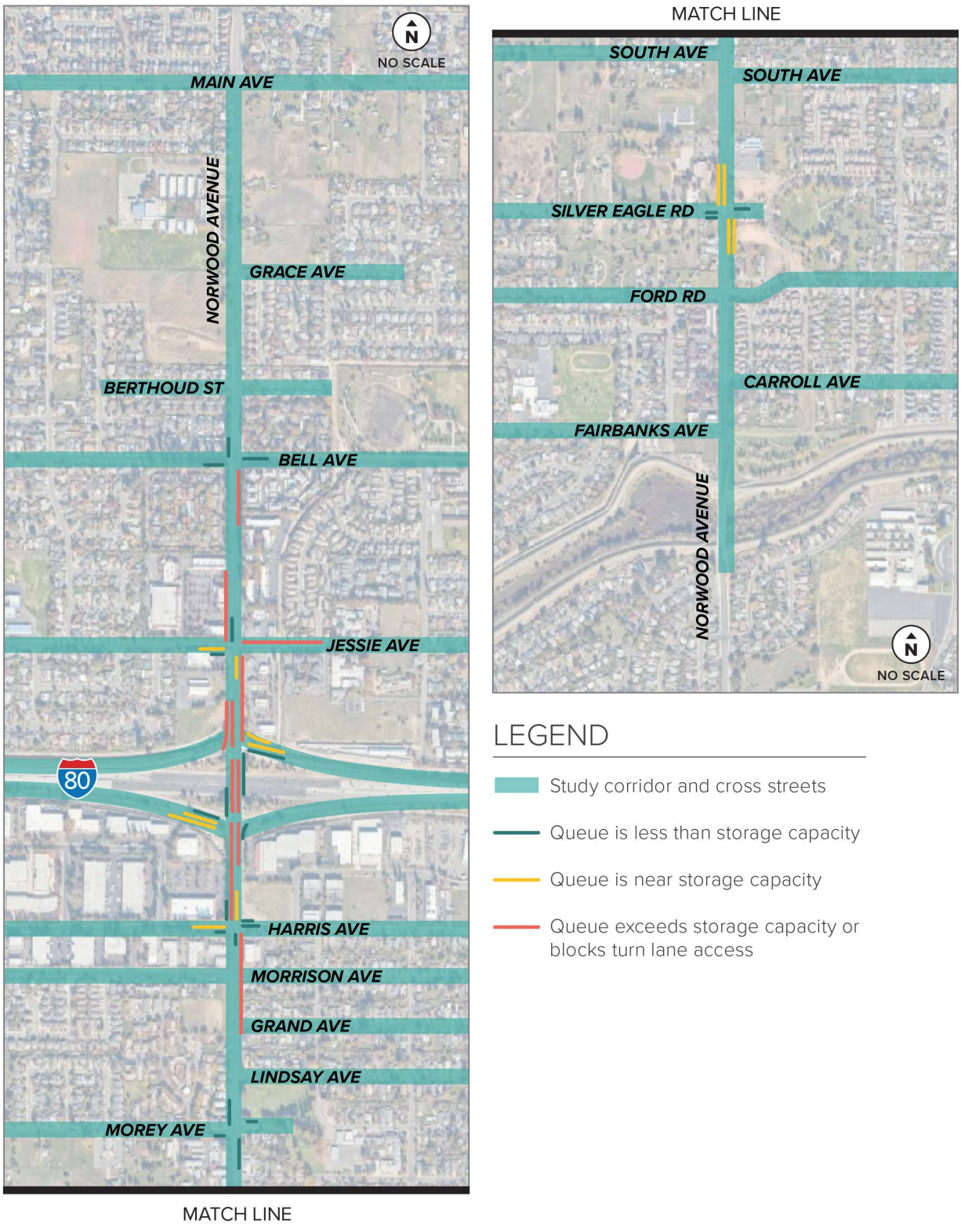

Figure 24: Future (2045) AM Peak Hour 95th Percentile Intersection Queues Alternative 3

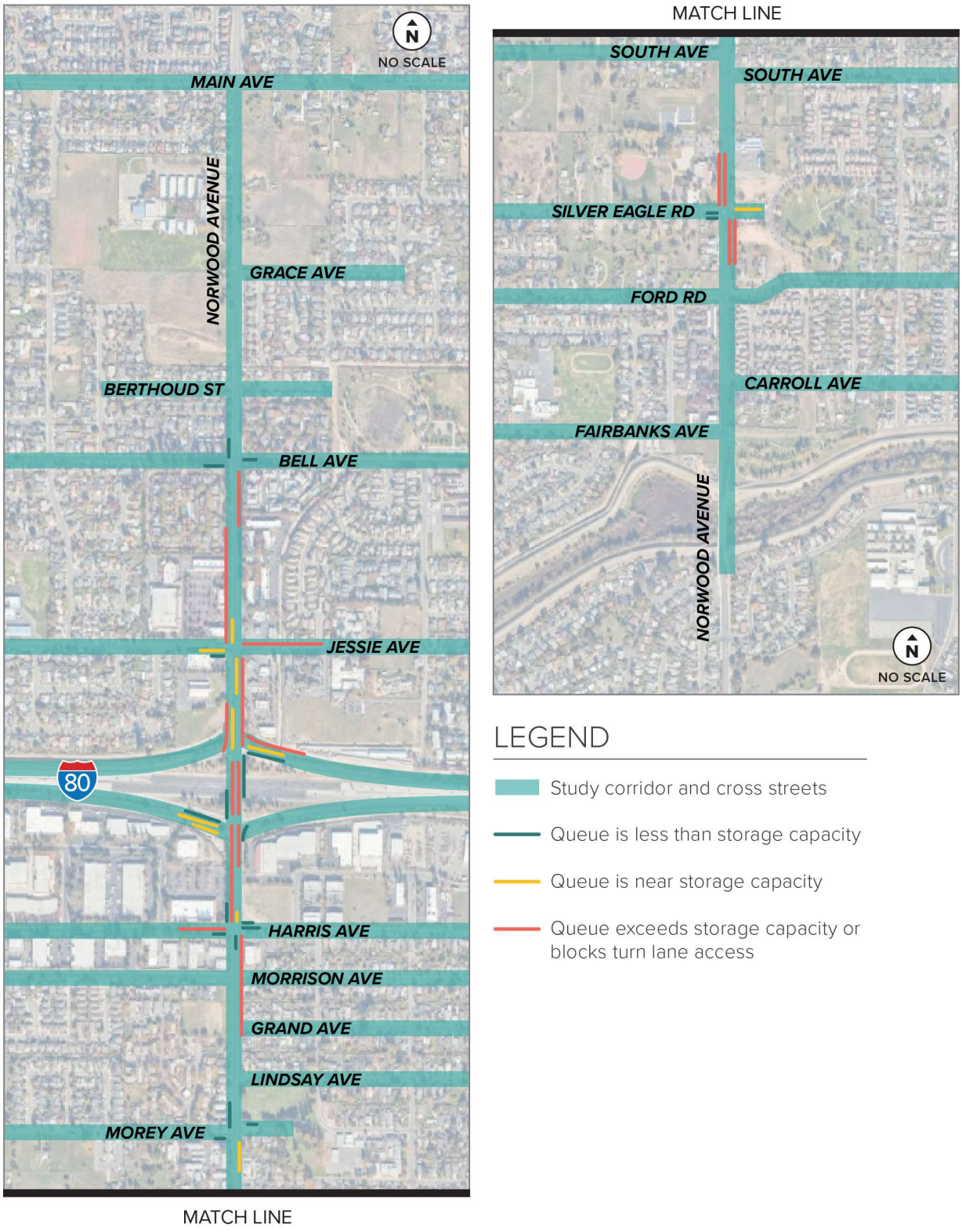

Figure 25: Future (2045) PM Peak Hour 95th Percentile Intersection Queues Alternative 3

Safety Benefit Assessment

Alternative 3 provides safety benefits through traffic calming and separation of travel modes. This alternative would reduce speeds by narrowing vehicle travel lanes, removing a vehicle travel lane per direction, adding roundabouts at Bell Avenue, Morey Avenue, and Silver Eagle Road, and by reducing the speed limit on Norwood Avenue. The roundabouts at Bell Avenue and Silver Eagle Road also address the collision trends observed at these intersections by lowering speeds and eliminating several vehicle conflicts within the intersections.

The addition of a shared use path would separate those riding bicycles from vehicle traffic, reducing the observed trend of bicycle involved collisions. Added crossing opportunities would help address the observed trend of pedestrian involved collisions along Norwood Avenue at unmarked crossing locations.

Transit Assessment

Alternative 3 would provide similar transit benefit opportunities as Alternative 2C and provide for transit stop enhancements beyond the improvements identified by SacRT. The landscaping strip included with this alternative gives space for expanding loading platforms and adding stop amenities such as benches and shade structures.

Alternative 3 provides space for people riding bikes at the sidewalk level so conflicts between transit vehicles and people riding bikes is not a concern with this alternative. The wide landscaping strip would allow for stops to be designed where those boarding transit are not in conflict with people riding bikes.

Community Priority Alignment

In addition to the safety benefits described above, Alternative 3 includes the addition of three new marked and signalized pedestrian crosswalks and signalizes pedestrian crossings at the freeway ramps. Alternative 3 also provides a low stress environment for people walking, biking, and accessing transit along the entire corridor by reducing traffic speeds and separating travel modes with physical buffers, including a separated structure across the freeway interchange.

Comparison of Alternative Analysis Results

Table 11 on the next page summarizes the findings of this report in regards to how the proposed alternatives perform on key metrics in comparison with each other. Each alternative is compared based on how it addresses mobility and safety along the corridor. Discussion with the community is still underway to better understand which alternative best aligns with local community values so no one alternative is recommended over another at this time.

Table 11: Comparison of Alternatives

Metric	No Build	Alt. 1	Alt. 2	Alt. 3
Defining Characteristics	No Change	• Additional Crossing Opportunities • Widen Sidewalk on West Side of Street	• Additional Crossing Opportunities • Separated Bikeway • Landscaped buffers • Roundabouts at Bell Ave, Morey Ave, and Silver Eagle Rd	• Additional Crossing Opportunities • Shared Use Path • Landscaped buffers • Roundabouts at Bell Ave, Morey Ave, and Silver Eagle Rd • Shared Use Path Over I-80
Average Level of Traffic Stress				
Walking		3	1	1
Biking		3	1	1
Travel Demand				
Traffic Diversion to Parallel Streets	N/A	None	~10%	~10%
Increases in VMT	N/A	None	None	None
Traffic Operations				
Intersection Delay	LOS C or Better	LOS C or Better	LOS D or Better	LOS D or Better
Extensive Queues	• Jessie Ave • I-80 WB Ramps • I-80 EB Ramps • Harris Ave • Silver Eagle Rd	• Jessie Ave • I-80 WB Ramps • I-80 EB Ramps • Harris Ave • Silver Eagle Rd	• Jessie Ave • I-80 WB Ramps • I-80 EB Ramps • Harris Ave	• Jessie Ave • I-80 WB Ramps • I-80 EB Ramps • Harris Ave

Metric	No Build	Alt. 1	Alt. 2	Alt. 3
Safety Improvements				
Added Crossing Opportunities	N/A	3	3	3
Traffic Calming Elements	N/A	• Speed Limit Reduction • Lane Width Reduction	• Speed Limit Reduction • Lane Width Reduction • Roundabout at Bell Ave • Roundabout at Morey Ave • Roundabout at Silver Eagle Rd	• Speed Limit Reduction • Lane Width Reduction • Roundabout at Bell Ave • Roundabout at Morey Ave • Roundabout at Silver Eagle Rd
Other Safety Enhancements	N/A	• Removal of On-Street Parking • Crossing Enhancements at I-80 Interchange	• Removal of On-Street Parking • Crossing Enhancements at I-80 Interchange • Separated Bikeways • Landscaped Buffers • Pedestrian Scale Lighting	• Removal of On-Street Parking • Crossing Enhancements at I-80 Interchange • Separated Bikeways • Landscaped Buffers • Pedestrian Scale Lighting
Transit Enhancements	N/A	• Added Bus Shelters • Wider Sidewalks Increase Waiting Area	• Added Bus Shelters • Wider Sidewalks Increase Waiting Area • In Lane Bus Stops	• Added Bus Shelters • Wider Sidewalks Increase Waiting Area • In Lane Bus Stops

Appendix

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Section 1. Synchro Intersection Analysis Results

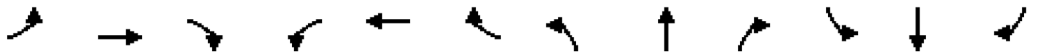
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	150	155	220	90	155	70	515	250	145	635	45
Future Volume (veh/h)	60	150	155	220	90	155	70	515	250	145	635	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1841	1841	1841	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	60	150	155	220	90	155	70	515	250	145	635	45
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	4	4	4	3	3	3	3	3	3
Cap, veh/h	450	203	210	272	253	209	188	740	320	262	853	60
Arrive On Green	0.25	0.24	0.24	0.16	0.14	0.14	0.11	0.21	0.21	0.15	0.26	0.26
Sat Flow, veh/h	1795	831	859	1753	1841	1520	1767	3526	1525	1767	3331	236
Grp Volume(v), veh/h	60	0	305	220	90	155	70	515	250	145	336	344
Grp Sat Flow(s),veh/h/ln	1795	0	1690	1753	1841	1520	1767	1763	1525	1767	1763	1804
Q Serve(g_s), s	1.8	0.0	11.6	8.5	3.1	5.1	2.6	9.4	5.6	5.3	12.2	12.3
Cycle Q Clear(g_c), s	1.8	0.0	11.6	8.5	3.1	5.1	2.6	9.4	5.6	5.3	12.2	12.3
Prop In Lane	1.00		0.51	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	450	0	413	272	253	209	188	740	320	262	451	462
V/C Ratio(X)	0.13	0.00	0.74	0.81	0.36	0.74	0.37	0.70	0.78	0.55	0.74	0.75
Avail Cap(c_a), veh/h	674	0	1099	658	1197	988	668	2293	992	661	1147	1174
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.3	0.0	24.3	28.5	27.3	15.8	29.0	25.5	6.9	27.6	23.9	23.9
Incr Delay (d2), s/veh	0.0	0.0	1.0	2.2	0.3	1.9	0.5	0.4	1.6	0.7	0.9	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	4.6	3.4	1.3	2.3	1.0	3.7	3.4	2.2	4.9	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	20.3	0.0	25.3	30.6	27.6	17.8	29.5	26.0	8.5	28.3	24.8	24.8
LnGrp LOS	C		C	C	C	B	C	C	A	C	C	C
Approach Vol, veh/h		365			465			835			825	
Approach Delay, s/veh		24.5			25.8			21.0			25.4	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.1	14.2	11.0	22.5	14.6	21.7	14.2	19.3
Change Period (Y+Rc), s	* 4.6	* 4.6	3.6	* 4.6	3.8	* 4.6	3.9	* 4.6
Max Green Setting (Gmax), s	* 26	* 45	26.4	* 45	26.2	* 45	26.1	* 45
Max Q Clear Time (g_c+I1), s	3.8	7.1	4.6	14.3	10.5	13.6	7.3	11.4
Green Ext Time (p_c), s	0.1	0.5	0.1	2.9	0.3	1.4	0.2	2.6

Intersection Summary	
HCM 7th Control Delay, s/veh	23.9
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



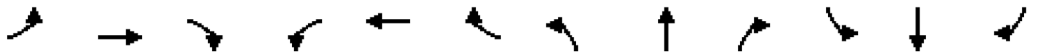
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	95	215	195	70	55	140	710	105	55	935	45
Future Volume (veh/h)	50	95	215	195	70	55	140	710	105	55	935	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	50	95	215	195	70	55	140	710	105	55	935	45
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	3	3	3	3	3	3	3	3	3
Cap, veh/h	104	198	261	245	88	69	179	1078	159	136	1119	54
Arrive On Green	0.16	0.16	0.16	0.23	0.23	0.23	0.10	0.35	0.35	0.08	0.33	0.33
Sat Flow, veh/h	634	1205	1585	1059	380	299	1767	3067	453	1767	3423	165
Grp Volume(v), veh/h	145	0	215	320	0	0	140	408	407	55	481	499
Grp Sat Flow(s),veh/h/ln	1839	0	1585	1738	0	0	1767	1763	1757	1767	1763	1825
Q Serve(g_s), s	6.1	0.0	11.2	14.9	0.0	0.0	6.6	16.7	16.8	2.5	21.7	21.7
Cycle Q Clear(g_c), s	6.1	0.0	11.2	14.9	0.0	0.0	6.6	16.7	16.8	2.5	21.7	21.7
Prop In Lane	0.34		1.00	0.61		0.17	1.00		0.26	1.00		0.09
Lane Grp Cap(c), veh/h	303	0	261	401	0	0	179	619	617	136	576	596
V/C Ratio(X)	0.48	0.00	0.82	0.80	0.00	0.00	0.78	0.66	0.66	0.41	0.84	0.84
Avail Cap(c_a), veh/h	784	0	676	741	0	0	547	935	932	547	935	968
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.4	0.0	34.6	31.0	0.0	0.0	37.6	23.4	23.4	37.7	26.7	26.7
Incr Delay (d2), s/veh	0.4	0.0	2.5	1.4	0.0	0.0	2.8	0.4	0.5	0.7	1.7	1.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	4.3	6.2	0.0	0.0	2.9	6.5	6.5	1.1	9.0	9.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.9	0.0	37.1	32.4	0.0	0.0	40.4	23.9	23.9	38.4	28.4	28.3
LnGrp LOS	C		D	C			D	C	C	D	C	C
Approach Vol, veh/h		360			320			955			1035	
Approach Delay, s/veh		35.4			32.4			26.3			28.9	
Approach LOS		D			C			C			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		23.3	12.2	32.6		17.6	10.1	34.7				
Change Period (Y+Rc), s		3.5	3.5	* 4.6		3.5	3.5	* 4.6				
Max Green Setting (Gmax), s		36.5	26.5	* 45		36.5	26.5	* 45				
Max Q Clear Time (g_c+I1), s		16.9	8.6	23.7		13.2	4.5	18.8				
Green Ext Time (p_c), s		1.2	0.2	4.3		0.9	0.1	3.2				

Intersection Summary	
HCM 7th Control Delay, s/veh	29.3
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	350	5	240	315	845	0	0	855	560
Future Volume (veh/h)	0	0	0	350	5	240	315	845	0	0	855	560
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1841	1841	1841	1841	1841	0	0	1870	1870
Adj Flow Rate, veh/h				354	0	0	315	845	0	0	855	0
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				4	4	4	4	4	0	0	2	2
Cap, veh/h				586	0		388	2274	0	0	1266	
Arrive On Green				0.17	0.00	0.00	0.22	0.65	0.00	0.00	0.36	0.00
Sat Flow, veh/h				3506	0	1560	1753	3589	0	0	3647	1585
Grp Volume(v), veh/h				354	0	0	315	845	0	0	855	0
Grp Sat Flow(s),veh/h/ln				1753	0	1560	1753	1749	0	0	1777	1585
Q Serve(g_s), s				4.5	0.0	0.0	8.2	5.4	0.0	0.0	9.8	0.0
Cycle Q Clear(g_c), s				4.5	0.0	0.0	8.2	5.4	0.0	0.0	9.8	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				586	0		388	2274	0	0	1266	
V/C Ratio(X)				0.60	0.00		0.81	0.37	0.00	0.00	0.68	
Avail Cap(c_a), veh/h				2621	0		965	2556	0	0	2598	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				18.6	0.0	0.0	17.8	3.9	0.0	0.0	13.1	0.0
Incr Delay (d2), s/veh				0.4	0.0	0.0	3.1	0.1	0.0	0.0	0.5	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.7	0.0	0.0	3.1	0.8	0.0	0.0	3.3	0.0
Unsig. Movement Delay, s/veh						26.60						22.40
LnGrp Delay(d), s/veh				19.0	0.0	26.6	20.9	4.0	0.0	0.0	13.6	22.4
LnGrp LOS				B		C	C	A			B	C
Approach Vol, veh/h					474			1160			1135	
Approach Delay, s/veh					20.9			8.6			15.8	
Approach LOS					C			A			B	

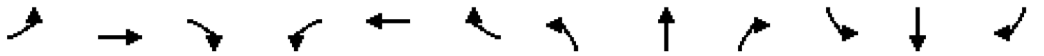
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	14.1	22.0		12.0		36.1						
Change Period (Y+Rc), s	3.5	4.8		4.0		4.8						
Max Green Setting (Gmax), s	26.5	35.2		36.0		35.2						
Max Q Clear Time (g_c+I1), s	10.2	11.8		6.5		7.4						
Green Ext Time (p_c), s	0.6	5.3		0.7		5.0						

Intersection Summary		
HCM 7th Control Delay, s/veh	13.6	
HCM 7th LOS	B	

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is included in calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	380	5	510	0	0	0	0	780	300	385	820	0
Future Volume (veh/h)	380	5	510	0	0	0	0	780	300	385	820	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826				0	1841	1841	1841	1841	0
Adj Flow Rate, veh/h	384	0	0				0	780	0	385	820	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	5	5				0	4	4	4	4	0
Cap, veh/h	619	0					0	1117		458	2271	0
Arrive On Green	0.18	0.00	0.00				0.00	0.32	0.00	0.26	0.65	0.00
Sat Flow, veh/h	3478	0	1547				0	3589	1560	1753	3589	0
Grp Volume(v), veh/h	384	0	0				0	780	0	385	820	0
Grp Sat Flow(s),veh/h/ln	1739	0	1547				0	1749	1560	1753	1749	0
Q Serve(g_s), s	5.2	0.0	0.0				0.0	10.0	0.0	10.6	5.5	0.0
Cycle Q Clear(g_c), s	5.2	0.0	0.0				0.0	10.0	0.0	10.6	5.5	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	619	0					0	1117		458	2271	0
V/C Ratio(X)	0.62	0.00					0.00	0.70		0.84	0.36	0.00
Avail Cap(c_a), veh/h	2457	0					0	2416		912	2416	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.3	0.0	0.0				0.0	15.2	0.0	17.8	4.1	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0				0.0	0.6	0.0	3.2	0.1	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.0				0.0	3.3	0.0	4.1	1.1	0.0
Unsig. Movement Delay, s/veh			44.50									
LnGrp Delay(d), s/veh	19.7	0.0	44.5				0.0	15.8	0.0	21.0	4.2	0.0
LnGrp LOS	B		D					B		C	A	
Approach Vol, veh/h		639						780			1205	
Approach Delay, s/veh		29.6						15.8			9.6	
Approach LOS		C						B			A	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		37.9			16.8	21.1		13.1				
Change Period (Y+Rc), s		4.8			3.5	4.8		4.0				
Max Green Setting (Gmax), s		35.2			26.5	35.2		36.0				
Max Q Clear Time (g_c+I1), s		7.5			12.6	12.0		7.2				
Green Ext Time (p_c), s		5.3			0.8	4.3		0.7				

Intersection Summary	
HCM 7th Control Delay, s/veh	16.3
HCM 7th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [EBR] is included in calculations of the approach delay and intersection delay.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	155	15	50	15	30	100	45	840	15	60	985	310
Future Volume (veh/h)	155	15	50	15	30	100	45	840	15	60	985	310
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1707	1707	1826	1826	1826	1870	1870	1870	1841	1841	1841
Adj Flow Rate, veh/h	155	15	50	15	30	100	45	840	15	60	985	310
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	13	13	13	5	5	5	2	2	2	4	4	4
Cap, veh/h	215	21	321	83	166	212	144	1522	27	150	1122	351
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.08	0.43	0.43	0.09	0.43	0.43
Sat Flow, veh/h	1489	144	1413	599	1197	1526	1781	3570	64	1753	2606	815
Grp Volume(v), veh/h	170	0	50	45	0	100	45	418	437	60	659	636
Grp Sat Flow(s),veh/h/ln	1633	0	1413	1796	0	1526	1781	1777	1857	1753	1749	1672
Q Serve(g_s), s	7.5	0.0	2.1	1.7	0.0	4.6	1.8	13.3	13.3	2.4	26.0	26.4
Cycle Q Clear(g_c), s	7.5	0.0	2.1	1.7	0.0	4.6	1.8	13.3	13.3	2.4	26.0	26.4
Prop In Lane	0.91		1.00	0.33		1.00	1.00		0.03	1.00		0.49
Lane Grp Cap(c), veh/h	236	0	321	249	0	212	144	757	792	150	753	720
V/C Ratio(X)	0.72	0.00	0.16	0.18	0.00	0.47	0.31	0.55	0.55	0.40	0.87	0.88
Avail Cap(c_a), veh/h	787	0	798	861	0	732	861	833	871	847	820	784
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.8	0.0	23.5	28.7	0.0	30.0	32.7	16.3	16.3	32.7	19.6	19.8
Incr Delay (d2), s/veh	1.6	0.0	0.1	0.1	0.0	0.6	0.5	0.5	0.5	0.6	9.6	10.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.7	0.7	0.0	1.6	0.8	4.8	5.1	1.0	11.6	11.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.4	0.0	23.6	28.9	0.0	30.6	33.2	16.7	16.7	33.3	29.2	30.5
LnGrp LOS	C		C	C		C	C	B	B	C	C	C
Approach Vol, veh/h		220			145			900			1355	
Approach Delay, s/veh		30.4			30.0			17.5			30.0	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	14.3	9.6	37.1	14.5	9.9	36.8
Change Period (Y+Rc), s	3.8	3.5	* 4.6	3.6	3.5	* 4.6
Max Green Setting (Gmax), s	36.2	36.5	* 35	36.4	36.5	* 35
Max Q Clear Time (g_c+I1), s	6.6	3.8	28.4	9.5	4.4	15.3
Green Ext Time (p_c), s	0.3	0.0	4.1	0.7	0.1	4.0

Intersection Summary	
HCM 7th Control Delay, s/veh	25.8
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	110	195	45	115	45	135	600	20	25	665	190
Future Volume (veh/h)	260	110	195	45	115	45	135	600	20	25	665	190
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1856	1856	1856	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	260	110	195	45	115	45	135	600	20	25	665	190
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	5	5	3	3	3	2	2	2	3	3	3
Cap, veh/h	310	142	251	150	189	74	222	1358	45	89	840	240
Arrive On Green	0.18	0.24	0.24	0.09	0.15	0.15	0.12	0.39	0.39	0.05	0.31	0.31
Sat Flow, veh/h	1739	584	1035	1767	1261	493	1781	3509	117	1767	2688	767
Grp Volume(v), veh/h	260	0	305	45	0	160	135	304	316	25	436	419
Grp Sat Flow(s),veh/h/ln	1739	0	1619	1767	0	1754	1781	1777	1849	1767	1763	1692
Q Serve(g_s), s	9.5	0.0	11.6	1.6	0.0	5.6	4.7	8.3	8.3	0.9	14.9	14.9
Cycle Q Clear(g_c), s	9.5	0.0	11.6	1.6	0.0	5.6	4.7	8.3	8.3	0.9	14.9	14.9
Prop In Lane	1.00		0.64	1.00		0.28	1.00		0.06	1.00		0.45
Lane Grp Cap(c), veh/h	310	0	393	150	0	262	222	688	716	89	551	529
V/C Ratio(X)	0.84	0.00	0.78	0.30	0.00	0.61	0.61	0.44	0.44	0.28	0.79	0.79
Avail Cap(c_a), veh/h	698	0	641	710	0	705	715	953	992	710	946	908
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.2	0.0	23.3	28.3	0.0	26.3	27.3	14.9	14.9	30.2	20.7	20.7
Incr Delay (d2), s/veh	2.3	0.0	1.3	0.4	0.0	0.9	1.0	0.2	0.2	0.6	1.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	4.3	0.7	0.0	2.3	1.9	2.9	3.0	0.4	5.8	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	28.5	0.0	24.6	28.7	0.0	27.1	28.3	15.1	15.1	30.8	21.7	21.8
LnGrp LOS	C		C	C		C	C	B	B	C	C	C
Approach Vol, veh/h		565			205			755			880	
Approach Delay, s/veh		26.4			27.5			17.5			22.0	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.3	13.8	11.7	25.2	9.1	19.9	6.8	30.1
Change Period (Y+Rc), s	3.5	* 3.9	3.5	* 4.6	3.5	3.9	3.5	* 4.6
Max Green Setting (Gmax), s	26.5	* 27	26.5	* 35	26.5	26.1	26.5	* 35
Max Q Clear Time (g_c+I1), s	11.5	7.6	6.7	16.9	3.6	13.6	2.9	10.3
Green Ext Time (p_c), s	0.3	0.5	0.1	3.6	0.0	1.0	0.0	2.2

Intersection Summary	
HCM 7th Control Delay, s/veh	22.1
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	1	45	5	1	5	23	881	1	1	1004	45
Future Volume (veh/h)	90	1	45	5	1	5	23	881	1	1	1004	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	98	1	49	5	1	5	25	958	1	1	1091	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	1	68	11	2	11	52	1825	2	4	1638	74
Arrive On Green	0.12	0.12	0.12	0.01	0.01	0.01	0.03	0.50	0.50	0.00	0.47	0.47
Sat Flow, veh/h	1133	12	567	770	154	770	1781	3643	4	1781	3464	156
Grp Volume(v), veh/h	148	0	0	11	0	0	25	467	492	1	560	580
Grp Sat Flow(s),veh/h/ln	1712	0	0	1693	0	0	1781	1777	1870	1781	1777	1842
Q Serve(g_s), s	4.1	0.0	0.0	0.3	0.0	0.0	0.7	8.8	8.8	0.0	12.0	12.0
Cycle Q Clear(g_c), s	4.1	0.0	0.0	0.3	0.0	0.0	0.7	8.8	8.8	0.0	12.0	12.0
Prop In Lane	0.66		0.33	0.45		0.45	1.00		0.00	1.00		0.08
Lane Grp Cap(c), veh/h	206	0	0	24	0	0	52	890	936	4	840	871
V/C Ratio(X)	0.72	0.00	0.00	0.46	0.00	0.00	0.48	0.53	0.53	0.28	0.67	0.67
Avail Cap(c_a), veh/h	867	0	0	854	0	0	183	1681	1769	180	1678	1740
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.0	0.0	0.0	24.2	0.0	0.0	23.7	8.4	8.4	24.7	10.1	10.1
Incr Delay (d2), s/veh	4.6	0.0	0.0	13.0	0.0	0.0	6.6	0.5	0.5	37.4	0.9	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.0	0.2	0.0	0.0	0.4	2.4	2.5	0.0	3.8	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	25.6	0.0	0.0	37.2	0.0	0.0	30.3	8.9	8.8	62.1	11.0	10.9
LnGrp LOS	C			D			C	A	A	E	B	B
Approach Vol, veh/h		148			11			984			1141	
Approach Delay, s/veh		25.6			37.2			9.4			11.0	
Approach LOS		C			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	29.3		10.5	6.0	27.9		5.2				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	46.9		25.1	5.1	46.8		25.0				
Max Q Clear Time (g_c+I1), s	2.0	10.8		6.1	2.7	14.0		2.3				
Green Ext Time (p_c), s	0.0	6.7		0.7	0.0	9.4		0.0				

Intersection Summary		
HCM 7th Control Delay, s/veh		11.4
HCM 7th LOS		B

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	60	305	220	90	155	70	515	250	145	680
v/c Ratio	0.12	0.73	0.65	0.26	0.38	0.33	0.64	0.46	0.54	0.63
Control Delay (s/veh)	27.7	42.7	48.4	45.0	10.3	50.6	39.0	7.8	49.6	34.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	27.7	42.7	48.4	45.0	10.3	50.6	39.0	7.8	49.6	34.0
Queue Length 50th (ft)	24	147	118	50	0	38	141	0	80	186
Queue Length 95th (ft)	73	309	261	120	60	106	267	69	184	331
Internal Link Dist (ft)		878		976			1238			453
Turn Bay Length (ft)	150		195		200	75		200	95	
Base Capacity (vph)	610	880	510	931	849	519	1787	896	513	1767
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.35	0.43	0.10	0.18	0.13	0.29	0.28	0.28	0.38

Intersection Summary

Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	145	215	320	140	815	55	980
v/c Ratio	0.60	0.54	0.79	0.63	0.54	0.35	0.75
Control Delay (s/veh)	60.2	12.0	57.2	63.7	27.2	62.0	37.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	60.2	12.0	57.2	63.7	27.2	62.0	37.5
Queue Length 50th (ft)	103	0	220	100	225	39	316
Queue Length 95th (ft)	196	73	381	195	388	95	#550
Internal Link Dist (ft)	758		547		632		1238
Turn Bay Length (ft)		100		100		120	
Base Capacity (vph)	610	671	581	423	1534	423	1442
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.32	0.55	0.33	0.53	0.13	0.68

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	178	177	240	315	845	855	560
v/c Ratio	0.56	0.56	0.56	0.72	0.36	0.63	0.76
Control Delay (s/veh)	37.5	37.3	16.4	38.2	5.8	22.8	20.6
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay (s/veh)	37.5	37.3	16.4	38.2	5.9	22.8	20.6
Queue Length 50th (ft)	86	85	32	143	70	167	126
Queue Length 95th (ft)	167	166	108	274	146	307	#356
Internal Link Dist (ft)		874			446	632	
Turn Bay Length (ft)			50	175			75
Base Capacity (vph)	834	837	856	646	2929	1750	883
Starvation Cap Reductn	0	0	0	0	700	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.21	0.28	0.49	0.38	0.49	0.63

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	194	191	510	780	300	385	820
v/c Ratio	0.40	0.39	0.89	0.76	0.45	0.84	0.39
Control Delay (s/veh)	29.8	29.6	40.1	35.9	5.7	53.2	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	29.8	29.6	40.1	35.9	5.7	53.2	11.1
Queue Length 50th (ft)	101	98	210	238	0	234	137
Queue Length 95th (ft)	177	174	#420	323	61	#448	194
Internal Link Dist (ft)		679		657			446
Turn Bay Length (ft)			50		220	180	
Base Capacity (vph)	662	665	718	1376	782	518	2502
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.29	0.71	0.57	0.38	0.74	0.33

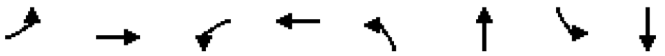
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	170	50	45	100	45	855	60	1295
v/c Ratio	0.61	0.11	0.19	0.35	0.21	0.56	0.31	0.90
Control Delay (s/veh)	42.5	6.4	38.3	12.2	39.7	21.3	42.3	34.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	42.5	6.4	38.3	12.2	39.7	21.3	42.3	34.6
Queue Length 50th (ft)	87	0	22	0	22	176	30	332
Queue Length 95th (ft)	150	23	60	47	60	298	74	#592
Internal Link Dist (ft)	655		515			251		657
Turn Bay Length (ft)		140			85		110	
Base Capacity (vph)	703	891	774	717	776	1526	761	1432
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.06	0.06	0.14	0.06	0.56	0.08	0.90

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

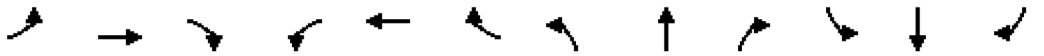


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	260	305	45	160	135	620	25	855
v/c Ratio	0.73	0.54	0.22	0.56	0.55	0.39	0.14	0.78
Control Delay (s/veh)	48.6	27.2	47.0	43.2	49.4	19.7	47.6	34.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	48.6	27.2	47.0	43.2	49.4	19.7	47.6	34.1
Queue Length 50th (ft)	138	128	24	79	73	102	13	214
Queue Length 95th (ft)	280	243	72	168	162	243	48	398
Internal Link Dist (ft)		710		228		480		903
Turn Bay Length (ft)	110				95		55	
Base Capacity (vph)	526	585	537	548	542	1646	537	1395
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.52	0.08	0.29	0.25	0.38	0.05	0.61

Intersection Summary

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	148	11	25	959	1	1140
v/c Ratio	0.44	0.06	0.16	0.45	0.01	0.56
Control Delay (s/veh)	26.5	27.4	35.9	8.8	36.0	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	26.5	27.4	35.9	8.8	36.0	11.3
Queue Length 50th (ft)	33	2	7	67	0	86
Queue Length 95th (ft)	129	21	41	254	6	322
Internal Link Dist (ft)	329	438		256		304
Turn Bay Length (ft)			100		50	
Base Capacity (vph)	776	760	159	2938	156	2916
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.01	0.16	0.33	0.01	0.39

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	90	115	300	115	130	130	445	335	130	610	20
Future Volume (veh/h)	15	90	115	300	115	130	130	445	335	130	610	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	15	90	115	300	115	130	130	445	335	130	610	20
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	1	1	1
Cap, veh/h	376	125	159	353	271	224	253	767	333	278	823	27
Arrive On Green	0.21	0.17	0.17	0.20	0.14	0.14	0.14	0.21	0.21	0.15	0.23	0.23
Sat Flow, veh/h	1795	741	947	1781	1870	1544	1795	3582	1557	1795	3536	116
Grp Volume(v), veh/h	15	0	205	300	115	130	130	445	335	130	309	321
Grp Sat Flow(s),veh/h/ln	1795	0	1688	1781	1870	1544	1795	1791	1557	1795	1791	1861
Q Serve(g_s), s	0.4	0.0	7.3	10.4	3.6	3.4	4.3	7.1	7.5	4.2	10.2	10.2
Cycle Q Clear(g_c), s	0.4	0.0	7.3	10.4	3.6	3.4	4.3	7.1	7.5	4.2	10.2	10.2
Prop In Lane	1.00		0.56	1.00		1.00	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	376	0	284	353	271	224	253	767	333	278	417	433
V/C Ratio(X)	0.04	0.00	0.72	0.85	0.42	0.58	0.51	0.58	1.00	0.47	0.74	0.74
Avail Cap(c_a), veh/h	736	0	1199	730	1328	1097	741	2543	1106	733	1272	1321
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.2	0.0	25.2	24.7	24.9	12.0	25.4	22.5	7.6	24.6	22.7	22.7
Incr Delay (d2), s/veh	0.0	0.0	1.3	2.2	0.4	0.9	0.6	0.3	15.1	0.5	1.0	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	2.9	4.1	1.5	1.7	1.7	2.7	5.3	1.7	4.1	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	20.2	0.0	26.5	26.9	25.3	12.9	26.0	22.8	22.7	25.1	23.7	23.7
LnGrp LOS	C		C	C	C	B	C	C	F	C	C	C
Approach Vol, veh/h		220			545			910			760	
Approach Delay, s/veh		26.0			23.2			23.2			23.9	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	13.9	12.6	19.5	16.5	15.4	13.8	18.3
Change Period (Y+Rc), s	* 4.6	* 4.6	3.6	* 4.6	3.8	* 4.6	3.9	* 4.6
Max Green Setting (Gmax), s	* 26	* 45	26.4	* 45	26.2	* 45	26.1	* 45
Max Q Clear Time (g_c+I1), s	2.4	5.6	6.3	12.2	12.4	9.3	6.2	9.5
Green Ext Time (p_c), s	0.0	0.6	0.1	2.6	0.4	0.9	0.2	2.4

Intersection Summary	
HCM 7th Control Delay, s/veh	23.7
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

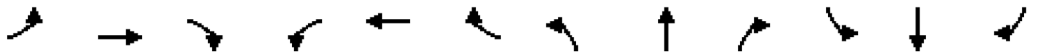
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	55	165	235	90	50	215	835	155	100	860	25
Future Volume (veh/h)	35	55	165	235	90	50	215	835	155	100	860	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	35	55	165	235	90	50	215	835	155	100	860	25
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	101	159	219	275	105	59	255	1022	190	172	1044	30
Arrive On Green	0.14	0.14	0.14	0.25	0.25	0.25	0.14	0.34	0.34	0.10	0.29	0.29
Sat Flow, veh/h	719	1130	1559	1115	427	237	1795	3001	557	1795	3551	103
Grp Volume(v), veh/h	90	0	165	375	0	0	215	498	492	100	434	451
Grp Sat Flow(s),veh/h/ln	1849	0	1559	1780	0	0	1795	1791	1767	1795	1791	1863
Q Serve(g_s), s	3.8	0.0	8.7	17.2	0.0	0.0	10.0	21.7	21.7	4.6	19.3	19.3
Cycle Q Clear(g_c), s	3.8	0.0	8.7	17.2	0.0	0.0	10.0	21.7	21.7	4.6	19.3	19.3
Prop In Lane	0.39		1.00	0.63		0.13	1.00		0.32	1.00		0.06
Lane Grp Cap(c), veh/h	260	0	219	439	0	0	255	610	602	172	527	548
V/C Ratio(X)	0.35	0.00	0.75	0.85	0.00	0.00	0.84	0.82	0.82	0.58	0.82	0.82
Avail Cap(c_a), veh/h	790	0	666	760	0	0	557	952	939	557	952	990
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.2	0.0	35.3	30.7	0.0	0.0	35.7	25.7	25.7	37.0	28.1	28.1
Incr Delay (d2), s/veh	0.3	0.0	2.0	1.9	0.0	0.0	2.9	1.6	1.6	1.2	1.3	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	3.3	7.4	0.0	0.0	4.4	8.8	8.7	2.0	8.1	8.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	33.5	0.0	37.3	32.6	0.0	0.0	38.6	27.3	27.4	38.2	29.4	29.3
LnGrp LOS	C		D	C			D	C	C	D	C	C
Approach Vol, veh/h		255			375			1205			985	
Approach Delay, s/veh		35.9			32.6			29.4			30.2	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	24.6	15.6	29.7	15.5	11.7	33.7
Change Period (Y+Rc), s	3.5	3.5	* 4.6	3.5	3.5	* 4.6
Max Green Setting (Gmax), s	36.5	26.5	* 45	36.5	26.5	* 45
Max Q Clear Time (g_c+I1), s	19.2	12.0	21.3	10.7	6.6	23.7
Green Ext Time (p_c), s	1.4	0.2	3.8	0.6	0.1	3.9

Intersection Summary	
HCM 7th Control Delay, s/veh	30.7
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	320	0	350	435	970	0	0	765	550
Future Volume (veh/h)	0	0	0	320	0	350	435	970	0	0	765	550
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	1885	1885	1885	1885	0	0	1885	1885
Adj Flow Rate, veh/h				320	0	0	435	970	0	0	765	0
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				1	1	1	1	1	0	0	1	1
Cap, veh/h				579	0		509	2390	0	0	1131	
Arrive On Green				0.16	0.00	0.00	0.28	0.67	0.00	0.00	0.32	0.00
Sat Flow, veh/h				3591	0	1598	1795	3676	0	0	3676	1598
Grp Volume(v), veh/h				320	0	0	435	970	0	0	765	0
Grp Sat Flow(s),veh/h/ln				1795	0	1598	1795	1791	0	0	1791	1598
Q Serve(g_s), s				4.2	0.0	0.0	11.8	6.3	0.0	0.0	9.5	0.0
Cycle Q Clear(g_c), s				4.2	0.0	0.0	11.8	6.3	0.0	0.0	9.5	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				579	0		509	2390	0	0	1131	
V/C Ratio(X)				0.55	0.00		0.86	0.41	0.00	0.00	0.68	
Avail Cap(c_a), veh/h				2517	0		927	2455	0	0	2455	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				19.8	0.0	0.0	17.4	3.9	0.0	0.0	15.3	0.0
Incr Delay (d2), s/veh				0.3	0.0	0.0	3.2	0.1	0.0	0.0	0.5	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.6	0.0	0.0	4.4	0.9	0.0	0.0	3.4	0.0
Unsig. Movement Delay, s/veh						38.50						32.30
LnGrp Delay(d), s/veh				20.1	0.0	38.5	20.6	4.0	0.0	0.0	15.8	32.3
LnGrp LOS				C		D	C	A			B	C
Approach Vol, veh/h					495			1405			1040	
Approach Delay, s/veh					26.6			9.1			20.2	
Approach LOS					C			A			C	

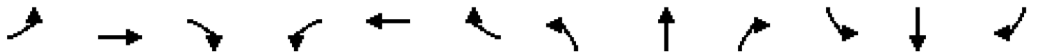
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	18.1	21.0		12.3		39.1						
Change Period (Y+Rc), s	3.5	4.8		4.0		4.8						
Max Green Setting (Gmax), s	26.5	35.2		36.0		35.2						
Max Q Clear Time (g_c+I1), s	13.8	11.5		6.2		8.3						
Green Ext Time (p_c), s	0.8	4.7		0.6		5.9						

Intersection Summary		
HCM 7th Control Delay, s/veh		16.0
HCM 7th LOS		B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is included in calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	520	15	465	0	0	0	0	885	325	330	755	0
Future Volume (veh/h)	520	15	465	0	0	0	0	885	325	330	755	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1870	1870	1885	1885	0
Adj Flow Rate, veh/h	531	0	0				0	885	0	330	755	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3				0	2	2	1	1	0
Cap, veh/h	708	0					0	1232		400	2274	0
Arrive On Green	0.20	0.00	0.00				0.00	0.35	0.00	0.22	0.63	0.00
Sat Flow, veh/h	3534	0	1572				0	3647	1585	1795	3676	0
Grp Volume(v), veh/h	531	0	0				0	885	0	330	755	0
Grp Sat Flow(s),veh/h/ln	1767	0	1572				0	1777	1585	1795	1791	0
Q Serve(g_s), s	7.6	0.0	0.0				0.0	11.6	0.0	9.3	5.2	0.0
Cycle Q Clear(g_c), s	7.6	0.0	0.0				0.0	11.6	0.0	9.3	5.2	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	708	0					0	1232		400	2274	0
V/C Ratio(X)	0.75	0.00					0.00	0.72		0.82	0.33	0.00
Avail Cap(c_a), veh/h	2382	0					0	2342		891	2361	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	20.1	0.0	0.0				0.0	15.2	0.0	19.8	4.5	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0				0.0	0.6	0.0	3.3	0.1	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	0.0				0.0	3.8	0.0	3.9	1.2	0.0
Unsig. Movement Delay, s/veh			33.50									
LnGrp Delay(d), s/veh	20.7	0.0	33.5				0.0	15.8	0.0	23.0	4.6	0.0
LnGrp LOS	C		C					B		C	A	
Approach Vol, veh/h		761						885			1085	
Approach Delay, s/veh		24.6						15.8			10.2	
Approach LOS		C						B			B	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		38.7			15.4	23.3		14.7				
Change Period (Y+Rc), s		4.8			3.5	4.8		4.0				
Max Green Setting (Gmax), s		35.2			26.5	35.2		36.0				
Max Q Clear Time (g_c+I1), s		7.2			11.3	13.6		9.6				
Green Ext Time (p_c), s		4.8			0.6	4.9		1.0				

Intersection Summary												
HCM 7th Control Delay, s/veh			16.0									
HCM 7th LOS			B									

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is included in calculations of the approach delay and intersection delay.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	15	45	20	10	95	30	965	25	70	1035	140
Future Volume (veh/h)	230	15	45	20	10	95	30	965	25	70	1035	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1885	1885	1885	1856	1856	1856
Adj Flow Rate, veh/h	230	15	45	20	10	95	30	965	25	70	1035	140
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3	3	3	3	1	1	1	3	3	3
Cap, veh/h	302	20	377	168	84	217	112	1316	34	166	1245	168
Arrive On Green	0.18	0.18	0.18	0.14	0.14	0.14	0.06	0.37	0.37	0.09	0.40	0.40
Sat Flow, veh/h	1664	109	1537	1197	599	1549	1795	3564	92	1767	3107	420
Grp Volume(v), veh/h	245	0	45	30	0	95	30	485	505	70	587	588
Grp Sat Flow(s),veh/h/ln	1772	0	1537	1796	0	1549	1795	1791	1865	1767	1763	1764
Q Serve(g_s), s	9.5	0.0	1.6	1.1	0.0	4.0	1.1	16.9	16.9	2.7	21.5	21.6
Cycle Q Clear(g_c), s	9.5	0.0	1.6	1.1	0.0	4.0	1.1	16.9	16.9	2.7	21.5	21.6
Prop In Lane	0.94		1.00	0.67		1.00	1.00		0.05	1.00		0.24
Lane Grp Cap(c), veh/h	321	0	377	252	0	217	112	661	689	166	706	707
V/C Ratio(X)	0.76	0.00	0.12	0.12	0.00	0.44	0.27	0.73	0.73	0.42	0.83	0.83
Avail Cap(c_a), veh/h	895	0	875	902	0	778	910	880	916	895	866	867
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.0	0.0	21.2	27.1	0.0	28.4	32.2	19.7	19.7	30.8	19.4	19.4
Incr Delay (d2), s/veh	1.4	0.0	0.1	0.1	0.0	0.5	0.5	1.8	1.7	0.6	5.4	5.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	0.6	0.4	0.0	1.4	0.5	6.5	6.8	1.1	9.1	9.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.4	0.0	21.3	27.2	0.0	28.9	32.7	21.5	21.4	31.4	24.7	24.9
LnGrp LOS	C		C	C		C	C	C	C	C	C	C
Approach Vol, veh/h		290			125			1020			1245	
Approach Delay, s/veh		28.2			28.5			21.8			25.2	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	13.9	8.0	33.5	16.7	10.3	31.2
Change Period (Y+Rc), s	3.8	3.5	* 4.6	3.6	3.5	* 4.6
Max Green Setting (Gmax), s	36.2	36.5	* 35	36.4	36.5	* 35
Max Q Clear Time (g_c+I1), s	6.0	3.1	23.6	11.5	4.7	18.9
Green Ext Time (p_c), s	0.3	0.0	5.3	1.0	0.1	4.5

Intersection Summary	
HCM 7th Control Delay, s/veh	24.4
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	160	230	15	120	40	190	625	25	45	610	235
Future Volume (veh/h)	280	160	230	15	120	40	190	625	25	45	610	235
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1870	1870	1870	1885	1885	1885
Adj Flow Rate, veh/h	280	160	230	15	120	40	190	625	25	45	610	235
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	1	1	1	2	2	2	1	1	1
Cap, veh/h	332	202	290	65	192	64	237	1265	51	137	771	296
Arrive On Green	0.18	0.29	0.29	0.04	0.14	0.14	0.13	0.36	0.36	0.08	0.31	0.31
Sat Flow, veh/h	1795	693	996	1795	1348	449	1781	3478	139	1795	2506	964
Grp Volume(v), veh/h	280	0	390	15	0	160	190	319	331	45	436	409
Grp Sat Flow(s),veh/h/ln	1795	0	1690	1795	0	1797	1781	1777	1840	1795	1791	1679
Q Serve(g_s), s	10.0	0.0	14.2	0.5	0.0	5.6	6.9	9.3	9.3	1.6	14.8	14.9
Cycle Q Clear(g_c), s	10.0	0.0	14.2	0.5	0.0	5.6	6.9	9.3	9.3	1.6	14.8	14.9
Prop In Lane	1.00		0.59	1.00		0.25	1.00		0.08	1.00		0.57
Lane Grp Cap(c), veh/h	332	0	491	65	0	256	237	647	669	137	551	516
V/C Ratio(X)	0.84	0.00	0.79	0.23	0.00	0.63	0.80	0.49	0.49	0.33	0.79	0.79
Avail Cap(c_a), veh/h	714	0	662	714	0	715	708	944	977	714	951	892
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.2	0.0	21.8	31.2	0.0	26.9	28.1	16.4	16.4	29.2	21.1	21.1
Incr Delay (d2), s/veh	2.3	0.0	3.3	0.7	0.0	0.9	2.4	0.2	0.2	0.5	1.0	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	5.6	0.2	0.0	2.3	2.9	3.3	3.4	0.7	5.9	5.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	28.5	0.0	25.1	31.9	0.0	27.8	30.5	16.7	16.6	29.7	22.1	22.2
LnGrp LOS	C		C	C		C	C	B	B	C	C	C
Approach Vol, veh/h		670			175			840			890	
Approach Delay, s/veh		26.5			28.2			19.8			22.5	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.8	13.4	12.3	25.1	5.9	23.3	8.6	28.8
Change Period (Y+Rc), s	3.5	* 3.9	3.5	* 4.6	3.5	3.9	3.5	* 4.6
Max Green Setting (Gmax), s	26.5	* 27	26.5	* 35	26.5	26.1	26.5	* 35
Max Q Clear Time (g_c+I1), s	12.0	7.6	8.9	16.9	2.5	16.2	3.6	11.3
Green Ext Time (p_c), s	0.4	0.5	0.2	3.6	0.0	1.2	0.0	2.3

Intersection Summary	
HCM 7th Control Delay, s/veh	23.1
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	1	23	5	1	5	45	899	1	1	1009	90
Future Volume (veh/h)	45	1	23	5	1	5	45	899	1	1	1009	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	45	1	23	5	1	5	45	899	1	1	1009	90
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	72	2	37	11	2	11	85	1899	2	4	1567	140
Arrive On Green	0.06	0.06	0.06	0.01	0.01	0.01	0.05	0.52	0.52	0.00	0.47	0.47
Sat Flow, veh/h	1116	25	571	770	154	770	1781	3642	4	1781	3300	294
Grp Volume(v), veh/h	69	0	0	11	0	0	45	439	461	1	543	556
Grp Sat Flow(s),veh/h/ln	1712	0	0	1693	0	0	1781	1777	1870	1781	1777	1817
Q Serve(g_s), s	1.8	0.0	0.0	0.3	0.0	0.0	1.1	7.1	7.1	0.0	10.4	10.4
Cycle Q Clear(g_c), s	1.8	0.0	0.0	0.3	0.0	0.0	1.1	7.1	7.1	0.0	10.4	10.4
Prop In Lane	0.65		0.33	0.45		0.45	1.00		0.00	1.00		0.16
Lane Grp Cap(c), veh/h	110	0	0	24	0	0	85	926	975	4	844	863
V/C Ratio(X)	0.63	0.00	0.00	0.46	0.00	0.00	0.53	0.47	0.47	0.25	0.64	0.64
Avail Cap(c_a), veh/h	952	0	0	938	0	0	257	1843	1939	201	1788	1829
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.6	0.0	0.0	22.1	0.0	0.0	21.0	6.9	6.9	22.5	9.0	9.0
Incr Delay (d2), s/veh	5.8	0.0	0.0	12.8	0.0	0.0	5.0	0.4	0.4	30.6	0.8	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.0	0.2	0.0	0.0	0.5	1.6	1.7	0.0	3.1	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	26.4	0.0	0.0	34.8	0.0	0.0	26.0	7.2	7.2	53.1	9.8	9.8
LnGrp LOS	C			C			C	A	A	D	A	A
Approach Vol, veh/h		69			11			945			1100	
Approach Delay, s/veh		26.4			34.8			8.1			9.8	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	28.0		7.4	6.7	25.9		5.1				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.1	46.8		25.1	6.5	45.4		25.0				
Max Q Clear Time (g_c+I1), s	2.0	9.1		3.8	3.1	12.4		2.3				
Green Ext Time (p_c), s	0.0	6.1		0.3	0.0	9.0		0.0				

Intersection Summary		
HCM 7th Control Delay, s/veh	9.7	
HCM 7th LOS	A	

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	15	205	300	115	130	130	445	335	130	630
v/c Ratio	0.06	0.66	0.59	0.14	0.17	0.54	0.55	0.55	0.52	0.75
Control Delay (s/veh)	36.8	41.0	38.4	23.9	6.6	49.6	35.4	7.4	48.6	40.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	36.8	41.0	38.4	23.9	6.6	49.6	35.4	7.4	48.6	40.3
Queue Length 50th (ft)	8	90	148	35	0	72	117	0	72	175
Queue Length 95th (ft)	27	190	#349	134	53	158	205	73	158	294
Internal Link Dist (ft)		878		976			1238			453
Turn Bay Length (ft)	150		195		200	75		200	95	
Base Capacity (vph)	521	861	505	930	838	513	1767	941	508	1758
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.24	0.59	0.12	0.16	0.25	0.25	0.36	0.26	0.36

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	90	165	375	215	990	100	885
v/c Ratio	0.43	0.51	0.79	0.73	0.74	0.54	0.77
Control Delay (s/veh)	58.9	13.7	53.9	64.2	35.7	65.2	42.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	58.9	13.7	53.9	64.2	35.7	65.2	42.5
Queue Length 50th (ft)	65	0	248	153	324	72	314
Queue Length 95th (ft)	133	66	#510	289	520	155	497
Internal Link Dist (ft)	758		547		632		1238
Turn Bay Length (ft)		100		100		120	
Base Capacity (vph)	593	614	576	417	1470	417	1423
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.27	0.65	0.52	0.67	0.24	0.62

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	160	160	350	435	970	765	550
v/c Ratio	0.43	0.43	0.80	0.78	0.40	0.67	0.82
Control Delay (s/veh)	33.3	33.3	34.8	42.6	7.9	29.4	26.2
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay (s/veh)	33.3	33.3	34.8	42.6	8.1	29.4	26.2
Queue Length 50th (ft)	83	83	125	230	110	187	147
Queue Length 95th (ft)	148	148	232	#502	220	301	#383
Internal Link Dist (ft)		874			446	632	
Turn Bay Length (ft)			50	175			75
Base Capacity (vph)	722	722	739	559	2752	1487	787
Starvation Cap Reductn	0	0	0	0	754	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.22	0.47	0.78	0.49	0.51	0.70

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	265	270	465	885	325	330	755
v/c Ratio	0.57	0.58	0.81	0.78	0.30	0.76	0.35
Control Delay (s/veh)	33.3	33.5	29.2	33.3	1.9	45.5	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	33.3	33.5	29.2	33.3	1.9	45.5	9.5
Queue Length 50th (ft)	132	135	141	232	0	170	98
Queue Length 95th (ft)	241	247	297	375	35	#347	174
Internal Link Dist (ft)		679		657			446
Turn Bay Length (ft)			50		220	180	
Base Capacity (vph)	763	767	817	1586	1267	603	2770
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.35	0.57	0.56	0.26	0.55	0.27

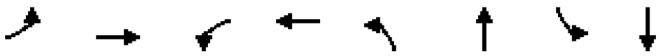
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	245	45	30	95	30	990	70	1175
v/c Ratio	0.69	0.08	0.12	0.32	0.13	0.62	0.33	0.77
Control Delay (s/veh)	43.9	6.4	38.6	12.2	39.7	23.4	43.2	27.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	43.9	6.4	38.6	12.2	39.7	23.4	43.2	27.5
Queue Length 50th (ft)	130	0	15	0	15	230	37	305
Queue Length 95th (ft)	214	22	45	47	46	366	84	#495
Internal Link Dist (ft)	655		515			251		657
Turn Bay Length (ft)		140			85		110	
Base Capacity (vph)	803	1042	810	753	817	1597	801	1533
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.04	0.04	0.13	0.04	0.62	0.09	0.77

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	280	390	15	160	190	650	45	845
v/c Ratio	0.75	0.62	0.08	0.55	0.66	0.43	0.25	0.80
Control Delay (s/veh)	51.1	30.4	49.3	45.6	51.7	21.9	50.9	36.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	51.1	30.4	49.3	45.6	51.7	21.9	50.9	36.8
Queue Length 50th (ft)	158	157	8	85	109	150	26	226
Queue Length 95th (ft)	#329	356	34	178	220	260	75	#409
Internal Link Dist (ft)		710		228		480		903
Turn Bay Length (ft)	110				95		55	
Base Capacity (vph)	526	632	526	540	521	1576	526	1363
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.62	0.03	0.30	0.36	0.41	0.09	0.62

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	69	11	45	900	1	1099
v/c Ratio	0.26	0.06	0.21	0.35	0.01	0.49
Control Delay (s/veh)	23.8	25.1	31.6	6.3	32.0	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	23.8	25.1	31.6	6.3	32.0	10.2
Queue Length 50th (ft)	15	2	14	46	0	125
Queue Length 95th (ft)	63	19	56	203	6	274
Internal Link Dist (ft)	329	438		256		304
Turn Bay Length (ft)			100		50	
Base Capacity (vph)	863	847	227	2898	178	2801
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.01	0.20	0.31	0.01	0.39

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	190	100	135	95	180	55	445	220	225	500	55
Future Volume (veh/h)	75	190	100	135	95	180	55	445	220	225	500	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1841	1841	1841	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	75	190	100	135	95	180	55	445	220	225	500	55
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	4	4	4	3	3	3	3	3	3
Cap, veh/h	295	232	122	172	238	193	130	466	230	256	778	86
Arrive On Green	0.16	0.20	0.20	0.10	0.13	0.13	0.07	0.40	0.40	0.14	0.48	0.48
Sat Flow, veh/h	1795	1143	602	1753	1841	1490	1767	1161	574	1767	1637	180
Grp Volume(v), veh/h	75	0	290	135	95	180	55	0	665	225	0	555
Grp Sat Flow(s),veh/h/ln	1795	0	1744	1753	1841	1490	1767	0	1735	1767	0	1818
Q Serve(g_s), s	4.0	0.0	17.6	8.3	5.2	11.0	3.3	0.0	41.1	13.8	0.0	25.5
Cycle Q Clear(g_c), s	4.0	0.0	17.6	8.3	5.2	11.0	3.3	0.0	41.1	13.8	0.0	25.5
Prop In Lane	1.00		0.34	1.00		1.00	1.00		0.33	1.00		0.10
Lane Grp Cap(c), veh/h	295	0	354	172	238	193	130	0	696	256	0	863
V/C Ratio(X)	0.25	0.00	0.82	0.79	0.40	0.93	0.42	0.00	0.95	0.88	0.00	0.64
Avail Cap(c_a), veh/h	426	0	717	416	756	613	390	0	744	386	0	863
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.3	0.0	42.1	48.7	44.2	32.8	48.9	0.0	32.1	46.3	0.0	21.9
Incr Delay (d2), s/veh	0.2	0.0	1.8	3.0	0.4	8.3	0.8	0.0	21.4	10.2	0.0	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	7.8	3.7	2.4	4.3	1.5	0.0	20.4	6.7	0.0	10.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	40.4	0.0	43.9	51.7	44.6	41.1	49.7	0.0	53.5	56.5	0.0	23.2
LnGrp LOS	D		D	D	D	D	D		D	E		C
Approach Vol, veh/h		365			410			720			780	
Approach Delay, s/veh		43.2			45.4			53.2			32.8	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.8	18.9	11.8	57.1	14.6	27.0	19.9	49.0
Change Period (Y+Rc), s	* 4.6	* 4.6	3.6	* 4.6	3.8	* 4.6	3.9	* 4.6
Max Green Setting (Gmax), s	* 26	* 45	24.4	* 47	26.2	* 45	24.1	* 47
Max Q Clear Time (g_c+I1), s	6.0	13.0	5.3	27.5	10.3	19.6	15.8	43.1
Green Ext Time (p_c), s	0.1	0.6	0.0	2.4	0.1	1.3	0.2	1.2

Intersection Summary	
HCM 7th Control Delay, s/veh	43.2
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

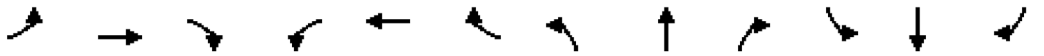
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	95	210	245	80	65	125	570	100	45	685	35
Future Volume (veh/h)	45	95	210	245	80	65	125	570	100	45	685	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	45	95	210	245	80	65	125	570	100	45	685	35
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	3	3	3	3	3	3	3	3	3
Cap, veh/h	89	189	240	265	86	70	151	800	658	100	704	36
Arrive On Green	0.15	0.15	0.15	0.24	0.24	0.24	0.09	0.43	0.43	0.06	0.40	0.40
Sat Flow, veh/h	592	1249	1585	1092	357	290	1767	1856	1527	1767	1750	89
Grp Volume(v), veh/h	140	0	210	390	0	0	125	570	100	45	0	720
Grp Sat Flow(s),veh/h/ln	1841	0	1585	1739	0	0	1767	1856	1527	1767	0	1839
Q Serve(g_s), s	8.9	0.0	16.4	27.8	0.0	0.0	8.8	32.0	5.1	3.1	0.0	48.8
Cycle Q Clear(g_c), s	8.9	0.0	16.4	27.8	0.0	0.0	8.8	32.0	5.1	3.1	0.0	48.8
Prop In Lane	0.32		1.00	0.63		0.17	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	278	0	240	421	0	0	151	800	658	100	0	740
V/C Ratio(X)	0.50	0.00	0.88	0.93	0.00	0.00	0.83	0.71	0.15	0.45	0.00	0.97
Avail Cap(c_a), veh/h	457	0	394	500	0	0	355	800	658	355	0	745
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	49.5	0.0	52.7	47.0	0.0	0.0	57.1	29.6	22.0	58.0	0.0	37.2
Incr Delay (d2), s/veh	0.5	0.0	6.8	19.9	0.0	0.0	4.4	2.6	0.0	1.2	0.0	26.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	6.9	14.3	0.0	0.0	4.1	14.3	1.8	1.4	0.0	26.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	50.0	0.0	59.4	66.8	0.0	0.0	61.5	32.2	22.0	59.1	0.0	63.4
LnGrp LOS	D		E	E			E	C	C	E		E
Approach Vol, veh/h		350			390			795			765	
Approach Delay, s/veh		55.7			66.8			35.5			63.1	
Approach LOS		E			E			D			E	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	34.2	14.3	55.6	22.7	10.7	59.3
Change Period (Y+Rc), s	3.5	3.5	* 4.6	3.5	3.5	* 4.6
Max Green Setting (Gmax), s	36.5	25.5	* 51	31.5	25.5	* 51
Max Q Clear Time (g_c+I1), s	29.8	10.8	50.8	18.4	5.1	34.0
Green Ext Time (p_c), s	0.9	0.1	0.2	0.7	0.0	2.2

Intersection Summary	
HCM 7th Control Delay, s/veh	53.1
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	285	5	205	300	735	0	0	695	560
Future Volume (veh/h)	0	0	0	285	5	205	300	735	0	0	695	560
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1841	1841	1841	1841	1841	0	0	1870	1870
Adj Flow Rate, veh/h				289	0	0	300	735	0	0	695	0
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				4	4	4	4	4	0	0	2	2
Cap, veh/h				643	0		378	2136	0	0	1114	
Arrive On Green				0.18	0.00	0.00	0.22	0.61	0.00	0.00	0.31	0.00
Sat Flow, veh/h				3506	0	1560	1753	3589	0	0	3647	1585
Grp Volume(v), veh/h				289	0	0	300	735	0	0	695	0
Grp Sat Flow(s),veh/h/ln				1753	0	1560	1753	1749	0	0	1777	1585
Q Serve(g_s), s				3.1	0.0	0.0	6.9	4.4	0.0	0.0	7.1	0.0
Cycle Q Clear(g_c), s				3.1	0.0	0.0	6.9	4.4	0.0	0.0	7.1	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				643	0		378	2136	0	0	1114	
V/C Ratio(X)				0.45	0.00		0.79	0.34	0.00	0.00	0.62	
Avail Cap(c_a), veh/h				2951	0		1086	2878	0	0	2924	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				15.5	0.0	0.0	15.9	4.1	0.0	0.0	12.5	0.0
Incr Delay (d2), s/veh				0.2	0.0	0.0	2.8	0.1	0.0	0.0	0.4	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.1	0.0	0.0	2.5	0.6	0.0	0.0	2.3	0.0
Unsig. Movement Delay, s/veh						23.10						20.20
LnGrp Delay(d), s/veh				15.7	0.0	23.1	18.7	4.2	0.0	0.0	13.0	20.2
LnGrp LOS				B		C	B	A			B	C
Approach Vol, veh/h					394			1035			975	
Approach Delay, s/veh					17.7			8.4			15.0	
Approach LOS					B			A			B	

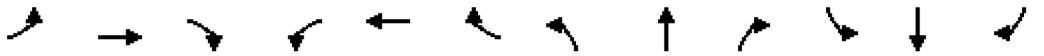
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	12.7	18.2		11.8		30.9						
Change Period (Y+Rc), s	3.5	4.8		4.0		4.8						
Max Green Setting (Gmax), s	26.5	35.2		36.0		35.2						
Max Q Clear Time (g_c+I1), s	8.9	9.1		5.1		6.4						
Green Ext Time (p_c), s	0.6	4.3		0.5		4.2						

Intersection Summary		
HCM 7th Control Delay, s/veh		12.6
HCM 7th LOS		B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is included in calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	360	5	435	0	0	0	0	655	295	375	605	0
Future Volume (veh/h)	360	5	435	0	0	0	0	655	295	375	605	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826				0	1841	1841	1841	1841	0
Adj Flow Rate, veh/h	364	0	0				0	655	0	375	605	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	5	5				0	4	4	4	4	0
Cap, veh/h	672	0					0	995		454	2162	0
Arrive On Green	0.19	0.00	0.00				0.00	0.28	0.00	0.26	0.62	0.00
Sat Flow, veh/h	3478	0	1547				0	3589	1560	1753	3589	0
Grp Volume(v), veh/h	364	0	0				0	655	0	375	605	0
Grp Sat Flow(s),veh/h/ln	1739	0	1547				0	1749	1560	1753	1749	0
Q Serve(g_s), s	4.4	0.0	0.0				0.0	7.7	0.0	9.4	3.7	0.0
Cycle Q Clear(g_c), s	4.4	0.0	0.0				0.0	7.7	0.0	9.4	3.7	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	672	0					0	995		454	2162	0
V/C Ratio(X)	0.54	0.00					0.00	0.66		0.83	0.28	0.00
Avail Cap(c_a), veh/h	2682	0					0	2637		995	2637	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.0	0.0	0.0				0.0	14.7	0.0	16.3	4.1	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.0				0.0	0.6	0.0	2.9	0.1	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.0				0.0	2.5	0.0	3.6	0.8	0.0
Unsig. Movement Delay, s/veh			27.70									
LnGrp Delay(d), s/veh	17.2	0.0	27.7				0.0	15.3	0.0	19.2	4.2	0.0
LnGrp LOS	B		C					B		B	A	
Approach Vol, veh/h		579						655			980	
Approach Delay, s/veh		21.1						15.3			9.9	
Approach LOS		C						B			A	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		33.7			15.6	18.1		13.0				
Change Period (Y+Rc), s		4.8			3.5	4.8		4.0				
Max Green Setting (Gmax), s		35.2			26.5	35.2		36.0				
Max Q Clear Time (g_c+I1), s		5.7			11.4	9.7		6.4				
Green Ext Time (p_c), s		3.7			0.8	3.6		0.7				

Intersection Summary			
HCM 7th Control Delay, s/veh		14.4	
HCM 7th LOS		B	

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is included in calculations of the approach delay and intersection delay.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	25	40	15	35	115	45	680	20	95	670	285
Future Volume (veh/h)	150	25	40	15	35	115	45	680	20	95	670	285
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1707	1707	1826	1826	1826	1870	1870	1870	1841	1841	1841
Adj Flow Rate, veh/h	150	25	40	15	35	115	45	680	20	95	670	285
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	13	13	13	5	5	5	2	2	2	4	4	4
Cap, veh/h	206	34	323	75	176	211	143	739	22	179	792	656
Arrive On Green	0.15	0.15	0.15	0.14	0.14	0.14	0.08	0.41	0.41	0.10	0.43	0.43
Sat Flow, veh/h	1403	234	1413	540	1259	1512	1781	1806	53	1753	1841	1524
Grp Volume(v), veh/h	175	0	40	50	0	115	45	0	700	95	670	285
Grp Sat Flow(s),veh/h/ln	1637	0	1413	1799	0	1512	1781	0	1859	1753	1841	1524
Q Serve(g_s), s	7.8	0.0	1.7	1.9	0.0	5.4	1.8	0.0	27.3	3.9	24.9	10.0
Cycle Q Clear(g_c), s	7.8	0.0	1.7	1.9	0.0	5.4	1.8	0.0	27.3	3.9	24.9	10.0
Prop In Lane	0.86		1.00	0.30		1.00	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	240	0	323	251	0	211	143	0	760	179	792	656
V/C Ratio(X)	0.73	0.00	0.12	0.20	0.00	0.54	0.31	0.00	0.92	0.53	0.85	0.43
Avail Cap(c_a), veh/h	780	0	790	852	0	717	851	0	862	838	853	706
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.2	0.0	23.5	29.1	0.0	30.6	33.1	0.0	21.4	32.6	19.5	15.2
Incr Delay (d2), s/veh	1.6	0.0	0.1	0.1	0.0	0.8	0.5	0.0	13.6	0.9	7.2	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	0.0	0.5	0.8	0.0	1.9	0.8	0.0	13.2	1.7	11.3	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.8	0.0	23.6	29.2	0.0	31.4	33.6	0.0	35.0	33.5	26.7	15.6
LnGrp LOS	C		C	C		C	C		D	C	C	B
Approach Vol, veh/h		215			165			745			1050	
Approach Delay, s/veh		31.1			30.8			34.9			24.3	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	14.5	9.7	37.5	14.8	11.3	35.8
Change Period (Y+Rc), s	3.8	3.5	* 4.6	3.6	3.5	* 4.6
Max Green Setting (Gmax), s	36.2	36.5	* 35	36.4	36.5	* 35
Max Q Clear Time (g_c+I1), s	7.4	3.8	26.9	9.8	5.9	29.3
Green Ext Time (p_c), s	0.4	0.0	3.1	0.7	0.1	2.0

Intersection Summary	
HCM 7th Control Delay, s/veh	29.1
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	125	270	50	125	30	195	475	25	10	420	190
Future Volume (veh/h)	200	125	270	50	125	30	195	475	25	10	420	190
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1856	1856	1856	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	200	125	270	50	125	30	195	475	25	10	420	190
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	5	5	3	3	3	2	2	2	3	3	3
Cap, veh/h	234	133	287	134	295	71	229	845	44	39	447	202
Arrive On Green	0.13	0.26	0.26	0.08	0.21	0.21	0.13	0.48	0.48	0.02	0.37	0.37
Sat Flow, veh/h	1739	505	1090	1767	1440	346	1781	1761	93	1767	1199	542
Grp Volume(v), veh/h	200	0	395	50	0	155	195	0	500	10	0	610
Grp Sat Flow(s),veh/h/ln	1739	0	1595	1767	0	1786	1781	0	1853	1767	0	1741
Q Serve(g_s), s	11.0	0.0	23.7	2.6	0.0	7.4	10.5	0.0	18.8	0.5	0.0	33.1
Cycle Q Clear(g_c), s	11.0	0.0	23.7	2.6	0.0	7.4	10.5	0.0	18.8	0.5	0.0	33.1
Prop In Lane	1.00		0.68	1.00		0.19	1.00		0.05	1.00		0.31
Lane Grp Cap(c), veh/h	234	0	421	134	0	366	229	0	889	39	0	650
V/C Ratio(X)	0.85	0.00	0.94	0.37	0.00	0.42	0.85	0.00	0.56	0.26	0.00	0.94
Avail Cap(c_a), veh/h	471	0	426	479	0	484	392	0	889	389	0	719
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.4	0.0	35.2	43.0	0.0	33.8	41.7	0.0	18.1	47.0	0.0	29.6
Incr Delay (d2), s/veh	3.4	0.0	28.2	0.6	0.0	0.3	3.4	0.0	0.5	1.3	0.0	18.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	0.0	12.3	1.2	0.0	3.2	4.7	0.0	7.5	0.3	0.0	16.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	44.8	0.0	63.5	43.6	0.0	34.1	45.1	0.0	18.6	48.3	0.0	48.0
LnGrp LOS	D		E	D		C	D		B	D		D
Approach Vol, veh/h		595			205			695			620	
Approach Delay, s/veh		57.2			36.4			26.0			48.0	
Approach LOS		E			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.7	23.9	16.1	41.1	10.9	29.7	5.6	51.5
Change Period (Y+Rc), s	3.5	* 3.9	3.5	* 4.6	3.5	3.9	3.5	* 4.6
Max Green Setting (Gmax), s	26.5	* 27	21.5	* 40	26.5	26.1	21.5	* 40
Max Q Clear Time (g_c+I1), s	13.0	9.4	12.5	35.1	4.6	25.7	2.5	20.8
Green Ext Time (p_c), s	0.2	0.5	0.2	1.4	0.0	0.1	0.0	1.8

Intersection Summary	
HCM 7th Control Delay, s/veh	42.2
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	1	45	5	1	5	23	681	1	1	679	45
Future Volume (veh/h)	90	1	45	5	1	5	23	681	1	1	679	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	98	1	49	5	1	5	25	740	1	1	738	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	135	1	67	11	2	11	51	1008	1	3	889	59
Arrive On Green	0.12	0.12	0.12	0.01	0.01	0.01	0.03	0.54	0.54	0.00	0.51	0.51
Sat Flow, veh/h	1133	12	567	770	154	770	1781	1867	3	1781	1734	115
Grp Volume(v), veh/h	148	0	0	11	0	0	25	0	741	1	0	787
Grp Sat Flow(s),veh/h/ln	1712	0	0	1693	0	0	1781	0	1870	1781	0	1850
Q Serve(g_s), s	4.6	0.0	0.0	0.4	0.0	0.0	0.8	0.0	16.7	0.0	0.0	20.0
Cycle Q Clear(g_c), s	4.6	0.0	0.0	0.4	0.0	0.0	0.8	0.0	16.7	0.0	0.0	20.0
Prop In Lane	0.66		0.33	0.45		0.45	1.00		0.00	1.00		0.06
Lane Grp Cap(c), veh/h	204	0	0	24	0	0	51	0	1010	3	0	948
V/C Ratio(X)	0.73	0.00	0.00	0.46	0.00	0.00	0.49	0.00	0.73	0.31	0.00	0.83
Avail Cap(c_a), veh/h	774	0	0	766	0	0	164	0	1590	161	0	1569
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.5	0.0	0.0	27.0	0.0	0.0	26.4	0.0	9.7	27.6	0.0	11.4
Incr Delay (d2), s/veh	4.9	0.0	0.0	13.3	0.0	0.0	7.0	0.0	1.1	47.2	0.0	2.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	0.0	0.2	0.0	0.0	0.4	0.0	4.9	0.1	0.0	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	28.4	0.0	0.0	40.4	0.0	0.0	33.4	0.0	10.7	74.7	0.0	13.4
LnGrp LOS	C			D			C		B	E		B
Approach Vol, veh/h		148			11			766			788	
Approach Delay, s/veh		28.4			40.4			11.5			13.5	
Approach LOS		C			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	34.4		11.1	6.1	32.8		5.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	47.0		25.0	5.1	46.9		25.0				
Max Q Clear Time (g_c+I1), s	2.0	18.7		6.6	2.8	22.0		2.4				
Green Ext Time (p_c), s	0.0	5.4		0.7	0.0	6.4		0.0				

Intersection Summary		
HCM 7th Control Delay, s/veh		14.0
HCM 7th LOS		B

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	75	290	135	95	180	55	665	225	555
v/c Ratio	0.21	0.82	0.65	0.37	0.49	0.37	0.99	0.79	0.62
Control Delay (s/veh)	43.2	64.9	70.0	58.5	12.2	66.4	70.4	71.4	30.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	43.2	64.9	70.0	58.5	12.2	66.4	70.4	71.4	30.7
Queue Length 50th (ft)	50	216	107	76	0	43	~530	174	329
Queue Length 95th (ft)	104	342	194	140	70	98	#989	#332	601
Internal Link Dist (ft)		878		976			1238		453
Turn Bay Length (ft)	150		195		200	75		95	
Base Capacity (vph)	423	648	368	671	671	346	675	341	890
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.45	0.37	0.14	0.27	0.16	0.99	0.66	0.62

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	140	210	390	125	570	100	45	720
v/c Ratio	0.66	0.57	0.84	0.68	0.69	0.14	0.35	1.00
Control Delay (s/veh)	71.6	13.2	62.2	75.7	36.5	11.0	69.3	73.7
Queue Delay	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0
Total Delay (s/veh)	71.6	13.2	62.2	75.7	37.3	11.0	69.3	73.7
Queue Length 50th (ft)	117	0	305	104	395	18	37	~609
Queue Length 95th (ft)	196	74	#555	183	619	60	86	#1050
Internal Link Dist (ft)	758		547		632			1238
Turn Bay Length (ft)		100		100			120	
Base Capacity (vph)	442	541	485	342	827	699	342	721
Starvation Cap Reductn	0	0	0	0	76	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.39	0.80	0.37	0.76	0.14	0.13	1.00

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	145	145	205	300	735	695	560
v/c Ratio	0.47	0.46	0.45	0.68	0.31	0.54	0.75
Control Delay (s/veh)	33.6	33.6	8.2	34.8	5.3	20.3	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	33.6	33.6	8.2	34.8	5.3	20.3	17.0
Queue Length 50th (ft)	57	57	0	109	47	111	83
Queue Length 95th (ft)	137	137	54	260	124	240	293
Internal Link Dist (ft)		874			446	632	
Turn Bay Length (ft)			50	175			75
Base Capacity (vph)	933	937	956	723	3064	1959	984
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.15	0.21	0.41	0.24	0.35	0.57

Intersection Summary

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	184	181	435	655	295	375	605
v/c Ratio	0.49	0.48	0.77	0.65	0.45	0.72	0.27
Control Delay (s/veh)	30.8	30.6	20.2	27.9	5.8	35.8	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	30.8	30.6	20.2	27.9	5.8	35.8	7.0
Queue Length 50th (ft)	76	75	61	135	0	142	50
Queue Length 95th (ft)	165	162	195	255	59	#402	127
Internal Link Dist (ft)		679		657			446
Turn Bay Length (ft)			50		220	180	
Base Capacity (vph)	847	851	922	1762	915	663	2973
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.21	0.47	0.37	0.32	0.57	0.20

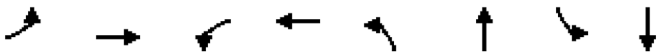
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	175	40	50	115	45	700	95	670	285
v/c Ratio	0.64	0.09	0.22	0.40	0.22	0.92	0.47	0.82	0.38
Control Delay (s/veh)	44.9	7.1	39.8	12.4	40.9	45.8	45.6	34.3	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	44.9	7.1	39.8	12.4	40.9	45.8	45.6	34.3	11.6
Queue Length 50th (ft)	90	0	25	0	22	339	49	325	51
Queue Length 95th (ft)	160	21	67	51	62	#726	107	#642	135
Internal Link Dist (ft)	655		515			251		657	
Turn Bay Length (ft)		140			85		110		
Base Capacity (vph)	671	849	738	696	739	759	725	813	747
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.05	0.07	0.17	0.06	0.92	0.13	0.82	0.38

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	200	395	50	155	195	500	10	610
v/c Ratio	0.74	0.83	0.30	0.49	0.76	0.50	0.07	0.91
Control Delay (s/veh)	61.1	47.1	54.6	45.5	64.7	20.5	52.4	52.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	61.1	47.1	54.6	45.5	64.7	20.5	52.4	52.0
Queue Length 50th (ft)	134	220	33	92	131	200	7	390
Queue Length 95th (ft)	232	365	81	178	235	446	27	#779
Internal Link Dist (ft)		710		228		480		903
Turn Bay Length (ft)	110				95		55	
Base Capacity (vph)	428	478	436	449	357	993	353	671
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.83	0.11	0.35	0.55	0.50	0.03	0.91

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	148	11	25	741	1	787
v/c Ratio	0.56	0.08	0.22	0.57	0.01	0.64
Control Delay (s/veh)	35.9	30.6	42.2	11.3	39.0	14.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	35.9	30.6	42.2	11.3	39.0	14.0
Queue Length 50th (ft)	51	2	10	120	0	133
Queue Length 95th (ft)	129	21	41	512	6	#630
Internal Link Dist (ft)	329	438		256		304
Turn Bay Length (ft)			100		50	
Base Capacity (vph)	565	552	116	1294	113	1238
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.02	0.22	0.57	0.01	0.64

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	115	85	205	145	170	95	320	250	195	495	30
Future Volume (veh/h)	20	115	85	205	145	170	95	320	250	195	495	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.95	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	20	115	85	205	145	170	95	320	250	195	495	30
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	1	1	1
Cap, veh/h	286	154	114	246	232	187	195	354	277	240	692	42
Arrive On Green	0.16	0.15	0.15	0.14	0.12	0.12	0.11	0.37	0.37	0.13	0.39	0.39
Sat Flow, veh/h	1795	995	736	1781	1870	1511	1795	970	758	1795	1757	106
Grp Volume(v), veh/h	20	0	200	205	145	170	95	0	570	195	0	525
Grp Sat Flow(s),veh/h/ln	1795	0	1731	1781	1870	1511	1795	0	1728	1795	0	1863
Q Serve(g_s), s	0.8	0.0	9.0	9.1	6.0	6.9	4.0	0.0	25.4	8.6	0.0	19.3
Cycle Q Clear(g_c), s	0.8	0.0	9.0	9.1	6.0	6.9	4.0	0.0	25.4	8.6	0.0	19.3
Prop In Lane	1.00		0.43	1.00		1.00	1.00		0.44	1.00		0.06
Lane Grp Cap(c), veh/h	286	0	268	246	232	187	195	0	631	240	0	734
V/C Ratio(X)	0.07	0.00	0.75	0.83	0.63	0.91	0.49	0.00	0.90	0.81	0.00	0.72
Avail Cap(c_a), veh/h	579	0	968	575	1046	845	584	0	966	577	0	1042
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.0	0.0	32.8	34.1	33.8	20.3	34.0	0.0	24.4	34.2	0.0	20.8
Incr Delay (d2), s/veh	0.0	0.0	1.6	2.8	1.0	6.5	0.7	0.0	5.8	2.5	0.0	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	3.8	3.9	2.6	3.4	1.7	0.0	10.4	3.8	0.0	8.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.1	0.0	34.4	36.9	34.8	26.8	34.7	0.0	30.2	36.7	0.0	21.3
LnGrp LOS	C		C	D	C	C	C		C	D		C
Approach Vol, veh/h		220			520			665			720	
Approach Delay, s/veh		33.9			33.0			30.9			25.5	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.5	14.7	12.4	36.6	15.0	17.2	14.8	34.2
Change Period (Y+Rc), s	* 4.6	* 4.6	3.6	* 4.6	3.8	* 4.6	3.9	* 4.6
Max Green Setting (Gmax), s	* 26	* 45	26.4	* 45	26.2	* 45	26.1	* 45
Max Q Clear Time (g_c+I1), s	2.8	8.9	6.0	21.3	11.1	11.0	10.6	27.4
Green Ext Time (p_c), s	0.0	0.8	0.1	2.3	0.2	0.9	0.2	2.3

Intersection Summary	
HCM 7th Control Delay, s/veh	29.9
HCM 7th LOS	C

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

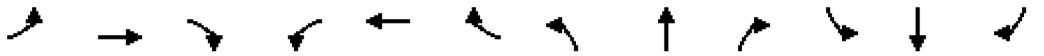
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	65	155	240	95	40	215	615	200	95	640	20
Future Volume (veh/h)	25	65	155	240	95	40	215	615	200	95	640	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	25	65	155	240	95	40	215	615	200	95	640	20
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	66	171	194	265	105	44	245	825	682	133	682	21
Arrive On Green	0.13	0.13	0.13	0.23	0.23	0.23	0.14	0.44	0.44	0.07	0.38	0.38
Sat Flow, veh/h	516	1343	1530	1144	453	191	1795	1885	1558	1795	1816	57
Grp Volume(v), veh/h	90	0	155	375	0	0	215	615	200	95	0	660
Grp Sat Flow(s),veh/h/ln	1859	0	1530	1788	0	0	1795	1885	1558	1795	0	1873
Q Serve(g_s), s	5.2	0.0	11.4	23.7	0.0	0.0	13.7	31.6	9.6	6.0	0.0	39.5
Cycle Q Clear(g_c), s	5.2	0.0	11.4	23.7	0.0	0.0	13.7	31.6	9.6	6.0	0.0	39.5
Prop In Lane	0.28		1.00	0.64		0.11	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	236	0	194	414	0	0	245	825	682	133	0	703
V/C Ratio(X)	0.38	0.00	0.80	0.91	0.00	0.00	0.88	0.75	0.29	0.72	0.00	0.94
Avail Cap(c_a), veh/h	504	0	415	562	0	0	409	825	682	409	0	812
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	46.5	0.0	49.3	43.4	0.0	0.0	49.2	27.3	21.1	52.6	0.0	35.0
Incr Delay (d2), s/veh	0.4	0.0	2.8	12.6	0.0	0.0	6.0	3.3	0.1	2.7	0.0	16.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	4.4	11.9	0.0	0.0	6.4	14.3	3.4	2.8	0.0	20.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	46.9	0.0	52.1	56.1	0.0	0.0	55.2	30.5	21.2	55.3	0.0	51.2
LnGrp LOS	D		D	E			E	C	C	E		D
Approach Vol, veh/h		245			375			1030			755	
Approach Delay, s/veh		50.2			56.1			33.9			51.7	
Approach LOS		D			E			C			D	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	30.4	19.4	48.2	18.3	12.1	55.5
Change Period (Y+Rc), s	3.5	3.5	* 4.6	3.5	3.5	* 4.6
Max Green Setting (Gmax), s	36.5	26.5	* 50	31.5	26.5	* 50
Max Q Clear Time (g_c+I1), s	25.7	15.7	41.5	13.4	8.0	33.6
Green Ext Time (p_c), s	1.2	0.2	2.1	0.5	0.1	2.6

Intersection Summary	
HCM 7th Control Delay, s/veh	44.6
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	285	0	325	415	855	0	0	630	505
Future Volume (veh/h)	0	0	0	285	0	325	415	855	0	0	630	505
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Lane Width Adj.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	1885	1885	1885	1885	0	0	1885	1885
Adj Flow Rate, veh/h				285	0	0	415	855	0	0	630	0
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				1	1	1	1	1	0	0	1	1
Cap, veh/h				634	0		497	2265	0	0	1001	
Arrive On Green				0.18	0.00	0.00	0.28	0.63	0.00	0.00	0.28	0.00
Sat Flow, veh/h				3591	0	1598	1795	3676	0	0	3676	1598
Grp Volume(v), veh/h				285	0	0	415	855	0	0	630	0
Grp Sat Flow(s),veh/h/ln				1795	0	1598	1795	1791	0	0	1791	1598
Q Serve(g_s), s				3.3	0.0	0.0	10.0	5.3	0.0	0.0	7.1	0.0
Cycle Q Clear(g_c), s				3.3	0.0	0.0	10.0	5.3	0.0	0.0	7.1	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				634	0		497	2265	0	0	1001	
V/C Ratio(X)				0.45	0.00		0.84	0.38	0.00	0.00	0.63	
Avail Cap(c_a), veh/h				2808	0		1033	2738	0	0	2738	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				17.0	0.0	0.0	15.7	4.1	0.0	0.0	14.5	0.0
Incr Delay (d2), s/veh				0.2	0.0	0.0	2.8	0.1	0.0	0.0	0.5	0.0
Initial Q Delay(d3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.2	0.0	0.0	3.6	0.8	0.0	0.0	2.5	0.0
Unsig. Movement Delay, s/veh						30.70						25.10
LnGrp Delay(d), s/veh				17.1	0.0	30.7	18.5	4.2	0.0	0.0	15.0	25.1
LnGrp LOS				B		C	B	A			B	C
Approach Vol, veh/h					450			1270			885	
Approach Delay, s/veh					22.1			8.8			17.9	
Approach LOS					C			A			B	

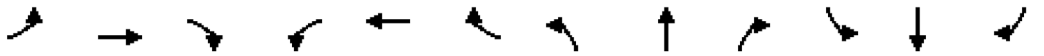
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	16.2	17.7		12.1		33.9						
Change Period (Y+Rc), s	3.5	4.8		4.0		4.8						
Max Green Setting (Gmax), s	26.5	35.2		36.0		35.2						
Max Q Clear Time (g_c+I1), s	12.0	9.1		5.3		7.3						
Green Ext Time (p_c), s	0.8	3.8		0.5		5.0						

Intersection Summary		
HCM 7th Control Delay, s/veh		14.2
HCM 7th LOS		B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is included in calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	515	15	420	0	0	0	0	750	285	305	610	0
Future Volume (veh/h)	515	15	420	0	0	0	0	750	285	305	610	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1870	1870	1885	1885	0
Adj Flow Rate, veh/h	526	0	0				0	750	0	305	610	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3				0	2	2	1	1	0
Cap, veh/h	728	0					0	1123		382	2164	0
Arrive On Green	0.21	0.00	0.00				0.00	0.32	0.00	0.21	0.60	0.00
Sat Flow, veh/h	3534	0	1572				0	3647	1585	1795	3676	0
Grp Volume(v), veh/h	526	0	0				0	750	0	305	610	0
Grp Sat Flow(s),veh/h/ln	1767	0	1572				0	1777	1585	1795	1791	0
Q Serve(g_s), s	6.4	0.0	0.0				0.0	8.5	0.0	7.5	3.8	0.0
Cycle Q Clear(g_c), s	6.4	0.0	0.0				0.0	8.5	0.0	7.5	3.8	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	728	0					0	1123		382	2164	0
V/C Ratio(X)	0.72	0.00					0.00	0.67		0.80	0.28	0.00
Avail Cap(c_a), veh/h	2742	0					0	2695		1025	2717	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.2	0.0	0.0				0.0	13.8	0.0	17.3	4.4	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0				0.0	0.5	0.0	2.9	0.1	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	0.0				0.0	2.7	0.0	3.0	0.8	0.0
Unsig. Movement Delay, s/veh			25.00									
LnGrp Delay(d), s/veh	17.7	0.0	25.0				0.0	14.3	0.0	20.2	4.4	0.0
LnGrp LOS	B		C					B		C	A	
Approach Vol, veh/h		736						750			915	
Approach Delay, s/veh		19.8						14.3			9.7	
Approach LOS		B						B			A	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		32.8			13.4	19.5		13.6				
Change Period (Y+Rc), s		4.8			3.5	4.8		4.0				
Max Green Setting (Gmax), s		35.2			26.5	35.2		36.0				
Max Q Clear Time (g_c+I1), s		5.8			9.5	10.5		8.4				
Green Ext Time (p_c), s		3.7			0.6	4.2		1.0				

Intersection Summary												
HCM 7th Control Delay, s/veh			14.2									
HCM 7th LOS			B									

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is included in calculations of the approach delay and intersection delay.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	25	50	40	15	155	30	715	30	85	815	130
Future Volume (veh/h)	230	25	50	40	15	155	30	715	30	85	815	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1885	1885	1885	1856	1856	1856
Adj Flow Rate, veh/h	230	25	50	40	15	155	30	715	30	85	815	130
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3	3	3	3	1	1	1	3	3	3
Cap, veh/h	285	31	365	162	61	191	105	787	33	155	868	713
Arrive On Green	0.18	0.18	0.18	0.12	0.12	0.12	0.06	0.44	0.44	0.09	0.47	0.47
Sat Flow, veh/h	1601	174	1537	1302	488	1532	1795	1794	75	1767	1856	1525
Grp Volume(v), veh/h	255	0	50	55	0	155	30	0	745	85	815	130
Grp Sat Flow(s),veh/h/ln	1775	0	1537	1790	0	1532	1795	0	1869	1767	1856	1525
Q Serve(g_s), s	12.5	0.0	2.3	2.5	0.0	8.9	1.4	0.0	33.7	4.2	37.8	4.5
Cycle Q Clear(g_c), s	12.5	0.0	2.3	2.5	0.0	8.9	1.4	0.0	33.7	4.2	37.8	4.5
Prop In Lane	0.90		1.00	0.73		1.00	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	316	0	365	223	0	191	105	0	820	155	868	713
V/C Ratio(X)	0.81	0.00	0.14	0.25	0.00	0.81	0.29	0.00	0.91	0.55	0.94	0.18
Avail Cap(c_a), veh/h	714	0	710	617	0	528	625	0	937	615	930	765
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.7	0.0	27.3	35.8	0.0	38.6	40.8	0.0	23.7	39.6	22.9	14.0
Incr Delay (d2), s/veh	1.9	0.0	0.1	0.2	0.0	3.1	0.5	0.0	11.3	1.1	16.0	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	0.8	1.1	0.0	3.4	0.6	0.0	15.9	1.8	19.1	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	37.6	0.0	27.4	36.0	0.0	41.7	41.4	0.0	35.0	40.7	38.9	14.1
LnGrp LOS	D		C	D		D	D		D	D	D	B
Approach Vol, veh/h		305			210			775			1030	
Approach Delay, s/veh		35.9			40.2			35.3			35.9	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	15.1	8.8	47.0	19.7	11.4	44.3
Change Period (Y+Rc), s	3.8	3.5	* 4.6	3.6	3.5	* 4.6
Max Green Setting (Gmax), s	31.2	31.5	* 45	36.4	31.5	* 45
Max Q Clear Time (g_c+I1), s	10.9	3.4	39.8	14.5	6.2	35.7
Green Ext Time (p_c), s	0.4	0.0	2.6	1.0	0.1	2.9

Intersection Summary	
HCM 7th Control Delay, s/veh	36.1
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

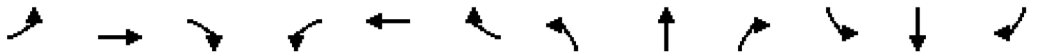
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	205	185	260	20	140	40	210	455	30	45	480	180
Future Volume (veh/h)	205	185	260	20	140	40	210	455	30	45	480	180
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1870	1870	1870	1885	1885	1885
Adj Flow Rate, veh/h	205	185	260	20	140	40	210	455	30	45	480	180
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	1	1	1	2	2	2	1	1	1
Cap, veh/h	241	188	264	77	250	71	245	802	53	117	507	190
Arrive On Green	0.13	0.27	0.27	0.04	0.18	0.18	0.14	0.46	0.46	0.07	0.39	0.39
Sat Flow, veh/h	1795	699	982	1795	1405	401	1781	1732	114	1795	1296	486
Grp Volume(v), veh/h	205	0	445	20	0	180	210	0	485	45	0	660
Grp Sat Flow(s),veh/h/ln	1795	0	1681	1795	0	1807	1781	0	1846	1795	0	1782
Q Serve(g_s), s	10.8	0.0	25.5	1.0	0.0	8.8	11.2	0.0	18.6	2.3	0.0	34.7
Cycle Q Clear(g_c), s	10.8	0.0	25.5	1.0	0.0	8.8	11.2	0.0	18.6	2.3	0.0	34.7
Prop In Lane	1.00		0.58	1.00		0.22	1.00		0.06	1.00		0.27
Lane Grp Cap(c), veh/h	241	0	452	77	0	321	245	0	854	117	0	697
V/C Ratio(X)	0.85	0.00	0.98	0.26	0.00	0.56	0.86	0.00	0.57	0.38	0.00	0.95
Avail Cap(c_a), veh/h	491	0	452	491	0	494	395	0	854	398	0	742
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.0	0.0	35.2	44.9	0.0	36.4	40.9	0.0	19.0	43.5	0.0	28.6
Incr Delay (d2), s/veh	3.3	0.0	37.8	0.7	0.0	0.6	5.7	0.0	0.6	0.8	0.0	20.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	0.0	14.9	0.5	0.0	3.9	5.1	0.0	7.4	1.1	0.0	18.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	44.3	0.0	73.0	45.6	0.0	37.0	46.6	0.0	19.5	44.2	0.0	48.6
LnGrp LOS	D		E	D		D	D		B	D		D
Approach Vol, veh/h		650			200			695			705	
Approach Delay, s/veh		64.0			37.8			27.7			48.3	
Approach LOS		E			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.5	21.2	16.8	42.5	7.7	30.0	9.8	49.5
Change Period (Y+Rc), s	3.5	* 3.9	3.5	* 4.6	3.5	3.9	3.5	* 4.6
Max Green Setting (Gmax), s	26.5	* 27	21.5	* 40	26.5	26.1	21.5	* 40
Max Q Clear Time (g_c+I1), s	12.8	10.8	13.2	36.7	3.0	27.5	4.3	20.6
Green Ext Time (p_c), s	0.2	0.5	0.2	1.2	0.0	0.0	0.0	1.7

Intersection Summary	
HCM 7th Control Delay, s/veh	45.6
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	1	23	5	1	5	45	654	1	1	814	90
Future Volume (veh/h)	45	1	23	5	1	5	45	654	1	1	814	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	45	1	23	5	1	5	45	654	1	1	814	90
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	64	1	33	11	2	11	79	1153	2	3	950	105
Arrive On Green	0.06	0.06	0.06	0.01	0.01	0.01	0.04	0.62	0.62	0.00	0.57	0.57
Sat Flow, veh/h	1116	25	571	770	154	770	1781	1867	3	1781	1655	183
Grp Volume(v), veh/h	69	0	0	11	0	0	45	0	655	1	0	904
Grp Sat Flow(s),veh/h/ln	1712	0	0	1693	0	0	1781	0	1870	1781	0	1837
Q Serve(g_s), s	2.3	0.0	0.0	0.4	0.0	0.0	1.4	0.0	12.0	0.0	0.0	24.0
Cycle Q Clear(g_c), s	2.3	0.0	0.0	0.4	0.0	0.0	1.4	0.0	12.0	0.0	0.0	24.0
Prop In Lane	0.65		0.33	0.45		0.45	1.00		0.00	1.00		0.10
Lane Grp Cap(c), veh/h	99	0	0	24	0	0	79	0	1154	3	0	1055
V/C Ratio(X)	0.70	0.00	0.00	0.46	0.00	0.00	0.57	0.00	0.57	0.33	0.00	0.86
Avail Cap(c_a), veh/h	736	0	0	728	0	0	153	0	1511	153	0	1485
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.9	0.0	0.0	28.5	0.0	0.0	27.2	0.0	6.6	29.0	0.0	10.4
Incr Delay (d2), s/veh	8.5	0.0	0.0	13.5	0.0	0.0	6.3	0.0	0.4	52.5	0.0	3.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.0	0.2	0.0	0.0	0.7	0.0	3.0	0.1	0.0	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	35.4	0.0	0.0	41.9	0.0	0.0	33.5	0.0	7.0	81.5	0.0	14.1
LnGrp LOS	D			D			C		A	F		B
Approach Vol, veh/h		69			11			700			905	
Approach Delay, s/veh		35.4			41.9			8.7			14.2	
Approach LOS		D			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	40.4		7.9	7.1	37.9		5.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	47.0		25.0	5.0	47.0		25.0				
Max Q Clear Time (g_c+I1), s	2.0	14.0		4.3	3.4	26.0		2.4				
Green Ext Time (p_c), s	0.0	4.6		0.3	0.0	7.4		0.0				

Intersection Summary												
HCM 7th Control Delay, s/veh			13.0									
HCM 7th LOS			B									

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	20	200	205	145	170	95	570	195	525
v/c Ratio	0.08	0.73	0.75	0.32	0.34	0.52	0.81	0.72	0.63
Control Delay (s/veh)	44.5	58.8	65.9	44.6	9.4	63.4	42.7	64.6	31.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	44.5	58.8	65.9	44.6	9.4	63.4	42.7	64.6	31.2
Queue Length 50th (ft)	14	126	146	76	0	68	355	139	287
Queue Length 95th (ft)	38	235	266	196	66	143	#758	253	547
Internal Link Dist (ft)		878		976			1238		453
Turn Bay Length (ft)	150		195		200	75		95	
Base Capacity (vph)	421	704	407	742	719	414	708	409	835
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.28	0.50	0.20	0.24	0.23	0.81	0.48	0.63

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	90	155	375	215	615	200	95	660
v/c Ratio	0.48	0.52	0.86	0.80	0.73	0.26	0.58	0.91
Control Delay (s/veh)	66.5	14.9	67.4	76.4	38.2	11.9	74.2	57.6
Queue Delay	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0
Total Delay (s/veh)	66.5	14.9	67.4	76.4	39.9	11.9	74.2	57.6
Queue Length 50th (ft)	76	0	297	179	423	40	80	535
Queue Length 95th (ft)	138	67	#539	299	724	115	153	#973
Internal Link Dist (ft)	758		547		632			1238
Turn Bay Length (ft)		100		100			120	
Base Capacity (vph)	449	495	504	364	841	756	364	725
Starvation Cap Reductn	0	0	0	0	102	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.31	0.74	0.59	0.83	0.26	0.26	0.91

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	142	143	325	415	855	630	505
v/c Ratio	0.42	0.42	0.74	0.71	0.35	0.58	0.76
Control Delay (s/veh)	32.3	32.4	26.7	34.0	6.2	25.4	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay (s/veh)	32.3	32.4	26.7	34.0	6.2	25.4	18.7
Queue Length 50th (ft)	62	63	73	162	71	132	86
Queue Length 95th (ft)	134	134	186	#431	157	221	240
Internal Link Dist (ft)		874			446	632	
Turn Bay Length (ft)			50	175			75
Base Capacity (vph)	848	848	865	657	3044	1746	894
Starvation Cap Reductn	0	0	0	0	685	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.17	0.38	0.63	0.36	0.36	0.56

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

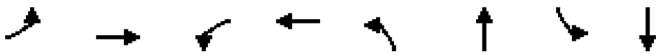
Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	263	267	420	750	285	305	610
v/c Ratio	0.59	0.60	0.72	0.69	0.27	0.70	0.28
Control Delay (s/veh)	31.6	31.7	20.1	28.1	1.9	38.3	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	31.6	31.7	20.1	28.1	1.9	38.3	8.1
Queue Length 50th (ft)	105	106	70	148	0	119	57
Queue Length 95th (ft)	240	244	222	306	34	298	136
Internal Link Dist (ft)		679		657			446
Turn Bay Length (ft)			50		220	180	
Base Capacity (vph)	890	895	934	1850	1355	703	3049
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.30	0.45	0.41	0.21	0.43	0.20

Intersection Summary

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	255	50	55	155	30	745	85	815	130
v/c Ratio	0.77	0.11	0.28	0.51	0.17	0.89	0.47	0.92	0.17
Control Delay (s/veh)	55.7	7.4	48.6	13.9	47.7	41.7	53.6	43.4	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0
Total Delay (s/veh)	55.7	7.4	48.6	13.9	47.7	42.4	53.6	43.4	11.3
Queue Length 50th (ft)	157	0	33	0	18	422	53	501	27
Queue Length 95th (ft)	255	26	80	63	52	#804	109	#867	71
Internal Link Dist (ft)	655		515			251		657	
Turn Bay Length (ft)		140			85		110		
Base Capacity (vph)	631	794	545	581	553	837	542	890	743
Starvation Cap Reductn	0	0	0	0	0	13	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.06	0.10	0.27	0.05	0.90	0.16	0.92	0.17

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	205	445	20	180	210	485	45	660
v/c Ratio	0.73	0.83	0.12	0.64	0.76	0.52	0.28	0.93
Control Delay (s/veh)	58.5	47.3	51.3	52.4	62.3	23.1	54.4	54.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	58.5	47.3	51.3	52.4	62.3	23.1	54.4	54.4
Queue Length 50th (ft)	130	234	12	109	133	223	28	405
Queue Length 95th (ft)	236	#446	42	203	#254	438	76	#858
Internal Link Dist (ft)		710		228		480		903
Turn Bay Length (ft)	110				95		55	
Base Capacity (vph)	456	534	456	470	367	941	370	706
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.83	0.04	0.38	0.57	0.52	0.12	0.93

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	69	11	45	655	1	904
v/c Ratio	0.37	0.08	0.39	0.45	0.01	0.70
Control Delay (s/veh)	31.8	29.2	47.4	7.4	37.0	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	31.8	29.2	47.4	7.4	37.0	15.1
Queue Length 50th (ft)	22	3	21	75	0	247
Queue Length 95th (ft)	65	19	#61	364	6	#707
Internal Link Dist (ft)	329	438		256		304
Turn Bay Length (ft)			100		50	
Base Capacity (vph)	569	556	114	1453	114	1300
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.02	0.39	0.45	0.01	0.70

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

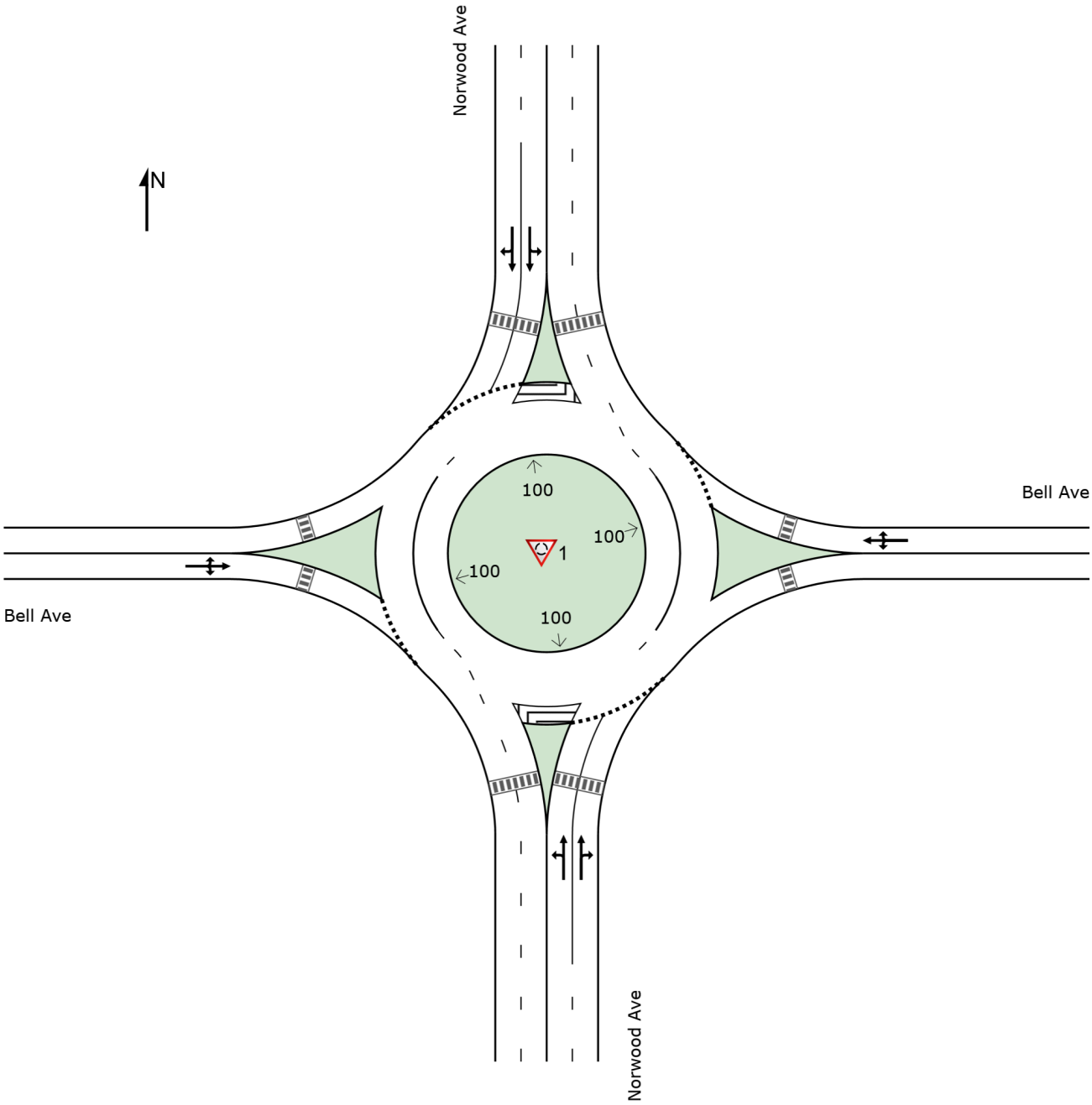
Section 2. Sidra Intersection Analysis Results

SITE LAYOUT

Site: 1 [Norwood/Bell - AM No Build (Site Folder: General)]

Norwood/Bell - AM No Build
Site Category: Future Conditions 1
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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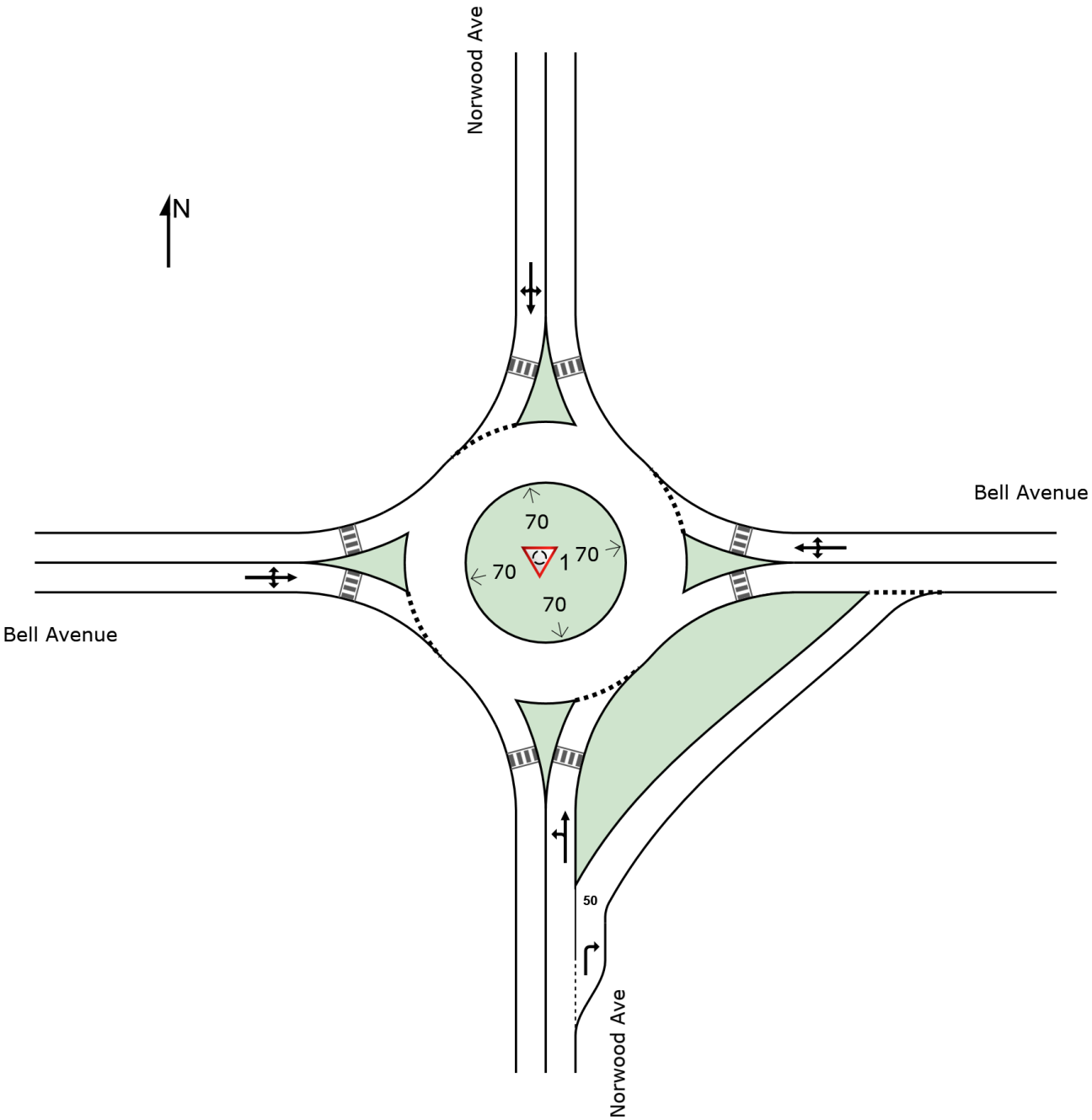
SITE LAYOUT

Site: 1 [Norwood/Bell - AM Road Diet (Site Folder: General)]

Norwood/Bell - AM Road Diet
Site Category: Future Conditions 2
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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SITE LAYOUT

Site: 33 [Norwood/Morey - AM No Build (Site Folder: General)]

Norwood/Morey - AM No Build
Site Category: Future Conditions 1
Roundabout

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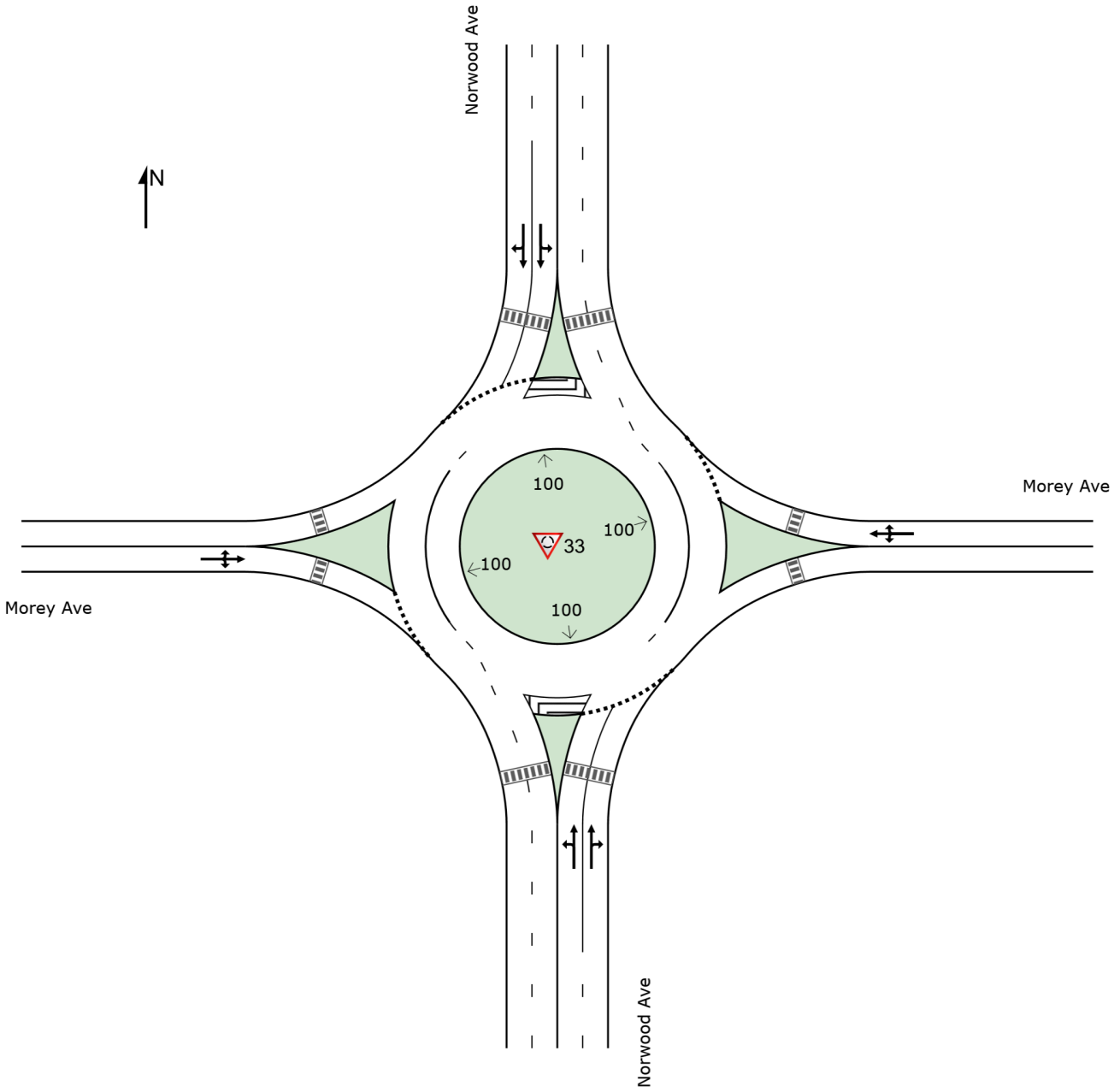

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SITE LAYOUT

Site: 1 [Norwood/Morey - AM Road Diet (Site Folder: General)]

Norwood/Morey - AM Road Diet
Site Category: Future Conditions 2
Roundabout

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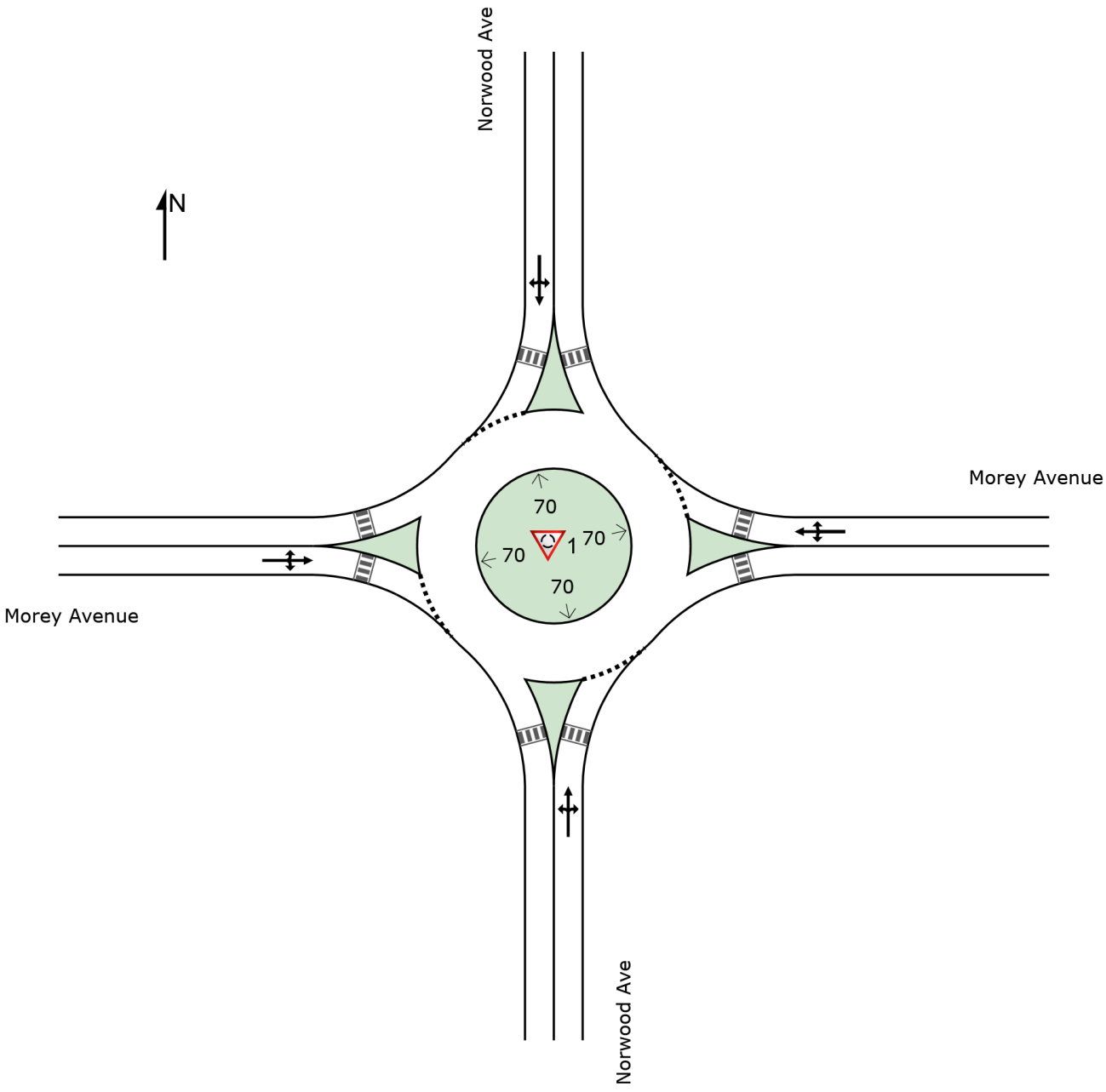

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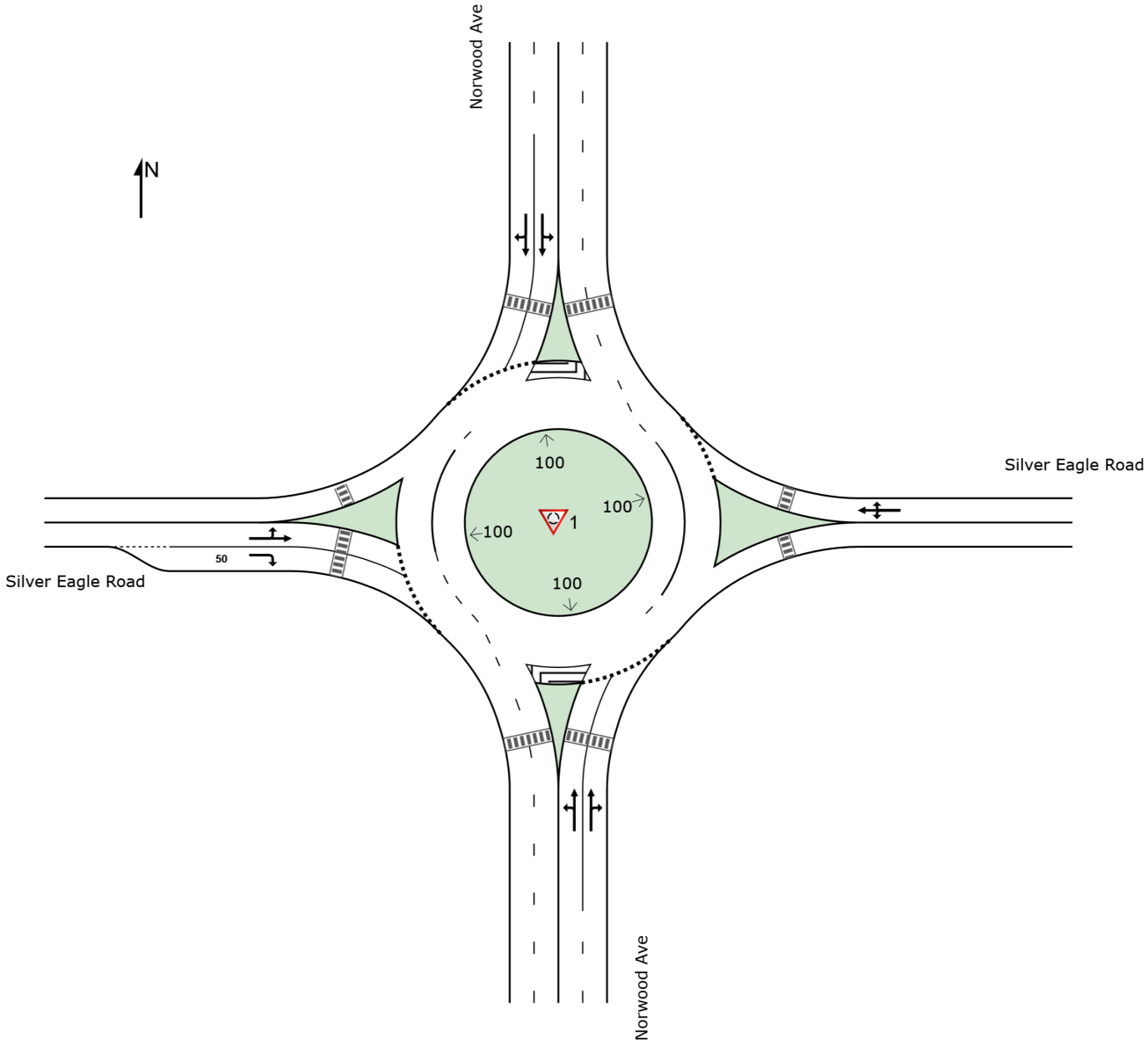
SITE LAYOUT

Site: 1 [Norwood/Silver Eagle Road - AM No Build (Site Folder: General)]

Norwood/Silver Eagle Road - AM No Build
Site Category: Future Conditions 1
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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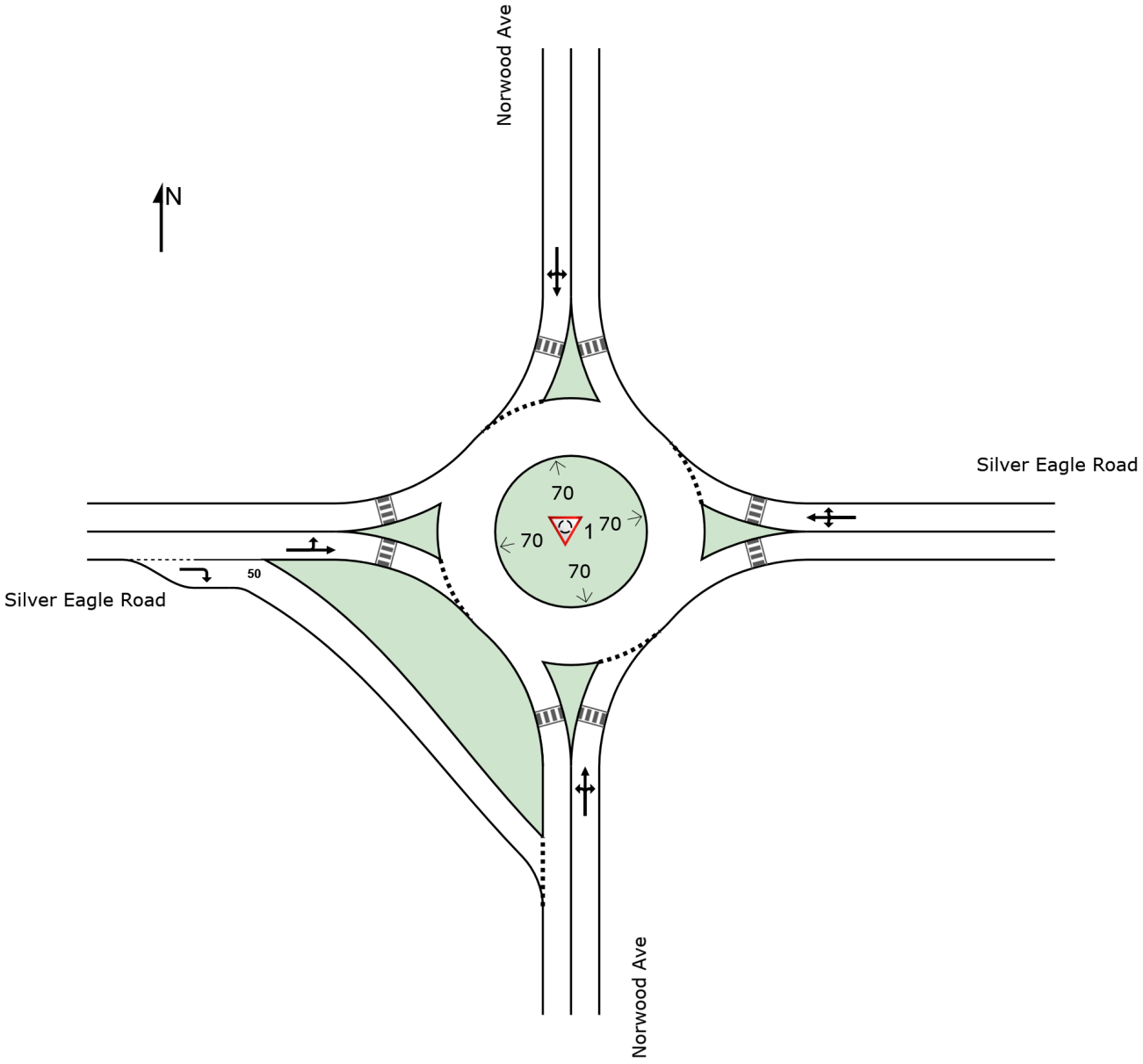
SITE LAYOUT

Site: 1 [Norwood/Silver Eagle Road - AM Road Diet (Site Folder: General)]

Norwood/Silver Eagle Road - AM Road Diet
Site Category: Future Conditions 2
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 1 [Norwood/Bell - AM No Build (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Norwood/Bell - AM No Build
Site Category: Future Conditions 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Norwood Ave															
3	L2	All MCs	70	3.0	70	3.0	0.428	8.5	LOS A	2.2	55.9	0.57	0.40	0.57	25.9
8	T1	All MCs	515	3.0	515	3.0	0.428	8.5	LOS A	2.2	55.9	0.57	0.40	0.57	26.2
18	R2	All MCs	250	3.0	250	3.0	0.428	8.5	LOS A	2.2	55.9	0.57	0.40	0.57	26.1
Approach			835	3.0	835	3.0	0.428	8.5	LOS A	2.2	55.9	0.57	0.40	0.57	26.1
East: Bell Ave															
1	L2	All MCs	220	4.0	220	4.0	0.624	15.4	LOS B	4.7	121.8	0.77	0.90	1.31	23.6
6	T1	All MCs	90	4.0	90	4.0	0.624	15.4	LOS B	4.7	121.8	0.77	0.90	1.31	23.8
16	R2	All MCs	155	4.0	155	4.0	0.624	15.4	LOS B	4.7	121.8	0.77	0.90	1.31	23.7
Approach			465	4.0	465	4.0	0.624	15.4	LOS B	4.7	121.8	0.77	0.90	1.31	23.7
North: Norwood Ave															
7	L2	All MCs	145	3.0	145	3.0	0.436	8.8	LOS A	2.4	61.4	0.59	0.46	0.65	25.5
4	T1	All MCs	635	3.0	635	3.0	0.436	8.8	LOS A	2.4	61.4	0.59	0.46	0.65	26.1
14	R2	All MCs	45	3.0	45	3.0	0.436	8.8	LOS A	2.4	61.4	0.59	0.46	0.65	26.2
Approach			825	3.0	825	3.0	0.436	8.8	LOS A	2.4	61.4	0.59	0.46	0.65	26.0
West: Bell Ave															
5	L2	All MCs	60	1.0	60	1.0	0.636	19.6	LOS B	3.9	98.7	0.80	1.01	1.38	22.9
2	T1	All MCs	150	1.0	150	1.0	0.636	19.6	LOS B	3.9	98.7	0.80	1.01	1.38	23.1
12	R2	All MCs	155	1.0	155	1.0	0.636	19.6	LOS B	3.9	98.7	0.80	1.01	1.38	23.1
Approach			365	1.0	365	1.0	0.636	19.6	LOS B	3.9	98.7	0.80	1.01	1.38	23.1
All Vehicles			2490	2.9	2490	2.9	0.636	11.5	LOS B	4.7	121.8	0.65	0.61	0.85	25.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [Norwood/Bell - PM No Build (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Norwood/Bell - PM No Build
Site Category: Future Conditions 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Norwood Ave															
3	L2	All MCs	130	1.0	130	1.0	0.403	7.3	LOS A	2.2	55.7	0.47	0.29	0.47	26.1
8	T1	All MCs	445	1.0	445	1.0	0.403	7.3	LOS A	2.2	55.7	0.47	0.29	0.47	26.4
18	R2	All MCs	335	1.0	335	1.0	0.403	7.3	LOS A	2.2	55.7	0.47	0.29	0.47	26.5
Approach			910	1.0	910	1.0	0.403	7.3	LOS A	2.2	55.7	0.47	0.29	0.47	26.4
East: Bell Ave															
1	L2	All MCs	300	2.0	300	2.0	0.662	15.6	LOS B	6.1	155.0	0.79	0.93	1.39	23.5
6	T1	All MCs	115	2.0	115	2.0	0.662	15.6	LOS B	6.1	155.0	0.79	0.93	1.39	23.7
16	R2	All MCs	130	2.0	130	2.0	0.662	15.6	LOS B	6.1	155.0	0.79	0.93	1.39	23.6
Approach			545	2.0	545	2.0	0.662	15.6	LOS B	6.1	155.0	0.79	0.93	1.39	23.5
North: Norwood Ave															
7	L2	All MCs	130	1.0	130	1.0	0.452	9.9	LOS A	2.7	67.2	0.66	0.62	0.84	25.2
4	T1	All MCs	610	1.0	610	1.0	0.452	9.9	LOS A	2.7	67.2	0.66	0.62	0.84	25.8
14	R2	All MCs	20	1.0	20	1.0	0.452	9.9	LOS A	2.7	67.2	0.66	0.62	0.84	25.9
Approach			760	1.0	760	1.0	0.452	9.9	LOS A	2.7	67.2	0.66	0.62	0.84	25.7
West: Bell Ave															
5	L2	All MCs	15	1.0	15	1.0	0.391	12.3	LOS B	1.7	42.2	0.70	0.78	0.91	24.8
2	T1	All MCs	90	1.0	90	1.0	0.391	12.3	LOS B	1.7	42.2	0.70	0.78	0.91	25.1
12	R2	All MCs	115	1.0	115	1.0	0.391	12.3	LOS B	1.7	42.2	0.70	0.78	0.91	25.0
Approach			220	1.0	220	1.0	0.391	12.3	LOS B	1.7	42.2	0.70	0.78	0.91	25.0
All Vehicles			2435	1.2	2435	1.2	0.662	10.4	LOS B	6.1	155.0	0.62	0.58	0.83	25.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [Norwood/Bell - AM Road Diet (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Norwood/Bell - AM Road Diet
Site Category: Future Conditions 2
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Norwood Ave															
3	L2	All MCs	55	3.0	55	3.0	0.584	12.7	LOS B	4.8	123.9	0.73	0.77	1.13	24.5
8	T1	All MCs	445	3.0	445	3.0	0.584	12.7	LOS B	4.8	123.9	0.73	0.77	1.13	24.7
18	R2	All MCs	220	3.0	220	3.0	0.256	6.9	LOS A	1.2	29.7	0.56	0.42	0.56	26.4
Approach			720	3.0	720	3.0	0.584	10.9	LOS B	4.8	123.9	0.68	0.66	0.95	25.2
East: Bell Avenue															
1	L2	All MCs	135	4.0	135	4.0	0.578	14.5	LOS B	4.3	111.2	0.78	0.84	1.19	23.7
6	T1	All MCs	95	4.0	95	4.0	0.578	14.5	LOS B	4.3	111.2	0.78	0.84	1.19	23.9
16	R2	All MCs	180	4.0	180	4.0	0.578	14.5	LOS B	4.3	111.2	0.78	0.84	1.19	23.9
Approach			410	4.0	410	4.0	0.578	14.5	LOS B	4.3	111.2	0.78	0.84	1.19	23.8
North: Norwood Ave															
7	L2	All MCs	225	3.0	225	3.0	0.793	19.3	LOS B	16.4	418.9	0.95	1.08	1.73	22.6
4	T1	All MCs	500	3.0	500	3.0	0.793	19.3	LOS B	16.4	418.9	0.95	1.08	1.73	22.9
14	R2	All MCs	55	3.0	55	3.0	0.793	19.3	LOS B	16.4	418.9	0.95	1.08	1.73	22.8
Approach			780	3.0	780	3.0	0.793	19.3	LOS B	16.4	418.9	0.95	1.08	1.73	22.8
West: Bell Avenue															
5	L2	All MCs	75	1.0	75	1.0	0.667	21.8	LOS C	4.6	115.5	0.85	1.03	1.40	22.1
2	T1	All MCs	190	1.0	190	1.0	0.667	21.8	LOS C	4.6	115.5	0.85	1.03	1.40	22.4
12	R2	All MCs	100	1.0	100	1.0	0.667	21.8	LOS C	4.6	115.5	0.85	1.03	1.40	22.3
Approach			365	1.0	365	1.0	0.667	21.8	LOS C	4.6	115.5	0.85	1.03	1.40	22.3
All Vehicles			2275	2.9	2275	2.9	0.793	16.2	LOS B	16.4	418.9	0.82	0.90	1.33	23.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [Norwood/Bell - PM Road Diet (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Norwood/Bell - PM Road Diet
Site Category: Future Conditions 2
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Norwood Ave															
3	L2	All MCs	95	1.0	95	1.0	0.402	7.7	LOS A	2.1	52.7	0.54	0.37	0.54	25.7
8	T1	All MCs	320	1.0	320	1.0	0.402	7.7	LOS A	2.1	52.7	0.54	0.37	0.54	26.0
18	R2	All MCs	250	1.0	250	1.0	0.253	6.1	LOS A	1.2	30.8	0.49	0.33	0.49	26.6
Approach			665	1.0	665	1.0	0.402	7.1	LOS A	2.1	52.7	0.52	0.36	0.52	26.2
East: Bell Avenue															
1	L2	All MCs	205	2.0	205	2.0	0.607	13.3	LOS B	5.8	147.0	0.77	0.79	1.17	23.9
6	T1	All MCs	145	2.0	145	2.0	0.607	13.3	LOS B	5.8	147.0	0.77	0.79	1.17	24.2
16	R2	All MCs	170	2.0	170	2.0	0.607	13.3	LOS B	5.8	147.0	0.77	0.79	1.17	24.1
Approach			520	2.0	520	2.0	0.607	13.3	LOS B	5.8	147.0	0.77	0.79	1.17	24.1
North: Norwood Ave															
7	L2	All MCs	195	1.0	195	1.0	0.840	25.3	LOS C	15.9	401.1	1.00	1.36	2.18	21.4
4	T1	All MCs	495	1.0	495	1.0	0.840	25.3	LOS C	15.9	401.1	1.00	1.36	2.18	21.6
14	R2	All MCs	30	1.0	30	1.0	0.840	25.3	LOS C	15.9	401.1	1.00	1.36	2.18	21.5
Approach			720	1.0	720	1.0	0.840	25.3	LOS C	15.9	401.1	1.00	1.36	2.18	21.5
West: Bell Avenue															
5	L2	All MCs	20	1.0	20	1.0	0.410	13.3	LOS B	2.0	49.4	0.74	0.79	0.93	24.3
2	T1	All MCs	115	1.0	115	1.0	0.410	13.3	LOS B	2.0	49.4	0.74	0.79	0.93	24.6
12	R2	All MCs	85	1.0	85	1.0	0.410	13.3	LOS B	2.0	49.4	0.74	0.79	0.93	24.5
Approach			220	1.0	220	1.0	0.410	13.3	LOS B	2.0	49.4	0.74	0.79	0.93	24.5
All Vehicles			2125	1.2	2125	1.2	0.840	15.4	LOS B	15.9	401.1	0.77	0.85	1.29	23.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 33 [Norwood/Morey - AM No Build (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Norwood/Morey - AM No Build
Site Category: Future Conditions 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Norwood Ave															
3	L2	All MCs	23	3.0	23	3.0	0.360	6.1	LOS A	2.0	50.6	0.29	0.12	0.29	26.8
8	T1	All MCs	881	3.0	881	3.0	0.360	6.1	LOS A	2.0	50.6	0.29	0.12	0.29	27.1
18	R2	All MCs	1	3.0	1	3.0	0.360	6.1	LOS A	2.0	50.6	0.29	0.12	0.29	27.0
Approach			905	3.0	905	3.0	0.360	6.1	LOS A	2.0	50.6	0.29	0.12	0.29	27.1
East: Morey Ave															
1	L2	All MCs	5	1.0	5	1.0	0.019	6.4	LOS A	0.1	1.5	0.59	0.53	0.59	26.0
6	T1	All MCs	1	1.0	1	1.0	0.019	6.4	LOS A	0.1	1.5	0.59	0.53	0.59	26.2
16	R2	All MCs	5	1.0	5	1.0	0.019	6.4	LOS A	0.1	1.5	0.59	0.53	0.59	26.2
Approach			11	1.0	11	1.0	0.019	6.4	LOS A	0.1	1.5	0.59	0.53	0.59	26.1
North: Norwood Ave															
7	L2	All MCs	1	3.0	1	3.0	0.394	5.9	LOS A	2.4	60.6	0.16	0.04	0.16	26.9
4	T1	All MCs	1004	3.0	1004	3.0	0.394	5.9	LOS A	2.4	60.6	0.16	0.04	0.16	27.2
14	R2	All MCs	45	3.0	45	3.0	0.394	5.9	LOS A	2.4	60.6	0.16	0.04	0.16	27.1
Approach			1050	3.0	1050	3.0	0.394	5.9	LOS A	2.4	60.6	0.16	0.04	0.16	27.2
West: Morey Ave															
5	L2	All MCs	90	1.0	90	1.0	0.239	9.5	LOS A	0.8	21.2	0.65	0.65	0.65	24.8
2	T1	All MCs	1	1.0	1	1.0	0.239	9.5	LOS A	0.8	21.2	0.65	0.65	0.65	25.1
12	R2	All MCs	45	1.0	45	1.0	0.239	9.5	LOS A	0.8	21.2	0.65	0.65	0.65	25.0
Approach			136	1.0	136	1.0	0.239	9.5	LOS A	0.8	21.2	0.65	0.65	0.65	24.9
All Vehicles			2102	2.9	2102	2.9	0.394	6.2	LOS A	2.4	60.6	0.25	0.12	0.25	27.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 33 [Norwood/Morey - PM No Build (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Norwood/Morey - PM No Build
Site Category: Future Conditions 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Norwood Ave															
3	L2	All MCs	45	3.0	45	3.0	0.360	5.8	LOS A	2.0	52.1	0.20	0.06	0.20	26.8
8	T1	All MCs	899	3.0	899	3.0	0.360	5.8	LOS A	2.0	52.1	0.20	0.06	0.20	27.2
18	R2	All MCs	1	3.0	1	3.0	0.360	5.8	LOS A	2.0	52.1	0.20	0.06	0.20	27.1
Approach			945	3.0	945	3.0	0.360	5.8	LOS A	2.0	52.1	0.20	0.06	0.20	27.2
East: Morey Ave															
1	L2	All MCs	5	1.0	5	1.0	0.019	6.4	LOS A	0.1	1.5	0.59	0.53	0.59	26.0
6	T1	All MCs	1	1.0	1	1.0	0.019	6.4	LOS A	0.1	1.5	0.59	0.53	0.59	26.2
16	R2	All MCs	5	1.0	5	1.0	0.019	6.4	LOS A	0.1	1.5	0.59	0.53	0.59	26.2
Approach			11	1.0	11	1.0	0.019	6.4	LOS A	0.1	1.5	0.59	0.53	0.59	26.1
North: Norwood Ave															
7	L2	All MCs	1	3.0	1	3.0	0.421	6.5	LOS A	2.6	66.6	0.23	0.08	0.23	26.7
4	T1	All MCs	1009	3.0	1009	3.0	0.421	6.5	LOS A	2.6	66.6	0.23	0.08	0.23	27.0
14	R2	All MCs	90	3.0	90	3.0	0.421	6.5	LOS A	2.6	66.6	0.23	0.08	0.23	26.9
Approach			1100	3.0	1100	3.0	0.421	6.5	LOS A	2.6	66.6	0.23	0.08	0.23	27.0
West: Morey Ave															
5	L2	All MCs	45	1.0	45	1.0	0.122	7.8	LOS A	0.4	10.2	0.62	0.62	0.62	25.3
2	T1	All MCs	1	1.0	1	1.0	0.122	7.8	LOS A	0.4	10.2	0.62	0.62	0.62	25.6
12	R2	All MCs	23	1.0	23	1.0	0.122	7.8	LOS A	0.4	10.2	0.62	0.62	0.62	25.5
Approach			69	1.0	69	1.0	0.122	7.8	LOS A	0.4	10.2	0.62	0.62	0.62	25.4
All Vehicles			2125	2.9	2125	2.9	0.421	6.2	LOS A	2.6	66.6	0.23	0.09	0.23	27.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [Norwood/Morey - AM Road Diet (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Norwood/Morey - AM Road Diet
Site Category: Future Conditions 2
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Norwood Ave															
3	L2	All MCs	23	3.0	23	3.0	0.579	9.4	LOS A	4.9	125.7	0.44	0.19	0.44	25.5
8	T1	All MCs	681	3.0	681	3.0	0.579	9.4	LOS A	4.9	125.7	0.44	0.19	0.44	25.8
18	R2	All MCs	1	3.0	1	3.0	0.579	9.4	LOS A	4.9	125.7	0.44	0.19	0.44	25.6
Approach			705	3.0	705	3.0	0.579	9.4	LOS A	4.9	125.7	0.44	0.19	0.44	25.7
East: Morey Avenue															
1	L2	All MCs	5	1.0	5	1.0	0.019	6.3	LOS A	0.1	1.7	0.61	0.51	0.61	25.8
6	T1	All MCs	1	1.0	1	1.0	0.019	6.3	LOS A	0.1	1.7	0.61	0.51	0.61	26.1
16	R2	All MCs	5	1.0	5	1.0	0.019	6.3	LOS A	0.1	1.7	0.61	0.51	0.61	26.0
Approach			11	1.0	11	1.0	0.019	6.3	LOS A	0.1	1.7	0.61	0.51	0.61	25.9
North: Norwood Ave															
7	L2	All MCs	1	3.0	1	3.0	0.557	7.8	LOS A	4.9	126.1	0.24	0.07	0.24	25.9
4	T1	All MCs	679	3.0	679	3.0	0.557	7.8	LOS A	4.9	126.1	0.24	0.07	0.24	26.2
14	R2	All MCs	45	3.0	45	3.0	0.557	7.8	LOS A	4.9	126.1	0.24	0.07	0.24	26.1
Approach			725	3.0	725	3.0	0.557	7.8	LOS A	4.9	126.1	0.24	0.07	0.24	26.2
West: Morey Avenue															
5	L2	All MCs	90	1.0	90	1.0	0.206	7.9	LOS A	0.8	21.3	0.64	0.57	0.64	25.1
2	T1	All MCs	1	1.0	1	1.0	0.206	7.9	LOS A	0.8	21.3	0.64	0.57	0.64	25.4
12	R2	All MCs	45	1.0	45	1.0	0.206	7.9	LOS A	0.8	21.3	0.64	0.57	0.64	25.3
Approach			136	1.0	136	1.0	0.206	7.9	LOS A	0.8	21.3	0.64	0.57	0.64	25.1
All Vehicles			1577	2.8	1577	2.8	0.579	8.5	LOS A	4.9	126.1	0.37	0.17	0.37	25.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [Norwood/Morey - PM Road Diet (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Norwood/Morey - PM Road Diet
Site Category: Future Conditions 2
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Norwood Ave															
3	L2	All MCs	45	3.0	45	3.0	0.548	8.2	LOS A	4.6	118.9	0.30	0.10	0.30	25.8
8	T1	All MCs	654	3.0	654	3.0	0.548	8.2	LOS A	4.6	118.9	0.30	0.10	0.30	26.1
18	R2	All MCs	1	3.0	1	3.0	0.548	8.2	LOS A	4.6	118.9	0.30	0.10	0.30	26.0
Approach			700	3.0	700	3.0	0.548	8.2	LOS A	4.6	118.9	0.30	0.10	0.30	26.0
East: Morey Avenue															
1	L2	All MCs	5	1.0	5	1.0	0.018	6.0	LOS A	0.1	1.6	0.59	0.49	0.59	25.9
6	T1	All MCs	1	1.0	1	1.0	0.018	6.0	LOS A	0.1	1.6	0.59	0.49	0.59	26.2
16	R2	All MCs	5	1.0	5	1.0	0.018	6.0	LOS A	0.1	1.6	0.59	0.49	0.59	26.1
Approach			11	1.0	11	1.0	0.018	6.0	LOS A	0.1	1.6	0.59	0.49	0.59	26.0
North: Norwood Ave															
7	L2	All MCs	1	3.0	1	3.0	0.712	11.4	LOS B	8.9	227.2	0.47	0.16	0.47	24.9
4	T1	All MCs	814	3.0	814	3.0	0.712	11.4	LOS B	8.9	227.2	0.47	0.16	0.47	25.2
14	R2	All MCs	90	3.0	90	3.0	0.712	11.4	LOS B	8.9	227.2	0.47	0.16	0.47	25.1
Approach			905	3.0	905	3.0	0.712	11.4	LOS B	8.9	227.2	0.47	0.16	0.47	25.2
West: Morey Avenue															
5	L2	All MCs	45	1.0	45	1.0	0.121	7.8	LOS A	0.5	11.5	0.64	0.61	0.64	25.1
2	T1	All MCs	1	1.0	1	1.0	0.121	7.8	LOS A	0.5	11.5	0.64	0.61	0.64	25.4
12	R2	All MCs	23	1.0	23	1.0	0.121	7.8	LOS A	0.5	11.5	0.64	0.61	0.64	25.3
Approach			69	1.0	69	1.0	0.121	7.8	LOS A	0.5	11.5	0.64	0.61	0.64	25.2
All Vehicles			1685	2.9	1685	2.9	0.712	9.9	LOS A	8.9	227.2	0.40	0.16	0.40	25.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [Norwood/Silver Eagle Road - AM No Build (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Norwood/Silver Eagle Road - AM No Build
Site Category: Future Conditions 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Norwood Ave															
3	L2	All MCs	135	2.0	135	2.0	0.401	8.3	LOS A	2.0	49.9	0.58	0.43	0.58	25.7
8	T1	All MCs	600	2.0	600	2.0	0.401	8.3	LOS A	2.0	49.9	0.58	0.43	0.58	26.2
18	R2	All MCs	20	2.0	20	2.0	0.401	8.3	LOS A	2.0	49.9	0.58	0.43	0.58	26.3
Approach			755	2.0	755	2.0	0.401	8.3	LOS A	2.0	49.9	0.58	0.43	0.58	26.1
East: Silver Eagle Road															
1	L2	All MCs	45	3.0	45	3.0	0.375	12.3	LOS B	1.5	38.7	0.69	0.76	0.89	24.7
6	T1	All MCs	115	3.0	115	3.0	0.375	12.3	LOS B	1.5	38.7	0.69	0.76	0.89	25.0
16	R2	All MCs	45	3.0	45	3.0	0.375	12.3	LOS B	1.5	38.7	0.69	0.76	0.89	24.9
Approach			205	3.0	205	3.0	0.375	12.3	LOS B	1.5	38.7	0.69	0.76	0.89	24.9
North: Norwood Ave															
7	L2	All MCs	25	3.0	25	3.0	0.426	8.1	LOS A	2.2	57.6	0.54	0.36	0.54	26.1
4	T1	All MCs	665	3.0	665	3.0	0.426	8.1	LOS A	2.2	57.6	0.54	0.36	0.54	26.4
14	R2	All MCs	190	3.0	190	3.0	0.426	8.1	LOS A	2.2	57.6	0.54	0.36	0.54	26.3
Approach			880	3.0	880	3.0	0.426	8.1	LOS A	2.2	57.6	0.54	0.36	0.54	26.4
West: Silver Eagle Road															
5	L2	All MCs	260	5.0	260	5.0	0.553	14.5	LOS B	3.3	85.3	0.74	0.85	1.17	23.6
2	T1	All MCs	110	5.0	110	5.0	0.553	14.5	LOS B	3.3	85.3	0.74	0.85	1.17	23.8
12	R2	All MCs	195	5.0	195	5.0	0.319	10.2	LOS B	1.2	32.4	0.65	0.63	0.72	25.5
Approach			565	5.0	565	5.0	0.553	13.0	LOS B	3.3	85.3	0.71	0.77	1.01	24.3
All Vehicles			2405	3.2	2405	3.2	0.553	9.7	LOS A	3.3	85.3	0.60	0.51	0.69	25.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [Norwood/Silver Eagle Road - PM No Build (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Norwood/Silver Eagle Road - PM No Build
Site Category: Future Conditions 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Norwood Ave															
3	L2	All MCs	190	2.0	190	2.0	0.480	10.2	LOS B	3.1	77.7	0.66	0.61	0.85	25.0
8	T1	All MCs	625	2.0	625	2.0	0.480	10.2	LOS B	3.1	77.7	0.66	0.61	0.85	25.7
18	R2	All MCs	25	2.0	25	2.0	0.480	10.2	LOS B	3.1	77.7	0.66	0.61	0.85	25.8
Approach			840	2.0	840	2.0	0.480	10.2	LOS B	3.1	77.7	0.66	0.61	0.85	25.5
East: Silver Eagle Road															
1	L2	All MCs	15	1.0	15	1.0	0.328	11.6	LOS B	1.3	32.0	0.70	0.75	0.83	25.1
6	T1	All MCs	120	1.0	120	1.0	0.328	11.6	LOS B	1.3	32.0	0.70	0.75	0.83	25.3
16	R2	All MCs	40	1.0	40	1.0	0.328	11.6	LOS B	1.3	32.0	0.70	0.75	0.83	25.3
Approach			175	1.0	175	1.0	0.328	11.6	LOS B	1.3	32.0	0.70	0.75	0.83	25.3
North: Norwood Ave															
7	L2	All MCs	45	1.0	45	1.0	0.430	8.1	LOS A	2.3	58.1	0.56	0.38	0.56	26.1
4	T1	All MCs	610	1.0	610	1.0	0.430	8.1	LOS A	2.3	58.1	0.56	0.38	0.56	26.4
14	R2	All MCs	235	1.0	235	1.0	0.430	8.1	LOS A	2.3	58.1	0.56	0.38	0.56	26.3
Approach			890	1.0	890	1.0	0.430	8.1	LOS A	2.3	58.1	0.56	0.38	0.56	26.3
West: Silver Eagle Road															
5	L2	All MCs	280	1.0	280	1.0	0.563	13.1	LOS B	3.9	98.2	0.73	0.81	1.14	24.0
2	T1	All MCs	160	1.0	160	1.0	0.563	13.1	LOS B	3.9	98.2	0.73	0.81	1.14	24.3
12	R2	All MCs	230	1.0	230	1.0	0.323	9.0	LOS A	1.4	34.3	0.63	0.57	0.66	25.9
Approach			670	1.0	670	1.0	0.563	11.7	LOS B	3.9	98.2	0.70	0.73	0.97	24.7
All Vehicles			2575	1.3	2575	1.3	0.563	10.0	LOS A	3.9	98.2	0.64	0.57	0.78	25.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [Norwood/Silver Eagle Road - AM Road Diet (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Norwood/Silver Eagle Road - AM Road Diet
Site Category: Future Conditions 2
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Norwood Ave															
3	L2	All MCs	195	2.0	195	2.0	0.740	17.1	LOS B	11.7	296.8	0.88	0.98	1.55	23.2
8	T1	All MCs	475	2.0	475	2.0	0.740	17.1	LOS B	11.7	296.8	0.88	0.98	1.55	23.4
18	R2	All MCs	25	2.0	25	2.0	0.740	17.1	LOS B	11.7	296.8	0.88	0.98	1.55	23.3
Approach			695	2.0	695	2.0	0.740	17.1	LOS B	11.7	296.8	0.88	0.98	1.55	23.3
East: Silver Eagle Road															
1	L2	All MCs	50	3.0	50	3.0	0.392	13.1	LOS B	1.8	45.8	0.74	0.78	0.91	24.2
6	T1	All MCs	125	3.0	125	3.0	0.392	13.1	LOS B	1.8	45.8	0.74	0.78	0.91	24.4
16	R2	All MCs	30	3.0	30	3.0	0.392	13.1	LOS B	1.8	45.8	0.74	0.78	0.91	24.3
Approach			205	3.0	205	3.0	0.392	13.1	LOS B	1.8	45.8	0.74	0.78	0.91	24.4
North: Norwood Ave															
7	L2	All MCs	10	3.0	10	3.0	0.688	15.4	LOS B	8.8	225.5	0.83	0.89	1.38	23.8
4	T1	All MCs	420	3.0	420	3.0	0.688	15.4	LOS B	8.8	225.5	0.83	0.89	1.38	24.1
14	R2	All MCs	190	3.0	190	3.0	0.688	15.4	LOS B	8.8	225.5	0.83	0.89	1.38	24.0
Approach			620	3.0	620	3.0	0.688	15.4	LOS B	8.8	225.5	0.83	0.89	1.38	24.0
West: Silver Eagle Road															
5	L2	All MCs	200	5.0	200	5.0	0.390	8.9	LOS A	1.9	48.8	0.61	0.51	0.67	24.9
2	T1	All MCs	125	5.0	125	5.0	0.390	8.9	LOS A	1.9	48.8	0.61	0.51	0.67	25.2
12	R2	All MCs	270	5.0	270	5.0	0.344	8.7	LOS A	1.6	41.1	0.62	0.49	0.62	25.8
Approach			595	5.0	595	5.0	0.390	8.8	LOS A	1.9	48.8	0.62	0.50	0.65	25.3
All Vehicles			2115	3.2	2115	3.2	0.740	13.9	LOS B	11.7	296.8	0.78	0.80	1.18	24.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [Norwood/Silver Eagle Road - PM Road Diet (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Norwood/Silver Eagle Road - PM Road Diet
Site Category: Future Conditions 2
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Norwood Ave															
3	L2	All MCs	210	2.0	210	2.0	0.811	22.9	LOS C	14.0	354.7	0.98	1.25	1.99	21.9
8	T1	All MCs	455	2.0	455	2.0	0.811	22.9	LOS C	14.0	354.7	0.98	1.25	1.99	22.1
18	R2	All MCs	30	2.0	30	2.0	0.811	22.9	LOS C	14.0	354.7	0.98	1.25	1.99	22.0
Approach			695	2.0	695	2.0	0.811	22.9	LOS C	14.0	354.7	0.98	1.25	1.99	22.0
East: Silver Eagle Road															
1	L2	All MCs	20	1.0	20	1.0	0.365	12.0	LOS B	1.7	41.9	0.73	0.75	0.86	24.6
6	T1	All MCs	140	1.0	140	1.0	0.365	12.0	LOS B	1.7	41.9	0.73	0.75	0.86	24.9
16	R2	All MCs	40	1.0	40	1.0	0.365	12.0	LOS B	1.7	41.9	0.73	0.75	0.86	24.8
Approach			200	1.0	200	1.0	0.365	12.0	LOS B	1.7	41.9	0.73	0.75	0.86	24.8
North: Norwood Ave															
7	L2	All MCs	45	1.0	45	1.0	0.760	18.3	LOS B	12.5	314.7	0.91	1.05	1.66	23.1
4	T1	All MCs	480	1.0	480	1.0	0.760	18.3	LOS B	12.5	314.7	0.91	1.05	1.66	23.3
14	R2	All MCs	180	1.0	180	1.0	0.760	18.3	LOS B	12.5	314.7	0.91	1.05	1.66	23.2
Approach			705	1.0	705	1.0	0.760	18.3	LOS B	12.5	314.7	0.91	1.05	1.66	23.3
West: Silver Eagle Road															
5	L2	All MCs	205	1.0	205	1.0	0.662	15.2	LOS B	6.4	160.9	0.81	0.90	1.34	23.5
2	T1	All MCs	185	1.0	185	1.0	0.662	15.2	LOS B	6.4	160.9	0.81	0.90	1.34	23.7
12	R2	All MCs	260	1.0	260	1.0	0.662	12.5	LOS B	6.4	160.9	0.74	0.78	1.09	24.5
Approach			650	1.0	650	1.0	0.662	14.1	LOS B	6.4	160.9	0.78	0.85	1.24	24.0
All Vehicles			2250	1.3	2250	1.3	0.811	18.0	LOS B	14.0	354.7	0.88	1.03	1.57	23.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: DKS ASSOCIATES | Licence: NETWORK / FLOATING | Processed: Thursday, February 20, 2025 6:48:37 PM
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The Norwood
Mobility Project

C – Engagement Summaries

The Norwood
Mobility Project

Phase 1 Engagement Materials

The Norwood Mobility Project

Help us develop a plan to improve safety and access on Norwood Avenue whether you are walking, biking, driving, or taking the bus!

¡Ayúdenos a desarrollar un plan para mejorar la seguridad y el acceso en Norwood Avenue ya sea que esté caminando, en bicicleta, conduciendo o tomando el autobús!

Join us for a workshop to share your ideas!

Únase a nosotros para un taller para ***compartir sus ideas!***

IN-PERSON
EN PERSONA

November 18, 2024 | *18 de noviembre de 2024*

6:30 PM - 8:00 PM

Robertson Community Center
3525 Norwood Ave Sacramento

VIRTUAL
VIRTUAL

December 9, 2024 | *9 de diciembre de 2024*

6:30 PM - 7:30 PM

Via Zoom Meeting | *Vía reunión de Zoom*
Register at | *Regístrese en*: bit.ly/norwood-register
Meeting ID | *ID de reunión*: 899 0189 8092
Passcode | *Código de acceso*: Norwood

Registration is required to attend
Es necesario registrarse para asistir

For more information, visit our website at:
Para más información visite nuestro sitio web en:
www.NorwoodMobility.org

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City of SACRAMENTO

The Norwood Mobility Project

City of SACRAMENTO

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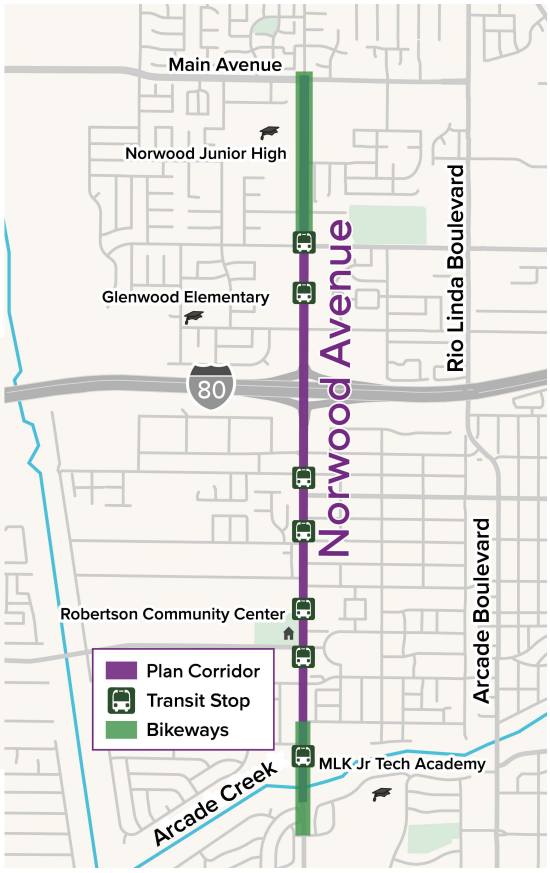

The Norwood Mobility Project

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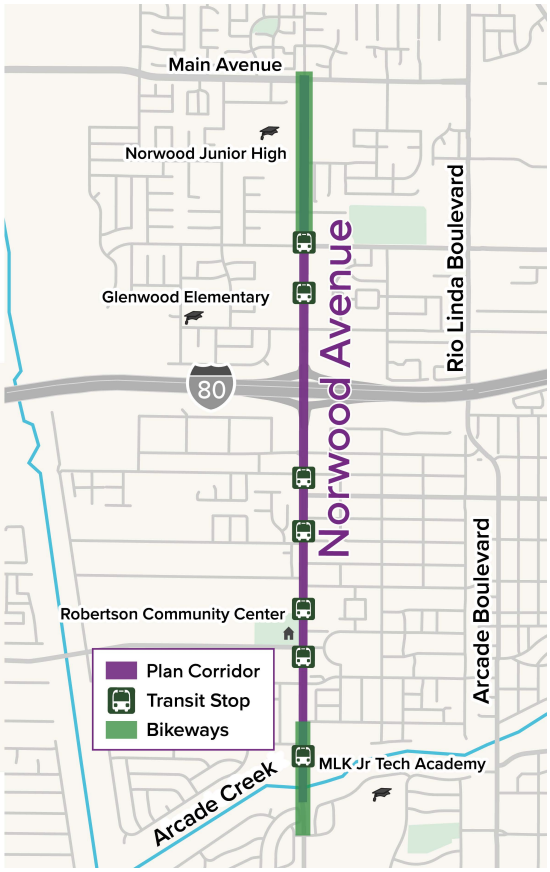


The Norwood Mobility Project

English

Open

Embed

Community Survey

Please take the following brief survey. Your input is extremely valuable, and it will help the project team select the preferred future options and potential physical changes to Norwood Avenue.

What is your zip code?

How often do you typically travel on Norwood Avenue?

Daily

- ○ Some Days (e.g., work commute, shopping, and errands)
- ○ Weekly
- ○ Every Couple of Weeks
- ○ Monthly
- ○ Rarely

How do you typically travel on Norwood Avenue? Select all that apply.

- ☐ Driving in a Personal Vehicle
- ☐ Riding in a Personal Vehicle
- ☐ Public Transit
- ☐ Paratransit
- ☐ Walking/Rolling
- ☐ Bicycling (including using e-bikes)
- ☐ Scooting
- ☐ Ride-Sharing (Uber, Lyft), Taxi
- ☐ Other (please specify)

For the next questions, please rate your interest in each potential change to Norwood Avenue on a scale from 1 (least interested) to 5 (most interested).

Improved public transit stop conditions and access.

1 = least interested, 5 = most interested.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

Improved walking conditions such as wider sidewalks and street trees.

1 = least interested, 5 = most interested.

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5

Improved walking and bicycling crossing of Norwood Ave.

1 = least interested, 5 = most interested.

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5

Improved bikeways on Norwood (buffer bike lanes or separated bikeways with a post or curb).

1 = least interested, 5 = most interested.

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5

Reduced driver speed.

1 = least interested, 5 = most interested.

- ◯ 1

Improved driving safety.

1 = least interested, 5 = most interested.

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5

Other transportation safety-related improvements (please specify and rate your interest in the change from 1 to 5).

The following optional three demographic questions help us know if we are getting a broad and representative range of community perspectives. Please still submit this survey even if you decide to not answer these three optional questions.

What best describes your race or ethnicity? Select all that apply.

(Optional).

- ☐ Asian
- ☐ Black or African American
- ☐ Hispanic or Latino/a/e
- ☐ Middle Eastern or North African
- ☐ Native American or Alaska Native
- ☐ Native Hawaiian or other Pacific Islander

- [ ] White
- [ ] Prefer not to say
- [ ] Other (please specify)

What is your age?

(Optional).

- ○ Under 18
- ○ 18 to 24 years
- ○ 25 to 34 years
- ○ 35 to 44 years
- ○ 45 to 64 years
- ○ 65 to 84 years
- ○ 85 to 99 years
- ○ 100 years and older

Do you identify as someone with a mobility or related disability that impacts how you travel?

(Optional).

- ○ Yes
- ○ No
- ○ Prefer not to say

Do you have any other comments related to accessibility and safety on Norwood Ave?

The Norwood
Mobility Project

Phase 1 Engagement Summary

Phase 1 Public Engagement Summary

The following section summarizes engagement methods and feedback received during the first round of public engagement.

Public Engagement Events

In-Person Events

The project team attended the Harvest Festival on Saturday, October 26, 2024. The Harvest Festival is a family friendly event that is highly attended and includes vendors, local organizations, and public agencies to promote their services and goods while providing a space for families to "trick or treat". This event was attended by the City to promote awareness of the Norwood Mobility Project, gather public input about current issues along the corridor, and encourage community members to complete a project survey. The project team interacted with over 50 people at the Harvest Festival.

A public workshop was held on Monday, November 18, 2024, from 6:30 to 8:00 pm. The workshop provided residents, employees, business owners, school district officials, parents, and other interested parties an opportunity to learn about the study and the City's efforts to improve corridor conditions. Attendees were introduced to the project's purpose, need, and goals, provided an opportunity to complete a community survey, and/or leave comments on the social pinpoint interactive map. Four comment boards were also provided to gather public input with each board denoting a transportation mode (i.e., walking, biking, driving, or transit). Approximately 10 people from the public attended the workshop. Attendees were engaged and receptive to the project and provided feedback regarding areas of concern on Norwood Avenue and potential improvements they would support.

On December 19, 2024, City staff attended a public workshop hosted by the Neighborhood Development Action Team (NDAT). The NDAT workshop was held at Bella's Boba, east of Norwood Avenue on Eleanor Avenue. This event was attended by approximately 20

members of the community and provided attendees with project information and the opportunity to complete a community survey, provide input on a map board, or discuss corridor issues with project staff.

Virtual Meeting

On Monday, December 9, 2024, a virtual community meeting was held. This virtual meeting served the same purpose as the in-person workshop to raise project awareness, gather public comment, and concerns. The event was held via Zoom from 6:30pm to 7:30pm in an effort to ensure community members could participate in project discussion and provide input. The virtual workshop consisted of a brief presentation to introduce the project purpose, need, and overall goals. During the virtual meeting, attendees were given the opportunity to provide comments, questions, or raise concerns to project staff. Participants were also given the project website information to complete the survey and/or interactive map on their own time.

Engagement Media Methods

Project Website

Integrated into the City of Sacramento website, a project specific webpage was created for the Norwood Mobility Project[17]. As shown in **Figure 27**, information such as project background, corridor extents, project schedule, and input methods are provided. The project webpage offers two forms of public input such as a community survey and interactive Social Pinpoint map (**Figure 28**). The community survey was provided at the in-person workshop in English and Spanish, the online version allows for translation (**Figure** 29).

[17] Norwood Mobility Project

The Norwood Mobility Project

Project overview

Norwood Avenue between Main Avenue and Arcade Creek is a critical corridor serving local neighborhoods, as well as students and businesses. However, it is part of the City's High Injury Network, corridors with a high number of transportation related severe injuries and fatalities, and identified as a high priority project in the City's Transportation Priorities Plan.

The City was awarded a competitive planning grant to review data and work with the community to develop a plan to address safety and mobility on the corridor.

The goal of the plan is to identify a data driven, community supported vision for a future Norwood Avenue, inclusive of all users and reflective of the needs of the community it serves, eliminating barriers to jobs, housing, and services.

Having a Council adopted plan ensures the City is eligible for competitive grant funding for any next phases such as Preliminary Engineering Design, Environmental Clearance, Final Design and Construction.

Project schedule

Fall 2024: Existing conditions analysis

Fall-Winter 2024/2025: Community engagement phase 1, including in-person and virtual workshops and pop-ins

Fall 2024 – Spring 2025: Alternatives analysis

Winter 2025: Community engagement phase 2, including community survey, virtual open house and focus groups

Spring -Fall 2025: Draft plan development and community engagement

Winter 2025: Final Plan

The Norwood Mobility Project Schedule

Share your input

Explore The Norwood Mobility Project interactive map where you can share your comments.

There will be a variety of opportunities for you to get involved and provide your input, including community pop-ins where we will meet with the community where they are, as well as in-person and virtual workshops.

In-Person Workshop

Monday, November 18, 2024 (completed!)

Virtual Workshop

Monday, December 9, 2024

6:30-7:30pm

Registration link

Registration required

You can review our Norwood Mobility Project Phase 1 presentation here.

The Norwood Mobility Project

Figure 27. Norwood Mobility Project Web Page

We need your input!

Use the interactive map to provide comments about locations in the study area.

Follow these instructions to use the map:

- To add a comment > Select the 'Add Marker' button in the lower right corner of the map and click the specific location where you want to leave your comment. Fill out the details of the input form as required and select the 'Submit' button.

  Add Marker

- To view the map legend and/or turn map layer on/off > Select the icon in the upper left corner of the map that looks like a stack of papers. The display box will show the maps layers. Click next to the circle to the right of each layer label to toggle that layer on/off.

- To select an a different base map > Select the icon in the upper left corner of the map that looks like an unfolded map. The display box will show several base map options to choose from.

- To view additional map instructions > Select the question mark icon just above the map in the upper left corner. The display box will include more instruction information.

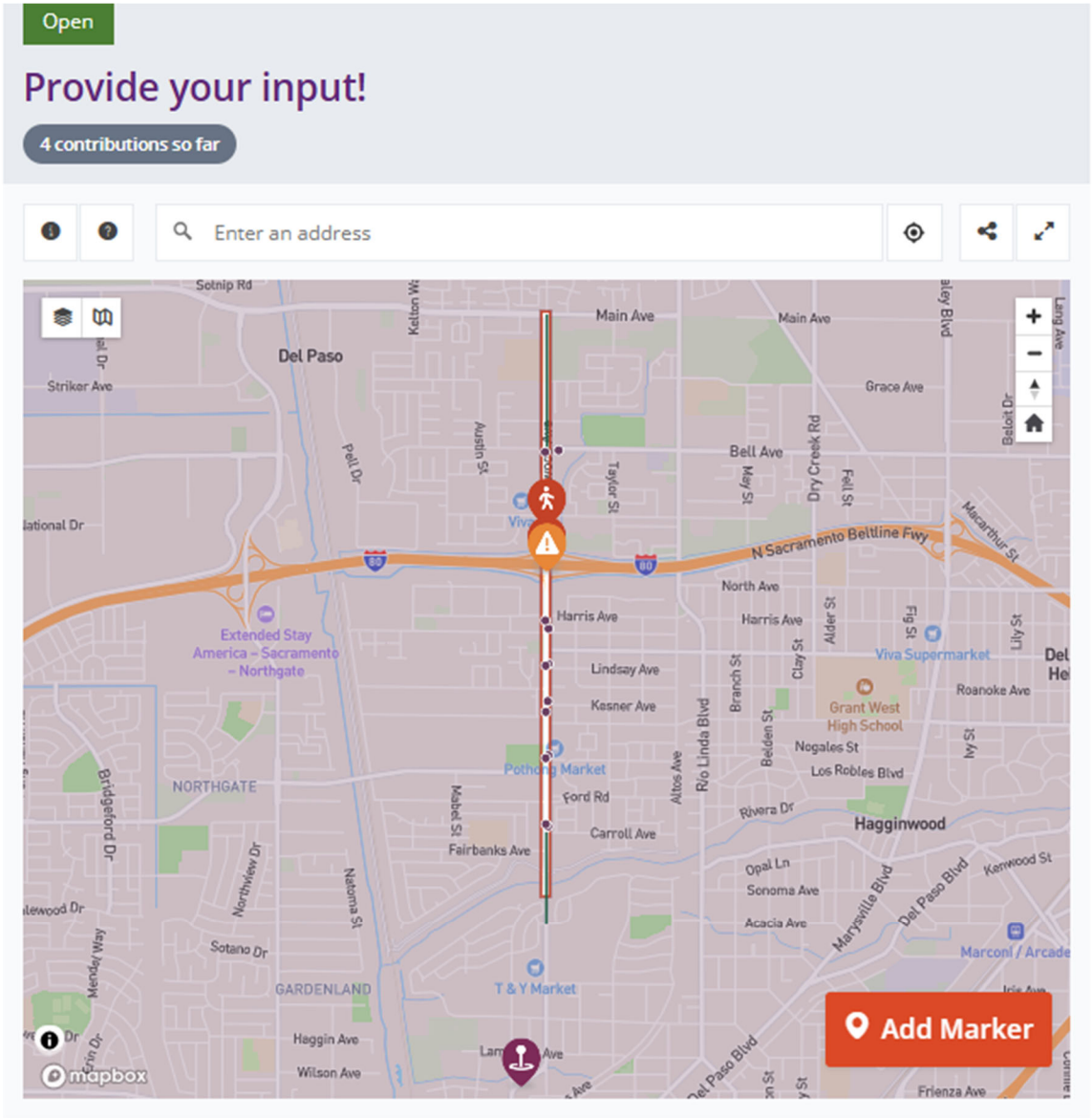
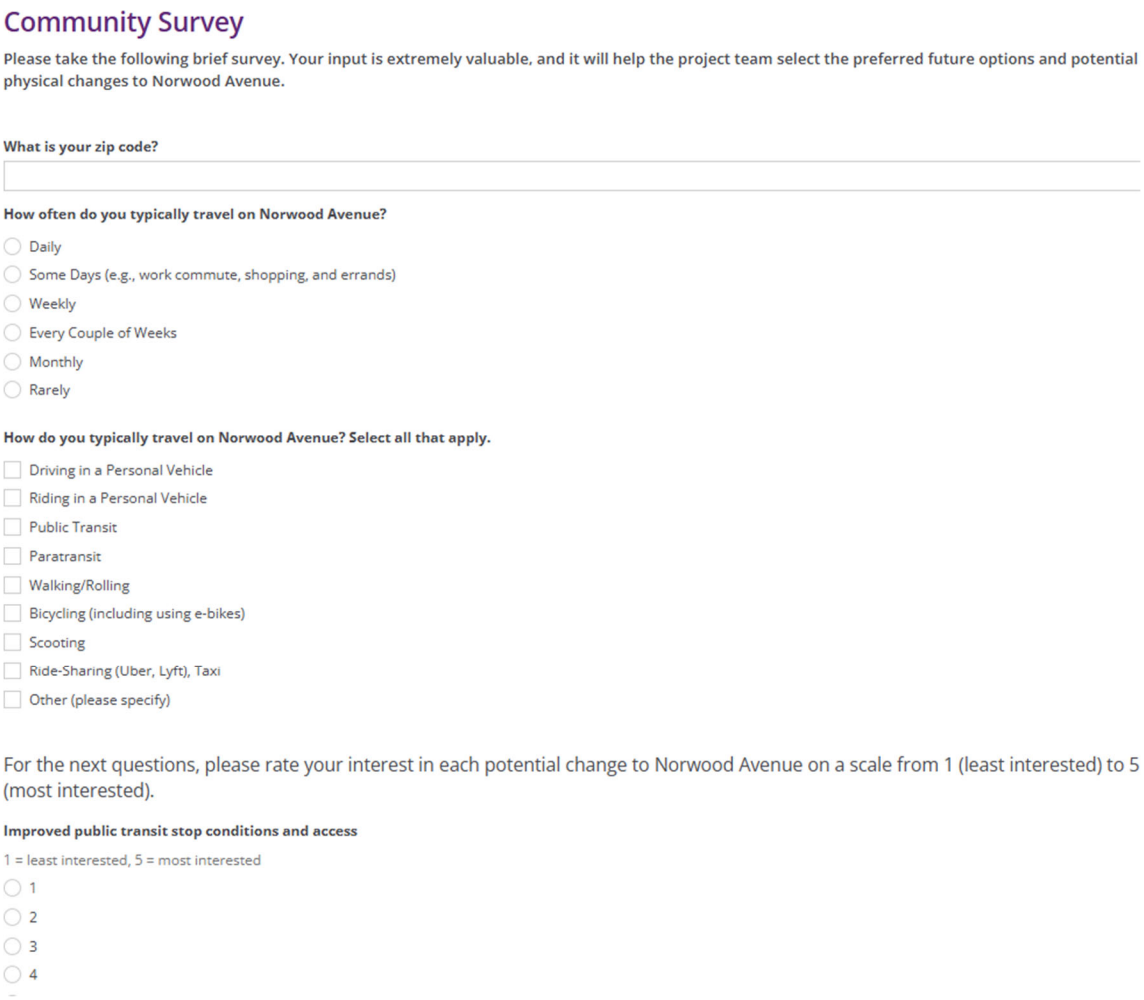


Figure 28. Norwood Avenue Interactive Comment Map



Community Survey

Please take the following brief survey. Your input is extremely valuable, and it will help the project team select the preferred future options and potential physical changes to Norwood Avenue.

What is your zip code?

How often do you typically travel on Norwood Avenue?

- Daily
- Some Days (e.g., work commute, shopping, and errands)
- Weekly
- Every Couple of Weeks
- Monthly
- Rarely

How do you typically travel on Norwood Avenue? Select all that apply.

- Driving in a Personal Vehicle
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- Bicycling (including using e-bikes)
- Scooting
- Ride-Sharing (Uber, Lyft), Taxi
- Other (please specify)

For the next questions, please rate your interest in each potential change to Norwood Avenue on a scale from 1 (least interested) to 5 (most interested).

Improved public transit stop conditions and access

1 = least interested, 5 = most interested

- 1
- 2
- 3
- 4

Figure 29. Norwood Avenue Community Survey

Event Flyers

To promote awareness of the public workshop and virtual meeting, a flyer was circulated on the City of Sacramento website, pop-up events, and social media outlets to promote the upcoming events. As shown in **Figure 30**, the event flyer consisted of meeting information, project background, links, and a QR code to route views to the project website, survey, and comment map.

Figure 30. Norwood Avenue Event Flyer

Public Engagement Results

Since the project webpage launch in September up to December 2024, the Norwood Mobility Project received several comments through various outlets such as the interactive map, public survey, and engagement events.

The community survey results are based on 75 respondents, 49 of the survey responses are from in-person events. Survey results indicated that around 76% of survey respondents travel on Norwood Avenue daily; about 75% typically drive in their personal vehicle, approximately 29% walk/roll, and about 16% take public transit on Norwood Avenue.

Survey respondents were mostly interested in improving crossing opportunities for those walking and bicycling on Norwood Avenue, reduced driver speed, improved driver safety, and improved walking conditions such as wider sidewalks and street trees.

Based on 54 comments received via the online interactive map and in-person events, 26 comments were specific to Bell Avenue, Jessie Avenue, and I-80 eastbound and westbound on/off ramps and generated the most concern from those who provided input (**Figure 31**). Walking access, driving operations, and safety were the most prominent concerns for respondents at Bell Avenue, Jessie Avenue and I-80 ramps. Jessie Avenue is one of the primary community focal points along with the Robertson Community Center and Pothong Market. The Jessie Avenue intersection provides key access to the Viva Supermarket, Rite Aid, Arco, and fast-food restaurants. Additionally, I-80 westbound on-off ramps are directly accessed by Jessie Avenue. Bell Avenue is a key intersection for people living in adjacent multi-family housing to access Norwood Avenue.

Figure 32 illustrates the comments stratified by transportation mode on Norwood Avenue. Approximately 43% revolve around walking concerns, such as areas where people walking feel unsafe. As noted, community members would support improved safety for people walking, including high-visibility crosswalks and lighting. The complete list of survey results and comments received are included in *Appendix E*.

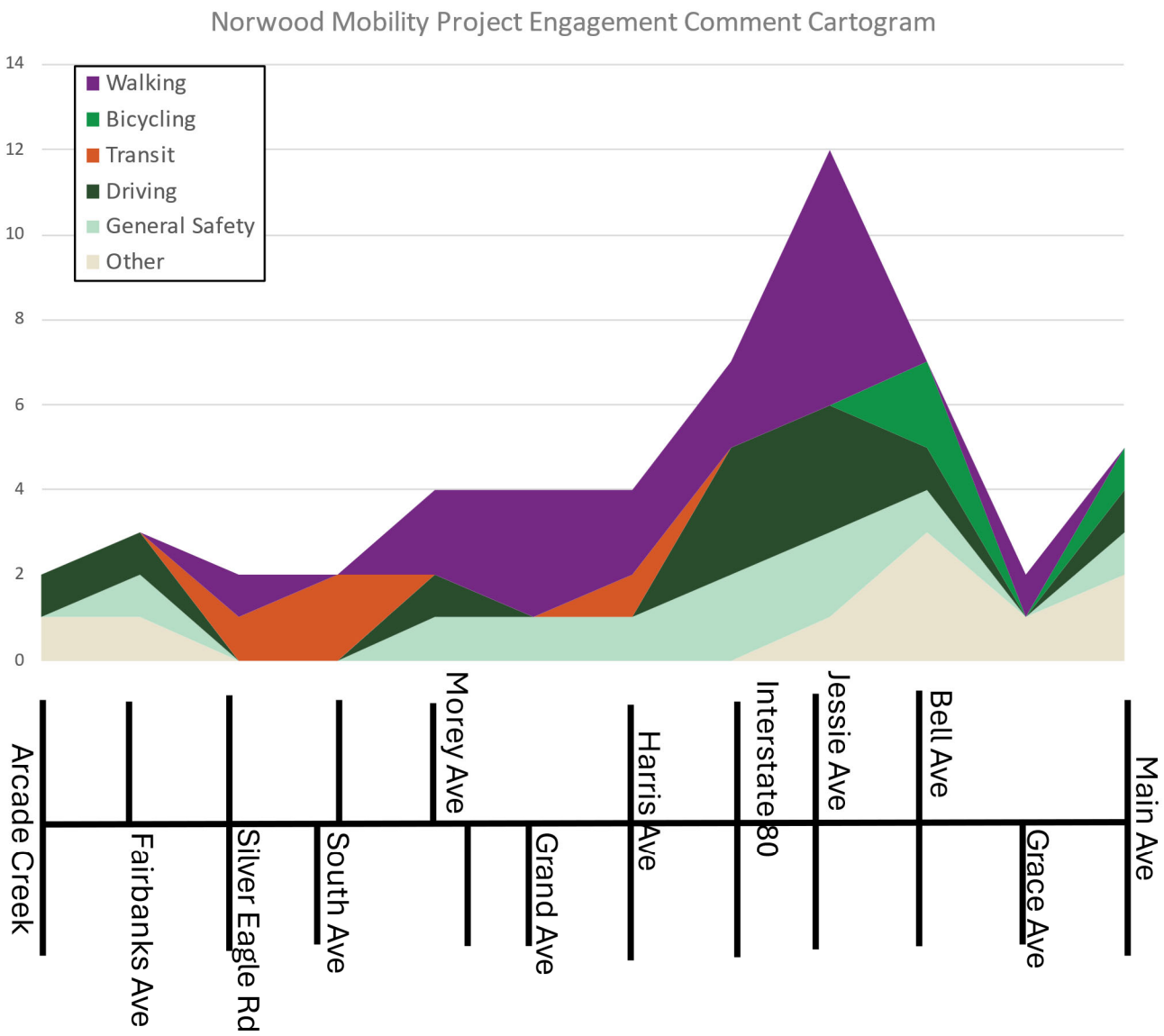


Figure 31. Engagement comments by Major Intersection

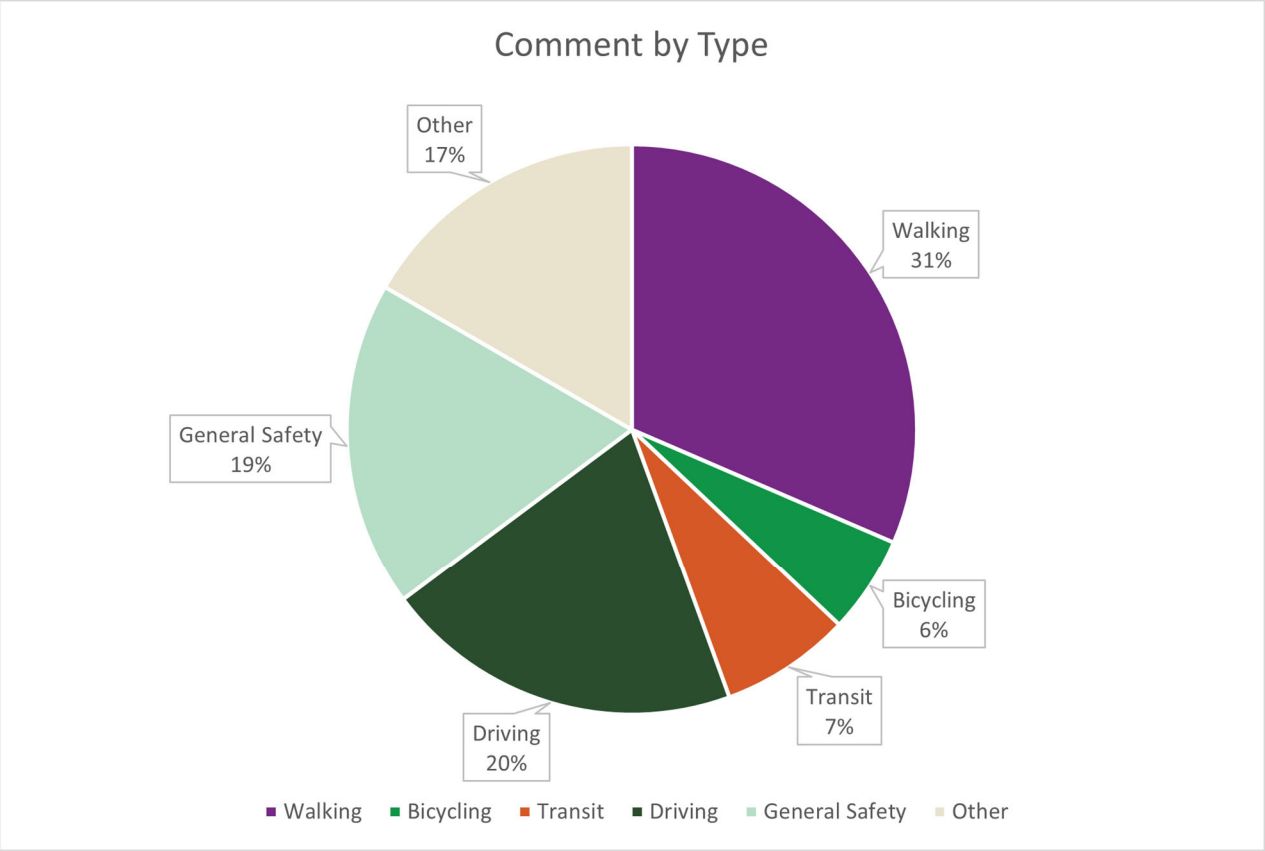


Figure 32. Comments by Type

Existing Transportation Challenges and Constraints

To gain a greater understanding of the challenges presented by this corridor, the primary concerns are outlined below. **Figure 33** illustrates the existing infrastructure along Norwood Avenue and identifies bicycle lanes and sidewalk gaps.

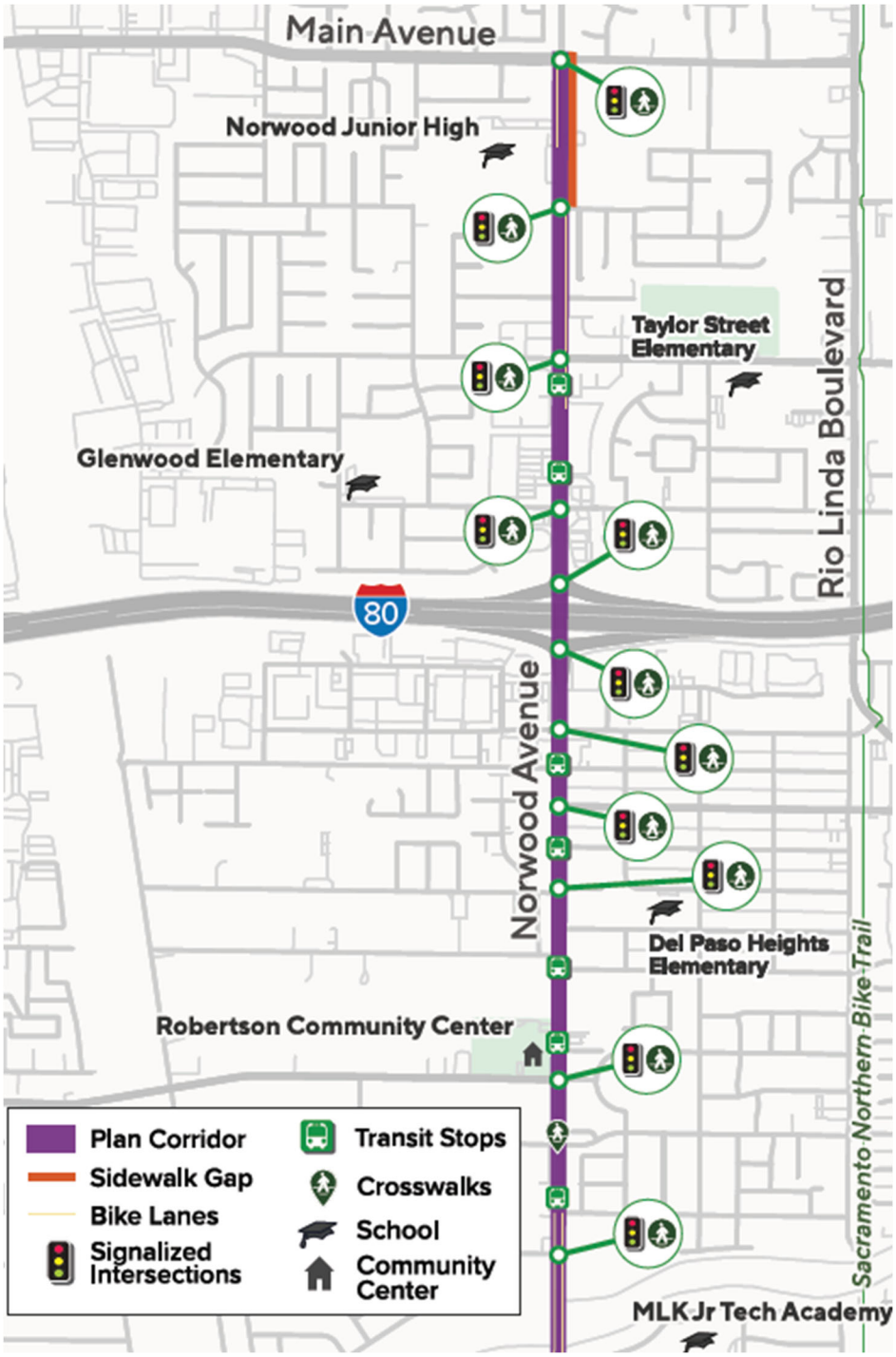


Figure 33. Infrastructure Gaps and Constraints

Walking Infrastructure

Sidewalks exist throughout the study corridor except along the northbound travel lanes from Grace Avenue to Main Avenue and along the southbound travel lanes from Grace Avenue to Berthoud Street. The existing sidewalks along Norwood Avenue do not show significant deterioration but contain some cracks and chipped concrete. In addition to sidewalk conditions, throughout the corridor the sidewalk width is five feet but are obstructed by utility poles placed within the sidewalk, reducing the available sidewalk width.

The sidewalk along the northbound lanes from Grace Avenue to Berthoud Street do not contain significant shade for people walking. Increased shade cover from street trees is prevalent from Berthoud Street to Jessie Avenue, the remainder of the corridor from Jessie Avenue to Arcade Creek consists of substantial tree cover to protect people walking from extreme temperatures.

There are 11 intersections that have controlled marked crosswalks, five are north of I-80 and six are south of I-80. The distance between marked controlled crosswalks can vary between 650 to over 1,500 feet. South of I-80, Morey Avenue is an offset controlled intersection with three marked crosswalks. At uncontrolled intersections south of I-80, there are no Norwood Avenue crossing opportunities which can present non-intuitive crossing needs for people walking, promoting crossing activity at uncontrolled locations.

Additionally, the I-80 freeway ramps can create another barrier to people walking. The lack of control and visibility enhancements at the freeway ramps create a high-stress environment for people walking as vehicles increase speeds to enter the freeway and there is no traffic control for vehicles exiting the freeway and merging onto Norwood Avenue.

Future potential design alternatives will seek to address increasing visibility and improving walking comfortability.

Bicycling Infrastructure

Bicycling infrastructure along Norwood Avenue is inconsistent and disconnected throughout the study corridor. Bike lane widths at the following locations are five feet and do not provide green paint to highlight conflict areas between modes or physical barriers to separate people biking from vehicle traffic. Bike lanes are present at the following locations:

- Northbound and southbound from Arcade Creek to Carroll Avenue
- Northbound Bell Avenue 200 feet south of the intersection approach
- Northbound from Bell Avenue to Grace Avenue.
- Southbound from Main Avenue to Grace Avenue

Having bike parking at locations could increase interest in biking as a form of transportation, allowing people biking to park their bike at commercial and recreational centers. Within the study corridor, there are five locations with bike parking ranging between three to seven spaces listed below:

- Robertson Community Center
- Nuevo Park
- Dollar General
- Department of Human Assistance
- Norwood Center

Future potential design alternatives will seek to address bicycle lane gaps, provide connection to the adjacent Sacramento Northern Bike Trail and Walter S. Ueda Bikeway, and improve access and comfortability for all ages and abilities of people biking.

Transit Infrastructure

Norwood Avenue is served by SacRT Route 19 and Route 86. Route 19 has 60-minute all day headways on weekdays and weekends. Route 86 has 30-minute weekday headways and between 45 and 60-minute headways on weekends.

Norwood Avenue has 14 bus stops with only one providing a bus shelter. The existing shelter is at the Norwood Avenue and Bell Avenue southbound bus stop and includes a bench for seating but does not have a trash bin. Bus stop locations vary along the corridor as being nearside or far-side of signalized intersections. All of the bus stops are located in-lane and, though the lanes are wider than City standards, a bus loading passengers would still block traffic.

Bus stops are heavily concentrated from Silver Eagle Road to Arcade Creek and there are no bus stops north of Bell Avenue. All bus stops along the corridor are identified by a transit sign. None of the bus stops are accessible via a low-stress walking or biking network.

Crashes

The study corridor experienced 137 injury crashes from 2018 to 2022. Of the 137 crashes, 21% were bicycle and pedestrian crashes (29 crashes). Fatal and severe injury crashes accounted for 34% of the 29 bicycle and pedestrian crashes. The highest density of crashes for all modes from 2018 to 2022 occurred between Bell Avenue and I-80, with 43% of all crashes occurring in Segment 2 of the corridor, making it a priority location for safety improvements.

This segment includes a mix of residential and commercial land use, on-street parking, and a high density of driveways. Of the 29 crashes involving people walking and biking, 16 occurred on this same segment between Bell Avenue and I-80.

The issues the design alternatives will seek to address are reducing uncontrolled conflicts between different modes of travel along the corridor, improving visibility and awareness of

potential conflict zones, reducing speeds along the corridor, and creating additional controlled crossing opportunities at high demand locations along the corridor.

OPERATIONS

Much of the corridor experiences unreliable travel times and congestion. Although corridor intersections operate acceptably, many of them experience weekday AM/PM peak hour queue conditions that exceed available storage. The corridor design alternatives will seek to address consistent cross-sections throughout the corridor, efficient signal timing for all users of the corridor including buses, providing sufficient storage for queuing, and operational modifications that improve safety for all roadway users.

Right of Way

Right of way (ROW) along the corridor varies throughout Norwood Avenue. From curb to curb, the ROW varies from 48 to 70 feet wide involving the following components:

- Inside travel lanes are 11 feet.
- Outside travel lane widths vary from 12 to 14 feet.
- Two-way center left turn lane is 10 feet.
- Sidewalks along the study corridor are 5 feet but are the responsibility of the fronting property owner[18]. Utility poles are located within the sidewalk width.
- Along the few segments where on-street parking is allowed, the parking lane is 8 feet.

Additional consideration for ROW will need to be given to the I-80 overpass and Arcade Creek bridge due to reduced roadway width and the structure providing a constrained roadway width. Where the corridor is two lanes per direction with a two-way center left turn lane, design alternatives will seek to use existing roadway space to improve infrastructure for people walking or biking such as widening sidewalks or implementing marked bike lanes or buffered bike lanes.

[18] Sacramento City Code, Section 12.32.020

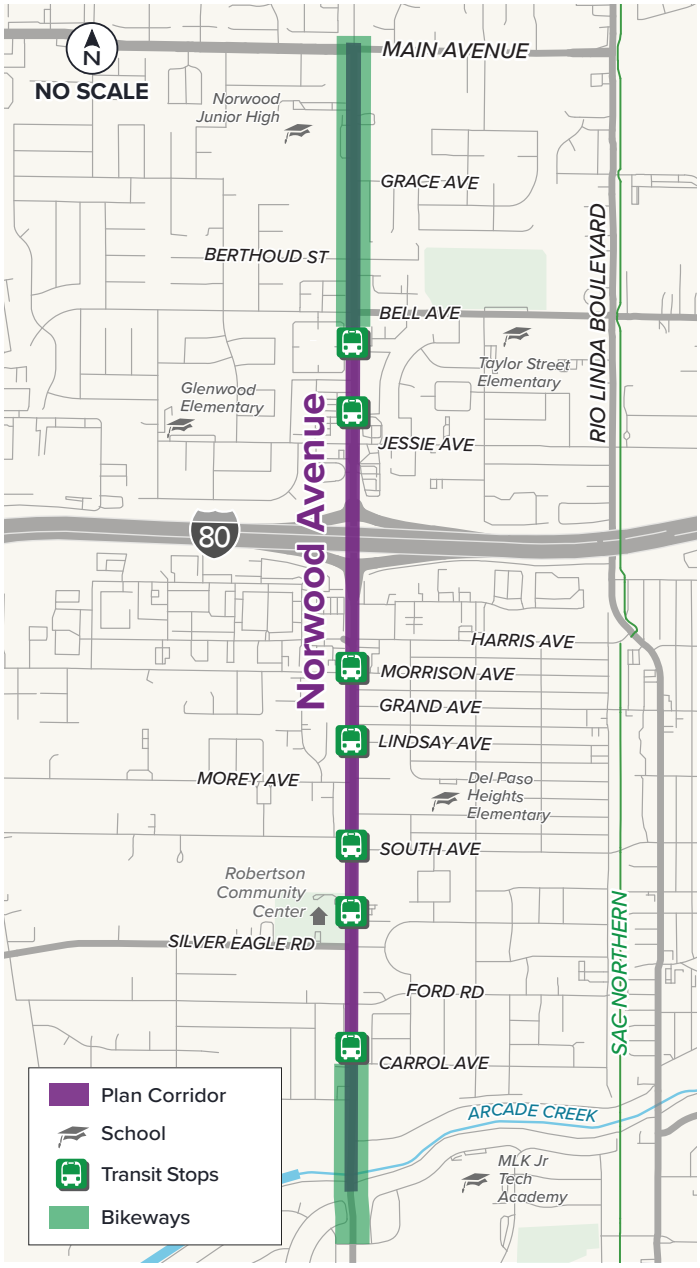
The Norwood
Mobility Project

Phase 2 Engagement Materials

The Norwood
Mobility Project

You shared ideas for changes to Norwood Avenue and we heard you. We developed concepts based on your input and we want your feedback!

Ustedes compartieron ideas para cambios en Norwood Avenue, y los escuchamos. Desarrollamos conceptos basados en sus aportes, ¡y ahora queremos saber qué opinan!



Share your input on proposed solutions at the next **community workshop!**

***¡Comparta su opinión** sobre las soluciones propuestas en el próximo taller comunitario!*

IN-PERSON
EN PERSONA

June 7, 2025 | *7 de junio de 2025*

10:00 AM - 11:30 AM

Robertson Community Center
3525 Norwood Ave, Sacramento

VIRTUAL
VIRTUAL

June 9, 2025 | *9 de junio de 2025*

6:30 PM - 7:30 PM

Via Zoom Meeting | *Vía reunión de Zoom*

Register on project website:
Regístrese en el sitio web del proyecto:
www.NorwoodMobility.org

Meeting ID | *ID de reunión*:
841 8286 4546

Registration is required to attend.
Es necesario registrarse para asistir.

SCAN HERE TO REGISTER:
ESCANEE EL CÓDIGO PARA REGISTRARSE:

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City of SACRAMENTO

The Norwood Mobility Project

City of SACRAMENTO

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¡Comparte tus comentarios sobre las soluciones propuestas en el próximo taller comunitario!

EVENTO EN PERSONA

7 de junio de 2025

10:00 a. m. a 11:30 a. m.

Robertson Community Center
3525 Norwood Ave, Sacramento

EVENTO VIRTUAL

9 de junio de 2025

6:30 p. m. a 7:30 p. m.

A través de Zoom

Regístrese en el sitio web del proyecto:
www.NorwoodMobility.org

ID de reunión: 841 8286 4546

Es necesario registrarse para asistir

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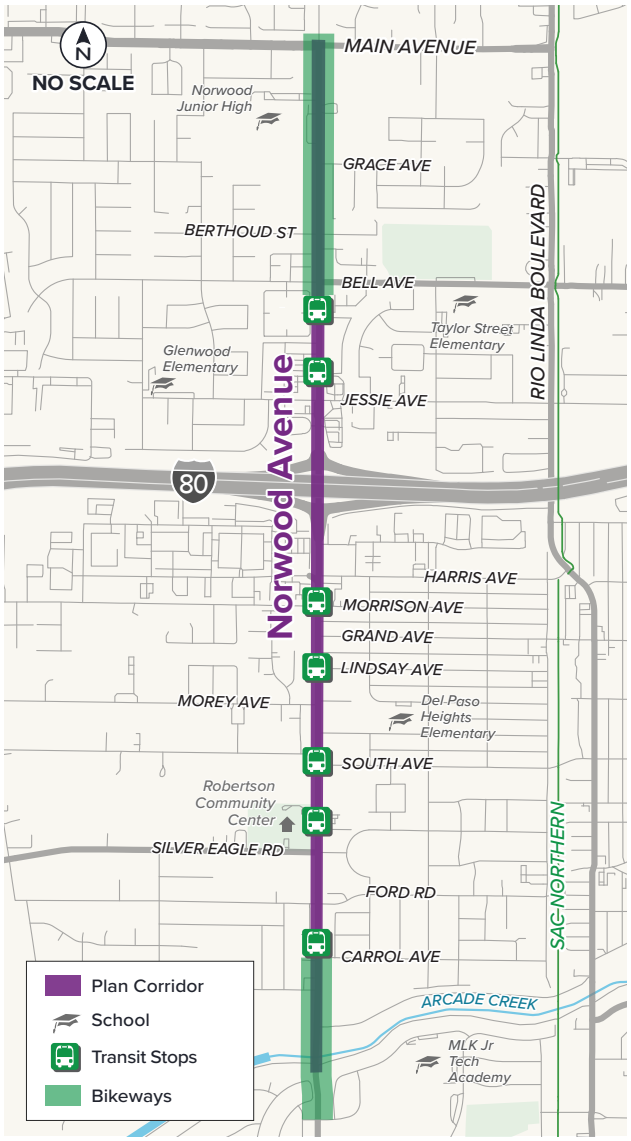
Ustedes compartieron ideas para cambios en Norwood Avenue, y los escuchamos. Desarrollamos conceptos basados en sus aportes, ¡y ahora queremos saber qué opinan!



Share your input on proposed solutions at the next **community workshop!**

***¡Comparta su opinión** sobre las soluciones propuestas en el próximo taller comunitario!*

VIRTUAL
VIRTUAL

June 17, 2025 | *17 de junio de 2025* NEW DATE! *¡NUEVA FECHA!*

6:30 PM - 7:30 PM

Via Zoom Meeting | *Vía reunión de Zoom*

Register on project website:
Regístrese en el sitio web del proyecto:
www.NorwoodMobility.org

Meeting ID | *ID de reunión*:
854 6961 1459

Registration is required to attend.
Es necesario registrarse para asistir.

SCAN HERE TO REGISTER:
ESCANEE EL CÓDIGO PARA REGISTRARSE:

311 Español | 中文 | Tagalog | Tiếng Việt | Hmoob | Русский

City of SACRAMENTO

The Norwood Mobility Project

City of SACRAMENTO

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The Norwood Mobility Project

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¡Comparte tus comentarios sobre las soluciones propuestas en el próximo taller comunitario!

17 de junio de 2025
6:30 p.m. a 7:30 p.m.
A través de Zoom

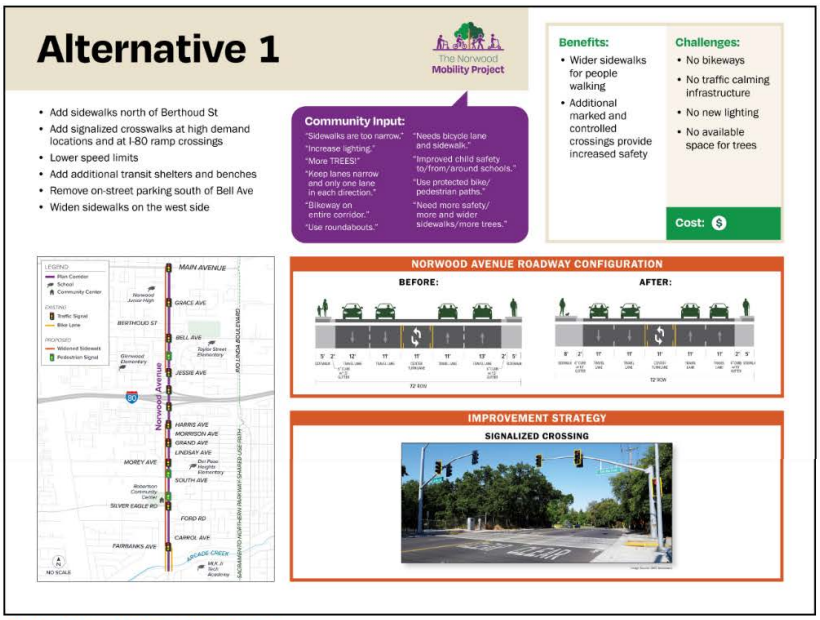
Regístrese en el sitio web del proyecto: www.NorwoodMobility.org

ID de reunión:: 854 6961 1459

Es necesario registrarse para asistir

311 Español | 中文 | Tagalog | Tiếng Việt | Hmoob | Русский

Please provide your feedback on Alternative 1!



Click here to view the image above larger.

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Embed

Alternative 1 Survey

After reviewing the proposed alternative (above), please provide your feedback below.

How well does Alternative 1 meet community priorities?

Improve corridor safety, particularly between Jessie Avenue and Bell Avenue and between Silver Eagle Road and Harris Avenue.

- Meets expectations
- Somewhat meets expectations
- Neutral
- Somewhat does not meet expectations
- Does not meet expectations

Improve walking infrastructure, including the addition of signal-protected crossing opportunities where feasible.

- Meets expectations
- Somewhat meets expectations
- Neutral
- Somewhat does not meet expectations
- Does not meet expectations

Create low-stress facilities that improve safety and comfort for people walking, rolling, and bicycling to reach transit.

- Meets expectations
- Somewhat meets expectations
- Neutral
- Somewhat does not meet expectations
- Does not meet expectations

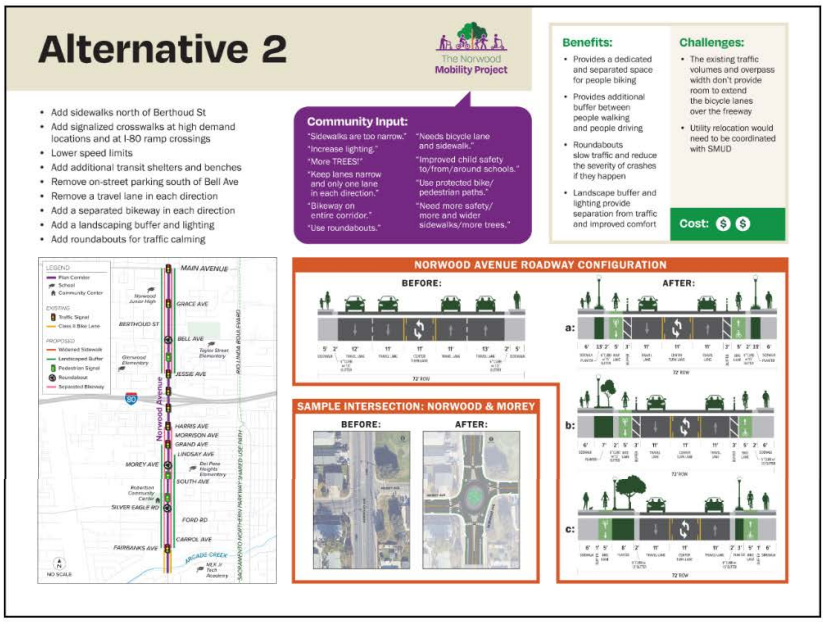
Create low-stress facilities that improve safety and comfort for people biking.

- Meets expectations
- Somewhat meets expectations
- Neutral
- Somewhat does not meet expectations
- Does not meet expectations

Please provide any additional feedback on this alternative.

Submit

Alternative 2



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Alternative 2 Survey

After reviewing the proposed alternative (above), please provide your feedback below.

How well does Alternative 2 meet community priorities?

Improve corridor safety, particularly between Jessie Avenue and Bell Avenue and between Silver Eagle Road and Harris Avenue.

- Meets expectations
- Somewhat meets expectations
- Neutral
- Somewhat does not meet expectations
- Does not meet expectations

Improve walking infrastructure, including the addition of signal-protected crossing opportunities where feasible.

- Meets expectations
- Somewhat meets expectations
- Neutral
- Somewhat does not meet expectations
- Does not meet expectations

Create low-stress facilities that improve safety and comfort for people walking, rolling, and bicycling to reach transit.

- Meets expectations
- Somewhat meets expectations
- Neutral
- Somewhat does not meet expectations
- Does not meet expectations

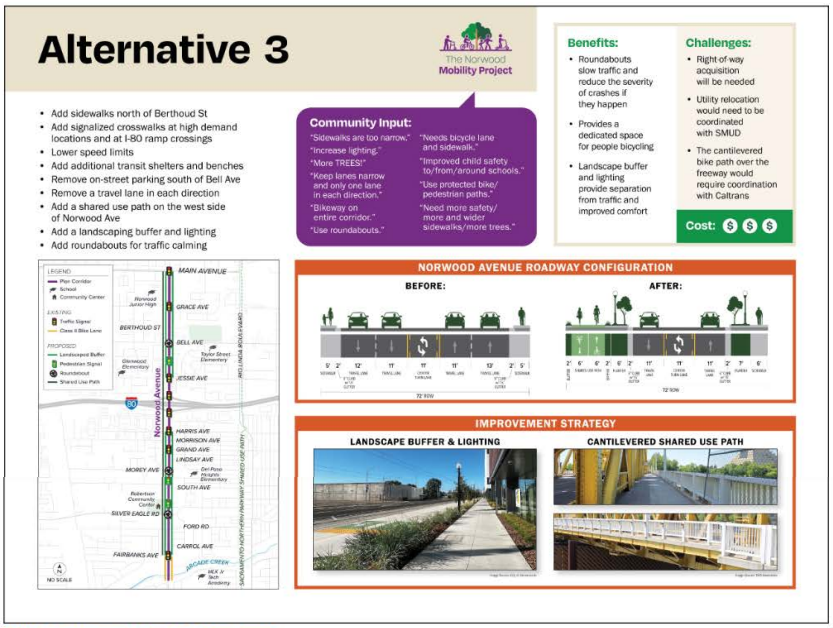
Create low-stress facilities that improve safety and comfort for people biking.

- Meets expectations
- Somewhat meets expectations
- Neutral
- Somewhat does not meet expectations
- Does not meet expectations

Please provide any additional feedback on this alternative.

Submit

Alternative 3



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Alternative 3 Survey

After reviewing the proposed alternative (above), please provide your feedback below.

How well does Alternative 3 meet community priorities?

Improve corridor safety, particularly between Jessie Avenue and Bell Avenue and between Silver Eagle Road and Harris Avenue.

- Meets expectations
- Somewhat meets expectations
- Neutral
- Somewhat does not meet expectations
- Does not meet expectations

Improve walking infrastructure, including the addition of signal-protected crossing opportunities where feasible.

- Meets expectations
- Somewhat meets expectations
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Create low-stress facilities that improve safety and comfort for people walking, rolling, and bicycling to reach transit.

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Create low-stress facilities that improve safety and comfort for people biking.

- Meets expectations
- Somewhat meets expectations
- Neutral
- Somewhat does not meet expectations
- Does not meet expectations

Please provide any additional feedback on this alternative.

Submit

Provide your overall feedback!

Alternative Components

Please review the elements in each alternative and then complete the survey to the right.

		Alt 1	Alt 2a	Alt 2b	Alt 2c	Alt 3
Widen & Complete Sidewalks		✓	✓	✓	✓	✓
New Signalized Crosswalks		✓	✓	✓	✓	✓
Removal of On-Street Parking		✓	✓	✓	✓	✓
Transit Shelters/Benches		✓	✓	✓	✓	✓
Sidewalk Scale Lighting			✓	✓	✓	✓
Removal of Vehicle Travel Lanes			✓	✓	✓	✓

Open

Embed

What is your preferred alternative?

Choose one: Required

- Alternative 1
- Alternative 2a
- Alternative 2b
- Alternative 2c
- Alternative 3

Please provide your thoughts on the following:

Widening and completing sidewalks

Adding signalized crosswalks

Removing on-street parking south of Bell Street

Adding bus shelters and benches

Adding sidewalk-scale lighting

Removing a travel lane in each direction

Adding roundabouts

Adding a landscaping buffer

Adding a separated bikeway in each direction

Adding shade trees where space permits

Adding a shared use path on the west side with a cantilever structure across the freeway

Submit

Roundabouts			✓	✓	✓	✓
Additional Landscaping			✓	✓	✓	✓
Separated Bikeway			✓	✓	✓	
Street Trees				✓	✓	✓
Shared Use Path						✓
Shared Use Path over Freeway						✓

The Norwood
Mobility Project

Phase 2 Engagement Summary

PHASE 2 OUTREACH SUMMARY

DATE: July 11, 2025

TO: Charisse Padilla | City of Sacramento

FROM: Elise Brockett | DKS Associates
Alice Chen | DKS Associates
Jim Damkowitch | DKS Associates

SUBJECT: Norwood Mobility Project Project #24795

INTRODUCTION

This memo provides an overview of the feedback received during Phase 2 of public outreach for the Norwood Mobility Project in June/July 2025.

The City of Sacramento and DKS Associates planned and completed the following outreach activities during the engagement period from June 2 – July 6, 2025:

- In-Person Workshop – June 7 from 10 – 11:30 a.m. at the Robertson Community Center
- Virtual Workshop – June 17 from 6:30 – 7:30 p.m. via Zoom
- Robla Park Community Association (RPCA) Mini Workshop #1 – June 25 from 7 – 8:30 p.m.
- Robla Park Community Association (RPCA) Action Committee Mini Workshop #2 – July 2 from 6:30 – 8:00 p.m.

PDFs of each alternative were also available on the project website where community members could submit their comments and feedback in an online form during the engagement period.

SUMMARY OF FEEDBACK

Overall themes from the feedback received both online and in person are presented first, followed by detailed feedback on each alternative, and then feedback on specific proposed elements from the online form.

OVERALL THEMES

Based on the feedback received both online and in person, Alternatives 2 and 3 were generally favored among respondents as opposed to Alternative 1. Alternative 3 received the most praise

and positive feedback, specifically for its ability to address pedestrian and bicycle safety, provide additional lighting and landscaping, and slow traffic to increase safety, despite the higher cost. Alternative 2 included three variations to the roadway configuration with varying locations and widths for elements such as landscaping, walking and biking facilities, and lighting. Respondents liked Alternative 2c the most, citing the inclusion of both street lighting and landscaping as a benefit due to the increased separation of pedestrians and bicyclists from vehicles.

FIGURE 1: ATTENDEES AT THE JUNE 7 WORKSHOP REVIEW THE ALTERNATIVES

While some respondents appreciate that Alternative 1 provides wider sidewalks and more bike and pedestrian crossings, almost all agreed that this option wouldn't be worth the time and funding to make minor improvements to an area that is plagued by unsafe travel conditions.

A link to the online response form (hosted on the platform Social Pinpoint) was available on the project website.

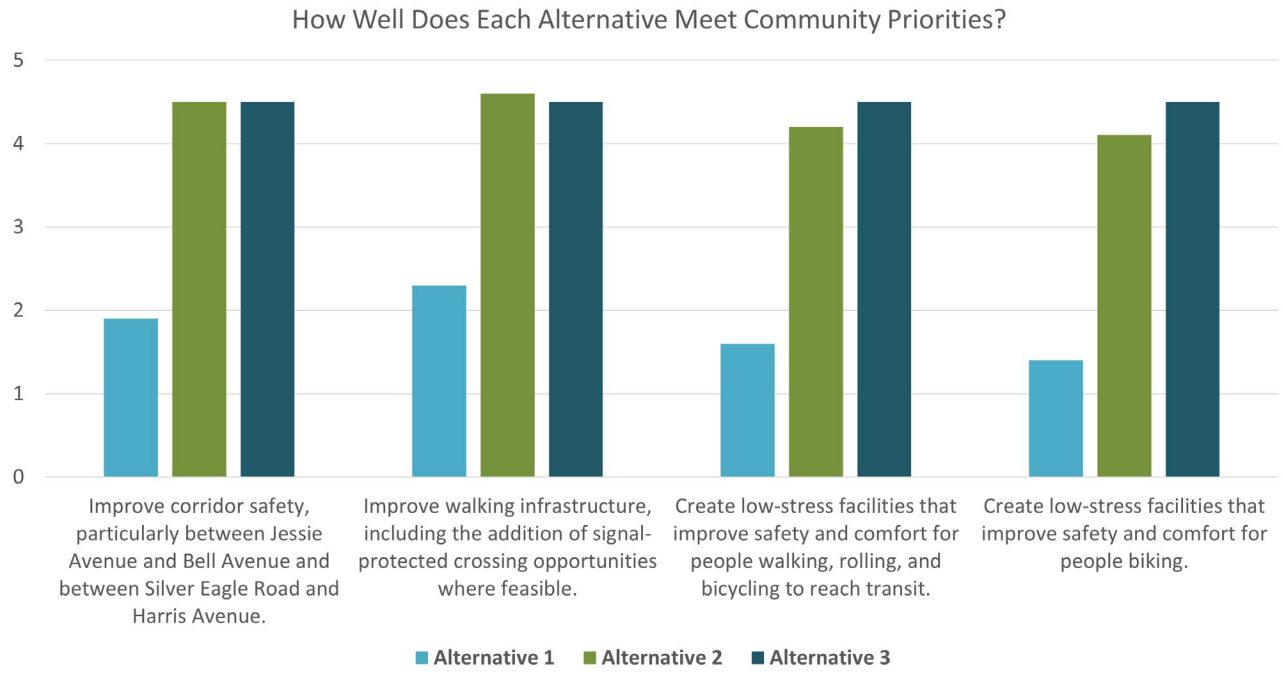
Respondents were asked to rate each alternative for how well it meets the community priorities identified earlier in the project:

1. Improve corridor safety, particularly between Jessie Avenue and Bell Avenue and between Silver Eagle Road and Harris Avenue.
2. Improve walking infrastructure, including the addition of signal-protected crossing opportunities where feasible.
3. Create low-stress facilities that improve safety and comfort for people walking, rolling, and bicycling to reach transit.
4. Create low-stress facilities that improve safety and comfort for people biking.

FIGURE 2: CHARISSE PADILLA, PROJECT MANAGER WITH THE CITY OF SACRAMENTO, PRESENTS ON THE PROPOSED ALTERNATIVES

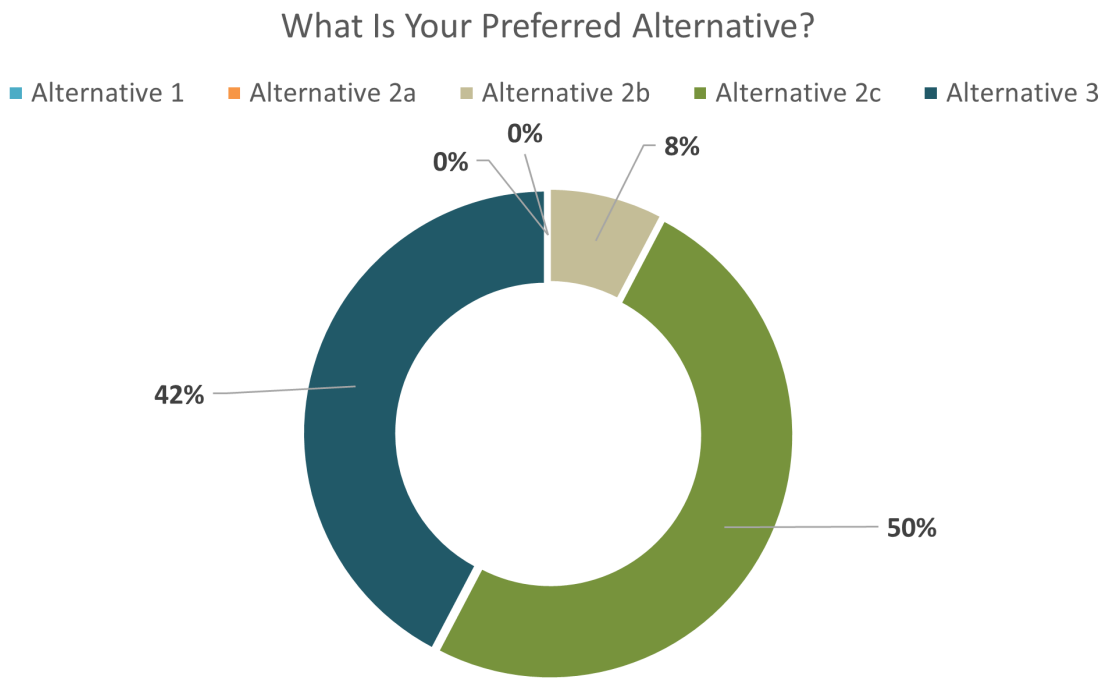
A score of 5 means the alternative "Meets expectations", 4 "Somewhat meets expectations", 3 is "Neutral", 2 "Somewhat does not meet expectations", and 1 "Does not meet expectations". Figure 3 shows an overview of the responses to this question.

FIGURE 3: FEEDBACK ON COMMUNITY PRIORITIES



Additionally, respondents were asked to select their preferred alternative. Figure 4 shows that 50% preferred Alternative 2c and 42% preferred Alternative 3.

FIGURE 4: PREFERRED ALTERNATIVE – SOCIAL PINPOINT DATA



The following sections include a more detailed summary and analysis of the feedback on each alternative received in the online written response forms and through in person outreach.

ALTERNATIVE 1

Alternative 1 was generally received with mixed reviews, skewing towards negative responses overall. While a few participants acknowledged some positive elements, such as widening sidewalks or maintaining current vehicle capacity, many were critical of its lack of changes or improvements to the current roadway. Several comments stated that the option does not do enough to address corridor safety, comfort of people walking and biking, or biking infrastructure and needs. One respondent explicitly stated that it is "pretty much the same, dangerous road," reflecting a broader sentiment that Alternative 1 fails to offer a meaningful transformation of the corridor.

Those who liked Alternative 1 brought up their concerns around reducing vehicle lanes and how it would impact traffic congestion on Norwood Avenue, which is already a prominent concern among residents. Some attendees at the RPCA mini workshops expressed concerns about this issue, particularly with the increase in new developments in the area, questioning how much congestion would increase if Norwood Avenue were reduced to two lanes.

ALTERNATIVE 2

Alternative 2 received more favorable responses, with many people saying it meets their expectations for addressing specific community priorities – mainly creating low stress facilities for those walking, biking, and rolling. Respondents showed appreciation for enhanced safety and improvements to walking and biking infrastructure, but expressed uncertainty about how well these ideas would be implemented, depending on configuration a, b, or c. Without a more distinct separation of vehicles from bikes and pedestrians, respondents had reservations about how effective this would be for improving safety. Option 2c was noted as the best long-term option for expanding green space, lighting, and comfortability along the corridor. Many respondents liked the inclusion of roundabouts for slowing traffic and reducing the potential for vehicle collisions, especially since Norwood Avenue is prone to motorists who travel at high speeds.

ALTERNATIVE 3

Alternative 3 received the most discussion and feedback during all outreach activities. This option was viewed as the boldest and most transformative of the three. Residents liked specific elements such as roundabouts, improved landscaping, and separated bike and pedestrian facilities, all of which contributed to a perception of enhanced safety and increased comfort along the corridor. Concerns were raised about the tradeoffs of implementing a road diet and some of the other major changes proposed in Alternative 3. Specifically, some respondents wondered how reduced on-street parking and lane reductions would affect access to nearby neighborhoods and small businesses. Though some responded negatively due to the change in lane configuration, this did not outweigh the support shown for Alternative 3 due to the improvements to on-street facilities, safety, and comfortability of Norwood Avenue.

FEEDBACK ON INDIVIDUAL PROJECT ELEMENTS

Respondents to the online form were asked to share feedback on various proposed elements of the project: widening and completing sidewalks, adding signalized crosswalks, removing on-street parking south of Bell Avenue, adding bus shelters and benches, adding sidewalk-scale lighting, removing a travel lane in each direction, adding roundabouts, adding a landscaping buffer, adding a separated bikeway in each direction, adding shade trees where space permits, and adding a shared use path on the west side with a cantilever structure across the freeway.

Feedback on these elements echoed many of the overarching themes in the previous section.

- Roundabouts were generally favored for traffic-calming and the safety benefits they would bring to users of the Norwood Avenue corridor. However, there were some concerns about the associated learning curve for motorists not used to traveling through roundabouts.
- Comments were supportive of removing on-street parking to use the space for protected bike lanes or wider sidewalks, if there is sufficient parking elsewhere to support visitors of local businesses.
- All improvements to walking, biking, and transit infrastructure and facilities were broadly supported in comments.
- Respondents generally supported the addition of signalized crosswalks and saw them as necessary, however, some questioned whether the high cost would be worth it since motorists don't always stop.
- Similarly, the proposed bike facilities, bus shelters, and sidewalk widening were seen as essential for improving safety and equity for active transportation users.
- Comments emphasized the need for clearly delineated routes that are separated from vehicles, reflecting the community's desire to make biking a more accessible travel option in the neighborhood. However, commenters were split on the idea of adding a shared use path with a cantilever across the freeway. Some saw it as an expensive and unnecessary addition, while others viewed it as a creative solution to create a low-stress option for crossing the freeway.
- As stated in previous sections, the reduction in travel lanes received positive feedback, while also acknowledging the potential for increasing traffic congestion. However, most respondents saw it as an important tradeoff in slowing traffic, increasing safety, and utilizing the extra space for landscaping, lighting, and comfortable walking and biking facilities.

The Norwood
Mobility Project

Phase 3 Engagement Materials

The Norwood Mobility Project

The Norwood Mobility Public Draft Plan is Ready for Review!

Review and comment October 10 - November 2 at www.NorwoodMobility.org

Want to learn more? Attend a Community Workshop:

IN-PERSON

October 18, 2025

1:00 - 2:00 PM

Robertson Community Center

3525 Norwood Ave, Sacramento

VIRTUAL

October 20, 2025

6:00 - 7:00 PM

Zoom Meeting

Register for the workshop: ***www.NorwoodMobility.org***

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City of SACRAMENTO

The Norwood Mobility Project

There's Still Time to Review The Norwood Mobility Plan Public Draft!

Review and comment

October 10 - November 2

www.NorwoodMobility.org

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City of SACRAMENTO

The Norwood
Mobility Project

Phase 3 Engagement Summary

PHASE 3 ENGAGEMENT SUMMARY

DATE: November 26, 2025

TO: Charisse Padilla | City of Sacramento

FROM: Elise Brockett | DKS Associates
Alice Chen | DKS Associates
Josh Pilachowski | DKS Associates

SUBJECT: Norwood Mobility Project Project #24795-000

INTRODUCTION

This memo provides an overview of the feedback received during Phase 3 of public engagement for the Norwood Mobility Project in October/November 2025.

The City of Sacramento planned and/or attended the following events or activities during the public engagement period from October 10 – November 2, 2025:

- Hagginwood Community Meeting – October 1 at 6:00 p.m. at the Hagginwood Community Center
- District 2 Town Hall – October 15 at 6:00 p.m. at the Hagginwood Community Center
- Active Transportation Commission Meeting – October 16 at 5:30 p.m. at the City Hall Complex
- Community Workshop (in-person) – October 18 from 12:00 – 2:00 p.m. at the Robertson Community Center
- Virtual Workshop – October 20 from 6:00 – 7:00 p.m. via Zoom
- Hmong Youth and Parents United (HYPU) Trunk or Treat – October 24 from 6:00 – 9:00 p.m. at the HOPE Center
- Mutual Assistance Network (MAN) Harvest Festival – October 25 from 11 a.m. – 2:00 p.m. at the Robertson Community Center

FIGURE 1: POP-IN AT THE HYPU TRUNK OR TREAT EVENT ON OCT. 24

- Robla Park Community Association (RPCA) Community Meeting – October 29 from 7:00 – 8:30 p.m. at Glenwood Elementary School

A PDF of the draft plan was also available on the project website where community members could review and submit their feedback during the engagement period.

SUMMARY OF FEEDBACK AND OVERALL THEMES

Several themes were noted in public feedback on the draft plan centering around safety, user access, and corridor design. Respondents shared their thoughts on proposed roundabouts, lane reductions, landscaping, and safety improvements for those walking and biking along Norwood Avenue.

ROUNDABOUTS

The following points were made regarding proposed roundabouts on Norwood Avenue:

- Roundabouts will be beneficial for the area if landscaping in the center does not obstruct driver view.
- Exploring a future roundabout at Morey Avenue would be beneficial.
- Proposed roundabout designs appear to require more space than necessary, with suggestions to explore smaller center circles to avoid right-of-way impacts.
- A two-lane roundabout may be unnecessary where only a right-turn slip lane exists today, as it could circumvent traffic calming goals.

FIGURE 2: POP-IN AT THE MAN HARVEST FESTIVAL ON OCT. 25

LANE REDUCTION

The following points were made regarding the proposed lane reduction and parking reduction on Norwood Avenue:

- A reduction to one lane of traffic could impact traffic congestion on Norwood Avenue.
- There were concerns regarding the reduction of parking availability south of Bell Avenue on Norwood Avenue

LANDSCAPING

The following points were made regarding the proposed landscaping improvements on Norwood Avenue:

- There is support for landscaping in roundabouts, with the caveat that plants should be low height to maintain visibility and safety for drivers.
- Green walkways with trees, flowers, and shrubs will make the corridor more inviting and offer some privacy for nearby residents.

- The landscaping should be sustainable in the long term.

OTHER COMMENTS

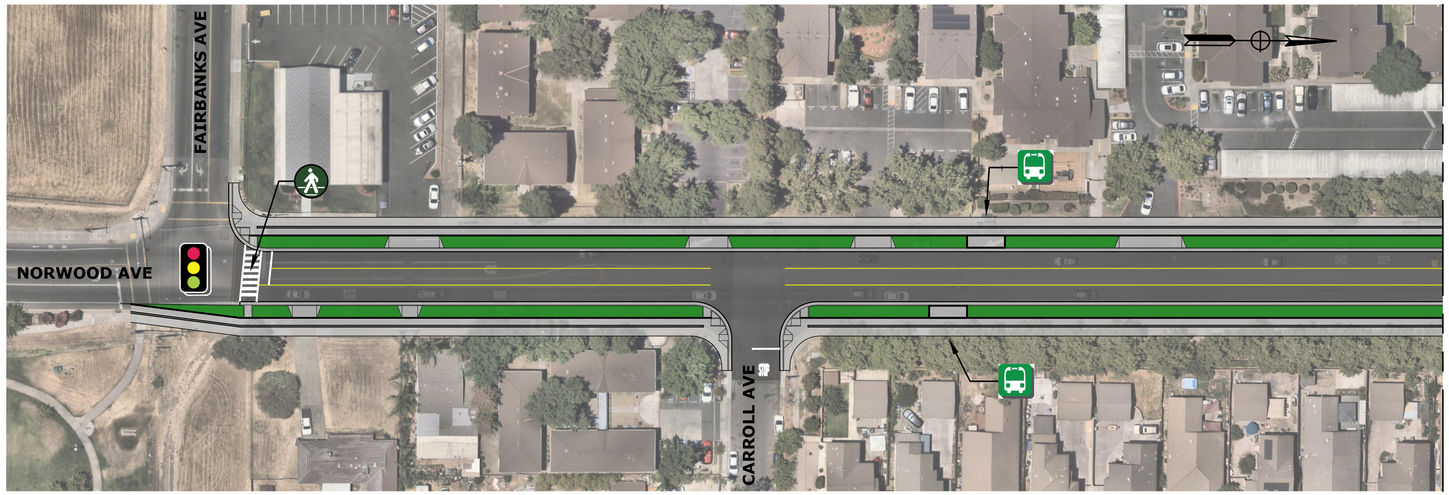
- Some commenters showed concerns that the project limits don’t extend further south along Norwood Avenue, which may exclude some communities and neighborhoods from safety and accessibility benefits.
- There were also suggestions for the following:
    - Adding multi-use lanes between Interstate 80 (I-80) north to Main Avenue and between I-80 south to Carrol Avenue
    - Adding a left-hand turning lane northbound at Jesse and Norwood and a left-hand turning lane southbound to prevent unsafe pedestrian crossings near the Chevron gas station.

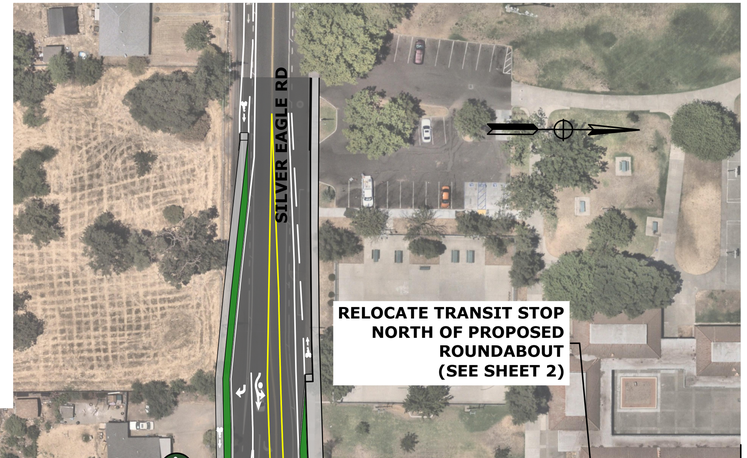
The Norwood
Mobility Project

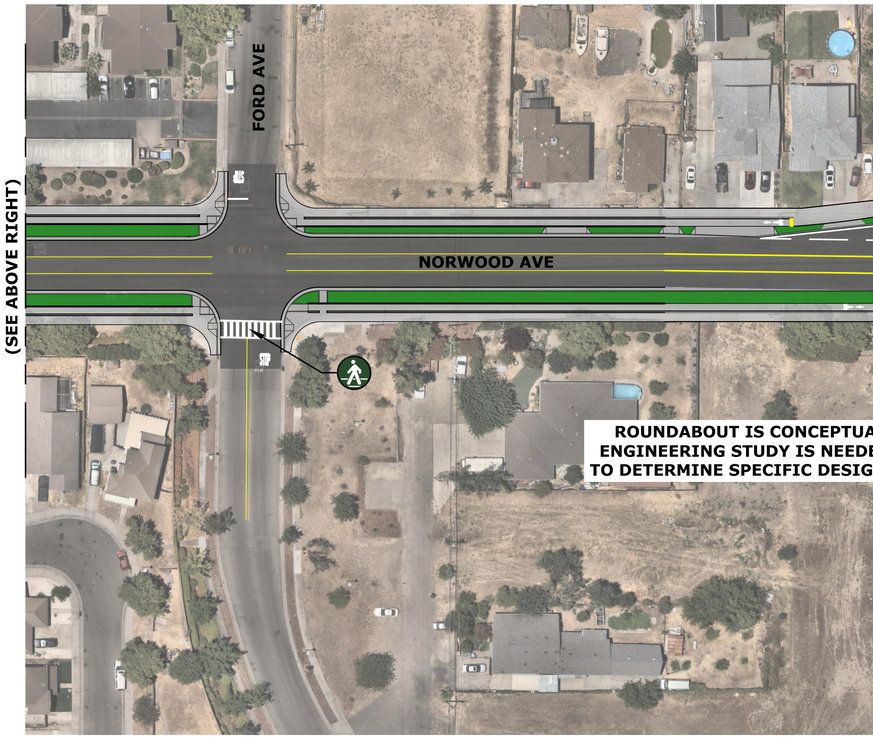
D – Concept Plan Set

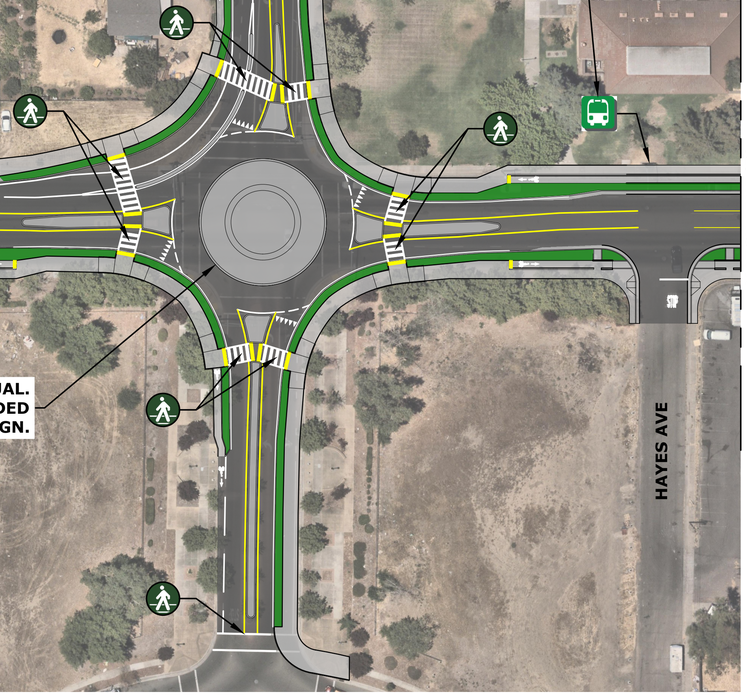
LEGEND:

- Concrete Barrier
- Crash Attenuator/Guardrail System
- Retaining Wall
- Modify Existing Traffic Signal
- Pedestrian Signal
- Roadway Pavement
- Landscaping and/or Trees
- Concrete Sidewalk/ Bike Lane/ Driveways
- Existing SACRT Transit Stop
- Crosswalk









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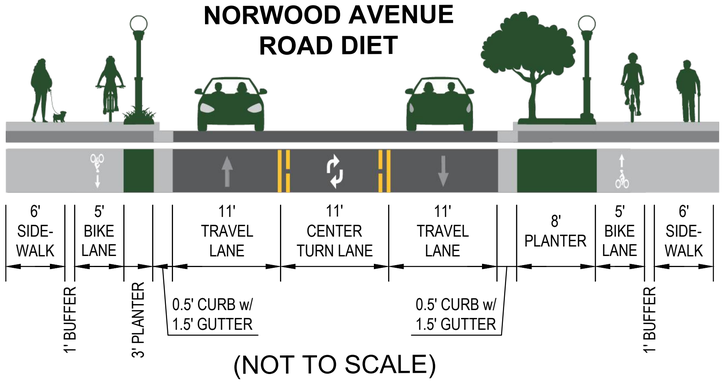

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City of SACRAMENTO

THE NORWOOD MOBILITY PLAN

ROADWAY IMPROVEMENT CONCEPT PLAN

PSOMAS

LEGEND:

- Concrete Barrier
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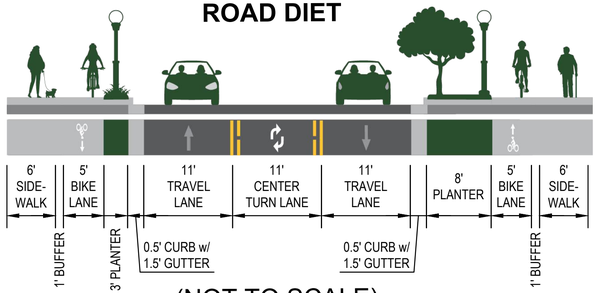
TYPICAL CROSS SECTION

NORWOOD AVENUE ROAD DIET



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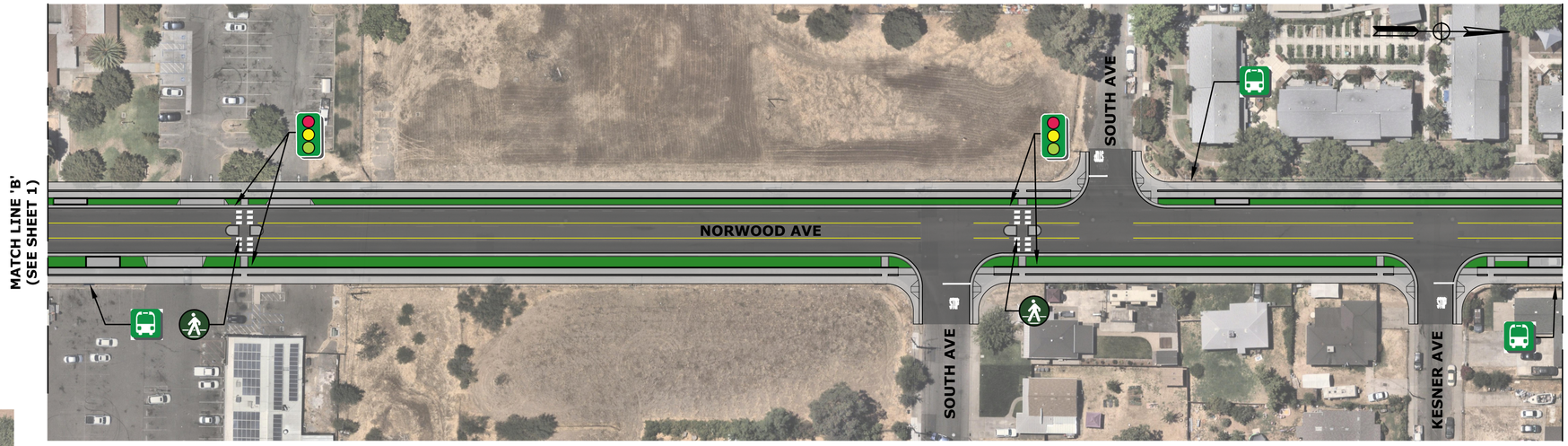

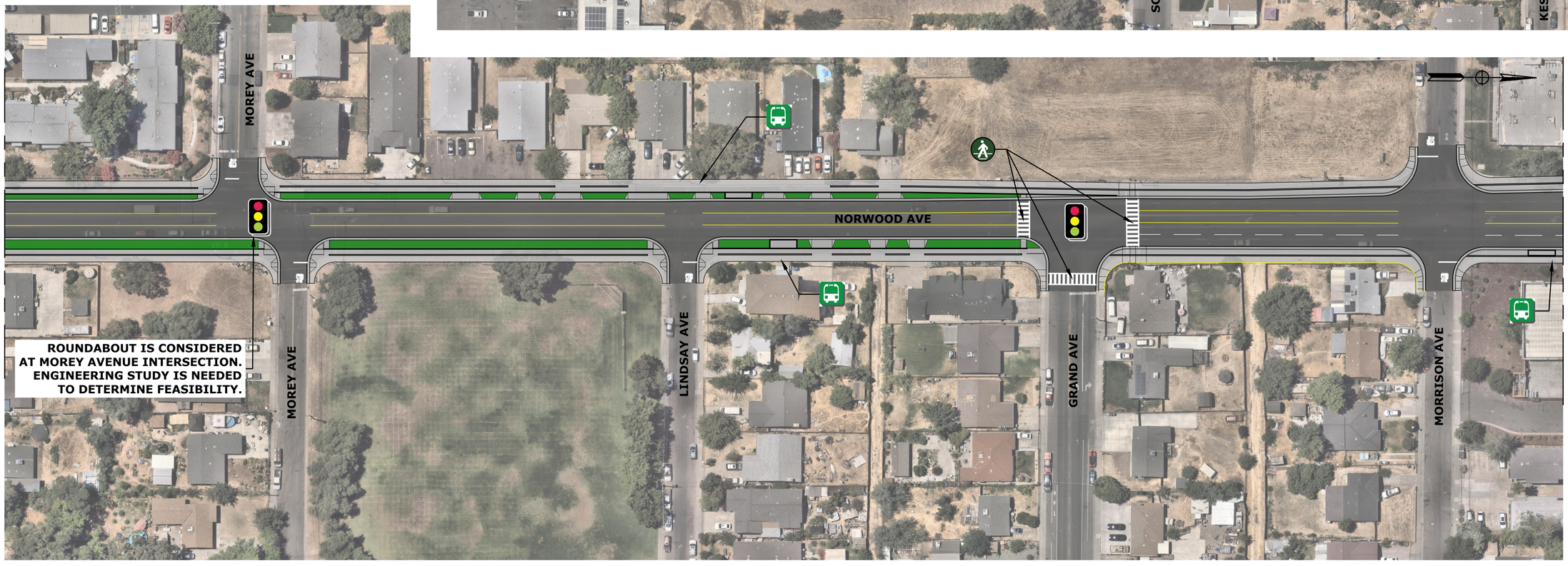

THE NORWOOD MOBILITY PLAN

ROADWAY IMPROVEMENT CONCEPT PLAN

City of SACRAMENTO

PSOMAS

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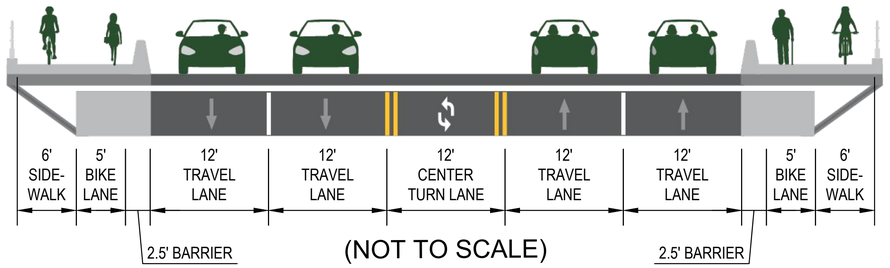
TYPICAL CROSS SECTION

NORWOOD AVENUE
I-80 INTERCHANGE



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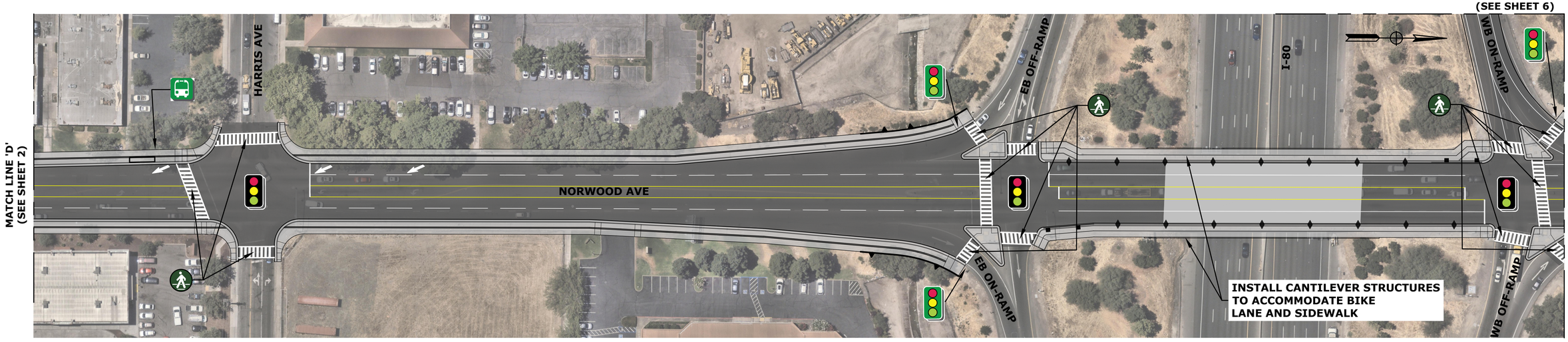

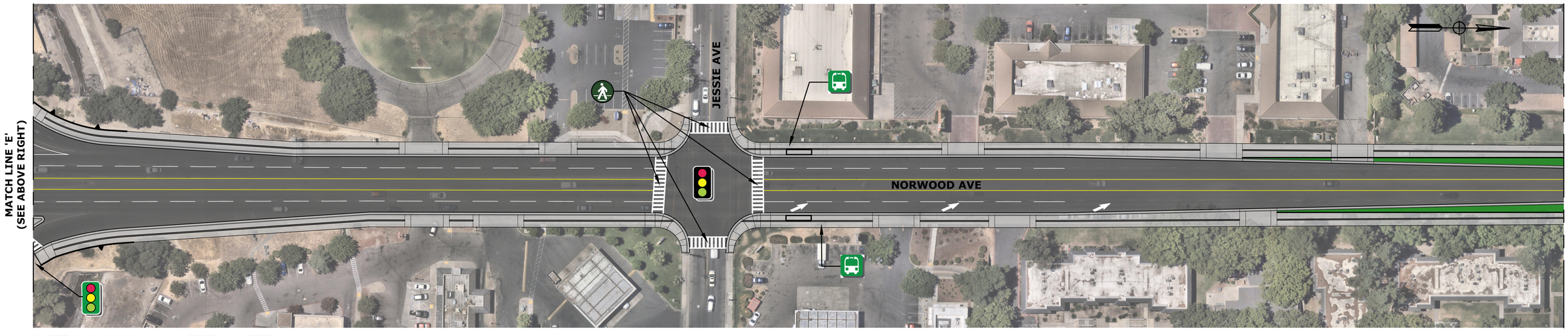

THE NORWOOD MOBILITY PLAN

ROADWAY IMPROVEMENT CONCEPT PLAN

City of SACRAMENTO

PSOMAS

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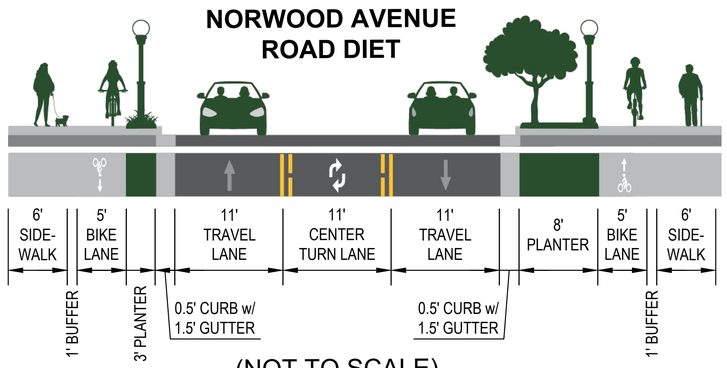
- Crosswalk

TYPICAL CROSS SECTION



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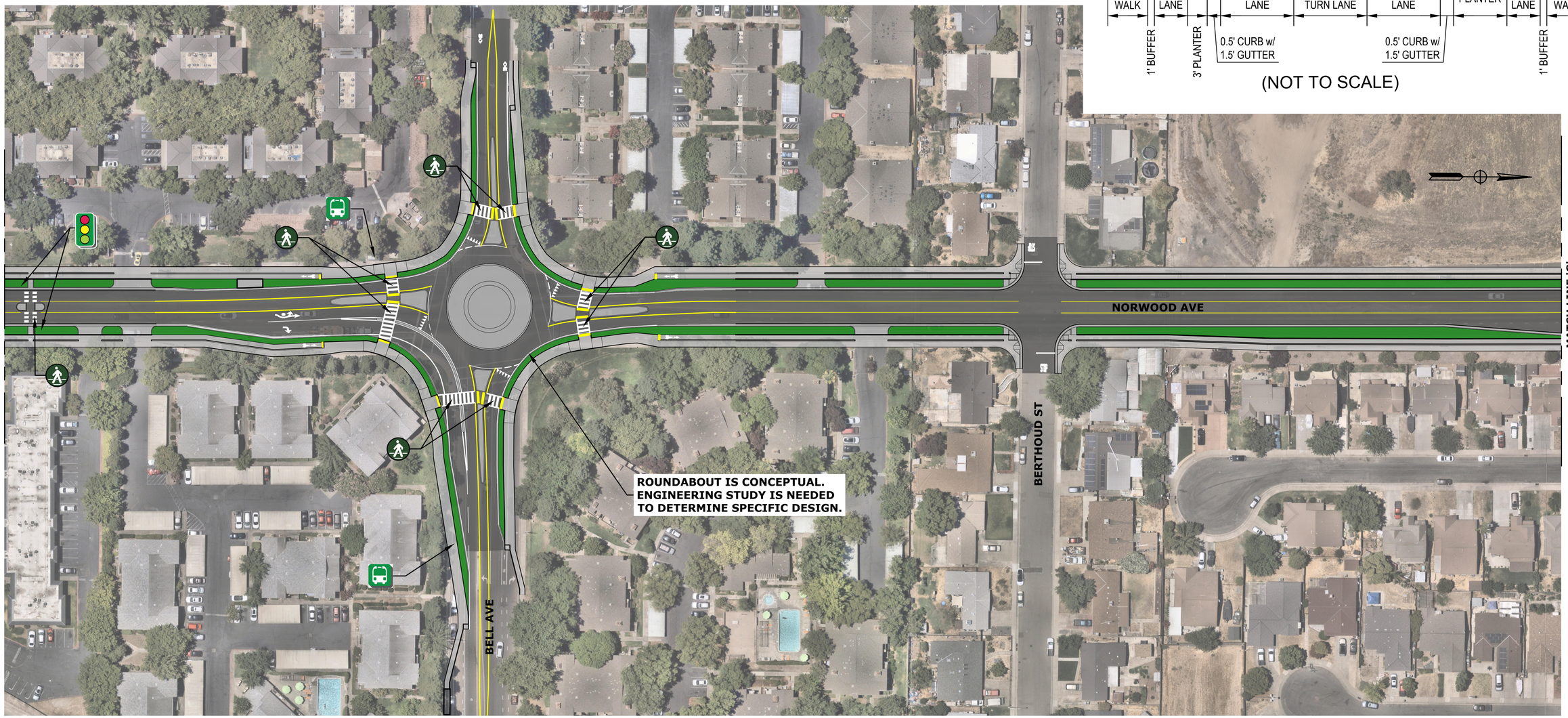


THE NORWOOD MOBILITY PLAN

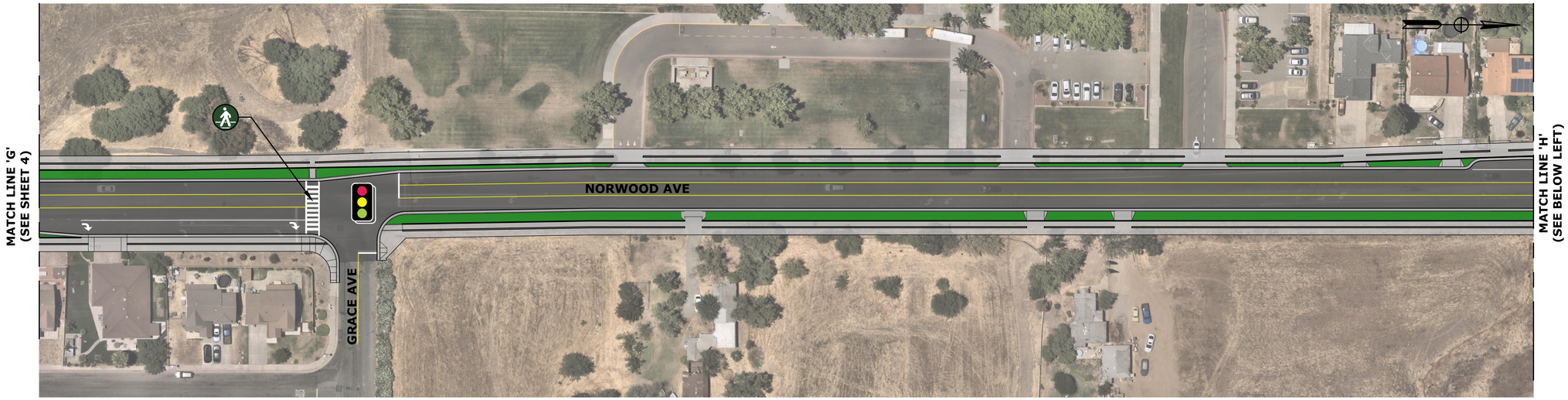
ROADWAY IMPROVEMENT CONCEPT PLAN

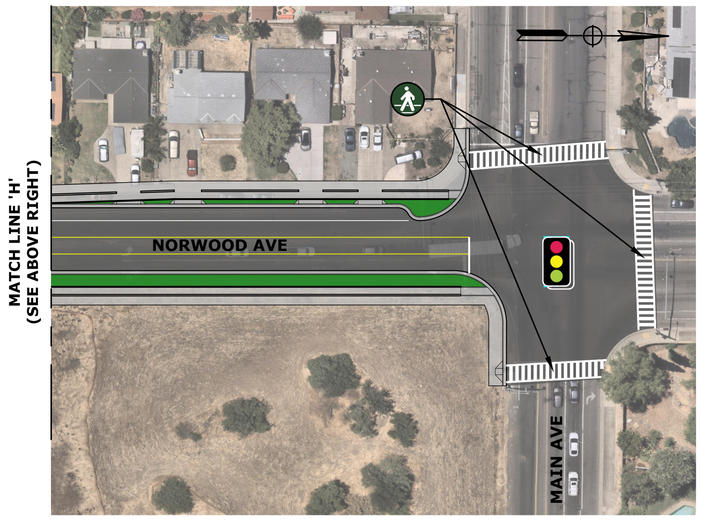
City of SACRAMENTO

PSOMAS

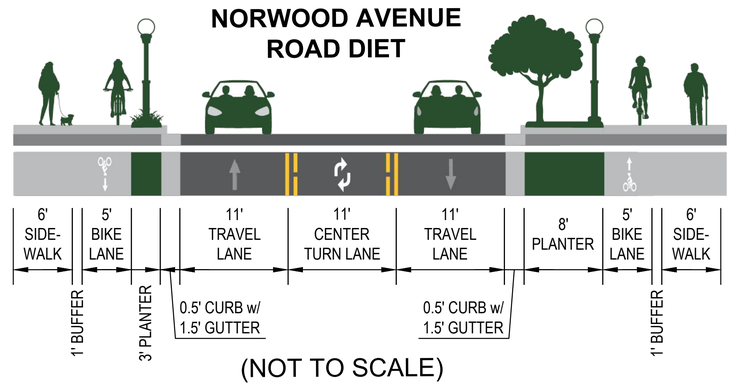
LEGEND:

- Concrete Barrier
- Crash Attenuator/Guardrail System
- Retaining Wall
- Modify Existing Traffic Signal
- Pedestrian Signal
- Roadway Pavement
- Landscaping and/or Trees
- Concrete Sidewalk/ Bike Lane/ Driveways
- Existing SACRT Transit Stop
- Crosswalk





TYPICAL CROSS SECTION



(NOT TO SCALE)

City of SACRAMENTO

THE NORWOOD MOBILITY PLAN

ROADWAY IMPROVEMENT CONCEPT PLAN

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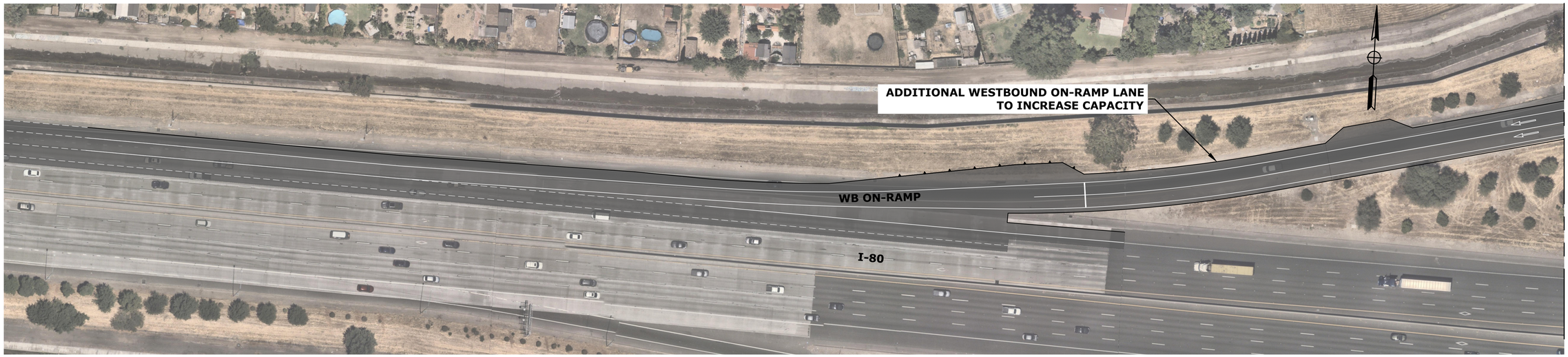


THE NORWOOD MOBILITY PLAN

ROADWAY IMPROVEMENT CONCEPT PLAN

The Norwood
Mobility Project

E – Planning Level Cost Estimates

PRELIMINARY CONCEPT DESIGN - CONSTRUCTION COST ESTIMATE

NORWOOD AVE COMPLETE STREETS - ALTERNATIVE 2C

6DKS010700

9/29/2025

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Temporary Construction Easement	AC	0.60	$200,000	$120,000
2	Right of Way Take	AC	1.30	$653,400	$850,000
3	Drainage System	LS	1	$1,136,800	$1,140,000
4	Remove Concrete Curb & Gutter	LF	19,900	$11	$220,000
5	Remove Concrete Sidewalk	SF	99,500	$8	$800,000
6	Roadway Excavation	CY	26,400	$350	$9,240,000
7	Base Repair	TON	2,040	$300	$620,000
8	Remove Striping	LF	42,400	$3	$130,000
9	Remove Pavement Markings	SF	5,400	$10	$60,000
10	Hot Mix Asphalt (includes 3" overlay over existing)	TON	11,200	$250	$2,800,000
11	Class 2 Aggregate Base	CY	30,400	$300	$9,120,000
12	PCC (Stamped Concrete) to Construct	SF	16,300	$30	$490,000
13	PCC (Curb)	LF	5,600	$24	$140,000
14	PCC (Curb & Gutter - Type 2) to Construct	LF	22,800	$50	$1,140,000
15	PCC (Sidewalk) to Construct	SF	221,900	$7	$1,560,000
16	PCC (Curb Ramp) to Construct	SF	15,200	$20	$310,000
17	PCC (Driveway) to Construct	SF	11,500	$15	$180,000
18	Concrete Barrier (Type 60M)	LF	800	$300	$240,000
19	Midwest Guardrail System	LF	50	$60	$3,000
20	Alternative In-Line Terminal System	EA	2	$3,000	$6,000
21	Retaining Wall	SF	2,040	$200	$410,000
22	Bridge Widening	LS	1	$8,400,000	$8,400,000
23	Striping	LF	27,000	$6	$170,000
24	Pavement Markings	SF	13,900	$15	$210,000
25	Roadside Signage	LS	1	$40,000	$40,000
26	Overhead Signage	EA	4	$75,000	$300,000
27	Street Lighting	EA	67	$40,000	$2,680,000
28	Traffic Signal Modifications	EA	9	$500,000	$4,500,000
29	Utility Adjustments	LS	1	$1,000,000	$1,000,000
30	Landscaping	LS	1	$800,000	$800,000

SUBTOTAL	**$54,500,000**
Contingency (25%)	$13,625,000
TOTAL CONSTRUCTION COST ESTIMATE	**$68,125,000**
Project Development Support Costs (35%)	$23,843,750
TOTAL COST ESTIMATE	**$91,968,750**
10 Year Escalated Subtotal	**$88,800,000**
10 Year Escalated Contingency (25%)	**$22,200,000**
10 Year Escalated CONSTRUCTION COST ESTIMATE	**$111,000,000**
10 Year Escalated Project Development Support Costs (35%)	**$38,900,000**
10 Year Escalated TOTAL COST ESTIMATE	**$149,900,000**

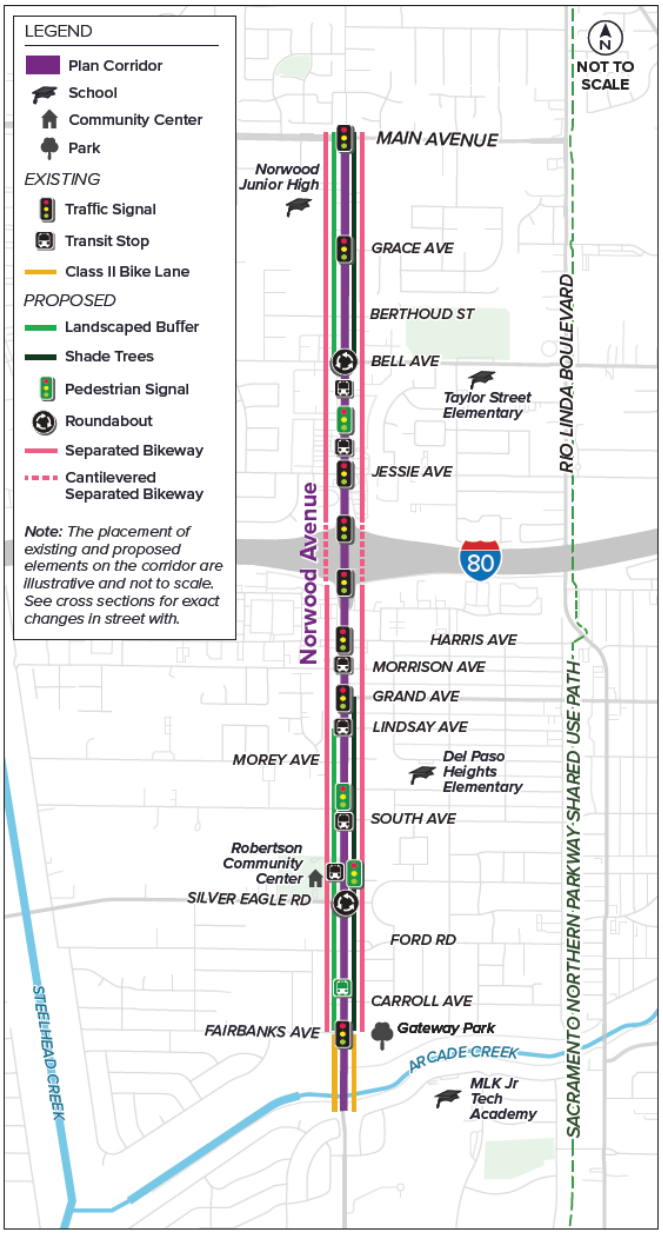
*** Escalation is 5% per year**

Attachment 4: Streets for People Plan Amendments

Add the following to the Streets for People Active Transportation Plan:

- New sidewalks north of Berthoud Street
- Lane reduction North of Jessie Avenue and South of Harris Avenue
- Add crossing points:
  - South of Bell Ave (see pg. 18 of Plan)
  - I-80 ramps (see pg. 19 of Plan)
  - Between off-set intersections of South Avenue (see pg. 21 of Plan)
  - North of Hayes Avenue (see pg. 21 of Plan)

The Norwood Mobility Plan



Streets for People Plan (current)