NOTICE OF INTENT TO ADOPT
AN INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

This is to advise that pursuant to Title 14 of the California Code of Regulations (CCR), §§ 15070 and 15071, the City of Emeryville (City), acting as Lead Agency, has prepared this Initial Study/Negative Declaration (IS/MND) for the project described below.

Project Name: ATPL-5106(010) 40th Street Transit and Multi-Modal Enhancements Project

Project Location: The proposed project is in the cities of Emeryville and Oakland in California, on Shellmound Street and 40th Street between Christie Avenue and Adeline Street. The proposed project is situated within Sections 15, 16, 21, 22, and 23 of Township 1 South, Range 4 West in the USGS Quadrangle Oakland West. Construction would occur in 2 phases. Phase 1 would include improvements to 40th Street and Shellmound Street between Adeline Street and the IKEA Entrance intersection. Phase 2 would include enhancements along Shellmound Street from the IKEA Entrance intersection to Christie Avenue.

Lead Agency Name and Address:

City of Emeryville
1333 Park Avenue
Emeryville, CA 94608

As mandated by Title 14 CCR § 15105(b), the minimum public review period for this document is 30 days. Prior to project approval, the City will consider all written comments regarding this proposed IS/MND that are received during the public review period; due to the holidays, the City is providing 45 days from the date of filing this document with the State Clearinghouse.

The proposed IS/MND is available for public review during regular business hours at the following locations:

- The front desk of Emeryville City Hall, at 1333 Park Avenue, Emeryville, CA 94608.
- In addition, the IS/MND is available for public review on City of Emeryville Public Works website (https://www.emeryville.org/40thStreetCEQA)

Project Description: The project would enhance existing infrastructure on 40th Street (Adeline Street to IKEA Entrance) and Shellmound Street (IKEA Entrance to Christie Avenue) through the construction of 1.4 miles of two-way separated Class IV bikeway, transit-only lanes, transit islands, pedestrian enhancements, a transit hub with complete street intersection improvements, and closing the unsignalized intersections of Hubbard Street and Haven Street on the north side of 40th Street, partial southbound closures at the unsignalized intersections of Holden Street and Watts Street on the north side of 40th Street per the Emeryville City Council Resolution 23-105, 23-106, 23-107, and 23-108 (July 18, 2023).

Project features would consist of realigning the existing lanes, removing and replacing medians, rehabilitating the pavement surface, restriping, installing green stormwater infrastructure improvements, upgrading street lighting, and reconstructing pedestrian infrastructure to accommodate a two-way separated Class IV bikeway, new sidewalk, and concrete bus pads.

40th Street (Adeline Street to IKEA Entrance) improvements would include:

- Lane realignment to accommodate two-way separated Class IV bikeway on the north edge of the roadway.
- Thin grind and asphalt concrete overlay.
- Asphalt concrete conforms adjacent to new concrete work.
- Full depth pavement reconstruction in areas of new islands for bikeway separation.
- Removal of existing roadway improvements as needed.
- Construction of sidewalk on Hubbard Street.
- Multi-use pathway connection between Hubbard Street and Halleck Street up to 4.5 feet in height.
- Addition of concrete bus pads at bus stops.

Shellmound Street (IKEA Entrance to Christie Avenue) improvements would include:

- Lane realignment to accommodate two-way separated Class IV bikeway on the west edge of the roadway.
- Thin grind and asphalt concrete overlay.
- Asphalt concrete conforms adjacent to new concrete work.
- Roadway improvements, including excavation to a maximum depth of one foot below existing grade.
- Addition of one concrete bus pad at one bus stop.

Statement of Findings: In accordance with the requirements of the California Environmental Quality Act (CEQA), an IS/MND has been prepared for this project. The City has reviewed the project and, on the basis of the whole record before it, has determined that there is no substantial evidence that the Project, with mitigation measures as identified in the Initial Study, will have a significant effect on the environment. The City prepared and hereby proposes to adopt an Initial Study/Mitigated Negative Declaration for this project.

Review: A 45-day public review period for the IS/MND will commence on November 24, 2025, and will end on January 7, 2026 for interested parties and public agencies to submit written comments on the document.

Written comments may be emailed or submitted to:

Ryan O'Connell
Senior Civil Engineer
City of Emeryville
1333 Park Avenue
Emeryville, CA 94608
email: roconnell@emeryville.org

Signature of Lead Agency Representative



Ryan O'Connell
Senior Civil Engineer
City of Emeryville
Dated: November 21, 2025

PUBLIC REVIEW DRAFT



Initial Study/Mitigated Negative Declaration

ATPL-5106(010) 40th Street Transit and Multi-Modal Enhancements Project

Emeryville, CA

November 2025

City of Emeryville
CALIFORNIA

ATPL-5106(010) 40th Street Transit and Multi-Modal Enhancements Project

Emeryville, CA

Initial Study/Mitigated Negative Declaration

Prepared for:

City of Emeryville
1333 Park Avenue
Emeryville, CA 94608

Contact:
Ryan O'Connell
City of Emeryville
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Principal
(510) 215-3620
gervin@ncenet.com

City of Emeryville
CALIFORNIA

MITIGATED NEGATIVE DECLARATION

The City of Emeryville (City) does hereby prepare, declare, and publish this Mitigated Negative Declaration for the following described project:

Project Name: ATPL-5106(010) 40th Street Transit and Multi-Modal Enhancements Project

Project Location: The proposed project is in the cities of Emeryville and Oakland in California, on Shellmound Street and 40th Street between Christie Avenue and Adeline Street. The proposed project is situated within Sections 15, 16, 21, 22, and 23 of Township 1 South, Range 4 West in the USGS Quadrangle Oakland West.

Project Description: The project would enhance existing infrastructure on 40th Street (Adeline Street to IKEA Entrance) and Shellmound Street (IKEA Entrance to Christie Avenue) through the construction of 1.4 miles of two-way separated Class IV bikeway, transit-only lanes, transit islands, pedestrian enhancements, a transit hub with complete street intersection improvements, and closing the unsignalized intersections of Hubbard Street and Haven Street on the north side of 40th Street, partial southbound closures at the unsignalized intersections of Holden Street and Watts Street on the north side of 40th Street per the Emeryville City Council Resolution 23-105, 23-106, 23-107, and 23-108 (July 18, 2023).

Project features would consist of realigning the existing lanes, removing and replacing medians, rehabilitating the pavement surface, restriping, installing green stormwater infrastructure improvements, upgrading street lighting, and reconstructing pedestrian infrastructure to accommodate a two-way separated Class IV bikeway, new sidewalk, and concrete bus pads.

40th Street (Adeline Street to IKEA Entrance) improvements would include:

- Lane realignment to accommodate two-way separated Class IV bikeway on the north edge of the roadway.
- Thin grind and asphalt concrete overlay.
- Asphalt concrete conforms adjacent to new concrete work.
- Full depth pavement reconstruction in areas of new islands for bikeway separation.
- Removal of existing roadway improvements as needed.
- Construction of sidewalk on Hubbard Street.
- Multi-use pathway connection between Hubbard Street and Halleck Street up to 4.5 feet in height.
- Addition of concrete bus pads at bus stops.

Shellmound Street (IKEA Entrance to Christie Avenue) improvements would include:

- Lane realignment to accommodate two-way separated Class IV bikeway on the west edge of the roadway.
- Thin grind and asphalt concrete overlay.
- Asphalt concrete conforms adjacent to new concrete work.
- Roadway improvements, including excavation to a maximum depth of one foot below existing grade.
- Addition of one concrete bus pad at one bus stop.

Findings: The City has reviewed the project and, on the basis of the whole record before it, has determined that there is no substantial evidence that the project, with mitigation measures as identified in the attached Initial Study, will have a significant effect on the environment. This Mitigated Negative Declaration reflects the City's independent judgment and analysis as Lead Agency. An Environmental Impact Report is not required pursuant to the Environmental Quality Act of 1970 (Sections 21000, et seq., Public Resources Code of the State of California).

Mitigation measures necessary to avoid the potentially significant effects on the environment are included in the attached Initial Study, which is hereby incorporated and fully made part of this Mitigated Negative Declaration. The City has hereby agreed to implement each of the identified mitigation measures which would be adopted as part of the Mitigation Monitoring and Reporting Plan.

This Mitigated Negative Declaration has been prepared pursuant to Title 14, Section 15070 of the California Code of Regulations.

Copies are also available for review at the front desk of Emeryville City Hall at 1333 Park Avenue, Emeryville, CA 94608.



Ryan O'Connell, Senior Civil Engineer
City of Emeryville

If you need this document presented in an alternative format,

please contact:

Ryan O'Connell

City of Emeryville

(510) 596-4300

roconnell@emeryville.org

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Executive Summary

The City of Emeryville proposes the 40th Street Transit and Multi-Modal Enhancements Project (project) to provide improvements for transit riders, pedestrians, and cyclists on 40th Street and Shellmound Street, creating a safe and efficient multi-modal corridor.

Project Description as Approved by Emeryville City Council on November 18, 2025

The project would enhance existing infrastructure on 40th Street (Adeline Street to IKEA Entrance) and Shellmound Street (IKEA Entrance to Christie Avenue) through the construction of 1.4 miles of two-way separated Class IV bikeway, transit-only lanes, transit islands, pedestrian enhancements, a transit hub with complete street intersection improvements, and closing the unsignalized intersections of Hubbard Street and Haven Street on the north side of 40th Street, partial southbound closures at the unsignalized intersections of Holden Street and Watts Street on the north side of 40th Street per the Emeryville City Council Resolution 23-105, 23-106, 23-107, and 23-108 (July 18, 2023).

Project features would consist of realigning the existing lanes, removing and replacing medians, rehabilitating the pavement surface, restriping, installing green stormwater infrastructure improvements, upgrading street lighting, and reconstructing pedestrian infrastructure to accommodate a two-way separated Class IV bikeway, new sidewalk, and concrete bus pads.

40th Street (Adeline Street to IKEA Entrance) improvements would include:

- Lane realignment to accommodate two-way separated Class IV bikeway on the north edge of the roadway.
- Thin grind and asphalt concrete overlay.
- Asphalt concrete conforms adjacent to new concrete work.
- Full depth pavement reconstruction in areas of new islands for bikeway separation.
- Removal of existing roadway improvements as needed.
- Construction of sidewalk on Hubbard Street.
- Multi-use pathway connection between Hubbard Street and Halleck Street up to 4.5 feet in height.
- Addition of concrete bus pads at bus stops.

Shellmound Street (IKEA Entrance to Christie Avenue) improvements would include:

- Lane realignment to accommodate two-way separated Class IV bikeway on the west edge of the roadway.
- Thin grind and asphalt concrete overlay.
- Asphalt concrete conforms adjacent to new concrete work.
- Roadway improvements, including excavation to a maximum depth of one foot below existing grade.

- Addition of one concrete bus pad at one bus stop.

Potential Impacts

Based on the environmental evaluation performed for this Initial Study, the proposed project would have:

- ***No Impact*** or beneficial effects on Agricultural and Forestry Resources, Land Use and Planning, Mineral Resources, and Population and Housing.
- ***Less Than Significant Impact*** on Aesthetics, Air Quality, Biological Resources, Cultural Resources, Energy, Geology and Soils, Greenhouse Gas Emissions, Hydrology and Water Quality, Noise, Public Services, Recreation, Transportation, Utilities and Service Systems, and Wildfire.
- ***Less Than Significant Impact with Mitigation Incorporated*** on Biological Resources, Hazards and Hazardous Materials, and Tribal Cultural Resources.

Impacts and Mitigation Measures

The following impacts and mitigation measures required to reduce project impacts to a "Less than Significant" level have been identified in this analysis:

- ***Mitigation Measure BIO-1:*** If any construction activities (e.g., demolition) are scheduled during the bird nesting season (typically defined by California Department of Fish and Wildlife as February 1 to September 1), the City or approved construction contractor shall retain a qualified biologist to conduct a pre-construction survey of the project area, including a 100-foot buffer, as access is available, to locate active bird nests, identify measures to protect the nests, and locate any other special status species. The pre-construction survey shall be conducted no more than 14 days prior to the implementation of construction activities (including staging and equipment storage). Any active nest should not be disturbed until the young have fledged or under the direction provided by a qualified biologist. Any special status species shall not be disturbed without the direction of a qualified biologist. If an active nest is found during construction, disturbance shall not occur without direction from a qualified biologist.
- ***Mitigation Measure HAZ-1:*** The contractor will prepare a Soil Management Plan that will address soil and groundwater excavation, disposal, stockpiling, and transportation. The Soil Management Plan shall explicitly address handling and disposal of soil, on-site soil management, off-site soil disposal, profiling of soil, transportation routes, and dust mitigation controls.
- ***Mitigation Measure TCR-1:*** The City shall ensure implementation all nonstandard conditions required in the Finding of No Adverse Effect and Post Development Resource Monitoring Plan as required by Caltrans and approved by the Tribes, Caltrans, and the State Office of Historic Preservation.

List of Abbreviations

Abbreviation	Definition
BAAQMD	Bay Area Air Quality Management District
BMP	Best management practice
CAL FIRE	California Department of Forestry and Fire Protection
CARB	California Air Resources Board
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFG	California Fish and Game (Code)
CRHR	California Register of Historical Resources
CWA	Clean Water Act
DG	Decomposed granite
EBMUD	East Bay Municipal Utility District
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GHG	Greenhouse gases
IS	Initial Study
MBTA	Migratory Bird Treaty Act
MMRP	Mitigation Monitoring and Reporting Plan
MND	Mitigated Negative Declaration
MTC	Metropolitan Transportation Commission
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_X	Nitrogen oxides
NPDES	National Pollution Discharge Elimination System

PCB	Polychlorinated biphenyls
PRC	Public Resources Code
ROG	Reactive organic gases
ROW	Right-of-way
RWQCB	San Francisco Bay Regional Water Quality Control Board
SER	Standard Environmental Reference
SHS	State Highway System
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	California State Water Resources Control Board
TMDL	Total Maximum Daily Load
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Service
VHFHSZ	Very High Fire Hazard Severity Zones
VMT	Vehicle miles traveled
VOC	Volatile organic compounds

1 Project Information

Type of Information	*Project Details*
1. Project title:	ATPL-5106(010) 40th Street Transit and Multi-Modal Enhancements Project
2. Lead agency name and address:	City of Emeryville 1333 Park Ave Emeryville, CA 94608
3. Contact person and phone number:	Ryan O'Connell City of Emeryville (510) 596-4300 roconnell@emeryville.org
4. Project location:	Emeryville, CA and Oakland, CA
5. Project sponsor's name and address:	City of Emeryville 1333 Park Ave Emeryville, CA 94608
6. General Plan designations:	No specific land use designation. The project involves work within the roadway right-of-way (ROW) and roadway.
7. Zoning:	No specific zoning designation. The project involves work within the roadway ROW and roadway.
8. Description of project:	This project would renovate portions of 40th and Shellmound streets to provide improvements for transit riders, pedestrians, and cyclists. It would create a transit hub on 40th Street just east of the intersection of 40th Street and San Pablo Avenue and add bike lanes, intersections, transit stops, streetscapes, and green stormwater infrastructure. The project would provide for continuation of the San Francisco Bay Trail as a two-way separated Class IV, which would include realignment of the existing lanes to allow construction of a two-way separated Class IV bikeway on the north side of 40th Street and a two-way separated Class IV bikeway on the west side of Shellmound Street.
9. Surrounding land uses and setting:	Commercial, with a variety of customer-centered businesses and offices, including a hotel, retail stores, and fast-food restaurants. Multifamily residential areas, senior care living, and multi-use areas are adjacent along the corridor and at the end of 40th Street near the intersection with Adeline Street.
10. Other public agencies whose approval is required:	California Department of Transportation (Caltrans) City of Oakland Metropolitan Transportation Commission

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code Section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?	On September 27, 2024, a letter was sent to the Native American Heritage Commission (NAHC) requesting a search of their Sacred Lands database and a list of contacts that may have knowledge of cultural or tribal resources within or immediately adjacent to the proposed project area. A response was received on October 1, 2024, indicating a positive presence of Native American cultural resources associated with the Amah Mutsun Tribal Band of Mission San Juan Bautista and the Northern Valley Yokut/Ohlone Tribe. The NAHC provided a list of 21 tribal representatives for consultation, including representatives from the Amah Mutsun Tribal Band of Mission San Juan Bautista, Northern Valley Yokut/Ohlone Tribe, Confederated Villages of Lisjan Nation, Muwekma Ohlone Tribe of the San Francisco Bay Area, Indian Canyon Mutsun Band of Costanoan, and the Ohlone Indian Tribe. Consultation letters were mailed to all representatives on April 3, 2025, and follow-up emails were sent on April 23, 2025. Five tribes, the Amah Mutsun Tribal Band of Mission San Juan Bautista, the Confederated Villages of Lisjan Nation, the Muwekma Ohlone Tribe of the San Francisco Bay Area, the Northern Valley Yokut/Ohlone Tribe, and the Ohlone Indian Tribe have responded to date. The Amah Mutsun Tribal Band subsequently deferred consultation responsibilities to the Muwekma Ohlone Tribe. Whereas this is a Caltrans funded project, tribal consultation is ongoing through the Caltrans Section 106 approval process. See Section 4.18, Tribal Cultural Resources, for details.

2 Introduction

2.1 Focus of the Environmental Review

2.1.1 California Environmental Quality Act

The City of Emeryville (City), as the project sponsor and lead agency, in cooperation with the California Department of Transportation (Caltrans) as Responsible Agency, has prepared this Draft Initial Study (IS) pursuant to the California Environmental Quality Act (CEQA) for the proposed 40th Street Transit and Multi-Modal Enhancement Project (project). This IS is an informational document provided to help the public and decision-makers understand the effects the project may have on the environment, and how any potential adverse effects may be mitigated. Because this document describes potentially significant impacts that can be reduced to less than significant with the adoption of mitigation measures, a Mitigated Negative Declaration (MND) has been prepared.

The Notice of Intent to Adopt a Mitigated Negative Declaration provides notice to interested agencies and the public that it is the City's intent to adopt an MND and, pending public review, expects to determine from this IS/MND that the proposed project would not have a significant effect on the environment as mitigated. This Public Review Draft IS/MND is subject to modification based on comments received by interested agencies and the public.

2.1.2 California Department of Transportation

Caltrans has assumed responsibility for the Federal Highway Administration (FHWA) for projects using FHWA funding or requiring FHWA approval. Caltrans has designated the role of lead agency to the City of Emeryville and serves as a Responsible Agency under CEQA; Caltrans must approve all technical studies and environmental documents before the project can proceed. Caltrans provides guidance for implementing regulations, as well as recommended report content and format, in the *Standard Environmental Reference* (SER; Caltrans 2024a) on the Caltrans SER web page. This guidance was used to develop supporting technical studies and CEQA topic analysis for the proposed project.

2.2 Summary of Findings

Biological Resources, Hazards and Hazardous Materials, and Tribal Cultural Resources would be potentially affected by this project, including at least 1 impact that would be a "Potentially Significant Impact" without the implementation of mitigation measures. Based on the environmental evaluation performed for this IS (Section 4), the proposed project would have:

- No Impact or beneficial effects on Agricultural and Forestry Resources, Land Use and Planning, Mineral Resources, and Population and Housing.
- Less Than Significant Impact on Aesthetics, Air Quality, Biological Resources, Cultural Resources, Energy, Geology and Soils, Greenhouse Gas Emissions, Hydrology and Water Quality, Noise, Public Services, Recreation, Transportation, Utilities and Service Systems, and Wildfire.
- Less Than Significant Impact with Mitigation Incorporated on Biological Resources, Hazards and Hazardous Materials, and Tribal Cultural Resources.

2.3 Required Permits and Additional Approvals

2.3.1 Permits

The project would obtain or comply with the following permits:

- Encroachment Permit (City of Oakland)
- Encroachment Permit (Caltrans)

2.3.2 Responsible Agencies

- Caltrans
- City of Oakland

2.4 Lead Agency Determination

On the basis of this initial evaluation:

__ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

X I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

__ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT (EIR) is required.

__ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An EIR is required, but it must analyze only the effects that remain to be addressed.

__ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

_____ _____

Signature Date

_____ _____

Name Title

3 Project Description

The City of Emeryville proposes the 40th Street Transit and Multi-Modal Enhancement Project to create a safe and efficient multi-modal corridor for transit riders, pedestrians, and cyclists on 40th Street and Shellmound Street. The project aligns with the City's goal to provide comfortable and safe circulation for all users.

3.1 Project Location

The proposed project is in the cities of Emeryville and Oakland in California, on Shellmound Street and 40th Street between Christie Avenue and Adeline Street (**Figure 1**). The proposed project is situated within Sections 15, 16, 21, 22, and 23 of Township 1 South, Range 4 West in the USGS Quadrangle Oakland West. The project limits are shown in **Figure 2**.

3.2 Background

The project was originally designed to create a major transit hub at 40th Street and San Pablo Avenue that would include a two-way separated bikeway on the north side of 40th Street, an additional eastbound transit-only lane, and conversion of a westbound travel lane into a transit-only lane, all between Adeline Street and the IKEA entrance. The process of developing concepts for these multi-modal improvements started in 2018 with preparation of initial design concepts for the bus hub and 40th Street west of San Pablo Avenue based on existing conditions along the 40th Street/Shellmound Street corridor.

On July 9, 2019, the City Council approved the "40th and San Pablo Bus Hub Project Conceptual Design Memorandum" and found the project to be exempt from environmental review under CEQA Guidelines Section 15301(c). A final report, "40th and San Pablo Bus Hub Project, Final Report" was prepared and approved at City Council on March 3, 2020.

Subsequently, a Part 2 multi-modal project was added into the scope of the project involving a cycle track from the IKEA entrance to the northern extent of the Shellmound Street and Christie Avenue intersection. This second segment involves relocating traffic signal poles and relocating center medians and landscaping in an area that is capped for hazardous materials, and where Native American shellmound resources have been identified. In addition, federal funding has been obtained, and NEPA compliance pursuant to the Caltrans Local Agency Procedures Manual is required as well as additional CEQA documentation. The environmental issues related to soil contamination, tribal cultural resources, and community concern over street closures have triggered the requirement for a CEQA IS/MND.

3.2.1 Community Involvement

In June 2023 and May 2024, the City made outreach efforts as part of their design process to ensure the community could have input and approved of the proposed improvements. Outreach efforts included mailers, meetings, and direct contact, where the consulting team met with businesses and residential property owners. Stakeholders also communicated with City staff through emails and phone calls.

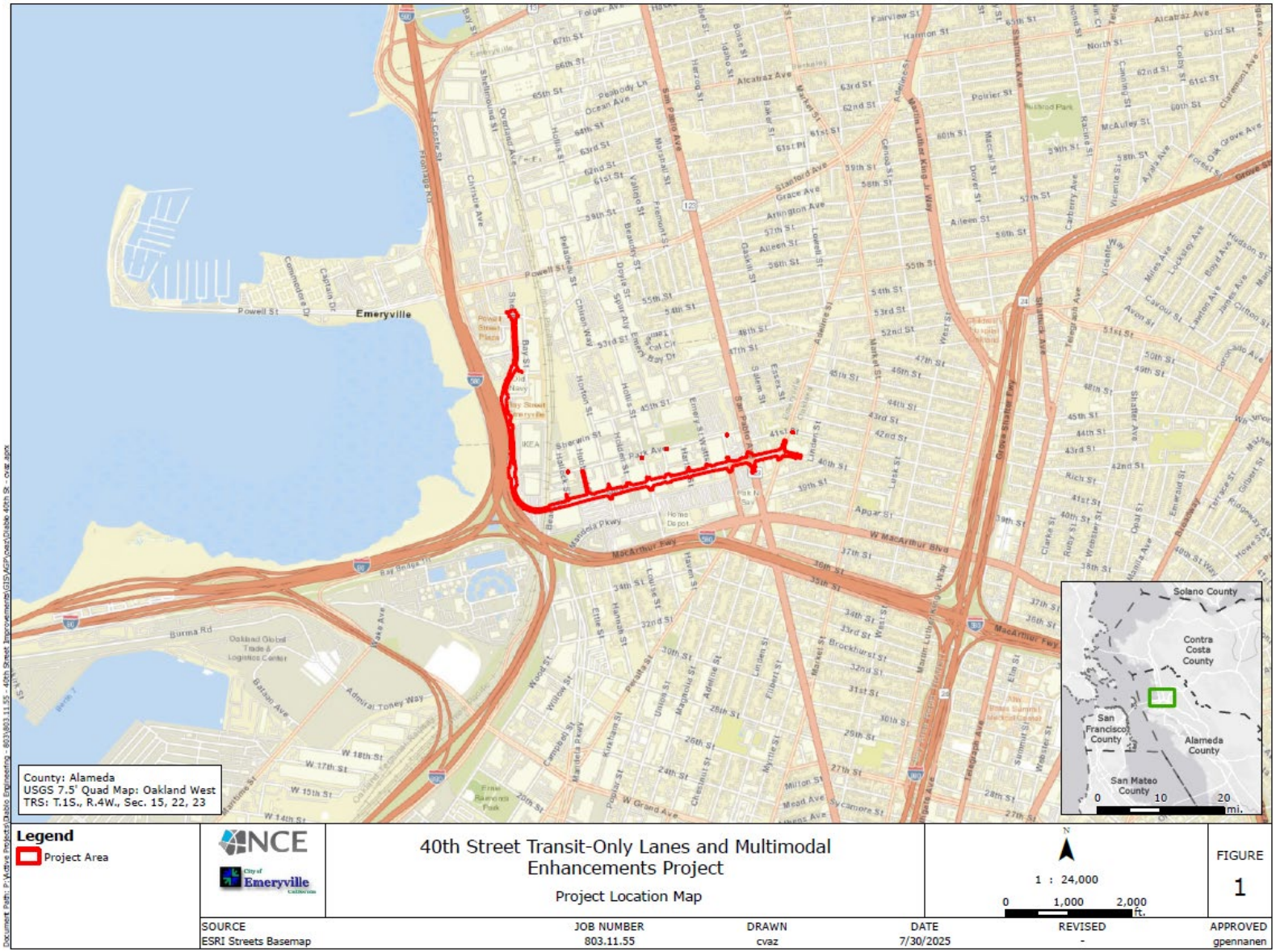


Figure 1. Project Location Map

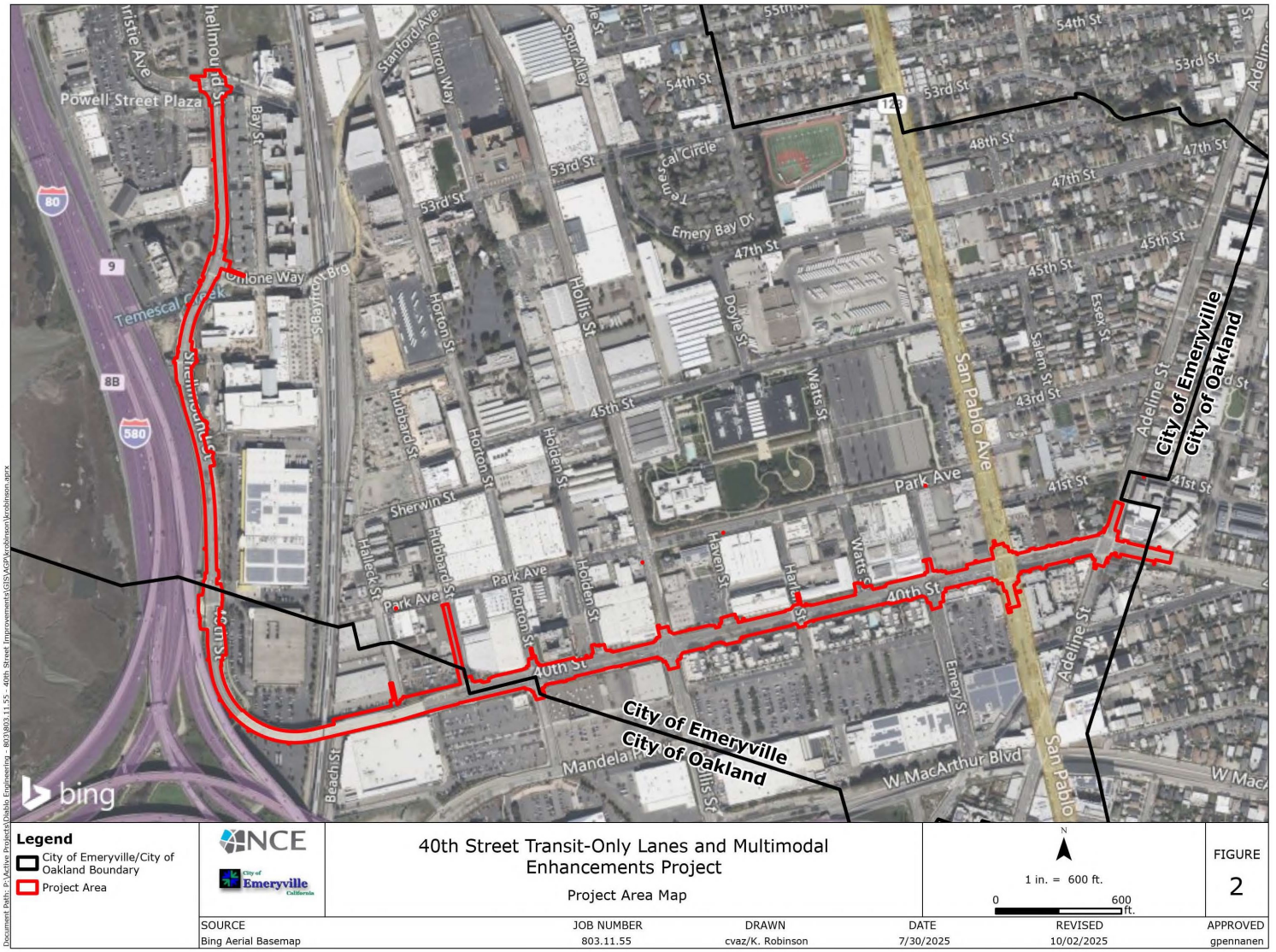


Figure 2. Project Area Map

Businesses like Rug Depot, Pottery & Beyond, and Granite Expo expressed concerns about access and parking, leading to design refinements such as redesigning street closures and curblines, and considering commercial loading zones. Residential concerns, particularly from the Watermark by the Bay, focused on loading space, parking, and emergency access, resulting in changes like creating shared spaces for bikes and pedestrians, maintaining trees, and adding loading zones. An online survey gathered feedback and verified support for the project design, showing significant support across income levels, with many respondents emphasizing the importance of protected bike lanes and traffic calming measures. Overall, the project team engaged extensively with the community to refine the design and address concerns, ensuring the project aligns with local development plans and promotes sustainable growth without compromising community cohesion. Community outreach consisted of in-person and virtual meetings, postcards, phone calls, emails and community events.

In response to these contacts, project design refinements and alternatives were considered included an option of the Hubbard Street closure to allow right-in movement, redesigning the curbline to facilitate truck turning movements, and being open to requests for a commercial loading zone on Horton Street. The major properties on Hubbard Street also have access to the parallel side streets of either Halleck Street or Horton Street.

After concerns from property owners along Hubbard Street, the October 2024 Traffic Safety and Operations Analysis was expanded in August 2025 to include an additional Intersection and Truck Activity Analysis Memorandum. During follow-up meetings with the Bessler Building Homeowner's Association, residents expressed concerns about the potential for homeless activity at the street closures. The project will provide an improved fence between the Bessler Building and the public City right-of-way (ROW) along Haven Street and 40th Street in response to the concerns from the homeowner's association.

After considering various concerns and alternatives, the concept designs were brought to the Emeryville City Council in July 2023. The City Council approved the concept of closing the unsignalized intersections of Hubbard Street and Haven Street on the north side of 40th Street, and the design concept of partial southbound closures at the unsignalized intersections of Holden Street and Watts Street on the north side of 40th Street. At the same meeting, Emeryville's City Council approved adding the Phase 2 concept into the scope of work of the project (Shellmound Street from IKEA Entrance to Christie Avenue). The approved concept designs have been incorporated into the final design (see Section 17 Transportation). A Caltrans Community Impact Memorandum with further details on this is provided in **Appendix A**.

3.3 Project Objectives

The project objective is to provide improvements to transit riders, pedestrians, and cyclists on 40th Street and Shellmound Street, creating a safe and efficient multi-modal corridor. This would be accomplished by renovating portions of 40th and Shellmound streets to create a transit hub on 40th Street just east of the intersection of 40th Street and San Pablo Avenue and adding bike lanes and other multi-modal improvements. The project would include continuation of the San Francisco Bay Trail as a two-way separated Class IV bikeway from its existing terminus at the IKEA entrance on the east side of Shellmound Street to the north side of 40th Street to Adeline Street. The project would include realignment of the existing lanes to allow the construction of the eastbound 2-lane separated Class IV bikeway on the north side of 40th Street and the northbound 2-lane separated Class IV bikeway on the

west side of Shellmound Street. In addition, the project would improve intersections, transit stops, and streetscapes, and provide green stormwater infrastructure to create a safe multi-modal corridor.

3.4 Existing Conditions

Shellmound Street is classified as a local street, and 40th Street, which provides access to Emeryville's commercial area, Oakland, and the Bay Bridge Trail, is classified as a minor arterial road. Major signalized intersections on 40th Street within the project include San Pablo Avenue (State Route 123), Adeline Street, Emery Street, Harlan Street, Hollis Street, and Horton Street. Major signalized intersections on Shellmound Street within the project include the IKEA entrance and exit, Bay Street, Ohlone Way, and Christie Avenue. Currently, 40th Street consists of 2 lanes in each direction, and Shellmound Street consists of 2 lanes in each direction transitioning to 1 lane over the train tracks between the IKEA entrance and Hubbard Street.

Land use throughout the corridor is commercial, with a variety of customer-centered businesses and offices, including IKEA, a hotel, retail stores, and fast-food restaurants. Multifamily residential areas, senior care living, and multi-use areas are adjacent along the corridor and at the end of 40th Street near the intersection with Adeline Street.

The portion of the project area located within the City of Oakland is an operating ROW for Emeryville by agreement. This area is identified in **Figure 2** and the City of Oakland Department of Transportation (OakDOT) has provided a letter of support for the project (**Appendix B**).

3.5 Project Features

The project features are illustrated in Figure 3.

Roadway Upgrades

Roadway upgrades would consist of realigning the existing lanes, rehabilitating the pavement surface, and restriping.

Segment One - 40th Street (Adeline Street – IKEA Entrance) improvements would include:

- Lane realignment to accommodate two-way separated Class IV bikeway on the north edge of the roadway.
- Thin grind and asphalt concrete overlay.
- Asphalt concrete conforms adjacent to new concrete work.
- Full depth pavement reconstruction in areas of new islands for bikeway separation.
- Removal of existing roadway improvements as needed.
- Construction of sidewalk on Hubbard Street. Maximum depth of excavation is anticipated to be 26 inches.
- Multi-use pathway connection between Hubbard Street and Halleck Street up to 4.5 feet in height. Maximum depth of excavation is anticipated to be 24 inches.
- Addition of concrete bus pads at bus stops. Maximum depth of excavation is anticipated to be 17 inches.

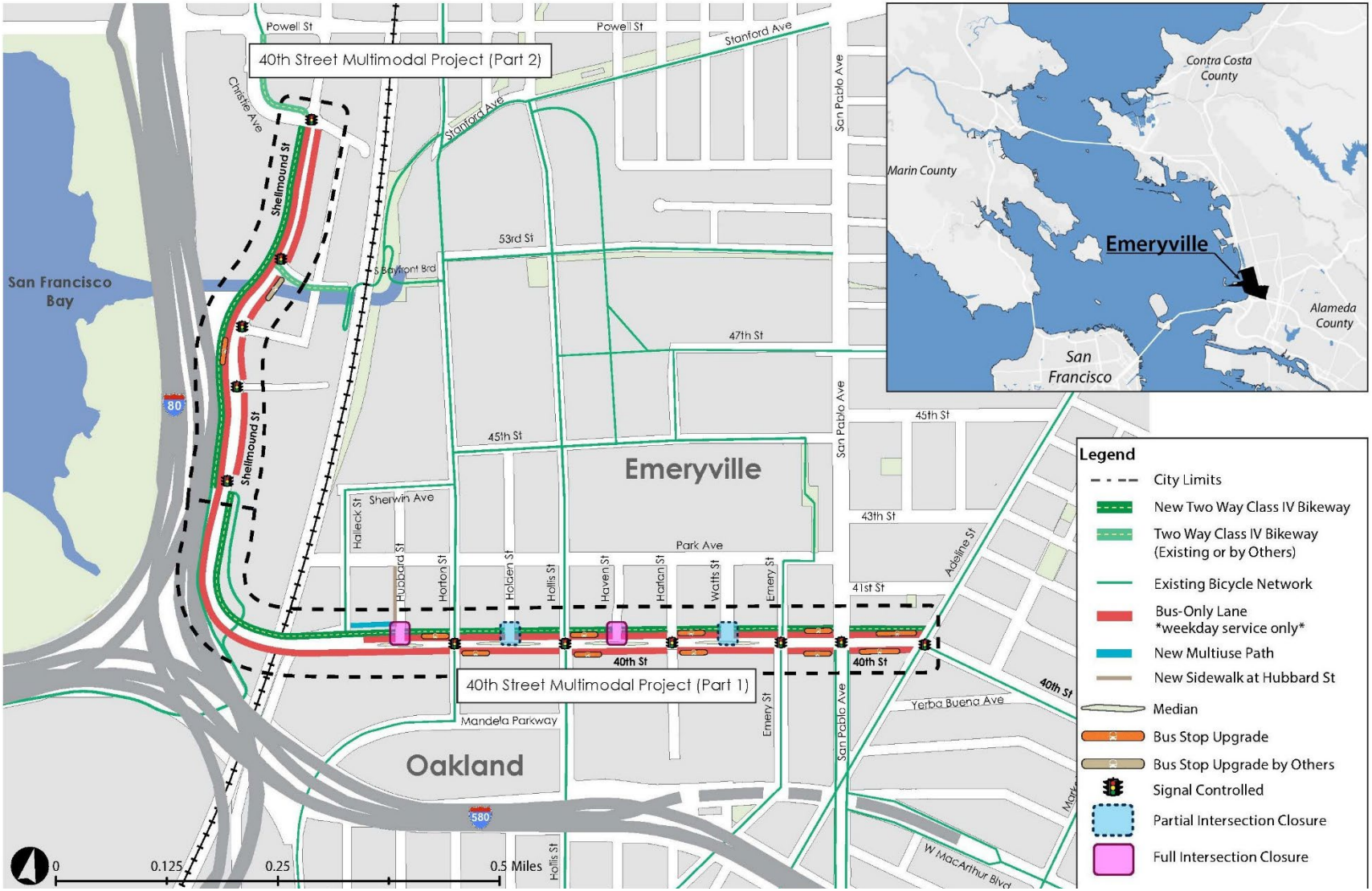


Figure 3. Project Detail Map
Source: Diablo Engineering, 2025

Segment Two - Shellmound Street (IKEA Entrance – Christie Avenue) improvements would include:

- Lane realignment to accommodate two-way separated Class IV bikeway on the west edge of the roadway.
- Thin grind and asphalt concrete overlay.
- Asphalt concrete conforms adjacent to new concrete work.
- Roadway improvements, including excavation to a maximum depth of 1 foot below existing grade.
- Addition of 1 concrete bus pad at 1 bus stop. Maximum depth of excavation is anticipated to be 17 inches.

Medians

Some existing medians would be removed, and new medians would be installed throughout the corridor where restricting movement is recommended to calm traffic, improve safety and access, and provide opportunities for green stormwater infrastructure and pedestrian refuge. During construction of the 40th Street segment, medians would be installed to restrict vehicle access along the north side of 40th Street at Hubbard (full access restriction), Holden (partial access restriction), Haven (full access restriction), and Watt (partial access restriction) streets. Full access restriction would prevent vehicles from turning from or onto the side street. Partial access restriction would prevent vehicles from turning from the side street onto 40th Street. In all cases, emergency access would be maintained. Median improvements would also include work related to new concrete sidewalk, curb and gutter, median curb, driveway, and curb ramps up to 1 foot of excavation along the entire 40th Street corridor. In addition, parking spaces would be removed within this segment along the north side of 40th Street and existing stalls converted on adjacent streets to accessible parking spaces. During construction of the Shellmound Street segment, the center median at the IKEA exit would be shifted to allow for the proposed Class I shared use path along the southbound shoulder.

Storm Drain

Green stormwater infrastructure is used to help collect, infiltrate, and treat stormwater runoff from adjacent impervious surfaces, including streets and sidewalks. Green stormwater infrastructure improvements are planned with 40th Street segment, and no storm drain or green stormwater infrastructure improvements are noted on the Shellmound Street Segment plans. Storm drain facilities and green stormwater infrastructure treatment basins would include:

- Storm drain inlets and pipe connections to convey stormwater runoff from repositioned flowlines in the street design.
- Bioretention facilities with excavation depths of approximately 48 inches, with deepened retaining curbs and a small retaining wall footing on the traffic side of the bioretention facilities.
- New permeable pavements to be used for stormwater infiltration in limited sidewalk areas. Excavation for these would be approximately 12 inches deep.
- New drain inlets and pipe connections along the new curb line, against the dedicated bus lane on the north side of 40th Street.

- Storm drain pipe and structures with excavation from 4 feet to 12 feet.

Street Lighting

Existing street lighting would be either upgraded or protected in place. Within the 40th Street segment, additional pedestrian scale lighting is proposed along the shared use path at Halleck Street and along the sidewalk on either side of 40th Street between Hubbard Street and Adeline Street, focused on plazas at restricted side streets and bus stop areas. Thirty-three street lights are planned for 40th Street and no new street lights are planned for Shellmound Street.

- Pedestrian scaled lighting pole foundations would be 2.5 feet in diameter and up to 7 feet deep, and the lighting pole would be up to 15 feet tall. Intersection lighting would have the same maximum foundation size but could be up to 35 feet tall.

Utility Relocation

The only utility relocations anticipated are of 4 or fewer fire hydrants in the 40th Street segment. This would need to be coordinated with East Bay Municipal Utility District (EBMUD), as they typically relocate fire hydrants with their own workforce and charge the City for the relocations.

Traffic Signals

Both project segments would implement either a separated shared use path for pedestrians and bicyclists or two-way Class IV bikeway by shifting traffic lanes. This would require traffic signals to be relocated to accommodate the lane shifts and modified to incorporate signalized pedestrian crossings. Signal modifications may require excavation to a depth of up to 14 feet below ground surface with a diameter of 4 feet, and minor trenching of conduits, typically 30 inches deep and up to 42 inches deep.

40th Street segment signal modifications would occur at the IKEA entrance, Horton Street, Hollis Street, Emery Street, San Pablo Avenue, and Adeline Street.

Shellmound Street signal modifications would include relocation of traffic signals to accommodate lane shift and pedestrian push button improvements for accessibility at the IKEA entrance, IKEA exit, Bay Street, Ohlone Way, and Christie Avenue.

Pedestrian Facilities

Pedestrian facilities would be reconstructed to comply with Americans with Disabilities Act (ADA) requirements. Improvements would include removal of obstructions, closure of sidewalk gaps, installations of shared use paths, installation of ramps and bulb-outs, shortened and high visibility crosswalks, and other pedestrian improvements intended to provide a more inviting and safer walking environment.

40th Street segment pedestrian improvements would include:

- Minor sidewalk widening to accommodate bus stop construction.
- New retaining walls along the shared use path between Halleck Street and Hubbard Street. Excavation for these would be up to 24 inches deep and next to the bridge abutment, which is entirely fill and above most of the existing grade.

- New pedestrian plazas at the intersections of Hubbard Street and 40th Street and Haven Street and 40th Street where the design closes off traffic access from 40th Street. This would include new or green stormwater infrastructure, storm drain connections, sidewalk, curb and gutter, and asphalt concrete pavement.
- Sidewalk gap closure on the west side of Hubbard Street between 40th Street and Park Avenue. Excavation for pavements, concrete sidewalk, and curb and gutter would be approximately 12 inches.
- New pedestrian curb ramps throughout the corridor. Depth would be approximately 10 inches with an adjacent 12-inch asphalt plug to tie into the existing asphalt concrete roadway.
- Construction of corner bulb-outs for placement of directional pedestrian curb ramps and shortened crosswalks at multiple signalized intersections noted along the corridor. Excavation for sidewalk and roadway improvements would be up to 12 inches.
- Corner islands for protected intersections comprised of sidewalk/stamped concrete and curb and gutter. Excavation would be up to 12 inches.
- New sidewalk, curb and gutter, bioretention basins, storm drain lines and inlets, curb ramps, etc., at Holden Street and Watts Street where only northbound traffic coming from westbound 40th Street is permitted.

Shellmound Street segment improvements would be limited to ADA curb ramp upgrades.

Bus Lane and Stop Upgrades

Both 40th Street and Shellmound Street would include dedicated bus lanes in both travel directions for increased capacity and improved service and reliability.

40th Street segment improvements would include:

- Concrete transit islands between bus lane stops and the two-way bikeway on the north side of 40th Street. Depth of excavation for the associated concrete and pavement work would be approximately 12 inches.
- New or relocated bus shelters at 3 bus/transit stops. Where the shelters are to be placed, a concrete pad would be placed underneath. Excavation depth for the pad would be 8 inches.
- Landscape and transit stop amenities such as bike racks, benches, bus shelters, and trash receptacles.

Shellmound Street improvements would include relocation of 1 bus stop and shelter to be adjacent to the bus only lane.

Landscaping

Existing landscaping would be preserved where possible.

The 40th Street segment would include removal and replacement of up to 52 street trees. Tree removal and planting depth is typically approximately 4 feet, as the City has a standard to create a rootable area for new trees. This rootable area provides space for tree roots to avoid future uplifting of pavement and sidewalk caused by roots.

The 40th Street segment would also include green infrastructure near the intersections of 40th Street and Halleck Street, Hubbard Street, Horton Street, Holden Street, Hollis Street, Haven Street, Watts Street, Emery Street, San Pablo Avenue, and Adeline Street. New plantings would be added to select locations in the medians and in the bioretention basins. Other landscaping elements would include shrubs, mulch, hydroseeding, and groundcovers. The landscaping would be irrigated.

No landscaping improvements are noted on the Shellmound Street segment drawings, however, landscaping where the medians are shifted and some minor landscaping near the new bus stop area are planned. This includes the removal of 4 trees and replacement of 6 trees.

Rights-of-way

The project upgrades would be positioned inside existing ROWs. The project staging would also be positioned inside existing ROWs.

A decomposed granite path and landscaping would be placed in Caltrans ROWs across from the IKEA entrance. The decomposed granite path would be approximately 8 inches deep. San Pablo Avenue is Caltrans ROW. Portions of the project are within the City of Oakland ROW.

Roadway Connection Closures and Modification

Four intersections with 40th Street would be closed or have modified traffic patterns. The intersections of Hubbard and Haven streets with 40th Street would be closed off. The dead end would provide adequate space for up to a 30-foot truck to turn around in the cul-de-sac and up to a 40-foot truck (WB-40) to turn around using driveways at the sites they are serving. Larger vehicles would need to follow approved traffic control procedures to access the sites they are serving, which is typical for oversized deliveries in the City. Large emergency vehicles would use a 14-foot emergency vehicle access from 40th Street.

The intersections of Holden and Watts streets and 40th Street would have modified traffic patterns only allowing a right turn onto those streets from 40th Street. Raised pedestrian crosswalks would be installed at these intersections to increase pedestrian awareness in drivers.

3.5.1 Construction Schedule

The design plans for both project segments are 95% complete. The final project design is expected to be completed by the end of 2025. Construction is expected to begin in spring/summer 2026 and be completed by the end of 2028.

3.6 Construction Controls

The project would be required to comply with local, state, and federal regulations pertaining to protection of human health, safety, and environment. In addition, the project must meet project-specific permit conditions established by regulatory agencies (see Section 2.3).

The following required conservation measures and construction controls from local, state, and federal agencies have been incorporated into the project design. In general, the City follows the Caltrans Construction Site Best Management Practices Manual (Caltrans 2024b).

3.6.1 Air Quality

The basic construction controls outlined below would be implemented to minimize impacts to air quality during construction, as required by the Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines Update (BAAQMD 2022).

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered 2 times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.
7. All trucks and equipment, including their tires, shall be washed off prior to leaving the site.
8. Unpaved roads providing access to sites located 100 feet or further from a paved road shall be treated with a 6- to 12-inch layer of compacted layer of wood chips, mulch, or gravel.
9. Publicly visible signs shall be posted with the telephone number and name of the person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's General Air Pollution Complaints number shall also be visible to ensure compliance with applicable regulations.

In addition, Caltrans' Standard Specifications in Section 14-9 (Caltrans 2024c) require the contractor to comply with all applicable air quality laws and regulations. Specific actions include:

- Post a publicly visible sign with large font, providing the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. BAAQMD's nuisance response phone number shall also be visible to ensure compliance with applicable regulations.
- Idling times shall be minimized either by shutting equipment off when not in use, or, reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage in large font shall be provided for construction workers at all access points for this requirement.
- Construction equipment and vehicles will be properly tuned and maintained. All construction equipment will use low sulfur fuel as required by CCR Title 17, Section 93114.
- Water or a dust palliative will be applied to the site and equipment as often as necessary to control fugitive dust emissions.

- Soil binder will be spread on any unpaved roads used for construction purposes, and on all project construction parking areas.
- Equipment and materials storage sites will be located as far away from residences and parks as practicable. Construction areas will be kept clean and orderly.
- Track-out reduction measures will be used at project access points to minimize dust and mud deposits on roads affected by construction traffic. Dust and mud that is deposited on paved, public roads due to construction activity and traffic will be promptly and regularly removed to reduce particulate matter emissions.
- To minimize spreading dust into the wider community, all transported loads of soils and wet materials will be covered before transport, or adequate freeboard will be provided.
- To the extent feasible, construction traffic will be scheduled and routed to reduce congestion during peak travel times.
- As soon as practical after grading, the contractor will install mulch or plant vegetation to reduce windblown particulate matter on spoils piles and areas not subject to near-term paving.

3.6.2 Geology and Soils

The Hydrology and Water Quality controls section below outlines erosion and sediment best management practices (BMPs) that would minimize impacts to geology and soils during construction.

3.6.3 Hazards and Hazardous Materials

The Construction General Permit requires that a Spill Prevention Plan be developed along with the project-specific Stormwater Pollution Prevention Plan (SWPPP) to detail site-specific BMPs to prevent spills from impacting water and land resources. The plan must outline protocols for contacting the San Francisco Bay Regional Water Quality Control Board (RWQCB) and other responsible agencies. Additionally, spill containment and absorbent materials must be kept on-site at all times, and petroleum products and hazardous waste must be removed and disposed of at an appropriate location.

3.6.4 Hydrology and Water Quality

Construction activities that disturb 1 acre or more of land, and construction on smaller sites that are part of a larger project, must comply with a California State Water Resources Control Board (SWRCB) Construction General Permit (Order 2009-0009-DWQ) that regulates stormwater leaving construction sites. Site owners must notify the state, prepare and implement a SWPPP, and monitor the effectiveness of the plan. The SWPPP must outline measures that will protect hydrology and water quality resources, including groundwater, from negative impacts during construction.

Construction site stormwater BMPs would follow the Caltrans Construction Site Best Management Practices Manual (Caltrans 2024b) to control and minimize the impacts of construction-related activities. Some of these controls are also outlined in Section 3.6.1 as construction controls for air quality. The following BMPs, at a minimum, would be implemented at the site during construction:

1. Temporary erosion and sediment control BMPs to prevent the transport of earthen materials and other construction waste materials from disturbed land areas, stockpiles, and staging areas during periods of precipitation or runoff (such as silt fence, erosion control fabric, fiber rolls).
2. Tracking controls and designated staging areas outside of drainage areas.
3. Revegetation of all disturbed areas, including staging with native species only.
4. Temporary BMPs to prevent wind erosion and sediment transport of disturbed areas, such as use of water for dust control and covering of stockpiles.
5. Construction boundary fencing to limit land disturbance to areas not planned for construction.

3.6.5 Traffic During Construction

For activities within a public ROW, a Temporary Traffic Control Plan and Pedestrian Control Plan conforming with the California Manual on Uniform Traffic Control Devices must be prepared and submitted for review and approval prior to issuance of applicable encroachment permits. Reviewing agencies would include the City (entire project) and Caltrans (only for the San Pablo Avenue/40th Street Intersection). Final project plans direct the contractor to keep access open to all residences and businesses at all times throughout construction.

4 Environmental Evaluation

The following sections evaluate the potential adverse impacts of the project in compliance with CEQA. Appendix G of the CEQA Guidelines (California Natural Resources Agency 2018) provides a sample checklist with a series of questions designed to enable the lead agency, the City of Emeryville, to identify project impacts with respect to 20 environmental topics; this IS generally follows this checklist.

Except where a specific threshold has been adopted by a public agency and is specified in the sections below, such as an air quality threshold, Appendix G of the CEQA Guidelines are used as thresholds of significance for the CEQA checklist questions.

Potential environmental impacts are described as follows:

- **Potentially Significant Impact**: An environmental impact that could be significant and for which no feasible mitigation is known. If any potentially significant impacts are identified in this Checklist, an EIR must be prepared.
- **Less than Significant Impact with Mitigation Incorporated**: An environmental impact that requires the implementation of mitigation measures to reduce that impact to a less than significant level.
- **Less than Significant Impact**: An environmental impact may occur; however, the impact would not exceed significance thresholds.
- **No Impact**: No environmental impacts would result from implementation of the project.

4.1 Aesthetics

4.1.1 Environmental Setting

The project is located in a highly urbanized area, and the project area consists of paved arterial roads and local roadways. Shellmound Street abuts Interstate 580. Land use throughout the corridor is commercial, with a variety of customer-centered businesses and offices, including IKEA, a hotel, retail stores, and fast-food restaurants. Multifamily residential areas, senior care living, and multi-use areas are adjacent along the corridor and at the end of 40th Street near the intersection with Adeline Street.

Landscaping is limited within the project area. Along Shellmound Street south of Christie Avenue, there is a narrow, landscaped median with occasional trees/shrubs, plus sparse trees along the street. The high-density housing along 40th Street has minimal ornamental landscaping around buildings and parking lots. Slope plantings are present near the I-80 interchange where Shellmound Street curves. Along 40th Street, there is also a landscaped median with sparsely spaced trees and landscape shrubs, and street trees line both sides of the street.

Existing nighttime light sources in the project area include street lighting along Shellmound Street and 40th Street, as well as security lighting from the surrounding residences and commercial buildings.

A Visual Impact Assessment was prepared to estimate the probable visual impacts of the project. The project received a score of 9, indicating that visual impacts of the project are minimal and acceptable, and no further Visual Impact Assessment was needed (Caltrans 2023).

4.1.2 CEQA Checklist Summary

Except as provided in Public Resources Code Section 21099, would the project:

CEQA Question	Impact Determination
a) Have a substantial adverse effect on a scenic vista?	No Impact
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings, within a state scenic highway?	Less Than Significant Impact
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	No Impact
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?	Less Than Significant Impact

4.1.3 Answers to CEQA Checklist Questions

Except as provided in Public Resources Code Section 21099:

a) Would the project have a substantial adverse effect on a scenic vista?

No Impact

A review of the Caltrans Vista Points GIS Data identified the Emeryville Public Access Pier Vista Point, located northwest of the project area along the San Francisco Bay Trail (Caltrans 2025a). However, the I-80 interchange separates the project area from the vista point, making the project area not visible from this location. Therefore, the proposed project would have no impact on a scenic vista, and no mitigation is required.

b) Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

Less than Significant Impact

A review of the Caltrans Scenic Highway Map did not reveal designated scenic highways in the immediate vicinity of the project area or within its viewshed that would be impacted by the proposed project (Caltrans 2018). One previously recorded historic district, the Emeryville Historic Industrial District, was mapped overlapping with the project area. Project activities are constrained to the ROWs and would not extend physically or significantly visually to the contributing elements of the district. No other notable scenic resources were identified within the project setting, which is highly urbanized and commercial. Therefore, the project would have a less than significant impact on scenic resources, and no mitigation is required.

c) In non-urbanized areas, would the project substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

No Impact

The visual changes due to the proposed project would be relatively minor and include new curbs, paving, and striping; removal and addition of medians throughout the corridor; installation of bioretention facilities; new storm drain inlets; potential utility relocations; and signal modifications at various intersections including the IKEA entrance, Horton Street, Hollis Street, Emery Street, San Pablo Avenue, and Adeline Street. Additionally, traffic signals will be relocated at the IKEA entrance and exit, Bay Street, Ohlone Way, and Christie Avenue. Other changes include minor sidewalk widening, adding concrete bus pads, concrete transit islands between bus lane stops, and both the relocation of existing bus shelters and the addition of new ones. These visual changes would be consistent with the existing roadway-dominated character of the project area.

The Oakland portion of the project is in the Regional Commercial zoning district (City of Oakland 2024). The Oakland portion of the project includes the southwest corner of Shellmound Street where it curves, between the IKEA entrance and Horton Street. The zoning does not indicate any specific aesthetic or scenic quality-related requirements applicable to the proposed project.

Within Emeryville, the project is in an area zoned in the General Plan for Mixed Use with Residential and Mixed Use with Non-Residential (City of Emeryville 2019a). Some portions along 40th Street are zoned for Medium Density Residential and Public. No applicable policies pertaining to aesthetics or scenic quality of the project were identified in the Emeryville General Plan or Zoning Ordinance.

The project area spans multiple districts (San Pablo Corridor, East Bay Bridge, Park Avenue, South Bayfront, and Powell/Christie) that are specifically envisioned for development and transformation in Emeryville's General Plan. The proposed transportation infrastructure improvements, including multi-modal and streetscape elements, align with the development visions and guidelines outlined in the General Plan for these districts.

Specifically, the South Bayfront Design Guidelines call for enhanced pedestrian and bicycle connections across the railroad tracks, which this project establishes through its Class IV bikeway improvements. The streetscape improvements and green stormwater infrastructure complement the Powell Street/Christie Avenue district's goal of fostering a community-centered character and the Park Avenue district's emphasis on pedestrian activity. Additionally, the transit hub development near San Pablo Avenue aligns with the East Bay Bridge district's vision to capitalize on transit access. Thus, the project would not conflict with applicable local zoning, general plan, or other regulations relating to scenic quality, and no mitigation is required.

d) Would the project create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?

Less Than Significant Impact

The project would not adversely affect day or nighttime views in the area, nor would it result in a significant increase in lighting. The area is highly urbanized with large commercial developments and high-density housing. Existing street lighting would be either upgraded or protected in place. The 40th Street segment would construct additional pedestrian scale lighting along the shared use path at Halleck Street and along the sidewalk on either side of 40th Street between Hubbard Street and Adeline Street, focused on plazas at restricted side streets and bus stop areas. Additional street lighting improvements are not noted in the 40th Street or Shellmound Street segment drawings, other than intersection lighting associated with signal modifications at the intersections. No reflective building surfaces are proposed that could create glare. Therefore, the project would have a less than significant impact on day or nighttime views in the area, and no mitigation is required.

4.2 Agricultural and Forestry Resources

4.2.1 Environmental Setting

The project area is located in the cities of Emeryville and Oakland. The project vicinity is zoned for commercial and high-density residential uses (see Section 4.11, Land Use and Planning).

There are no agricultural or forestry land uses on or near the project area. According to the Alameda County Important Farmland 2022 Map, the majority of Prime Farmland or Farmland of Statewide Importance is located in the eastern regions of Alameda County (California Department of Conservation 2022).

4.2.2 CEQA Checklist Summary

Would the project:

CEQA Question	Impact Determination
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	No Impact
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	No Impact
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code (PRC) § 12220(g)), timberland (as defined by PRC § 4526), or timberland zoned Timberland Production (as defined by Government Code § 51104(g))?	No Impact
d) Result in the loss of forest land or conversion of forest land to non-forest use?	No Impact
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	No Impact

4.2.3 Answers to CEQA Checklist Questions

a) Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

No Impact

The project is not located in an area of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency (California Department of Conservation 2022). Additionally, the project does not propose features that would result in a change in land use; therefore, the project would have no impact on farmland, nor would it convert farmland to non-agricultural use, and no mitigation is required.

b) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

No Impact

The project does not overlap any area zoned for agricultural use. Additionally, there are no Williamson Act contracts in the vicinity (Alameda County Community Development Agency 2020). Because there are no agricultural zoning designations and no Williamson Act contracts associated with the project, there would be no impact on agricultural resources, and no mitigation is required.

c) Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code (PRC) § 12220(g)), timberland (as defined by PRC § 4526), or timberland zoned Timberland Production (as defined by Government Code § 51104(g))?

No Impact

There are no forest land or timberland land uses or zoning designations in the project vicinity. The project would have no impact on land development or conversion of land use. Therefore, the project does not have potential to conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production, and no mitigation is required.

d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?

No Impact

There are no forest land or timberland land uses or zoning designations in the project vicinity. The project would have no impact on land development or conversion of land use. Therefore, the project would not result in the loss of forest land or conversion of forest land to non-forest use, and no mitigation is required.

e) Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?

No Impact

Refer to responses a – d. There is no potential for this infrastructure project to result in a conversion of land and there is no farmland or forest land associated with the project; therefore, there would be no impact on Farmland or agricultural uses, and no mitigation is required.

4.3 Air Quality

4.3.1 Environmental Setting

The topography of a region can substantially impact air flow and pollutant concentrations. California is divided into 15 air basins with similar topography and meteorology to better manage air quality throughout the state. Each air basin has a local air district that is responsible for identifying and implementing air quality strategies to comply with ambient air quality standards.

The project is located within the San Francisco Bay Air Basin, which includes Marin, Napa, San Mateo, Contra Costa, Alameda, Santa Clara, and parts of Sonoma and Solano counties. Air quality regulation in the San Francisco Bay Air Basin is administered by the BAAQMD. The project region is non-attainment for federal ambient air quality standards for ozone and PM2.5, and state ambient air quality standards for ozone, PM10, and PM2.5 (BAAQMD 2017).

4.3.2 Regulatory Setting

Air Quality Standards

Air quality within Alameda County is regulated by the U.S. Environmental Protection Agency (EPA), the California Air Resources Board (CARB), and the BAAQMD. These agencies develop rules, regulations, policies, and/or plans to achieve the goals and directives imposed through legislation.

The EPA is responsible for implementing the federal Clean Air Act (1970), including establishing health-based National Ambient Air Quality Standards for air pollutants. National Ambient Air Quality Standards established for criteria pollutants under the Clean Air Act are ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, PM10, and PM2.5, and lead. The standards set for criteria pollutants are periodically reviewed and revised as applicable.

In California, CARB is responsible for implementing the California Clean Air Act (1988) and has established California ambient air quality standards, which are more restrictive than the national standards. In general, CARB works with local agencies to develop policies, guidance, and regulations related to state and federal ambient air quality standards; coordinates with local agencies on transportation plans and strategies; and provides assistance to local districts and transportation agencies to meet air quality standards established under both the federal and California clean air acts.

The BAAQMD has primary responsibility for air quality regulation in the project area. The BAAQMD seeks to allow development while working to achieve and stay in compliance with air quality standards. The BAAQMD also enforces general state regulations for nuisance and odors. As part of that role, the BAAQMD prepared CEQA Thresholds and Guidelines, most recently updated in 2022 (BAAQMD 2022). The CEQA Thresholds and Guidelines outlines the process for evaluation and review of air quality impacts and recommends mitigation measures as appropriate. It also establishes construction significance thresholds for air quality for the priority pollutants shown in Table 1. Projects that exceed these thresholds may have to adopt alternative construction schedules or specific mitigation measures.

The Metropolitan Transportation Commission (MTC) prepares and updates transportation plans, including the current Plan Bay Area 2050. The MTC conducts regional air modeling to ensure that

projects and actions do not inhibit air district efforts to achieve clean air. Consequently, Plan Bay Area 2050, under which this project falls, is harmonized with the BAAQMD Clean Air Plan.

Table 1. BAAQMD Thresholds of Significance for Construction-Related Criteria Air Pollutants and Precursors (BAAQMD 2022)

Criteria Air Pollutant	Construction Thresholds – Average Daily Emissions (lbs/day)	Operational Thresholds – Average Daily Emissions (lbs/day)	Operational Thresholds – Maximum Annual Emissions (tons/year)
ROG	54	54	10
NO_X	54	54	10
PM10	82 (exhaust)	82	15
PM2.5	54 (exhaust)	54	10

Note: ROG = reactive organic gases, NO_x = nitrogen oxides, PM10 = coarse particulate matter or particulates with an aerodynamic diameter of 10 micrometers (µm) or less, PM2.5 = fine particulate matter or particulates with an aerodynamic diameter of 2.5 µm or less.

Cumulative Impacts

In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Therefore, additional analysis to assess cumulative impacts is unnecessary.

Health Effects

If emissions generated from project construction do not exceed the applicable BAAQMD thresholds for ozone, PM10, and PM2.5, the emission of criteria pollutants for which the area is non-attainment would not be associated with adverse health impacts.

Screening Criteria - Construction-Related Impacts

Criteria Air Pollutants and Precursors

For construction projects, the BAAQMD has identified screening criteria to assist with determining whether the project would substantially impact air quality. If all of the following construction screening criteria are met, the construction of the proposed project would result in a less than significant impact from criteria air pollutant and precursor emissions. If not, then construction emissions need to be quantified (BAAQMD 2022).

1. The project is below the applicable screening level size shown in Table 3-1 of the BAAQMD CEQA Guidelines (Operational-Related).
2. All Basic Construction Mitigation Measures would be included in the project design and implemented during construction.

3. Construction-related activities would not include any of the following:
    a. Demolition.
    b. Simultaneous occurrence of more than 2 construction phases (e.g., paving and building construction would occur simultaneously).
    c. Simultaneous construction of more than one land use type (e.g., project would develop residential and commercial uses on the same site) (not applicable to high-density infill development).
    d. Extensive site preparation (i.e., greater than default assumptions used by the Urban Land Use Emissions Model for grading, cut/fill, or earth movement).
    e. Extensive material transport (e.g., greater than 10,000 cubic yards of soil import/export) requiring a considerable amount of haul truck activity.

4.3.3 CEQA Checklist Summary

Would the project:

CEQA Question	Impact Determination
a) Conflict with or obstruct implementation of the applicable air quality plan?	Less Than Significant Impact
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	Less Than Significant Impact
c) Expose sensitive receptors to substantial pollutant concentrations?	Less Than Significant Impact
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	Less Than Significant Impact

4.3.4 Answers to CEQA Checklist Questions

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

Less Than Significant Impact

Projects that could generate emissions in excess of the BAAQMD recommended significance thresholds would be considered to potentially conflict with or obstruct implementation of the applicable air plan.

The proposed project is an infrastructure project that involves only construction activities, including demolition. The proposed project would have no operational effects that would result in increased emissions and is intended to provide multi-modal improvements that are known to reduce regional emissions. As identified by BAAQMD, construction-related activities result in the generation of criteria air pollutants including carbon monoxide, sulfur dioxide, particulate matter (PM10 and PM2.5),

precursor emissions such as ROG and NO_x, and greenhouse gas (GHG) emissions from exhaust, fugitive dust, and off-gas emissions.

The project does not fall under the BAAQMD screening criteria for construction projects because some demolition of existing roadway infrastructure would be required. The California Air Pollution Control Officers Association has developed a computer model (California Air Pollution Control Officers Association 2022) that can estimate a project's construction and operation emissions. The most recent iteration of this model (V2022.1.1.30) was used to estimate emissions of ROG, NOx and PM10 during project construction, as outlined in Table 2.

Table 2. Expected Average Emissions From the Project (Summer)

Pollutant	Construction Daily Maximum	Operation Daily Maximum
ROG	3.66 lbs/day	0 lbs/day
No_x	32.0 lbs/day	0 lbs/day
PM10 (Exhaust)	5.85 lbs/day	0 lbs/day

As can be seen in Table 2, all expected construction and operation emissions fall well below the BAAQMD significance thresholds.

Because the project receives partial federal funding it must comply with special regulations for air quality impacts from transportation projects. The project must conform to both regional and local plans. The proposed project was considered under the Bay Area Plan 2050 and was determined to be exempt per Title 40 of the *Code of Federal Regulations*, Part 93, Subpart A, as a project that corrects, improves, or eliminates a hazardous location. Therefore, this project aligns with the Bay Area Plan 2050.

Projects that create new traffic volumes or that increase vehicle miles traveled (VMT) would usually increase air pollution. Hence, they might be considered to have a significant impact on efforts to achieve the National Ambient Air Quality Standards and California ambient air quality standards. This project does not increase VMT or create more trips. Its sole function is to reduce congestion and promote more efficient vehicle travel; therefore, the project is in furtherance of the applicable air quality plans, and no mitigation is required.

b) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

Less Than Significant Impact

The project region is non-attainment for federal ambient air quality standards for ozone and PM2.5, and state ambient air quality standards for ozone, PM10, and PM2.5. The BAAQMD has established that if a project exceeds the identified significance thresholds, its emissions would be considered cumulatively considerable and additional analysis to determine cumulative impacts would be unnecessary. As discussed in Section 4.3.4(a), project construction emissions would not exceed BAAQMD significance

thresholds; therefore, there would be no cumulatively considerable net increase in criteria pollutants that would adversely impact human health, and no mitigation is required.

c) Would the project expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant Impact

The BAAQMD defines sensitive receptors to include residential dwellings, including apartments, houses, and condominiums; schools, colleges, and universities; daycare centers and hospitals, and senior care facilities. Most of the surrounding area is developed as commercial facilities and businesses. However, multifamily residential complexes, senior living facilities, and mixed use developments are situated along the corridor and at the terminus of 40th Street near its intersection with Adeline Street.

Construction activities would temporarily introduce a new source of contaminants with the potential to adversely affect existing sensitive receptors in the project vicinity. During construction, short-term degradation of air quality is expected from the release of particulate emissions (airborne dust) generated by excavation, repaving, minor demolition, and other activities related to construction. Emissions from construction equipment powered by gasoline and diesel engines are also anticipated and would include carbon monoxide, NOx, ROG, directly emitted PM10, and PM2.5, and toxic air contaminants such as diesel exhaust particulate matter.

Construction emissions would be temporary and limited to the immediate area surrounding the construction activities, and do not exceed BAAQMD thresholds of significance. However, ozone, PM10 and PM2.5 emissions can cause adverse health impacts for nearby sensitive receptors. High concentrations of ozone have the potential to irritate lungs, and long-term exposure may cause lung tissue damage and cancer (CARB 2020). Typical sources of low-altitude ozone are almost entirely formed from reactive organic gases (ROG), volatile organic compounds (VOC) and NOx in the presence of sunlight and heat. Common precursor emitters include motor vehicles and other internal combustion engines, solvent evaporation, boilers, furnaces, and industrial processes (CARB n.d.). Particulate matter PM10 (respirable particulate matter) and PM2.5 (fine particulate matter) can irritate the eyes and respiratory tract and decrease lung capacity. Both are associated with increased cancer and mortality and contribute to haze and reduced visibility (CARB 2022).

To reduce particulate and diesel emissions impacts to nearby sensitive receptors, BAAQMD recommends applying BMPs as outlined in their 2022 CEQA Guidelines. The BMPs are incorporated as part of the project description to reduce impacts on sensitive receptors. The project would also implement Caltrans' BMPs within Standard Specifications, Section 14-9. Note that some of these best practice measures are required by federal, state or local regulations. Please refer to Section 3.6.1 for the BAAMQD and Caltrans BMPs.

As discussed in 4.3.4(a), the project would not generate emissions that exceed local thresholds of significance. The project includes the above listed construction controls that further protect against significant amounts of diesel toxic air contaminants and particulate pollutants being generated by the project during construction. Emissions generated during project construction would be less than significant due to the temporary nature of activities and construction controls for particulates and emissions-generating equipment, as well as distance from the source. Therefore, project effects on sensitive receptors would be less than significant, and no additional mitigation is required.

d) Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Less Than Significant Impact

Temporary construction activities associated with the project would involve the use of a variety of gasoline or diesel-powered equipment and pavement coatings emitting temporary exhaust fumes and odors. However, construction-related emissions would be temporary in nature and would dissipate rapidly with increasing distance from the project area. As a result, short-term construction activities would not expose a substantial number of people to objectionable odors. Additionally, as shown in Table 1, there is no Threshold of Significance for construction-related odors impacts. Because no significant odor impacts from construction-related projects have been identified, and due to their temporary nature, the impact would be less than significant, and no mitigation is required.

4.4 Biological Resources

4.4.1 Environmental Setting

The project area is characterized as extensively developed urban land, consisting of existing asphalt and concrete roadways, and abutting dense commercial and residential development. The only biological resources in the project area are landscape trees and shrubs along the sidewalks and in the medians.

4.4.2 Regulatory Setting

Federal

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) makes it unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, or kill migratory birds. The law applies to the removal of nests occupied by migratory birds during the breeding season. California Fish and Game (CFG) Code (Section 3500) also prohibits the destruction of any nest, egg, or nestling.

Executive Order 13112 – Invasive Species

Executive Order 13112 requires federal agencies to combat the introduction or spread of invasive species in the United States. Invasive species are defined as “any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health."

FHWA guidance issued August 10, 1999, directs the use of the invasive species list, maintained by the California Invasive Species Council, to define the invasive plants that must be considered as part of the National Environmental Policy Act analysis of a proposed project within California.

State

California Endangered Species Act

Pursuant to the California Endangered Species Act (CESA) and Section 2081 of the CFG Code, an Incidental Take Permit from the California Department of Fish and Wildlife (CDFW) is required for projects that could result in the “take” of a state listed threatened or endangered species. Under CESA, “take” is defined as an activity that would directly or indirectly kill an individual of a species proposed for listing (called “candidates” by the state). Section 2080 of the CFG Code prohibits the taking, possession, purchase, sale, and import or export of endangered, threatened, or candidate species, unless otherwise authorized by permit or in the regulations.

Local – Tree Removal

The City of Emeryville’s General Plan Conservation, Safety and Noise Element contains relevant local requirements, including CSN-P-19 and -20, that discuss landscaping and mature trees, native plant use in landscaping, and the stated goal to protect local and regional environmental quality (City of Emeryville 2019a).

Emeryville's City Code 7.10.05 requires an encroachment permit to perform work on any street tree and contains procedures for the replacement of street trees that are removed (City of Emeryville 2024).

4.4.3 CEQA Checklist Summary

Would the project:

CEQA Question	Impact Determination
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the California Department of Fish & Wildlife (CDFW) or U.S. Fish & Wildlife Service (USFWS)?	Less Than Significant Impact with Mitigation Incorporated
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFW or USFWS?	No Impact
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	Less Than Significant Impact
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	Less Than Significant Impact with Mitigation Incorporated
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	Less Than Significant Impact
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	No Impact

4.4.4 Answers to CEQA Checklist Questions

a) Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the California Department of Fish & Wildlife (CDFW) or U.S. Fish & Wildlife Service (USFWS)?

Less Than Significant Impact with Mitigation Incorporated

Information about the distribution of special status species with the potential to occur within the project area and a 1-mile radius was compiled from the California Natural Diversity Database (CDFW n.d.). Based on the developed nature of the area and lack of native or riparian habitat, no federal or state listed endangered, threatened, rare, or otherwise sensitive flora or fauna are anticipated to be within the project area.

The project area and surrounding area are currently developed with commercial buildings, surface parking lots, roadways, and landscaping, including trees. However, the project area and adjacent lands contain trees which may provide habitat for migratory birds. Migratory birds are protected under the

MBTA, and birds of prey are also protected in California under provisions of the state Fish and Game Code, Section 3503.5. Both make it illegal to "take" protected species except under the terms of a permit. It is possible that nesting habitat could be disturbed during construction due to tree removal, noise, and vibrations from construction equipment. This would be a potentially significant impact on migratory birds and/or birds of prey.

Implementation of ***Mitigation Measure BIO-1*** would reduce potentially significant impacts to migratory birds and/or birds of prey to less than significant.

- ***Mitigation Measure BIO-1***: If any construction activities (e.g., demolition) are scheduled during the bird nesting season (typically defined by CDFW as February 1 to September 1), the City or approved construction contractor shall retain a qualified biologist to conduct a pre-construction survey of the project area, including a 100-foot buffer, as access is available, to locate active bird nests, identify measures to protect the nests, and locate any other special status species.

  The pre-construction survey shall be conducted no more than 14 days prior to the implementation of construction activities (including staging and equipment storage). Any active nest should not be disturbed until the young have fledged or under the direction provided by a qualified biologist. Any special status species shall not be disturbed without the direction of a qualified biologist. If an active nest is found during construction, disturbance shall not occur without direction from a qualified biologist.

Implementation of ***Mitigation Measure BIO-1*** would reduce potentially significant impacts to migratory birds and birds of prey to less than significant.

b) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFW or USFWS?

No Impact

The site does not contain riparian habitat and is not located within a known regional wildlife movement corridor or other sensitive biological area identified by CDFW or USFWS. Therefore, the project would have no impact on these resources, and no mitigation is required.

c) Would the project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Less Than Significant Impact

The National Wetlands Inventory was reviewed to determine if wetlands or non-wetland waters have been previously documented and mapped in or near the project area (USFWS n.d.). One potential jurisdictional wetland was identified just south of the Ohlone Way and Shellmound Street intersection. This wetland is fully culverted under the roadway and Interstate 80 before discharging into the San Francisco Bay. The construction and operation of the proposed project would not involve or require the direct removal, filling, hydrological interruption, or any other alteration of the bed, bank, channel, or

adjacent upland area of the wetland, therefore the project would have less than significant impact, and no mitigation is required.

d) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less Than Significant Impact with Mitigation Incorporated

There are no established migratory corridors associated with the project. Construction could temporarily interrupt movement of native resident or migratory wildlife species through the project area, but not significantly as it is already a roadway barrier.

As discussed above, the project area may contain migratory bird and bird of prey nesting habitat. With implementation of ***Mitigation Measure BIO-1***, migratory species utilizing the project area for nesting would be protected against significant impacts.

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Less Than Significant Impact

The project proposes to cut, trim, or remove trees and shrubs within the project area. The 40th Street segment of the project would include removal and replacement of up to 52 street trees. Tree removal and planting depth is typically around 4 feet, adhering to the City's standard for creating a rootable area for new trees. Other landscaping elements would include shrubs, mulch, hydroseeding, and groundcover. The Shellmound Street segment would include the removal of 4 trees and the replacement of 6 trees. The project would comply with City Code 7.10.04, which requires the City to maintain and enhance street and park trees to improve the environment and provide habitat. Additionally, the project would replace any tree removed at a 1:1 ratio, at minimum, and thus would be in compliance with City Code 7.10.05. Therefore, the proposed project would not conflict with local policies and ordinances protecting biological resources, and no mitigation is required.

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact

The project area is not located in an area with an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Therefore, the project would not conflict with such a plan, and no impact would occur, thus no mitigation is required.

4.5 Cultural Resources

Section 4.5 addresses post contact and historic Cultural Resources. This IS separately addresses Tribal Cultural Resources in section 4.18 below.

4.5.1 Environmental Setting

The project area generally consists of redeposited fill and highly disturbed local soil. Historical uses of the project area included a public park, racetrack, and various industrial uses. The area of potential affect (APE) for cultural resources includes 84 acres in total and approximately 15 acres of direct impact, encompassing Shellmound Street and 40th Street ROW, where ground disturbance may occur as a result of project implementation. The area of direct impact (ADI) includes historic resources identified within the project area and within the vicinity of the project area including the Emeryville Historic Industrial District and the Bay Area Warehouse Company (Tremaine & Associates, Inc. 2025).

Site Investigation

An investigation was conducted to locate, describe, and evaluate cultural resources present within the APE. Much of the APE has experienced some level of previous disturbance, e.g., cut and fill activities and urban development (Tremaine & Associates, Inc. 2025).

A records search was conducted at the Northwest Information Center for resources within and in the vicinity around the APE. The search results indicated 6 distinct resources are located within the project area: the Emeryville Historic Industrial District, 3 shellmounds that are part of the Emeryville Shellmound Complex, the former location of the Bay Area Warehouse Company, and the northern portion of the Santa Fe Railyard. The Emeryville Shellmound Complex and Santa Fe Railyard were determined to be eligible for the National Register of Historic Places. In addition, a district record for the Emeryville Shellmound Complex and an updated site record for the Bay Area Warehouse Company were completed. The now demolished Bay Area Warehouse Company was located within the ADI at the southwest corner of 40th Street and Hollis Street. It was considered not eligible at that time for the National Historic Register. Based on previous archaeological studies of the project area, it is unlikely that intact archaeological resources lie beneath the previous footprint of the building.

The Pixar Historic Trash Deposit is located within the area of indirect impact (AII). The Pixar Historic Trash Deposit was recorded during the preparation for construction of a new building on the Pixar Animation Studios campus. The artifacts and archaeological features were consistent with the use of the area as Oakland Trotting Park, established in 1871 and demolished in 1915, and later use as an industrial park. The site contains historic refuse artifacts, a carbonized redwood-lined pit, historic brick foundation, and various concrete structures. Artifacts discovered at this site were found to be not eligible under CEQA.

The heavy urbanization of Emeryville has created a low probability of identifying archaeological sites by pedestrian reconnaissance alone. In general, subsurface tests conducted in proximity to the APE have found little evidence of intact resources within the APE, or resources with a specific association. The historic shoreline of the Bay extended further east than it does today, encompassing the area of present-day Shellmound Street. When the Emeryville Shellmound Complex was leveled in 1924, midden material was displaced westward as Bay fill and for construction of Shellmound Street. Subsequent

observations and studies indicate that any archaeological materials beneath the current street alignment are likely redeposited, not intact midden deposits. The extent of site boundaries, secondary deposits, or submerged cultural resources beneath the roadway and hazardous waste cap remains unknown.

Negative findings from late 20th-century testing west of Shellmound Street suggest no near-surface cultural deposits, though industrial fill and waste obscure subsurface conditions. Remediation work east of the railroad encountered sterile alluvium 6 to 10 feet below ground surface, which may also underlie Shellmound Street. While there is some potential for deeply buried precontact deposits, the likelihood of encountering intact archaeological resources during ground disturbance is considered low. Cultural resources that could be encountered below street alignments in the project area are unlikely to have specific associations or retain data potential (Tremaine & Associates, Inc. 2025).

4.5.2 Regulatory Setting

Federal

The National Historic Preservation Act (NHPA) of 1966 defined the role and responsibilities of the federal government in historic preservation and established the National Register of Historic Places. The NHPA directs agencies to identify and manage historic properties under their control, to undertake actions that would advance the Act's provisions and avoid actions contrary to its purposes, to consult with others while carrying out historic preservation activities, and to consider the effects of their actions on historic properties.

State

California Register of Historical Resources

The California Register of Historical Resources (CRHR) is a guide to cultural resources that must be considered when a government agency undertakes a discretionary action subject to CEQA. The CRHR helps government agencies identify and evaluate California's historical resources and indicates which properties are to be protected, to the extent prudent and feasible, from substantial adverse change (PRC § 5024.1(a)). Any resource listed in, or eligible for listing in, the CRHR must be considered during the CEQA process.

Caltrans

Projects on the Caltrans State Highway System (SHS) must comply with federal and state environmental laws and regulations designed to protect cultural resources significant in American archaeology, architecture, history, culture, and engineering. Caltrans has developed guidance to comply with federal and state laws and regulations regarding cultural resources. The Caltrans SER contains provisions for the discovery of previously unidentified cultural resources. Chapter 2 of the SER, Section 2.4.4 "Post-Review Discoveries," offers guidance to assist Caltrans personnel in planning for the possibility of unexpected discovery of cultural resources and of unexpected effects on known historic properties (revised 2015). Chapter 3 of the SER outlines procedures that shall be followed if human remains are discovered during any Caltrans activity, in accordance with Section 7050.5 of the California Health and Safety Code. Chapter 5 outlines procedures that shall be followed if previously unidentified archaeological resources

are encountered during construction. To meet legal requirements for cultural resources management, Caltrans personnel must follow the guidelines outlined in Volume 2 of the SER (Caltrans 2024a).

Local

City of Emeryville General Plan – Conservation Safety and Noise Element

The Conservation Safety and Noise Element provides guidance and policies related to historic and cultural resources, which as lead agency, would be relevant to the entire project area:

- CSN-P-29 New development adjacent to historic and architecturally significant structures shall be reviewed for compatibility with the character of the structure and the surrounding neighborhood.
- CSN-P-30 Archaeological sites and resources shall be protected from damage. Areas found to contain significant indigenous artifacts shall be examined by a qualified archaeologist for recommendations concerning protection and preservation.

4.5.3 CEQA Checklist Summary

Would the project:

CEQA Question	Impact Determination
a) Cause a substantial adverse change in the significance of a historical resource pursuant to CEQA Guidelines § 15064.5?	Less Than Significant Impact
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines § 15064.5?	Less Than Significant Impact
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	Less Than Significant Impact

4.5.4 Answers to CEQA Checklist Questions

a) Would the project cause a substantial adverse change in the significance of a historical resource pursuant to CEQA Guidelines § 15064.5?

Less Than Significant Impact

The APE includes previously recorded historic resources. The Bay Area Warehouse Company was demolished between 1990 and 1993 and was not considered eligible for the National Register of Historic Places. Previous archaeological studies indicate it is unlikely that intact archaeological resources remain beneath the building's former footprint. The Pixar Historic Trash Deposit, which includes historic refuse artifacts and structural remains associated with the Oakland Trotting Park and later industrial uses, was previously determined not eligible under CEQA. The 40th Street alignment overlays the Santa Fe Railyard; however, remediation soil removal and backfill with imported fill occurred in the 1990s, along with a 2.5-foot-deep hazardous materials cap. Although isolated deeper excavations will locally breach this cap and extend into native soils along 40th Street, their limited size and distribution will not

diminish the characteristics that make the northern spur of the Santa Fe Railyard eligible for the National Register of Historic Places (Tremaine & Associates, Inc. 2025).

Additional records review indicated that 1 historic district and 1 historic site overlap with the ADI. The Emeryville Historic Industrial District is located within the ADI, but project activities are limited to roadway improvements and will not affect contributing elements of the district. The Bay Area Warehouse Company site was determined not eligible for the National Register and has since been demolished. Subsurface investigations in the vicinity have not identified intact deposits associated with this resource, and the potential for historic materials to be encountered during construction is low.

Results from the record search also indicated 1 historic site and 1 prehistoric site previously recorded within 0.25 miles of the APE, both of which are outside the APE and will not be affected by the project. The proposed improvements will be confined to an existing roadway and will primarily involve shallow excavation, with deeper excavation limited to small, localized areas such as streetlight and traffic signal foundations. Vertical features are consistent with the existing transit corridor, and would have no visual effect on listed resources, and construction would not extend outside the APE.

Therefore, the proposed project would not cause an adverse change in the significance of a historical resource, and no mitigation is required.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines § 15064.5?

Less Than Significant Impact

Historic archaeological resources previously documented within the APE include the Bay Area Warehouse Company site and the Pixar Historic Trash Deposit. The Bay Area Warehouse Company was not considered eligible for the National Register of Historic Places and archaeological studies indicate it is unlikely that intact deposits are present beneath the former footprint of the structure. The Pixar Historic Trash Deposit, consisting of historic refuse, a carbonized redwood-lined pit, brick foundations, and concrete structures, was associated with the Oakland Trotting Park and subsequent industrial use. This resource was evaluated and determined not eligible under CEQA. As discussed above in 4.5.4(a), the scope of the proposed project would not diminish the historically important characteristics of the Santa Fe Railyard. Based on these previous evaluations, in combination with the extensive disturbance from industrial activities and fill deposition within the APE, it is unlikely that intact, significant historic-period archaeological resources are present.

In addition, a Post-Review Discovery and Monitoring Plan (PDRMP) was prepared to implement Caltrans' nonstandard conditions (referred to as avoidance measures in this document) outlined within the Section 106 Finding of No Adverse Effect (FNAE). The plan establishes Archaeological Monitoring Areas within the ADI, the scope of monitoring and archaeological and Tribal monitoring protocols, inadvertent discovery procedures, roles and responsibilities, notification protocols, stop-work procedures, and reporting requirements to be implemented during construction. Monitoring is a precautionary measure due to the potential for redeposited or disturbed archaeological materials, including human remains, to be encountered beneath fill and remediated soils along Shellmound and 40th streets. It does not include data recovery or treatment procedures as no testing, data recovery, collection, analysis, or curation

activities are authorized by this plan. Monitoring will therefore focus on detecting redeposited materials and ensuring appropriate notification and coordination if inadvertent discoveries occur.

Additional nonstandard conditions established for the project include compilation of legacy data from prior archaeological investigations of the Emeryville Shellmound Complex, revisions to the Shellmound Complex's archaeological district form or preparation of a Tribal Cultural Landscape, and public interpretation. These will be implemented by the City in coordination with Caltrans, consulting Tribes, and subject matter experts.

The cultural analysis determined that the proposed project would not cause a substantial adverse change in the significance of an archaeological resource, and no mitigation is required. The nonstandard conditions outlined in the Caltrans FNAE are a condition of the project that minimize or avoid the potential loss of inadvertent discovery of redeposited materials.

c) Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

Less Than Significant Impact

The APE is located within an area historically inhabited by the Ohlone people and associated with the Emeryville Shellmound Complex, which was used for burial and ceremonial purposes. However, archaeological investigations have shown that the shellmound was substantially leveled in 1924, and displaced midden material was used as fill. Subsurface testing has not identified intact deposits within or adjacent to Shellmound Street, and remediation work in nearby areas has encountered sterile alluvium at depths of 6 – 10 feet.

Although the potential is considered low, there remains a possibility that deeply buried deposits are present within the APE. Project construction includes some localized deeper excavations where previously unidentified deeply buried resources could theoretically be present. If human remains are unexpectedly encountered during ground disturbance, compliance with California Health and Safety Code § 7050.5 and § 7052, PRC § 5097 and CEQA Guidelines § 15064.5(e) would be required. This includes coordination with the County Coroner and the NAHC. State law ensures proper treatment of unanticipated discovery of human remains during construction; therefore, the impact is less than significant, and no mitigation is required.

4.6 Energy

4.6.1 Environmental Setting

Since the project area is highly urbanized, energy sources in the project area serve urban uses and include electricity, natural gas, gasoline and diesel fuel, and renewable energies commonly associated with commercial and residential development.

4.6.2 CEQA Checklist Summary

Would the project:

CEQA Question	Impact Determination
a) Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	Less Than Significant Impact
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	Less Than Significant Impact

4.6.3 Answers to CEQA Checklist Questions

a) Would the project result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Less Than Significant Impact

The project would not result in a significant increase in energy demand. It involves replacing and installing new street and pedestrian signal lighting. The new energy use would be minor and would include energy efficient lighting consistent with current City code.

Energy would be required during construction, but no additional capacity would be required on a local or regional scale. BAAQMD construction BMPs would reduce use of fossil fuels and increase energy efficiency of construction vehicles. Because increased energy use during construction would be temporary and would comply with BAAQMD efficiency requirements, the project would not result in wasteful, inefficient, or unnecessary consumption of energy resources. The impact would be less than significant, and no mitigation is required.

b) Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Less Than Significant Impact

The project would construct new street lighting up to code and consistent with the goals and policies of the City's Climate Action Plan (City of Emeryville 2016). Energy efficient lighting upgrades would offset minor new energy use, as discussed above. Implementing BMPs to reduce fossil fuel use by construction vehicles would also be consistent with these goals and policies, and no mitigation is required.

4.7 Geology and Soils

4.7.1 Environmental Setting

The project area lies near the edge of the San Francisco Bay. It is a flat, asphalt-paved area with elevation ranging from 10 – 33 feet above mean sea level. Elevation increases from the western end of the site to the eastern end of the site.

Regional Geologic Setting

Emeryville is situated within the Coast Ranges geomorphic province of California, which extends approximately 400 miles from the Klamath Mountains to the Santa Ynez River. This province lies between the Pacific Ocean and the Great Valley (Sacramento and San Joaquin valleys) provinces and is characterized by a series of northwest-trending mountain ridges and valleys, running generally parallel to the San Andreas Fault zone (City of Emeryville 2019a).

Emeryville lies at the eastern edge of San Francisco Bay as part of the flatlands known as the East Bay Plain, consisting of alluvial deposits from the Berkeley Hills. The western side of the City contains former tidal sloughs and marshlands that were progressively filled in since the 1900s. The City's surface soils predominantly consist of fine-grained alluvium, including silts and clays, underlain by bay mud in the western portion (City of Emeryville 2019a).

The San Francisco Bay is located in a broad depression in the Franciscan bedrock, resulting from an east-west expansion between the San Andreas and Hayward fault systems. The bedrock surface can be found at elevations of 200 to 2,000 feet below mean sea level across the Bay Area. Sedimentary deposits overlying the Franciscan bedrock originated from millions of years of erosion, deposition, and changes in sea level (City of Emeryville 2019a).

Seismicity and Faulting

Faults that have moved during the past 11,000 years are considered active. Generally, only active faults are considered in evaluating seismic risk for building construction. The project area is within a seismically active region, and historically numerous moderate to strong earthquakes related to the San Andreas system of faults have occurred in this region. The nearest active fault is the active Hayward fault, a designated Alquist-Priolo fault located approximately 3.4 miles to the east of the project area. Other major faults that could cause significant shaking in the project area are the Chabot and Wildcat faults.

Liquefaction

Liquefaction can occur when wet or saturated cohesionless soils temporarily lose strength due to the buildup of excess water pressure during events such as earthquakes. Soil most susceptible to liquefaction is loose, clean, saturated, uniformly graded sand. According to the Liquefaction Hazard Map from the Association of Bay Area Governments, the project area is generally classified as having a moderate to very high susceptibility to liquefaction (**Figure 4**).

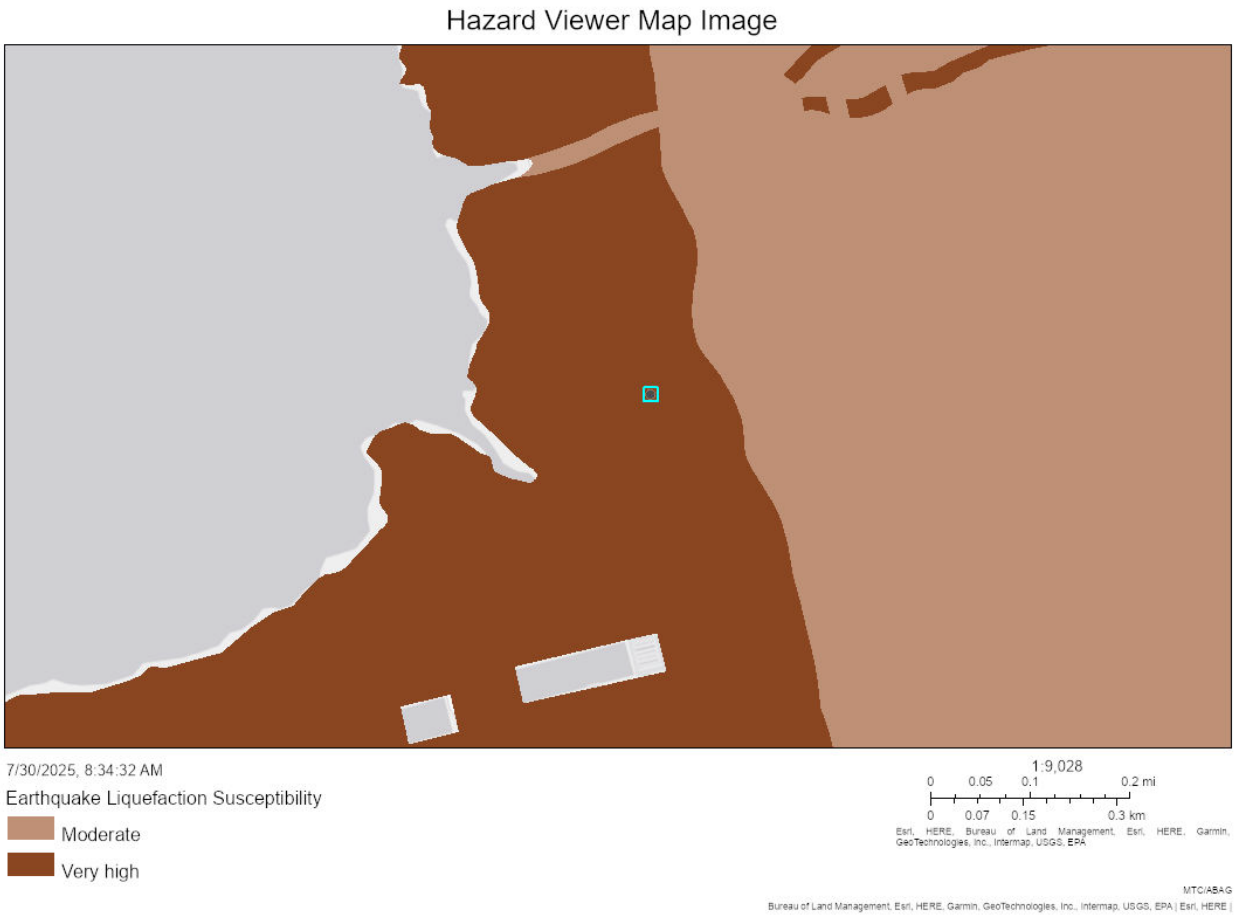


Figure 4. Liquification Susceptibility Map

Groundwater

The project area is located in the East Bay Plain Groundwater Basin which extends from Richmond in the northwest to Hayward in the southeast. The water table in the City of Emeryville occurs only a few feet below the surface (City of Emeryville 2019a).

Soils

The City of Emeryville General Plan describes 2 surface soil types which underly the project area, fill and fine-grained alluvium, including silts and clays, where artificial fill is not present. In the western portion of the City, fill is underlain by bay mud, which consists of soft saturated clay and is subject to differential settlement and subsidence (City of Emeryville 2019a).

There are 2 Natural Resource Conservation Service's Soil Survey soils mapped in the project area (Natural Resources Conservation Service, United States Department of Agriculture n.d.). These are classified as Urban Land-Clear Lake complex, slope 0 to 2 percent, and Urban Land. Urban Land-Clear Lake complex is described as having poor drainage with medium water runoff.

4.7.2 CEQA Checklist Summary

Would the project:

CEQA Question	Impact Determination
a) Could the project directly or indirectly cause potential substantial adverse effects, including risk of loss, injury, or death involving: i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	No Impact
ii. Strong seismic ground shaking?	Less Than Significant Impact
iii. Seismic-related ground failure, including liquefaction?	Less Than Significant Impact
iv. Landslides?	No Impact
b) Result in substantial soil erosion or the loss of topsoil?	Less Than Significant Impact
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on or off site landslide, lateral spreading, subsidence, liquefaction or collapse?	Less Than Significant Impact
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	No Impact
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	No Impact
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	No Impact

4.7.3 Answers to CEQA Checklist Questions

a) Would the project directly or indirectly cause potential substantial adverse effects, including risk of loss, injury, or death involving:

i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

No Impact

The project area is not within an Alquist-Priolo Earthquake Fault Zone that designates a known active fault (fault that is defined to be active if it has ruptured or shows evidence of displacement in the

Holocene or the last 11,000 years) that is susceptible to fault rupture as defined by the California Geologic Survey (formerly the California Division of Mines and Geology). Although the area is seismically active, there is no evidence of faults in or within 3 miles of the project area that could be subject to rupture. Therefore, the project would not cause substantial adverse effects in the event of a rupture of a known earthquake fault.

ii. Strong seismic ground shaking?

Less Than Significant Impact

The primary geologic hazard at the project area is the potential for moderate to strong ground shaking associated with nearby faults such as the Hayward fault 3.4 miles from the project area. The characteristics of earthquake ground motion at the project area would depend upon the magnitude of the earthquake, distance from the zone of energy release, travel path, topographic effects, subsurface materials, and rupture/source mechanism.

The proposed construction would be designed to accommodate anticipated ground motions in accordance with seismic design criteria for the Bay Area; therefore, the impact would be less than significant.

iii. Seismic-related ground failure, including liquefaction?

Less Than Significant Impact

Liquefaction can occur when wet or saturated cohesionless soils temporarily lose strength due to the buildup of excess water pressure during events such as earthquakes. Soil most susceptible to liquefaction is loose, clean, saturated, uniformly graded sand. The project area overall is identified as having a high susceptibility for liquification (**Figure 4**), however, the proposed construction would be designed to avoid liquefaction settlement in accordance with roadway design criteria; therefore, the impact would be less than significant

iv. Landslides?

No Impact

The proposed project lies on the edge of the San Francisco Bay on relatively flat terrain throughout the area, with elevation between 10 – 33 feet above mean sea level. There are no steep slopes within the project area that could result in landslides. Construction of the project would therefore have no impact related to landslides in the vicinity of the project.

b) Would the project result in substantial soil erosion or the loss of topsoil?

Less than Significant Impact

The project area is completely covered in impervious surfaces; therefore, topsoil is limited to minor areas of landscaping. The project would include some trenching though existing pavement for drainage improvements, signal placement, and relocation of medians that could expose some soil. Implementation of erosion and sediment BMPs as outlined in Section 3.6 would prevent significant soil loss or erosion during construction activities.

c) Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on or off site landslide, lateral spreading, subsidence, liquefaction or collapse?

Less Than Significant Impact

As discussed in the Environmental Setting, the project area contains soil mostly classified as urban and artificial fill. The project is proposing to improve roadways within the project area by improving pavement conditions and drainage on 40th Street and Shellmound Street. The improvements will be constructed to current standards appropriate for the soil conditions. Therefore, the project would have a less than significant impact on lateral spreading, subsidence, and liquification.

d) Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

No Impact

The proposed project would construct pedestrian, transportation, and drainage improvements in an existing roadway. No buildings would be constructed, therefore, no substantial direct or indirect risk to property of life is anticipated as a result of the project.

e) Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

No Impact

The project does not propose the use of septic tanks and would not require use of alternative wastewater disposal services; therefore, there would be no impact from these systems.

f) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

No Impact

The project area is roadway ROW and generally consists of imported fill, local fill, and highly disturbed local soil. No unique paleontological resource or site or unique geologic features are present within the project area, and no construction is planned within a geological formation. Therefore, there would be no impact on paleontological resources or unique geologic features.

4.8 Greenhouse Gas Emissions

4.8.1 Environmental Setting

GHGs are atmospheric gases that absorb solar radiation and subsequently emit radiation in the thermal infrared region of the energy spectrum, trapping heat in the Earth's atmosphere. GHGs of concern include carbon dioxide, methane, nitrous oxide, and fluorinated gases. Unlike emissions of criteria and toxic air pollutants, which have local or regional impacts, emissions of greenhouse gases have a broader, global impact.

The primary sources of GHGs in the City of Emeryville include transportation (50.1%), commercial/industrial (40.3%), residential (6.0%), and waste (3.6%) (City of Emeryville 2016).

4.8.2 Regulatory Setting

State

The State of California has taken several legislative steps including Assembly Bills (AB) and Executive Orders to reduce increases in GHG emissions. CARB is the lead agency in the development of reduction strategies for greenhouse gases in California (CARB 2017). California's GHG reduction requirements aim to reduce VMT, thereby improving air quality by reducing GHG emissions from automobiles.

Local

City of Emeryville Climate Action Plan

The City of Emeryville in 2016 became the first city in the San Francisco Bay Area to update their Climate Action Plan to align their GHG targets with California state climate targets. The Climate Action Plan (CAP) 2.0 contains GHG targets, updated GHG community and municipal inventories, a business-as-usual GHG forecast, deep decarbonization vision for 2050, adaptation and mitigation action plans, and a monitoring plan (City of Emeryville 2016). Transportation was identified as the single largest contributor to Emeryville's community GHG emissions, particularly considering the state highways running through the City. The City's focus is on reducing transportation-related emissions by improving low-carbon transportation infrastructure, such as bicycles and buses, and coordinating land use policies to promote a denser, more walkable community with jobs and housing located close to other necessities. The relevant objectives for the Transportation section of the Mitigation Action Plan for 2030 included in CAP 2.0 are outlined below:

1. Create vibrant neighborhoods where residents can easily walk to their basic daily needs.
2. Reduce the total VMT on local roads by 30%.
3. Reduce the carbon intensity of vehicles through cleaner fuels and electrification by 30%.

BAAQMD

In April 2022, BAAQMD adopted CEQA Thresholds for Evaluating the Significance of Climate Impacts From Land Use Projects and Plans (BAAQMD 2022) which governs operational emissions. The BAAQMD does not have an adopted Threshold of Significance for construction-related GHG emissions. Because the proposed project is a road infrastructure project, and not a land use or planning project, the

BAAMQD CEQA guidelines would not apply. However, the proposed project would improve safety and effectiveness of alternative transportation through 40th Street/Shellmound Street, which is consistent with GHG targets in the region and within the State's climate targets.

4.8.3 CEQA Checklist Summary

Would the project:

CEQA Question	Impact Determination
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	Less Than Significant Impact
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	No Impact

4.8.4 Answers to CEQA Checklist Questions

a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less Than Significant Impact

The project would result in short-term, temporary increases in GHG emissions during construction due to equipment and vehicle use. For a construction period of 32 months, heavy equipment such as excavators, haul trucks, and worker commutes would generate exhaust. Emissions from construction equipment powered by gasoline and diesel engines would include carbon monoxide, NOx, VOC, directly emitted PM10 and PM2.5, and toxic air contaminants, such as diesel exhaust particulate matter.

Because the project does not propose a new, long-term operational source of GHGs, project effects would be considered less than cumulatively significant. In addition, BMPs effective in minimizing GHG emissions would be required by the BAAQMD and the City and implemented.

As discussed in Section 4.3, Air Quality, the project falls below the BAAQMD operational and construction screening levels. The proposed project would improve transit, pedestrian and bicycle access throughout the 40th Street/Shellmound Street corridor. This would in turn could modestly reduce fuel consumption and GHG emissions relative to the no-project alternative, which is consistent with the City's goals of reducing VMT. Therefore, the project would not result in long-term GHG emissions or overall increases in GHGs from operational or construction source, and no mitigation is required.

b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

No Impact

Given that construction-related increases in emissions would be short-term, the GHG emissions generated during construction would not be considered significant and would not limit the state's ability to attain the reduction targets identified in AB 32, the Scoping Plan, or SB 32. Additionally,

implementation of the project would not conflict with, and would be in furtherance of, the GHG policies within the City of Emeryville's Climate Action Plan 2.0 (City of Emeryville 2016). Therefore, the proposed project does not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emission of GHGs, and no mitigation is required.

4.9 Hazards and Hazardous Materials

4.9.1 Environmental Setting

The proposed project is in a highly urbanized area with a history of commercial and industrial uses (City of Emeryville 2019c). In the past, industrial uses within and around the project area have included fueling stations, automotive repair facilities, steel storage and manufacturing facilities, and paint, pigment, and pesticide manufacturing facilities. As a result, some areas slated for improvements during the Shellmound Street segment of the project have soil and groundwater impacted by regulated hazardous chemicals and are currently protected by an underground engineered cap covering these impacted soils. Lighting pole foundations and signal modifications may exceed the depth of existing infrastructure and reach or penetrate the cap. Caltrans requested that NCE identify hazards that may impact worker and future user safety. NCE prepared a Hazards Memorandum describing deed-restricted properties that may impact the project (NCE 2025; **Appendix E**). Specifically, impacted soils associated with the following properties may be encountered during project construction:

- 4650, 5500, 5600 Shellmound Street (South Bayfront Shellmound Deed Restriction) – Formerly used for paint and pesticide manufacturing and vehicle maintenance. Contamination included heavy metals and solvents (arsenic, lead, chromium VI, TCE, copper). A cleanup occurred in 1999. The site remains under a Risk Management Plan requiring engineered caps, soil cover, and groundwater monitoring. Residual contamination remains and could be encountered during deep excavation.
- 4650 Shellmound Street (Pfizer/Elementis Pigments) – Historically used for pigment production, with contamination from leaking underground storage tanks (USTs) that released petroleum hydrocarbons, VOCs, and metals (arsenic, lead, zinc). Between 1987 and 1999, 14 USTs were removed, along with contaminated soil and groundwater. The case was closed in 2000, but the California Department of Toxic Substances Control (DTSC) retains oversight due to residual solvent contamination. Impacted groundwater and soils may still be present.
- 5555 Shellmound Street (Shellmound Venture Deed Restriction, former Judson Steel site) – Historically used for steel slag storage and disposal. Soil investigations found metals contamination including arsenic, lead, chromium, cadmium, and PCBs. A 1998 Land Use Covenant restricts use to commercial and industrial activities and prohibits residential, school, and health care uses. Soil disturbance is prohibited without an approved Soil Management Plan. Lead and chromium remain present in soils.
- 4300 Eastshore Highway (Shellmound Street Deed Restriction) – Former steel manufacturing area. Excavations in the mid-1990s revealed soils contaminated with heavy metals (arsenic, lead, zinc). The site is capped with roadway pavement and subject to a DTSC deed restriction. Soil disturbance requires DTSC approval. Contaminated soils remain under the cap.
- 5500 Eastshore Highway (Powell Street Plaza) – Formerly developed with USTs and subject to petroleum contamination, including a gas spill in the 1970s. Remediation involved tank removal and soil excavation. Regulatory case closure occurred in 2001, but some contaminated soils may remain beneath the shopping center development.

Historical depth to groundwater in the vicinity of the project is approximately 6 to 8 feet below ground surface, and groundwater flow is generally to the west. Project-specific Soil Management Plans (and Groundwater Management Plans) are required for work that involves breaching the cap and subsurface work that could potentially encounter the cap and/or contaminated soils and groundwater.

4.9.2 CEQA Checklist Summary

Would the project:

CEQA Question	Impact Determination
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	Less Than Significant Impact
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	Less Than Significant Impact with Mitigation Incorporated
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	Less Than Significant Impact with Mitigation Incorporated
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	Less Than Significant Impact with Mitigation Incorporated
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	No Impact
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	Less Than Significant Impact
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	No Impact

4.9.3 Answers to CEQA Checklist Questions

a) Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Less Than Significant Impact

The project's use of hazardous materials is limited to fuels, imported materials, and other maintenance related chemicals to run equipment machinery during construction; there are no long-term operational activities related to the project. New concrete and asphalt materials would be used to construct the new bike path, resurface the existing roadways, and construct curb, gutter, and sidewalk improvements. Soils

excavated from beneath the cap must be characterized and disposed of in accordance with the regulatory agreements governing its location.

The project would also involve minor demolition. Demolition materials would be disposed of as construction waste. Demolition of such materials and appropriate disposal are highly regulated by the state and federal government, and routine transport to an appropriate landfill would pose no significant hazard to the public.

Transport and use of hazardous materials are anticipated to be minimal. The use and storage of fuels and other vehicle-related chemicals as well as construction materials would be managed according to the on-site SWPPP. For example, the SWPPP requires that equipment fueling and maintenance, if performed at the job site, be performed in a designated area utilizing secondary containment with a spill kit nearby. Rinsing of concrete tools and chutes would also be performed according to the SWPPP, including utilizing concrete washouts and/or requiring that wastewater be kept within the concrete truck and hauled off-site for recycling. Therefore, the project would have a less than significant impact on hazards to the public or the environment through the routine transport, use, or disposal of hazardous materials, and no mitigation is required.

b) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Less Than Significant Impact with Mitigation Incorporated

Construction of the proposed new lighting pole foundations and signal modifications would include excavation to depths penetrating the engineered soil cap. Since excavations are likely to reach groundwater, impacts to groundwater in the vicinity could affect project construction or worker safety. The properties beneath the cap have been identified as containing soils contaminated with arsenic, lead, chromium, cadmium, and polychlorinated biphenyls (PCBs). Penetration of the cap could expose and disturb soil contaminated with regulated hazardous materials, which could be a potentially significant impact for construction workers and nearby sensitive receptors if improperly handled. Project-specific Soil Management Plans are required for work at the site that would involve breaching the cap and subsurface work that could encounter the cap and/or contaminated soils and groundwater. The capped areas within the project area are identified on **Figure 4**.

Implementation of ***Mitigation Measure HAZ-1*** would reduce potentially significant impacts to less than significant.

- ***Mitigation Measure HAZ-1*****:** The contractor shall prepare a project-specific Soil Management Plan that incorporates the following:
    - The contractor is responsible for off-site disposal of soils. Soils shall require profiling and waste characterization within 6 months of removal and stockpiling for disposal facility acceptance. All soil spills shall be disposed of by the contractor and transported by a licensed waste hauler to an appropriately licensed waste disposal facility.
    - Soil stockpiles shall be controlled, covered, and demarcated by the contractor when not in active use.



Figure 5. Deed Restriction Map

- Worker protection and training shall be required by the City of the contractor in advance of and during construction to mitigate potential health concerns related to exposure of metals and petroleum hydrocarbons.
- The contractor shall prepare a Soil Management Plan that addresses the above mitigation requirements. The Soil Management Plan shall generally address soil and groundwater excavation, disposal, stockpiling, and transportation. The Soil Management Plan shall explicitly address handling and disposal of soil, on-site soil management, off-site soil disposal, profiling of soil, transportation routes, and dust mitigation controls.

Implementation of ***Mitigation Measure HAZ-1*** would ensure that hazardous waste exposed during construction is appropriately handled, characterized, and disposed of, which would protect construction workers, the public, and the environment from reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment and reduce impacts to less than significant.

c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Less Than Significant Impact with Mitigation Incorporated

There are multiple schools within a quarter mile of the project area. The nearest school is East Bay German International School, located approximately 380 feet north of the project area.

As discussed above, hazardous materials use as part of the proposed project is anticipated to be limited. The potential for the release of hazardous materials during construction would be mitigated through implementation of ***Mitigation Measure HAZ-1***. Construction-related vehicles would produce routine emissions that would be temporary and less than significant. For a discussion on air quality emissions on sensitive receptors, see Section 4.3 Air Quality.

d) Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Less Than Significant Impact with Mitigation Incorporated

This checklist question refers specifically to the Department of Toxic Substance Control "Cortese List" which is no longer being issued. There are 2 identified properties listed on the CalEPA Hazardous Waste and Substances Site List (Cortese) (DTSC n.d.): IKEA (former Barbary Coast) located at 4300 East Shore Highway and Myers Drum – Emeryville located at 5600 Shellmound Street.

The IKEA site, (Shellmound Street Deed Restriction), was a former steel manufacturing area with soils contaminated with heavy metals. Myers Drum – Emeryville (part of the South Bayfront Shellmound Deed Restriction) contains soils contaminated with heavy metals and solvents. All areas excavated below the soil cap during project implementation would be paved over with new asphalt or concrete or otherwise sealed after installation of lighting poles, as required by the conditions for the cap. Implementation of ***Mitigation Measure HAZ-1*** would protect the public, construction workers, and the

environment from unintended releases during construction. Therefore, the impact of listed hazardous materials sites would be less than significant after mitigation.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

No Impact

The project is not located within an airport land use plan area and there are no airports within 2 miles of the project area. The nearest airport is Oakland International airport located approximately 7.15 miles south of the project area. Therefore, the project would not expose people residing or working in the project area to safety hazards or noise, and no mitigation is required.

f) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less Than Significant Impact

Once constructed, the project may improve local emergency response or evacuation plans by reducing congestion along the 40th Street/Shellmound Street corridor. Project construction would occur within public road rights-of way along 40th Street and Shellmound Street, and the intersections of those streets with Halleck, Hubbard, Horton, Hollis, Haven, Harlan, Watts and Adeline streets, and San Pablo Avenue, Christie Avenue, and Ohlone Way. Emergency response vehicles use both 40th Street and Shellmound Street, as well as the streets that share intersections with the 2 streets. During the construction phase of the project, 40th Street, Shellmound Street, and connecting streets mentioned previously could be partially blocked by construction activities, equipment, and crews but would remain open to all emergency vehicles and for evacuation traffic. The project would implement temporary traffic control measures in accordance with the Manual for Uniform Traffic Control Devices, Chapter 6, where necessary during all construction activities (see Section 4.17, Transportation), and no mitigation is required.

g) Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

No Impact

The project would create transit improvements in an existing urbanized area. Therefore, the project would not expose people or structures to any significant risk associated with wildland fires, and no mitigation is required.

4.10 Hydrology and Water Quality

4.10.1 Environmental Setting

Watershed and Water Quality

The project area is in the Central Basin of the San Francisco Bay Basin (SWRCB 2024). The Central Basin is included on the 2024 Clean Water Act (CWA) Section 303(d) list of impaired water bodies for chlordane, DDT, dieldrin, dioxins, furans, invasive species, mercury, polycyclic aromatic hydrocarbons, PCBs, and selenium. Total Maximum Daily Load (TMDL) requirements are in effect for mercury and PCBs, including requirements in the City's municipal stormwater permit (San Francisco Bay Municipal Regional Permit Provisions C.11 [Mercury Controls] and C.12 [PCB Controls]).

Existing Stormwater Drainage Pattern

Stormwater runoff from the 40th Street corridor discharges into San Francisco Bay via traditional gray infrastructure with little or no water treatment, via minimal drainage infrastructure consisting of storm drain inlets, storm drainpipes, manholes, and culverts. The street consists of impermeable pavement that increases runoff and concentrates pollutants.

Flood, Tsunami, Seiche Hazards

The project area is delineated on Federal Emergency Management Agency (FEMA) map panel 06001C0058H, effective December 21, 2018. The majority of the project area lies within a Zone X area of minimal flood hazard, while a small portion lies within Zone X with a 0.2% annual flood chance hazard.

According to the latest Tsunami Hazard Area Maps from the California Geological Survey, tsunami inundation areas in Emeryville extend beyond the railroad to east of Horton Street (California Department of Conservation 2021a). Tsunamis generally impact the Pacific Coast of California, and reports of tsunamis entering the San Francisco Bay are rare. The most recent tsunami to impact the Bay Area was associated with the March 2011 earthquake off the coast of Japan. The tsunami surge caused significant damage to docks and boats in the region (California Department of Conservation 2021b). Given the known history of tsunamis within the San Francisco Bay, a tsunami is possible, but the severity of the impacts on the City of Emeryville is not known.

Tsunamis, or seiches as they are called when they occur within an enclosed body of water, can also be generated within the Bay by the Hayward fault, which passes under San Pablo Bay. The Great 1868 Earthquake on the Hayward fault is reported to have created a seiche within the Bay. It is unknown whether the seiche impacted Emeryville.

4.10.2 Regulatory Setting

Federal

Clean Water Act and NPDES Permit

The CWA, passed in 1972, regulates and protects surface water quality across the United States. Section 402 of the CWA requires National Pollution Discharge Elimination System (NPDES) permits for

stormwater discharges from municipal storm drain systems. The SWRCB issues the municipal stormwater NPDES permits to address stormwater impairments and recommend actions. Stormwater discharges into the City's municipal stormwater drainage system are regulated by the SWRCB under the Municipal Regional Stormwater NPDES Permit, Order No. R2-2015-0049.

Section 303(d) of the CWA authorizes the EPA to assist jurisdictions in listing impaired waters and developing TMDLs for these waterbodies. A TMDL establishes the maximum levels of each pollutant allowed in a waterbody and serves as the starting point or planning tool for restoring water quality. In California, the state and regional water boards assess water quality monitoring data for the state's surface waters every 2 years to determine if they contain pollutants at levels that exceed protective water quality standards. Water bodies and pollutants that exceed these standards are placed on the state's 303(d) List. The determination is governed by the Water Quality Control Policy for developing California's Clean Water Act Section 303(d) List. Currently, the 2018 303(d) list is in effect.

State

Statewide Construction General Permit

Because the proposed project would disturb more than 1 acre, it is subject to the statewide Construction General Permit Order 2009-0009-DWQ, which regulates stormwater leaving construction sites. Under this order, site owners must notify the state and implement a SWPPP prepared by a Qualified SWPPP Developer. The SWPPP must outline measures that would protect hydrology and water quality resources, including groundwater, from negative impacts during construction through implementation of BMPs and monitoring the effectiveness of BMPs. This permit is administered by the SWRCB and overseen by the RWQCB.

Local

Appendix C of the 2019 City of Emeryville Green Infrastructure Plan outlines the City's general guidelines for green infrastructure projects. According to the plan, streets must continue to fulfill the following functions when implementing a green infrastructure project (City of Emeryville 2019b):

- Street use for stormwater management, including treatment.
- Safe pedestrian travel.
- Use as a public space for bicycle, transit, and vehicle movement/parking.
- Use as locations for urban forestry.

4.10.3 CEQA Checklist Summary

Would the project:

CEQA Question	Impact Determination
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	Less Than Significant Impact
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	Less Than Significant Impact
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: i. result in substantial erosion or siltation on or off-site;	Less Than Significant Impact
ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off-site;	Less Than Significant Impact
iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	Less Than Significant Impact
iv. impede or redirect flood flows?	Less Than Significant Impact
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	Less Than Significant Impact
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	Less Than Significant Impact

4.10.4 Answers to CEQA Checklist Questions

a) Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

Less Than Significant Impact

The proposed project would construct green infrastructure to help collect, infiltrate, and treat stormwater runoff from the adjacent impervious surfaces, including streets and sidewalks in the 40th Street segment of the project. Improvements would include storm drain inlets and pipe connections to manage runoff, bioretention facilities, permeable pavements for infiltration in limited sidewalk areas, new drain inlets along the curb line by the bus lane on 40th Street, and new storm drain pipe.

During the construction phase, the project would be subject to the requirements of the Construction General Permit, which requires implementation of a SWPPP, and various monitoring and reporting activities, depending on the project's risk level.

Because the project would not adversely affect water quality during the construction phase and would improve water quality through the incorporation of engineered stormwater treatment systems, impacts would be less than significant, and no mitigation is required.

b) Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Less than Significant Impact

The project does not propose any groundwater withdrawals and would have no adverse impact on groundwater recharge. The project design maintains on-site infiltration of stormwater by incorporating green infrastructure, which in turn would facilitate groundwater recharge. Therefore, the proposed project would not have a significant effect on groundwater recharge or management of the groundwater basin, and no mitigation is required.

c) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i) Result in substantial erosion or siltation on or off-site?

Less Than Significant Impact

The proposed project would not significantly alter existing drainage patterns and would not increase impervious areas within the ROW. The project would implement construction BMPs as specified in Section 3.6.4 and the Construction General Permit and would not result in substantial erosion or siltation. The drainage improvements would not cause substantial erosion or siltation, and no mitigation is required.

ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off-site?

Less Than Significant Impact

The project would not substantially increase the rate or amount of surface runoff. Green infrastructure design elements as discussed in Section 4.10.4(a) will provide water quality treatment and reduce the amount of pollutants in runoff compared to the existing condition. Therefore, impacts would be less than significant, and no mitigation is required.

iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Less Than Significant Impact

The project would not create or contribute runoff water that would exceed storm drain capacity or increase polluted runoff. Project plans provide additional on-site spaces for bioretention facilities and other green infrastructure design elements that would increase capacity for infiltration of polluted runoff. Therefore, the project could reduce the potential for pollutants to travel to the storm drain system or receiving waters. During construction, a site-specific SWPPP would ensure that all runoff would be treated prior to conveyance into the storm drain system, and no mitigation is required.

iv) Impede or redirect flood flows?

Less than Significant Impact

The proposed project does not include structures that would impede or redirect flood flows. The proposed project would include signal and light poles, storm drainage and green infrastructure improvements which would not substantially alter the flow of floodwaters. Therefore, the project would have a less than significant impact on flood flows, and no mitigation is required.

d) In flood hazard, tsunami, or seiche zones, would the project risk release of pollutants due to project inundation?

Less than Significant Impact

Flood Hazard

The project is located within a minimal flood hazard zone. The project proposes no new uses that would introduce new pollutants into the ROW. The incorporation of green infrastructure and stormwater treatment measures into the proposed project would improve the current pollutant load in the project area and would minimize the potential to release road pollutants if an inundation were to occur, and no mitigation is required.

Tsunami and Seiche Hazard

A tsunami or seiche could inundate the project area. The project proposes no new uses that would introduce new pollutants into the ROW. The incorporation of green infrastructure and stormwater treatment measures into the project would improve the pollutant load in the project area and minimize the potential to release road-related pollutants due to inundation. Therefore, the risk of release of pollutants due to a tsunami or seiche would be less than significant, and no mitigation is required.

e) Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Less Than Significant Impact

The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the SWRCB's planning document (SWRCB 2024). It outlines how water quality will be protected and improved in the region, including for groundwater, requiring that it be managed in a way that protects its quality and ensures it remains usable for current and future needs, especially in light of climate change and human impacts.

The project would not conflict with implementation of the Basin Plan as it would not adversely affect beneficial uses of the Bay. The project would incorporate new green infrastructure site design measures, such as diverting drainage to vegetated areas and improving the existing storm drainage system, to help the City meet water quality objectives established to protect beneficial uses. The proposed project would preserve and enhance beneficial functions required for green infrastructure by the City's Green Infrastructure Plan, by improving stormwater management, pedestrian, bicycle and transit travel, while preserving existing trees or replacing trees removed as a result of the proposed project. Therefore, implementation of the project would result in an improvement in stormwater runoff quality associated with road-based pollutants compared to the existing condition, and no mitigation is required.

4.11 Land Use and Planning

4.11.1 Environmental Setting

The project is in a highly urbanized area encompassing Emeryville and Oakland. It primarily lies within the ROW of Shellmound Street, running north/south and then transitions to 40th Street as it turns east/west. Within Emeryville, the project area spans Shellmound Street and 40th Street between its intersections with Christie Avenue and Adeline Street. A segment of Shellmound Street, located between the IKEA parking structure entrance and its transition to 40th Street, falls under the jurisdiction of the City of Oakland.

The corridor's land use is predominantly commercial, featuring a variety of customer-oriented businesses and offices, including IKEA, a hotel, retail stores, and fast-food restaurants. Adjacent to the corridor and near the intersection of 40th Street and Adeline Street are multifamily residential areas, senior care facilities, and multi-use spaces.

The project involves constructing improvements within the existing roadway ROW. Zoning adjacent to the roadway includes mixed use residential and mixed use non-residential, with local and regional retail overlays. One parcel at the corner of 40th Street and Hollis Street is zoned for public use. Existing establishments along the project alignment include a shopping mall, several large retailers, and high-density residential buildings (City of Emeryville 2019a).

4.11.2 Regulatory Setting

This project is not a land use project but is an infrastructure project. All planning goals and policies pertinent to the project are outlined in Section 4.17.2, Transportation.

4.11.3 CEQA Checklist Summary

Would the project:

CEQA Question	Impact Determination
a) Physically divide an established community?	No Impact
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	No Impact

4.11.4 Answers to CEQA Checklist Questions

a) Would the project physically divide an established community?

No Impact

The proposed project would improve an existing roadway and provide improved multi-modal infrastructure. No new traffic lanes or roadway widening would separate existing land uses, and improvements would improve non-vehicular access. Therefore, there would be no impact on an established community, and no mitigation is required.

b) Would the project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

No Impact

The proposed project would support a reduction in VMT by improving pedestrian, bicycle, and transit infrastructure within the project area. This is consistent with goals and policies of the City of Emeryville General Plan, Active Transportation Plan, and the Plan Bay Area 2050. The project would be consistent with and in furtherance of local land use plan policies related to transportation, which have been adopted to encourage multi-modal transportation to avoid or mitigate air quality, public health and safety, and other environmental effects. Project construction would further comply with regulations adopted for the purpose of avoiding or mitigating construction-related environmental effects by implementing controls to protect or avoid impacts to sensitive resources and mitigating any impacts to less than significant levels, as described in the other sections of this IS.

Because the project would comply with and be in furtherance of City land use plan, policies, and regulations, as well as regulations administered by the permitting agencies adopted for the purpose of avoiding or mitigating environmental impacts, the proposed project would not conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect, and no mitigation is required.

4.12 Mineral Resources

4.12.1 Environmental Setting

Minerals are naturally occurring chemical elements or compounds, or groups of elements and compounds, formed from inorganic processes and organic substances including, but not limited to, coal, peat, and oil-bearing rock, but excluding geothermal resources, natural gas, and petroleum. Rock, sand, and gravel are also considered minerals when extracted by surface mining operations.

The project area is an existing roadway in a highly urbanized area, and no known mineral resources are located within or near the project area.

4.12.2 CEQA Checklist Summary

Would the project:

CEQA Question	Impact Determination
a) Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	No Impact
b) Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	No Impact

4.12.3 Answers to CEQA Checklist Questions

a) Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

No Impact

According to the General Plan, there are no state or regionally valuable mineral resources within the project area (City of Emeryville 2019). The proposed project would therefore not result in the loss of a known mineral resource, and no mitigation is required.

b) Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

No Impact

According to the State Mining and Geology Board and the General Plan there are no resource recovery sites associated with the project; therefore, there would be no impact, and no mitigation is required.

4.13 Noise

4.13.1 Environmental Setting

Noise is defined as a sound or series of sounds that are intrusive, objectional, or disruptive to daily life. Noise levels are measured in order to regulate ambient noise and protect residents from exposure to excessive noise. Different land uses have different acceptability levels in terms of noise disturbance. For example, industrial uses have a higher noise threshold than residential uses. Noise standards provide a means of assessing exposure and compatibility based on specific uses. Significant existing noise generators in the project vicinity include motor vehicles on the existing roadway and on Interstate 80/580.

4.13.2 Regulatory Setting

Local

The City of Emeryville Noise Ordinance, Chapter 13, Section 5, establishes noise limits and allowable hours for construction activities, typically 7:00 a.m. – 6:00 p.m.

4.13.3 CEQA Checklist Summary

Would the project result in:

CEQA Question	Impact Determination
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Less Than Significant Impact
b) Generation of excessive groundborne vibration or groundborne noise levels?	Less Than Significant Impact
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	No Impact

4.13.4 Answers to CEQA Checklist Questions

a) Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less Than Significant Impact

During construction, workers and persons residing in the area (i.e., multifamily housing and senior living) would be temporarily exposed to minor ground borne vibration and noise generated by construction equipment, such as compaction equipment, excavators, and loaders. No pile driving is required for the project, which is the primary source of ground borne vibrations and noise during construction.

Generation of intermittent noise would be temporary during construction and would comply with the City of Emeryville Noise Ordinance requirements for construction projects. Construction equipment noise from the project is exempt from the noise ordinance thresholds. The project would not result in significant ambient noise levels in excess of established standards set forth in the general plan or noise ordinance, and no mitigation is required.

b) Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

Less Than Significant Impact

Construction vibration is generally associated with pile driving and rock blasting, and occasionally large bulldozers and loaded trucks can cause perceptible vibration at close proximity. Project construction activities would expose the adjacent area near the project area to intermittent groundborne vibration. However, this impact would be temporary. Because impacts would be temporary and intermittent, they would be less than significant, and no mitigation is required.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

No Impact

There are no airports within 2 miles of the project area. The nearest airport is Oakland International airport located approximately 7.15 miles south of the project area. Therefore, the project would not expose construction workers or residents to excessive aircraft noise, and no mitigation is required.

4.14 Population and Housing

4.14.1 Environmental Setting

As of January of 2025, the City of Emeryville had an estimated population of 13,471 residents and an estimated housing stock of 8,373 dwelling units (State of California Department of Finance 2025). Land use throughout the project corridor is primarily commercial, but multifamily residential areas, senior care living, and multi-use areas are along the corridor and at the end of 40th Street near the intersection with Adeline Street.

4.14.2 CEQA Checklist Summary

Would the project:

CEQA Question	Impact Determination
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	No Impact
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	No Impact

4.14.3 Answers to CEQA Checklist Questions

a) Would the project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

No Impact

The project scope is limited to improving multi-modal transit facilities and corridor safety within existing roadway ROW and would not increase roadway capacity or VMT. The project would not induce substantial population growth by adding new housing or commercial uses or indirectly by adding new infrastructure that would induce growth in the area, and no mitigation is required.

b) Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

No Impact

The project does not propose any removal or construction of features which would result in displacement of people and would therefore not require construction or replacement housing elsewhere. Therefore, there would be no impact, and no mitigation is required.

4.15 Public Services

4.15.1 Environmental Setting

The proposed project is in an urban area served by existing infrastructure and public services. Fire protection in the project area is provided by the Alameda County Fire Department from Fire Station No. 34. The Department provides 24-hour emergency response for medical emergencies, fire suppression, water rescue, and disaster response. Police protection in the project area is provided by the Emeryville Police Department. Both the Emeryville Police Department and Alameda County Fire Department Fire Station No. 34 are located approximately 1 mile northwest of the project area.

4.15.2 CEQA Checklist Summary

Would the project result in:

CEQA Question	Impact Determination
a) Would the project result in substantial adverse physical impacts associated with the need and/or provision of new or physically altered governmental services and/or facilities in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services? i) Fire protection? ii) Police protection? iii) Schools? iv) Parks? v) Other public facilities?	Less Than Significant Impact

4.15.3 Answers to CEQA Checklist Questions

a) Would the project result in substantial adverse physical impacts associated with the need and/or provision of new or physically altered governmental services and/or facilities in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services?

i) Fire protection?
ii) Police protection?
iii) Schools?
iv) Parks?
v) Other public facilities?

Less Than Significant Impact

The project would not increase dwelling units or road capacity in the vicinity and would not construct uses that would increase the population in the project area. Thus, the project would not increase demand for public services such as schools, parks, or other public facilities such as libraries.

During construction, the project may have a negligible temporary increase in emergency services demand to protect construction equipment or personnel that could be adequately served by existing services. There are adequate fire and police services to protect the construction sites and construction workers without affecting emergency services ratios, response times, or other performance objectives.

During operation, the project would improve safe transit, bicycle, and pedestrian access, which may result in a drop in emergency calls throughout the corridor. Therefore, the proposed project would not require new or physically altered governmental services and/or facilities in order to maintain acceptable service ratios, response times, or other performance objectives. The proposed project would have a less than significant impact on governmental services, and no mitigation is required.

4.16 Recreation

4.16.1 Environmental Setting

Due to its industrial history, the City has limited parks and open spaces. The General Plan includes a general framework for expanding open spaces to create a cohesive local network and set forth standards to develop 3 acres of parkland per 1,000 new residents, develop 0.25 acres of parkland per 1,000 new employees, and locate at least 1 park within a 5 minute walk of all residences (City of Emeryville 2019a). The City is currently served by 25 parks and open spaces, of which the City owns and manages 15 (City of Emeryville 2025, City of Emeryville n.d.).

Connected to the project area, the San Francisco Bay Trail in Emeryville spans approximately 3 miles and is characterized by its accessibility and scenic views. The trail is accessible for wheelchairs, strollers, and mobility equipment, with benches along the way for resting and taking in the scenery. The trail is popular for road biking, running, and walking, and is open year-round. The trail enters the project area at the base of the Shellmound Street bridge, where southbound users can currently take the bike lane over the Shellmound Street bridge and northbound users can cross Shellmound Street at the IKEA entrance to use the northbound bike lane. In the project area, the Trail is currently classified as a Class II, in-road bike lane between shared use path Class I bikeway sections of the trail, located on Ohlone Way at the northern end of the project area and at the IKEA entrance on the east side of Shellmound Street.

4.16.2 CEQA Checklist Summary

Would the project:

CEQA Question	Impact Determination
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	Less than Significant Impact
b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	Less than Significant Impact

4.16.3 Answers to CEQA Checklist Questions

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Less Than Significant Impact

The project would include the continuation of the San Francisco Bay Trail as a two-way separated Class IV bikeway from its existing terminus at the IKEA entrance. The project would continue the Trail as an eastbound 2-lane separated Class IV bikeway on the north side of 40th Street and a northbound 2-lane separated Class IV bikeway on the west side of Shellmound Street. This is intended to expand usage of the Trail and reduce VMT. While more users could contribute to a minor increase in normal

deterioration of the trail surface over time, the increase in use would be based on improved access and not based on a project induced increase in population. Population growth is the main driver of increased park and recreational facility use. These improvements would not induce population growth that would increase demand on neighborhood or regional parks and therefore would not increase or accelerate the physical deterioration of existing recreational facilities. The proposed project would have a less than significant impact on recreational facilities, and no mitigation is required.

b) Would the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

Less Than Significant Impact

As noted above, the project would include enhancement and expansion of the San Francisco Bay Trail. The proposed project would construct a protected Class IV bikeway extending from Christie Avenue to Adeline Street, increasing safety and extending the Trail eastward. This IS identifies the potential physical effects during construction and operation, and all adverse environmental effects that have potential to occur as a result of the proposed project can be reduced to less than significant with the application of mitigation measures outlined in this document. Therefore, as mitigated, the recreational facilities provided by the project would have a less than significant impact on the environment, and no mitigation is required.

4.17 Transportation

4.17.1 Environmental Setting

Roadway Network

Regional access to the project area is provided by Interstate 580, Interstate 80, and SR-123 (San Pablo Avenue). Local access to the project area is provided by various connectors and local roads. The project area is located primarily within Shellmound Street and 40th Street, which are both classified as transit streets under the General Plan (City of Emeryville 2019a). Caltrans classifies 40th Street as a minor arterial road and Shellmound Street as a local road (Caltrans 2025b).

Shellmound Street is a 4-lane local street/transit street which is a continuation of 40th Street from the intersection of Hubbard Street and 40th Street. There is 1 lane of traffic from Shellmound Street's eastern end as it passes over the railroad tracks and IKEA parking lot, and it expands to 2 lanes again at the intersection of the IKEA parking lot and Shellmound Street.

40th Street is a minor arterial road/transit street which travels east to west across the City of Emeryville and the City of Oakland. The section of 40th Street that the project area covers is from the Shellmound-40th Street Bridge to Adeline Street just at the easterly city limits of Emeryville. 40th Street has general travel lanes in each direction divided by a median and periodic left turn lanes. Portions of 40th Street within the project area have Class II bike lanes and portions outside the project area to the east have a mix of Class II bike lanes, no bicycle infrastructure, or are a Class III bike route. The posted speed limit is 25 mph.

The project area is connected to numerous local roads which extend from 40th Street into surrounding Oakland and Emeryville. Hubbard Street, Holden Street, Haven Street, and Watts Street are 4 northwest to southeast local roads, which share intersections with 40th Street within the project area and currently allow right turns onto 40th Street.

Transit Network

The City of Emeryville is centrally located in the East Bay and is served by a range of regional and local transit options. The free Emery Go-Round shuttle provides frequent connections between locations in Emeryville and the MacArthur BART Station in Oakland. There are 2 Emery Go-Round lines, Hollis and Shellmound/Powell. Hollis has stops on the eastern side of the project area on 40th Street, and the Shellmound/Powell line stops along 40th Street and Shellmound Street within the project area. The Emery Go-Round shuttle operates Monday through Friday 6:00 a.m. to 10:00 p.m. and Saturdays from 8:00 a.m. to 10:00 p.m. and on Sunday's from 9:00 a.m. to 7:00 p.m. Multiple stops on 40th Street including those at intersections with Horton and Hollis Streets and the Sonsesta stop on Shellmound Street are accessible from the project area (Emery Go-Round 2020). While the Emery Go-Round functions as a key first-mile/last-mile link for commuters, it is not designed to provide comprehensive local service for residents or to connect destinations across Emeryville (City of Emeryville 2019a).

AC Transit provides several fixed-route bus services in the vicinity of the project area. The 72 Rapid operates along San Pablo Avenue, offering frequent service between Jack London Square in Oakland and Hilltop Mall in Richmond. Additional AC Transit local routes operate along 40th Street and Shellmound

Street, including the F line to University of California Berkeley campus and line 57 to Foothill Square. Another AC Transit local route (line 22) operates along Hollis Street and connects from City of Berkeley to West Oakland BART. This line intersects the center of the 40th Street portion of the project area with bus stops at or near the 40th Street and Hollis Street intersection. Multiple stops on 40th Street, including those at intersections with Horton and Hollis streets and those on Shellmound Street at its intersection with Bay Street, are accessible within the project area (AC Transit 2025).

Bicycle Network

The 2012 City of Emeryville Active Transportation Plan (City of Emeryville 2023) defines classifications for the City's bicycle paths:

- Class I Shared Use Path: Provides a completely separated ROW for the exclusive use of bicycles and pedestrians with minimized crossflow. Shared use paths are paved, bidirectional pathways physically separated from the roadway, often following independent ROWs like former rail lines.
- Class II Bike Lane: A bike lane is a dedicated on-street space for cyclists, marked by signage and pavement striping, that runs parallel to vehicle traffic in the same direction.
- Class III Bike Route: Provides shared use with pedestrians and motor vehicle traffic, typically on lower volume roadways. Travel lanes are a minimum of 14 feet to accommodate both vehicle and bicycle traffic.
- Class IIIB Bike Boulevard: Bicycle boulevards prioritize cyclists on low-traffic streets using signage, markings, and traffic calming measures to deter vehicle through-traffic and enhance crossing safety at major arterials.
- Class IV Separated Bikeways: Separated bikeways, such as those which would be constructed as part of the proposed project, are bicycle paths which are physically divided from vehicular traffic by an inflexible barrier, grade separation, or on-street parking. This design provides a protected corridor for cyclists traveling alongside vehicular traffic.

As of 2020, the City had 2.1 miles of shared use paths (Class I), 4.2 miles of bike lanes (Class II), 1.5 miles of bike routes (Class III), 2.5 miles of bike boulevards (Class IIIB), and 0.9 miles of separated bike lanes (Class IV) (City of Emeryville 2023).

Figure 5 shows the existing bicycle facilities in the vicinity of the project area. Class II bike lanes run along 40th Street and Shellmound Street. Class II bike lanes also exist along Emery Street, Horton Street and Hollis Street to the south of the project area. A portion of the San Francisco Bay Trail, a Class I Shared Use Path, runs adjacent to the western side of the southern portion of Shellmound Street within the project area. Horton Street is a Class IIIB bicycle boulevard where it meets 40th Street (City of Emeryville 2023).

Pedestrian Facilities

Pedestrian facilities within the City include sidewalks, crosswalks, and pedestrian signals. There are sidewalks extending the length of 40th Street, and along all sections of streets which share an intersection with 40th Street within the project area. Shellmound Street has a sidewalk but only on the northeastern/eastern side of the roadway.

Shellmound Street has high visibility crosswalks at all intersections. The intersections of 40th Street and Hubbard Street, and Holden Street and Watts Street are unsignalized with high visibility crosswalks. The intersections 40th Street with Horton Street, Hollis Street, Harlan Street, Emery Street, SR-123, and Adeline Street are signalized with high visibility crosswalks.

Safety Considerations

The project area is located within the cities of Emeryville and Oakland. Traffic collision data for this area obtained from the California Highway Patrol Statewide Integrated Traffic Records System database, and the University of California SafeTREC Transportation Injury Mapping System shows 45 collisions involving a pedestrian or bicyclist within the project area over a 12-year period from 2013 – 2024. During that same period there were 63 auto-only collisions along 40th Street. Specific intersections have the most associated accidents. At the intersection of 40th Street and Hubbard Street, 9 bicycle injury incidents were reported, making it one of the most problematic locations in the corridor. This intersection is of particular concern because westbound lanes merge over the bridge at high speeds, and vehicles can turn onto Hubbard Street without control measures.

Other intersections along 40th Street also demonstrate recurring bicycle collision patterns, including Horton Street (2 collisions), Hollis Street (2 collisions), Harlan Street (2 collisions), and Emery Street (3 collisions). Pedestrian collisions were recorded at Hollis Street (1), Emery Street (1), San Pablo Avenue (5), and Adeline Street (2). Five collisions occurred within the intersection of San Pablo Avenue and 40th Street, and 2 collisions occurred at the intersection of Adeline Street and 40th Street. Along Shellmound Street, fewer incidents were reported during the same period, including 4 bicycle injury collisions and 5 pedestrian injury collisions (Fehr and Peers 2025). The full 40th Street Multi-modal Transportation Analysis (Fehr and Peers 2025) is provided in **Appendix D.**

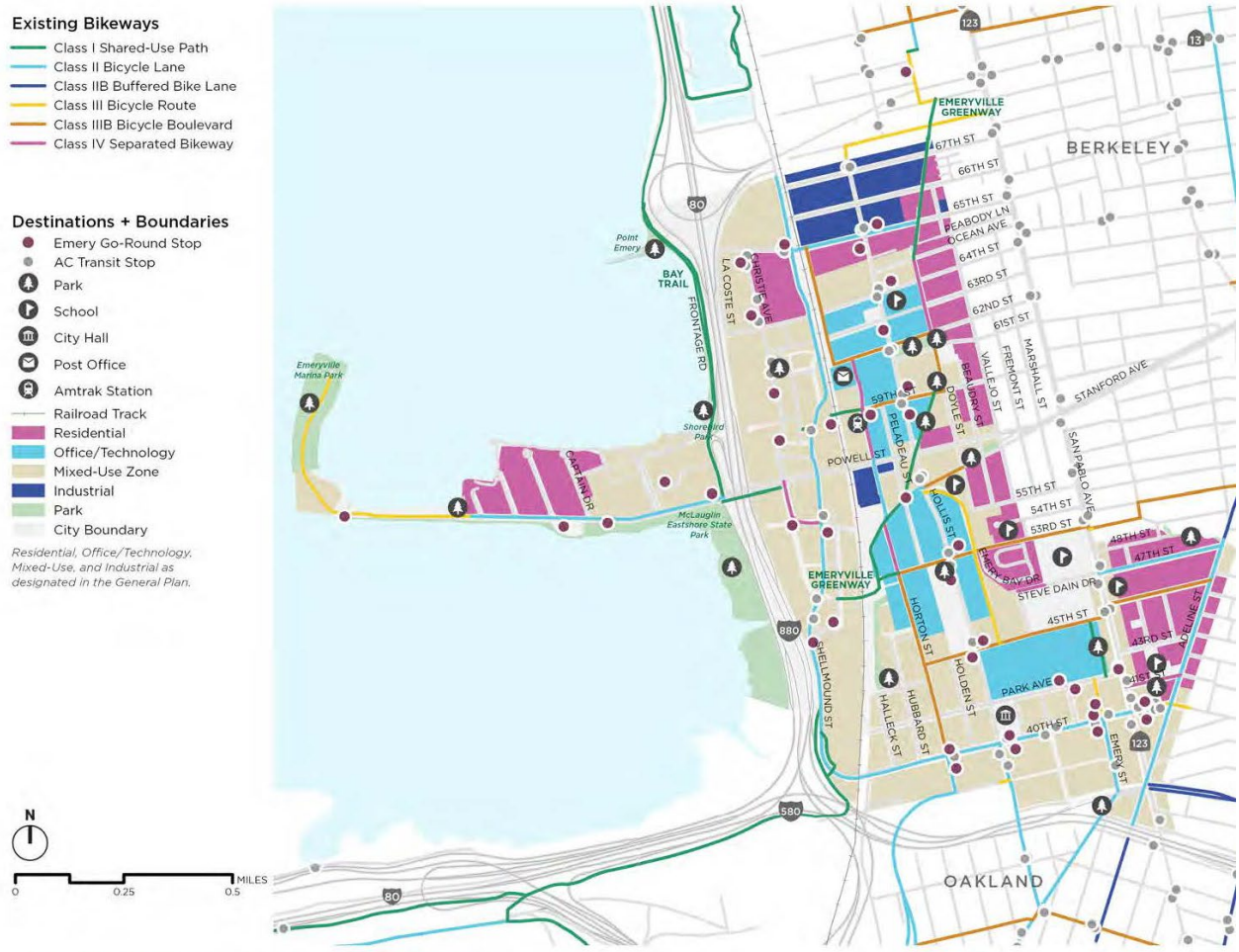


Figure 6. Existing Bicycle Facilities in the City of Emeryville

Source: City of Emeryville Active Transportation Plan (City of Emeryville 2019a)

4.17.2 Regulatory Setting

State

Vehicle Code Section 21209 prohibits motor vehicles from driving in a bicycle lane except for the purposes of entering or leaving the roadway, parking, or to prepare for a turn within 200 feet of an intersection.

Local and Regional Transportation

The following local and regional transportation guidance documents apply to the project:

The Plan Bay Area 2050 is a 30-year plan that establishes 35 strategies to improve housing, the economy, transportation, and the environment across the Bay Area's 9 counties - Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano and Sonoma. This long-range plan, developed by the Bay Area's 2 regional planning agencies, the MTC and the Association of Bay Area

Governments, outlines a $1.4 trillion vision for "a more equitable and resilient future for Bay Area residents." The Plan identifies 12 transportation strategies; the strategies applicable to the proposed project include:

- T1. Restore, operate and maintain the existing system. Commit to operate and maintain the Bay Area's roads and transit infrastructure while reversing pandemic-related cuts to total transit service hours.
- T8. Build a Complete Streets network. Enhance streets to promote walking, biking and other micro-mobility through sidewalk improvements, car-free slow streets, and 10,000 miles of bike lanes or multi-use paths.

The Emeryville General Plan functions as Emeryville's comprehensive, long-range policy document and guides physical development and land use decisions. The State requires that general plans include a circulation element regulating the location and extent of transportation modes, accessways, and thoroughfares (California Government Code Section 65302b). The Transportation Element fulfills this requirement by establishing the City's transportation-related policies and goals. The following are the goals and policies from the Transportation Element that are relevant to the project (City of Emeryville 2019a):

- T-G-3 Multi-modal - A transportation system that eliminates the necessity of owning and/or driving personal vehicles because of the availability of convenient and accessible alternative modes of transportation.
- T-G-4 A walkable city - A universally accessible, safe, pleasant, convenient, and integrated pedestrian system that provides links within the City and to surrounding communities and reduces vehicular conflicts.
- T-G-5 A safe, comprehensive, and integrated bicycle system - A system and support facilities throughout the City that encourage accessible bicycling for all community members.
- T-G-7 A multi-functional street system - A system that will ensure the safe and efficient movement of people, goods, and services and support a high quality of life and economic vitality.
- T-P-2 The design, construction, operation, and maintenance of City streets shall be based on a "complete streets" concept that enables safe, comfortable, and attractive access and travel for pedestrians, bicyclists, motorists, and transit users of all ages and abilities.
- T-P-4 Transportation planning shall be coordinated with emergency service providers to ensure continued emergency service operation and service levels.
- T-P-12 The City will plan, upgrade, and maintain pedestrian crossings at intersections and mid-block locations by providing safe, well-marked crosswalks with audio/visual warnings, bulb-outs, and median refuges that reduce crossing widths.
- T-P-28 Existing public transit to BART, Amtrak, and regional destinations will be supported, and transit within Emeryville for residents, workers, and visitors will be promoted.

- T-P-31 The City will develop and implement transit stop amenities such as pedestrian pathways approaching stops, benches, traveler information systems, shelters, and bike racks to facilitate transit stops as place-making destinations and further the perception of transit as an attractive alternative to driving.
- T-P-32 Transit stops will be sited at safe, efficient, and convenient locations, and located appropriately within the ROW.
- T-P-33 The City supports transit priority on Transit Streets through features such as traffic signal priority, bus queue jump lanes at intersections, exclusive transit lanes, and other techniques as appropriate, with adjustments to technology as conditions change.

The City of Emeryville Active Transportation Plan is the City's 10-year blueprint for improving active transportation infrastructure and programs. The Plan supports the use of human-powered modes of travel, including walking and bicycling (City of Emeryville 2023). It sets 6 goals for the City's active transportation network, outlined below:

1. The active transportation network is easy for all types of people to navigate, including seniors and children.
2. The active transportation network is integrated within Emeryville and into external neighboring communities.
3. Traveling within the active transportation network is enjoyable.
4. The needs of the less resourced are centered in project and program planning, prioritization, and implementation and given equal weight to residents' more resourced counterparts.
5. The active transportation network encourages mode shift to zero-emission travel (biking, walking, etc.) and helps lower the carbon footprint of those living and working in Emeryville.
6. The City incorporates active transportation network improvements into all aspects of the planning, development and construction process.

4.17.3 CEQA Checklist Summary

Would the project:

CEQA Question	Impact Determination
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	Less Than Significant Impact
b) Conflict or be inconsistent with CEQA Guidelines §15064.3, subdivision (b)?	Less Than Significant Impact
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	Less Than Significant Impact
d) Result in inadequate emergency access?	Less Than Significant Impact

4.17.4 Answers to CEQA Checklist Questions

a) Would the project conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?

Less Than Significant Impact

The proposed project is a multi-modal project specifically designed to further the City's Active Transportation Plan by improving pedestrian and bicyclist safety and mobility through the installation of a Class IV protected bike trail. Proposed roadway modifications are designed to enhance user safety while resulting in negligible effects on overall traffic circulation. Proposed roadway modifications would also streamline bus movement throughout the project area. The project is consistent with the goals and policies of the City of Emeryville General Plan and Plan Bay Area 2050, and the City's Active Transportation Plan, which emphasize a need for complete streets, improved safety, and promotion of alternative transportation modes. Therefore, the proposed project would not conflict with, and would be in furtherance of, the City's programs, plans, ordinances and policies addressing the circulation system, and no mitigation is required.

b) Would the project conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?

Less Than Significant Impact

CEQA Guidelines § 15064.3, subdivision (b) pertains to the use of VMT to analyze transportation impacts. The Governor's Office of Planning and Research Technical Advisory on Evaluating Transportation Impacts in CEQA (Governor's Office of Planning and Research 2018) provides technical recommendations regarding the assessment of VMT, non-binding thresholds of significance, potential exemptions or presumptions of less than significant CEQA impacts, and mitigation measures. Section F of the Technical Advisory notes that maintenance activities and the installation of operational features such as upgrading traffic control devices, adding turn pockets, or installing traffic calming measures are "unlikely to lead to a substantial or measurable increase in vehicle travel." As noted in CEQA Guidelines Section 15064.3(b)(2), transportation projects "that reduce, or have no impact on, VMT should be presumed to cause a less that significant transportation impact."

Construction equipment and worker vehicles will generate vehicle trips over the 32 months of construction, which will be temporary and a minor addition to existing VMT. Therefore, the project is unlikely to induce vehicle travel, and thus the project will have a less than significant temporary impact on VMT. Therefore, the project would not result in a significant impact under CEQA Guidelines § 15064.3(b), and no mitigation is required.

Operations

The project would involve the modification of existing roadways to provide additional considerations for alternative transportation and safer passage along 40th and Shellmound Street for bicycles and pedestrians. As a result, it is considered to enhance and encourage means of alternative transportation, while decreasing roadway speeds, and improving transit access. No features of the project would increase operational VMT. Moreover, the project, through encouragement of alternative transportation, may reduce per capita VMT in the area by providing dedicated and protected lanes of travel for transit,

bicycles, and pedestrians. No impact is anticipated with respect to operational impacts, but overall, impacts would be less than significant due to temporary increases in VMT during construction, and no mitigation is required.

c) Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Less than Significant Impact

Construction

Project construction is expected to begin in 2026 and would be completed within approximately 32 months. Construction transportation impacts would be localized and temporary; however, during construction of the project, traffic operations could be degraded. The City would prepare a construction traffic control plan (TCP) which would demonstrate appropriate traffic handling during construction activities for all work that will or may impact the traveling public. The TCP would include the following elements:

- Identify the location of the proposed construction area.
- Illustrate the location of areas where the public ROW would be closed or obstructed.
- Identify the placement of traffic control devices necessary to perform the work.
- Present proposed phases of traffic control.
- Establish time periods when the traffic control would be in effect and, although not anticipated, identify the time periods when work may prohibit access to private property from a public ROW.
- Provide information on access for emergency vehicles to prevent interference with emergency response.

The construction plans specifically direct that access shall remain open for all residents and businesses in the project area. For this reason, the impact related to transportation hazards during construction would be less than significant, and no mitigation is required.

Operations

As detailed in Section 3, “Project Description,” the project would involve the modification of existing roadways to provide additional considerations for alternative transportation and safer passage along 40th Street and Shellmound Street for bicycles and pedestrians. On-site circulation would provide interconnected pedestrian and bicycle paths, as well as transit efficiency, throughout the project area to promote multi-modal transportation choices.

The project would be consistent with City development standards. Further and as noted under threshold a) above, the project would reduce the number of interaction points between bicycles/pedestrians/buses and other personal occupancy vehicles/trucks. It would lengthen site distances between interaction points and reduce the risk of pedestrian and bicycle-vehicle conflicts.

The primary purpose of the proposed project is to improve bus movement and pedestrian and bicyclist safety and through the already existing multi-modal corridor along 40th and Shellmound streets. The proposed project would designate separate bus lanes and protected bicyclist and pedestrian trails along

with modifying access to several intersections on 40th Street to improve bicyclist and pedestrian safety. Closures of intersections of streets previously connected to 40th Street would involve installation of cul-de-sacs with turning radius adequate for trucks and large emergency vehicles. Other intersections would have raised pedestrian crosswalks installed to increase pedestrian awareness in drivers. The project is designed to increase safety and reduce hazards. Therefore, once completed, the proposed project would have a beneficial impact on safety, and no mitigation is required.

d) Would the project result in inadequate emergency access?

Less Than Significant Impact

According to the 2025 Fehr and Peers Multi-modal Transportation Analysis (**Appendix D**), designating bus only lanes would not cause significant traffic delays. Closures of 2 intersections on the north side of 40th Street would involve installation of cul-de-sacs. The cul-de-sacs would also provide a turning radius adequate for trucks and large emergency vehicles. The cul-de-sacs would include a 14-foot emergency vehicle access lane to allow emergency access to and from 40th Street. As detailed in 4.17.4c, above, the construction contractor would prepare a TCP prior to construction which would minimize safety impacts during construction including ensuring that emergency access is maintained at all times. As a result, adequate emergency access would be maintained during both construction and operation of the project. Therefore, the project would not result in inadequate emergency access, and this impact would be less than significant, and no mitigation is required.

4.18 Tribal Cultural Resources

4.18.1 Environmental Setting

The project area generally consists of imported fill, local fill, and highly disturbed local soil. Prehistorically, land within and surrounding the project area was inhabited by the Ohlone people and contained a large shellmound used for burial and cultural practices. The APE for cultural resources includes 84 acres in total and approximately 15 acres of direct impact, encompassing Shellmound Street and 40th Street ROW, where ground disturbance may occur as a result of project implementation. The AII includes the entire approximate footprint of the Emeryville Shellmound Complex.

An investigation was conducted to locate, describe, and evaluate cultural resources present within the APE. Much of the APE has experienced some level of previous disturbance, e.g., cut and fill activities and urban development (Tremaine & Associates, Inc. 2025). A records search was conducted at the Northwest Information Center for resources within the APE, and resources in the vicinity around the APE (archival study area). The search results indicated 3 distinct prehistoric resources are located within the project area: 3 shellmounds that are part of the Emeryville Shellmound Complex. The Emeryville Shellmound Complex was determined to be eligible for the National Register of Historic Places.

In general, subsurface tests conducted in proximity to the APE have found little evidence of intact resources within the APE, or resources with a specific association. The historic shoreline of the Bay extended further east than today, encompassing the area of present-day Shellmound Street. When the Emeryville Shellmound Complex was leveled in 1924, midden material was displaced westward as Bay fill and for construction of Shellmound Street. Subsequent observations and studies indicate that any archaeological materials beneath the current street alignment are likely redeposited, not intact midden deposits. The extent of site boundaries, secondary deposits, or submerged cultural resources beneath the roadway and hazardous waste cap remains unknown.

4.18.2 Regulatory Setting

Native American Consultation

In accordance with Assembly Bill 52, as identified in the PRC Section 21080.3.1(b)(2) of CEQA and Section 106 of the NHPA, Native American tribes (tribes) identified by the NAHC must be invited to consult on projects. Caltrans, acting as the federal lead agency under the assigned authority of the FHWA, is providing project oversight for Section 106 consultation as federal funds are involved. The environmental review, consultation, and any other actions required by applicable federal environmental laws for this project are being, or have been, carried out by Caltrans pursuant to 23 U.S.C. 326 or 327 and the Memoranda of Understanding executed by FHWA and Caltrans.

4.18.3 CEQA Checklist Summary

Would the project:

CEQA Question	Impact Determination
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC § 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: i. Listed or eligible for listing in CRHR, or in a local register of historical resources as defined in PRC § 5020.1(k), or	Less Than Significant Impact
ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC § 5024.1. In applying the criteria set forth in subdivision (c) of PRC § 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	Less Than Significant Impact with Mitigation Incorporated

4.18.4 Answers to CEQA Checklist Questions

Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC § 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

i. Listed or eligible for listing in CRHR, or in a local register of historical resources as defined in PRC § 5020.1(k)?

Less Than Significant Impact

As noted above in Section 4.5, Cultural Resources, records search results from the Northwest Information Center indicated that 6 records of distinct resources were identified in the project area. Of these, 3 were identified as potential tribal cultural resources. These are the aforementioned 3 shellmounds that are part of the Emeryville Shellmound Complex, which was determined to be eligible for the National Register of Historic Places. However, the Emeryville Shellmound Complex was leveled in 1924, and midden material was displaced westward as Bay fill and for construction of Shellmound Street. Subsequent observations and studies indicate that any archaeological materials beneath the current street alignment are likely redeposited, not intact midden deposits. Further, negative findings from late 20th-century testing west of Shellmound Street suggest no near-surface cultural deposits, though industrial fill and waste obscure subsurface conditions. Remediation work east of the railroad encountered sterile alluvium 6 to 10 feet below ground surface, which may also underlie Shellmound Street.

While there is some potential for deeply buried precontact deposits, the likelihood of encountering resources during ground disturbance is considered low, due in part to the limited disturbance depth and area and the results of prior investigations conducted in the vicinity of the project. Planned excavation

of project elements such as the relocation of traffic signals would be localized with small footprints (2 – 4 feet in diameter), further limiting the potential for disturbance of resources.

A PRDMP was prepared in consultation with the tribes and Caltrans to implement nonstandard conditions outlined in the FNAE to manage the potential for inadvertent discovery of redeposited materials. Please refer to Section 4.5.4(a) for a discussion on the PDRMP. The nonstandard conditions outlined in the Caltrans FNAE are a condition of the project that minimize or avoid the potential loss of inadvertent discovery of redeposited materials.

Therefore, due to historic disturbance within the project area, the limited ground disturbance in the area, and available information regarding resources present, along with implementation of the nonstandard conditions for inadvertent discoveries of redeposited materials, the project would not result in a substantial adverse change in the significance of the Emeryville Shellmound Complex, and no mitigation is required.

ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC § 5024.1. In applying the criteria set forth in subdivision (c) of PRC § 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?

Less Than Significant Impact with Mitigation Incorporated

As previously discussed, negative findings from late 20th-century testing west of Shellmound Street suggest no near-surface cultural deposits, though industrial fill and waste obscure subsurface conditions. The heavy urbanization of Emeryville has created a low probability of identifying archaeological sites by pedestrian reconnaissance alone. Large-scale remediation in the late 1990s removed contaminated soils, replaced them with imported clean fill, and installed a 2.5-foot-deep concrete cap along Shellmound Street. These activities further reduced the likelihood of intact deposits and made pre-construction subsurface testing infeasible. As a result, the potential for tribal cultural resources to be identified above the hazardous materials cap within Shellmound Street is considered minimal, and no resources are known to be present. Remediation work east of the railroad encountered sterile alluvium 6 to 10 feet below ground surface, which may also underlie Shellmound Street. While there is some potential for deeply buried precontact deposits, the likelihood of encountering intact archaeological resources during ground disturbance is considered low due to the limited disturbance area and depth of excavation of the project.

However, as the extent of the Shellmound Complex under Shellmound Street remains uncertain, the potential for encountering resources cannot be precluded. Due to the historic presence of resources in the area, there is a potential for discovering or impacting unknown cultural resources or elements of the Shellmound Complex resources during construction activities. Tribal consultation is ongoing through the City and Caltrans, and the aforementioned Native American tribes culturally connected to the Shellmound resources are in active consultation regarding the potential for inadvertent discovery of redeposited tribal cultural resources within the project area. As part of that process, Caltrans is developing a PRDMP consistent with Stipulation XV.A of the Section 106 Programmatic Agreement between numerous federal and state entities, in consultation with the aforementioned Native American

tribes. If any resources are encountered, handling of the resources would be conducted in a manner consistent with the nonstandard conditions outlined in the FNAE and the procedures outlined in the PRDMP and involve further coordination between Native American Tribal representatives, Caltrans, and the City.

Whereas the project cannot proceed without Caltrans NEPA approval and funding, the following mitigation measure would reduce the potential for adverse impacts on resources considered significant by the consulting Tribes to less than significant:

- ***Mitigation Measure TCR-1:*** The City shall ensure implementation all nonstandard conditions required in the FNAE and Post Development Resource Monitoring Plan as required by Caltrans and approved by the Tribes, Caltrans, and the State Office of Historic Preservation.

4.19 Utilities and Service Systems

4.19.1 Environmental Setting

40th Street serves as an alignment for utilities that service the area. These utilities include water, sanitary sewer, storm sewer, gas, electricity, and telecommunications.

The City of Emeryville is serviced by Pacific Gas & Electric for electricity, EBMUD for water, and AT&T for telecommunications.

4.19.2 CEQA Checklist Summary

Would the project:

CEQA Question	Impact Determination
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	Less Than Significant Impact
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	Less Than Significant Impact
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	No Impact
d) Generate solid waste in excess of State or local standards or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	Less Than Significant Impact
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	Less Than Significant Impact

4.19.3 Answers to CEQA Checklist Questions

a) Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

Less Than Significant Impact

The project would involve improvements to the existing roadway and would not result in increased demand for water and wastewater services. As part of the project, new lighting would be installed and is anticipated to be more efficient, resulting in potentially less electrical demand in the immediate area. Further, the project would involve the implementation of additional low impact development techniques for stormwater purposes, which would result in greater detention of stormwater flows within the project area. While there is a potential for temporary interruption of service during construction, this would be avoided through safe construction techniques in accordance with California

Building Code requirements. As a result, impacts would be less than significant, and no mitigation is required.

b) Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

Less Than Significant Impact

Roadway, bikeway, and pedestrian safety improvements would have no impact on water usage. Replacement, relocation, and installation of some new landscaping with native plants could result in a negligible increase in water use. Landscaping irrigation would connect to existing EBMUD water lines. The project would not generate significant new demand for water; therefore, there would be a less than significant impact on water use, and no mitigation is required.

c) Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

No Impact

The project would not involve development of uses that would result in direct or indirect discharge of wastewater to sanitary sewer or on-site septic systems. No demand for wastewater treatment or facilities would occur as a result of the project and therefore the project would have no impact on wastewater treatment systems, and no mitigation is required.

d) Would the project generate solid waste in excess of State or local standards or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

Less Than Significant Impact

Construction activities associated with the project would generate solid waste requiring disposal at area landfills. Waste generated during project construction would be limited to vegetation debris, asphalt, and road subgrade. The project would utilize rubblization and other methods to recycle and reuse construction debris on-site, consistent with the attainment goals and policies of the City's General Plan (2019a). Waste generation would be temporary during construction and would not significantly reduce available capacities at existing landfills or otherwise impair the attainment of solid waste recycling and disposal goals, thus no mitigation is required.

e) Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Less Than Significant Impact

Please refer to discussion in 4.19.13(d), above. The project would comply with federal, state, and local management and reduction statutes and regulations related to solid waste, and no mitigation is required.

4.20 Wildfire

4.20.1 Environmental Setting

The California Department of Forestry and Fire Protection (CAL FIRE) designates fire hazard severity zones for areas under state jurisdiction. For areas under local jurisdiction, CAL FIRE identifies areas that the department considers to be Very High Fire Hazard Severity Zones (VHFHSZs), and local jurisdictions must choose whether to adopt the CAL FIRE recommendations. The project area is not located in a State Responsibility Area for High Fire Hazard Severity.

Emeryville's terrain and vegetation do not pose a high risk for large or devastating wildfires. However, the threat of urban fires remains significant. The risk of loss of life and property from an urban fire is highest in areas where large groups of people gather, such as offices, stores, hotels, high-rise buildings, and theaters (City of Emeryville 2019a). The most severe urban fire scenario could occur in conjunction with an earthquake.

4.20.2 CEQA Checklist Summary

If located in or near state responsibility areas or lands classified as VHFHSZs:

CEQA Question	Impact Determination
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	Less Than Significant Impact
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	No Impact
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	No Impact
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	No Impact

4.20.3 Answers to CEQA Checklist Questions

a) Would the project substantially impair an adopted emergency response plan or emergency evacuation plan?

Less Than Significant Impact

The project area is not located within a state responsibility area or on lands classified as a VHFHSZ. The project area is within an existing roadway, and at least 1 lane in each direction would remain open at all times during construction.

The City employs 2 emergency notification systems to alert residents and businesses. The Emeryville Police Department and the Alameda County Fire Department utilize NIXLE, a nationwide public safety

alert system. Additionally, the "AC Alert" System, powered by Everbridge, is used for emergency notifications. AC Alert is a web-automated service that delivers accurate and timely information directly from the City. In the event of a wildfire, these notification systems will inform nearby residents and workers and provide evacuation directions as necessary. The project would have a less than significant impact on emergency access during construction, and would have no operational impacts, thus would not substantially impair an adopted emergency response plan or emergency evacuation plan, and no mitigation is required.

b) Would the project, due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

No Impact

The proposed project is a transportation enhancement project that would include multi-modal safety improvements. The project does not propose to construct or modify habitable structures within the project area that could expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire; thus no mitigation is required.

c) Would the project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

No Impact

The project proposes enhancements to existing infrastructure through the construction of Class IV bikeway, transit-only lanes, transit islands, pedestrian enhancements, and a transit hub with complete street intersection improvements, and proposes no habitable structures requiring fire protection. The proposed project does not require associated infrastructure or utilities that would exacerbate fire risk, thus no mitigation is required.

d) Would the project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

No Impact

The proposed project is a transportation enhancement project that would include multi-modal safety improvements. The project would include: storm drain inlets and pipe connections to convey stormwater runoff from repositioned flowlines in the street design; bioretention facilities with excavation depths of at least 41 inches, with deepened retaining curbs and no retaining wall footing; new permeable pavements to be used for stormwater infiltration in limited sidewalk areas; and new drain inlets and pipe connections along the new curb line, against the dedicated bus lane on the north side of 40th Street. These improvements would not expose people or structures to risks associated with runoff, slope instability, or drainage changes, and would improve stormwater runoff capacity, thus no mitigation is required.

4.21 Mandatory Findings of Significance

4.21.1 CEQA Checklist Summary

CEQA Question	Impact Determination
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	Less Than Significant Impact With Mitigation Incorporated
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, or the effects of probable future projects.)	Less Than Significant Impact With Mitigation Incorporated
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	Less Than Significant Impact With Mitigation Incorporated

4.21.2 Answers to CEQA Mandatory Findings of Significance Questions

a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

Less Than Significant Impact with Mitigation Incorporated

The project would construct multi-modal and green infrastructure improvements within existing roadway ROW. It would not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or reduce the number or restrict the range of rare or endangered plants or animals. ***Mitigation Measure BIO-1*** requires the City to conduct pre-construction nesting bird surveys and implement necessary actions identified by a qualified biologist to ensure migratory birds are protected during construction activities, which would reduce potential impacts to migratory birds to less than significant.

The project area does contain 1 listed prehistoric resource, the Emeryville Shellmound Complex, that could still contain prehistoric materials beneath the contaminated soils cap on Shellmound Street. Resources could be inadvertently excavated during relocation and placement of features such as signal poles that reach beneath the cap during construction. ***Mitigation Measure TCR-1*** requires the City to implement all nonstandard conditions identified by Caltrans in consultation with locally affiliated Native

American Tribes and the State Office of Historic Preservation to ensure inadvertent discoveries are managed appropriately; this would reduce impacts on tribal cultural resources to less than significant.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, or the effects of probable future projects.?

Less Than Significant Impact with Mitigation Incorporated

The project would not result in an increase in population or growth that would require new housing, facilities, or structures that would cause environmental degradation. Project construction or operation would not result in an exceedance for any criteria air pollutant for which the region is in non-attainment; therefore, there would be no cumulatively considerable net increase in criteria pollutants. The project would be consistent with local, state, and federal regulations pertaining to the protection and mitigation of impacts to sensitive resources. Compliance with ***Mitigation Measure BIO-1*** would ensure potential harm to migrating birds is mitigated, and ***Mitigation Measure TCR-1*** would ensure that potential cumulative loss of tribal resources is mitigated, therefore the project would not result in a cumulative loss of either biological or tribal cultural resources. All identified potentially significant impacts from construction and implementation would be reduced to less than significant with the mitigation measures that have been included in the project.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less Than Significant Impact with Mitigation Incorporated

All potential impacts associated with construction and implementation of the project that could cause a substantial adverse effect on human beings are either less than significant or less than significant after mitigation. ***Mitigation Measure HAZ-1*** would ensure construction workers and sensitive receptors are protected from inadvertent exposure to contaminated soils during construction activities that penetrate the cap, as well as protect water quality. Additionally, implementation of BMPs and compliance with state and federal regulations protecting human and environmental health during construction, such as preparation of a SWPPP and Spill Prevention Plan and air quality construction controls, will ensure there are no significant impacts on human health. Therefore, the project would not result in environmental effects that cause substantial adverse effects on human beings either directly or indirectly.

5 Mitigation Monitoring and Reporting Plan

CEQA requires review of any project that could have significant adverse effects on the environment. In 1988, CEQA was amended to require reporting on and monitoring of mitigation measures adopted as part of the environmental review process. This Mitigation Monitoring and Reporting Plan is designed to aid the City in their implementation and monitoring of measures proposed in the IS for the proposed project.

Table 3 provides details of the Mitigation Monitoring and Reporting Plan (MMRP). The mitigation measures are taken from the IS and are assigned the same number as in the IS. The MMRP describes the actions that must take place to implement each mitigation measure, the timing of those actions, and the entities responsible for implementing and monitoring the actions.

Table 3. Mitigation and Monitoring Plan

Mitigation Measure	Mitigation Activities	Implemented By	Monitored By	Timing and Frequency	Verification of Compliance
BIO-1	If any construction activities (e.g., demolition) are scheduled during the bird nesting season (typically defined by CDFW as February 1 to September 1), the City or approved construction contractor shall retain a qualified biologist to conduct a pre-construction survey of the project area, including a 100-foot buffer, as access is available, to locate active bird nests, identify measures to protect the nests, and locate any other special status species. The pre-construction survey shall be conducted no more than 14 days prior to the implementation of construction activities (including staging and equipment storage). Any active nest should not be disturbed until the young have fledged or under the direction provided by a qualified biologist. Any special status species shall not be disturbed without the direction of a qualified biologist. If an active nest is found during construction, disturbance shall not occur without direction from a qualified biologist.	City of Emeryville, Qualified Biologist Project Contractor	City of Emeryville	No more than 14 days prior to construction, once at the start of nesting season	*Verified by:* *Date:*
HAZ-1	The contractor will prepare a Soil Management Plan that will address soil and groundwater excavation, disposal, stockpiling, and transportation. The Soil Management Plan shall explicitly address handling and disposal of soil, on-site soil management, off-site soil disposal, profiling of soil, transportation routes, and dust mitigation controls.	Project Contractor	City of Emeryville	Prior to and during construction	*Verified by:* *Date:*
TCR-1	The City shall ensure implementation all nonstandard conditions required in the Finding of No Adverse Effect and Post Development Resource Monitoring Plan as required by Caltrans and approved by the Tribes, Caltrans, and the State Office of Historic Preservation.	Tribal Representative, Qualified Archaeologist, Contractor	City of Emeryville	Prior to and during ground disturbing activities	*Verified by:* *Date:*

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Appendix A

Community Impact Memorandum

Diablo Engineering Group
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Jennifer@diabloengineeringgroup.com
(510) 550-8959

November 17, 2025

Mohamed Alaoui
Public Works Director
City of Emeryville
1333 Park Avenue
Emeryville, CA 94608

Subject: Community Impacts Assessment (CIA) Memo – 40th Street Multimodal Project

Dear Mr. Alaoui:

As the prime consultant for the project, Diablo Engineering Group has worked closely with CD+A on the outreach, Fehr & Peers on the traffic analysis and NCE on the environmental clearance for the 40th Street Multimodal Project. An impact on the community will be the reduction of parking spaces and its effect on businesses. Summarized in the table below are the parking impacts and businesses coordinated with by block along Westbound 40th Street.

BLOCKS	# STALLS REMOVED	# STALLS CONVERTED (ADA)	Businesses:
Block 1: Halleck ST to Hubbard ST	1	1	Buttner Properties (Pottery and Beyond)
Block 2: Hubbard ST to Horton ST	3	0 (1 EX ADA STALL)	Rug Depot/ Bon Motif, POP Manufacturing, Bay Wheels
Block 3: Horton ST to Holden St	3	1	The Watermark
Block 4: Holden ST to Hollis ST	11	1	Granite Expo
Block 5: Hollis ST to Haven ST	5	0 (4 EX ADA STALLS)	City Hall (Public)
Block 6: Haven ST to Harlan ST	7	1	Scan Art Print, Computer Link, Oxide Computer, 1251-1259 Park Ave Commercial Property Owners
Block 7: Harlan ST to Watts ST	7	1	Park Business Center HOA
Watts ST to Emery ST			No impact
Emery ST to San Pablo Ave	3	1	No response from businesses
San Pablo AVE to Adeline ST			No impact
Adeline to Yerba Buena (south)	1	1	No response from businesses
Adeline to Linden ST (north)	1	1	No response from businesses

Initial Outreach Summary (June 2023 to May 2024)

There was a mailer sent to all residences and businesses throughout the project area along with contact information and an online survey for the community to provide input. The businesses listed in the table above were part of a series of meetings conducted between June 2023 and May 2024, facilitated by the Project Consulting Team. Some of these stakeholders also had direct contact with City staff through emails and phone calls. Additionally, residential property owners fronting the area between Emery and Hollis Streets were contacted and met with. Overall, the proposed unsignalized road closures were a bigger concern to the businesses than the parking impacts. Property owners were notified of the July 18, 2023, Council Meeting to discuss and decide on the recommendations for the four side street closures under review. At the July 2023 Council meeting, staff were directed to incorporate the following connection closures for all vehicles except for emergency vehicles. At all four locations, vehicles will no longer be permitted to exit from the side street onto 40th St.

Hubbard ST **Full connection closure**

Holden ST **Partial connection closure (Vehicles permitted to turn from 40th ST to Holden ST only)**

Haven ST **Full connection closure**

Watts ST **Partial connection closure (Vehicles permitted to turn from 40th ST to Watts ST only)**

Businesses south of Park Avenue were contacted related to the proposed unsignalized closure at Hubbard Street. In the initial conversations with Rug Depot and Rug Depot Business and the Rug Depot / Bon Motif Property Owners had concerns about limited access to their loading dock and requested yellow curbs for loading zones. Buttner Properties (Pottery & Beyond) was worried about the impact on customer access and property redevelopment value. POP Manufacturing expressed concerns about truck access and suggested potential plaza space improvements. Bay Wheels had no stated concerns but noted the project would benefit employees who bike to work. In response to these contacts, project design refinements included considering a redesign of the Hubbard Street closure to allow right-in movement, redesigning the curbline to facilitate truck turning movements, and being open to requests for a commercial loading zone on Horton Street. The major properties on Hubbard Street also have access to the parallel side streets of either Halleck Street or Horton Street. After considering various concerns, the full connection closure was implemented in final design.

The Hubbard Closure is important to reduce a critical conflict point with the two-way separated Class IV bikeway. It is concerning that a cyclist could be traveling down the steep grade (over 5%) of the Shellmound Bridge and conflict with a vehicle turning right out of Hubbard. The vehicle exiting Hubbard is used to only looking left for vehicles and cyclists. With the two-way bikeway on the north side of 40th Street, drivers would also need to look right to make sure that a cyclist isn't coming down off the bridge. Additionally, the sight distance is poor for vehicles exiting Hubbard onto 40th Street due to trees, signage and physical grades.

The Watermark by the Bay (now 1440 by the Bay) was contacted regarding the proposed two-way bikeway in front of their building entrance and resulting passenger loading changes. Several coordination emails and phone calls were exchanged with Stephanie Hall, the Executive Director. An on-site meeting on 12/06/2023 discussed the project's history and process. Concerns included maintaining the amount of passenger loading space on 40th St, preserving on-street parking for visitors and staff, ensuring ambulance and fire access, and retaining landscaping and trees. Project design refinements included redesigning the paratransit loading area to be in front of the entrance, creating a shared space for bikes and pedestrians, keeping most existing trees, and adding a yellow

loading zone along Horton St. At a second on-site meeting on 05/23/2024, Stephanie Hall confirmed that the changes addressed the concerns.

Granite Expo was contacted regarding the proposed unsignalized closure at Holden St. Concerns included complications for customer and supplier access, potential congestion on 40th St, loss of parking, and increased traffic on signalized streets. In response, the project design was refined to allow right turns from 40th onto Holden, facilitating customer and truck access and maintaining access to the apartment parking structure entry on Holden.

1251-1259 Park Ave Owners were contacted regarding the proposed unsignalized closure at Haven St, which affects their loading operations. Concerns included property value, tenant retention, and security issues with using the back-alley gate from Haven St to Harlan St. Scan Art Print, Computer Link, and Oxide Computer, tenants of 1251-1259 Park Ave, were also contacted about the closure. Scan Art Print had slight concerns about delivery trucks, while Computer Link and Oxide Computer discussed their delivery operations, which are operated either through the back-alley or Harlan St.

Park Business Center HOA was contacted about the proposed closure at Watts St, with concerns about truck access, potential homeless encampments, and increased traffic. In response, the project design was refined to allow right turns from 40th St onto Watts and considered a one-way northbound traffic pattern on Watts St if needed.

The 40th Street Multimodal Project involved significant outreach efforts to address community impacts, particularly parking loss and impacts associated with unsignalized side street connection closures. The project led to the removal and conversion of several parking stalls across various blocks, with specific changes detailed for each segment from Halleck St to Adeline St. Outreach efforts included mailers and follow up meetings and direct contact between June 2023 and May 2024, where the Project Consulting Team engaged with businesses and residential property owners. Stakeholders also communicated with City staff through emails and phone calls. Businesses like Rug Depot, Pottery & Beyond, and Granite Expo expressed concerns about access and parking, leading to design refinements such as redesigning street closures and curblines, and considering commercial loading zones. Residential concerns, particularly from the Watermark by the Bay, focused on loading space, parking, and emergency access, resulting in changes like creating shared spaces for bikes and pedestrians, maintaining trees, and adding loading zones. An online survey gathered feedback and verified support for the project design, showing significant support across income levels, with many respondents emphasizing the importance of protected bike lanes and traffic calming measures. Overall, the project team engaged extensively with the community to refine the design and address concerns, ensuring the project aligns with local development plans and promotes sustainable growth without compromising community cohesion. The following is a summary of the overall outreach and feedback from the community:

- Outreach
    - 612 Post Cards and 460 Mailers
    - 15 in-person meetings (42 stakeholders)
    - 4 virtual meetings (22 stakeholders)
    - 2 Bike to Wherever Day stations with project boards and flyers
    - 20 Phone calls and 9 Email inquiries

- Feedback
    - Most property owners in agreement with final modified designs
    - 203 Online Survey Responses
    - Over 30% of respondents who typically commute by car felt improvements would encourage them to bike commute

Outreach Summary Update (May 2024 to November 2025)

The property owners along Hubbard St continued to express dissatisfaction with the closure of Hubbard St, including reaching out to several other businesses in the area and Emeryville city council members.

On April 3, 2025, council member Kalimah Priforce wrote a letter to Caltrans expressing concerns regarding the proposed street closures and their impact on the small business community (see attachment 1). Following that, on April 24, 2025, A group of twelve property and business owners signed a similar letter expressing concerns about loss of efficient access/ financial impact, traffic congestion/ air quality, and misinterpreted traffic data (see attachment 2). Some of these property owners paid Abrams Associates Traffic Engineering to prepare a project transportation impact analysis summary. The project description and lane configurations of 40th Street in the Abrams study do not match the City's project description.

Given the repeated concerns that the property owners along Hubbard St. have brought to the City staff and council members regarding lost future development opportunity, inhibited traffic circulation, and lack of truck access as a result of the project, the October 2024 Traffic Safety and Operations Analysis was expanded in August 2025 to include additional intersections and a Truck Activity Analysis Memo was developed to provide recommendations regarding truck routing and wayfinding through the project area. The analysis shows that the project traffic impact on the project area, including Park Avenue, would be very minimal. There is no negative traffic impact on Park Avenue. The relative change in operations with the opening year would be the relative change in 2045 forecast as well. The recommendations in the Truck Activity Analysis Memo will need to be shared with the greater Park District and reviewed at the City's Transportation and Sustainability Committee where they can make approvals for appropriate signage and routing in the area. These recommended improvements are betterments for the community, not required mitigation for the project.

In September 2025, the City met with POP Manufacturing to review the challenges associated with that property receiving new 3D printers to their site. These special deliveries only occur approximately twice per year as upgrades are needed. As that type of delivery to POP Manufacturing would be challenging with Hubbard closed, the City staff discussed the potential to permit use of the emergency vehicle access (EVA) for these special infrequent deliveries. Project exhibits show the modeled turning movements for large trucks navigating to Pottery & Beyond and Rug Depot using their onsite loading spaces and includes other delivery vehicle types that can use the cul-de-sac at Hubbard. For the POP Manufacturing site, because there isn't onsite space for larger truck type vehicle turning, the City has committed to a clear and fair process for managing large deliveries in coordination with the Public Works department.

In addition, several follow up meetings took place with the Bessler Building Homeowner's Association, as the Bessler Building is along 40th St between Haven St and Harlan St and residents park on Haven St where access will be closed to 40th St after the project is constructed. In general, the homeowner's association has been supportive of the project, but residents have had concerns with the potential for homeless activity at the access closure. The

design of the parklet at the access closure was reviewed by residents and comments incorporated. The project will also provide an improved fence between the Bessler Building and the public city right of way along Haven St and 40th St in response to the safety concerns from the Bessler Building Homeowner's Association.

Along the south side of 40th Street, the improvements are relatively minor given that the two-way protected bikeway and bus bulbs will be on the north side of 40th Street. The improvements are focused on the intersections and bus stops, in order to make them accessible to all users. It is desired to install bus shelters at bus stops in the eastbound direction, however, given limited right of way space, there are three bus shelter easements needed on the eastbound side of 40th Street (two from one property owner and one from another) if bus shelters are to be installed on that side. These are less than 4-foot-wide easements into the existing commercial landscaping that are needed. The City team met with both property owners to discuss the proposed improvements and the desire to obtain easements in May 2024. Both property owners were generally supportive of the project and said that they needed to receive the easement documents and have their team review the language and details. Both expressed the desire to have the city fully responsible for maintenance of any facilities in the easement areas. It took until March 2025 to get the easement documents prepared, approved by the city's legal team and transmitted to the two property owners. The city is currently in discussions with these two property owners, and each owner has been reviewing the document language.

The city has maintained that the cycle track improvements and major pedestrian and bus stop improvements are focused on the westbound side of the street. If these bus shelters can't be installed on the eastbound side because the properties won't provide easements, there is no detriment to the goals of the project. The ADA improvements will still be made, and the project doesn't need these shelter improvements to fulfill the project funding commitments and to be a successful and complete project. These property owners have not made any complaints about the project. They want to make sure that they won't have any added liability if they grant the easements. If they don't grant the easements in time for the right of way certification, these shelters will be removed from the project.

In summary, the 40th Street Multimodal Project will be transformative for pedestrians, cyclists and transit users traveling from Oakland and Emeryville into and out of the Emeryville commercial core and connecting to the Bay Trail. This project will result in some minor impacts to businesses and residents along the north side of 40th Street as described.

Regards,



Diablo Engineering Group

Jennifer Harmon
1300 Clay St, Suite 600, Oakland, CA 94612
Phone (510) 550-8959
Fax (510) 751-4589

Attachment 1

Jennifer Harmon

From: Emery Rising NG <emeryrisingx@gmail.com>
Sent: Thursday, April 3, 2025 4:19 PM
To: El-Tawansy, Dina@DOT
Cc: Holstein, Thomas@DOT; Oakes, Cameron@DOT; Meharena, Ephrem@DOT; Rivas, Dan@DOT; Melissa.White@sutterhealth.org; kevinlu.email@gmail.com; team@indigenousjusticecoalition.com; cnijmeh@muwekma.org; knijmeh@muwekma.org; James McGoey; Joyce Cunningham/USA; Deborah Cohen; twrobi04@gmail.com; curthimy@bonmotif.com
Subject: Urgent Concerns Regarding 40th Street Multi-Modal Project Review Process
Attachments: Caltrans Response Letter - City of Emeryville - 40th Street Multimodal Project - 5106 (010).pdf; Letter from Mayor - Caltrans Environmental Review.pdf; 40th Street Multimodal Project TIA Summary.pdf

EXTERNAL EMAIL. Links/attachments may not be safe.

Dear Director El-Tawansy and the Caltrans Environmental Team,

I hope this email finds you well. My name is Kalimah Priforce, and I am writing to you both as a dedicated member of the Emery Rising Neighborhood Group and as a city council member who has been a proud resident of Emeryville for the past fourteen years. I am reaching out to express my deep concerns regarding the review process for the 40th Street Multi-Modal Project. While I wholeheartedly support the project's intent to enhance transportation safety options, I strongly urge Caltrans to take a more measured approach in its review and to avoid rushing approval without a thorough examination of the potential negative consequences.

Specifically, I am troubled by the proposed street closures and their impact on our small business community, as well as the lack of sensitivity to the cultural and historical significance embedded within this project. Attached to this email is a conflicting traffic study that presents compelling evidence indicating that the current design—originally not including street closures—could severely disrupt traffic patterns. Such changes are projected to create bottlenecks that could lead to environmentally damaging consequences, such as increased congestion on surrounding streets. I have been contacted by residents who have expressed an uptick in detoured high speed traffic on Haven Street just with temporary street closures on Hollis and Park Avenue.

My fellow neighbors of Emery Rising share a growing concern that vehicles idling in traffic jams will produce concentrated emissions, worsening air quality and negatively affecting public health. As a former resident of the Bay Street condominiums, I can personally attest to the persistent accumulation of smog on our windows, requiring weekly cleaning and frequent air filter replacements in our homes to maintain breathable air quality.

Further complicating the matter, Sutter Health announced on February 19, 2025, its plan to establish a flagship campus in Emeryville. This regional medical center—spanning approximately 1.3 million square feet—will provide outpatient services at existing locations on Hollis Street and Chiron Street, while also constructing a new acute care facility adjacent to the Hollis Street property.

The 12-acre Sutter Emeryville Campus at Horton and 53rd Streets is intended to provide equitable healthcare access to local workers, families, and the unsheltered. Yet, this essential expansion may be severely hindered by proposed street closures—including Hubbard and 40th Street— redirecting traffic flow onto Horton and impacting accessibility for patients seeking urgent and routine medical care in addition to the elder care residence on 40th between Horton and Holden.

Emery Rising also works closely with the faith community to advocate for reducing maternal mortality rates among Black women, a critical issue given the CDC's finding that in 2021, non-Hispanic Black women experienced maternal mortality rates of 69.9 deaths per 100,000 live births—2.6 times higher than that of non-Hispanic White women. The expansion of Sutter's healthcare services presents a meaningful opportunity to

address these disparities. However, such a milestone could be overshadowed by public outcry and distrust if the street closures move forward without adequate public input and revision.

During a live traffic simulation that included members of the Watts Street business community (area directly adjacent to the main entrance of Pixar headquarters) and Emeryville staff, a shipment truck demonstration revealed significant navigational difficulties should these closures be implemented. Notably, a single truck's maneuvering resulted in substantial traffic delays. Following this demonstration, city staff members shocked the business community by disclosing that their properties are expected to be converted into housing in the future.

This admission of covert use of eminent domain practices by city officials has further marginalized these businesses by excluding their voices from the design process, effectively disregarding their economic and operational needs. Many of these businesses are legacy establishments that persevered through the COVID-19 pandemic, only to now face potential displacement by gentrification.

It is deeply concerning to witness a repetition of Emeryville's history of gentrification—particularly the missteps surrounding Shellmound and Bay Street. The failure of city officials to conduct open forums and public discussions with impacted businesses is unacceptable. While the recognition of potential archaeological resources and the meaningful engagement with tribal representatives are commendable steps, they must be matched by a commitment to transparent discussions with all affected stakeholders.

As a city that refuses to have land acknowledgement of the Ohlone during public meetings, I encourage Caltrans to continue working closely with tribal representatives and cultural resource experts to ensure this project progresses in a manner that respects and preserves invaluable historical and cultural assets. Moreover, I urge Caltrans to incorporate meaningful engagement with local businesses, residents, and community groups to create a truly inclusive project design.

It should not take dramatic protests—such as chaining ourselves to bulldozers—to demonstrate that the City of Emeryville's transparency with Caltrans regarding this project has been incomplete in the public's eye. Emery Rising is not opposed to the 40th Street Multi-Modal Project itself, but rather to the street closures and their intended and unintended consequences, which threaten our local economy and community well-being. We would welcome a more thoughtful, inclusive design process that integrates public input and truly considers the needs of all stakeholders.

I hope you can agree that this is not a process that should be rushed and encourage the City of Emeryville to meet and work with local stakeholders to resolve these issues before this project commences. I look forward to your response and appreciate your commitment to ensuring a more equitable and responsible review of this critical project.

Sincerely,

Kalimah Priforce
(510) 410-8120, emeryrisingx@gmail.com
Emery Rising Neighborhood Group & Emeryville City Council Member

Attachment 2

April 24th, 2025

Dear Director El-Tawansy and Members of the Caltrans Environmental Team,

We, the undersigned businesses of Emeryville, urge Caltrans to reconsider the proposed 40th Street Multi-Modal Project and associated street closures, as they risk significantly impacting our operations and future redevelopment as presently designed. While we support efforts to enhance transportation safety, we strongly believe that a more thorough and stakeholder-inclusive review is necessary to evaluate unintended consequences.

Our concerns center around three key issues, outlined below:

1) Loss of Efficient Access & Financial Impact

The full closure of Hubbard and Holden Streets will impair deliveries, customer access, and business viability while also negatively affecting Buttner Properties' redevelopment plans. The City's proposed solutions—such as updated signage and GPS modifications—are insufficient to address these serious concerns. Below are specific examples illustrating concerns from just a few of the impacted businesses:

- **Pottery and Beyond** relies on weekly deliveries via 24-ft box trucks, owns a 12-ft box truck, and regularly receives 40-ft shipping containers from the port via 18-wheelers. These require adequate access. Customers also depend on vehicle accessibility to transport large purchases.
- **Rug Depot** has a parking lot located just 20 feet from 40th Street that is critical for customer loading and unloading. Rug Depot also receives 40' container (18-wheeler) deliveries every 6-8 weeks, in addition 12' box truck deliveries (and shipments) ~3 times a week, and weekly water and recycling truck visits.
- **POP Manufacturing LLC** operates out of a facility that lacks driveway access or turnaround space. While most deliveries to this business use box trucks, occasional heavy machinery shipments necessitate tractor-trailer access. Without access to 40th Street, exiting trucks would be forced to back into Park Avenue, into inefficient multi-point turns, or to rely on neighboring properties (that POP does not have rights to use) for U-turns.
- **Bon Motif Company** was forced to close its 40+-year-old import business when Watermark development restricted loading dock access for 40-ft containers. This project threatens to further diminish access for remaining businesses struggling to stay afloat.
- **Buttner Properties** has planned redevelopment in the area, including potential hotel and life science developments. The proposed closures would severely impact these efforts, limiting future investment.

2) Traffic Congestion & Air Quality Risks

Street closures combined with dedicated bus lanes in each direction and a buffered bike lane on the North side of 40th Street will lead to severe congestion on 40th Street and its side street approaches, limiting business access and worsening environmental conditions. The San Pablo Avenue Bus Project will only compound these problems. A traffic study commissioned by Buttner Properties and conducted by Abrams Associates found:

- The City's assessment only projects traffic conditions to 2025, whereas long-term Level of Service (LOS) analysis through 2045 shows significant economic and logistical impacts due to increased congestion and queueing.
- The closures will substantially increase traffic backup on Horton Street near Watermark, a senior living facility. Extended vehicle idling will degrade air quality, adversely affecting public health, particularly for elderly residents.
- Park Avenue, home to businesses like Rudy's Can't Fail Cafe and several residential complexes, would see a rise in redirected truck traffic. This would diminish its role as a pedestrian- and bike-friendly corridor, further disrupting outdoor commerce.

3) Misinterpreted Traffic Data

Justifications for the Hubbard Street closure based on safety concerns appear flawed. Specifically:

- Incident #9039401, referenced in Emeryville's report, was incorrectly attributed to Hubbard when it actually occurred in the Target parking lot. Though this discrepancy was flagged to City Council and recently acknowledged privately, the correction has not, to our knowledge, been shared publicly or to agencies like Caltrans for re-review.
- Safety improvements made at Hubbard between 2020 and 2024 have drastically reduced incidents (one since 2020 compared to three between 2016 and 2019). A comparison with the San Pablo/40th intersection suggests that the drop in incidents is attributable to physical improvements rather than pandemic-related reductions in traffic.
- A review by Abrams Associates found that over 80% of accidents on 40th Street occurred at signalized intersections—not at the unsignalized locations slated for closure. Over the past five years, only two pedestrian/bicycle accidents occurred at the four intersections targeted for closure.

Conclusion

We do not oppose the intent behind the project, but urge a more inclusive approach that balances infrastructure improvements with economic necessity and sustainability. Emeryville should work with stakeholders to refine the design and consider alternatives—such as rerouting bike lanes to Park Avenue—to avoid unnecessary harm to local businesses.

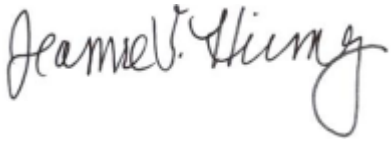
This process must not be rushed. We ask for collaboration and a more responsible review before any project implementation.

We appreciate your commitment to an equitable and well-considered approach and look forward to your response.

Sincerely,



Brennan Carpenter
ABCRE LLC
1447 Park Ave
Emeryville, CA 94608



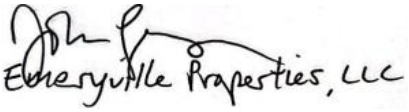
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Tim Robison
Buttner Properties
1501 Park Ave & 4060 - 4070 Halleck St
Emeryville, CA 94608



Andrew Pomerantz
Ellis Partners
(Tenant: Metagenomi)
1545 Park Ave
Emeryville, CA 94608



John Lewerenz
Emeryville Properties, LLC
(Tenant: Peet's Coffee HQ)
1400 Park Ave
Emeryville, CA 94608



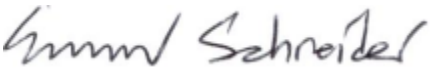
Matthew B. Jessee
MB Jessee Painting
1552 Beach St, Suite G
Oakland, CA 94608



David Bruck
Park Avenue Building LLC
1485 Park Ave
Emeryville, CA 94608



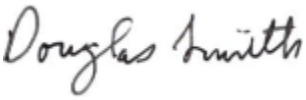
William H. Banker
P + H Associates
(Tenant: Pacific Flooring Supply)
4220 Hubbard St
Emeryville CA 94608
&
(Tenant: Petit Pot)
4221 Horton St
Emeryville, CA 94608



Evan Schneider
POP Manufacturing
4070 Hubbard St
Emeryville, CA 94608



Kevin Xu
Pottery & Beyond
4055 Hubbard St
Emeryville, CA 94608



Douglas Smith
Rudy's Can't Fail Cafe
4081 Hollis St
Emeryville, CA 94608



Deborah Cohen
Rug Depot Outlet
4056 Hubbard St
Emeryville, CA 94608

Appendix B

Air Quality Outputs

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6.3. Adjusted Climate Risk Scores

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7.5. Evaluation Scorecard

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	40th Street
Construction Start Date	4/1/2026
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.90
Precipitation (days)	17.0
Location	37.829340101602, -122.28853190834687
County	Alameda
City	Oakland
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	1513
EDFZ	1
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.30

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Road Widening	1.40	Mile	19.3	0.00	—	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	4.43	3.66	32.0	38.9	0.08	1.34	4.51	5.85	1.22	0.60	1.83	—	9,612	9,612	0.40	1.01	14.0	9,725
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	4.42	3.66	32.1	38.7	0.08	1.34	4.51	5.85	1.22	0.60	1.83	—	9,587	9,587	0.40	0.33	0.12	9,696
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.40	1.97	17.3	22.0	0.05	0.67	2.53	3.20	0.61	0.35	0.97	—	5,717	5,717	0.24	0.30	1.85	5,795
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.44	0.36	3.17	4.02	0.01	0.12	0.46	0.58	0.11	0.06	0.18	—	947	947	0.04	0.05	0.31	959

6. Climate Risk Detailed Report

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A

Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

7. Health and Equity Details

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	80.0
Healthy Places Index Score for Project Location (b)	60.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	West Oakland

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

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8. User Changes to Default Data

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	40th Street
Construction Start Date	4/1/2026
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.90
Precipitation (days)	17.0
Location	37.829340101602, -122.28853190834687
County	Alameda
City	Oakland
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	1513
EDFZ	1
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.30

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Road Widening	1.40	Mile	19.3	0.00	—	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	4.43	3.66	32.0	38.9	0.08	1.34	4.51	5.85	1.22	0.60	1.83	—	9,612	9,612	0.40	1.01	14.0	9,725
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	4.42	3.66	32.1	38.7	0.08	1.34	4.51	5.85	1.22	0.60	1.83	—	9,587	9,587	0.40	0.33	0.12	9,696
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.40	1.97	17.3	22.0	0.05	0.67	2.53	3.20	0.61	0.35	0.97	—	5,717	5,717	0.24	0.30	1.85	5,795
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.44	0.36	3.17	4.02	0.01	0.12	0.46	0.58	0.11	0.06	0.18	—	947	947	0.04	0.05	0.31	959

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	4.43	3.66	32.0	38.9	0.08	1.34	4.51	5.85	1.22	0.60	1.83	—	9,612	9,612	0.40	1.01	14.0	9,725

2027	4.24	3.50	29.8	38.6	0.08	1.21	4.51	5.73	1.11	0.60	1.71	—	9,571	9,571	0.40	0.33	4.44	9,684
2028	2.22	1.79	16.3	21.4	0.05	0.55	2.35	2.90	0.50	0.37	0.87	—	6,059	6,059	0.25	0.31	4.07	6,161
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	4.42	3.66	32.1	38.7	0.08	1.34	4.51	5.85	1.22	0.60	1.83	—	9,587	9,587	0.40	0.33	0.12	9,696
2027	4.23	3.49	30.0	38.5	0.08	1.21	4.51	5.73	1.11	0.60	1.71	—	9,546	9,546	0.40	0.33	0.12	9,655
2028	2.22	1.78	16.5	21.3	0.05	0.55	2.35	2.90	0.50	0.37	0.87	—	6,042	6,042	0.26	0.32	0.11	6,143
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	1.75	1.40	13.4	15.0	0.04	0.53	2.02	2.55	0.48	0.31	0.79	—	4,674	4,674	0.21	0.30	1.85	4,771
2027	2.40	1.97	17.3	22.0	0.05	0.67	2.53	3.20	0.61	0.35	0.97	—	5,717	5,717	0.24	0.23	1.36	5,795
2028	1.01	0.82	7.47	10.5	0.02	0.25	0.83	1.09	0.23	0.13	0.36	—	2,564	2,564	0.11	0.11	0.66	2,601
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.32	0.26	2.45	2.74	0.01	0.10	0.37	0.47	0.09	0.06	0.14	—	774	774	0.03	0.05	0.31	790
2027	0.44	0.36	3.17	4.02	0.01	0.12	0.46	0.58	0.11	0.06	0.18	—	947	947	0.04	0.04	0.23	959
2028	0.18	0.15	1.36	1.92	< 0.005	0.05	0.15	0.20	0.04	0.02	0.07	—	425	425	0.02	0.02	0.11	431

3. Construction Emissions Details

3.1. Linear, Grubbing & Land Clearing (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.55	0.46	4.04	4.49	0.01	0.21	—	0.21	0.20	—	0.20	—	632	632	0.03	0.01	—	634

Dust From Material Movement	—	—	—	—	—	—	0.60	0.60	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.09	0.75	0.84	< 0.005	0.04	—	0.04	0.04	—	0.04	—	118	118	< 0.005	< 0.005	—	118
Dust From Material Movement	—	—	—	—	—	—	0.11	0.11	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.14	0.15	< 0.005	0.01	—	0.01	0.01	—	0.01	—	19.5	19.5	< 0.005	< 0.005	—	19.6
Dust From Material Movement	—	—	—	—	—	—	0.02	0.02	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.03	0.45	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	106	106	< 0.005	< 0.005	0.39	108

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.49	0.14	7.54	3.04	0.04	0.12	1.70	1.83	0.08	0.47	0.55	—	6,325	6,325	0.34	1.00	13.6	6,644
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.07	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	18.5	18.5	< 0.005	< 0.005	0.03	18.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.09	0.03	1.46	0.57	0.01	0.02	0.31	0.34	0.02	0.09	0.10	—	1,179	1,179	0.06	0.19	1.09	1,237
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.06	3.06	< 0.005	< 0.005	0.01	3.10
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.02	< 0.005	0.27	0.10	< 0.005	< 0.005	0.06	0.06	< 0.005	0.02	0.02	—	195	195	0.01	0.03	0.18	205

3.3. Linear, Grading & Excavation (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	4.16	3.50	29.9	36.6	0.07	1.31	—	1.31	1.20	—	1.20	—	7,644	7,644	0.31	0.06	—	7,670
Dust From Material Movement	—	—	—	—	—	—	3.73	3.73	—	0.40	0.40	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	4.16	3.50	29.9	36.6	0.07	1.31	—	1.31	1.20	—	1.20	—	7,644	7,644	0.31	0.06	—	7,670
Dust From Material Movement	—	—	—	—	—	—	3.73	3.73	—	0.40	0.40	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.46	1.23	10.5	12.8	0.02	0.46	—	0.46	0.42	—	0.42	—	2,677	2,677	0.11	0.02	—	2,687
Dust From Material Movement	—	—	—	—	—	—	1.31	1.31	—	0.14	0.14	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.27	0.22	1.91	2.34	< 0.005	0.08	—	0.08	0.08	—	0.08	—	443	443	0.02	< 0.005	—	445
Dust From Material Movement	—	—	—	—	—	—	0.24	0.24	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.13	0.09	1.54	0.00	0.00	0.35	0.35	0.00	0.08	0.08	—	361	361	0.01	0.01	1.33	367
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	26.2	26.2	< 0.005	< 0.005	0.07	27.4
Hauling	0.12	0.04	1.89	0.76	0.01	0.03	0.43	0.46	0.02	0.12	0.14	—	1,581	1,581	0.09	0.25	3.39	1,661
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.12	0.12	1.35	0.00	0.00	0.35	0.35	0.00	0.08	0.08	—	335	335	0.01	0.01	0.03	340
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	26.2	26.2	< 0.005	< 0.005	< 0.005	27.4
Hauling	0.12	0.03	2.00	0.77	0.01	0.03	0.43	0.46	0.02	0.12	0.14	—	1,582	1,582	0.08	0.25	0.09	1,659
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.04	0.46	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	118	118	< 0.005	< 0.005	0.20	120
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	9.17	9.17	< 0.005	< 0.005	0.01	9.60
Hauling	0.04	0.01	0.68	0.27	< 0.005	0.01	0.15	0.16	0.01	0.04	0.05	—	554	554	0.03	0.09	0.51	581
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	19.6	19.6	< 0.005	< 0.005	0.03	19.8
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.52	1.52	< 0.005	< 0.005	< 0.005	1.59
Hauling	0.01	< 0.005	0.12	0.05	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	91.7	91.7	< 0.005	0.01	0.08	96.2

3.5. Linear, Grading & Excavation (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipm	3.99	3.35	27.9	36.5	0.07	1.18	—	1.18	1.09	—	1.09	—	7,644	7,644	0.31	0.06	—	7,670
Dust From Material Movement	—	—	—	—	—	—	3.73	3.73	—	0.40	0.40	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.99	3.35	27.9	36.5	0.07	1.18	—	1.18	1.09	—	1.09	—	7,644	7,644	0.31	0.06	—	7,670
Dust From Material Movement	—	—	—	—	—	—	3.73	3.73	—	0.40	0.40	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.58	1.32	11.0	14.4	0.03	0.47	—	0.47	0.43	—	0.43	—	3,022	3,022	0.12	0.02	—	3,032
Dust From Material Movement	—	—	—	—	—	—	1.47	1.47	—	0.16	0.16	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.29	0.24	2.01	2.63	0.01	0.09	—	0.09	0.08	—	0.08	—	500	500	0.02	< 0.005	—	502
Dust From Material Movement	—	—	—	—	—	—	0.27	0.27	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.12	0.08	1.44	0.00	0.00	0.35	0.35	0.00	0.08	0.08	—	354	354	0.01	0.01	1.20	360
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	25.7	25.7	< 0.005	< 0.005	0.06	26.9
Hauling	0.11	0.03	1.83	0.74	0.01	0.03	0.43	0.46	0.02	0.12	0.14	—	1,547	1,547	0.08	0.25	3.14	1,627
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.13	0.12	0.11	1.27	0.00	0.00	0.35	0.35	0.00	0.08	0.08	—	329	329	0.01	0.01	0.03	333
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	25.7	25.7	< 0.005	< 0.005	< 0.005	26.9
Hauling	0.11	0.02	1.93	0.75	0.01	0.03	0.43	0.46	0.02	0.12	0.14	—	1,548	1,548	0.08	0.25	0.08	1,624
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.04	0.49	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	131	131	< 0.005	0.01	0.21	133
Vendor	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	10.1	10.1	< 0.005	< 0.005	0.01	10.6
Hauling	0.04	0.01	0.75	0.29	< 0.005	0.01	0.17	0.18	0.01	0.05	0.05	—	612	612	0.03	0.10	0.54	642
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.09	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	21.7	21.7	< 0.005	< 0.005	0.03	22.0
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.68	1.68	< 0.005	< 0.005	< 0.005	1.76
Hauling	0.01	< 0.005	0.14	0.05	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	101	101	0.01	0.02	0.09	106

3.7. Linear, Drainage, Utilities, & Sub-Grade (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.07	1.73	15.0	19.7	0.04	0.57	—	0.57	0.52	—	0.52	—	4,089	4,089	0.17	0.03	—	4,103
Dust From Material Movement	—	—	—	—	—	—	1.61	1.61	—	0.17	0.17	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.07	1.73	15.0	19.7	0.04	0.57	—	0.57	0.52	—	0.52	—	4,089	4,089	0.17	0.03	—	4,103
Dust From Material Movement	—	—	—	—	—	—	1.61	1.61	—	0.17	0.17	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.66	0.55	4.80	6.27	0.01	0.18	—	0.18	0.17	—	0.17	—	1,304	1,304	0.05	0.01	—	1,309

Dust From Material Movement	—	—	—	—	—	—	0.51	0.51	—	0.06	0.06	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.88	1.15	< 0.005	0.03	—	0.03	0.03	—	0.03	—	216	216	0.01	< 0.005	—	217
Dust From Material Movement	—	—	—	—	—	—	0.09	0.09	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.06	1.01	0.00	0.00	0.25	0.25	0.00	0.06	0.06	—	250	250	< 0.005	0.01	0.85	254
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.13	0.03	2.09	0.85	0.01	0.03	0.49	0.52	0.02	0.13	0.16	—	1,768	1,768	0.10	0.28	3.59	1,859
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.08	0.90	0.00	0.00	0.25	0.25	0.00	0.06	0.06	—	232	232	0.01	0.01	0.02	235
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.13	0.03	2.21	0.85	0.01	0.03	0.49	0.52	0.02	0.13	0.16	—	1,769	1,769	0.10	0.28	0.09	1,856
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.02	0.28	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	74.5	74.5	< 0.005	< 0.005	0.12	75.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.04	0.01	0.69	0.27	< 0.005	0.01	0.15	0.17	0.01	0.04	0.05	—	564	564	0.03	0.09	0.49	592
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	12.3	12.3	< 0.005	< 0.005	0.02	12.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	< 0.005	0.13	0.05	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	93.4	93.4	0.01	0.02	0.08	98.1

3.9. Linear, Drainage, Utilities, & Sub-Grade (2028) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.00	1.68	14.2	19.6	0.04	0.52	—	0.52	0.48	—	0.48	—	4,088	4,088	0.17	0.03	—	4,102
Dust From Material Movement	—	—	—	—	—	—	1.61	1.61	—	0.17	0.17	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.00	1.68	14.2	19.6	0.04	0.52	—	0.52	0.48	—	0.48	—	4,088	4,088	0.17	0.03	—	4,102
Dust From Material Movement	—	—	—	—	—	—	1.61	1.61	—	0.17	0.17	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.67	0.56	4.77	6.56	0.01	0.17	—	0.17	0.16	—	0.16	—	1,368	1,368	0.06	0.01	—	1,373
Dust From Material Movement	—	—	—	—	—	—	0.54	0.54	—	0.06	0.06	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.87	1.20	< 0.005	0.03	—	0.03	0.03	—	0.03	—	227	227	0.01	< 0.005	—	227
Dust From Material Movement	—	—	—	—	—	—	0.10	0.10	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.06	0.96	0.00	0.00	0.25	0.25	0.00	0.06	0.06	—	246	246	< 0.005	< 0.005	0.76	247
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.13	0.03	2.03	0.82	0.01	0.03	0.49	0.52	0.02	0.13	0.16	—	1,724	1,724	0.08	0.27	3.31	1,811
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.07	0.84	0.00	0.00	0.25	0.25	0.00	0.06	0.06	—	228	228	0.01	0.01	0.02	231

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.13	0.03	2.15	0.83	0.01	0.03	0.49	0.52	0.02	0.13	0.16	—	1,725	1,725	0.08	0.27	0.09	1,809
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.02	0.27	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	76.8	76.8	< 0.005	< 0.005	0.11	77.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.04	0.01	0.70	0.28	< 0.005	0.01	0.16	0.17	0.01	0.04	0.05	—	577	577	0.03	0.09	0.48	606
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	12.7	12.7	< 0.005	< 0.005	0.02	12.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	< 0.005	0.13	0.05	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	95.6	95.6	< 0.005	0.02	0.08	100

3.11. Linear, Paving (2028) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.89	0.75	7.04	11.7	0.02	0.24	—	0.24	0.22	—	0.22	—	1,768	1,768	0.07	0.01	—	1,774
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.89	0.75	7.04	11.7	0.02	0.24	—	0.24	0.22	—	0.22	—	1,768	1,768	0.07	0.01	—	1,774

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.25	0.21	1.97	3.27	< 0.005	0.07	—	0.07	0.06	—	0.06	—	494	494	0.02	< 0.005	—	496
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.04	0.36	0.60	< 0.005	0.01	—	0.01	0.01	—	0.01	—	81.8	81.8	< 0.005	< 0.005	—	82.1
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.04	0.72	0.00	0.00	0.19	0.19	0.00	0.04	0.04	—	184	184	< 0.005	< 0.005	0.57	185
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.05	0.63	0.00	0.00	0.19	0.19	0.00	0.04	0.04	—	171	171	< 0.005	0.01	0.01	173
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.01	0.17	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	48.1	48.1	< 0.005	< 0.005	0.07	48.8
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.96	7.96	< 0.005	< 0.005	0.01	8.08
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Linear, Grubbing & Land Clearing	Linear, Grubbing & Land Clearing	4/1/2026	7/5/2026	5.00	68.0	—
Linear, Grading & Excavation	Linear, Grading & Excavation	7/6/2026	7/21/2027	5.00	272	—
Linear, Drainage, Utilities, & Sub-Grade	Linear, Drainage, Utilities, & Sub-Grade	7/22/2027	6/19/2028	5.00	238	—
Linear, Paving	Linear, Paving	6/20/2028	11/9/2028	5.00	102	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Linear, Grubbing & Land Clearing	Signal Boards	Electric	Average	2.00	8.00	6.00	0.82
Linear, Grubbing & Land Clearing	Crawler Tractors	Diesel	Average	1.00	8.00	87.0	0.43
Linear, Grubbing & Land Clearing	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Linear, Grading & Excavation	Excavators	Diesel	Average	3.00	8.00	36.0	0.38
Linear, Grading & Excavation	Crawler Tractors	Diesel	Average	1.00	8.00	87.0	0.43
Linear, Grading & Excavation	Graders	Diesel	Average	2.00	8.00	148	0.41
Linear, Grading & Excavation	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Linear, Grading & Excavation	Signal Boards	Electric	Average	2.00	8.00	6.00	0.82
Linear, Grading & Excavation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Linear, Grading & Excavation	Rubber Tired Loaders	Diesel	Average	1.00	8.00	150	0.36
Linear, Grading & Excavation	Scrapers	Diesel	Average	2.00	8.00	423	0.48
Linear, Drainage, Utilities, & Sub-Grade	Scrapers	Diesel	Average	1.00	8.00	423	0.48
Linear, Drainage, Utilities, & Sub-Grade	Rough Terrain Forklifts	Diesel	Average	1.00	8.00	96.0	0.40
Linear, Drainage, Utilities, & Sub-Grade	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Linear, Drainage, Utilities, & Sub-Grade	Signal Boards	Electric	Average	2.00	8.00	6.00	0.82

Linear, Drainage, Utilities, & Sub-Grade	Graders	Diesel	Average	1.00	8.00	148	0.41
Linear, Drainage, Utilities, & Sub-Grade	Plate Compactors	Diesel	Average	1.00	8.00	8.00	0.43
Linear, Drainage, Utilities, & Sub-Grade	Pumps	Diesel	Average	1.00	8.00	11.0	0.74
Linear, Drainage, Utilities, & Sub-Grade	Air Compressors	Diesel	Average	1.00	8.00	37.0	0.48
Linear, Drainage, Utilities, & Sub-Grade	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Linear, Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Linear, Paving	Paving Equipment	Diesel	Average	1.00	8.00	89.0	0.36
Linear, Paving	Pavers	Diesel	Average	1.00	8.00	81.0	0.42
Linear, Paving	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Linear, Paving	Signal Boards	Electric	Average	2.00	8.00	6.00	0.82

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Linear, Grubbing & Land Clearing	—	—	—	—
Linear, Grubbing & Land Clearing	Worker	12.5	11.7	LDA,LDT1,LDT2
Linear, Grubbing & Land Clearing	Vendor	0.00	8.40	HHDT,MHDT
Linear, Grubbing & Land Clearing	Hauling	91.9	20.0	HHDT
Linear, Grubbing & Land Clearing	Onsite truck	—	—	HHDT
Linear, Grading & Excavation	—	—	—	—
Linear, Grading & Excavation	Worker	42.5	11.7	LDA,LDT1,LDT2
Linear, Grading & Excavation	Vendor	1.00	8.40	HHDT,MHDT
Linear, Grading & Excavation	Hauling	23.0	20.0	HHDT

Linear, Grading & Excavation	Onsite truck	—	—	HHDT
Linear, Drainage, Utilities, & Sub-Grade	—	—	—	—
Linear, Drainage, Utilities, & Sub-Grade	Worker	30.0	11.7	LDA,LDT1,LDT2
Linear, Drainage, Utilities, & Sub-Grade	Vendor	0.00	8.40	HHDT,MHDT
Linear, Drainage, Utilities, & Sub-Grade	Hauling	26.3	20.0	HHDT
Linear, Drainage, Utilities, & Sub-Grade	Onsite truck	—	—	HHDT
Linear, Paving	—	—	—	—
Linear, Paving	Worker	22.5	11.7	LDA,LDT1,LDT2
Linear, Paving	Vendor	0.00	8.40	HHDT,MHDT
Linear, Paving	Hauling	0.00	20.0	HHDT
Linear, Paving	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)

Linear, Grubbing & Land Clearing	25,000	25,000	19.3	0.00	—
Linear, Grading & Excavation	25,000	25,000	19.3	0.00	—
Linear, Drainage, Utilities, & Sub-Grade	25,000	25,000	19.3	0.00	—

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Road Widening	19.3	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2026	117	204	0.03	< 0.005
2027	117	204	0.03	< 0.005
2028	117	204	0.03	< 0.005

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	7.10	annual days of extreme heat
Extreme Precipitation	7.50	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	0.00	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.

The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	3.12
AQ-PM	46.2
AQ-DPM	98.0
Drinking Water	4.21
Lead Risk Housing	56.1
Pesticides	0.00
Toxic Releases	52.6
Traffic	90.3
Effect Indicators	—
CleanUp Sites	100
Groundwater	99.9
Haz Waste Facilities/Generators	94.4
Impaired Water Bodies	83.0
Solid Waste	89.1
Sensitive Population	—
Asthma	97.2
Cardio-vascular	41.2
Low Birth Weights	83.3
Socioeconomic Factor Indicators	—

Education	26.9
Housing	70.5
Linguistic	26.4
Poverty	30.0
Unemployment	45.8

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	43.39792121
Employed	80.73912486
Median HI	63.85217503
Education	—
Bachelor's or higher	75.77312973
High school enrollment	100
Preschool enrollment	37.95714102
Transportation	—
Auto Access	21.6091364
Active commuting	94.30257924
Social	—
2-parent households	13.34530989
Voting	52.23918902
Neighborhood	—
Alcohol availability	18.88874631
Park access	60.29770307
Retail density	49.21083023
Supermarket access	42.17887848

Tree canopy	17.36173489
Housing	—
Homeownership	30.71987681
Housing habitability	20.10778904
Low-inc homeowner severe housing cost burden	11.53599384
Low-inc renter severe housing cost burden	18.22148082
Uncrowded housing	37.66200436
Health Outcomes	—
Insured adults	47.91479533
Arthritis	79.8
Asthma ER Admissions	1.0
High Blood Pressure	76.3
Cancer (excluding skin)	85.3
Asthma	18.0
Coronary Heart Disease	87.2
Chronic Obstructive Pulmonary Disease	59.8
Diagnosed Diabetes	65.9
Life Expectancy at Birth	19.2
Cognitively Disabled	44.8
Physically Disabled	73.0
Heart Attack ER Admissions	64.3
Mental Health Not Good	34.8
Chronic Kidney Disease	73.0
Obesity	31.6
Pedestrian Injuries	77.0
Physical Health Not Good	49.1
Stroke	58.2
Health Risk Behaviors	—

Binge Drinking	36.9
Current Smoker	29.7
No Leisure Time for Physical Activity	53.7
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	13.3
Children	14.8
Elderly	94.7
English Speaking	53.9
Foreign-born	50.4
Outdoor Workers	58.6
Climate Change Adaptive Capacity	—
Impervious Surface Cover	6.2
Traffic Density	91.8
Traffic Access	72.7
Other Indices	—
Hardship	40.1
Other Decision Support	—
2016 Voting	38.1

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	80.0
Healthy Places Index Score for Project Location (b)	60.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	West Oakland

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Appendix C

City of Oakland OakDOT Letter of Support

CITY OF OAKLAND

250 FRANK H. OGAWA PLAZA OAKLAND, CALIFORNIA 94612–2033

Department of Transportation
Josh Rowan, Director

Mobile: (510) 926-0895
Desk: (510) 238-2967

October 16, 2024

Mohammed Alaoui, Director
City of Emeryville, Public Works Department
1333 Park Ave
Emeryville, CA 94608-4389

Re: 40th St Multimodal Project and the City of Emeryville's Extra-territorial Jurisdiction

Dear Mr. Alaoui:

This letter provides written consent for the roadway modifications proposed by the City of Emeryville's 40th Street Multimodal Project that are located within the area subject to the 1993 Memorandum of Understanding (MOU) between the City of Emeryville and the City of Oakland for the Bay/Shellmound Street Project (Attachment A).

The MOU provides extra-territorial jurisdiction to the City of Emeryville for a portion of the City of Oakland bounded by Interstate 880, Interstate 580, and the Oakland-Emeryville city line, roughly a straight line projection of 36th St from San Pablo Ave to the San Francisco Bay shoreline. Exhibit B of the MOU provides a map of this geographic area.

The MOU was established in 1993 to enable the development of this geographic area. The development included the East Bay Bridge Shopping Center, the 40th Street Overhead Bridge, Shellmound Street, and connecting side streets. The MOU specifies, "Emeryville shall be responsible for the preparation of all improvement designs, plans, and specifications and for the installation of all improvements, including improvements within Oakland" (MOU, Section 2(a)(6)).

The MOU specifies that the City of Oakland's Director of Transportation (formerly Public Works) must provide written consent for substantive changes by the City of Emeryville to the infrastructure in the geographic area of the MOU.

- Section 2(a)13 of the MOU reads, "Emeryville shall not close, permanently, or temporarily, any street, path or other public property located within Oakland, unless prior written consent is obtained from the Director of Public Works of the City of Oakland."
- Section 2(a)18 of the MOU reads, "After construction, none of the assessment district improvements that are located in, or that may impact Oakland, shall be substantially

altered, realigned, closed on a permanent or long- term basis, or otherwise materially changed without the prior written consent of Oakland."

The 40th Street Multimodal Project proposes work on Shellmound Street and 40th Street between the intersections of Shellmound Street/IKEA Entry and 40th Street/Adeline Street. The project is within the geographic area of the MOU on Shellmound Street/40th Street from roughly the Shellmound Street/IKEA Entry intersection to the 40th Street/Horton Street intersection. Within the MOU's geographic area, the project proposes the following changes:

- Reconfiguring the roadway cross-section of Shellmound Street and 40th Street to install bus-only lanes and replace on-street bike lanes with separated bike lanes.
- Closing vehicular access on Hubbard Street at its unsignalized intersection with 40th Street. The proposed vehicular closure will maintain access for emergency vehicles, pedestrians, and bicyclists.
- Constructing a Class 1 Bicycle and Pedestrian Path between Hubbard Street and Halleck Street which will be parallel and adjacent to 40th Street.

Excerpts of the draft street improvement plans are included as Attachment B.

Thank you for this opportunity to collaborate with the City of Emeryville on the 40th Street Multimodal Project. For questions and additional information, please contact Jason Patton, Senior Transportation Planner at 510-238-7049 or jpatton@oaklandca.gov.

Respectfully,

Josh Rowan (Oct 16, 2024 17:49 PDT)

Josh Rowan
Director
Department of Transportation
JRowan@oaklandca.gov

Attachments

A. Memorandum of Understanding, Bay/Shellmound Street Project, Emeryville and Oakland, California (1993)
B. 40th Street Multimodal Project, Draft Plans – Excerpts (10/9/24)

MEMORANDUM OF UNDERSTANDING

BAY/SHELLMOUND STREET PROJECT
Emeryville and Oakland, California

THIS MEMORANDUM OF UNDERSTANDING is entered into as of March 1, 1993, by and among the City of Emeryville, a municipal corporation ("Emeryville") and the City of Oakland, a municipal corporation ("Oakland").

RECITALS

A. The Emeryville City Council desires to undertake appropriate special assessment and assessment bond proceedings for making the acquisitions and improvements described in Exhibit "A", attached hereto and made a part hereof, and to assess the costs thereof and the expenses incidental thereto, upon a district benefitted thereby, the exterior boundaries of which are the coterminous exterior boundaries of the composite and consolidated area shown on the map thereof on file in the office of the Emeryville City Clerk, included herein as Exhibit "C".

B. A portion of said acquisitions and improvements to be made is within the incorporated territory of Oakland.

C. A portion of the lands to be assessed to pay the costs and expenses thereof is incorporated territory within Oakland.

D. The acquisitions and improvements to be made are of such a character that they will directly and peculiarly affect property not only within the boundaries of Emeryville but also incorporated territory within Oakland, and the purposes sought to be accomplished can best be accomplished by a single comprehensive scheme of work.

E. The public interest, convenience and necessity will be served by the making of said acquisitions and improvements and the levying of said assessments.

F. The special assessment proceedings, assessment bond proceedings, acquisitions, installations and maintenance shall be made and done pursuant and consistent with all applicable State Law, including but not limited to the Municipal Improvement Act of 1913 (Section 10000 et seq. of the California Streets and Highways Code) (the "1913 Act") and the Improvement Bond Act of 1915 (Section 8500 et seq. of the California Streets and Highways Code) (the "1915 Act").

G. The foregoing recitals are based upon representations, written and oral, made to Oakland by agents, officials and representatives of Emeryville.

H. The Emeryville City Council has requested Oakland to provide Emeryville with extra-territorial jurisdiction. The Oakland City Council has agreed to provide Emeryville with extra-territorial jurisdiction to the extent required for the purposes set forth in this Agreement.

NOW, THEREFORE, the parties do hereby agree as follows:

1. Grant of Extra-Territorial Jurisdiction

(a) Oakland, through its City Council, hereby grants Emeryville extra-territorial jurisdiction to undertake proceedings, pursuant to the 1913 Act and the 1915 Act, to form an assessment district, to make acquisitions, to construct improvements, to levy assessments and to assume jurisdiction, for the above-stated limited purposes and for such other purposes as set forth below, over that geographic area of Oakland set forth in Exhibit "B", which is attached hereto and incorporated herein by this reference.

2. Limitations and Conditions

(a) The extra-territorial jurisdiction granted herein shall be subject to the following conditions and limitations:

(1) Prior to the exercise of any extra-territorial jurisdiction granted hereunder, this Memorandum of Understanding shall be approved by the City Councils of Oakland and Emeryville. This Memorandum of Understanding expressly sets forth the jurisdiction, including all conditions and limitations related thereto, granted by previous Resolutions adopted by the respective City Councils. This Memorandum of Understanding shall be approved as to form and legality by the City Attorney of Emeryville and the City Attorney of Oakland.

(2) Prior to the acquisition of any property interest within Oakland by Emeryville, the Director of Public Works of the City of Oakland or his designee must agree in writing that each acquisition located within Oakland is necessary to implement the purposes of this Memorandum of Understanding.

(3) The authority of Emeryville to acquire real property interest located within Oakland, for the purposes set forth herein, shall extend through and expire eight (8) years from the date that this Memorandum of Understanding is executed, unless such time period is extended by the written, mutual consent of the parties.

(4) All real property interest located within Oakland that is acquired by Emeryville for the proposed assessment district shall be conveyed free of charge and clear of all liens, except valid assessment district liens, if any, to Oakland, by Emeryville, within thirty (30) days of the date on which Emeryville receives

clear title to such property. If it is determined that said property must be held by the assessment district, such property shall be conveyed to Oakland within thirty (30) days of the date the bonds, or other obligations, if any, issued to finance the assessment district are retired; provided that this provision shall not prohibit said bonds or other obligations, if any, from being refinanced.

(5) Emeryville shall have no power to tax or assess (other than assessments made pursuant to State Law), or levy any fee or charge on any property located within Oakland, unless the prior written consent of the Oakland City Council is hereafter obtained.

(6) Emeryville shall be responsible for the preparation of all improvement designs, plans and specifications and for the installation of all improvements, including improvements within Oakland. Such responsibility shall include responsibility for all costs and liabilities, including both direct and indirect costs. Costs for the design, construction, project administrator and contract manager shall be funded through the assessment district and other identified funding. The City of Oakland will have no financial responsibility for the above costs.

(7) All improvement designs, plans, specifications and improvements approved and made by Emeryville, including those improvements located within Emeryville, shall be subject to the co-approval of the Director of Public Works of the City of Oakland or his designee. All such designs, plans and specifications shall be prepared by engineers licensed by the State of California. Oakland's co-approval authority, for improvements located in Emeryville, shall be limited to approval of preliminary plans to determine total project consistency. In addition, Oakland shall have full review and approval authority of final plans and specifications, for improvements located in Oakland. Approvals of designs, plans and specifications for the improvements located in Emeryville shall be completed by Oakland within thirty (30) days of the date of receipt of each submittal by Emeryville, provided that this thirty day period shall not include any time during which a submittal has been returned to Emeryville for corrections or modifications. All improvement design plans and specifications which are part of any assessment district shall be reviewed and approved by the Director of Public Works for City of Oakland. The portion of the improvements in the City of Emeryville will be reviewed by City of Oakland for scope of work and project consistency only. The portion of the plans in the City of Oakland will be reviewed by Director of Public Works of the City of Oakland and final authority of final plans and specification for improvements in Oakland. City of Oakland shall perform review at approximately 10%, 60% and 100% or other agreed intervals. These review will be completed within 30 days exclusive of any redesign.

(8) Emeryville shall provide Oakland with two weeks prior notice of all hearings required by law. Said notice shall be in writing and shall be delivered to the City of Manager of Oakland and the Director of Public Works of Oakland. In addition, Emeryville, prior to holding any such hearings, shall provide at least two weeks notice of such hearings in a newspaper of general circulation in Oakland.

(9) Emeryville shall be responsible for maintaining, in perpetuity, all grade-separated roadway assessment district improvements (which shall include but not be limited to lighting systems, deck, resurfacing and landscaping, if any, including improvements located within Oakland), made pursuant to the authority granted in this Memorandum of Understanding. Such maintenance may be funded with assessment district funds.

(10) Emeryville shall fully and completely indemnify, defend and hold Oakland harmless against and from all claims, lawsuits, judgments, settlements, costs, expenses and fees, including attorney's fees, that may result from either: (1) the passage of the prior Resolution or this Memorandum of Understanding; (2) the execution of said agreement by Oakland and Emeryville; (3) the assumption of the extra-territorial jurisdiction by Emeryville; (4) the design, inspection, and/or installation of any and/or all improvements (located within, or partially within Emeryville), made, authorized and/or accepted by Emeryville; (5) the operation (or failure of operation) of any such improvements; or (6) any other act or omission by Emeryville, its officers, agents, employees, contractors, sub-contractors, and/or vendees that is related to or results from the matters set forth in subsections one (1) through five (5) in this Paragraph "10." Oakland and Emeryville each shall agree fully and completely to indemnify, defend and hold each other harmless against and from all claims, lawsuits, judgments, costs, expenses and fees, including attorney's fees, that may result from any of the following sections by the respective City: (a) approval of designs, plans and/or specifications for improvements located in Oakland; (b) inspection of improvements located in Oakland; (c) the acceptance of improvements installed in Oakland; (d) the operation (or failure of operation) of any of the Oakland improvements; or (e) any other act or omission by Oakland or Emeryville, its officers, agents, employees, contractors, sub-contractors, and/or vendees that is related to or results from the matters set forth in subsections (a) through (d) of this Paragraph "10."

(11) Emeryville shall require all of its contractors and sub-contractors who are responsible for installing or providing any services related to improvements to carry appropriate public liability insurance, to name Oakland, its officers, agents and employees as additional insureds, and to agree to the indemnification, defense and hold harmless language set forth in

Paragraph 11 of this Memorandum of Understanding. The amount and form of said insurance shall be subject to the approval of Oakland. Prior to the start of any work that is contemplated by this Memorandum of Understanding, Emeryville shall provide Oakland with evidence of insurance and hold harmless certifications for each of its contractors, including subcontractors.

(12) Emeryville shall be responsible for obtaining all permits and licenses necessary to carry out the improvement work described herein, including, but not limited to any approvals required to be obtained from the Port of Oakland, Southern Pacific Railroad, Union Pacific Railroad or the California Public Utilities Commission. When permits and licenses are required by the City of Oakland said permits and licenses shall be furnished in a timely manner.

(13) Emeryville shall not close, permanently or temporarily, any street, path or other public property located within Oakland, unless prior written consent is obtained from the Director of Public Works of the City of Oakland.

(14) Emeryville shall pay all reasonable costs and expenses including consultant, legal, mitigation and monitoring costs, incurred by Oakland for environmental review related to the assessment district, necessary improvements and any required general plan changes. Emeryville shall act as lead agency as such term is defined in the California Environmental Quality Act ("CEQA") and Oakland shall act as a responsible party for all CEQA assessments and approvals except as to matters relating to amendments of Oakland's General Plan, as to which matters Oakland shall act as lead agency and Emeryville shall act as responsible agency.

(15) Oakland shall adopt a General Plan Amendment to delineate and designate Shellmound Street-40th Street as a City Arterial and an extension of Mandela Parkway to Hollis Street and/or 40th Street as a City Collector. Emeryville shall cooperate with Oakland to extend Mandela Parkway pursuant to this agreement and the Caltrans-Emeryville Memorandum of Agreement, attached hereto as Exhibit "D".

(16) If the improvement work is done in phases, Emeryville shall require all contractors performing any construction work contemplated by this Memorandum of Understanding, performed or contracted for after execution of this Agreement, and located in Oakland, to comply with Oakland's Minority and Women Business Enterprise programs. Oakland shall be responsible for qualifying MBE's and WBE's and monitoring all such contracts to assure compliance.

(17) Emeryville shall have only those extra-territorial powers that are expressly granted it in writing by Oakland.

(18) After construction, none of the assessment district improvements that are located in, or that may impact Oakland, shall be substantially altered, realigned, closed on a permanent or long-term basis, or otherwise materially changed without the prior written consent of Oakland.

(19) The grant of extra-territorial authority given by this Memorandum of Understanding shall not be interpreted as authorizing any changes in corporate boundaries.

(20) In the event the assessment district street improvements contemplated by this Memorandum of Understanding are not started and completed in one phase, Emeryville agrees and guarantees that the street improvements that are to be constructed on the Emeryville side shall be constructed up to the Oakland and Emeryville corporate boundary line. Emeryville also agrees and guarantees that said street improvements shall be constructed in such a manner and that property purchased for said street improvements shall be purchased (in quantity and in location), and held in such a manner so as to allow reasonable access and connections to said street improvements by Oakland, for street extension purposes on the Oakland side. This agreement and guarantee, which shall accord street connections and extension rights to Oakland, shall be binding upon Emeryville, regardless of whether Emeryville is successful in resolving at-grade crossing and design issues with the Public Utilities Commission (P.U.C.). This agreement and guarantee, however, shall not require Oakland to make any such street connections or improvements.

(21) In the event that Emeryville fails to substantially complete installation of the street improvements with Oakland within eight (8) years of the date of execution of this Memorandum of Understanding, the assessment district, at Oakland's option, shall be amended to exclude all property within Oakland. Moreover, no property located within Oakland shall be assessed pursuant to the authority granted in this Memorandum of Understanding, unless and until the improvements are extended into and constructed in Oakland.

(22) In the event of a breach by Emeryville of any material provision of this Memorandum of Understanding, Oakland, after giving reasonable notice, may pursue all available remedies, in law and in equity, including revocation of the extra-territorial authority granted by this Memorandum of Understanding. In the event it becomes necessary for either party to bring a legal action to enforce any of the provisions of this Memorandum of Understanding, the parties agree that a court of competent

jurisdiction may determine and award reasonable costs and attorney's fees to the prevailing party.

3. Miscellaneous

(1) This Agreement represents the entire understanding of the parties as to those matters contained herein. No prior or oral written understanding shall be of any force or effect with respect to those matters covered herein. This Agreement may not be modified or altered except in a writing signed by the parties to this Agreement.

(2) This Agreement shall be administered and interpreted under the laws of the State of California. Jurisdiction and venue of litigation arising from this Agreement shall be in the County of Alameda, State of California.

IN WITNESS WHEREOF, the parties have executed this Agreement below.

APPROVED AS TO FORM:

City Attorney

Attest:

City Clerk

Emeryville
City of Emeryville, a municipal corporation

By:

Its: City Manager

APPROVED AS TO FORM:

City Attorney

Attest:

City Clerk

Oakland
City of Oakland, a municipal corporation

By:

Its: Asst City Mgr

h:\von\mou-bay2.gh

EXHIBIT A

BAY/SHELLMOUND STREET PROJECT
Emeryville and Oakland, California

The Bay/Shellmound Street Project consists of the acquisitions and improvements listed below and shown on the map (following page).

A. Construction of the following streets and portions of streets, including intersections of said streets and portions of streets with other streets (all rights-of-way and all improvements to be in accordance with the standards and requirements of the City of Emeryville and/or the City of Oakland):

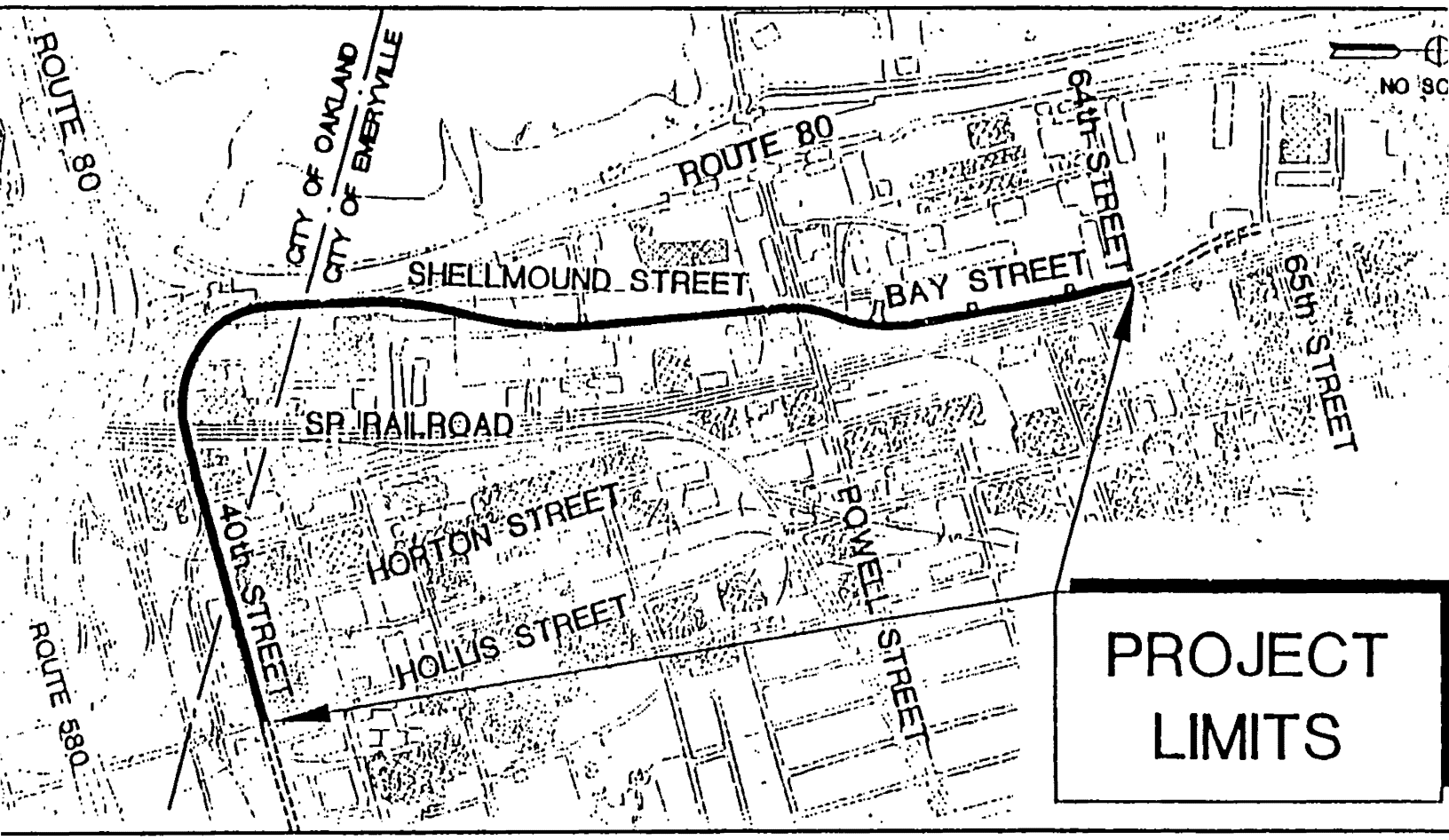
1, Construction of a road known as Bay Street commencing at 64th Street and extending southerly to Powell Street at Shellmound Street;

2. Construction of a road known as Shellmound Street commencing at Bay Street and extending southerly to the Southern Pacific Railroad tracks (SPRR) at 40th Street;

3. Construction of a road and bridge crossing of the SPRR commencing at the southerly terminus of Shellmound Street and extending easterly across the SPRR;

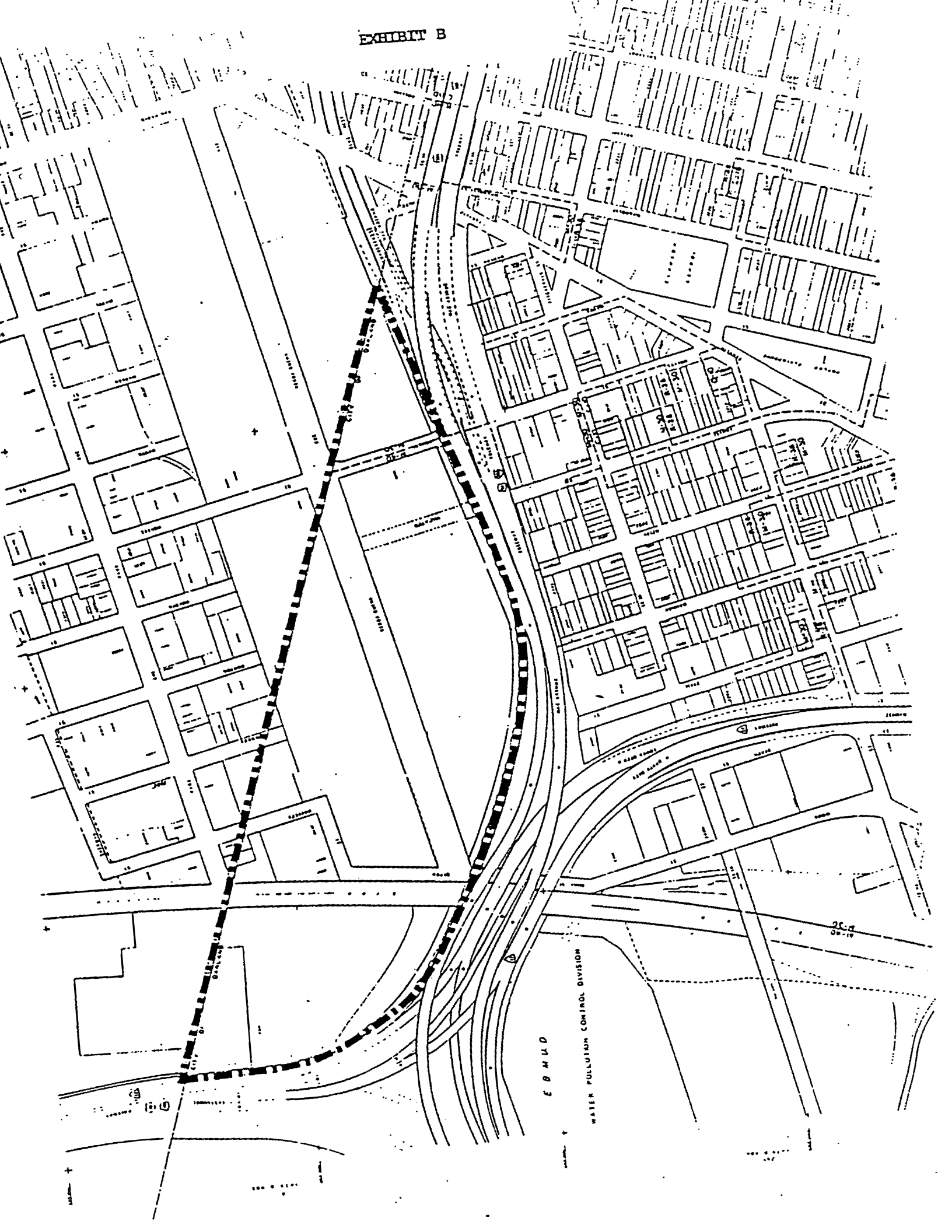
4. Construction of 40th Street commencing at the SPRR and extending easterly to Hollis Street.

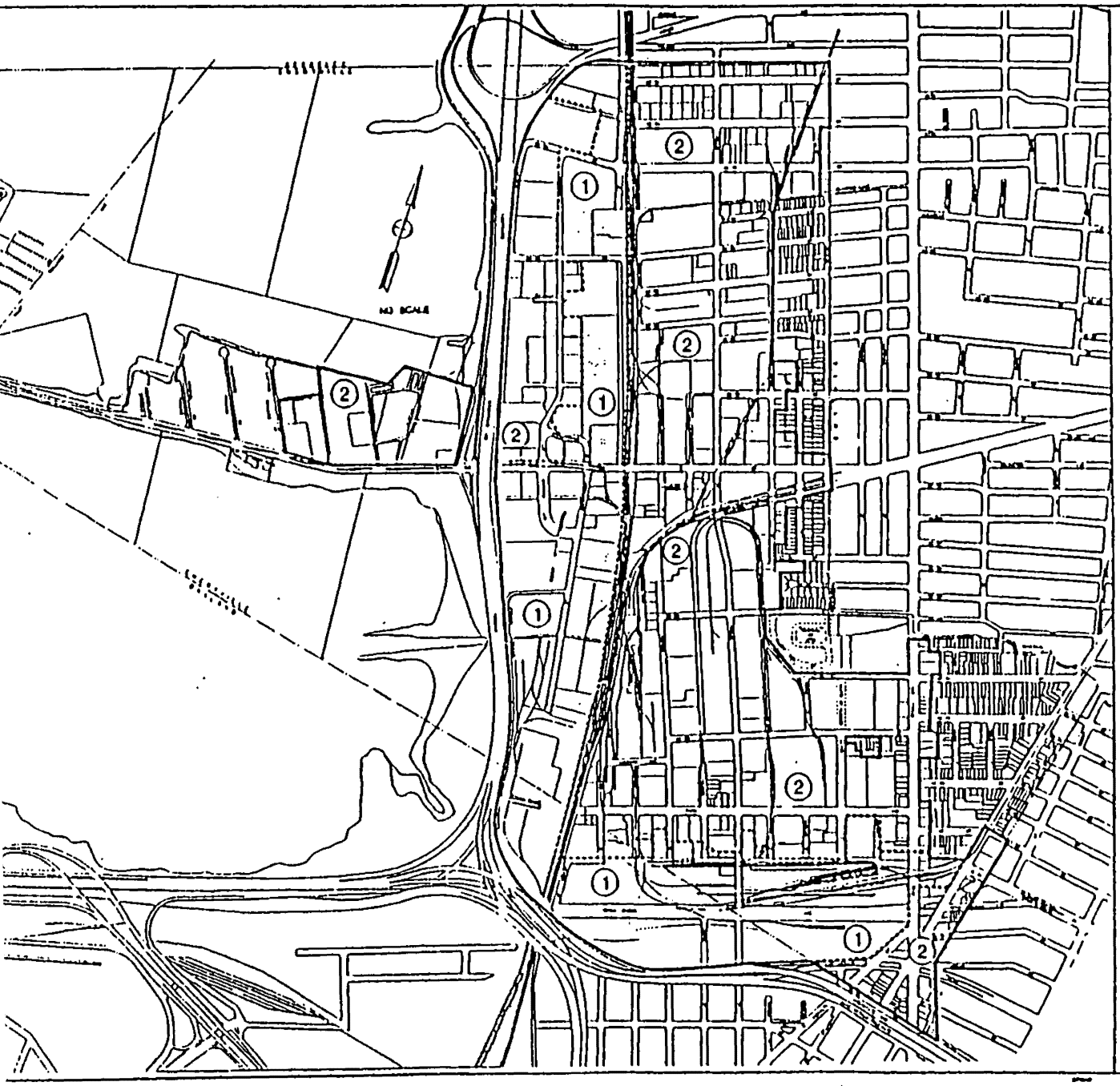
B. Improvement of said streets and portions of streets by grading, removing trees, bushes and existing structures as required and the construction of bridges and roadways, including pavements, curbs, gutters and sidewalks, medians, landscaping, sewers, stormdrains, and appurtenances, water mains, hydrants and appurtenances, street lighting facilities, underground electric, telephone, gas, and cable television facilities, street signing and striping, traffic signalization, all as required.



Source: Mark Th
May 18,

EXHIBIT B





PROPOSED BOU
OF
BAY STREET-SHELLI
EXTENSIC
ASSESSMENT D
CITY OF EMERY
COUNTY OF ALAMEDA, STA

CITY CLERK'S CERTIFICATE

I HEREBY CERTIFY that the map
PROPOSED BOUNDARIES OF ASSES
OF THE CITY OF EMERYVILLE
STATE OF CALIFORNIA, and appro
Council of the City of Emeryville
thereof held on the ___ day
of its Resolution No. _____

CITY CLERK OF

FILED in the office of the City
day of _____, 19___.

CITY CLERK OF

COUNTY RECORDER'S CERTIFICATE

FILED this _____ day of _____
hour of _____ o'clock ___ M. in
MAPS OF ASSESSMENT AND COM
DISTRICTS at page _____ in the
RECORDER in the County of Ala
California.

FEE _____ FILE NO.

_____ BY _____
COUNTY RECORDER
COUNTY OF ALAMEDA

Reference is hereby made to m
office of the Assessor of the Co
detailed description of the lines a
lots, pieces, or parcels of land sh
these parcels for all details not

LEGEND

Zone of Benefit

Assessment D

(1) (2) Districts

DRAFT

OCTOBER 3, 1

MARK THOM

EXHIBIT D

MEMORANDUM OF AGREEMENT January 14, 1992

The purpose of this Memorandum of Agreement ("MOA") is to memorialize an agreement reached between the City of Emeryville ("CITY") and the State of California Department of Transportation ("STATE") as follows.

I. The parties to this MOA agree to perform the following tasks:

A. MacArthur Off-Ramp. The STATE agrees for the immediate future to retain the off-ramp from eastbound I-580 to MacArthur Boulevard.

B. The STATE agrees that no K-rail barrier will be installed at the westbound I-80 Powell Street on-ramp until such time as the STATE provides alternative access to westbound I-80, eastbound I-580, and southbound I-880 at or in the immediate vicinity of Powell Street, and that after such alternative access is provided, said on-ramp will remain open and a K-rail barrier may be installed.

II. The parties to this MOA agree to use their best efforts to perform the following tasks:

A. MacArthur On-Ramp. The STATE agrees to actively pursue funding for the design and construction for an on-ramp facility from MacArthur boulevard to I-580 westbound. Caltrans will use its best efforts to construct this facility prior to the end of 1996.

B. The CITY and STATE will work with the City of Berkeley to revise the Ashby Street Interchange to accommodate Bay Street on-ramp traffic to northbound I-80.

C. The CITY and STATE will work with the City of Oakland to extend Mandela Parkway to connect with 40th Street in the City of Emeryville.

STATE OF CALIFORNIA
Department of Transportation
JAMES W. VAN LOBEN SELS
Director of Transportation

By _____
Preston W. Kelley
District Director

CITY OF EMERYVILLE

By _____
John A. Flores
City Manager

APPROVED TO FORM AND PROCEDURE:

_____
Antonio R. Anziano
Deputy Attorney

_____
Anne Haden
City Attorney

ADJACENT

ITIES.

ALL MATCH
TLY BETWEEN

OUT OF THE
ED LANE

TYPE IV (R) ARROW PER STANDARD PLAN

TYPE VII (R) ARROW PER STANDARD PLAN

TYPE VII (L) ARROW PER STANDARD PLAN

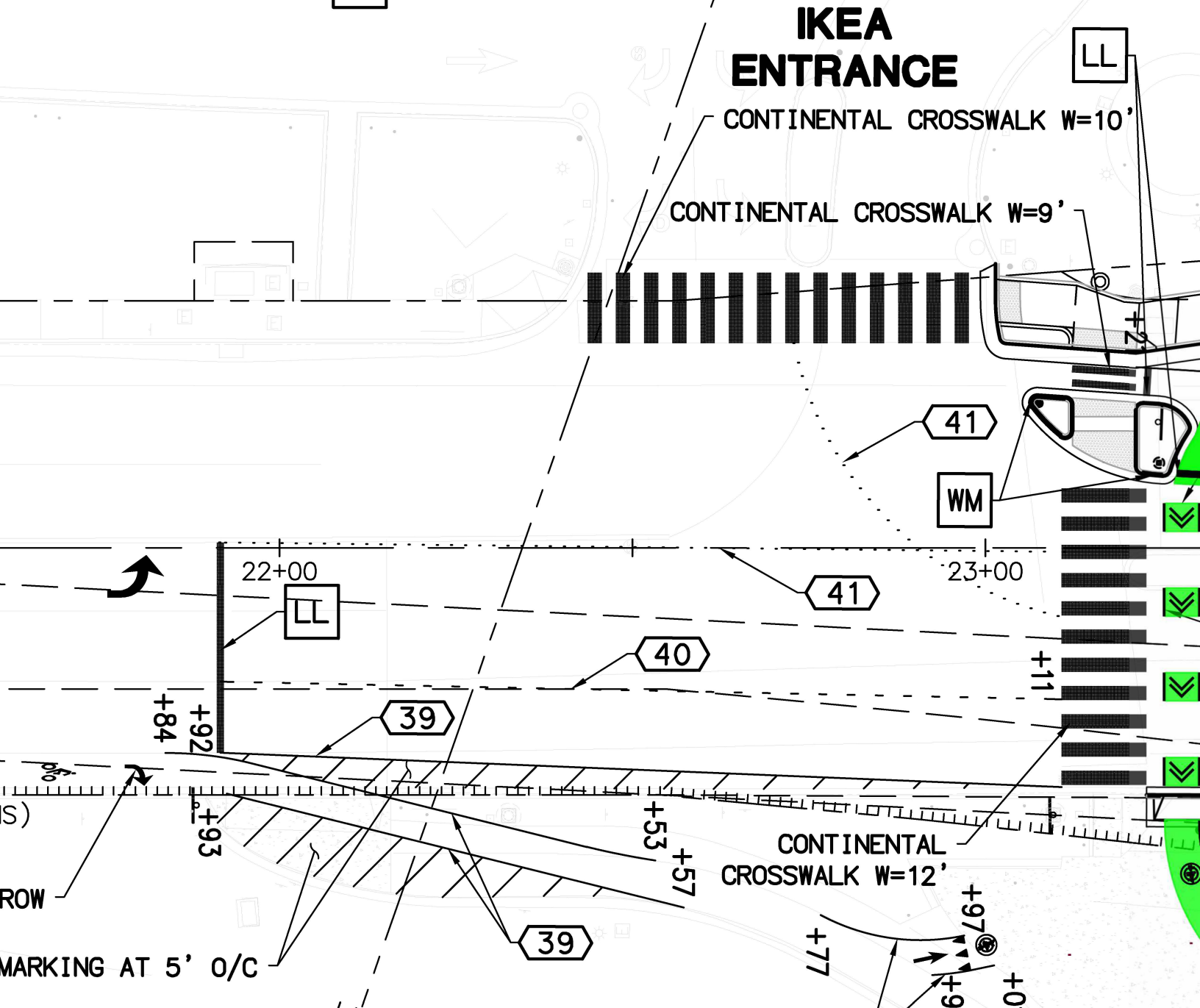
TYPE III (B) ARROW PER STANDARD PLAN

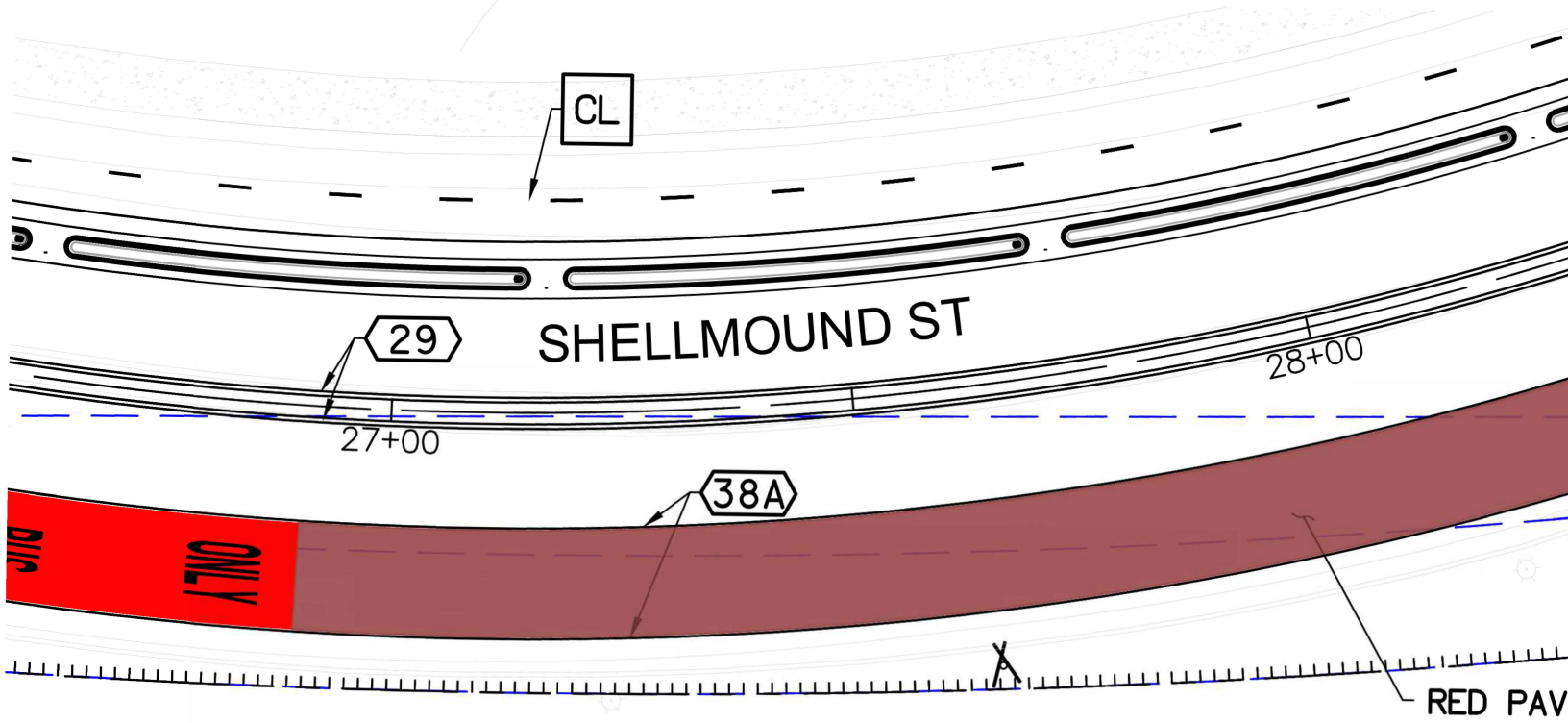
FG — INSTALL FG 300 TURNPIKE GRADE CURB S
EQUAL SPACED AT 6.5'

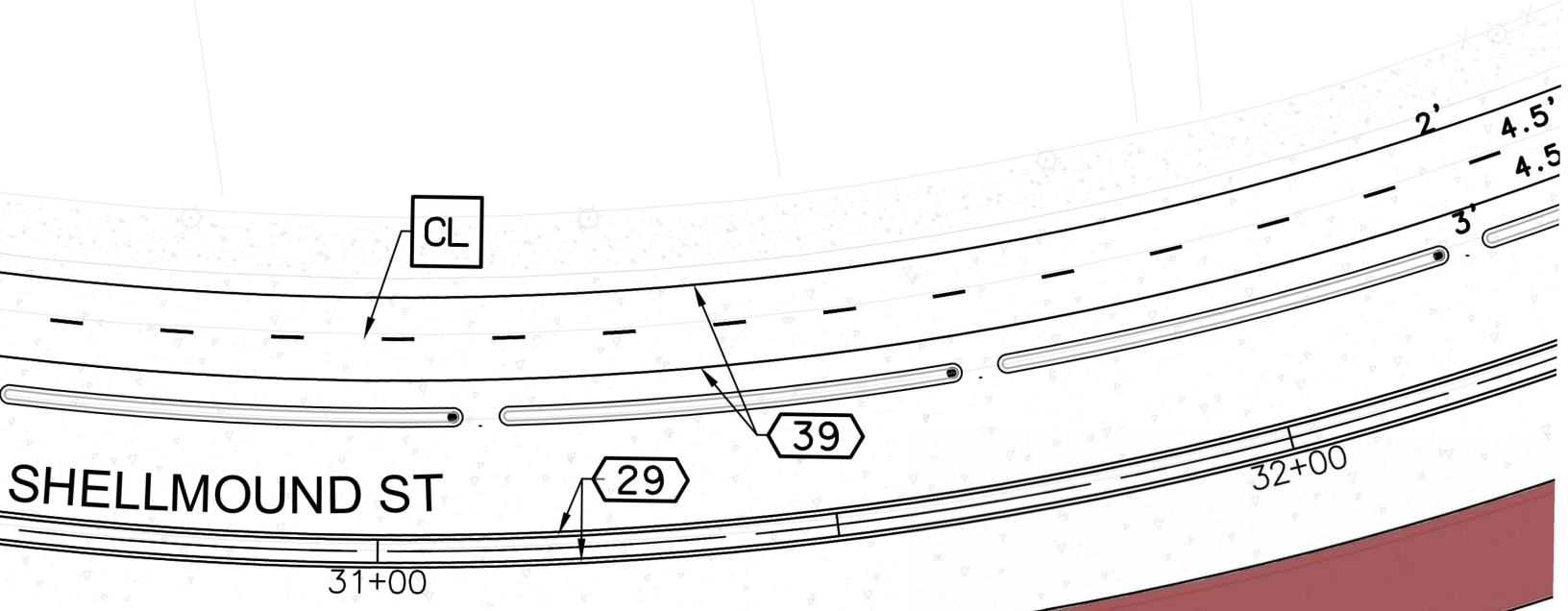
WM — INSTALL WHITE REFLECTIVE PAVEMENT MAR
OF CURB PER DETAIL A

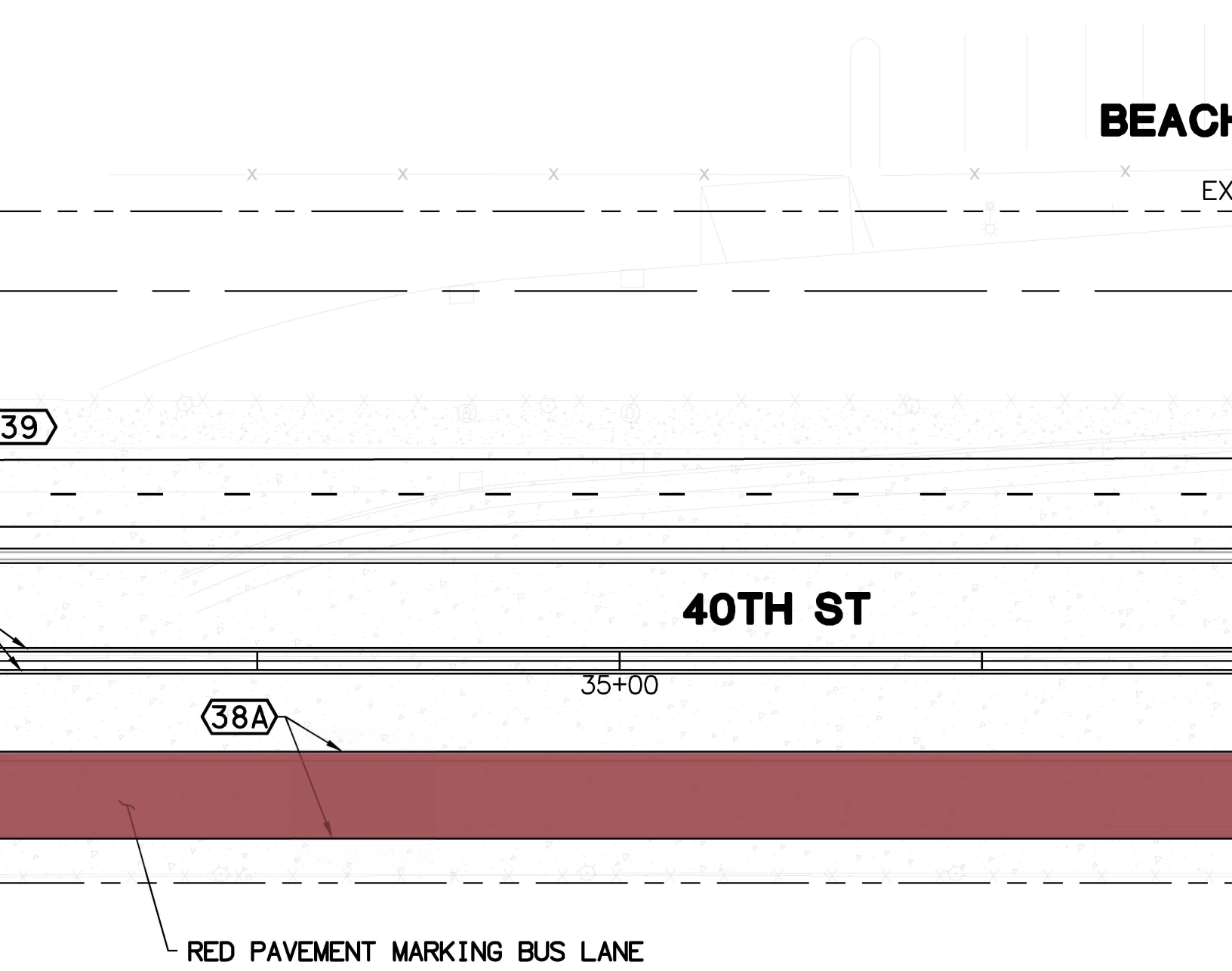
BS — 8" WHITE DASHED EDGELINE BORDERING BU
RED PAVEMENT MARKING

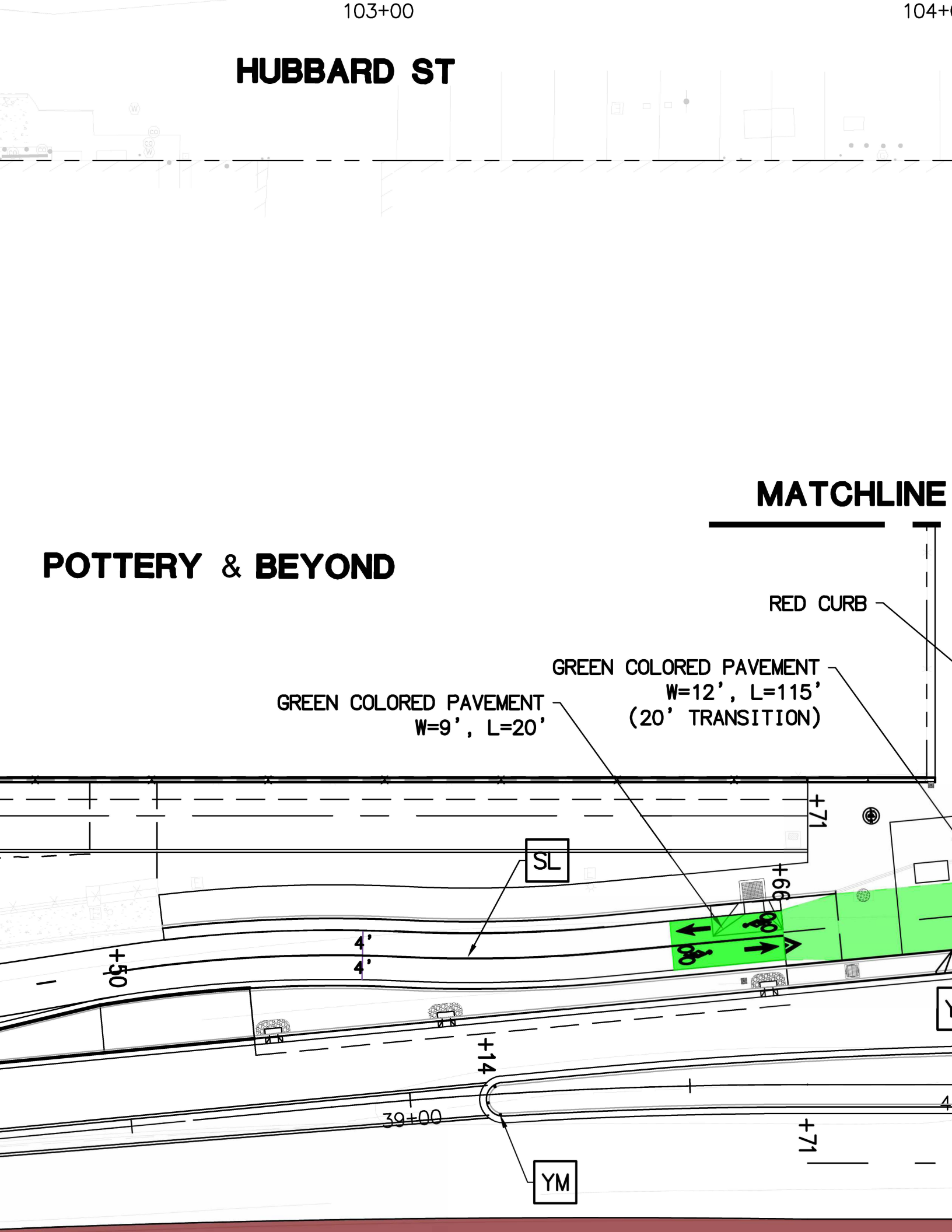
YM — INSTALL YELLOW RAISED PAVEMENT MARK

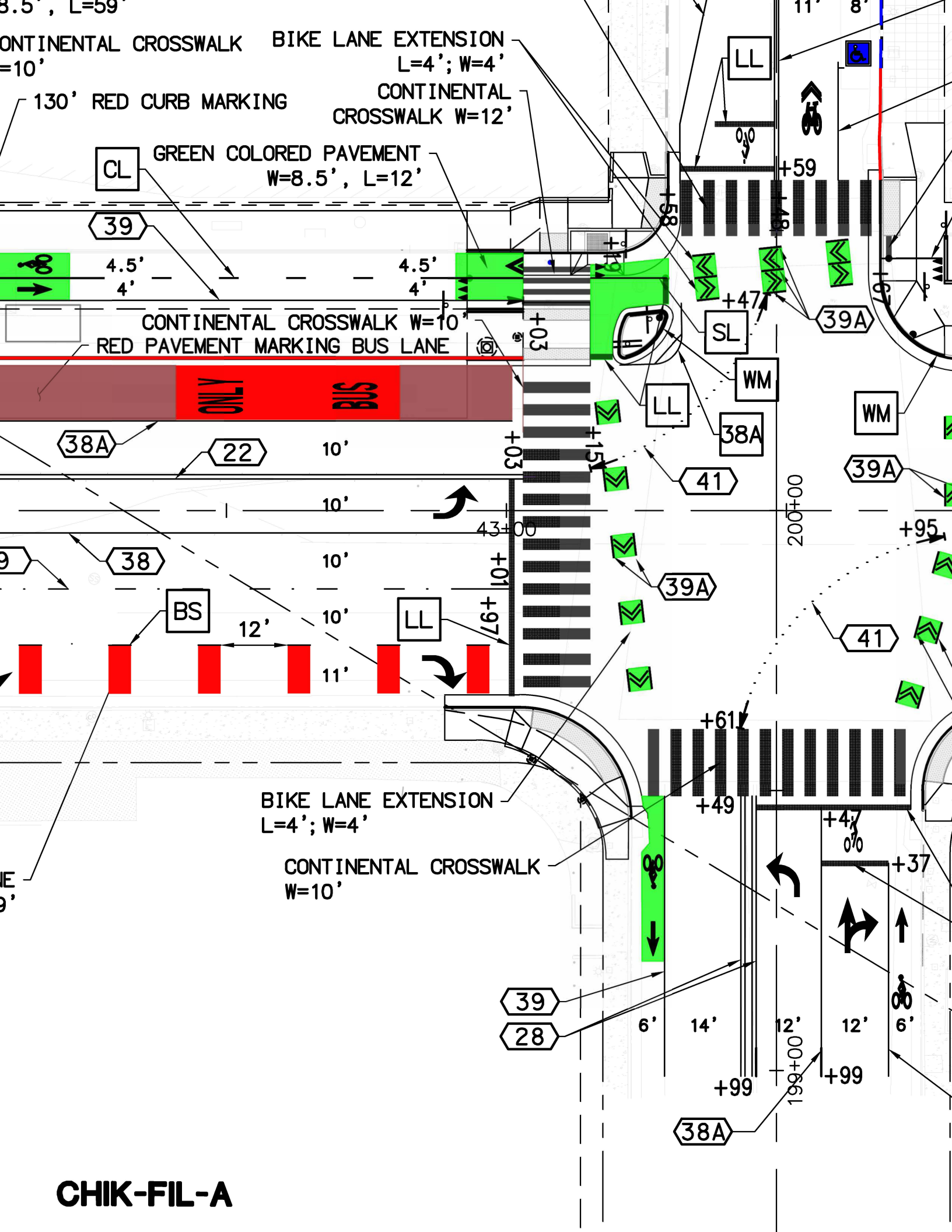



CL
29
SHELLMOUND ST
28+00
27+00
38A
BUS
ONLY
RED PAV


2'
4.5'
4.5
3'
CL
39
SHELLMOUND ST
29
32+00
31+00


BEACH
EX
39
40TH ST
35+00
38A
RED PAVEMENT MARKING BUS LANE
TARG


103+00
104+0
HUBBARD ST
MATCHLINE
POTTERY & BEYOND
RED CURB
GREEN COLORED PAVEMENT
W=12', L=115'
(20' TRANSITION)
GREEN COLORED PAVEMENT
W=9', L=20'
+71
SL
+66
4'
4'
+50
+14
39+00
+71
YM


8.5', L=59'
ONTINENTAL CROSSWALK
=10'
130' RED CURB MARKING
BIKE LANE EXTENSION
L=4'; W=4'
CONTINENTAL
CROSSWALK W=12'
CL
GREEN COLORED PAVEMENT
W=8.5', L=12'
39
4.5'
4'
4.5'
4'
CONTINENTAL CROSSWALK W=10'
RED PAVEMENT MARKING BUS LANE
ONLY
BUS
38A
22
10'
10'
38
10'
BS
12'
10'
11'
LL
+03
+15
+01
+97
43+00
41
200+00
+95
39A
WM
SL
38A
39A
+47
+59
+58
+67
+61
+49
+47
0%
+37
BIKE LANE EXTENSION
L=4'; W=4'
CONTINENTAL CROSSWALK
W=10'
39
28
6'
14'
12'
12'
6'
+99
+99
199+00
38A

CHIK-FIL-A

Appendix D

Multi-Modal Transportation Analysis

FEHR PEERS

Technical Memorandum

Date: August 29, 2025

To: Jennifer Harmon, Diablo Engineering Group

From: Robert Rees, PE, and Lam Ngo, Fehr & Peers

Subject: 40th Street Multimodal Project – Part 1 and Part 2

OK22-0501

This memorandum summarizes the multimodal safety and operations analysis that Fehr & Peers completed for the 40th Street Multimodal Project (Project) in Emeryville, CA. It compares analysis results with and without the Project for the modeled transportation conditions along the 40th Street corridor, between Adeline Street and IKEA entry, (Part 1) and along the Shellmound Street corridor, between IKEA entry and Christie Avenue, (Part 2). The analysis maintains the overall assumptions and procedures described in the two *40th Street Multimodal Project – Multimodal Transportation Analysis* memorandums (October 2024). While expanding the safety analyses to address crashes between 2013 and 2024. A separate, detailed analysis of commercial vehicle movements, impacts, and proposed rerouting is provided in the *40th Street Multimodal Project - Truck Activity Analysis Memo* (August 2025).

Executive Summary

The 40th Street corridor (Part 1 and Part 2) serves as a critical link between residential areas, commercial centers, and transit hubs, making it essential to provide a facility that caters to a diverse range of users, including commuters, families, shoppers, and recreational cyclists. As noted in this memorandum between 2013 and 2024 there were sixty-three motor vehicle injury or fatal crashes, twenty-nine bicycle injury or fatal crashes, and sixteen pedestrian injury or fatal crashes, making safety a paramount concern in the decision-making process.

In 2018 the city, recognizing the need for safety enhancements, embarked on changing 40th Street (Part 1) between Adeline Street and the IKEA entry to provide a safer environment especially for the most vulnerable users – pedestrians and bicyclists – who experience a higher concentration of fatal and injury crashes on 40th Street. The Project (Part 1) was approved by the City Council in March 2020 and final engineering design began in March 2023. In July 2023, the City Council expanded the Project to include Shellmound Street (Part 2) which extended Part 1 of the Project from the IKEA entry north to Christie Avenue.

Key Project features approved by the City Council in March 2020 and incorporated into the design—eliminating one westbound traffic lane, incorporating a two-way cycle track, protected intersection improvements, improved pedestrian accessibility with shortened crossings, bus lanes, and enhanced bus stop waiting areas with shelters, lighting, and rider amenities—all contribute to making the 40th Street corridor and Transit Hub a safer and more comfortable environment. These features follow the Safe System Approach to proactively address vulnerable road user safety by reducing speed, removing conflicts, and separating users in space and time.

The engineering design was presented to the City Council in July 2023, and they directed the city to proceed with the Project and requested that additional safety features be incorporated that would further separate motor vehicle movements from pedestrian and bicycle movements. The added project features requested by the City Council, and described below, also follow the Safe System Approach.

- Watts Street allows right turning traffic to and from 40th Street. The Project eliminates right turning traffic from Watts Street to 40th Street while allowing right turning traffic from 40th Street. The crosswalk and the two-way cycle track are raised to sidewalk-level crossing Watts Street to slow right turning traffic. The half-closure will be designed to accommodate the turning radii of emergency vehicles, large delivery vehicles (SU-30), and WB-40 trucks. This change follows the Safe System Approach by reducing turning vehicle speeds and removing conflicts and responds to community feedback that drivers turning right from Watts Street may not look to the left and right for bicycle riders before proceeding onto 40th Street.
- Haven Street allows right turning traffic to and from 40th Street. The Project includes a cul-de-sac at Haven Street, eliminating right turning traffic both to and from Haven Street at 40th Street. This change will be accompanied with signage and potential curb and parking modifications to make the route changes intuitive to truck drivers. The cul-de-sac will be designed to accommodate the turning radii of emergency vehicles, large delivery vehicles (SU-30), and WB-40 trucks. This change follows the Safe System Approach by removing conflicts, and addresses community feedback that drivers turning right from Haven Street may not look to the left and right for bicycle riders before proceeding onto 40th Street as well as community support for expanded landscape treatments.
- Holden Street allows right turning traffic to and from 40th Street. The Project eliminates right turning traffic from Holden Street to 40th Street while allowing right turning traffic from 40th Street. The crosswalk and the two-way cycle track are raised to sidewalk level crossing Holden Street to slow right turning traffic. The half-closure will be designed to accommodate the turning radii of emergency vehicles, large delivery vehicles (SU-30), and WB-40 trucks. This change follows the Safe System Approach by reducing turning vehicle speeds and removing conflicts, and it addresses community feedback that drivers turning right from Holden Street may not look to the left and right for bicycle riders before proceeding onto 40th Street.

- Hubbard Street allows right turning traffic to and from 40th Street. The Project includes a cul-de-sac at Hubbard Street eliminating right turning traffic both to and from Hubbard Street. This change will be accompanied with signage and potential curb and parking modifications to make the route changes intuitive to truck drivers. The cul-de-sac will be designed to accommodate the turning radii of emergency vehicles, large delivery vehicles (SU-30), and WB-40 trucks. This change follows the Safe System Approach by removing conflicts, and addresses the following safety concerns from stakeholders and decision-makers:
    - Eastbound bicycle riders traveling at high speeds down the Shellmound Bridge (greater than 5% grade) and conflicting with vehicles turning right to and from Hubbard Street.
    - Trees, poles, and signage constraining sight lines between drivers turning right from Hubbard Street and eastbound bicycle riders (with Project construction).
    - The bus lane that ends at Hubbard Street, where buses merge into one shared mixed-flow lane over the bridge, increases rear-end crash potential with right turning traffic onto Hubbard Street.

The City Council, in July, also expanded the project to include Shellmound Street (Part 2) between the IKEA entry, where Part 1 is terminated, and the Christie Avenue intersection. Part 2 includes a two-way cycle track along the west side of Shellmound Street and bus lanes that would operate on weekdays, Monday through Friday. The bus lanes would be open to all traffic on weekends.

The remainder of this memorandum compares transportation conditions with and without the Project along 40th Street (Part 1) and Shellmound Street (Part 2) and includes the following key highlights:

- **Project Design and Implementation**: The Safe System Approach led to a Project that includes a multimodal transportation design, with features such as a two-way cycle track, bus lanes, and full or partial closures of unsignalized intersections to improve safety and accessibility for all road users. The Project is consistent with the City Council original decision in 2018 to embark on changing 40th Street to provide a safer environment for its most vulnerable users. The Project was approved by the City Council in March 2020, and the design was reviewed by the City Council in July 2023. The council, in July 2023, directed the city to proceed with the Project (Part 1 and Part 2) with additional safety features at the unsignalized intersections along the corridor to reduce vehicle speeds and remove vehicle conflicts with pedestrians and bicyclists. To address specific concerns from local businesses regarding commercial vehicle access, a comprehensive truck activity study was conducted; its findings and recommendations for truck routing are detailed in the *40th Street Multimodal Project - Truck Activity Analysis Memo*.
- **Public and Stakeholder Engagement**: Extensive community engagement efforts, including surveys and workshops, have been conducted and are on-going to gather feedback and refine the design. The Project team also engaged with key stakeholders,

including property owners and transit agencies, to address concerns and incorporate feedback into the design. The final design evaluated in this memorandum reflects public preferences for safety and accessibility improvements.

- **Safety Improvements**: The City Council in 2018 prioritized safety for the Project and the City followed the Safe System Approach to proactively address vulnerable road user safety throughout the project's design development. The Project, approved in 2020, addressed high-risk areas through design features such as protected intersections, bulb outs, and high-visibility crosswalks combined with the two-way cycle track with the aim to reduce vehicle speeds, remove conflicts, separate users in space and time, and reduce collisions. The City Council in July 2023, consistent with the Safe System Approach, incorporated additional safety features at unsignalized intersections to reduce speeds and remove conflicts.
- **Public Design**: In response to community feedback regarding safety and security in the newly created public spaces, the project incorporates Crime Prevention Through Environmental Design (CPTED) principles. The design of parklets and cul-de-sacs will maximize visibility, ensuring that activities are easily observed by passersby, adjacent businesses, and law enforcement. This includes strategic placement of lighting, clear sightlines, and open layouts. These design elements, combined with the City's ongoing and active encampment outreach and support programs, are intended to ensure these new public spaces enhance the quality of life for residents and businesses while deterring encampments and illicit behavior.
- **Multimodal Operations**: The analysis in this memorandum used Vissim software for Part 1 to simulate multimodal traffic operations during the weekday PM peak hour to understand multimodal operations without and with the Project. Findings show overall intersection operations along 40th Street remain at LOS D or better with the Project including the unsignalized side street modifications and so there will be no time incentive for drivers to divert to the Park Avenue corridor. Overall, bus travel times on 40th Street improve with the Project. Although delays increase such as through the Transit Hub where pedestrian and bike activities are highest. Intersection operations along Park Avenue and Hollis Street remain at LOS B or better with the Project indicating that changes to the 40th Street unsignalized intersections would not cause traffic congestion on either Park Avenue or Hollis Street. As noted in the *40th Street Multimodal Project - Truck Activity Analysis Memo* trucks are currently using Park Avenue even though truck restriction signs are posted throughout the corridor west of Hollis Street and the multimodal operations analysis assumed that this behavior would continue. To provide clearer direction and enhance safety, the city is implementing a holistic strategy for Park Avenue that includes new, clearer truck wayfinding signage to better direct commercial vehicles. The city is also actively improving pedestrian safety on Park Avenue through separate initiatives, such as the 2024 Sustainable Streetscapes project, which is adding high visibility crosswalks and green infrastructure bulb-outs at the Park Avenue and Hollis Street intersection. Multimodal operations analysis was also completed for Part 2 using

the Synchro software. Findings show that overall intersection operations along Shellmound Street remain at LOS D or better with the Project.

The remainder of this memorandum addresses the following topics.

1. Project Features
2. City Decision Process
   2.1. Engagement Efforts
3. Safety Assessment (40th Street and Shellmound Street)
   3.1. Collision Characteristics
   3.2. Vehicle Speed Implications
   3.3. Sight Distance Implications
   3.4. Conflict Points
   3.5. Compliance with Laws
   3.6. Adequacy of Traffic Control
   3.7. Adequacy of Bike and Pedestrian Facilities
   3.8. Reduce Behaviors Leading to Crashes
   3.9. Consideration for Two-Way Cycle Track
4. Multimodal Operations (40th Street, Project Part 1)
   4.1. Methodology
      4.1.1. Vissim Model
   4.2. Measures of Effectiveness
      4.2.1. Bus Maneuvering Time
      4.2.2. End-to-End Travel Time
      4.2.3. Level of Service
   4.3. Analysis Results
      4.3.1. Bus Maneuvering Time
      4.3.2. Corridor Travel Times
         4.3.2.1. Bus (AC Transit and EGR combined) Travel Times
         4.3.2.2. Auto / Truck Travel Times
      4.3.3. Level of Service and Delay Analysis
5. Multimodal Operations (Shellmound Street, Project Part 2)
   5.1. Methodology and Study Intersections
   5.2. Project Analysis Assumptions
   5.3. Analysis Results
      5.3.1. Level of Service and Delay Analysis
6. Appendix

1. Project Features

Attachment A provides a striping layout of the 40th Street Multimodal Project (Part 1 and Part 2), which was based, in part, on the preferred design concept described in the concept drawings approved by the City Council in 2020. The 2020 concept design for 40th Street (Part 1) converts an existing motor vehicle lane in the westbound direction to a bus lane, adds a new bus lane in the

eastbound direction, and provides a two-way cycle track on the north side of 40th Street by removing the existing on-street bike lanes and the on-street parking on the north side of 40th Street, adjusting the existing medians, and reducing the motor vehicle lane widths. Part 2 provides a two-way cycle track on the west side of Shellmound Street by removing the on-street bike lanes, modifying the median, and narrowing the motor vehicle lane widths.

On 40th Street (Part 1) the new eastbound bus lane starts after the IKEA Entry signalized intersection via a lane drop, east of the intersection, and ends at the Adeline Street intersection. The westbound bus lane starts after the Adeline Street signalized intersection and ends at Hubbard Street, where it merges with one shared mixed-flow lane over the bridge. On Shellmound Street (Part 2) one of the lanes in each direction operates as a bus lane on weekdays, Monday through Friday, and these lanes open to all traffic during the weekends.

A key feature of the 2020 concept is the traffic signal phasing on San Pablo Avenue. Due to high westbound right-turning traffic volume, the right-turn is protected with right-turn red, yellow, and green arrows. As a result, right turning traffic does not conflict with either bicycle or pedestrian movements crossing San Pablo Avenue, which would both go concurrently with the westbound motor vehicle through movement while the westbound right turning traffic has a red arrow.

Following the 2020 concept design, additional Project design features include changes to the unsignalized intersections along westbound 40th Street at Watts Street, Haven Street, Holden Street, and Hubbard Street. The specific design choices for these intersections were informed by a detailed truck activity analysis, which is documented in the *40th Street Multimodal Project - Truck Activity Analysis Memo* and addresses truck routing and circulation.

- Watts Street allows right turning traffic to and from 40th Street. The Project eliminates right turning traffic from Watts Street to 40th Street while allowing right turning traffic from 40th Street. The crosswalk and the two-way cycle track are raised to sidewalk-level crossing Watts Street to slow right turning traffic. The half-closure will be designed to accommodate the turning radii of emergency vehicles, large delivery vehicles (SU-30), and WB-40 trucks. This change addresses community feedback that drivers turning right from Watts Street may not look to the left for bicycle riders before proceeding onto 40th Street.
- Haven Street allows right turning traffic to and from 40th Street. The Project includes a cul-de-sac at Haven Street, eliminating right turning traffic both to and from Haven Street at 40th Street. This change will be accompanied with signage and potential curb and parking modifications to make the route changes intuitive to truck drivers. The cul-de-sac will be designed to accommodate the turning radii of emergency vehicles, large delivery vehicles (SU-30), and WB-40 trucks. This change addresses community feedback that drivers turning right from Haven Street may not look to the left for bicycle riders before proceeding onto 40th Street as well as community support for expanded landscape treatments.

- Holden Street allows right turning traffic to and from 40th Street. The Project eliminates right turning traffic from Holden Street to 40th Street while allowing right turning traffic from 40th Street. The crosswalk and the two-way cycle track are raised to sidewalk level crossing Holden Street to slow right turning traffic. The half-closure will be designed to accommodate the turning radii of emergency vehicles, large delivery vehicles (SU-30), and WB-40 trucks. This change addresses community feedback that drivers turning right from Holden Street may not look to the left for bicycle riders before proceeding onto 40th Street.
- Hubbard Street allows right turning traffic to and from 40th Street. The Project includes a cul-de-sac at Hubbard Street eliminating right turning traffic both to and from Hubbard Street at 40th Street. This change will be accompanied with signage and potential curb and parking modifications to make the route changes intuitive to truck drivers. The cul-de-sac will be designed to accommodate the turning radii of emergency vehicles, large delivery vehicles (SU-30), and WB-40 trucks. This change addresses the following concerns from stakeholders and decision-makers:
    - Eastbound bicycle riders traveling at high speeds down the Shellmound Bridge (greater than 5% grade) and conflicting with vehicles turning right to and from Hubbard Street.
    - Trees, poles, and signage constraining sight lines between drivers turning right from Hubbard Street and eastbound bicycle riders (with Project construction).
    - The bus lane that ends at Hubbard Street, where buses merge into one shared mixed-flow lane over the bridge, increases rear-end crash potential with right turning traffic onto Hubbard Street.

2. City Decision Process

The city presented the Project to the Transportation Committee in May 2023 and to the City Council in July 2023. **Attachment B** provides the Action Minutes for the Transportation Committee meeting, City Council Meeting, as well as the Adopted City Council Resolution (Number 23-105).

The May 2023 Transportation Committee meeting provided an update on the planning process, grant funding, public engagement, and anticipated schedule. Three alternatives were presented including the base project as well two alternatives that incorporated unsignalized intersection side street closures: one with a Horton diverter and one without the diverter. The committee raised concerns with the base project's design at the Hubbard Street/40th Street intersection. Specifically, bicycle riders descending Shellmound Bridge would travel at high speeds approaching Hubbard Street, conflicting with drivers turning to and from Hubbard Street. The committee was also concerned that two westbound vehicle lanes merging into a single lane at Hubbard Street would complicate driver decisions turning to and from Hubbard Street, that drivers would tend to speed

up when approaching Shellmound Street Bridge, and that bus merging would further complicate the condition. The committee passed a motion to recommend to the City Council a design alternative that includes the closure of the four unsignalized side streets i.e., Watts Street, Haven Street, Holden Street, and Hubbard Street.

The July 2023 City Council meeting was well attended with people speaking in support of and against the modified Project. Property owners along Hubbard Street, Holden Street, and Watts Street urged the council members not to fully close the connections to the side streets at 40th Street. The following are property owners' opinions on the modified Project:

- Property owners along Haven Street voiced support for the modified Project and closure of Haven Street at 40th Street to support weekend and evening events.
- Property owners on Holden Street expressed concerns about impacts on customers, including losing parking, but showed support for the modified Project if the council voted to allow the right turning traffic from 40th Street at Holden Street to accommodate delivery trucks and customer loading. Property owners on Watts Street expressed similar sentiments.
- An attorney for the property owner between Hubbard Street and Halleck Street expressed concern that closing Hubbard Street at 40th Street was a significant impact on the property's access.

The council members discussed these topics, and others, and directed the City to proceed with the modified Project including a cul-de-sac at Haven Street and accommodating right turning traffic from 40th Street onto Watts Street and onto Holden Street. After discussion, the council members determined that the Hubbard Street closure was necessary to improve the Project's safety, reducing the conflicts between high-speed bicycle riders and drivers turning to/from Hubbard Street as well as the merging and turning conflicts between drivers at Hubbard Street. The council members noted that Hubbard Street had parallel street access via Park Avenue. The 40th Street Multimodal Project (Attachment A) evaluated in this memorandum responds to the City Council direction.

2.1 Engagement Efforts During Design Development

In 2018, public engagement focused on design options. Invitations mailed to over 10,000 addresses in Emeryville and Oakland included an online survey link, which received ninety-three responses. Four out of five respondents preferred the final concept. A community workshop and survey in 2019 reaffirmed this preference, with over 70% of more than fifty respondents supporting it despite traffic trade-offs. The city council provided input on the concept design in December 2018 based on public input, technical assessment, and feedback from transit agencies. The final report and design were approved by the City Council in March 2020.

The final engineering design phase began in March 2023. The design was refined to assess full or partial closures of unsignalized intersections north of 40th Street, balancing local access and

reducing vehicle/bicycle conflicts. For example, AC Transit provided input through multiple meetings and plan reviews, leading to bus stop design refinements. Similarly, property owners, employees, and residents provided input, leading to design refinements.

Over six hundred Project postcards with multilingual contact information were mailed in June 2023 to residents and businesses in the broader area, and over 450 detailed letters were sent to those residing on 40th Street and the northside streets to convey the proposed side street closures. A dedicated Project phone number and email address were provided along with a Project webpage link. The Project team engaged with key stakeholders through phone calls, emails, and fourteen meetings with over seventy stakeholders. These meetings, held either at the stakeholders' business/property locations or via Zoom, aimed to reduce barriers to engagement.

The Project team contacted businesses along the side streets impacted by the street closures and met with specific businesses that requested a meeting to address the Project's implications to their business operations such as customer and delivery access, parking, and pedestrian and bicycle circulation. This outreach began in June 2023 and is on-going.

An online survey from February to June 2024 received 137 responses, with over 90% of bicyclists and transit riders and about 80% of pedestrians saying the Project with the side street closures would improve their travel. Almost 30% of drivers said the improvements would encourage them to take the bus or ride their bike.[1] The survey was publicized by contacting local employers, distributing the link to employees, emailing those on the Project email list, providing a QR code for the survey and Project website on sidewalk decals on 40th Street, and distributing the QR code to over 200 people at two project area energizer stations during 2024's Bike to Wherever Day on May 16. Spanish-speaking staff members were available at the stations.

The engagement efforts will continue and include information and education as the Project design is finalized, and the Project is constructed. Once the online survey is completed, a summary of input will be prepared, along with an update to the Project website to provide additional information and a frequently asked questions (FAQ) document responding to questions raised by respondents to the survey. The Project email list of more than eighty individuals and organizations will be notified when the website is updated. Additional meetings with adjacent businesses, property owners, and other stakeholders or stakeholder groups will occur as needed before the design phase concludes.

[1] https://fp.mysocialpinpoint.com/40thstreetmultimodal

3. Safety Assessment

The 40th Street Multimodal Project is intended to improve transportation infrastructure, emphasizing first/last mile connections and safety for residents on the corridor, employees commuting to their jobs, and people exploring the Bay Trail in the area. Safety features of the Project include the two-way cycle track providing a dedicated and protected space for riding; enhanced intersections with shorter crossing distances, accessible waiting areas, protected bicycle movements, and upgraded signal timing and phasing; side street full and partial closures to minimize conflicts between pedestrians, bike riders, and motor vehicles; and transit islands to separate bike riders from buses and pedestrian (un)loading activities. These features follow the Safe System Approach to proactively address vulnerable road user safety by reducing speed, removing conflicts, and separating users in space and time.

3.1 Collision Characteristics

The project area collision summaries (**Table 1** through **Table 4**) show forty-five crashes over a 12-year period (2013 to 2024) between vehicles and both cyclists and pedestrians that resulted in injury or fatality. During this same period there were sixty-three auto-only collisions with an injury or fatality. These collisions are also noted in **Figures 1A** through **Figure 1D**.

Collision records prior to 2013 are not available from the Statewide Integrated Traffic Records System (SWITRS) database which is managed by the California Highway Patrol or the Transportation Injury Mapping System (TIMS) database which is managed by SafeTREC at UC Berkeley. The 2023 and 2024 collision data are considered provisional by both agencies managing these databases and are, therefore, subject to change. Last, the COVID pandemic in 2020 and 2021 dampened traffic volumes which explains why there were fewer collisions in these two years compared to the earlier years between 2013 and 2019.

The remaining discussion in this section addresses the most vulnerable users – pedestrians and bicyclists – who experience a higher concentration of fatal and injury crashes compared to the total number of people traveling in the corridor.

Table 1A: Auto Collisions – 2013 Through 2018

Figure ID #	Case ID	Collision Date	Collision Severity	Type of Collision
1	6193510	7/3/2013	Complaint of pain	Rear End
2	5997040	1/19/2013	Complaint of pain	Rear End
3	6876971	2/5/2015	Injury (Other Visible)	Broadside
4	6859549	12/21/2014	Complaint of pain	Hit Object
5	8351677	9/6/2015	Injury (Other Visible)	Broadside
6	6693615	8/21/2014	Complaint of pain	Rear End

Figure ID #	Case ID	Collision Date	Collision Severity	Type of Collision
7	8365891	4/3/2017	Complaint of pain	Rear End
8	6699493	9/20/2014	Complaint of pain	Broadside
9	8620568	11/22/2017	Complaint of pain	Sideswipe
10	6418516	1/24/2014	Complaint of pain	Rear End
11	6537536	3/2/2014	Complaint of pain	Broadside
12	8351604	1/22/2017	Complaint of pain	Hit Object
13	8351602	11/24/2015	Complaint of pain	Sideswipe
14	8625210	8/10/2017	Complaint of pain	Rear End
15	8351610	12/11/2015	Complaint of pain	Broadside
16	8351609	7/29/2015	Complaint of pain	Sideswipe
17	90261275	8/30/2016	Complaint of pain	Head-on
18	8618347	10/21/2017	Injury (Other Visible)	Rear End
19	8620576	11/4/2017	Complaint of pain	Rear End
20	8351613	2/18/2016	Complaint of pain	Rear End
21	6698881	8/15/2014	Injury (Severe)	Not Stated
22	8351674	1/29/2016	Complaint of pain	Broadside
23	8351636	7/3/2016	Complaint of pain	Broadside
24	6859545	12/18/2014	Complaint of pain	Broadside
25	8351628	7/9/2016	Complaint of pain	Rear End
26	8351670	2/8/2017	Complaint of pain	Hit Object
27	6942267	1/9/2015	Complaint of pain	Rear End
28	8769211	12/5/2018	Injury (Other Visible)	Rear End
29	8351601	6/20/2015	Complaint of pain	Rear End
30	6296070	9/25/2013	Complaint of pain	Rear End
31	6942729	4/25/2015	Complaint of pain	Rear End
32	8363436	4/13/2017	Complaint of pain	Rear End
33	8618351	10/8/2017	Complaint of pain	Rear End
34	8624223	8/28/2017	Complaint of pain	Broadside
35	6516655	3/1/2014	Complaint of pain	Rear End
36	8351615	11/5/2015	Complaint of pain	Overturned
37	8695573	8/9/2018	Complaint of pain	Rear End
38	6942699	3/17/2015	Complaint of pain	Sideswipe

Source: SWITRS and TIMS databases (2013 through 2018), Fehr & Peers 2025

Table 1B: Auto Collisions – 2019 Through 2024

Figure ID #	Case ID	Collision Date	Collision Severity	Type of Collision
1	8897786	6/6/2019	Injury (Other Visible)	Broadside
2	82356747	2/27/2024	Complaint of pain	Rear End
3	9463379	6/27/2022	Injury (Other Visible)	Broadside
4	9546726	12/22/2022	Complaint of pain	Broadside
5	8970835	9/15/2019	Injury (Other Visible)	Rear End
6	8907495	7/7/2019	Complaint of pain	Rear End
7	9301796	7/14/2021	Fatal	Head-on
8	9435254	3/17/2022	Injury (Severe)	Sideswipe
9	8877134	5/7/2019	Complaint of pain	Rear End
10	9546829	8/17/2022	Complaint of pain	Broadside
11	9547117	8/9/2022	Complaint of pain	Hit Object
12	84514380	11/30/2024	Complaint of pain	Rear End
13	82877692	6/27/2024	Complaint of pain	Rear End
14	8943597	8/15/2019	Injury (Other Visible)	Rear End
15	84472530	11/4/2024	Complaint of pain	Broadside
16	82367255	3/30/2024	Complaint of pain	Rear End
17	9016746	1/28/2020	Injury (Other Visible)	Rear End
18	8943530	8/1/2019	Injury (Other Visible)	Head-on
19	8907483	7/16/2019	Injury (Other Visible)	Rear End
20	9547052	10/5/2022	Complaint of pain	Rear End
21	9547067	9/21/2022	Complaint of pain	Sideswipe
22	9221278	12/22/2020	Injury (Other Visible)	Head-on
23	84420296	9/20/2024	Injury (Severe)	Broadside
24	8975255	10/26/2019	Complaint of pain	Sideswipe
25	9546725	12/12/2022	Complaint of pain	Rear End

Source: SWITRS and TIMS databases (2019 through 2024), Fehr & Peers 2025

Table 1C: Bicycle Collisions – 2013 Through 2024

Figure ID #	Case ID	Collision Date	Collision Severity	Type of Collision
1	6699150	10/13/2014	Complaint of pain	Broadside
2	82356738	2/17/2024	Complaint of pain	Other
3	8351625	2/15/2016	Injury (Other Visible)	Broadside
4	8855841	4/24/2019	Injury (Other Visible)	Rear End
5	6203353	8/10/2013	Complaint of pain	Broadside
6	8625084	4/25/2018	Complaint of pain	Broadside
7	8975787	10/2/2019	Injury (Other Visible)	Broadside
8	82376433	3/23/2024	Complaint of pain	Head-on
9	6436788	2/26/2014	Complaint of pain	Other
10	6698905	8/16/2014	Complaint of pain	Not Stated
11	6835732	11/25/2014	Complaint of pain	Rear End
12	8003055	11/14/2015	Complaint of pain	Broadside
13	6430197	2/24/2014	Injury (Other Visible)	Head-on
14	6623331	5/9/2014	Complaint of pain	Broadside
15	8351605	8/27/2016	Complaint of pain	Broadside
16	6699513	9/12/2014	Injury (Other Visible)	Not Stated
17	9548591	9/4/2022	Complaint of pain	Head-on
18	6537548	3/13/2014	Complaint of pain	Not Stated
19	6699166	10/13/2014	Injury (Other Visible)	Broadside
20	6298964	10/26/2013	Complaint of pain	Broadside
21	6630001	6/18/2014	Injury (Other Visible)	Not Stated
22	8351665	7/20/2015	Injury (Other Visible)	Sideswipe
23	9456342	5/23/2022	Injury (Other Visible)	Other
24	6623916	7/5/2014	Injury (Other Visible)	Broadside
25	8351645	10/15/2015	Complaint of pain	Head-on
26	84359241	8/5/2024	Complaint of pain	Broadside
27	8351671	6/22/2016	Injury (Other Visible)	Broadside
28	8351631	10/20/2015	Complaint of pain	Rear End
29	84518724	12/5/2024	Complaint of pain	Broadside

Source: SWITRS and TIMS databases (2013 through 2024), Fehr & Peers 2025

Table 1D: Pedestrian Collisions – 2013 Through 2024

Figure ID #	Case ID	Collision Date	Collision Severity	Type of Collision
1	5997036	1/28/2013	Complaint of pain	Vehicle/Pedestrian
2	9168089	9/9/2020	Injury (Other Visible)	Vehicle/Pedestrian
3	6204825	6/12/2013	Complaint of pain	Vehicle/Pedestrian
4	8880116	5/3/2019	Injury (Other Visible)	Vehicle/Pedestrian
5	9554440	1/29/2023	Injury (Severe)	Vehicle/Pedestrian
6	8351603	11/8/2015	Complaint of pain	Vehicle/Pedestrian
7	8774390	12/16/2018	Injury (Other Visible)	Vehicle/Pedestrian
8	9548599	10/20/2022	Injury (Other Visible)	Head-on
9	6699505	9/20/2014	Complaint of pain	Vehicle/Pedestrian
10	6106326	2/12/2013	Complaint of pain	Vehicle/Pedestrian
11	6299543	9/6/2013	Injury (Other Visible)	Vehicle/Pedestrian
12	6418488	1/26/2014	Complaint of pain	Vehicle/Pedestrian
13	5997020	1/31/2013	Injury (Other Visible)	Vehicle/Pedestrian
14	8756515	11/17/2018	Injury (Other Visible)	Head-on

Source: SWITRS and TIMS databases (2013 through 2024), Fehr & Peers 2025

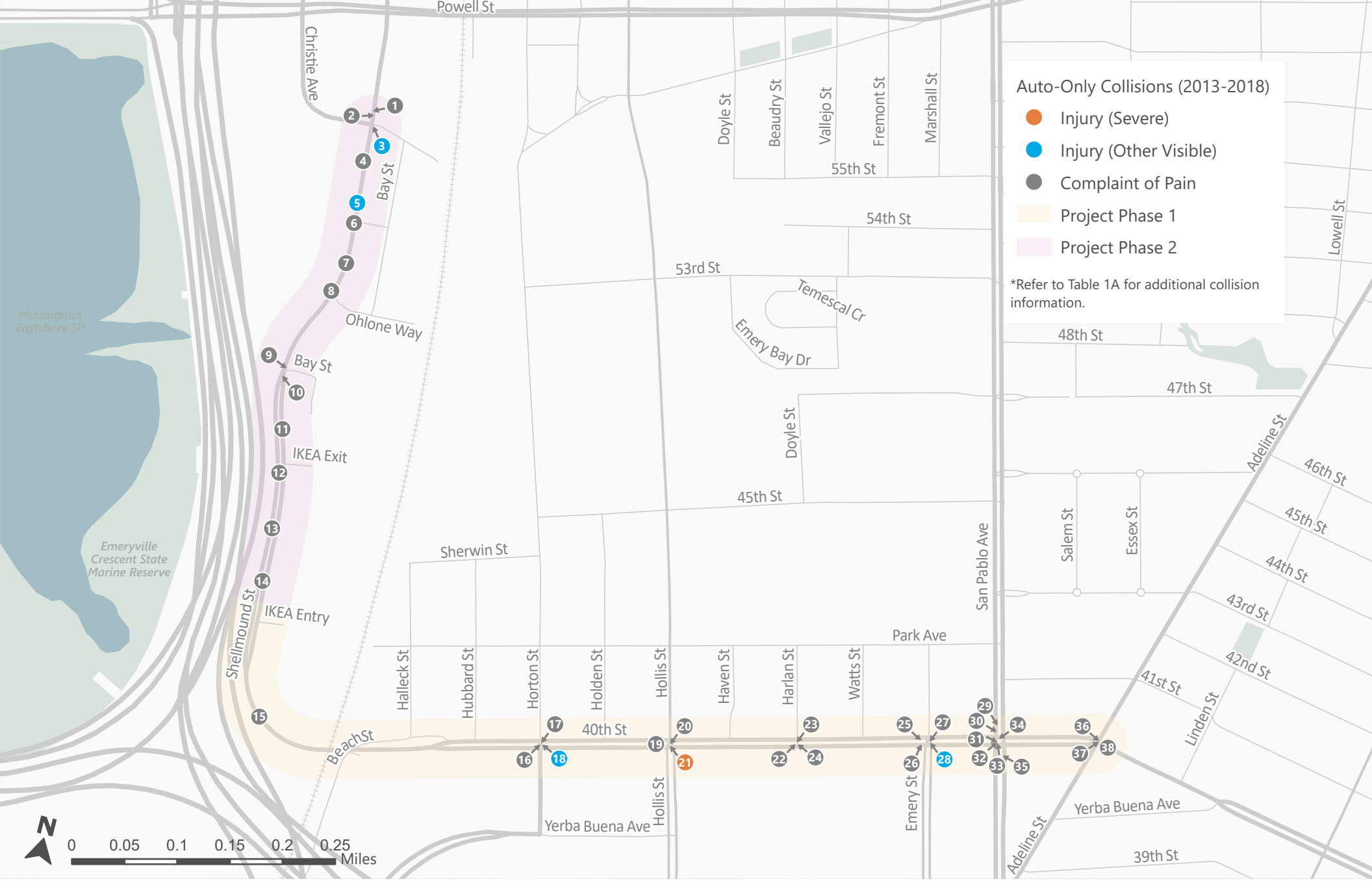


Figure 1A

40th Street Multimodal Project

Auto-Only Collisions Map (2013-2018)

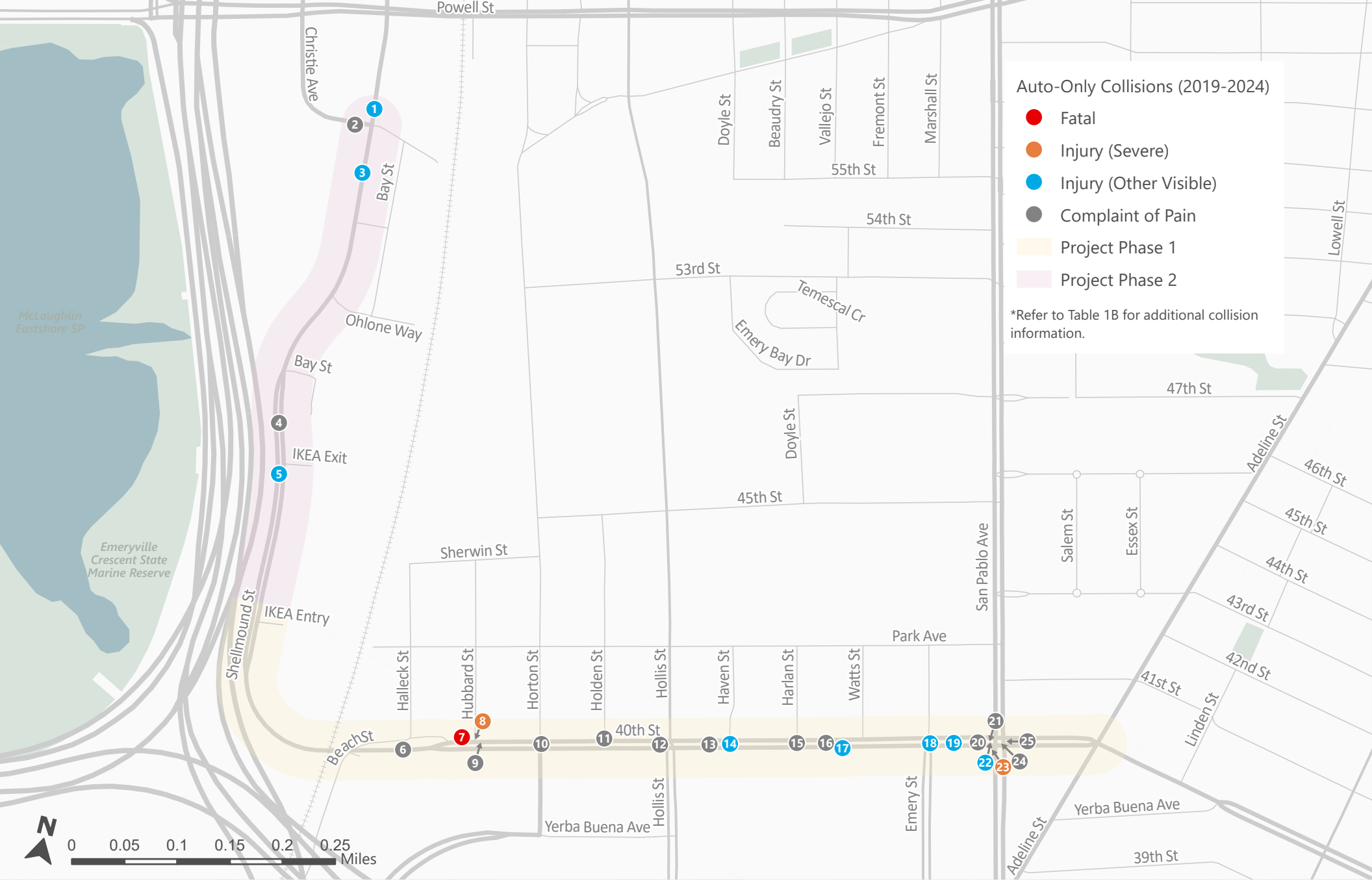


Figure 1B

40th Street Multimodal Project

Auto-Only Collisions Map (2019-2024)

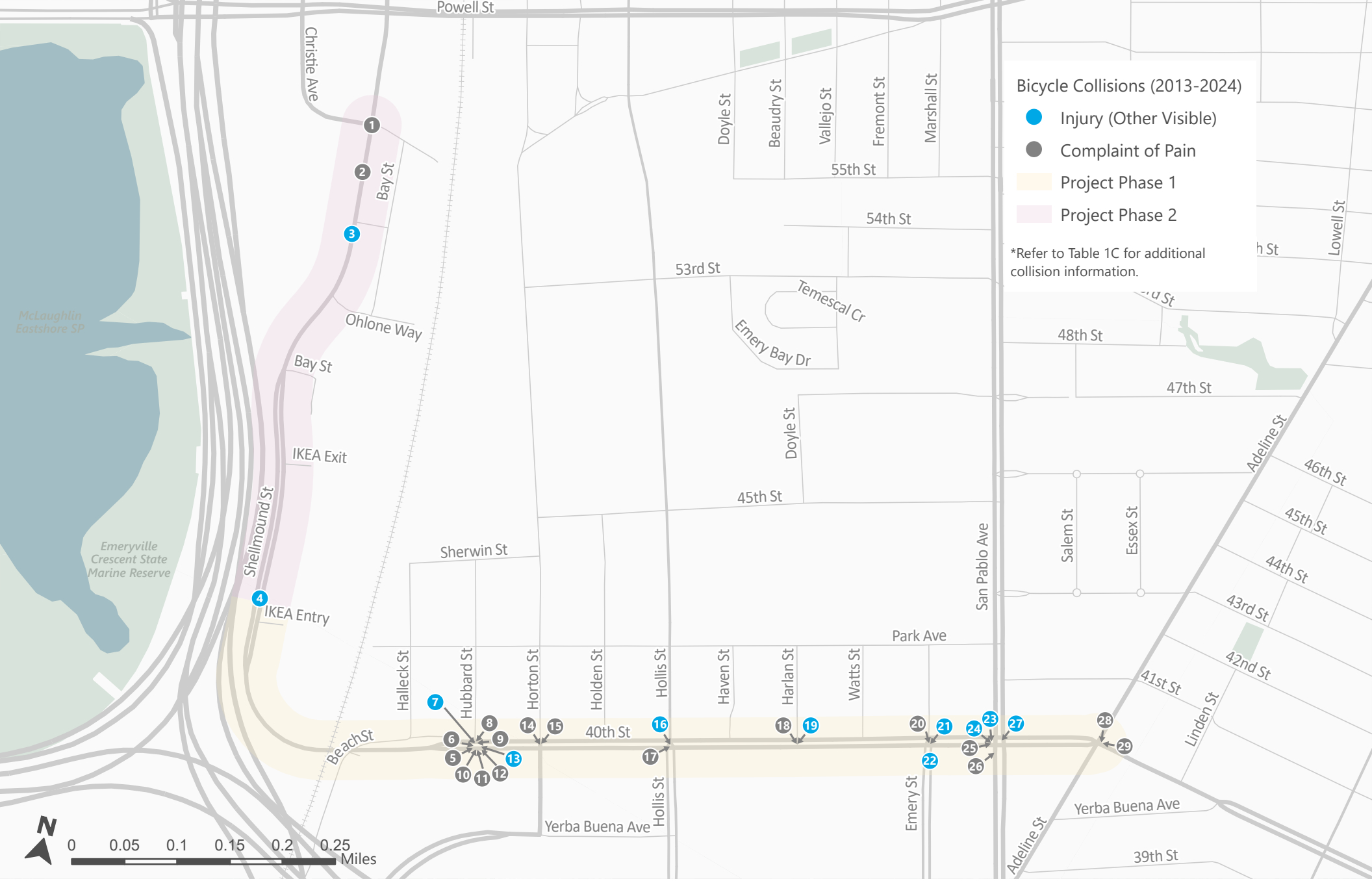


Figure 1C

40th Street Multimodal Project

Bicycle Collisions (2013-2024) Map

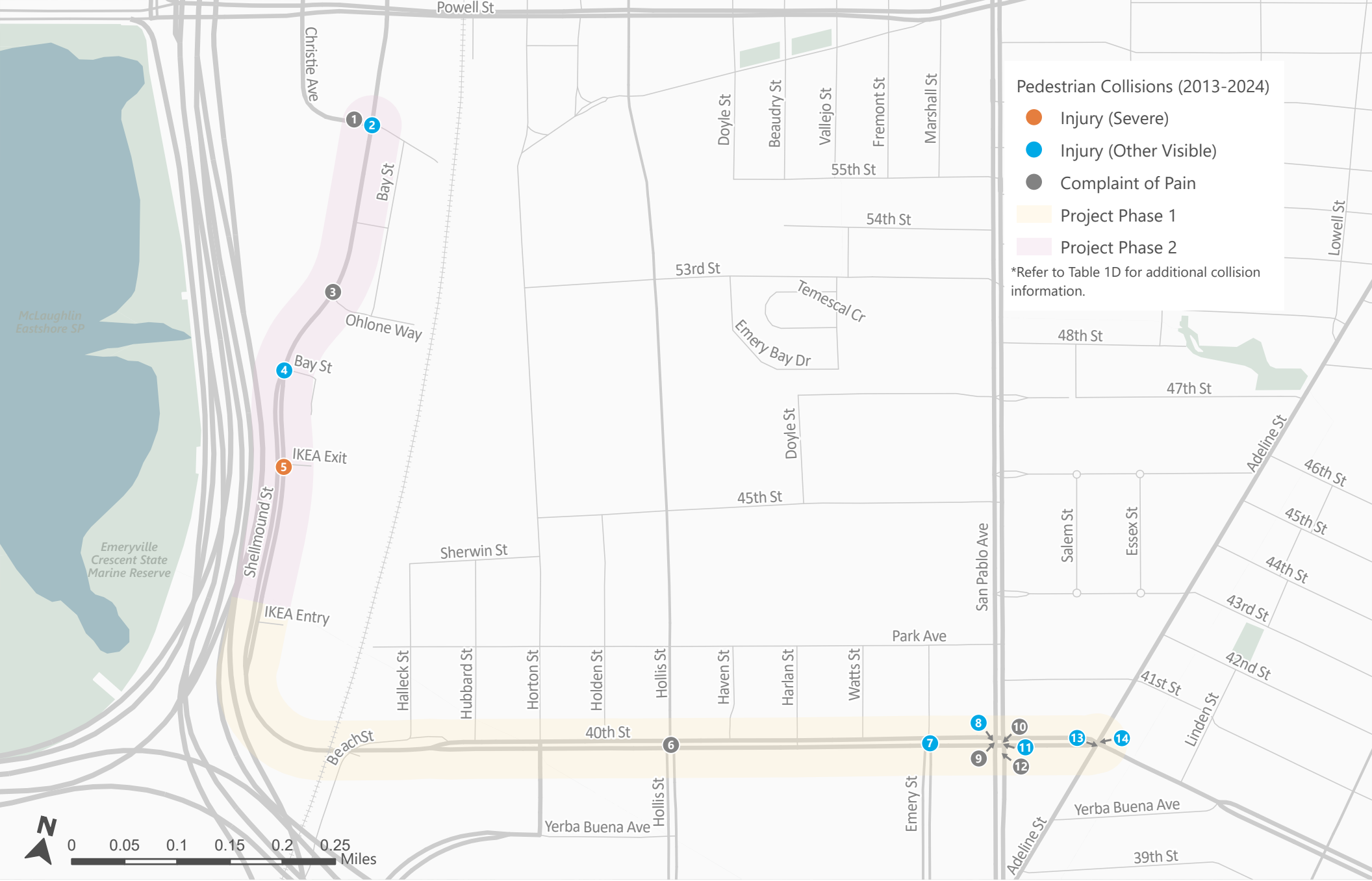


Figure 1D

40th Street Multimodal Project

Pedestrian Collisions (2013-2024) Map

Along 40th Street (Part 1), nine bike injuries, or complaints of pain, occurred at the intersection of 40th Street and Hubbard Street. This intersection is a concern because it tees into an uncontrolled part of 40th Street where the two existing westbound lanes merge together into a single lane over the bridge. Drivers tend to speed through the merge to be the first to go over the bridge. Vehicles are also able to turn into Hubbard uncontrolled. The Project proposes fully closing vehicular access to and from 40th Street at Hubbard, except for emergency vehicles, to minimize the safety risk to bicycle riders. Cyclists coming down off the bridge on the newly constructed two-way cycle track will not need to worry about a vehicle exiting Hubbard and forgetting to look both ways.

At the signalized intersection of 40th Street and Horton Street two bike collisions occurred, two each occurred at Hollis Street and Harlan Street, and three occurred at Emery Street. The Project will reduce the crossing length of 40th Street and will provide a protected intersection on the north side to minimize these collisions.

Pedestrian collisions occurred at the 40th Street signalized intersections with Hollis Street (1), Emery Street (1), San Pablo Avenue (5), and Adeline Street (2). Pedestrian crossing distances at these intersections will be decreased and directional curb ramps will be constructed, providing better visibility at these corners that have existing buildings at the back of the sidewalk.

Forty feet west of San Pablo Avenue there was a bike collision on 40th Street that could have been the result of a vehicle not looking for cyclists when pulling in and out of the on-street parking area or a vehicle parking and swinging their door open into a cyclist. The property facing this area, Black & White Liquor, has excess off-street parking, but this on-street parking (20-minute maximum) is available for customers who want to quickly access the liquor store. City staff worked with the property owner to create an opening through the property's fence so that customers will be able to park in the off-street parking and still quickly access the liquor store.

Within the San Pablo Avenue Transit Hub area, seven bike collisions occurred on 40th Street, five at San Pablo Avenue and two at Adeline Street; five pedestrian collisions also occurred at San Pablo Avenue and two pedestrian collisions also occurred at Adeline Street. The Transit Hub area has a high concentration of pedestrians and cyclists, in addition to a high concentration of vehicular traffic, including heavy bus traffic. The elimination of one traffic lane and the incorporation of the two-way cycle track, protected intersection improvements, improved pedestrian accessibility with shortened crossings, and enhanced bus stop waiting areas will all contribute to making the Transit Hub a safer and more comfortable environment.

There were fewer collisions along Shellmound Street (Part 2) where during the same 12-year period there were four bicycle injury collisions and five pedestrian injury collisions.

The data shows a clear trend of high-risk intersections and midblock areas, particularly where visibility is poor, and vehicle speeds are high. Speeding, poor sight distance, inadequate traffic control devices, and conflicts between vehicles, pedestrians, and cyclists are common factors in

these collisions. The Project's comprehensive approach targets these specific issues by implementing measures such as lane reductions to calm traffic, protected bikeways to separate cyclists from vehicular traffic, removing vehicle movements at unsignalized intersections that conflict with pedestrians and bicycle riders, and enhanced signalization to improve compliance with traffic laws.

The Project's design addresses each identified collision type and location with targeted safety improvements. For instance, merge and pedestrian conflict points at uncontrolled intersections will be mitigated by closing or controlling these access points. Enhanced pedestrian crossings will reduce crossing distances and improve visibility, addressing common collision points. The two-way cycle track and protected intersections will reduce conflict points between vehicles and cyclists, providing a safer environment for all nonmotorized users.

3.2 Vehicle Speed Implications

The Project incorporates a road diet reducing the number of motor vehicle lanes from two in each direction to one lane in the westbound direction. The change means that driving speeds will be determined by the drivers traveling at a slower speed, sometimes referred to as the "prudent driver." On a street with two lanes each way drivers make lane changes to pass slower moving drivers and this tends to increase driving speeds along a corridor. The Project reduces the number of lanes to one lane in the westbound direction and so drivers cannot change lanes to pass slower moving drivers.

Driving speeds with the Project are expected to decrease such that average driving speed before the Project becomes the 85th percentile speed after the Project's road diet. This is because average driving speeds before the Project dictate the predominant speed when drivers are unable to pass slower moving drivers with the Project. The net benefit is a speed reduction of 4 to 6 miles per hour. Because speed is exponentially related to severe injuries and fatalities when a collision occurs, this speed reduction is meaningful for vulnerable road users in the corridor.

3.3 Sight Distance Implications

Currently, intersections have narrow sidewalks with buildings that come up to the back of sidewalk, causing inadequate intersection sight distance. The sidewalks narrow to four feet in areas where there is a history of pedestrian collisions, such as at Hollis and Horton Streets. There are also areas where proper daylighting at intersections is not provided, thus limiting visibility.

The Project improvements will resolve these sight distance and visibility issues by providing bulb outs and protected intersections, shifting the motor vehicle travel lanes away from the buildings, and red curbing intersections to the currently recommended distances of 20 feet minimum near side and far side of each intersection with a 30-foot minimum near side at each signalized intersection. These proven countermeasures will be effective in reducing collisions along the

corridor: the Caltrans Local Roadway Safety Manual gives the following values for crash reduction factors: 1) NS11, "Improve sight distance to intersection" (Crash Reduction Factor = 20%).

3.4 Conflict Points

Currently, nonmotorized users, including pedestrians and cyclists, are proximate to high-speed vehicles with no protection. These conflicts occur midblock, at crossings, and at intersections. The highest kinetic energy risk (injury risk) occurs when speed and mass are high in conflict with vulnerable road users. High speed locations include midblock, high speed right turns (with large radii), and high speed left turns (on and off the corridor where turns are not protected). These conflict points are exacerbated where heavy vehicles (trucks and buses) are also present.

The Project will address conflict severity by reducing speed throughout the corridor by 4 to 6 mph. To address midblock conflicts, the physical raised median that will be constructed to separate motorized and nonmotorized users on the north side of 40th Street will provide a significant benefit to pedestrians and cyclists. Pedestrians will be separated from motorized traffic by the raised median and the two-way cycle track. Cyclists will be separated from the motorized traffic by the raised median and green infrastructure improvements. Conflicts with buses will be addressed with bus stop enhancements and dedicated bus lanes. Finally, turning movement conflicts will be addressed with intersection geometry and signal adjustments to separate users in space and time. These proven countermeasures will be effective in reducing collisions along the corridor: the Caltrans Local Roadway Safety Manual gives the following value for crash reduction factors: R34PB, "Install Separated Bike Lanes" (Crash Reduction Factor = 45%).

3.5 Compliance with Laws

The Project incorporates design elements to prevent motorists from speeding and ensure compliance with California Vehicle Code 21209 VC, which prohibits vehicles from being driven in bicycle lanes. The Project introduces physically protected bicycle lanes with barriers, putting both eastbound and westbound bicycle riders on the north side of the street in a two-way separated bikeway, making it difficult for vehicles to encroach on these lanes. This separation enhances the safety of cyclists by clearly delineating the space for bicycles and motor vehicles. Additionally, the Project reduces the number of westbound vehicle travel lanes to a single lane. This design change significantly impacts driver behavior by eliminating opportunities to pass slower traffic, naturally calming traffic flow and reducing speeds. The narrower roadway and single westbound travel lane create a visual and physical environment that encourages drivers to adhere to the posted speed limit. The implementation of these measures, including the two-way protected bike lanes and reduced lane widths, not only discourages speeding but also promotes safer interactions between motorists and cyclists. By designing the roadway to control and moderate vehicle speeds, the Project ensures a safer, more predictable environment for all road users, aligning with the goals of improving safety and accessibility in Emeryville.

3.6 Adequacy of Traffic Control

Uncontrolled movements at unsignalized intersections on the north side of 40th Street (at Hubbard, Holden, Haven, and Watts) encourage vehicle encroachment into the crosswalk, bike lane, and parking as motorists look for a gap in traffic flow on 40th Street. Uncontrolled movements and permissive conflicts present significant risks, as they allow vehicles to move freely into crosswalks and bike lanes without dedicated signals or barriers that protect nonmotorized users, increasing the likelihood of crashes. This lack of control creates dangerous interactions. The Safe System hierarchy of pro-active countermeasures to address kinetic energy risk emphasizes the need for physical separation and controlled movements to minimize risk of collisions and injuries.

AC Transit buses are impacted by the traffic signal operations at Emery Street, San Pablo Avenue, and Hollis Street, illustrating the negative effects the current signal configuration has on near side bus stop operations. This inadequacy not only affects bus operations but also exacerbates conflicts with other road users, highlighting the need for improved, pro-active, traffic controls.

On higher speed, higher volume roadways, vulnerable road users should be separated in space and time to ensure their safety. The current traffic controls along 40th Street are inadequate because they do not provide this essential separation, particularly where heavy vehicles such as trucks and buses interact with cyclists and pedestrians.

The Project incorporates design elements to separate vulnerable users in space and time. Uncontrolled turns at unsignalized intersections will be eliminated with full closures or minimized to right-turns only with partial closures, eliminating or minimizing vehicle encroachments into crosswalks and bike lanes. A key feature of the concept design is the traffic signal phasing on San Pablo Avenue. Due to high westbound right turning traffic volume, the right-turn should be protected with right-turn red, yellow, and green arrows. As a result, right turning traffic will not conflict with either bicycle or pedestrian movements crossing San Pablo Avenue, which would both go concurrently with the westbound motor vehicle through movement. Bicycle signal heads and phasing will further separate bicycle movements, where applicable.

3.7 Adequacy of Bike and Pedestrian Facilities

Currently, pedestrians and bicyclists using the corridor are confronted with Class II bike lanes with no intersection treatments or dedicated bicycle signal phasing, pedestrian facilities that do not meet accessibility standards, and inadequate crosswalks and sidewalks. As noted in Caltrans DIB 94 (https://dot.ca.gov/-/media/dotmedia/ programs/design/documents/dib-94-010224-a11y.pdf), Class II bike lanes are not appropriate for the speed and volume of the corridor. Additionally, the wide pedestrian crossings increase exposure, and the cross slopes do not meet the needs of community members with disabilities. Lack of bicycle treatments at intersections increases the risk of right-hook and left-hook bicycle-vehicle collisions at intersections.

The Project follows the Safe System Approach to proactively address vulnerable road user safety by reducing speed, removing conflicts, and separating users in space and time. The Project replaces the existing Class II bike lanes with a two-way cycle track (Class IV bike lanes), which may reduce bicycle-vehicle crashes by up to 53% according to the California Local Road Safety Manual (LRSM). The addition of advanced stop bars may reduce pedestrian crashes by up to 25%. The Project includes high-visibility crosswalks at all intersections, which may reduce vehicle-pedestrian crashes by up to 40%, and adds curb extensions to reduce pedestrian crossing distance. Bike boxes, green-backed sharrows, protected corners, and dedicated bicycle phasing reduce conflict at intersections by separating bicyclists from other road users in space and time. The Project reduces the number of vehicles crossing bicycle and pedestrian movements throughout the corridor by up to 100% at Hubbard and Haven Streets. The Project will also improve accessibility by constructing a new accessible sidewalk on the west side of Hubbard Street and bringing the cross slopes of intersections into compliance with accessibility regulations.

3.8 Reduce Behaviors Leading to Crashes

Following the Safe System Approach, this Project seeks to create a self-enforcing design where "safe behaviors are the easy behaviors" and mistakes do not have lethal consequences. Behaviors that will be eliminated or reduced include speeding, right-hook crashes, contra-flow bicycle riding, and motorist encroachment into the bike lane. As noted above, the road diet is expected to reduce corridor speeds and reduce pedestrian crossing distances.

The two-way separated bikeway and increased multimodal accessibility at intersections will reduce contra-flow bicycle travel. The separation also provides a barrier that prevents moving vehicles from passing, loading, or parking in the bike lane. The Project separates users in time using protected left and right turn phases at high-volume conflict points, reducing crashes associated with turning movements.

3.9 Considerations for Two-Way Cycle Track

Strictly from a traffic engineering perspective, the average daily traffic, posted speeds, and observed speeds were assessed. Observed motor vehicle speeds exceeded 20 mph along the corridor and ADT was above 10,000. Caltrans guidance (DIB 94) recommends a Class I or Class IV bicycle facility for this speed and volume context. But when evaluating and selecting the bikeway facility type for the Project, multiple factors were considered to ensure the chosen design would best serve community needs while addressing safety, accessibility, and connectivity concerns.

The decision to implement a two-way cycle track (Class IV facility) was influenced by critical considerations. Community engagement has been a cornerstone of the Project's development since its inception. In 2018, a series of workshops, surveys, and public meetings were held to gather input on design options. These engagement activities included morning and evening pop-ups at bus stops, community workshops, and an online survey. Invitations were mailed to over 10,000 addresses in Emeryville and Oakland, ensuring broad participation. Feedback from these

sessions highlighted a strong community preference for a separate bikeway to enhance safety and encourage cycling.

Emeryville is an urban environment with high pedestrian and cyclist activity. The selected bikeway facility needed to reflect the urban context and support the City's goals for active transportation. The 40th Street corridor serves as a regional bike corridor connecting residential areas, commercial centers, and transit hubs. It is an essential bike corridor serving a diverse range of users, including commuters, families, shoppers, and recreational cyclists. The Project creates a single, seamless, and safe arterial bike corridor connecting three distinct networks: the local bicycle network, the regional transit network (with direct links to MacArthur BART and West Oakland BART), and the recreational Bay Trail system. This strategic connection justifies the investment in 40th Street itself, as it serves a broader regional function beyond what Emeryville's local bike network connections provide.

Safety was a paramount concern in the decision-making process. The corridor has experienced a considerable number of vehicle-cyclist and vehicle-pedestrian collisions, particularly at intersections. Community feedback underscored the need for a design that minimizes conflict points between vehicles and nonmotorized users. The two-way cycle track addresses these concerns by providing a physical barrier between cyclists and motor vehicles, thereby reducing the risk of collisions. In addition to the bikeway, the Project incorporates traffic calming measures to further enhance safety. The reduction of vehicle travel lanes and the implementation of full and partial closures at unsignalized intersections were designed to slow down traffic and create a more predictable environment for all users. These measures complement the two-way cycle track by ensuring that motor vehicles operate at safer speeds along the corridor. Even with closures, the two-way cycle track could be integrated into the existing right-of-way without significant roadway widening or the removal of essential pedestrian amenities.

4. Multimodal Operations (40th Street Project Part 1)

4.1 Methodology

The multimodal operations analysis was prepared using Vissim multimodal microsimulation software, which provides outputs for a range of measures of effectiveness (MOE). The MOEs calculated from the Vissim model were based on an average of ten simulation runs to account for random vehicle, pedestrian, and bicycle arrivals. Conditions for weekday PM commute peak hour were modeled and the results documented. The model used new multimodal traffic counts taken for all study intersections in January 2023 and in March 2024 and reflect the recently opened Chick-fil-A on the southwest corner of Horton Street at 40th Street. The model also included traffic from yet to be built major development projects including buildout of the Sherwin Williams and BMR developments. Two alternatives were evaluated, and **Attachment C** provides the multimodal traffic volumes used in the analysis.

- **Alternative 1 (2025 Forecast)** – Existing traffic volumes plus traffic from approved major development projects yet to be built. This includes the buildout of the Sherwin Williams and BMR sites with 2023 geometrics and traffic signal operations.
- **Alternative 2 (Modified Project)** – Same traffic volumes as Alternative 1 with the Project geometry approved by City Council in July 2023, including unsignalized side street closures and optimized traffic signal operations.

4.1.1 Vissim Model

Multimodal operations for pedestrians, bicycles, motor vehicles, and transit modes were modeled during the weekday PM commute peak hour. Bicycle, pedestrian, and vehicle volumes were loaded into the model to simulate how individual bicycles, pedestrians, buses, trucks, and cars interact with transit along the 40th Street corridor. Buses entered and exited the network according to posted bus times on AC Transit and Emery Go-Round (EGR) websites.

The Vissim model was validated to the City of Emeryville's citywide Synchro software network and field observations. Both software platforms (Vissim and Synchro) use the methods outlined in the *Highway Capacity Manual* (HCM) to evaluate multimodal traffic operations.

The Vissim model accounts for intersections interacting with each other across the length of the corridor while the Synchro model looks at each intersection in isolation. The increase in vehicle delay is especially important at the San Pablo Avenue and 40th Street intersection where, during the PM peak hour, vehicle queues spill back to upstream intersections. The Vissim model captures

the effect of this spillback on upstream intersection operations, leading to results that better reflect field observations.

Given the bus stop modifications analyzed with this Project, special focus was placed on simulating transit operations in the corridor for the AC Transit and Emery Go-Round (EGR) services. At existing stops with width for cars to pass, buses were assumed to pull up to the curb and out of the travel lane, allowing vehicles to pass. This requires the bus to merge back into traffic after completing the stop, which is consistent with field observations. Bus dwell times, defined as the time when a bus is stationary with doors open at a stop, were based on field observation averages. Based on observations, AC Transit buses have longer dwell times than EGR buses. This is likely because AC Transit buses require passengers to pay fares individually during boarding, which increases dwell time. EGR service does not require a fare; therefore, the boarding process is faster. The model used average dwell time for AC Transit and EGR buses.[2]

The dwell time for all buses in the model is constant because the objective of this analysis is to compare the location and type of stops on the corridor between existing and Plus Project conditions and their respective impact on multimodal operations. By keeping dwell time constant, the maneuvering time into and out of each stop becomes the analysis focus, which aligns with the goal of analyzing the location and type of stops on the corridor. For AC Transit buses the dwell time is 12 seconds; for EGR buses the dwell time is 8 seconds.

All buses were assumed to stop on 40th Street at the San Pablo Avenue and Emery Street stops, while buses stop 50% of the time at all other stops on the corridor. This assumption provides enough data to perform a comprehensive stop analysis and captures the lower observed stop rate at the other stops in the corridor.

The calibrated Vissim model used for the *40th Street Multimodal Project – Multimodal Transportation Analysis* (August 2023) was used for this analysis. The model was expanded to include the following additional intersections on Park Avenue, north of 40th Street, to assess travel times and traffic operations with the Project and the unsignalized side street closures. The added Park Avenue intersections are:

- Park Avenue at Hubbard Street
- Park Avenue at Holden Street
- Park Avenue at Haven Street
- Park Avenue at Harlan Street
- Park Avenue at Watts Street
- Park Avenue at Emery Street
- Park Avenue at San Pablo Avenue

[2] Wheelchair loading was not considered in the model. If a bus is stopped 8 to 10 minutes for wheelchair loading this would mean that the bus lane is blocked and buses behind the stopped bus would enter the adjacent travel lane to go around the stopped bus.

4.2 Measures of Effectiveness

Three evaluation metrics were used to develop and evaluate the Project for transit service in the corridor: bus maneuvering time into and out of stops, end-to-end travel time on 40th Street, and intersection level of service.

4.2.1 Bus Maneuvering Time

Bus maneuvering time focuses on the behavior of buses at bus stops and was calculated according to the following equations:

- Total Delay = (Bus Travel Time – Free Flow Time)
- Maneuvering Time = Total Delay – Dwell Time

Free flow time is the time the bus would take to travel through the bus stop area if it did not stop at the bus stop. Free flow time was calculated based on the link segment distance that contains the bus traveling at the posted speed. **Bus travel time** is output by Vissim and is the actual time it takes the bus to travel the bus stop link segment distance, including time spent stationary at the curbside bus stop and time to merge in and out of the travel lane. **Total delay** is the difference between bus travel time and free flow time and represents the amount of time the bus spends making the stop. **Dwell time** is also output by Vissim. For this study, this time was kept fixed based on field observations. Maneuvering time is the difference between total delay and dwell time and represents the amount of time the bus spends merging out of and into traffic at each bus stop.

4.2.2 End-to-End Travel Time

End-to-end travel time is the actual time vehicles spend in the study corridor and is a measure of travel time performance. This metric is calculated for vehicles traveling eastbound and westbound on 40th Street between the IKEA Entry intersection and Yerba Buena Avenue intersection with 40th Street, about 650 feet east of Adeline Street, and vice versa. The analysis includes the auto/ truck vehicle class and the bus vehicle class i.e., AC Transit and EGR. Note that the findings in this memorandum subdivide the end-to-end travel time to include travel time through the transit hub, travel time west of the transit hub, and travel time east of the transit hub.

4.2.3 Level of Service

Roadway facility operations are typically described with the term level of service (LOS), a qualitative description of traffic flow based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels are defined from LOS A, which reflects free-flow conditions with little interaction between vehicles, to LOS F, where the vehicle demand exceeds the intersection capacity and elevated levels of vehicle delay result. LOS E represents “at-capacity” operations. LOS F occurs when traffic volumes exceed the intersection capacity, stop-and-go conditions result, and a vehicle may wait through multiple signal cycles before passing through the intersection.

4.3 Analysis Results

The following figures and tables present the identified performance metrics in the 40th Street corridor under the three alternatives evaluated.

4.3.1 Bus Maneuvering Time

Figure 2 illustrates the bus maneuvering times from the analysis for the two alternatives.

Overall, the analysis shows that near side stops adjacent to a traffic signal have longer maneuvering times because buses have a harder time merging back into the travel lane. Since the stop is near side of the intersection, traffic signal related delays and queues affect the maneuvering time. Under Alternative 1, the near side eastbound bus stop at 40th Street at Emery Street has the longest maneuvering time.

Under Alternative 2, the delay at the westbound bus stops on 40th Street approaching San Pablo Avenue increase compared to conditions without the Project. The degradation of service at these stops is due to buses leaving the stop that may experience additional delay if the traffic signal indication at San Pablo Avenue for the westbound right turn lane is red. The westbound right turn signal indication is a protected phase to physically separate right turning traffic from the pedestrian and bicyclist crossings. The Harlan near side stops are removed with the Project. The remainder of the bus stops would maintain their maneuvering time with the Project.

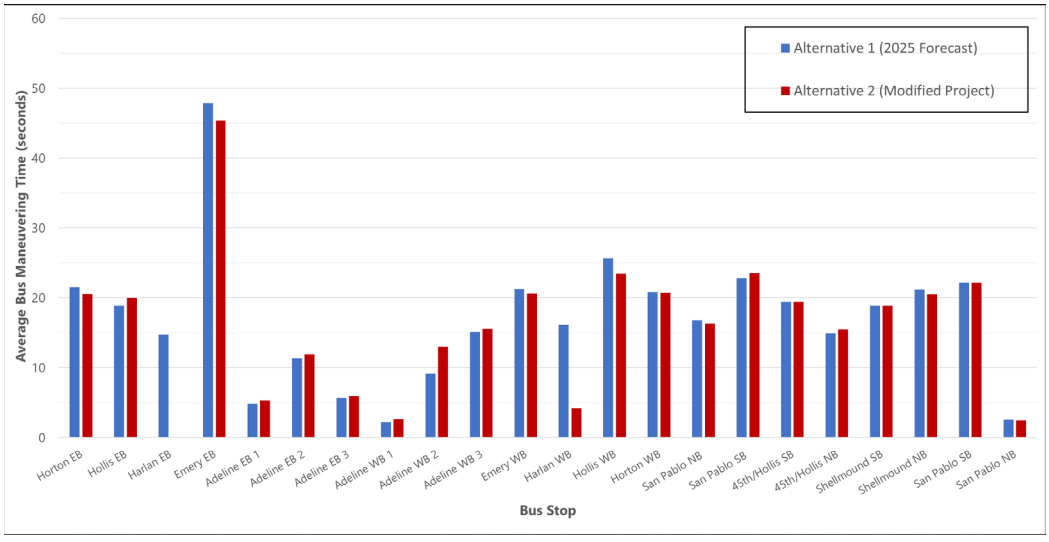


Figure 2: PM Peak Average Bus Maneuvering Times along 40th Street

4.3.2 Corridor Travel Times

This section presents the directional travel times for the weekday PM commute peak hour for Alternative 1 and Alternative 2, by AC Transit / EGR buses and by autos / trucks. Travel time incorporates the average of all vehicles traveling the corridor and includes the travel time between intersections, the time while slowing or stopped at traffic signals, and the time spent maneuvering/(un)loading at bus stops. Travel times were calculated for the following:

- Buses, autos, and trucks traveling eastbound and westbound on 40th Street:
  - Between IKEA Entry and San Pablo Avenue
  - Through the Transit Plaza (between San Pablo Avenue and Adeline Street)
  - Between Adeline Street and Yerba Buena Avenue
- Buses, autos, and trucks traveling northbound and southbound on San Pablo Avenue between 47th Street to 36th Street.

Attachment D presents the Weekday PM commute peak hour average speed plots for buses and autos/trucks to visualize the low-speed zones within the study corridor.

4.3.2.1 Bus (AC Transit and EGR combined) Travel Times

Under Alternative 2, the following travel time findings were identified from the detailed travel times shown in **Table 2a**.

Table 2a: 40th Street Travel Times (Buses Combined) – Alternative 1 versus Alternative 2

Direction		PM Commute Peak Hour Travel Time (minutes)		
		Alt 1	Alt 2	Change (Seconds)
40th WB	Yerba Buena Avenue to Adeline Street	0.5	0.7	+ 6 seconds
	Transit Plaza – (Adeline Street to San Pablo Avenue)	1.5	1.6	+ 6 seconds
	San Pablo Avenue to IKEA	5.4	5.6	+ 12 seconds
40th EB	IKEA to San Pablo Avenue	7.6	6.4	- 72 seconds
	Transit Plaza – (San Pablo Avenue to Adeline Street)	0.8	0.9	+ 6 seconds
	Adeline Street to Yerba Buena Avenue	0.3	0.3	No change
San Pablo Avenue SB (47th Street to 36th Street)		4.5	5.0	+ 30 seconds
San Pablo Avenue NB (36th Street to 47th Street)		2.8	3.4	+ 36 seconds

Source: Fehr & Peers, April 2025.

4.3.2.1.1 Westbound 40th Street

Within the Transit Plaza between San Pablo Avenue and Adeline Street, westbound travel times for combined buses is anticipated to increase about 6 seconds compared to Alternative 1 No

Project, because buses travel with the protected right-turn phase, and must wait for the right-turn signal to be able to cross the intersection.

East of the Transit Plaza, westbound combined bus travel times increase by about 6 seconds (between Yerba Buena Avenue and Adeline Street) because buses, autos, and trucks share one westbound lane east of Adeline Street.

West of the Transit Plaza between San Pablo Avenue and IKEA, the westbound travel times increase about 12 seconds because buses, autos, and trucks share both westbound lanes between San Pablo Avenue and Emery Street. Autos and trucks must share the bus lane because of the dual left-turn lane from San Pablo Avenue onto westbound 40th Street. Auto and truck traffic from the dual left turn lanes merge into the single westbound lane on 40th Street after the Emery Street intersection.

4.3.2.1.2 Eastbound 40th Street

Within the Transit Plaza between San Pablo Avenue and Adeline Street, eastbound travel times for combined buses is anticipated to increase about 6 seconds compared to Alternative 1 No Project. The increase in time spent within the Transit Plaza is due to a slight increase in bus stop delays because buses stop in the bus lane, whereas with Alternative 1 buses pull out of the lane to stop.

East of the Transit Plaza, eastbound combined bus travel times remain unchanged (between Adeline Street and Yerba Buena Avenue).

West of the Transit Plaza between IKEA and San Pablo Avenue, the eastbound bus travel times improve by 72 seconds compared to Alternative 1 because the Project provides a bus lane, removing auto and truck traffic congestion from bus flows.

4.3.2.1.3 San Pablo Avenue

Along San Pablo Avenue, between 36th Street and 47th Street, the bus travel times increase by 30-36 seconds under Alternative 2, because the signal optimization at 40th Street was adjusted to reflect the protected westbound right-turn lane signal phase.

4.3.2.2 Auto / Truck Travel Times

Under Alternative 2, the following travel time findings were identified. Refer to **Table 5b** for the detailed travel times.

Table 5b: 40th Street Travel Times (Autos and Trucks) – Alternative 1 versus Alternative 2

Direction		PM Commute Peak Hour Travel Time (minutes)		
		Alt 1	Alt 2	Change (Seconds)
40th WB	Yerba Buena Avenue to Adeline Street	0.5	0.6	+ 6 seconds
	Transit Plaza – (Adeline Street to San Pablo Avenue)	1.1	0.8	- 18 seconds
	San Pablo Avenue to IKEA	3.4	3.7	+ 18 seconds
40th EB	IKEA to San Pablo Avenue	5.6	5.8	+ 12 seconds
	Transit Plaza – (San Pablo Avenue to Adeline Street)	0.4	0.3	- 6 seconds
	Adeline Street to Yerba Buena Avenue	0.3	0.3	No change
San Pablo Avenue SB (47th Street to 36th Street)		3.1	3.6	+ 30 seconds
San Pablo Avenue NB (36th Street to 47th Street)		2.2	2.3	+ 6 seconds

Source: Fehr & Peers, April 2025.

4.3.2.2.1 Westbound 40th Street

Within the Transit Plaza between San Pablo Avenue and Adeline Street, westbound travel times for autos and trucks is anticipated to improve by about 18 seconds compared to Alternative 1 No Project. The decrease in time spent within the Transit Plaza is because the bus lane separates bus maneuvers from the bus stops from westbound vehicles traveling through the intersection as well as signal optimization for westbound 40th Street to accommodate the protected right-turn phase.

East of the Transit Plaza, the auto and truck westbound travel times are expected to increase by 6 seconds (between Adeline Street and Yerba Buena Avenue) because buses and autos share one westbound lane east of Adeline Street under the Project.

West of the Transit Plaza between San Pablo Avenue and IKEA, the westbound travel times are expected to increase by 18 seconds because the Project removes one westbound travel lane for vehicles and trucks.

4.3.2.2.2 Eastbound 40th Street

Within the Transit Plaza between San Pablo Avenue and Adeline Street, eastbound travel times for autos and trucks is anticipated to improve about 6 seconds compared to Alternative 1 No Project, since the bus lane prevents buses maneuvering at bus stops from disrupting vehicular travel.

East of the Transit Plaza, autos and trucks eastbound travel times remain unchanged (between Adeline Street and Yerba Buena Avenue).

West of the Transit Plaza, between IKEA and San Pablo Avenue, the eastbound travel times are expected to increase by about 12 seconds compared to Alternative 1 because the Project has one eastbound through lane approaching San Pablo Avenue.

4.3.2.2.3 San Pablo Avenue

Along San Pablo Avenue, between 36th Street and 47th Street, the southbound auto and truck travel time increases by 30 seconds and the northbound increases by 6 seconds under Alternative 2, because the signal optimization at 40th Street was adjusted to reflect the protected westbound right-turn lane signal phase.

4.3.3 Level of Service and Delay Analysis

Intersection operations during the PM commute peak hour are presented in **Table 6** on the following page. All intersections operate at LOS D or better with Alternative 1 and Alternative 2. The San Pablo Avenue / 40th Street intersection operations are expected to be similar between the two alternatives because of signal optimization which balances the delay across the intersection approaches. While the Emery Street intersection operations are expected to deteriorate from LOS C to D because green time is prioritized for the 40th Street movements.

Intersection delay along Park Avenue increases slightly but operations remain at LOS B or higher. As noted in the *40th Street Multimodal Project - Truck Activity Analysis Memo* trucks are currently using Park Avenue even though truck restriction signs are posted throughout the corridor west of Hollis Street and the multimodal operations analysis assumed that this behavior would continue. To offset these impacts and enhance safety, the city is implementing a holistic strategy for Park Avenue that includes new, clearer truck wayfinding signage to better direct commercial vehicles. The city is also actively improving pedestrian safety on Park Avenue through separate initiatives, such as the 2024 Sustainable Streetscapes project, which is adding high visibility crosswalks and green infrastructure bulb-outs at the Park Avenue and Hollis Street intersection.

Attachment E provides the intersection analysis worksheets.

Table 6: Intersection Level of Service and Delay – PM Commute Peak Hour – Alternative 1 versus Alternative 2

ID	Intersection	Control [1]	Alternative 1		Alternative 2	
			Delay [2]	LOS [2]	Delay [2]	LOS [2]
1	Adeline St/40th St	Signal	24	C	33	C
2	San Pablo Ave/40th St	Signal	46	D	46	D
3	Emery St/40th St	Signal	26	C	53	D
4	Watts St/40th St[3]	Side-street Stop	8 (EB 16)	A (C)	--	--
5	Harlan St/40th St	Signal	10	A	15	B
6	Haven St/40th St[3]	Side-street Stop	1 (SB 9)	A (A)	--	--
7	Hollis St/40th St	Signal	37	D	28	C
8	Holden St/40th St	Side-street Stop	3 (SB 20)	A (C)	4 (NB 9)	A (A)
9	Horton St/40th St	Signal	39	D	41	D
10	Hubbard St/40th St	Side-street Stop	8 (NB 14)	A (B)	5 (NB 8)	A (A)
11	Shellmound St/ IKEA Entrance	Signal	19	B	8	A
12	San Pablo Ave/Park Ave	Signal	11	B	11	B
13	Emery St/Park Ave	Side-street Stop	5 (NB 18)	A (C)	5 (NB 19)	A (C)
14	Watts St/Park Ave	All-way Stop	7	A	8	A
15	Harlan St/Park Ave	Side-street Stop	2 (NB 11)	A (B)	2 (NB 11)	A (B)
16	Haven St/Park Ave	Side-street Stop	1 (NB 14)	A (B)	1 (NB 14)	A (B)
17	Hollis St/Park Ave	Signal	14	B	15	B
18	Holden St/Park Ave	Side-street Stop	3 (NB 11)	A (B)	3 (NB 10)	A (B)
19	Horton St/Park Ave	All-way Stop	10	B	10	B
20	Hubbard St/Park Ave	Side-street Stop	3 (NB 12)	A (B)	4 (NB 12)	A (B)
21	San Pablo Ave/45th Ave	Signal	10	A	8	A
22	Hollis St/45th Ave	Signal	11	B	11	B

Notes:
1. Signal = Signalized intersection.
2. For signalized intersections, average intersection delay and LOS based on the 2010 HCM method are shown. For side-street stop-controlled intersections, delays for worst movement and average intersection delay are shown.
3. Unsignalized side street intersections at 40th Street to be closed in Alternative 2.

Source: Fehr & Peers, April 2025.

5. Multimodal Operations (Shellmound Street Project Part 2)

5.1 Study Intersections and Methodology

5.1.1 Project Study Intersections

There are five (5) study intersections. **Attachment F** shows the locations and turning movements at the project study intersections evaluated along Shellmound Street. All intersections are signalized and coordinated along Shellmound Street.

1. Shellmound Street at Christie Avenue
2. Shellmound Street at Ohlone Way
3. Shellmound Street at Bay Street
4. Shellmound Street at IKEA Exit
5. Shellmound Street at IKEA Entrance

The analysis was done for five (5) identified peak hour timing plans: AM, Midday, PM, Weekend Midday, and Weekend PM. The study intersections were evaluated for three (3) scenarios:

- **Scenario 1 (Existing Conditions)**: Existing lane configuration, volumes, and timings
- **Scenario 2**: Proposed lane configuration, existing volumes, existing timings
- **Scenario 3**: Proposed lane configuration, existing volumes, optimized timings

5.1.2 Intersection Analysis Methodology

Existing operational conditions at the five study intersections were evaluated using the 2000 Highway Capacity Manual (HCM) Level of Service (LOS) methodology. Synchro software was used for this analysis.

Level of service is an expression, in the form of a scale, of the relationship between the capacity of an intersection and the demand volume of traffic moving through it. The level of service scale describes traffic flow with six ratings ranging from A to F, with A indicating free flow and F indicating jammed conditions with excessive delay.

For signalized intersections, the HCM methodology determines the capacity of each lane group approaching the intersection. The LOS is based on average control delay (in seconds per vehicle) for various movements within the intersection. A combined weighted average control delay and LOS are presented for the intersection. **Appendix G** summarizes the HCM 2000 results for the study intersections. **Table 7** on the next page describes the relationship between LOS and the average control delay at signalized intersections.

Table 7: HCM 2000 Level of Service for Signalized Intersections		
Level of Service	**Delay (seconds per vehicle)**	**Description of Operations**
A	< 10	**Free Flow/Insignificant Delays**: No approach phase fully utilized by traffic and no vehicle waits longer than one red indication. Most vehicles do not stop at all. Progression is favorable and most vehicles arrive during the green phase.
B	> 10 – 20	**Stable Operation/Minimal Delays**: Occasional approach phase is fully utilized. Drivers begin to feel restricted within vehicle platoons. Occurs with good progression and/or short cycles.
C	> 20 – 35	**Stable Operation/Acceptable Delays**: Major approach phases fully utilized. Most drivers feel restricted. Higher delays from fair progression and longer cycles. Individual cycle failures may occur, and the number of vehicles stopping is significant.
D	> 35 – 55	**Approaching Unstable/Tolerable Delays**: Congestion becomes more noticeable. Drivers may wait through more than one red signal indication. Longer delays result from unfavorable progression and long cycle lengths, or high v/c ratios. Proportion of vehicles not stopping declines, and individual cycle failures are noticeable.
E	> 55 – 80	**Unstable Operation/Significant Delays**: Vehicles may wait through multiple cycles. Long queues form upstream from the intersection. High delays indicate poor progression, long cycles, and high v/c ratios. Individual cycle failures are a frequent occurrence.
F	> 80	**Forced Flow/Excessive Delays**: Represents jammed conditions. Queues may block upstream intersections. Arrival flow rates exceed capacity and are unacceptable to most drivers. Poor progression, long cycle lengths, and v/c ratios approaching 1.0 contribute to high delay.

Source: Highway Capacity Manual, Transportation Research Board, Washington D.C.

5.1.3 Synchro Model

The Synchro analysis model was built from the City of Emeryville's (City) citywide Synchro software network and field observations. The same peak hours were used for all analysis scenarios. A peak hour factor of 1.00 is assumed for all scenarios due to even demand volumes across the peak period and the expectation that the Project may cause congestion, thereby dispersing traffic more evenly across the peak hours of analysis.

5.2 Project (Part 2) Assumptions

Scenario 1 assumes existing lane configuration as described in the City's Synchro model. Under Scenarios 2 and Scenario 3, the proposed geometry is sourced from the 40th Street Bay Trail Gap Closure Project which constructs a two-way cycle track on the west side of the Shellmound Street corridor and converts one vehicle lane in each direction to bus lanes.

5.2.1 Two-way Cycle Track Features

The Project (Part 2 of the 40th Street Multimodal Project) proposes a two-way cycle track on the west side of Shellmound Street between the IKEA entry and Christie Avenue. This Project would connect the two-way cycle track as part of Part I of the 40th Street Multimodal Project with the existing east-west two-way cycle track on Christie Avenue. At the IKEA entry, the cycle track shifts from the east side to the west side of Shellmound Street and cyclists cross the southern leg crosswalk at the IKEA entry to make this transition. To enhance the safety of cyclists using the cycle track at the IKEA entry, turning right on red would be prohibited.

5.2.2 Bus Lanes

The concept design assumes no change to the current cross-section along Shellmound Street between the IKEA entry and Bay Street and between Ohlone Way and Christie Avenue. At Ohlone Way, the northbound right turn lane is removed, and the rightmost lane is converted to a transit-only lane where vehicles can merge into the bus lane to turn right. The right turn lane removal was recently completed as part of a separate project.

The southbound bus lane starts south of Christie Avenue and extends to IKEA, where it then continues over the Shellmound Street bridge as part of Phase I of the 40th Street Multimodal Project. The northbound bus lane starts at the IKEA entry and goes up to Christie Avenue where it ends. A future project would extend the transit-only north of Christie Avenue.

5.3 Analysis Results

As a reminder, the analysis was done for five (5) peak hour timing plans: AM, Midday, PM, Weekend Midday, and Weekend PM. And, evaluated for three (3) scenarios:

- **Scenario 1 (Existing Conditions)**: Existing lane configuration, volumes, and timings
- **Scenario 2**: Proposed lane configuration, existing volumes, existing timings
- **Scenario 3**: Proposed lane configuration, existing volumes, optimized timings

5.3.1 Level of Service and Delay Analysis

Table 8a documents the existing level of service conditions at the study intersections. Under existing conditions, all intersections are performing at LOS D or better.

Table 8a: Intersection Level of Service Conditions under Scenario 1							
Intersection along Shellmound Street		Control type	Level of Service (delay in seconds) during peak hour				
			AM	Midday	PM	Weekend Midday	Weekend PM
1	Christie Avenue	Signalized	C (34)	C (30)	C (31)	D (47)	D (51)
2	Ohlone Way	Signalized	B (11)	B (13)	B (18)	B (20)	C (24)
3	Bay Street	Signalized	A (3)	A (7)	B (10)	B (12)	B (14)
4	IKEA Exit	Signalized	A (3)	A (5)	A (5)	A (8)	A (9)
5	IKEA Entrance	Signalized	A (2)	B (11)	A (7)	B (18)	B (13)

Source: Fehr & Peers, April 2025.

Table 8b documents the level of service conditions at the study intersections under Scenario 2. Notably, Christie Avenue intersection experiences LOS F under the new geometry with existing timing plans and the poor operations occur on the weekends in the afternoon and evening. Between Scenarios 1 and Scenario 2, the operations at all study intersections deteriorate during all peak hours. Vehicles are reduced to a single mixed-flow lane of travel in both directions along Shellmound Street through the study corridor. The existing timing plan is not sufficient to serve this concentrated demand; therefore, intersection operations degrade under the proposed lane configurations. But only the Christie Avenue intersection operations fall below LOS D during weekend operations.

Table 8c documents the level of service conditions at the study intersections under Scenario 3. Modifying the existing timing plans in Synchro to serve demand within the new geometry requires re-timing of the signals within the project area. Under Scenario 3 using the built-in Synchro optimization function, the timing plans are coordinated to a cycle length of 55/110 seconds during weekday AM peak hour, 60/120 seconds during weekday midday and weekday PM peak hours, and 75/150 seconds during weekend peak hours. The study intersections are coordinated to the northbound and southbound approaches along Shellmound Street.

Table 8b: Intersection Level of Service Conditions under Scenario 2							
Intersection along Shellmound Street		Control type	Level of Service (delay in seconds) during peak hour				
			AM	Midday	PM	Weekend Midday	Weekend PM
1	Christie Avenue	Signalized	C (30)	D (43)	D (43)	**F (85)**	**F (149)**
2	Ohlone Way	Signalized	B (11)	B (19)	C (23)	C (34)	D (48)
3	Bay Street	Signalized	A (2)	A (10)	B (10)	B (15)	B (14)
4	IKEA Exit	Signalized	A (2)	A (9)	B (11)	B (16)	C (25)
5	IKEA Entrance	Signalized	A (2)	B (12)	B (12)	D (52)	B (18)

Source: Fehr & Peers, April 2025.

Table 8c: Intersection Level of Service Conditions under Scenario 3							
Intersection along Shellmound Street		Control type	Level of Service (delay in seconds) during peak hour				
			AM	Midday	PM	Weekend Midday	Weekend PM
1	Christie Avenue	Signalized	C (27)	C (29)	C (34)	**E (62)**	**E (75)**
2	Ohlone Way	Signalized	B (12)	C (24)	C (22)	C (32)	D (51)
3	Bay Street	Signalized	A (2)	A (8)	A (8)	B (13)	B (15)
4	IKEA Exit	Signalized	A (2)	A (8)	A (9)	B (13)	B (17)
5	IKEA Entrance	Signalized	A (2)	B (14)	B (11)	D (37)	C (21)

Source: Fehr & Peers, April 2025.

Between Scenarios 2 and Scenario 3, weekday operations improve. All intersections perform at LOS D or better during weekday peak travel hours. During weekend operations, the intersection operations at Christie Avenue continue to fail during the weekend midday and PM peak hours. During these two periods, the resulting northbound queues on Shellmound Street are anticipated to extend back through the Ohlone Way and Bay Street intersections.

Based on the intersection operations analysis, bus lanes should be considered for the Shellmound Street study segment (Part 2) for the weekdays but during the weekend the bus lanes should be open to all traffic.

6. Appendix

Attachment A Modified Project Striping Plan

Attachment B Transportation Committee and Council Agenda Items

Attachment C Alternatives 1 and 2 Peak Hour Intersection Multimodal Traffic Volumes (Part 1)

Attachment D Alternatives 1 and 2 Corridor Speed Plots (Part 1)

Attachment E Intersection LOS and Delay Calculation Worksheets (Part 1)

Attachment F Intersection Multimodal Traffic Volumes (Part 2)

Attachment G Intersection LOS and Delay Calculation Worksheets (Part 2)

Attachment A:
Modified Project Striping Plan

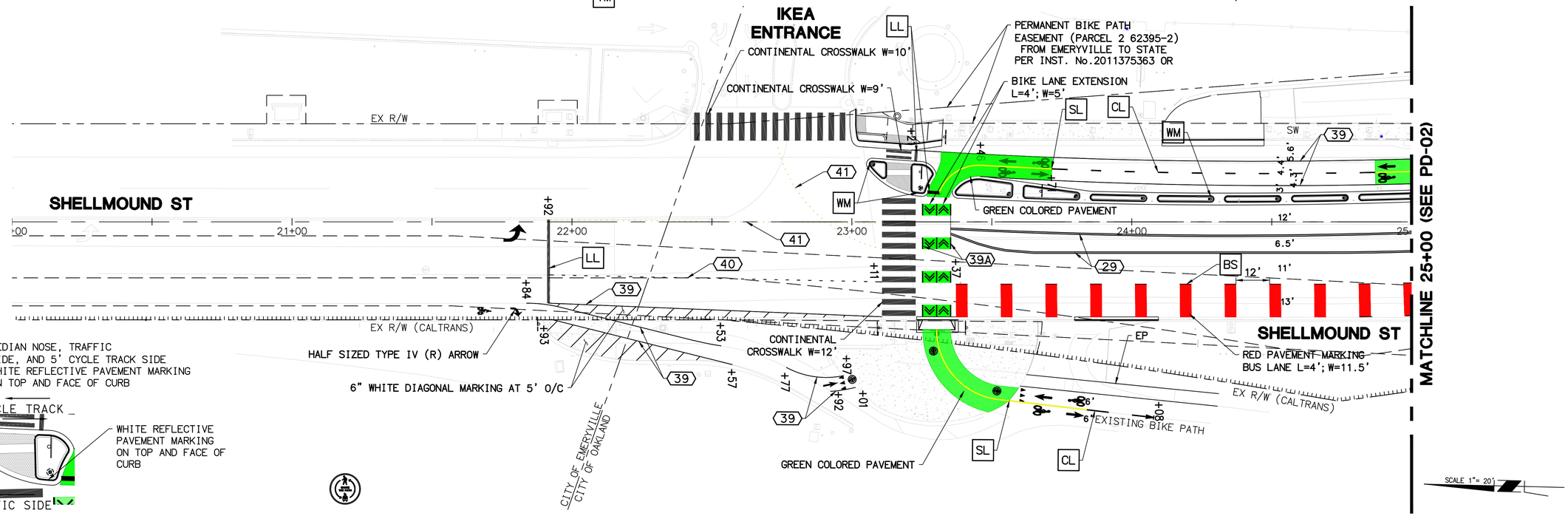
GENERAL NOTES

1. PAVEMENT DELINEATION WORK SHALL BE IN ACCORDANCE WITH THE 2023 CALTRANS STD PLANS, THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (CA-MUTCD) LATEST EDITION, AND THE CONTRACT SPECIAL PROVISIONS. PAVEMENT DELINEATION DETAIL DESIGNATION NUMBERS ARE PER CALTRANS STD PLANS A20A TO A20D. PAVEMENT MARKINGS ARROWS, SYMBOLS, WORDS AND CROSSWALKS ARE PER CALTRANS STD PLANS A24A TO A24F. BIKE PAVEMENT MARKINGS PER CITY OF OAKLAND "DESIGN DETAILS FOR TRANSPORTATION FACILITIES".
2. CONTRACTOR SHALL REMOVE BY WET SANDBLASTING ALL EXISTING AND PAVEMENT MARKINGS WHICH CONFLICT WITH NEW WORK AS SHOWN ON THE PLANS. SANDBLAST AREAS FOR PAVEMENT MARKING LEGENDS AND ARROWS SHALL BE RECTANGULAR ALL SANDBLASTED ARE FOG SEALED.
3. CONTRACTOR SHALL FINISH AND INSTALL ALL CONSTRUCTION MATERIALS FOR PAVEMENT DELINEATION AND SIGN WORK.
4. EXACT LOCATIONS OF ALL NEW SIGNS, PAVEMENT DELINEATION AND MARKINGS SHALL BE MARKED/CAT-TRACED IN THE FIELD BY CONTRACTOR AND SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
5. LANE WIDTHS SHALL BE MEASURED BETWEEN THE CENTER LINES OF EACH ADJACENT SINGLE OR DOUBLE STRIPE OR TOP FACE OF CURB AS APPROPRIATE.
6. LANE WIDTHS OF CYCLE TRACK SHALL BE MEASURED BETWEEN THE CENTER LINES OF EACH ADJACENT STRIPE OR GUTTER EDGE AS APPROPRIATE.
7. ALL PAVEMENT DELINEATION AND MARKING SHALL BE THERMOPLASTIC.
8. FOR ARROW PAVEMENT MARKINGS REDUCE CALTRANS STANDARD TO HALF-SIZE IN BIKE FACILITIES.
9. FOR CONFLICT ZONES AND BIKE LANE EXTENSIONS, GREEN-COLORED PAVEMENT PATTERN SHALL MATCH THE PATTERN OF THE DOTTED LINES, THUS FILLING IN ONLY THE AREAS THAT ARE DIRECTLY BETWEEN A PAIR OF DASHED LINE SEGMENTS.
10. FOR AREAS WHERE GENERAL TRAFFIC IS PERMITTED TO ENTER INTO THE TRANSIT LANE OR OUT OF THE TRANSIT LANE, RED COLORED PAVEMENT PATTERN SHALL MATCH THE PATTERN OF THE DASHED LANE LINES (SUCH AS DETAIL 8).

LEGEND:

##	STRIPING DETAILS PER 2018 STANDARD PLANS (A20A, A20B, A20C, AND A20D) AND REVISED STANDARD PLANS
LL	12" WHITE LIMIT LINE
CL	6" WIDE 3' LONG YELLOW DASHED CENTERLINE WITH 9' GAP
SL	6" YELLOW SOLID CENTERLINE
	BIKE LANE SYMBOL WITH PERSON AND LANE ARROW PER CITY OF OAKLAND STANDARD RM-1
	BIKE LANE EXTENTION THROUGH INTERSECTION PER CITY OF OAKLAND STANDARD RM-9
	SHARED ROADWAY BIKE SYMBOL PER STANDARD PLAN A24C
	BIKE LANE SYMBOL WITH PERSON PER STANDARD PLAN A24C
	TYPE IV (L) ARROW PER STANDARD PLAN A24A, SEE NOTE 7
	TYPE IV (R) ARROW PER STANDARD PLAN A24A
	TYPE VII (R) ARROW PER STANDARD PLAN A24A
	TYPE VII (L) ARROW PER STANDARD PLAN A24A, SEE NOTE 7
	TYPE III (B) ARROW PER STANDARD PLAN A24B, SEE NOTE 7
FG	INSTALL FG 300 TURNPIKE GRADE CURB SYSTEM OR APPROVED EQUAL SPACED AT 6.5'
WM	INSTALL WHITE REFLECTIVE PAVEMENT MARKING ON TOP AND FACE OF CURB PER DETAIL A
BS	8" WHITE DASHED EDGELINE BORDERING BUS LANE RED PAVEMENT MARKING
YM	INSTALL YELLOW RAISED PAVEMENT MARKER ON MEDIAN NOSE

	TYPE VI ARROW PER STANDARD PLAN A24A
	TYPE III (B) ARROW PER STANDARD PLAN A24B, SEE NOTE 7
	TYPE V ARROW PER STANDARD PLAN A24A
	TYPE I 10'-0" ARROW PER STANDARD PLAN, A24A SEE NOTE 7
	"YIELD LINE" PAVEMENT MARKING PER STANDARD PLAN A24G
STOP	"STOP" PAVEMENT MARKING PER STANDARD PLAN A24D
BUS ONLY	"BUS ONLY" PAVEMENT MARKING PER STANDARD PLAN
	BEGIN/END TRAFFIC STRIPE DETAIL
	CHANGE TRAFFIC STRIPE DETAIL
	"SHARE THE PATH" PAVEMENT MARKING
	PAVEMENT MARKING FOR SPEED TABLE OR SPEED HUMP WITH CROSSWALK PER CA MUTCD FIGURE 3B-30.
	INSTALL CURB MARKING, COLOR AND LENGTH AS NOTED
	24" CONTINENTAL CROSSWALK BARS, WIDTH AS NOTED
	INSTALL SHARROW SYMBOL WITH GREEN PAVEMENT BACKING
	INSTALL "BUS ONLY" LANE. OPTIONAL.
	YELLOW RAISED PAVEMENT MARKING ON MEDIAN NOSE
	K72, SEE SIGN PLANS



DETAIL A
TYPICAL CURB MARKING AT INTERSECTION ISLANDS

DETAIL B
SHARE THE PATH PAVEMENT MARKING

SCALE 1"= 20'

20 10 0 20 40 60
SCALE: 1"=20'

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DATE 10-08-24

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DEPARTMENT OF PUBLIC WORKS

APPROVED BY	BY	DATE

APPROVED BY
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40TH STREET MULTIMODAL PROJECT

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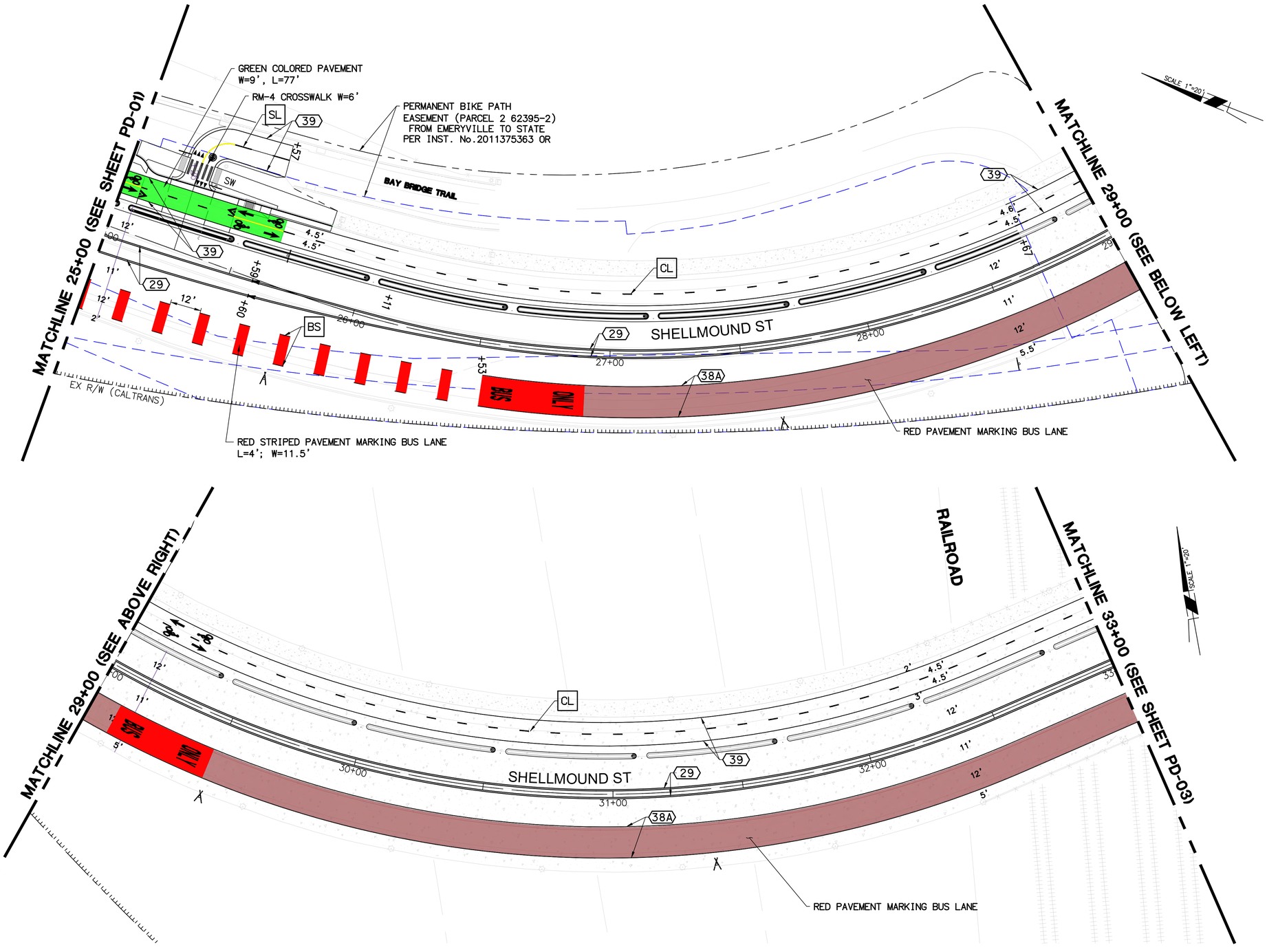
PAVEMENT DELINEATION PLAN

SHELLMOUND STREET AT IKEA FROM BEG TO STA 25+00

HORIZ. SCALE: 1" = 20' | VERT. SCALE: N/A

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40TH STREET MULTIMODAL PROJECT

PAVEMENT DELINEATION PLAN

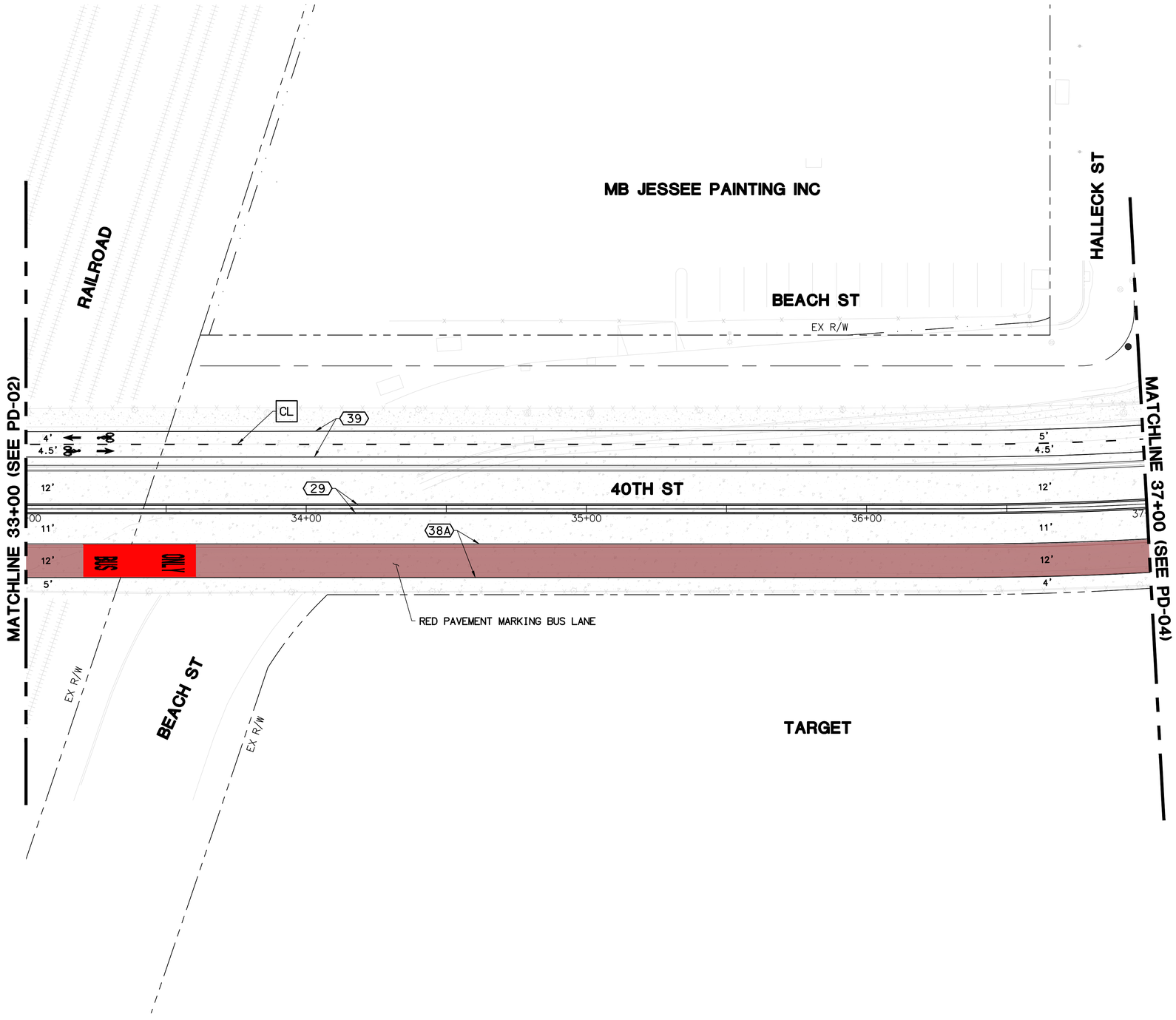
SHELLMOUND STREET FROM STA 25+00 TO STA33+00

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DEPARTMENT OF PUBLIC WORKS

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CITY ENGINEER
DATE

40TH STREET MULTIMODAL PROJECT

PAVEMENT DELINEATION PLAN

SHELLMOUND BRIDGE FROM STA 33+00 TO STA37+00

HORIZ. SCALE: 1" = 20' | VERT. SCALE: N/A

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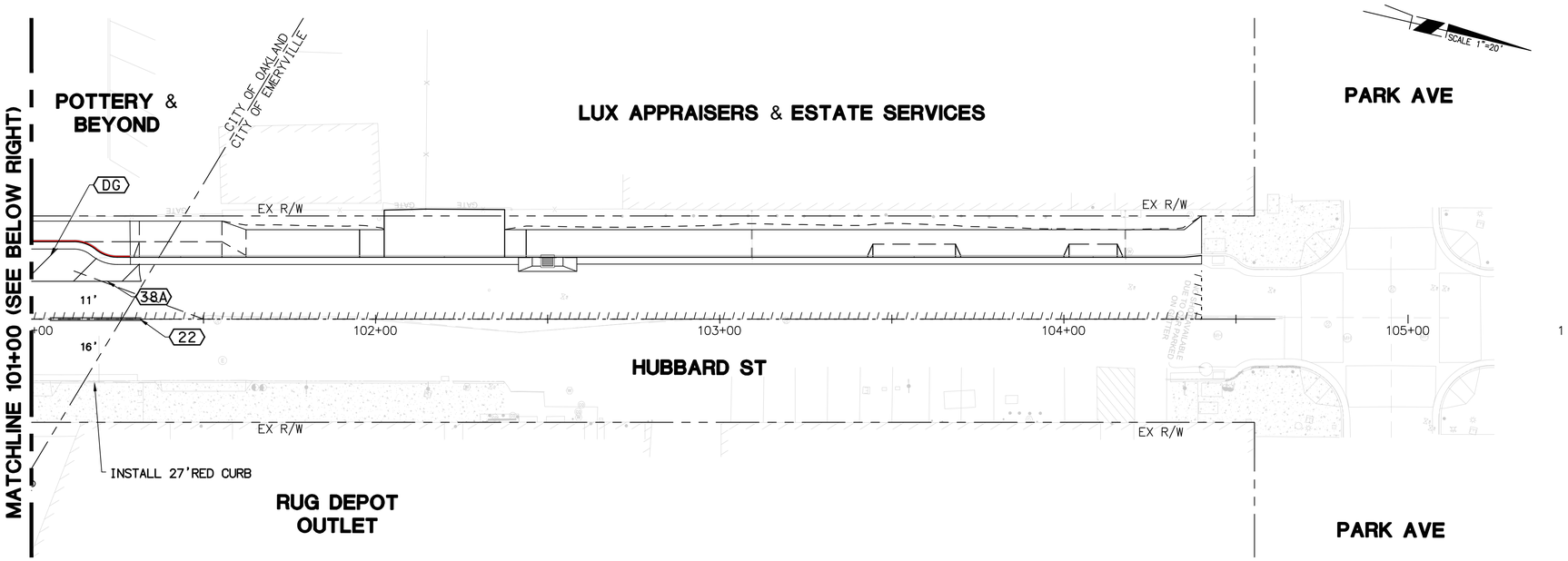
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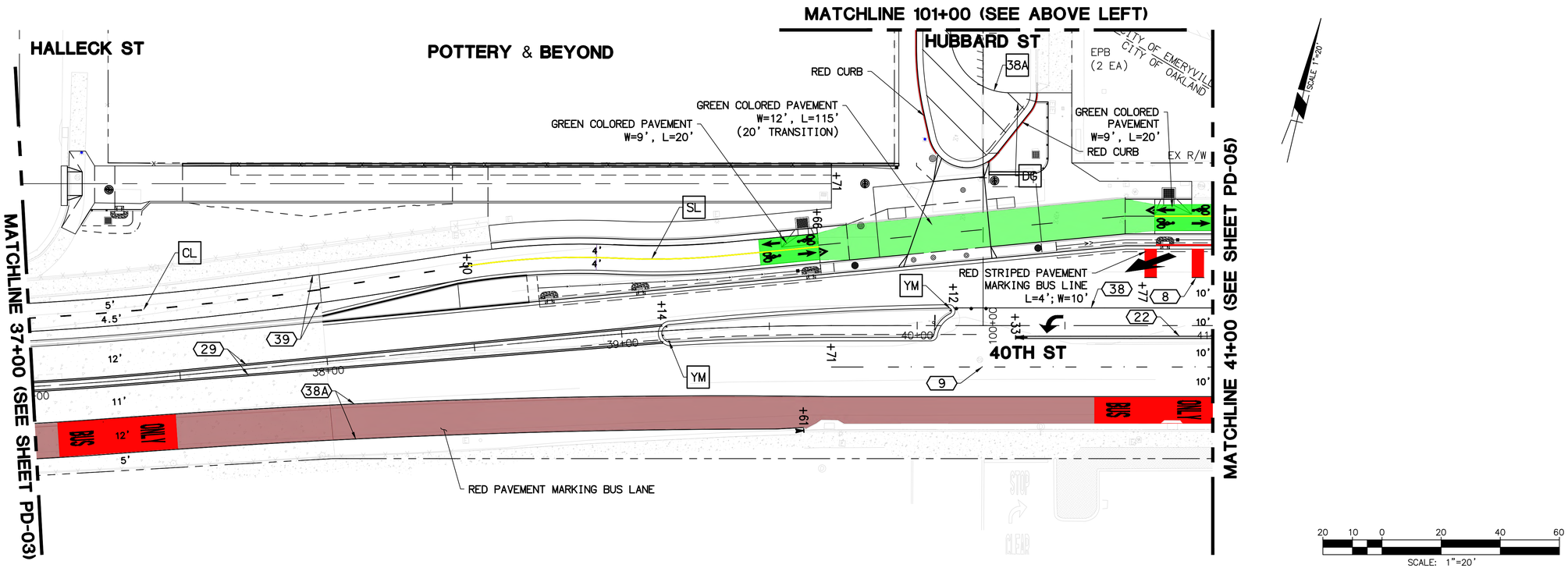
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DEPARTMENT OF PUBLIC WORKS

APPROVED BY	BY	DATE

APPROVED BY
CITY ENGINEER
DATE

40TH STREET MULTIMODAL PROJECT

PAVEMENT DELINEATION PLAN

HALLECK STREET CONNECTION FROM STA 37+00 TO STA41+00

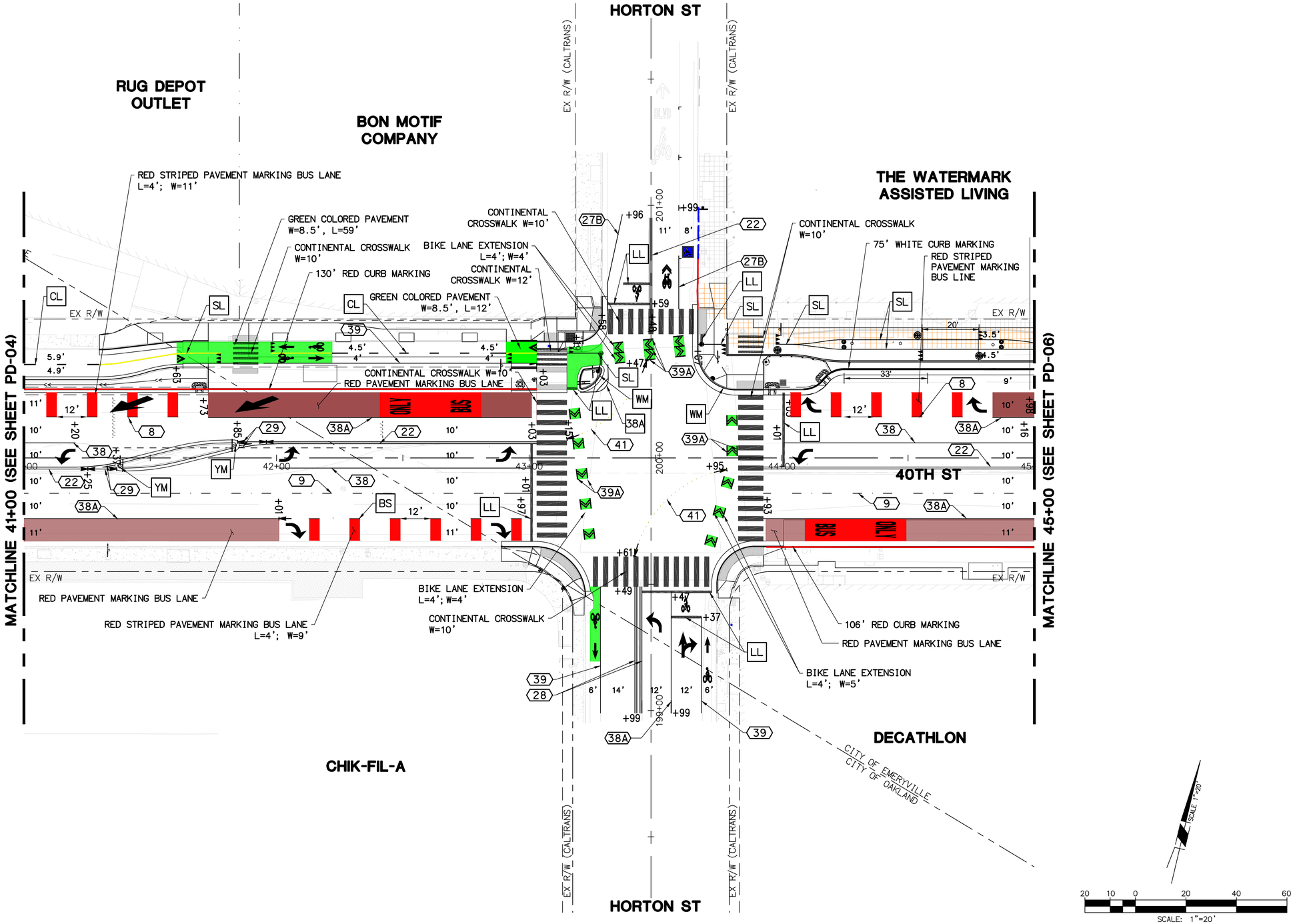
HORIZ. SCALE: 1" = 20' | VERT. SCALE: N/A

DESIGN WORK ORDER. NO.: XXXXXXX
CONSTR. WORK ORDER. NO.: XXXXXXX

PD-04

SHEET 106 OF 273

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SCALE: 1" = 20'

ENGINEER IN RESPONSIBLE CHARGE

SHAWN KOWALEWSKI
R.C.E. No. 59539 EXPIRES: 12-31-25
DATE 10-08-24

REGISTERED PROFESSIONAL ENGINEER
SHAWN KOWALEWSKI
No. 59539
Exp. 12/31/25
CIVIL
STATE OF CALIFORNIA

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CITY OF EMERYVILLE, CALIFORNIA
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DATE

40TH STREET MULTIMODAL PROJECT

PAVEMENT DELINEATION
40TH STREET AT HORTON STREET
FROM STA 41+00 TO STA45+00

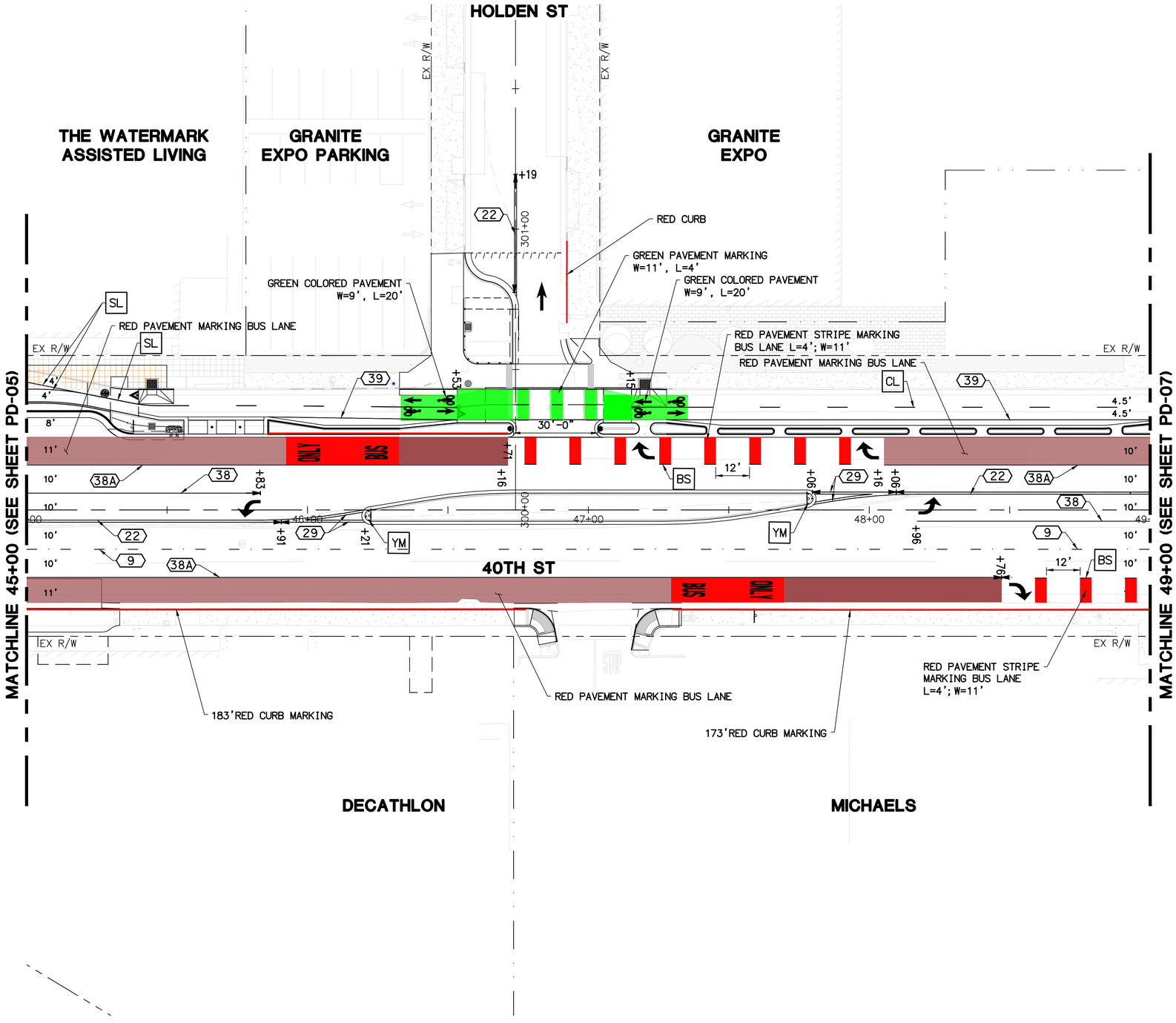
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PD-05

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DATE

40TH STREET MULTIMODAL PROJECT

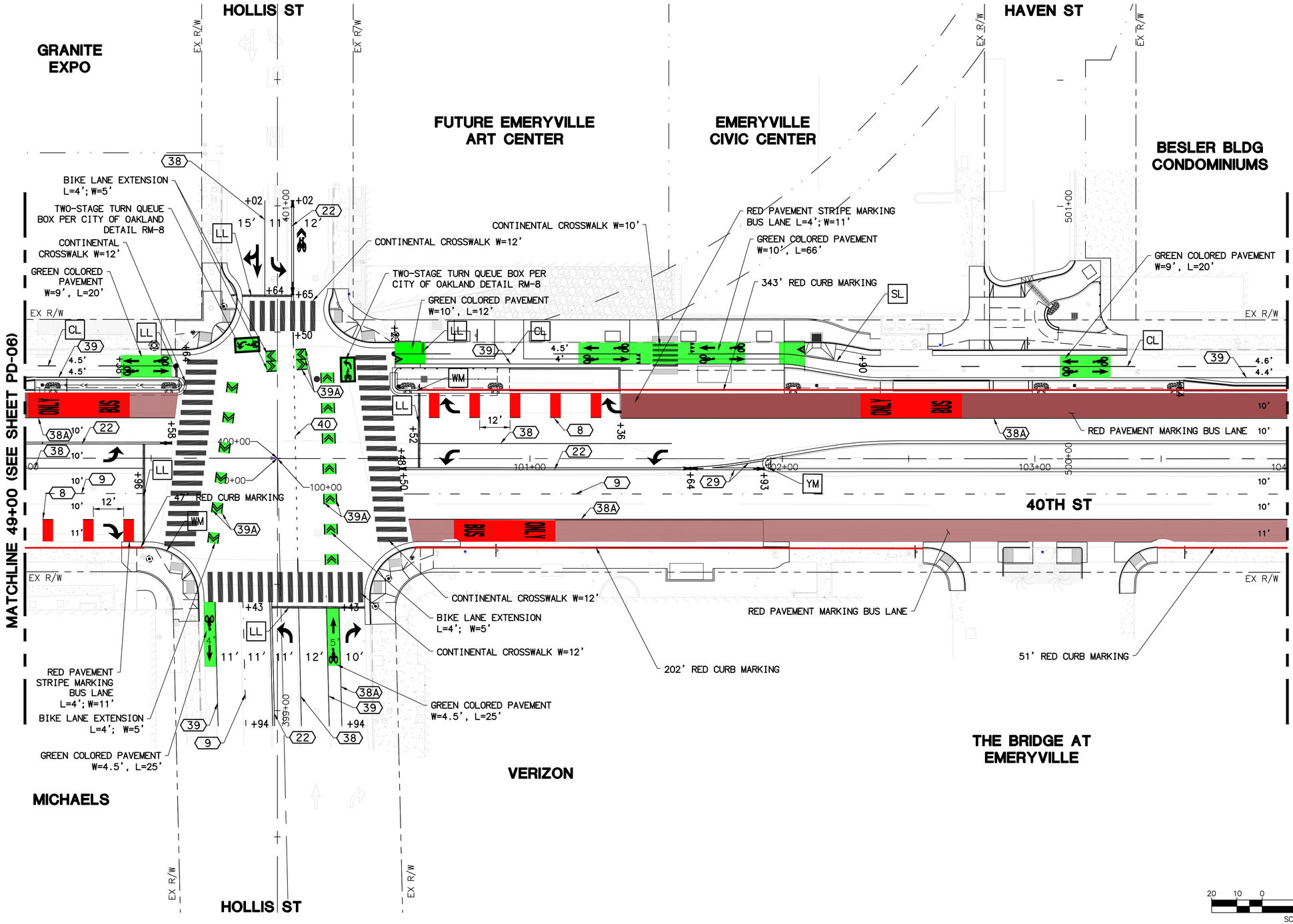
PAVEMENT DELINEATION PLAN
40TH STREET AT HOLDEN STREET
FROM STA 45+00 TO STA49+00

HORIZ. SCALE: 1" = 20' | VERT. SCALE: N/A

DESIGN WORK ORDER. NO.: XXXXXXX
CONSTR. WORK ORDER. NO.: XXXXXXX

PD-06

SHEET 108 OF 273



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DATE 10-08-24

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CITY ENGINEER
DATE

40TH STREET MULTIMODAL PROJECT

PAVEMENT DELINEATION PLAN 40TH STREET AT HOLLIS STREET/HAVEN STREET FROM STA 49+00 TO STA104+00

HORIZ. SCALE: 1" = 20' | VERT. SCALE: N/A

DESIGN WORK ORDER NO.: XXXXXX
CONSTR. WORK ORDER NO.: XXXXXX

PD-07

SHEET 109 OF 273

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HARLAN ST

BESLER BLDG CONDOMINIUMS

APPLE WEST HOME MEDICAL SUPPLYS

DECORUM FURNITURE AND RUGS

EX R/W

205' RED CURB MARKING

EXISTING CONTINENTAL CROSSWALK W=12'

GREEN COLORED PAVEMENT W=9', L=20'

BIKE LANE EXTENSION L=4'; W=5'

RED PAVEMENT STRIPE MARKING BUS LANE L=4'; W=11'

210' RED CURB MARKING

RED PAVEMENT MARKING BUS LANE

MATCHLINE 104+00 (SEE SHEET PD-07)

MATCHLINE 109+00 (SEE SHEET PD-09)

40TH ST

RED PAVEMENT MARKING BUS LANE

RED PAVEMENT STRIPE MARKING BUS LANE L=4'; W=11'

190' RED CURB MARKING

EXISTING CONTINENTAL CROSSWALK W=12'

218' RED CURB MARKING

THE BRIDGE AT EMERYVILLE

THE BRIDGE AT EMERYVILLE

HARLAN ST

SCALE 1"=20'

20 10 0 20 40 60

SCALE: 1"=20'

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DATE 10-08-24

REGISTERED PROFESSIONAL ENGINEER
SHAWN KOWALEWSKI
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40TH STREET MULTIMODAL PROJECT

PAVEMENT DELINEATION PLAN

40TH STREET AT HARLAN
FROM STA 104+00 TO STA109+00

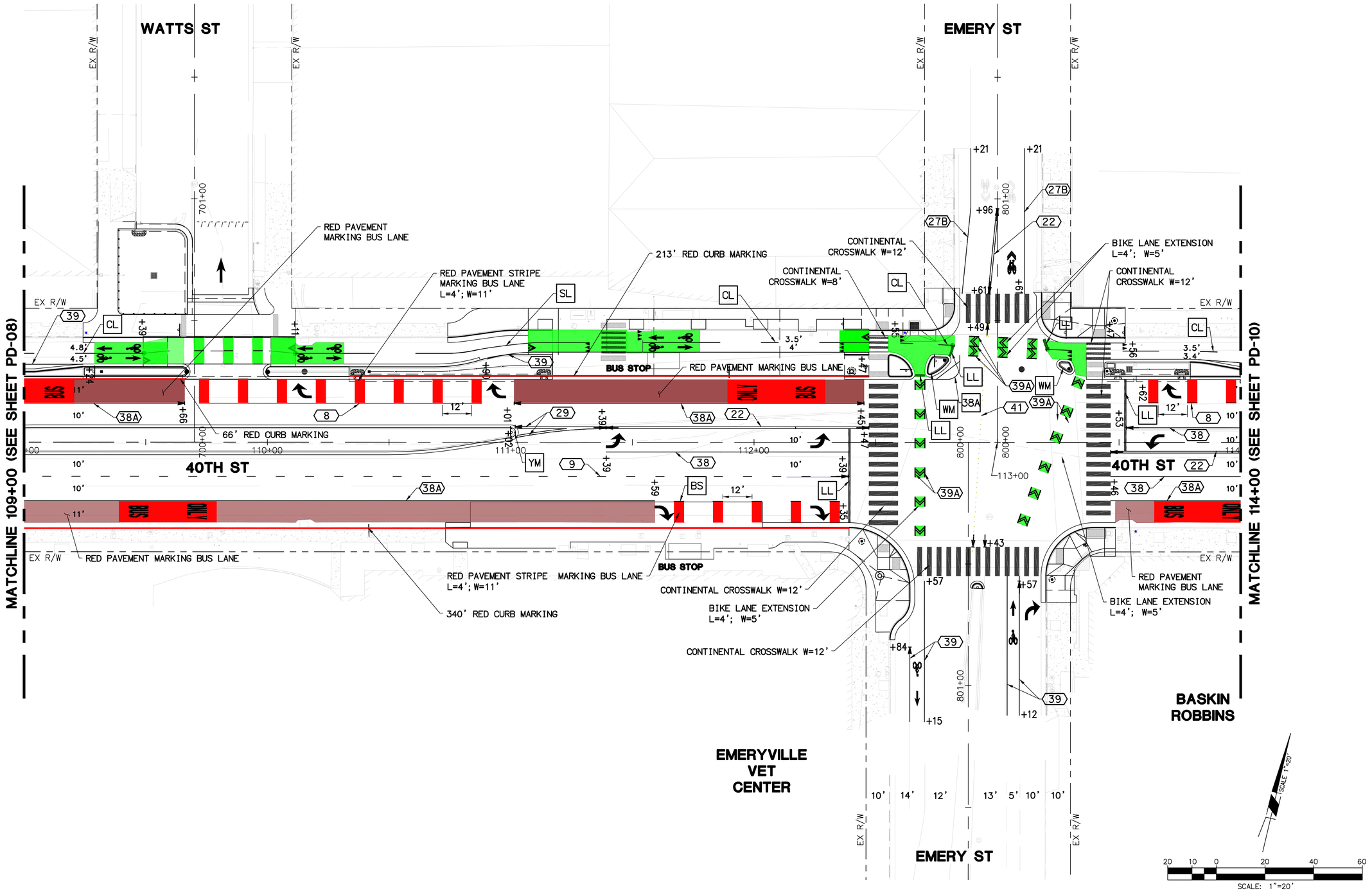
HORIZ. SCALE: 1" = 20' | VERT. SCALE: N/A

DESIGN WORK ORDER. NO.: XXXXXXX
CONSTR. WORK ORDER. NO.: XXXXXXX

PD-08

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R.C.E. No. 59539 EXPIRES: 12-31-25
DATE 10-08-24

REGISTERED PROFESSIONAL ENGINEER — SHAWN KOWALEWSKI — No. 59539 — Exp. 12/31/25 — CIVIL — STATE OF CALIFORNIA

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40TH STREET MULTIMODAL PROJECT

PAVEMENT DELINEATION PLAN 40TH STREET AT WATTS STREET/EMERY STREET FROM STA 109+00 TO STA114+00

HORIZ. SCALE: 1" = 20' | VERT. SCALE: N/A

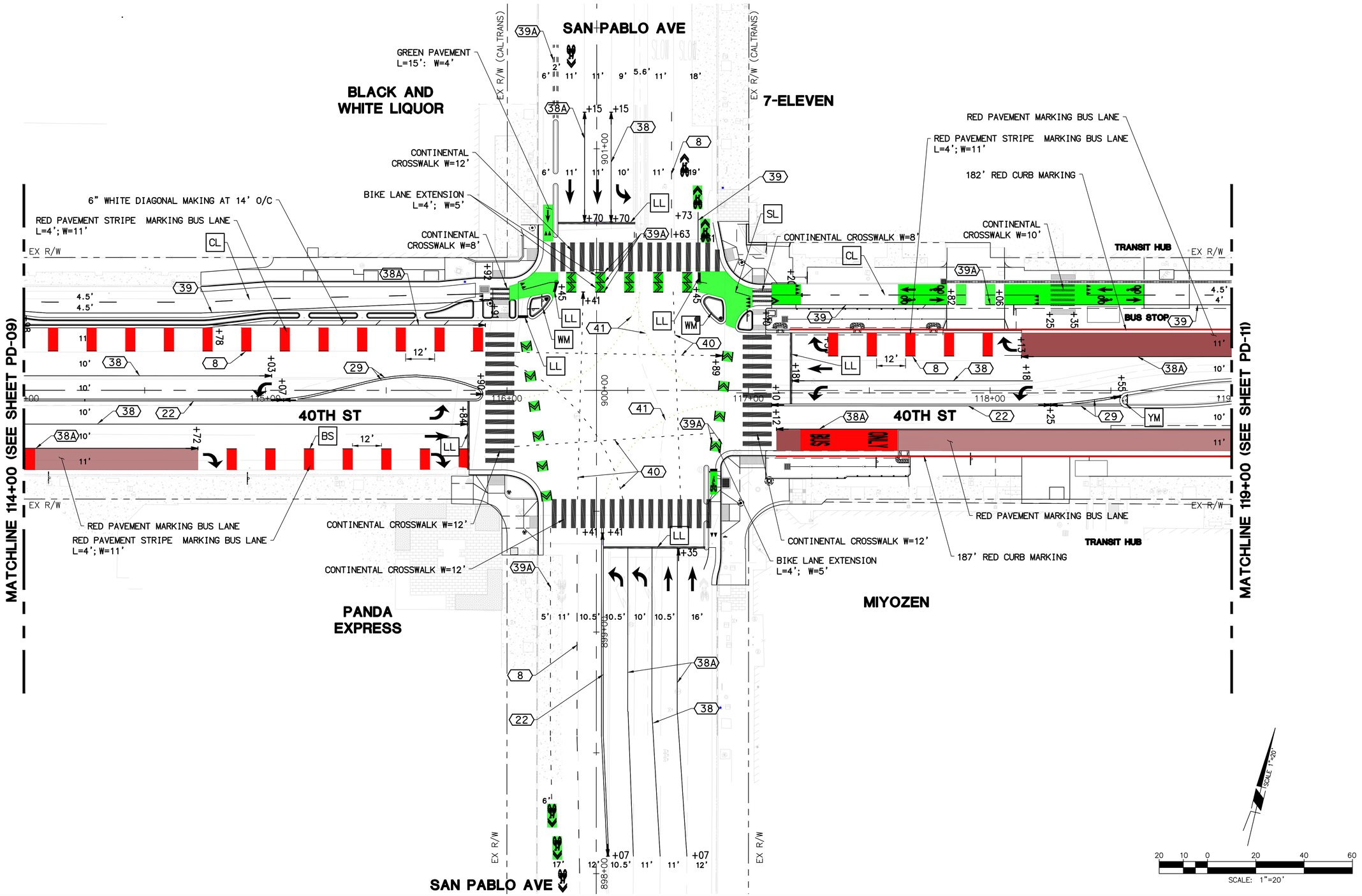
DESIGN WORK ORDER. NO.: XXXXXXX
CONSTR. WORK ORDER. NO.: XXXXXXX

PD-09

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DATE 10-08-24

REGISTERED PROFESSIONAL ENGINEER
SHAWN KOWALEWSKI
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40TH STREET MULTIMODAL PROJECT

PAVEMENT DELINEATION PLAN 40TH STREET AT SAN PABLO AVENUE FROM STA 114+00 TO STA119+00

HORIZ. SCALE: 1" = 20' | VERT. SCALE: N/A

DESIGN WORK ORDER. NO.: XXXXXXX
CONSTR. WORK ORDER. NO.: XXXXXXX

PD-10

SHEET 112 OF 273

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OAK WALK APARTMENTS

RED PAVEMENT MARKING BUS LANE

208' RED CURB MARKING

CONTINENTAL CROSSWALK W=10'

CONTINENTAL CROSSWALK W=10'

BIKE LANE EXTENSION L=4'; W=5'

CONTINENTAL CROSSWALK W=14'

EX R/W

YIELD LINE

ONLY BUS

40TH ST

RED PAVEMENT STRIPE MARKING BUS LANE L=4'; W=11'

RED PAVEMENT MARKING BUS LANE

172' RED CURB MARKING

6" WHITE DIAGONAL MARKING AT 5' O/C

CONTINENTAL CROSSWALK W=8'

BIKE LANE EXTENSION L=4'; W=5'

ANDANTE APARTMENTS

ADELINE ST

CONTINENTAL CROSSWALK W=14'

CONTINENTAL CROSSWALK W=12'

BIKE LANE EXTENSION L=4'; W=5'

HOMETOWN HEROES

CONTINENTAL CROSSWALK W=10'

CONTINENTAL CROSSWALK W=10'

145' RED CURB MARKING

6" WHITE DIAGONAL MARKING FOR BIKE LANE BUFFER

DIAGONAL MARKING WITHIN LOADING ZONE

MATCHLINE 119+00 (SEE SHEET PD-10)

MATCHLINE 202+00 (SEE SHEET PD-12)

CITY OF EMERYVILLE
CITY OF OAKLAND

SCALE 1"=20'

SCALE: 1"=20'

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CITY OF EMERYVILLE, CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

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CITY ENGINEER

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40TH STREET MULTIMODAL PROJECT

DESIGN WORK ORDER. NO.: XXXXXXX
CONSTR. WORK ORDER. NO.: XXXXXXX

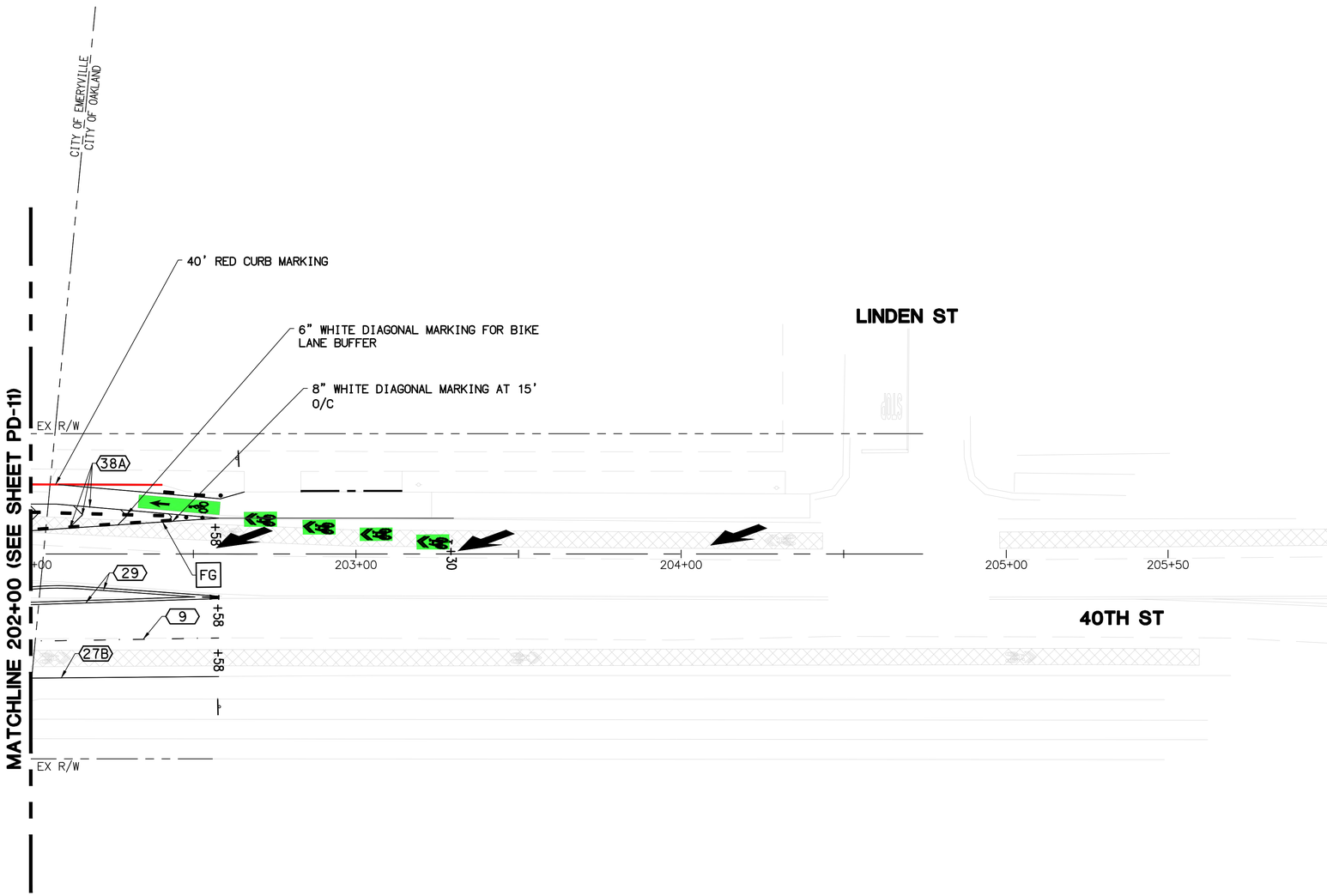
PAVEMENT DELINEATION PLAN
40TH STREET AT ADELINE STREET
FROM STA 119+00 TO STA202+00

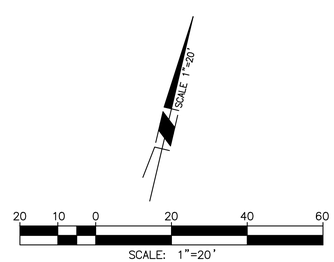
HORIZ. SCALE: 1" = 20' | VERT. SCALE: N/A

PD-11

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R.C.E. No. 59539 EXPIRES: 12-31-25
DATE 10-08-24

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SHAWN KOWALEWSKI
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40TH STREET MULTIMODAL PROJECT

PAVEMENT DELINEATION PLAN
40TH STREET AT LINDEN STREET
FROM STA 202+00 TO STA205+50

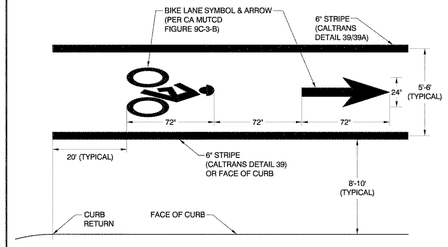
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CONSTR. WORK ORDER. NO.: XXXXXXX

PD-12

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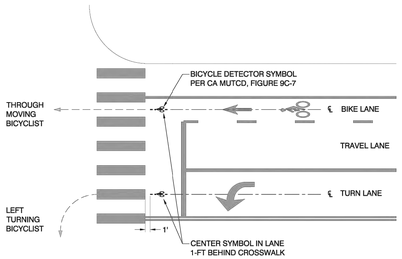


NOTES

1. Place a minimum of two bike lane symbol and arrow markings on each block face, centered in bike lane.
2. Place first marking on block 20 ft from curb return or crosswalk, unless otherwise noted.
3. Place last marking on block such that tip of arrow is 20 ft before curb return, unless otherwise noted.
4. Place additional mid-block markings, as noted on plans, such that spacing between symbols is no more than 200 ft, as measured from the base of one symbol to the next.
5. Adjust marking placement to leave at least 10 ft (parallel to the direction of travel) from advanced yield lines, limit lines, and other markings, unless otherwise noted.

NOT TO SCALE

CITY OF OAKLAND	BIKE LANE SYMBOL, ARROW, AND STRIPING	ROADWAY MARKING DETAILS	
DEPARTMENT OF TRANSPORTATION | SAFE STREETS DIVISION BICYCLE & PEDESTRIAN PROGRAM 250 FRANK H. OGAWA PLAZA, SUITE 4314 * OAKLAND CA, 94612 EMAIL: bikeped@oaklandca.gov		SCALE: NTS	DWG. NO.
		DATE: MAR 2021	RM-1

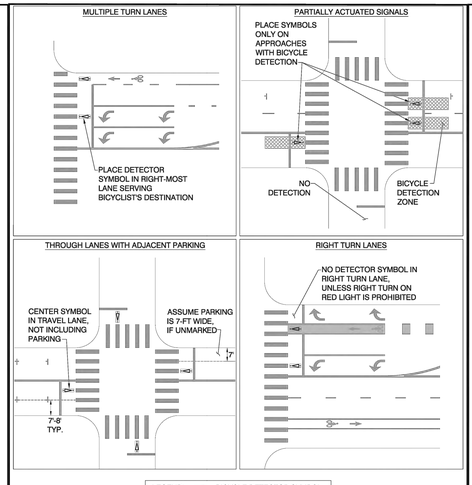


NOTES

1. The bicycle detector pavement marking (symbol) shall be used at all actuated traffic signal approaches that are capable of detecting bicycles.
2. A symbol shall be installed in the right-most lane serving the bicyclist's destination, including left turn lanes, through lanes, and bike lanes.
3. Center the symbol in the lane (aligned with lane assignment arrow).
4. The leading edge of the symbol shall be installed one foot behind the crosswalk (or limit line, if there is no crosswalk).
5. On Approaches with marked crosswalks and advanced limit lines, the symbol should be placed between the crosswalk and advanced limit line.

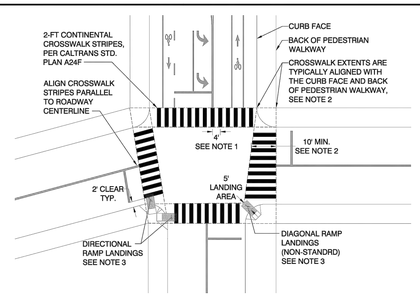
NOT TO SCALE

CITY OF OAKLAND	BICYCLE DETECTOR PAVEMENT MARKING	ROADWAY MARKING DETAILS	
DEPARTMENT OF TRANSPORTATION | SAFE STREETS DIVISION BICYCLE & PEDESTRIAN PROGRAM 250 FRANK H. OGAWA PLAZA, SUITE 4314 * OAKLAND CA, 94612 EMAIL: bikeped@oaklandca.gov		SCALE: NTS	DWG. NO.
		DATE: MAR 2021	RM-3



LEGEND: BICYCLE DETECTOR SYMBOL (PER CA MUTCD, FIGURE 9C-7)

CITY OF OAKLAND	BICYCLE DETECTOR PAVEMENT MARKING	SUPPLEMENTAL GUIDANCE	
DEPARTMENT OF TRANSPORTATION | SAFE STREETS DIVISION BICYCLE & PEDESTRIAN PROGRAM 250 FRANK H. OGAWA PLAZA, SUITE 4314 * OAKLAND CA, 94612 EMAIL: bikeped@oaklandca.gov		SCALE: NTS	DWG. NO.
		DATE: MAR 2021	RM-3A

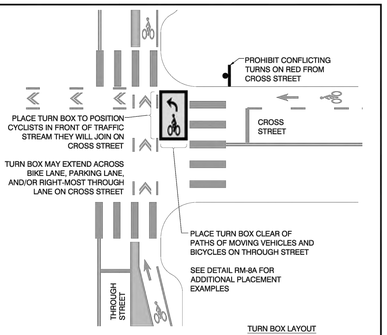


NOTES

1. Continental crosswalk stripe spacing is 4 ft, on-center, unless otherwise specified. Align first crosswalk stripe with centerline of roadway and continue pattern toward edge of roadway, maintaining 2 ft clear from face of curb (if present).
2. Crosswalks should encompass the pedestrian walkways they connect. Unless otherwise specified, align the front of the crosswalk with the curb face at the corresponding curb returns. Align the back of the crosswalk with the back of the pedestrian walkway but no less than 10 ft back from the front of the crosswalk.
3. Crosswalks must encompass the curb ramp landing areas they connect. Directional ramps are the preferred standard, but where a single diagonal ramp serves both crosswalks at a corner, the front of the crosswalks may need to be shifted toward the intersection to encompass the entire 5' landing area at the bottom of the curb ramp.
4. See Detail RM-4A for supplemental crosswalk layout guidance.
5. At controlled approaches, install advanced limit lines with continental crosswalks, per Marking Detail RM-5.

NOT TO SCALE

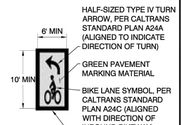
CITY OF OAKLAND	CONTINENTAL CROSSWALK	ROADWAY MARKING DETAILS	
DEPARTMENT OF TRANSPORTATION | SAFE STREETS DIVISION BICYCLE & PEDESTRIAN PROGRAM 250 FRANK H. OGAWA PLAZA, SUITE 4314 * OAKLAND CA, 94612 EMAIL: bikeped@oaklandca.gov		SCALE: NTS	DWG. NO.
		DATE: MAR 2021	RM-4



NOTES

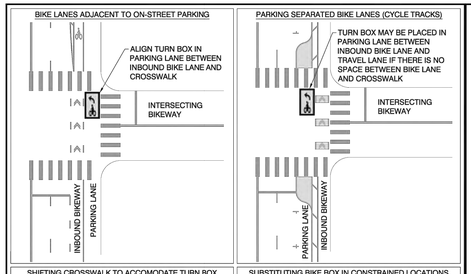
1. Install two-stage turn queue boxes (turn boxes) at signalized intersections where separated (Class IV) bikeways intersect with another bikeway, to facilitate two-stage turns from the separated bikeway.
2. Turn boxes may also be used at the intersections of other bikeway types, where comfortable and convenient turns are not otherwise supported.
3. Prohibit turns on red from intersecting streets where turn boxes are installed in the path of turning vehicles.
4. Turn boxes shall be placed in a protected area, outside of the path of conflicting vehicle, bicycle, and pedestrian movements.
5. Turn boxes may also be used at unsignalized intersections to simplify cyclist turning movements, but engineering judgement must be used to ensure the safe placement of queue boxes outside the path of conflicting vehicle movements.
6. At signalized intersections with passive detection for bicycles, provide passive detection within the turn box

TURN BOX LAYOUT

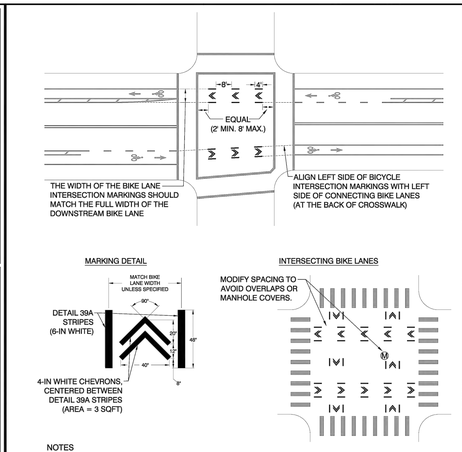


NOT TO SCALE

CITY OF OAKLAND	TWO-STAGE TURN QUEUE BOX	ROADWAY MARKING DETAILS	
DEPARTMENT OF TRANSPORTATION | SAFE STREETS DIVISION BICYCLE & PEDESTRIAN PROGRAM 250 FRANK H. OGAWA PLAZA, SUITE 4314 * OAKLAND CA, 94612 EMAIL: bikeped@oaklandca.gov		SCALE: NTS	DWG. NO.
		DATE: MAR 2021	RM-8



CITY OF OAKLAND	TWO-STAGE TURN QUEUE BOX	SUPPLEMENTAL GUIDANCE	
DEPARTMENT OF TRANSPORTATION | SAFE STREETS DIVISION BICYCLE & PEDESTRIAN PROGRAM 250 FRANK H. OGAWA PLAZA, SUITE 4314 * OAKLAND CA, 94612 EMAIL: bikeped@oaklandca.gov		SCALE: NTS	DWG. NO.
		DATE: MAR 2021	RM-8A

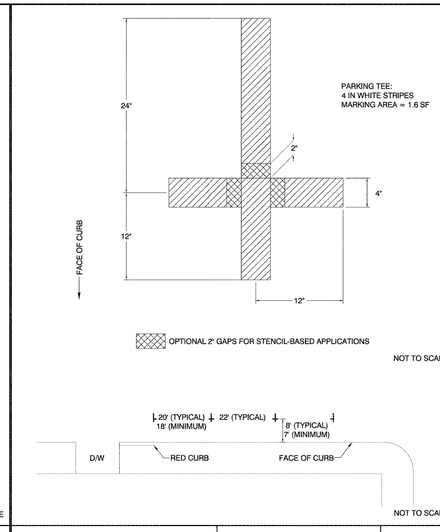


NOTES

1. Install bike lane intersection markings to connect approaching and receiving bike lanes across intersections, unless otherwise specified.
2. See Green Bike Lane Detail GB-4 for standard bike lane intersection markings through complex intersections.

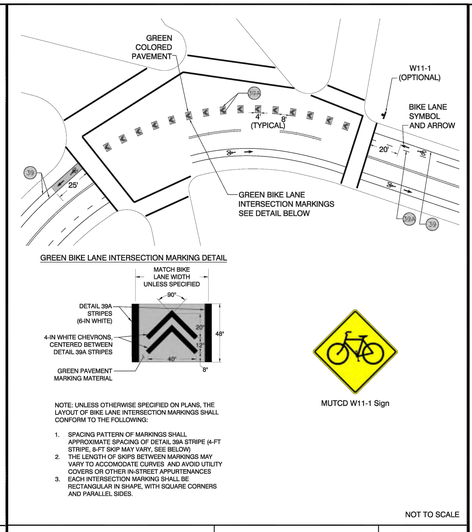
NOT TO SCALE

CITY OF OAKLAND	BIKE LANE EXTENSION THROUGH INTERSECTION	ROADWAY MARKING DETAILS	
DEPARTMENT OF TRANSPORTATION | SAFE STREETS DIVISION BICYCLE & PEDESTRIAN PROGRAM 250 FRANK H. OGAWA PLAZA, SUITE 4314 * OAKLAND CA, 94612 EMAIL: bikeped@oaklandca.gov		SCALE: NTS	DWG. NO.
		DATE: MAR 2021	RM-9



NOT TO SCALE

CITY OF OAKLAND	PARKING STALL "TEE"	ROADWAY MARKING DETAILS	
DEPARTMENT OF TRANSPORTATION | SAFE STREETS DIVISION BICYCLE & PEDESTRIAN PROGRAM 250 FRANK H. OGAWA PLAZA, SUITE 4314 * OAKLAND CA, 94612 EMAIL: bikeped@oaklandca.gov		SCALE: NTS	DWG. NO.
		DATE: MAR 2021	RM-11

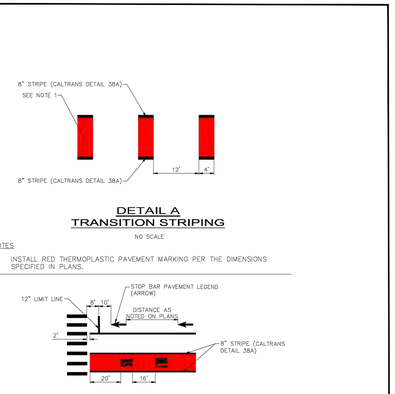


NOTE: UNLESS OTHERWISE SPECIFIED ON PLANS, THE LAYOUT OF BIKE LANE INTERSECTION MARKINGS SHALL CONFORM TO THE FOLLOWING:

1. SPACING PATTERN OF MARKINGS SHALL APPROXIMATE SPACING OF DETAIL 39A STRIPE (4-FT STRIPE, 8-FT SKIP MAY VARY, SEE BELOW)
2. THE LENGTH OF SKIPS BETWEEN MARKINGS MAY VARY TO ACCOMODATE CURVES AND AVOID UTILITY COVERS OR OTHER IN-STREET APPURTENANCES
3. EACH INTERSECTION MARKING SHALL BE RECTANGULAR IN SHAPE, WITH SQUARE CORNERS AND PARALLEL SIDES.

NOT TO SCALE

CITY OF OAKLAND	GREEN BIKE LANE (TYPE 4) COMPLEX INTERSECTION	GREEN BIKE LANE DETAILS	
DEPARTMENT OF TRANSPORTATION | SAFE STREETS DIVISION BICYCLE & PEDESTRIAN PROGRAM 250 FRANK H. OGAWA PLAZA, SUITE 4314 * OAKLAND CA, 94612 EMAIL: bikeped@oaklandca.gov		SCALE: NTS	DWG. NO.
		DATE: MAR 2021	GB-4



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R.C.E. No. 59539 EXPIRES: 12-31-25
DATE 10-08-24

REGISTERED PROFESSIONAL ENGINEER
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CITY OF EMERYVILLE, CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

APPROVED BY	BY	DATE

APPROVED BY
CITY ENGINEER
DATE

40TH STREET MULTIMODAL PROJECT

PAVEMENT DELINEATION DETAILS

HORIZ. SCALE: 1" = 20' VERT. SCALE: N/A

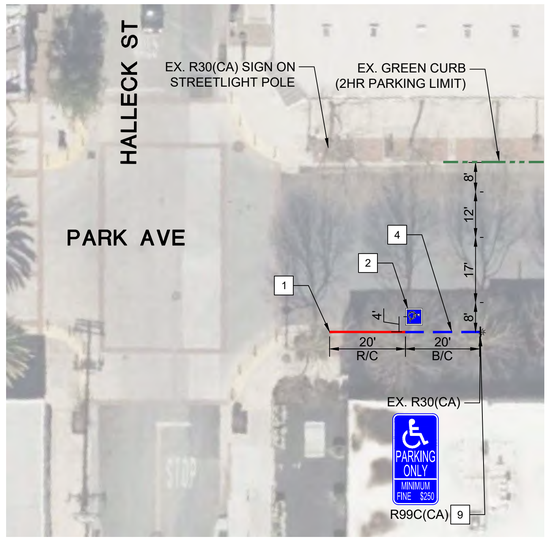
DESIGN WORK ORDER. NO.: XXXXXX
CONSTR. WORK ORDER. NO.: XXXXXX

PD-D-01

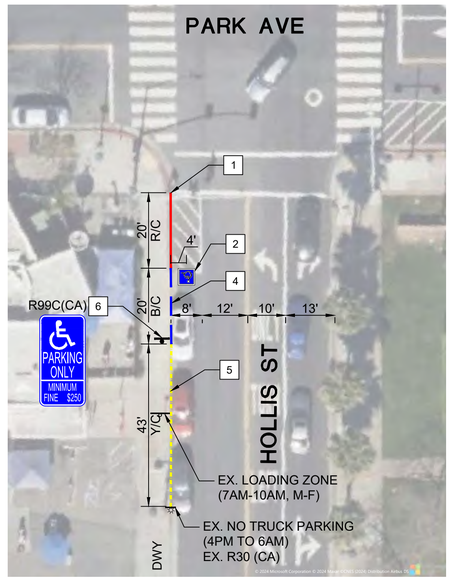
SHEET 115 OF 273

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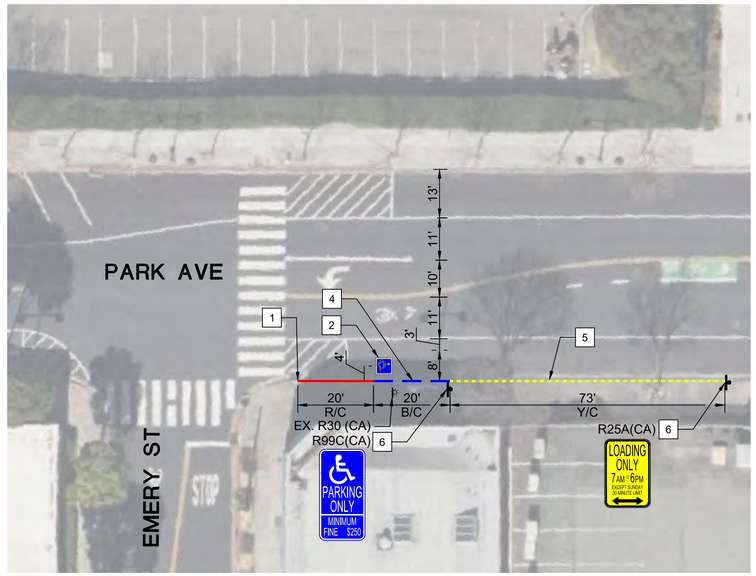
1 **PARK AVE AT HALLECK ST**
1" = 20'



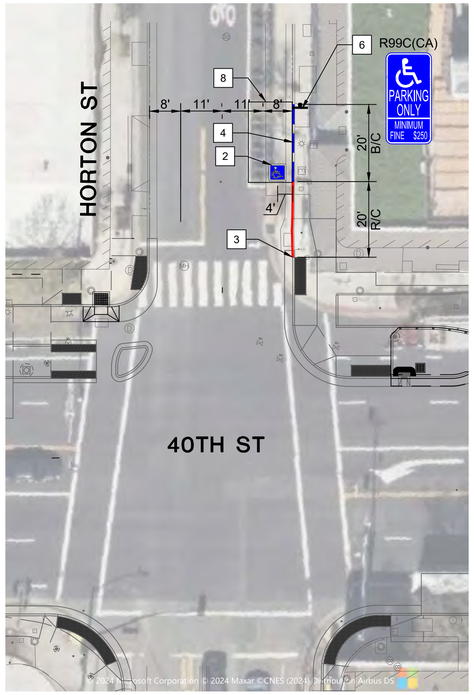
2 **PARK AVE AT HOLLIS ST**
1" = 20'



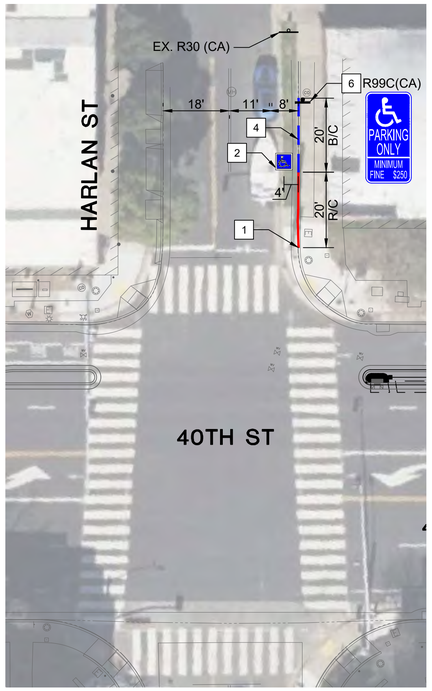
3 **PARK AVE AT HAVEN ST**
1" = 20'



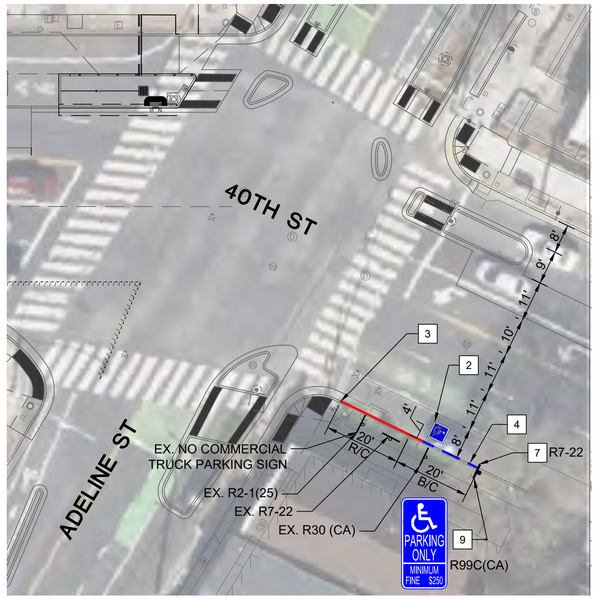
4 **PARK AVE AT EMERY ST**
1" = 20'



5 **40TH ST AT HORTON ST**
1" = 20'



6 **40TH ST AT HARLAN ST**
1" = 20'



7 **40TH ST AT ADELINE ST**
1" = 20'



8 **41ST ST AT ADELINE ST**
1" = 20'

20' 10' 0' 10' 20'
SCALE: 1" = 20'

LEGEND

- RED CURB (R/C)
- BLUE CURB (B/C) - ACCESSIBLE PARKING
- YELLOW CURB (Y/C) - LOADING ZONE
- GREEN CURB - TIME-LIMITED PARKING

GENERAL NOTES

1. ALL EXISTING SIGNS TO REMAIN UNLESS OTHERWISE SHOWN ON PLANS

KEYNOTES

1	INSTALL RED CURB BEGINNING AT CURB RETURN
2	INSTALL INTERNATIONAL SYMBOL OF ACCESSIBILITY (ISA) MARKING PER CALTRANS STD. PLAN A24C
3	INSTALL RED CURB BEGINNING AT CROSSWALK
4	INSTALL BLUE CURB AS SHOWN
5	INSTALL YELLOW CURB AS SHOWN
6	INSTALL SIGN AS SHOWN ON NEW POST PER CALTRANS STD. PLANS RS1 AND RS5
7	REMOVE AND SALVAGE EXISTING SIGN
8	REMOVE AND RELOCATE BIKE SHARE STATION
9	INSTALL SIGN ON EXISTING POST OR STREETLIGHT

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DEPARTMENT OF PUBLIC WORKS

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CITY ENGINEER
DATE

40TH STREET MULTIMODAL PROJECT

DESIGN WORK ORDER. NO.: XXXXXXX
CONSTR. WORK ORDER. NO.: XXXXXXX

PAVEMENT DELINEATION DETAILS

PD-D-02

SHEET 116 OF 273

HORIZ. SCALE: 1" = 20' | VERT. SCALE: N/A

PAVEMENT DELINEATION

SHEET No.	LOCATION	THERMOPLASTIC TRAFFIC STRIPING														PAVEMENT MARKER (RETROREFLECTIVE)		THERMOPLASTIC PAVEMENT MARKING																				
		6" YELLOW						6" WHITE						8" WHITE																								
		SOLID					DASH	SOLID			DASH																										
		CL (BIKE)	SL (BIKE)	DETAIL 22	DETAIL 28	DETAIL 29	DETAIL 41	DETAIL 27B	DETAIL 39	DETAIL 8	DETAIL 9	DETAIL 39A	DETAIL 40	DETAIL 38		TYPE D		PAINT BLUE CURB	RED PARKING	PAINT WHITE CURB	RED STRIPED BUS LANE	RED BACKGROUND BUS ONLY	RED BUS LANE	GREEN BIKE LANE	LIMIT LINE	BIKE LANE EXTENSION	SHARED ROADWAY BIKE SYMBOL	BIKE SYMBOL W/ PERSON	BIKE LANE TYPE I ARROW	TYPE I 10FT ARROW	TYPE IV (L,R) ARROW (BIKE)	TYPE V (L,R) ARROW	TYPE VII (L,R) ARROW, MERGE	TYPE III (B) ARROW (BIKE)	TYPE VI ARROW	YIELD LINE	BUS ONLY	SPEED TABLE	CONTINENTAL CROSSWALK	DIAGONAL (6" WIDE)	CHEVRON
		LF														EA	EA	LF	LF	LF	SQFT				SQFT												
PD-01	SHLMD	246				326	54		690	163		48	239				1			58	471			392	38	24		42	21			31				5			562	158	
PD-02	SHLMD	800				1,477			1,377	291				119	1,354	125	6				387	902	7,937	558				35	14							5	84	24	30		
PD-03	40TH	399				798			797						801	69						460	4,738					14	7								42				
PD-04	40TH	223	150	119		213			417	24	129			195	691	32	4				77	804	4,217	1,675				28	14			15	27		42	3	84	24		54	
	HUBBARD															2																								
PD-05	40TH	131	269	273		21	98		218	274	308	116		200	444	29	17			64	558	719	3,183	1,108	147	48	12	42	14			150	54		42	13	84	24	1,130		
	HORTON				50											4																								
PD-06	40TH	207	81	345		119			240	153	68			162	612	43	10				429	718	5,537	800				28	14	14		75					84	36			
	HOLDEN															2																								
PD-07	40TH	285	57	248		30			323	153	394	128	90	486	717	27	30				297	700	5,963	1,735	132	51	12	70	35		8	150			42	5	126	24	1,514		
	HOLLIS															2	1																								
PD-08	40TH	406		278		109			377		586	36		230	640	36	24			3	432	904	5,724	442	76	18		28	14			120					84		1,296		
	HARLAN															2																								
PD-09	40TH	387		196		37	92		383	104	475	132		200	636	23	20			6	598	1,215	4,695	2,102	81	54	12	56	28	14		135				12	168	48	1,290		
	WATTS																																								
	EMERY															2																								
PD-10	40TH	390		357		199	196		373	544		212	415	459	859	50					895	345	3,094	1,578	144	60	69	35	18	84		180				14	42	12	1,562	10	
	SAN PABLO															2	1																								
PD-11	40TH	143		478		137	264	562	1,112	56	153	136		120	633	55	10				151	353	2,926	2,373	71	60	23	63	25	42		105			126	14	42	12	944		
	ADELINE															2																				5				18	
PD-12	40TH					108		57			58				174	11	2							176			46	7	4				81							29	116
PD-D-02	ADA																	160	160																					
	TOTAL	3,617	557	2,294	50	3,574	704	619	6,307				744		7,561	518	126	160	160	131	4,295	7,120	48,014	12,939	689	315	173	448	207	154	8	961	162	0	252	74	840	204	8,328	268	116

REMOVE PAVEMENT DEINEATION

SHEET NO	LOCATION	REMOVE YELLOW THERMOPLASTIC TRAFFIC STRIPE (HAZARDOUS)	REMOVE THERMOPLASTIC TRAFFIC STRIPE
		LF	LF
PD-1	SHELLMOUND	148	308
	65TH ST	53	172
PD-2	66TH ST	152	
PD-3	SHELLMOUND	143	243
	67TH ST	177	203
TOTAL		673	926

REMOVE PAVEMENT MARKING

SHEET NO	LOCATION	RR XING SYMBOL	TYPE IV ARROW	TYPE VII ARROW	LIMIT LINE	BIKE LANE SYMBOL	BIKE LANE ARROW	CONTINENTAL XING
		SQFT						
PD-1	SHELLMOUND		15	42	175	7	3.5	
	65TH ST	140			92			144
PD-2	66TH ST	70						
PD-3	SHELLMOUND							
	67TH ST	70				7	3.5	
TOTAL		280	15	42	267	14	7	144
GRAND TOTAL		769						

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DEPARTMENT OF PUBLIC WORKS

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40TH STREET MULTIMODAL PROJECT

DESIGN WORK ORDER. NO.: XXXXXXX
CONSTR. WORK ORDER. NO.: XXXXXXX

PAVEMENT DELINEATION QUANTITIES

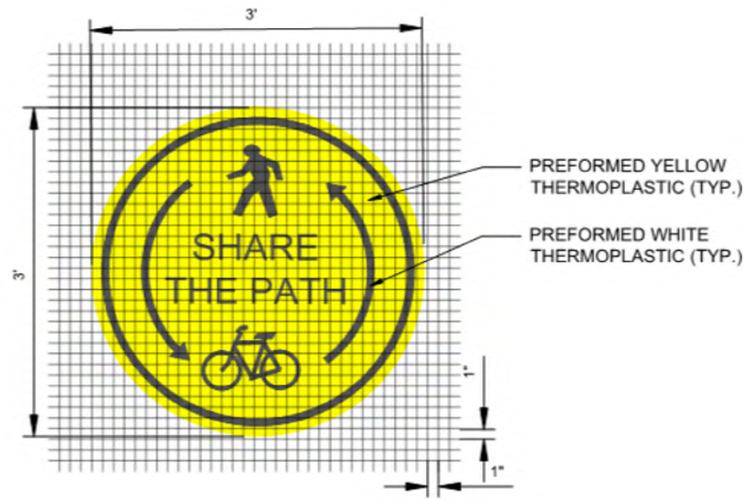
HORIZ. SCALE: 1" = 20' | VERT. SCALE: N/A

PDQ-01

SHEET 117 OF 273

GENERAL NOTES

1. PAVEMENT DELINEATION WORK SHALL BE IN ACCORDANCE WITH THE 2023 CALTRANS STD PLAN, THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (CA-MUTCD) LATEST EDITION, AND THE CONTRACT SPECIAL PROVISIONS. PAVEMENT DELINEATION DETAIL DESIGNATION NUMBERS ARE PER CALTRANS STD PLANS A20A TO A20D. PAVEMENT MARKINGS ARROWS, SYMBOLS, WORDS AND CROSSWALKS ARE PER CALTRANS STD PLANS A24A TO A24F. BIKE PAVEMENT MARKINGS PER CITY OF OAKLAND "DESIGN DETAILS FOR TRANSPORTATION FACILITIES".
2. CONTRACTOR SHALL REMOVE BY WET SANDBLASTING ALL EXISTING AND PAVEMENT MARKINGS WHICH CONFLICT WITH NEW WORK AS SHOWN ON THE PLANS. SANDBLAST AREAS FOR PAVEMENT MARKING LEGEND AND ARROWS SHALL BE RECTANGULAR. ALL SANDBLASTED ARE FOG SEALED.
3. CONTRACTOR SHALL FINISH AND INSTALL ALL CONSTRUCTION MATERIALS FOR PAVEMENT DELINEATION AND SIGN WORK.
4. EXACT LOCATIONS OF ALL NEW SIGNS, PAVEMENT DELINEATION AND MARKINGS SHALL BE MARKED/ CAT-TRACED IN THE FIELD BY CONTRACTOR AND SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
5. LANE WIDTHS SHALL BE MEASURED BETWEEN THE CENTER LINES OF EACH ADJACENT SINGLE OR DOUBLE STRIPE OR TOP OF FACE OF CURB AS APPROPRIATE.
6. LANE WIDTHS OF CYCLE TRACK SHALL BE MEASURED BETWEEN THE CENTER LINES OF EACH ADJACENT STRIPE OR GUTTER EDGE AS APPROPRIATE.
7. ALL PAVEMENT DELINEATION AND MARKING SHALL BE THERMOPLASTIC.
8. CALTRANS PAVEMENT MARKINGS IN BIKE FACILITIES SHALL BE REDUCED TO HALF-SIZE.
9. FOR CONFLICT ZONES AND BIKE LANE EXTENSIONS, GREEN-COLORED PAVEMENT PATTERN SHALL MATCH THE PATTERN OF THE DOTTED LINES, THUS FILLING IN ONLY THE AREAS THAT ARE DIRECTLY BETWEEN A PAIR OF DASHED LINE SEGMENTS.
10. FOR AREAS WHERE GENERAL TRAFFIC IS PERMITTED TO ENTER INTO THE TRANSIT LANE OR OUT OF THE TRANSIT LANE, RED COLORED PAVEMENT PATTERN SHALL BE 4'-12'-4'.



LEGEND

(##)	STRIPING DETAILS PER STANDARD PLANS
LL	12" WHITE LIMIT LINE
CL	6" WIDE 3' LONG YELLOW DASHED CENTERLINE WITH 9' GAP
SL	6" YELLOW SOLID CENTERLINE
RP	REMOVE ALL EXISTING CONFLICTING TRAFFIC STRIPING, MARKING OR ARROW AS NOTED, INCLUDING RAISED PAVEMENT MARKERS
WM	INSTALL WHITE REFLECTIVE PAVEMENT MARKING ON TOP AND FACE OF CURB PER DETAIL A ON THE PART 1 PLANS.
	BIKE LANE SYMBOL WITH PERSON AND ARROW
	BIKE LANE
	TYPE (IV) L ARROW PER STD PLAN A24A
	TYPE (IV) R ARROW PER STD PLAN A24A
	TYPE (VI) ARROW PER STD PLAN A24A
	TYPE I ARROW PER STD PLAN A24A
	TYPE VII ARROW (L) PER STD PLAN A24A
	YIELD LINE PER STD A24G
	SHARE THE PATH
	SPEED TABLE/ SPEED HUMP WITH CROSSWALK PER CA MUTCD
BUS ONLY	BUS ONLY PER STD PLAN A24E, L=40'
	24" CONTINENTAL CROSSWALK BARS
	K72 DARK GREY
	"BUS ONLY" LANE TRANSITION STRIPING, L=4'

S-#	SIGN IDENTIFICATION NUMBER
	PROPOSED ROADSIDE SIGN (ONE POST)
	PROPOSED ROADSIDE SIGN (STREETLIGHT)
	EXISTING ROADSIDE SIGN (ONE POST)
PP	PROTECT IN PLACE
SS	INSTALL SIGN (STRAP AND SADDLE BRACKET METHOD)
BAY ST	"BAY ST" PAVEMENT MARKING PER STANDARD PLAN A24D

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R.C.E. No. 63909 EXPIRES: 9-30-26
DATE 02-28-2025

REGISTERED PROFESSIONAL ENGINEER
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No. C 63909
Exp. 9-30-26
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40TH STREET MULTIMODAL PROJECT - PART 2

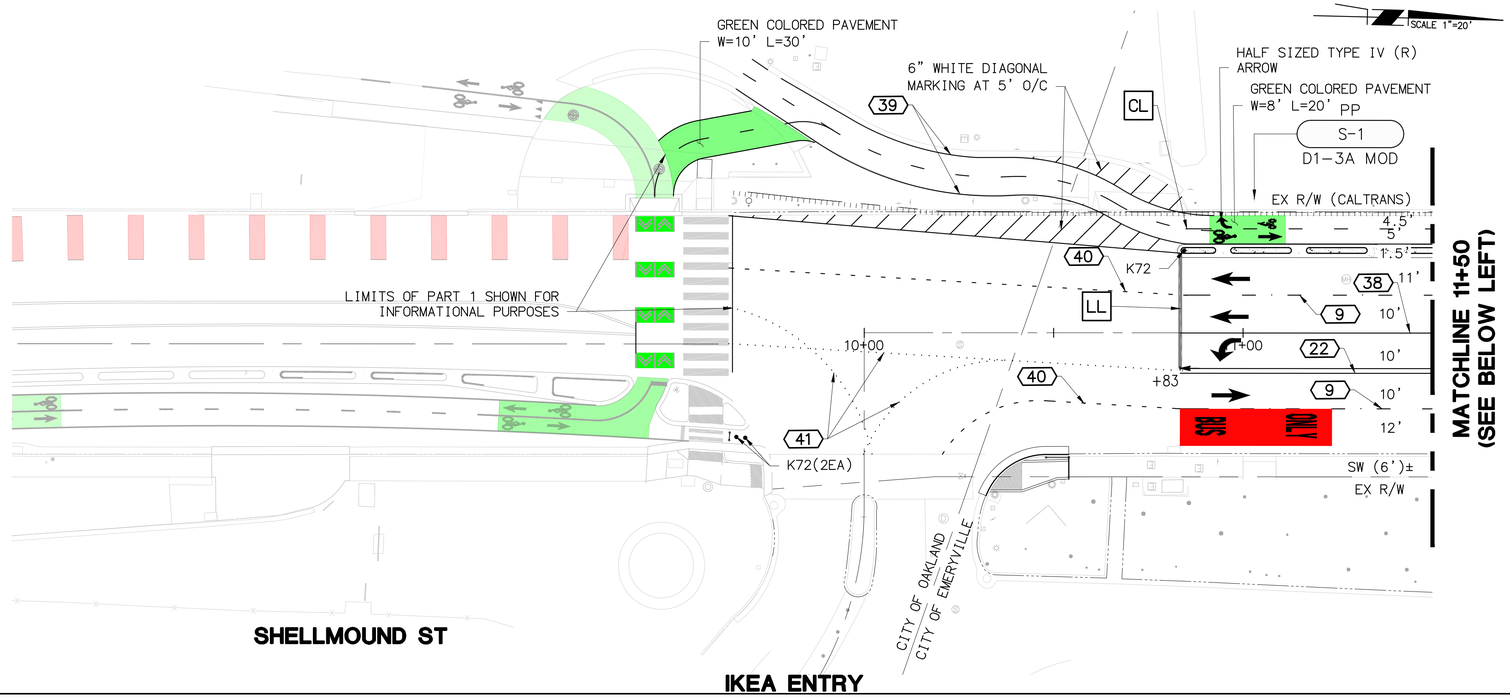
PAVEMENT DELINEATION NOTES AND DETAILS

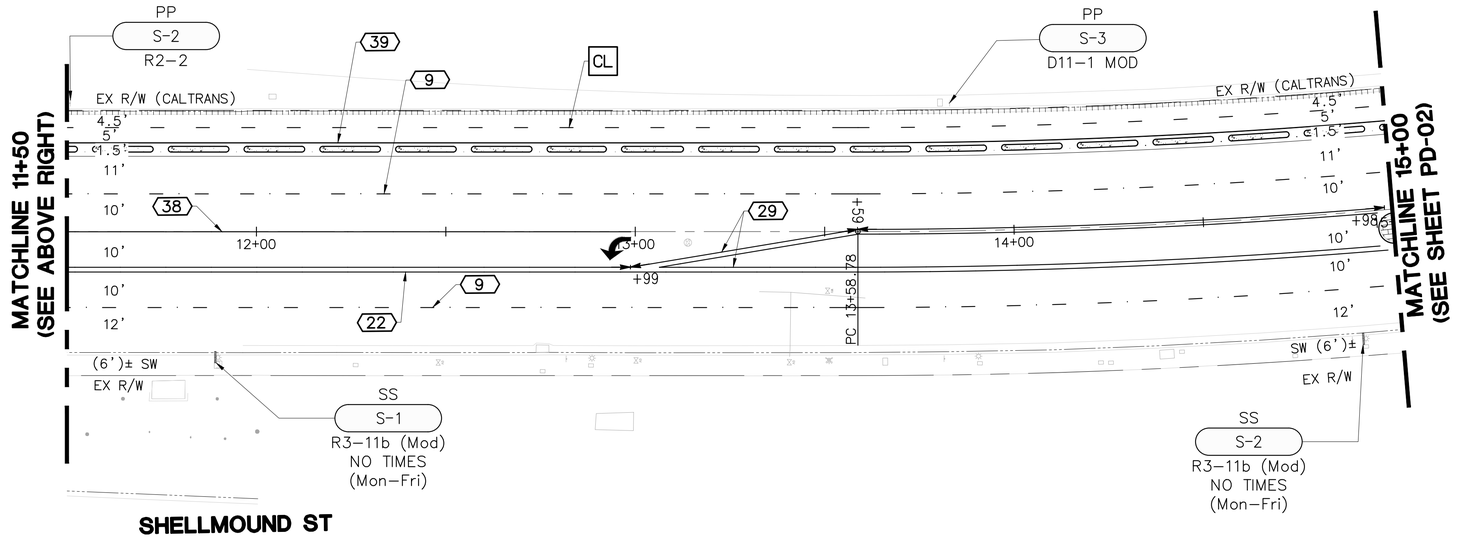
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SCALE: 1"=20'

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40TH STREET MULTIMODAL PROJECT - PART 2

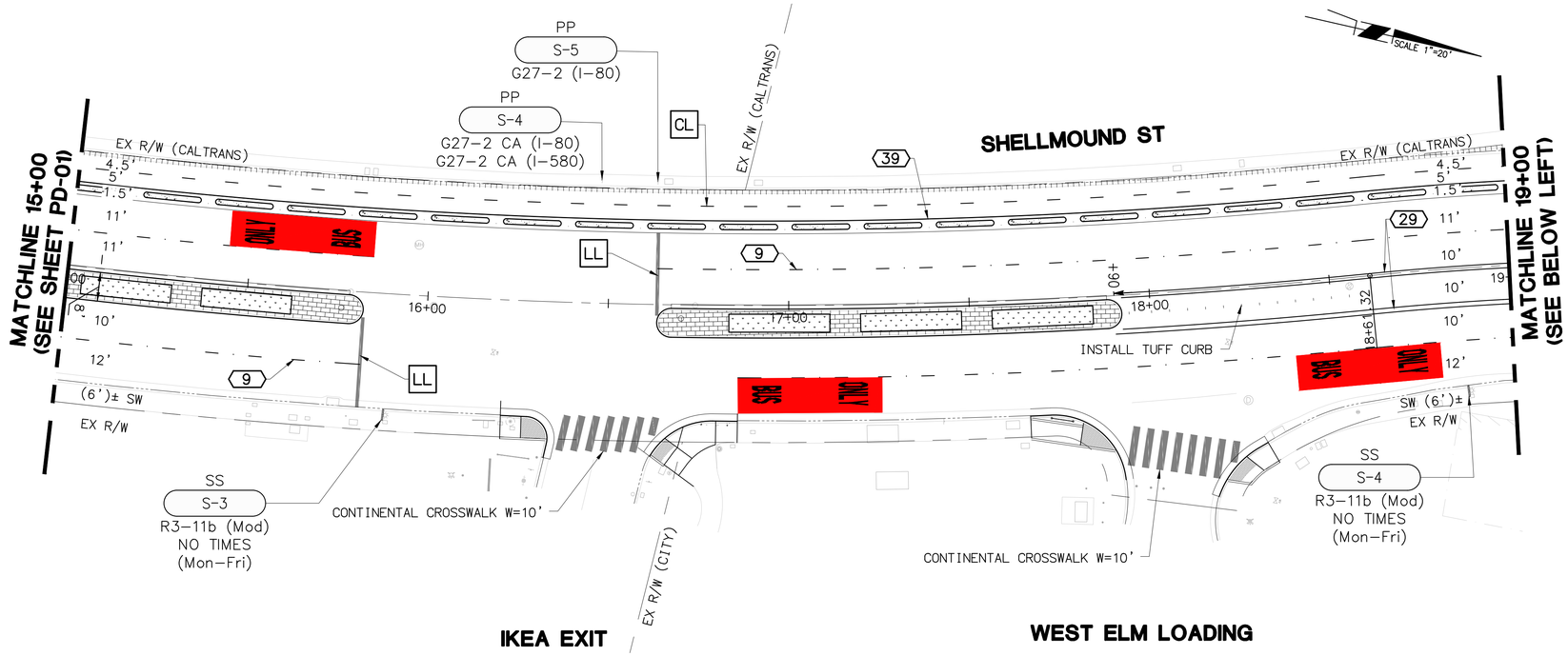
PAVEMENT DELINEATION PLAN
SHELLMOUND STREET
FROM BEG TO STA 15+00

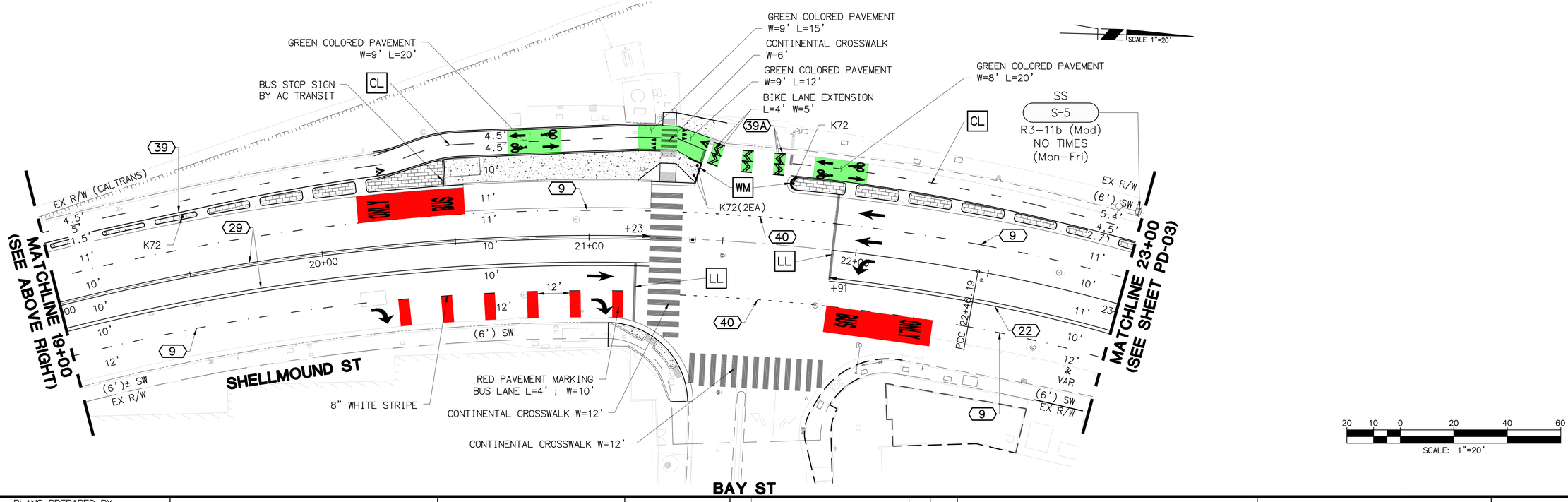
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SHEET 238 OF 273





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C:\Users\Miguel Vazquez\Diablo Engineering Group\Emeryville - 40th Street\CAD_Part2\Div\221-PD_Part2.dwg
2/28/2025 1:48 PM Miguel Vazquez

PLANS PREPARED BY
DIABLO ENGINEERING GROUP
1300 CLAY STREET, SUITE 600
OAKLAND, CA 94612
(510) 550-8959

ENGINEER IN RESPONSIBLE CHARGE
JENNIFER HARMON
R.C.E. No. 63909 EXPIRES: 9-30-26
DATE 02-28-2025

REGISTERED PROFESSIONAL ENGINEER
JENNIFER A. HARMON
No. C 63909
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

Underground Service Alert North 811
Call: TOLL FREE 1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

MARK	REVISIONS	APPR.	DATE

DESIGNED BY AT DRAWN BY AT CHECKED BY JH

CITY OF EMERYVILLE, CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

APPROVED BY	BY	DATE

APPROVED BY
CITY ENGINEER
DATE

40TH STREET MULTIMODAL PROJECT - PART 2

PAVEMENT DELINEATION PLAN
SHELLMOUND STEET
FROM STA 15+00 TO STA 23+00

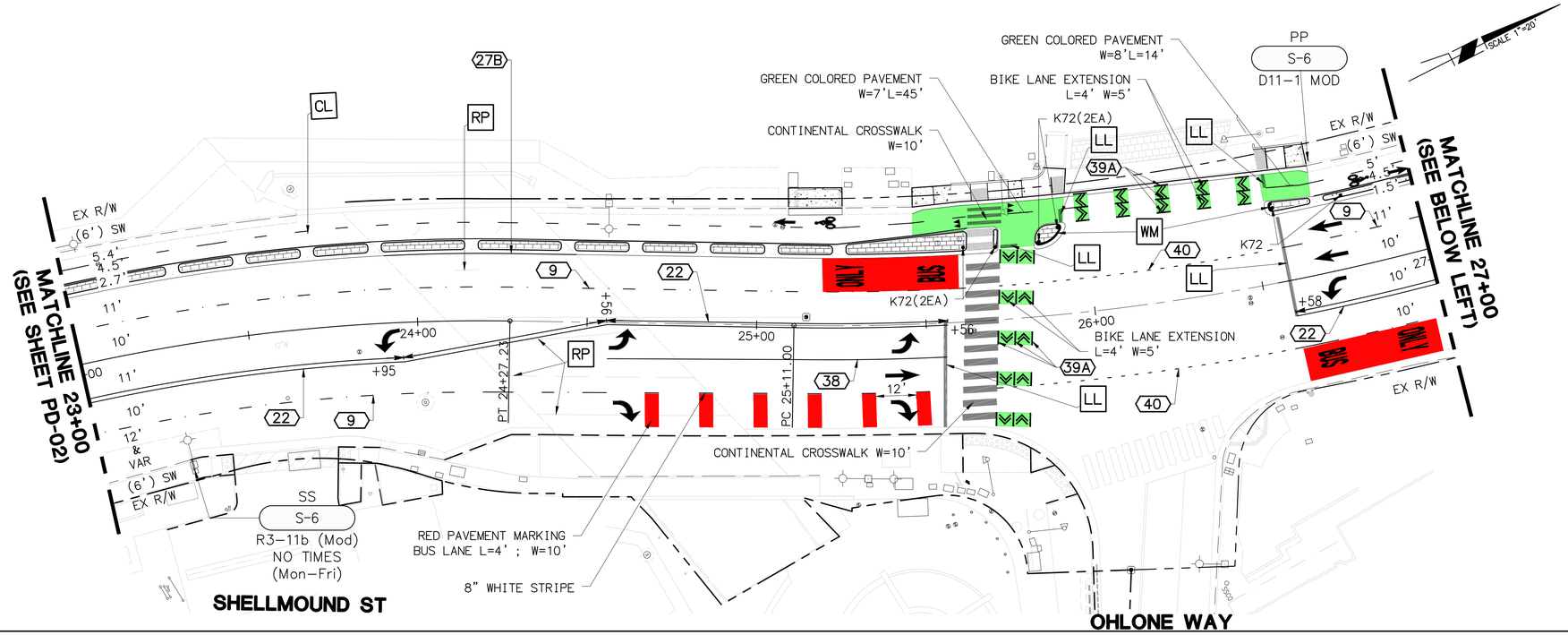
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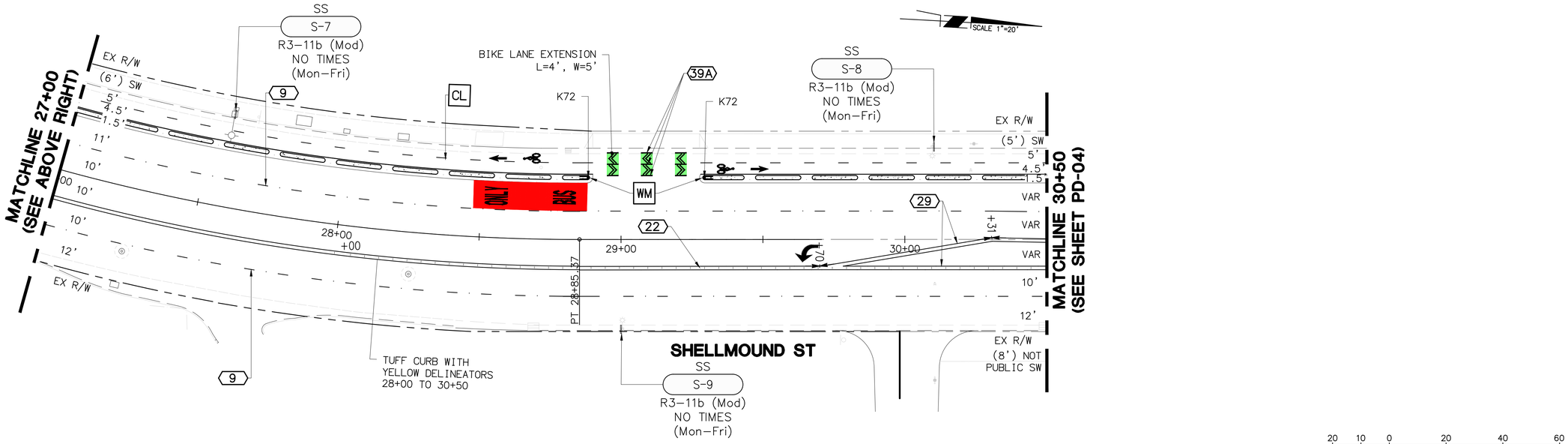
DESIGN WORK ORDER. NO.: XXXXXXX
CONSTR. WORK ORDER. NO.: XXXXXXX

PD-03

SHEET 239 OF 273

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2/28/2025 1:47 PM Miguel Vazquez

PLANS PREPARED BY
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1300 CLAY STREET, SUITE 600
OAKLAND, CA 94612
(510) 550-8959

ENGINEER IN RESPONSIBLE CHARGE
JENNIFER HARMON
R.C.E. No. 63909 EXPIRES: 9-30-26
DATE 02-28-2025

REGISTERED PROFESSIONAL ENGINEER
JENNIFER A. HARMON
No. C 63909
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

CALL BEFORE YOU DIG
Under Ground Service Alert North 811
Call: TOLL FREE 1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

MARK	REVISIONS	APPR.	DATE

DESIGNED BY AT DRAWN BY AT CHECKED BY JH

CITY OF EMERYVILLE, CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

APPROVED BY	BY	DATE

APPROVED BY
CITY ENGINEER
DATE

40TH STREET MULTIMODAL PROJECT - PART 2

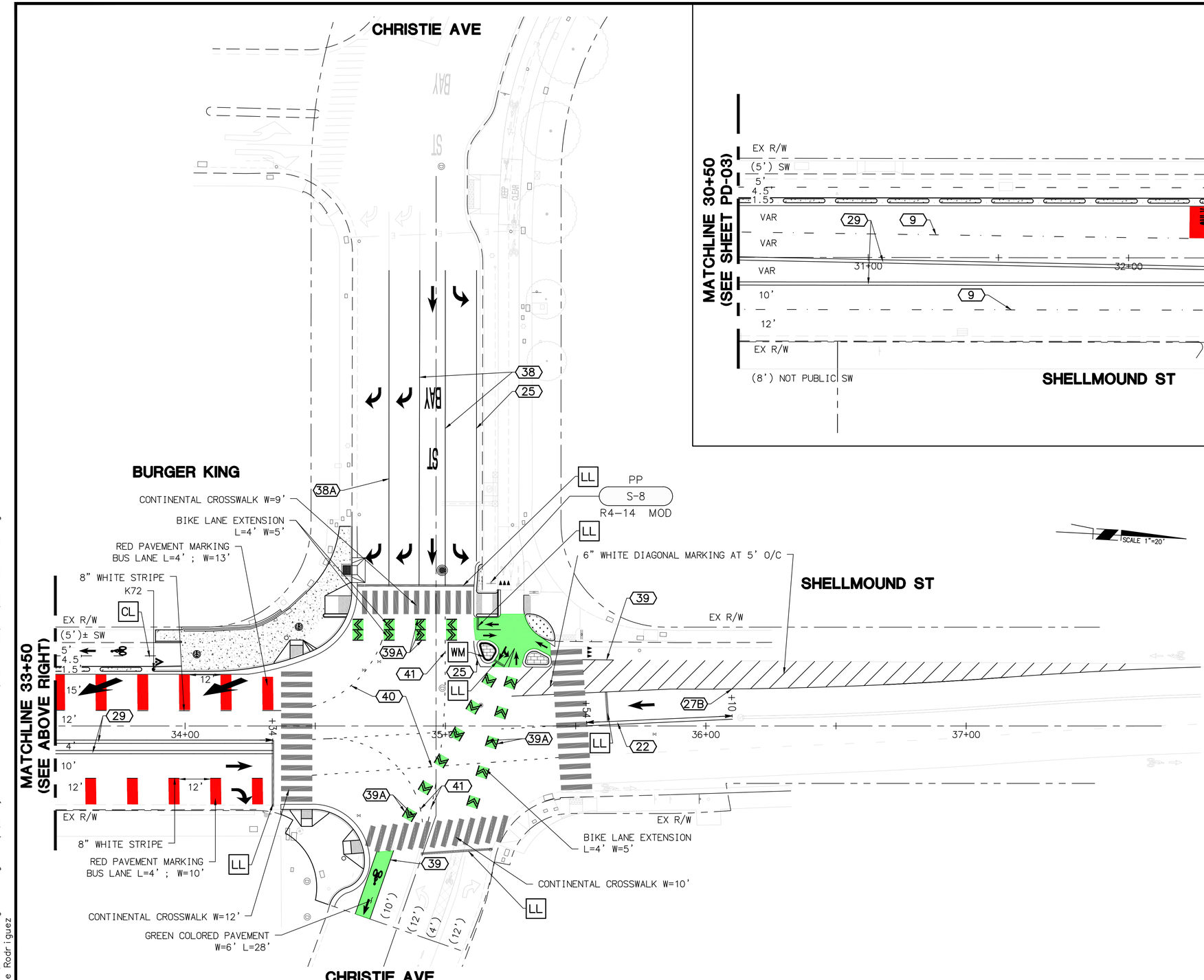
PAVEMENT DELINEATION PLAN
SHELLMOUND STREET
FROM STA 23+00 TO STA 30+50

HORIZ. SCALE: AS SHOWN | VERT. SCALE: N/A

DESIGN WORK ORDER, NO.: XXXXXXX
CONSTR. WORK ORDER, NO.: XXXXXXX

PD-04

SHEET 240 OF 273



100% SUBMITTAL, NOT FOR CONSTRUCTION

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2/28/2025 4:58 PM Jose Rodriguez

PLANS PREPARED BY
DIABLO ENGINEERING GROUP
1300 CLAY STREET, SUITE 600
OAKLAND, CA 94612
(510) 550-8959

ENGINEER IN RESPONSIBLE CHARGE

JENNIFER HARMON
R.C.E. No. 63909 EXPIRES: 9-30-26
DATE 02-28-2025

REGISTERED PROFESSIONAL ENGINEER
JENNIFER A. HARMON
No. C 63909
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

CALL BEFORE YOU DIG
Under Ground Service Alert North 811
Call: TOLL FREE 1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

MARK	REVISIONS	APPR.	DATE

DESIGNED BY AT DRAWN BY AT CHECKED BY JH

CITY OF EMERYVILLE, CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

APPROVED BY	BY	DATE

APPROVED BY
CITY ENGINEER
DATE

40TH STREET MULTIMODAL PROJECT - PART 2

PAVEMENT DELINEATION PLAN
SHELLMOUND ST TO CHRISTIE AVE
FROM STA 30+50 TO END

HORIZ. SCALE: 1" = 20' | VERT. SCALE: N/A

DESIGN WORK ORDER. NO.: XXXXXXX
CONSTR. WORK ORDER. NO.: XXXXXXX

PD-05

SHEET 241 OF 273

Attachment B:
Transportation Committee and City Council Agendas

PLEASE POST

City of Emeryville

INCORPORATED 1896

1333 Park Avenue. Emeryville, CA 94608-3517
t (510) 596-4300 | f (510) 596-4389

Chair John Bauters
Member Sukhdeep Kaur

Actions taken by Advisory Bodies are not official actions of the City Council, but must be considered and potentially ratified at a regular City Council meeting.

All writings that are public records and relate to an agenda item, which are distributed to a majority of the legislative body less than 72 hours prior to the meeting is noticed, will be made available via email by request to the Committee Secretary. In compliance with the Americans with Disabilities Act, a person requiring an accommodation, auxiliary aid, or service to participate in this meeting should contact the Committee Secretary as far in advance as possible, but no later than 72 hours prior to the scheduled event. The best effort to fulfill the request will be made. Assistive listening devices will be made available for anyone with hearing difficulty and must be returned to the Committee Secretary at the end of the meeting. All documents are available in alternative formats upon request. No animals shall be allowed at, or brought in to, a public meeting by any person except (i) as to members of the public or City staff utilizing the assistance of a service animal, which is defined as a guide dog, signal dog, or other animal individually trained to provide assistance to an individual with a disability; or (ii) as to police officers utilizing the assistance of a dog(s) in law enforcement duties.

TRANSPORTATION COMMITTEE

Special Meeting
Civic Center, Garden Level / Teleconference
1333 Park Avenue. Emeryville, CA 94608
June 20, 2023 – 3:00 PM

This meeting is being conducted in a hybrid (in-person/Zoom format) at the location indicated on the agenda. To join the meeting via Zoom, use the information provided below.

Zoom Meeting Information:
https://emeryville-org.zoom.us/j/87489115150?pwd=VUJxRG5MblNxamZnN3BlY1hzdE9oZz09
Audio Only: Call in to 669-900-6833, Meeting ID 874 8911 5150, Passcode 917042.

AGENDA

1. Call to Order
2. Roll Call
3. Public Comment
   3.1 *Submit an Online Speaker Card at www.emeryville.org/advisorybodies.*
4. Approval of May 8, 2023, Regular Meeting Action Minutes
5. Action Items
   5.1 Wayfinding (Oaks)
   5.2 Objective Standards (Bicycle Parking and Sidewalks) (Oaks)
   5.3 SB1 Project List RMRA (Road Maintenance and Rehabilitation Account) Funding (O'Connell)
6. Information Items
   6.1 Transportation and Other Grants (Alaoui)
   6.2 Capital Improvement Program Tracking Spreadsheet (Ahrens)
7. Future Agenda Items
   7.1 40th Street Multimodal Project Update (July 2023)
   7.2 Active Transportation Plan (July 2023)
   7.3 Civic Center Painting Project (July 2023)
   7.4 Tree Planting Program (Fall 2023)
8. Announcements / Member Comments
9. Adjournment

Public comment for agenda items can be submitted online via our online speaker card at www.emeryville.org/advisorybodies. Written comments can also be submitted by email to the Committee Secretary. If you would like to support, oppose, or otherwise comment on an upcoming agenda item, please send in your comments prior to the meeting.

FURTHER INFORMATION may be obtained by contact Josie Ahrens, Committee Secretary, at 510-596-4319 or josie.ahrens@emeryville.org. The next regular meeting is scheduled for July 10, 2023, at 3:00 PM.

DATED: **JUNE 13, 2023**

Post On: JUNE 16, 2023
Post Until: JUNE 21, 2023

Lorrayne Leong, Deputy City Clerk

Action Minutes for
City of Emeryville
Transportation Committee, Regular Meeting of the Advisory Committee
May 8, 2023 – 3:00PM to 5:00PM

Members:
John J. Bauters (Bauters), Chair and Mayor
Sukhdeep Kaur (Kaur), Councilmember

Staff Present:
Josie Ahrens (Ahrens)
Mohamed Alaoui (Alaoui)
Paul Buddenhagen (Buddenhagen)
Nik Ignacio (Ignacio)
Nancy Humphrey (Humphrey)
Valorie Maxwell (Maxwell)
Ryan O'Connell (O'Connell)
Michael Roberts (Roberts)
Randall West (West)

Members of the Public:
Celeste Burrows
Betsy Cooley
Phil Erickson (Community Design + Architecture)
Jennifer Harmon (Diablo Engineering Group)
Rob Rees (Fehr & Peers)

1. **Call to order:** This meeting was called to order at 3:01 PM.

2. **Roll Call:** See above.

3. **Public Comment:** None.

4. **Approval of Action Minutes**

   4.1 Approval of April 10, 2023 Special Meeting Action Minutes.

   A motion was made to approve the April 10, 2023 action minutes. No public comment.

   Motion: Kaur / Second: Bauters / Vote: Unanimous approval.

5. Action Items:

5.1 40th Street Multimodal Project Update (O'Connell)

O'Connell presented updates on the project's progress in the planning phase, which included sharing an overall timeline as well as grants received for the project. Consultants on the project were also present, which included Phil Erickson from Community Design + Architecture, Jennifer Harmon from Diablo Engineering Group, and Rob Rees from Fehr & Peers. The scope of work of the project includes transit-only lanes with new boarding islands, two-way cycle track, and pedestrian improvements at eleven intersections.

The project team shared the initial results from the traffic feasibility study and shared initial plans for community outreach. The goal is to have 100% plans complete in spring 2024 and construction to begin in summer 2024 and completed by fall 2025. The project was originally approved by City Council in March 2020, but the consultants are doing a traffic study again for full or patrial closures on unsignalized intersections, and traffic counts have gone down in January 2023 in comparison to pre-covid levels.

O'Connell presented three alternatives: Alternative 1 is current base project, Alternative 2 is side street closures with Horton diverter, and Alternative 3 is side street closures with no Horton diverter. He outlined the benefits for closures: green infrastructure opportunities, trees, benches, bike parking, and mini park spaces, while still maintaining emergency vehicle access and smaller delivery truck access.

The consultants presented traffic impact data from transportation impact software and studies. Staff recommend Alternative 3. The Horton diverter is currently tied to a condition of approval for the Sherwin Williams site and would need to be modified through the process of modifying conditions of approval.

Public Comment: Cooley asked a question about how the project will impact the EmergyGo Round. Staff responded that the EmeryGo Round was analyzed in 2019 and service was improved with transit-only lanes and potential TSP (transit signal priority) for transit service. But more analysis should be done on the impact on Hollis Street for service.

Kaur and Bauters asked a few clarifying questions about design elements and expressed support for the project.

A motion was made to recommend to the Council a design alternative that includes, at a minimum, the closure of the four unsignalized side streets.

Motion: Bauters / Second: Kaur / Vote: Unanimous approval.

City of Emeryville
CALIFORNIA

M E M O R A N D U M

DATE: July 18, 2023

TO: Paul Buddenhagen, City Manager

FROM: Mohamed Alaoui, Public Works Director

SUBJECT: **40th Street Multimodal Project:**

Resolution Of The City Council Of The City Of Emeryville Approving Concept Closing Unsignalized Intersections On The North Side Of 40th Street (Watts, Haven, Holden, and Hubbard) As Part Of The 40th Street Multimodal Project; And/Or

Resolution Of The City Council Of The City Of Emeryville Approving Addition Of New Scope Of Work (Exhibit A-1) Related To Additional Design Work For Unsignalized Intersections On The North Side Of 40th Street As Part Of The 40th Street Multimodal Project Into The Professional Services Contract With Diablo Engineering Group; And/Or

Resolution Of The City Council Of The City Of Emeryville Approving Addition Of New Scope Of Work (Exhibit A-2) Related To Design Of The 40th Street Multimodal Project Phase 2: Bay Trail Gap Closure (CIP No. SUT-05) Into The Professional Services Contract With Diablo Engineering Group; And

Resolution Of The City Council Of The City Of Emeryville Authorizing The City Manager To Execute A First Amendment To The Professional Services Contract With Diablo Engineering Group For Additional Services As Described In Exhibit(s) _____, Increase The Total Compensation By $_____, For A Total Amount Not To Exceed $_____

RECOMMENDATION

Staff recommends that the City Council adopt the above-entitled resolutions.

BACKGROUND

The 40th Street Multimodal Project ("Project") is a significant initiative undertaken by the City of Emeryville to improve transportation conditions for bus riders, pedestrians, and cyclists. The project focuses on the redesign of 40th Street, as well as sections of San Pablo Avenue and Shellmound Street, with the aim of enhancing connectivity, safety, and efficiency for various modes of transportation.

This Project holds significant importance as 40th Street has been designated as a major Transit Street and Regional Retail Access Route, serving as a vital multimodal

connector within Emeryville. It plays a critical role in providing access to employment opportunities, essential services, and regional transit hubs/destinations, including the MacArthur BART Station, San Pablo Avenue, and the Bay Trail.

The suite of improvements proposed in the Project include the implementation of dedicated bus-only lanes in both directions along 40th Street, aimed at reducing travel time for buses and optimizing transit efficiency. Furthermore, a two-way Class 4 separated bikeway will be established, running from Adeline Street to the Bay Bridge Trail. This dedicated bikeway aims to enhance safety for cyclists while also promoting active transportation and improving accessibility. Lastly, to ensure pedestrian safety, the Project incorporates improvements at eleven intersections along the route. These enhancements encompass various measures such as traffic calming measures, enhanced crosswalks, and the installation of bus boarding islands and shelters.

On March 3, 2020, the City Council approved the conceptual design of the Project and found it to be exempt from the California Environmental Quality Act. As part of the resolution, City Council added items for consideration in the final engineering design phase which included a feasibility analysis of closing unsignalized cross streets on the northside of 40th Street.

The City of Emeryville has made significant progress in advancing the Project since City Council's concept approval in March 2020. In 2021, the City received $3,174,000 for the Design Phase from Alameda CTC for transit improvements and from the statewide Active Transportation Program for pedestrian and bicycle improvements. In 2022, the City received $3,800,000 from the statewide Affordable Housing and Sustainable Communities Program for construction of a transportation project to support infill and compact developments that reduce greenhouse gas emissions. Lastly in May 2023, the City received notice that they will be awarded $8,376,000 from Alameda CTC's Comprehensive Investment Program 2024 which covers the remaining construction funding gap for the Project.

In August 2022, the Public Works Department issued a Request for Proposals for "Professional Design Services for the 40th Street Transit-Only Lanes And Multimodal Enhancements Project." Two consultant teams submitted proposals, demonstrating a detailed understanding of the project, strong team composition, and technical expertise from past projects. After careful evaluation, City staff identified Diablo Engineering Group ("Diablo Engineering") as the most suitable consultant, considering their approach, experience, and understanding of the City's requirements.

Following the evaluation process, City staff engaged in negotiations with Diablo Engineering, adhering to the Local Assistance Procedures Manual (LAPM) guidelines. Minor scope changes were incorporated into the original proposal, and these adjustments were outlined in the task breakdown summary as shown in Attachment A – Original Professional Services Contract. The Contract was approved at City Council on November 15, 2022 (Resolution No. 22-154) and the Contract was executed on January 13, 2023.

DISCUSSION

Progress to Date

Diablo Engineering, and their project team, has been diligently working on the 35% design plans for the Project and recently completed a traffic feasibility analysis that was presented to the Transportation Committee on May 9, 2023. They will continue to progress with their design work throughout 2023 and they expect to be 100% complete with the design phase in Spring/Summer 2024.

First Resolution – Approval Of Concept Closing Unsignalized Intersections On The North Side Of 40th Street (Watts, Haven, Holden, and Hubbard)

In March 2020, City Council instructed Staff to conduct a traffic feasibility study for full and partial closures of the unsignalized streets that connect to 40th Street from the north (Watts, Haven, Holden, and Hubbard). In early 2023, Fehr & Peers (a subconsultant to the Diablo Engineering team) completed a traffic feasibility analysis as one of the first items of work for the design phase of the Project. The results of the analysis were shared with the Emeryville Transportation Committee on May 9, 2023.

In the traffic feasibility analysis, the team studied various circulation alternatives along the corridor with and without closures of unsignalized intersections. All the signalized intersections in the Project area were found to operate with some congestion with average delays except for one intersection. The San Pablo Avenue intersection with 40th Street would continue to operate with significant congestion and delays, without a significant change from the project. The analysis went on to show that the extent of vehicle queuing on 40th Street would experience no significant change regardless of whether the unsignalized intersections on the north side of 40th street are fully closed or open.

At the Transportation Committee meeting, Staff received positive feedback on the overall project, circulation/traffic pattern changes, and the concept of green infrastructure and parklet opportunities if the unsignalized streets were closed off to vehicular traffic. The Committee made a motion to forward the concept of closing unsignalized intersections on the north side of 40th Street (Watts, Haven, Holden, and Hubbard) to City Council. This is the first resolution attached to this staff report.

Second Resolution – Addition Of New Scope Of Work Related To Additional Design Work For Unsignalized Intersections On The North Side Of 40th Street (Exhibit A-1)

Given the progress made thus far and the need for additional work related to the unsignalized intersections, Staff recommends extending the design contract with Diablo Engineering to include the following:

- Exhibit A-1 (Additional design work for unsignalized intersections) – Total cost of $120,232.00

- These tasks will involve the preparation of a final traffic analysis, environmental studies, and civil designs for the additional design work needed for the unsignalized intersections on the north side of 40th Street within the original "Phase 1" Project limits (Adeline Street to IKEA Entrance).
- The "Phase 1" Project including Exhibit A-1 is fully funded through various grant programs for Design and Construction Phases.

***Third Resolution* – Addition Of New Scope Of Work Related To Design Of The 40th Street Multimodal Project Phase 2: Bay Trail Gap Closure (Exhibit A-2)**

On July 21, 1999, the Emeryville Public Financing Authority issued revenue bonds in the amount of $14,420,000 to acquire three outstanding series of bonds that had been issued by the City of Emeryville including West Emeryville Assessment District Limited Obligation Refunding Bonds, Bay-Shellmound Street Extension Assessment District Limited Obligation Refunding Bonds, and the Assessment District 1993-1 (East Bay Bridge Center) Limited Obligation Refunding Bonds. The 1999 Emeryville Public Financing Authority Revenue Bonds were paid in full in September 2021. However, a fund balance of $1.07 million remained.

On February 7, 2023, City Council authorized the establishment of a capital improvement fund to be used for public improvements or the maintenance of public improvements within the area for which the Bay Street-Shellmound bonds were issued, and City Council authorized the transfer of the $1.07 million in remaining funds to this capital improvement fund (Fund 441).

On June 6, 2023, City Council approved the Capital Improvement Program for Fiscal Years 2023-2024 through 2027-2028 ("CIP"). Included within the CIP is Project No. SUT-05, 40th Street Multimodal Project Phase 2: Bay Trail Gap Closure, which was assigned the 1.07 million in Fund 441.

The "Phase 2" Project is aligned with local planning efforts through our Active Transportation Plan and Sustainable Transportation section from the CIP. Additionally, it is consistent with goals and policies at the regional level with the Countywide Transportation Plan (from Alameda CTC), Plan Bay Area 2050 (from MTC), and Bay Trail Gap Closure Implementation Plan (from MTC).

As shown in Attachment C, the original "Phase 1" Project limits connect the equity priority communities to the east of San Pablo Avenue with the Bay Trail entrance across the railroad tracks. The proposed "Phase 2" Project extends the multimodal corridor to Emeryville's Central core area where residents can connect to job centers, shopping areas, and more recreational opportunities.

Additionally, this extended portion of the "Phase 2" Project connects to other active transportation facilities including our South Bayfront Bridge. The bridge connects across the railroad tracks to the large Sherwin Williams Site and a newly built 3.5-acre park. At the southerly end of the 40th Street Phase 2 Project, there is a connection to the

regional Bay Trail landing point. At the North end at the Shellmound/Christie Avenue intersection, the Project closes the last remaining gap of the regional Bay Trail in Emeryville.

Combining the delivery of the “Phase 1” and “Phase 2” Projects represents an efficient use of Staff resources. It also ensures that the two phases are designed in an integrated fashion with ease. If “Phase 2” were delivered as a separate project, there would be a multi-year delay before the design would be completed and greater difficulty in ensuring the integration of the two designs. Furthermore, by designing “Phase 2” now, it puts us in a better position to seek grant funds for the associated Phase 2 construction phase.

Staff recommends extending the design contract with Diablo Engineering to include the following:

- Exhibit A-2 (Phase 2 Design) – Total cost of $656,440.00
    - These tasks will encompass the preparation of a final traffic analysis, environmental study, and civil designs for the "Phase 2” Project. This extension will expand the “Phase 1” Project limits by 0.5 miles northward as described in CIP No. SUT-05.
    - Staff recommends funding Exhibit C with funds from Fund 441 in CIP No. SUT-05.

Fourth Resolution – 1st Amendment Professional Services Contract for Diablo Engineering

The approved resolutions will determine the total amount of the 1st Amendment Professional Services Contract with Diablo Engineering. This may include:

- Exhibit A-1: Total cost of $120,232.00
- Exhibit A-2: Total cost of $656,440.00
- Or Exhibit A-1 + A-2: Total cost of $776,672.00

By executing a 1st Amendment to the Professional Services Contract with Diablo Engineering, incorporating the additional scopes of work (Exhibit A-1 and A-2), the City will ensure comprehensive support during the design and bidding phases, as well as the successful implementation of the Project's various elements.

Community Outreach Efforts

In an effort to ensure transparent and inclusive communication, City staff has actively engaged with the public regarding the Project. Recognizing the importance of gathering feedback and addressing concerns, the following outreach efforts have been undertaken:

- Project Mailers
    - Staff distributed six hundred and twelve (612) project postcards to residents and businesses within a ¼ mile radius of the 40th Street and Park Avenue corridors.
    - Additionally, four hundred and fifty-four (454) individual addresses directly on the 40th Street and unsignalized street corridors were sent project mailers which had more information/graphics than the postcard, and eleven (11) mailers were delivered in person to assure delivery when "return to sender" was received.
    - The mailers provided an informative resource with essential details about the project and its potential impacts on the local community. Included in the information was a dedicated project phone line and email to collect input and feedback from residents and businesses in the area. A link to the project web page for further information was also provided. Residents and businesses in closer proximity received the project mailer with more details about the proposed closures of unsignalized intersections so they would be aware of access changes that more directly affect them.
- In-Person Outreach Meetings and Phone Calls
    - Throughout the month of June and into early July, Staff and their consultants have conducted seven (7) in-person outreach meetings where presentations and materials were shared. The team has engaged in phone calls with nine (9) representatives of residents and/or businesses situated in the Project area. These interactions have provided an opportunity for stakeholders to voice their opinions, seek clarifications, and share their concerns directly with the project team. Staff members have actively listened to the feedback received, taking note of valuable insights, and will be considering their input in the ongoing project development.
- Email Correspondence:
    - In addition to the targeted outreach mentioned above, the Project team has been responsive to six (6) inquiries received from residents and businesses who responded to the project mailer via email. Through a dedicated project email address, staff has provided information, addressed queries, and ensured that the concerns of the community are acknowledged and considered.

Resulting Community Input

During the outreach to date, City staff and their consultants have followed up the mailings in the areas near to the proposed intersection closures with phone calls,

dropping off flyers, and making drop-in contacts with business and property owners, and management and leasing companies. Some stakeholders have not provided responses.

The following is a summary of input from the community as of the date the report was drafted.

Negative Input

1. Community members not directly located at the proposed unsignalized closure streets have expressed concerns regarding the potential increasing traffic on Park Avenue and signalized side streets. Some also expressed concerns about congestion that will result from the previously approved based scope of the 40th Street Project.
2. Some oppose the project due to concerns about potential impact on property values and development potential.
3. There is no convenient way to return to Hubbard Street if a customer misses the signalized right turn at Horton Street, and several businesses expressed concerns about the closures complicating customer access to their businesses.
4. Several business owners expressed serious concerns about accessing their loading docks; especially for larger trucks on Hubbard and Holden Street. Large trucks already have limited access at loading docks due to street width.
5. Necessary adjustments to curb markings to ensure truck access after the street closures may impact street parking for business customers and employees.
6. Retail access from pass-by trips on the frontage of 40th Street will be significantly reduced.

Staff Comment on Negative Input

1. *Vehicular traffic on the overall network will experience acceptable levels of congestion, see earlier discussion of traffic analysis.*
2. *There are numerous recent and proposed developments in Emeryville that have vehicular access similar to that which will result from the 40th Street Project.*
3. *This can be addressed with wayfinding signs and collaboration with businesses for them to provide information on their websites, and reviewing wayfinding results from Waze and similar apps.*
4. *The Project Team has analyzed truck turning movements with the closures in place. Results show that access appears to be feasible, albeit less flexible, and requiring additional red curb and removing existing truck restrictions on Park Avenue. Discussions with business and property owners are continuing.*
5. *While less convenient and further away, on-street parking is available in the surrounding street network.*
6. *This can be addressed with wayfinding signs and collaboration with businesses for them to provide information on their websites, and reviewing wayfinding results from Waze and similar apps.*

Positive Input

Public green spaces at the end of the streets have been well-received by several businesses and residents, as an open space amenity, opportunity for public art, and improved community environment.

1. The closure of Haven St. is gaining support from residents, who have suggested utilizing the closed space for weekend and evening activities. The reduced vehicle activity at after-hours provides opportunities for several types of open space activation.
2. Some business owners see the potential value of the bicycle, pedestrian, and green space improvements as a benefit to their business and property values.
3. Several businesses have employees who already bike to work and walk to services in the area. They see that the bicycle infrastructure will enhance their commute and improve safety and comfort for them when walking or biking in the Park Avenue District.
4. Certain businesses have suggested placing art in the parklet areas.

Staff Comment on Positive Input

1. *The City currently issues block party permits throughout the year, and this will make it easier to hold events in a safe defined space.*
2. *In general, studies have shown that bicycles and pedestrians visit business more frequently than single occupancy auto visits. Actual statistics for a particular business may vary.*
3. *The project improvements will encourage other employees to bike or take transit to work.*
4. *Staff is open to working with the Public Art Committee on art opportunities Project wide.*

Additional Nuanced Input

1. Some businesses have voiced support for the safety benefits and parklet activation opportunities of the closure sites, but are concerned that Park Avenue cannot support the diverted truck traffic.
2. Several community members and businesses have shown support for the multimodal improvements on 40th Street and are accepting of the reduction in parking. However, their concerns primarily revolve on how the street closures would affect loading and customer access issues.
3. A business owner provided positive feedback of the closure to most vehicles while expressing a desire to retain the option of using emergency exits for semi-truck deliveries on an occasional basis.
4. Residents next to closure sites are in support of the activation of the space for green infrastructure and parklet ideas, but they are worried about the maintenance and security of the area.

Staff Comment on Nuanced Input

1. *In order to ensure truck access to affected businesses, it will be necessary to remove turn restrictions for trucks on Park Avenue. Minor modifications to curbs on Park Avenue will also be needed and additional parking may be removed on the closure streets to accommodate trucks turning into and out of loading areas.*
2. *Discussions and design refinements are on-going. The City is investigating all solutions to ensure loading activity remains feasible.*
3. *Emergency vehicle access is for the exclusive use of emergency vehicles. However, use of emergency access "aprons" similar to driveway/sidewalk areas of the street right of way to facilitate truck turning movements is acceptable.*
4. *The City will need to assign funds for regular maintenance of the new facilities that are built. The Project team will consult with Emeryville PD on site layout and lighting levels.*

The City remains committed to fostering open lines of communication and encourages ongoing public engagement throughout the remaining phases of the Project. This is demonstrated by the extent of public outreach to date. By actively involving the community in the design process, staff aims to ensure that the Project will reflect the needs and priorities of the residents and businesses it serves.

Upcoming Project Schedule and Milestones

- Spring - Summer 2023: Preliminary Design
  - Feasibility/Traffic Study
  - Committee Reviews and City Council Approvals
  - Community Outreach and Engagement
- Summer 2023: Stakeholder and Committee Reviews of 35% Design
- Spring 2024: Council Approval to Advertise Bids (and other items as necessary)
- ATP state funding project approval
- Summer 2024: 100% Plans Complete
- Fall 2024: Construction Begins
- Late 2025: Construction Completion

FISCAL IMPACT

<u>40th Street Multimodal Project (CIP No. T-13)</u>
The original Professional Services Contract with Diablo Engineering Group (Attachment A) is written to not exceed $2,198,806.84. Items of work as described in Exhibit B are eligible expenses under the current grant funding programs that are funding the design phase of the 40th Street Multimodal Project (CIP No. T-13). There is adequate funding in the Project to fund this additional work ($120,232).

<u>40th Street Multimodal Project Phase 2: Bay Trail Gap Closure (CIP No. SUT-05)</u>

On June 6, 2023, City Council approved the CIP which includes funding for CIP No. SUT-05, *40th Street Multimodal Project Phase 2: Bay Trail Gap Closure*. There is adequate funding in the Project to fund this additional work ($656,440).

Funding Table

40th Street Multimodal Project (CIP No. T-13)	Fund 254 (Alameda CTC)	$2,000,000	Resolution 21-125
40th Street Multimodal Project (CIP No. T-13)	Fund 254 (ATP Cycle 5)	$1,374,000	Resolution 22-117
40th Street Multimodal Project Phase 2: Bay Trail Gap Closure (CIP No. SUT-05)	Fund 441	$1,072,000	Resolution 23-69

STAFF COMMUNICATION WITH THE PUBLIC

Staff has sent (612) postcards and (454) project mailers to residents and businesses along the 40th Street and Park Avenue Corridors. Throughout the month of June and into early July, staff and their consultants have conducted (7) in-person outreach meetings and (9) phone calls with residents and businesses in the Project area. Additionally, there have been (6) emails with other residents and businesses who reached out to the Project team by way of the mailer or City Website.

CONFLICT OF INTEREST

None.

CONCLUSION

Staff recommends the City Council adopt the attached resolutions. By executing a 1st Amendment to the Professional Services Contract with Diablo Engineering, incorporating the additional scopes of work (Exhibit A-1 and A-2), the City will ensure comprehensive support during the design and bidding phases, as well as the successful implementation of the Project's various elements.

If one or more of the resolutions is not approved or modified, Staff recommends the Council allow staff to amend the other resolutions as necessary.

PREPARED BY: Ryan O'Connell, Senior Civil Engineer, Public Works Department

APPROVED AND FORWARDED TO THE CITY COUNCIL OF THE CITY OF EMERYVILLE:

Paul Buddenhagen, City Manager

ATTACHMENTS

- Attachment A – Original Professional Services Contract (Diablo)
    1. Exhibit A – Original Proposal from Diablo Engineering Group
- Attachment B – Draft 1st Amendment Professional Services Contract (Diablo)
    1. Exhibit A-1 – Additional Design Work For Unsignalized Intersections on 40th Street (Task 8)
    2. Exhibit A-2 – Phase 2: Bay Trail Gap Closure (Task 9)
- Attachment C – Map of 40th Street Multimodal Projects: Phase 1 and Phase 2
- Draft Resolutions
    1. First Resolution – Concept of Closing Unsignalized Intersections On The North Side Of 40th Street (Watts, Haven, Holden, and Hubbard)
    2. Second Resolution – Addition Of New Scope Of Work Related To Additional Design Work For Unsignalized Intersections On The North Side Of 40th Street (Exhibit B)
    3. Third Resolution – Addition Of New Scope Of Work Related To Design Of The 40th Street Multimodal Project Phase 2: Bay Trail Gap Closure (Exhibit C)
    4. Fourth Resolution – 1st Amendment Professional Services Contract for Diablo Engineering

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RESOLUTION NO. 23-105

Resolution Of The City Council Of The City Of Emeryville Approving The Concept Of Closing The Unsignalized Intersections Of Hubbard Street And Haven Street On The North Side Of 40th Street, And The Design Concept Of Partial Southbound Closures At The Unsignalized Intersections Of Holden Street And Watts Street On The North Side Of 40th Street As Part Of The 40th Street Multimodal Project

WHEREAS, on March 3, 2020, the City Council approved the conceptual design of the 40th Street Multimodal Project and found it to be exempt from the California Environmental Quality Act; and

WHEREAS, as part of the resolution, City Council instructed Staff to conduct a traffic feasibility study for full and partial closures of the unsignalized streets that connect to 40th Street from the north (Watts, Haven, Holden, and Hubbard); and

WHEREAS, in August 2022, the Public Works Department issued a Request for Proposals for "Professional Design Services for the 40th Street Transit-Only Lanes And Multimodal Enhancements Project" and after careful evaluation, City staff identified Diablo Engineering Group (“Diablo Engineering”) as the most suitable consultant, considering their approach, experience, and understanding of the City's requirements; and

WHEREAS, in early 2023, Fehr & Peers (a subconsultant to the Diablo Engineering team) completed a traffic feasibility analysis as one of the first items of work for the design phase of the Project and the results of the analysis were shared with the Emeryville Transportation Committee on May 9, 2023; and

WHEREAS, in the traffic feasibility analysis, the team studied the impact of closing unsignalized intersections in the project area various circulation alternatives along the corridor with and without closures of unsignalized intersections and all of the signalized intersections in the Project area were found to experience no significant change in congestion as a result of the additional closure of the unsignalized intersections as compared to the base project; and

WHEREAS, the traffic feasibility analysis went on to show that the extent of vehicle queuing on 40th Street would be similar whether the unsignalized intersections are fully closed or not as compared to the base project; and

WHEREAS, at the May 9, 2023, Transportation Committee meeting, Staff received positive feedback on the overall project, circulation/traffic pattern changes, and the concept of green infrastructure and parklet opportunities if the unsignalized streets were closed off to vehicular traffic; and

WHEREAS, the Transportation Committee recommended forwarding the concept of closures at unsignalized intersections on the north side of 40th Street (Watts, Haven, Holden, and Hubbard) to City Council; and

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WHEREAS, on July 18, 2023, the City Council reviewed the concept of closures at unsignalized intersections on the north side of 40th Street, considered the public testimony, the staff report dated July 18, 2023, and the record as a whole; and

WHEREAS, on July 18, 2023, the City Council approved a motion directing staff to move forward with further conceptual review of the Transportation Committee's recommendation to study full closures at Hubbard Street and Haven Street and partial southbound closures at Watts Street and Holden Street; now, therefore, be it

RESOLVED, by the City Council of the City of Emeryville that the City Council approves the design concept of closing the unsignalized intersections of Hubbard Street and Haven Street on the north side of 40th Street, and the design concept of partial southbound closures at the unsignalized intersections of Holden Street and Watts Street on the north side of 40th Street as part of the 40th Street Multimodal Project.

ADOPTED, by the City Council of the City of Emeryville at a regular meeting held Tuesday, July 18, 2023, by the following vote:

AYES:	4	Mayor Bauters, Vice Mayor Welch and Council Members Kaur and Mourra
NOES:	1	Council Member Priforce
ABSTAIN:	0	
ABSENT:	0	

DocuSigned by:
John Bauters
C7383B49E2C9458...
MAYOR

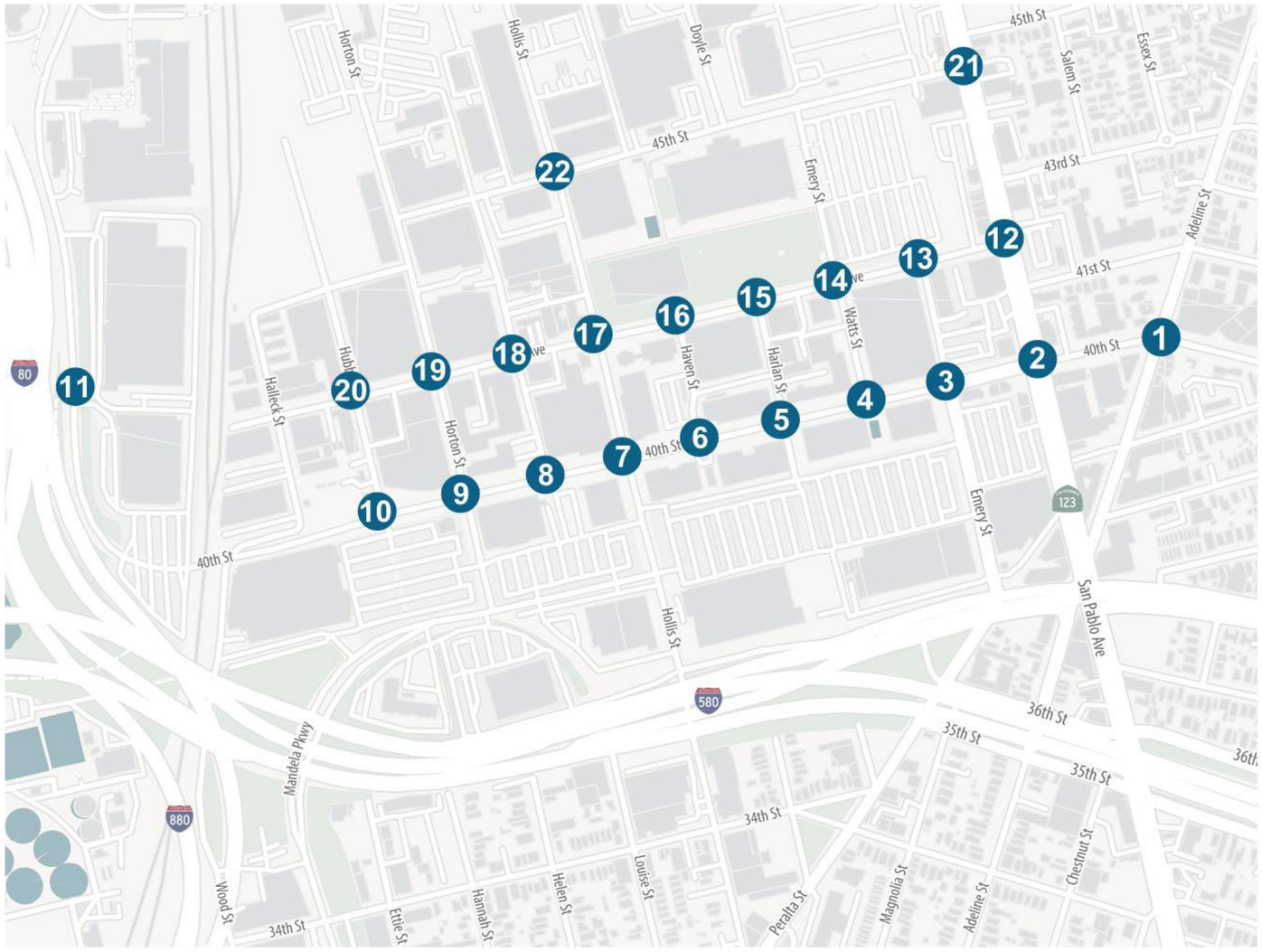
ATTEST:

DocuSigned by:
April Richardson
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CITY CLERK

APPROVED AS TO FORM:

DocuSigned by:
John Kennedy
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CITY ATTORNEY

Attachment C:
Alternatives 1 and 2
Peak Hour Intersection Traffic Volumes
(Part 1)



XX PM Peak Hour Traffic Volume

Signalized

Stop-Controlled

Study Intersection

Transit Priority Lanes

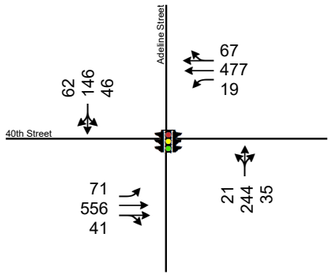
Note: Traffic volumes reflect data collected in 2024 plus traffic from near term developments including the Sherwin Williams and BMR projects.

FEHR PEERS

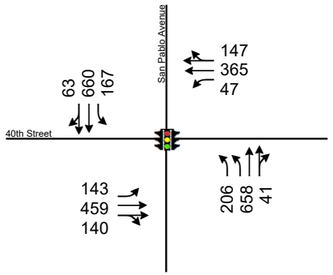
Weekday PM Peak Hour Traffic Volumes and Lane Configurations - 40th Street Transit Hub

ATTACHMENT C

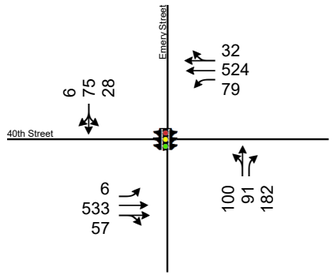
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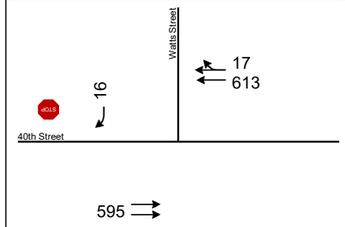
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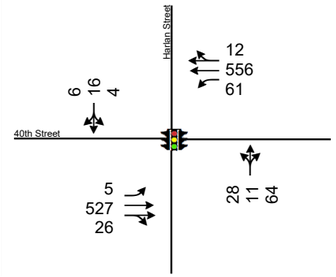
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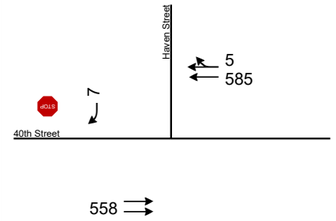
4. Watts Street/40th Street



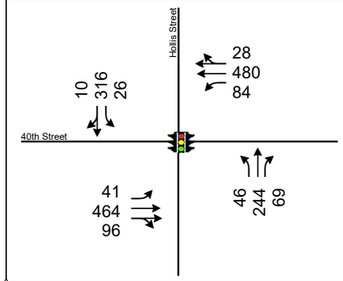
5. Harlan Street/40th Street



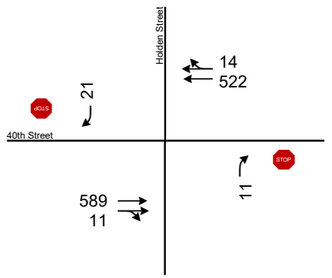
6. Haven Street/40th Street



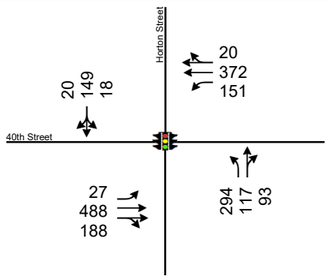
7. Hollis Street/40th Street



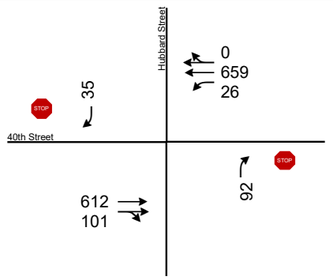
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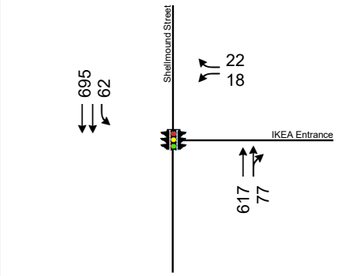
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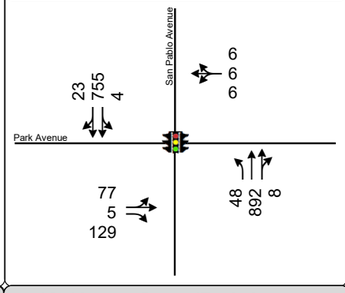
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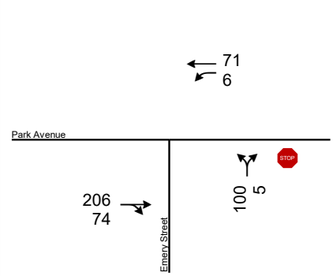
11. Shellmound Street/IKEA Entrance



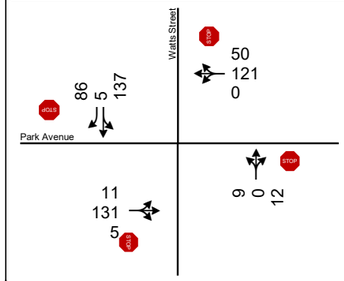
12. San Pablo Avenue/Park Avenue



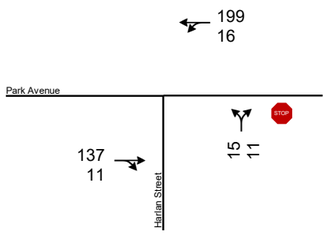
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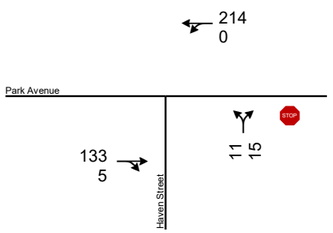
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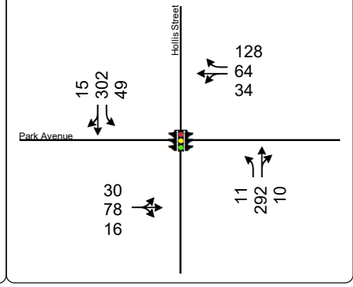
15. Harlan Street/Park Avenue



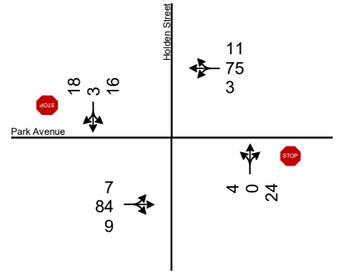
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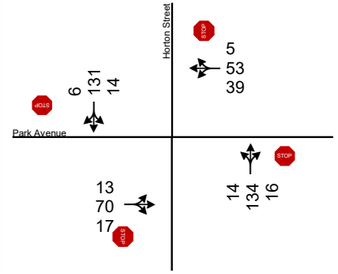
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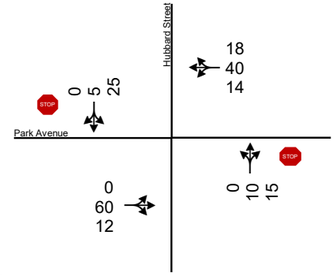
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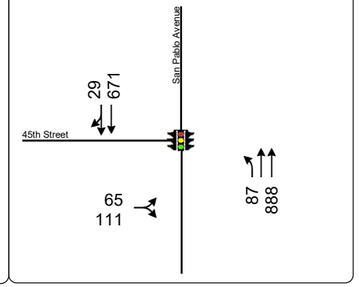
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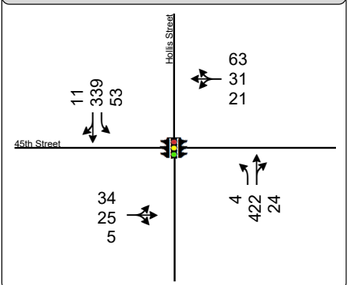
20. Hubbard Street/Park Avenue



21. San Pablo Avenue/45th Street



22. Hollis Street/45th Street



XX PM Peak Hour Traffic Volume

Signalized

Stop-Controlled

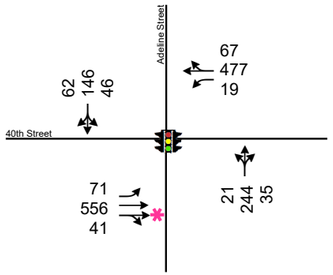
Note: Traffic volumes reflect data collected in 2024 plus traffic from near term developments including the Sherwin Williams and BMR projects.

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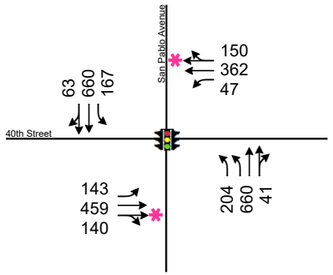
Weekday PM Peak Hour Traffic Volumes and Lane Configurations - 40th Street Transit Hub - Alternative 1

ATTACHMENT C-1

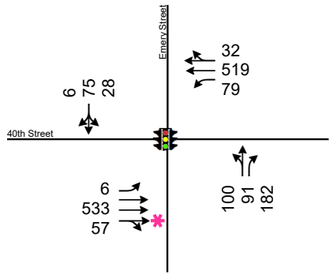
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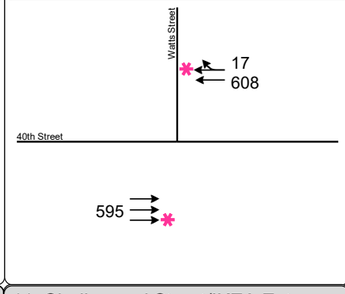
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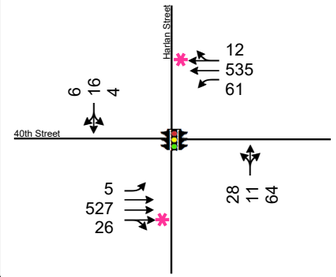
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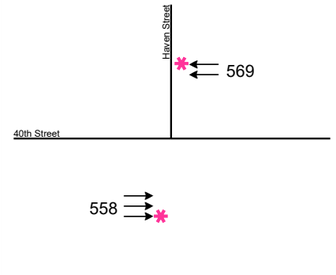
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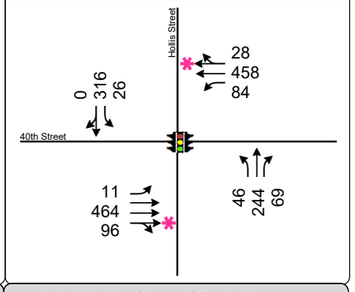
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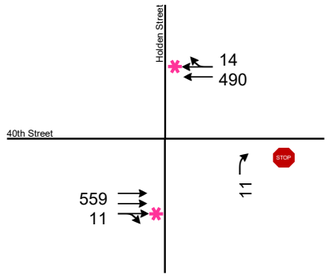
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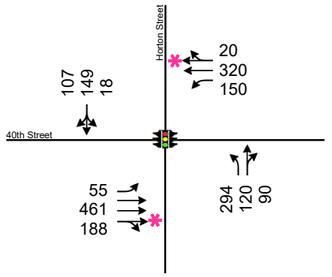
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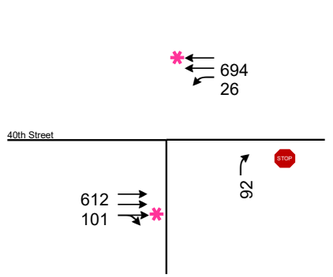
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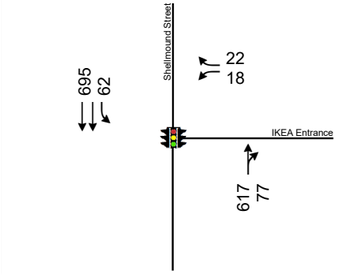
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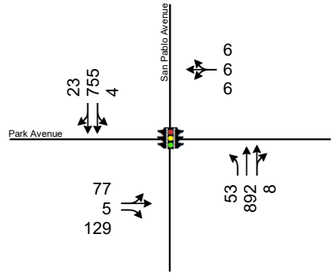
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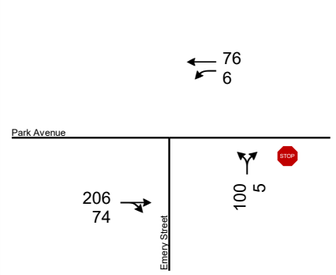
11. Shellmound Street/IKEA Entrance



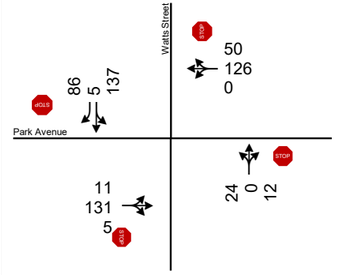
12. San Pablo Avenue/Park Avenue



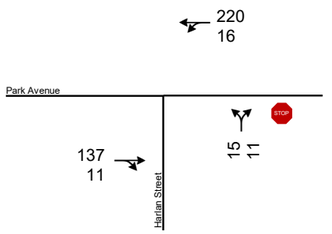
13. Emery Street/Park Avenue



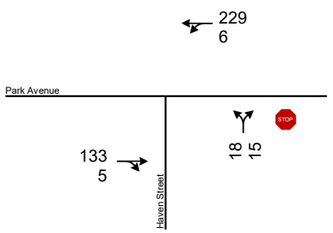
14. Watts Street/Park Avenue



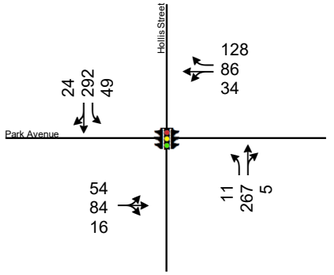
15. Harlan Street/Park Avenue



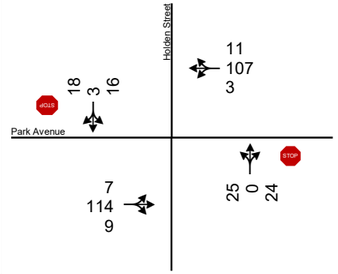
16. Haven Street/Park Avenue



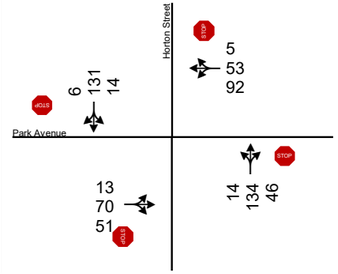
17. Hollis Street/Park Avenue



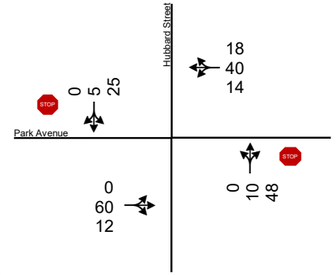
18. Holden Street/Park Avenue



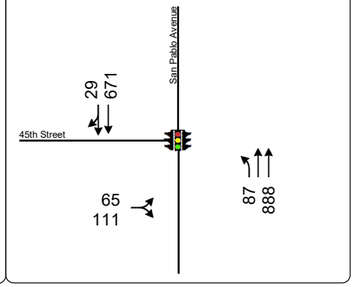
19. Horton Street/Park Avenue



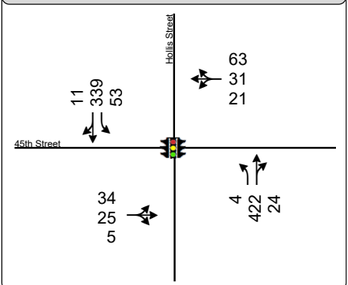
20. Hubbard Street/Park Avenue



21. San Pablo Avenue/45th Street



22. Hollis Street/45th Street



XX PM Peak Hour Traffic Volume

Signalized

Stop-Controlled

Transit Priority Lanes

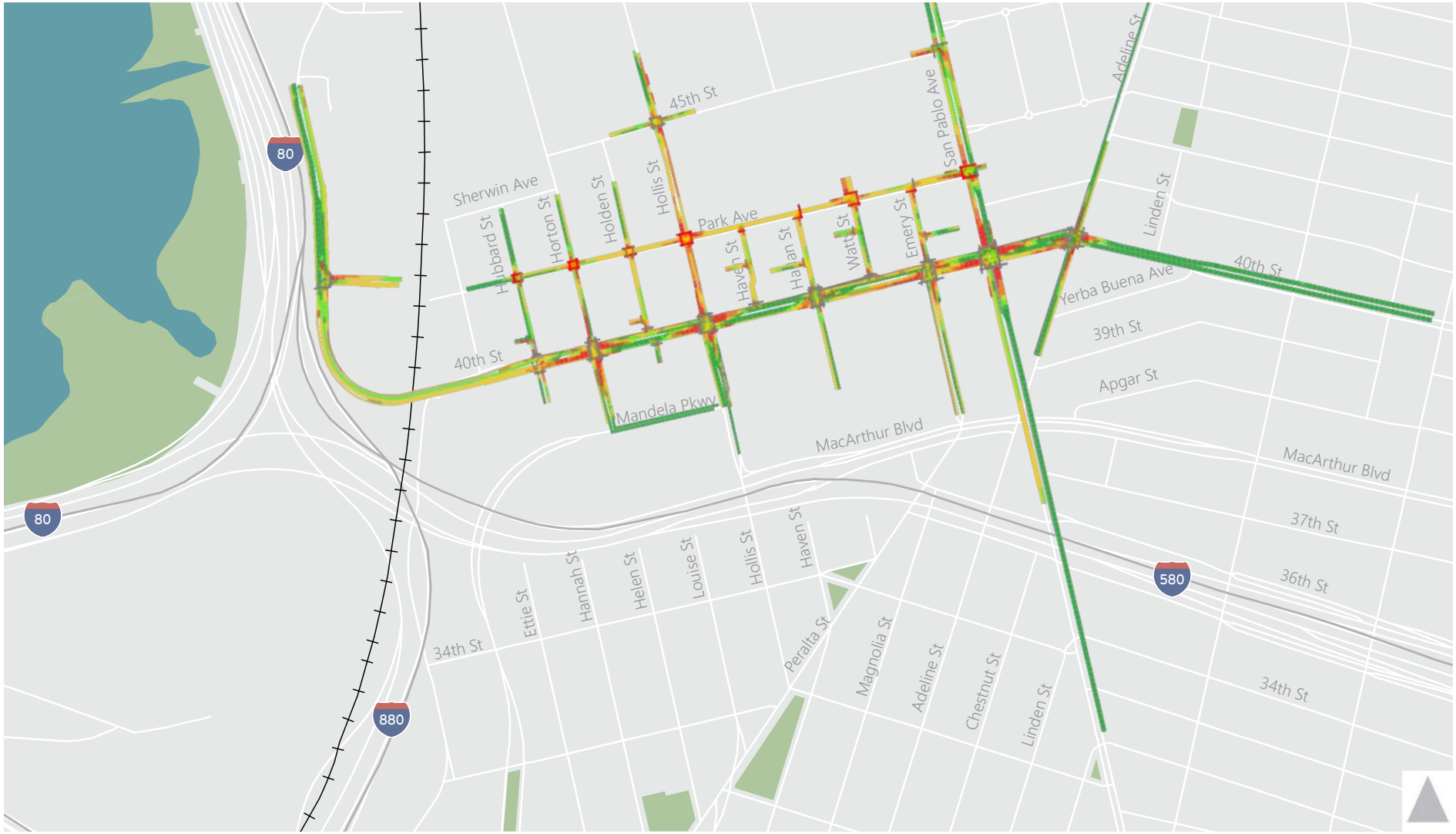
Note: Traffic volumes reflect data collected in 2024 plus traffic from near term developments including the Sherwin Williams and BMR projects.

FEHR PEERS

Weekday PM Peak Hour Traffic Volumes and Lane Configurations - 40th Street Transit Hub - Alternative 2

ATTACHMENT C-2

Attachment D:
Alternatives 1 and 2 Corridor Speed Plots (Part 1)



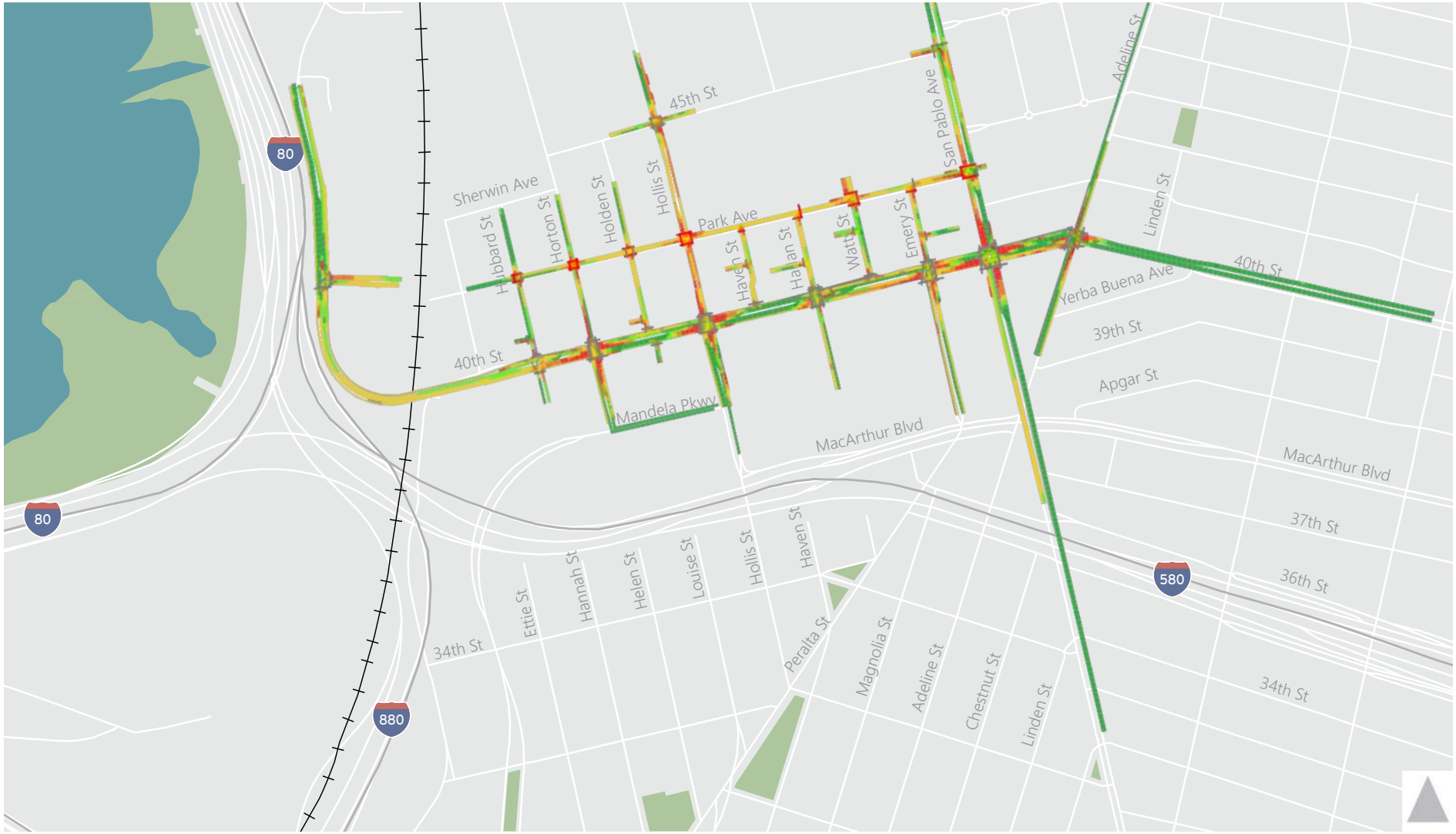
- 0 mph - 5 mph
- 5 mph - 10 mph
- 10 mph - 15 mph
- 15 mph - 20 mph
- > 20 mph

- **Alternative 1 (No Project)** – 2023 traffic volumes plus approved Major Development Projects yet to be built including Sherwin Williams and BMR buildout with 2023 geometrics and traffic signal operations.
- **Alternative 2 (Modified Project)** – Same traffic volumes as Alternative 1 with the modified project geometry approved by Council in July 2023 and optimized traffic signal timings.

Alternative 1 – Average Motor Vehicle and Bus Speeds
4:45 PM - 5:00 PM

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ATTACHMENT D



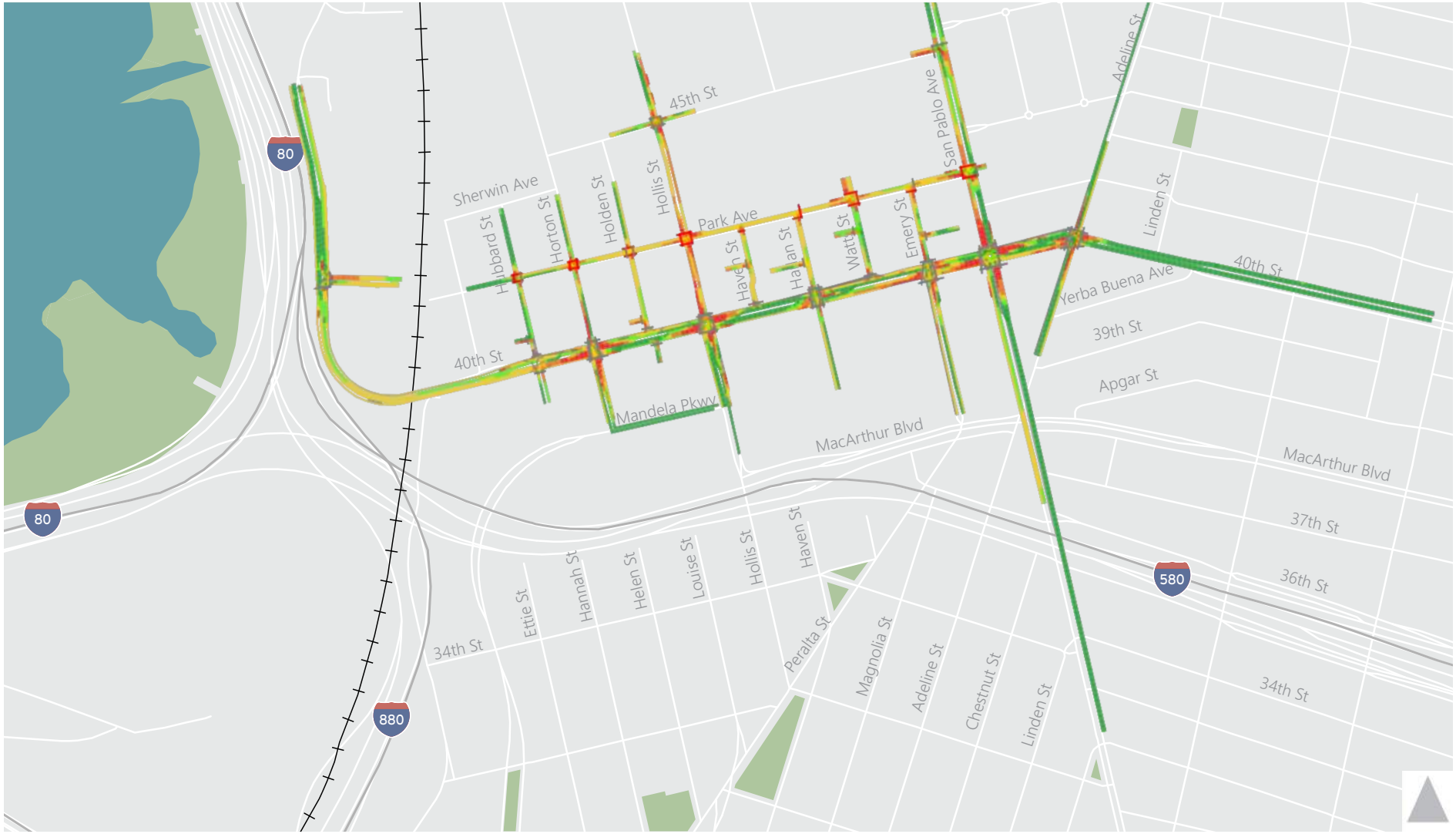
- 0 mph - 5 mph
- 5 mph - 10 mph
- 10 mph - 15 mph
- 15 mph - 20 mph
- > 20 mph

- **Alternative 1 (No Project)** – 2023 traffic volumes plus approved Major Development Projects yet to be built including Sherwin Williams and BMR buildout with 2023 geometrics and traffic signal operations.
- **Alternative 2 (Modified Project)** – Same traffic volumes as Alternative 1 with the modified project geometry approved by Council in July 2023 and optimized traffic signal timings.

Alternative 1 – Average Motor Vehicle and Bus Speeds
5 PM - 5:15 PM

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ATTACHMENT D



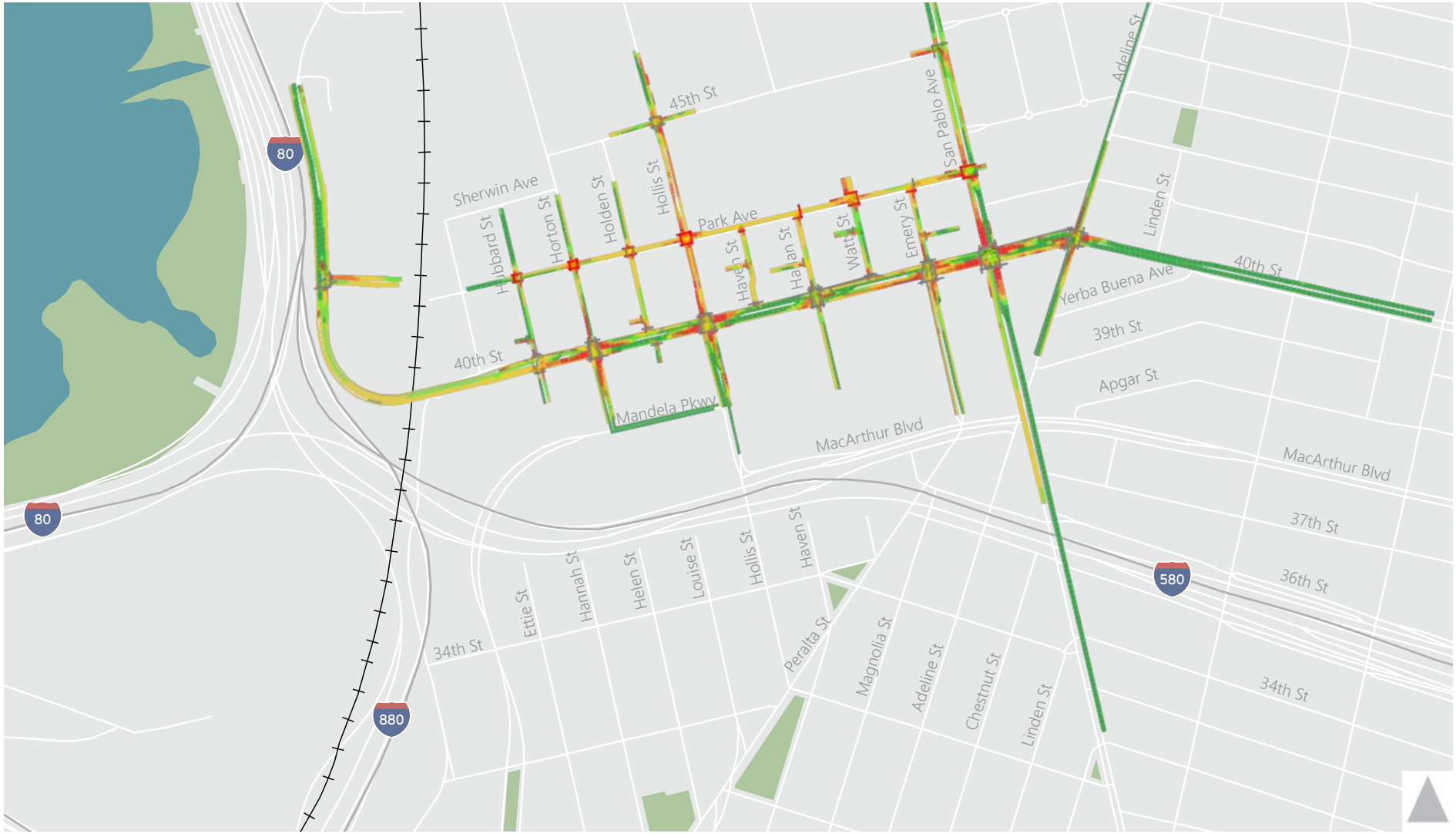
- 0 mph - 5 mph
- 5 mph - 10 mph
- 10 mph - 15 mph
- 15 mph - 20 mph
- > 20 mph

- **Alternative 1 (No Project)** – 2023 traffic volumes plus approved Major Development Projects yet to be built including Sherwin Williams and BMR buildout with 2023 geometrics and traffic signal operations.
- **Alternative 2 (Modified Project)** – Same traffic volumes as Alternative 1 with the modified project geometry approved by Council in July 2023 and optimized traffic signal timings.

Alternative 1 – Average Motor Vehicle and Bus Speeds
5:15 PM - 5:30 PM

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ATTACHMENT D



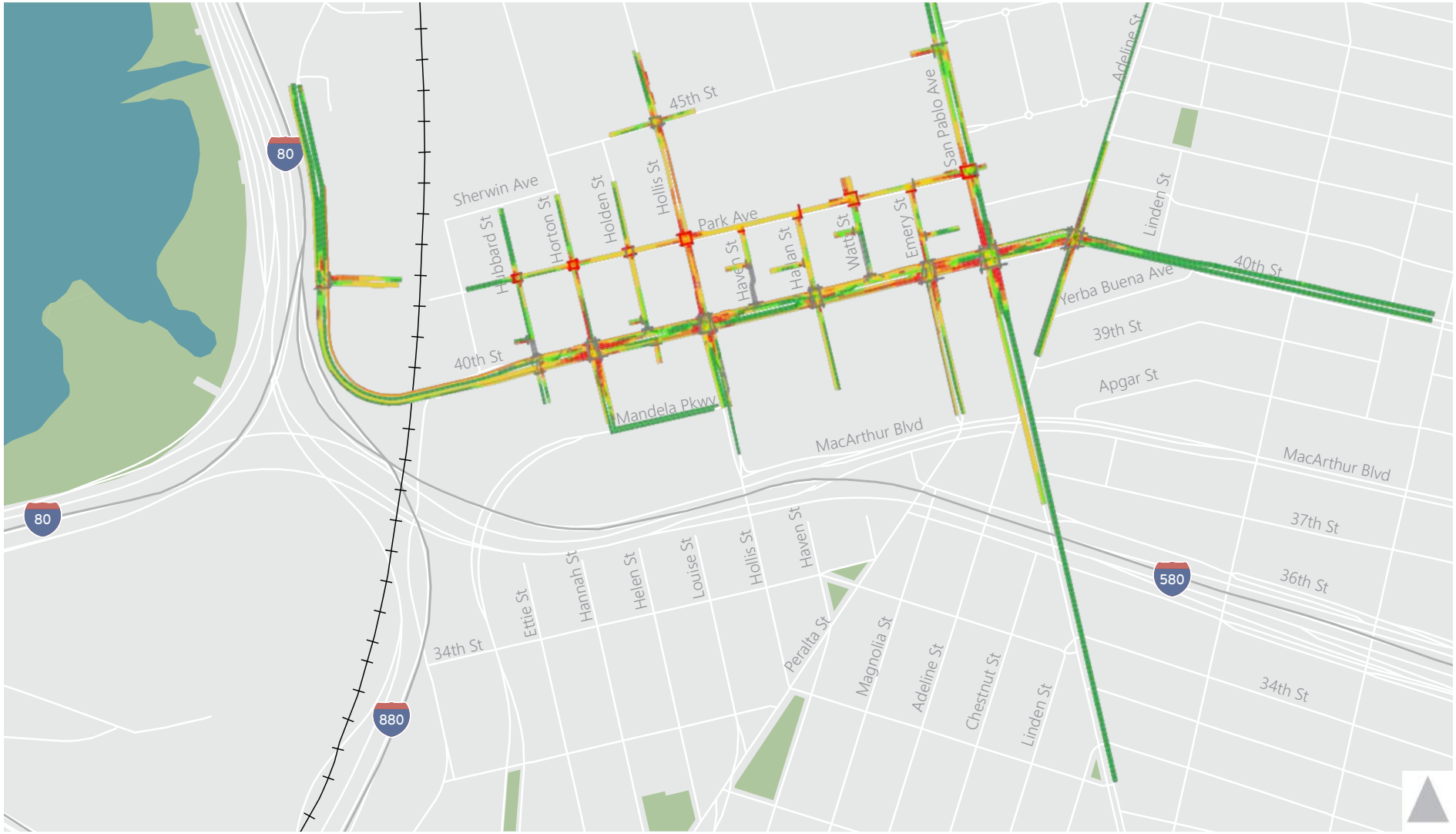
- 0 mph - 5 mph
- 5 mph - 10 mph
- 10 mph - 15 mph
- 15 mph - 20 mph
- > 20 mph

- **Alternative 1 (No Project)** – 2023 traffic volumes plus approved Major Development Projects yet to be built including Sherwin Williams and BMR buildout with 2023 geometrics and traffic signal operations.
- **Alternative 2 (Modified Project)** – Same traffic volumes as Alternative 1 with the modified project geometry approved by Council in July 2023 and optimized traffic signal timings.

Alternative 1 – Average Motor Vehicle and Bus Speeds
5:30 PM - 5:45 PM

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ATTACHMENT D



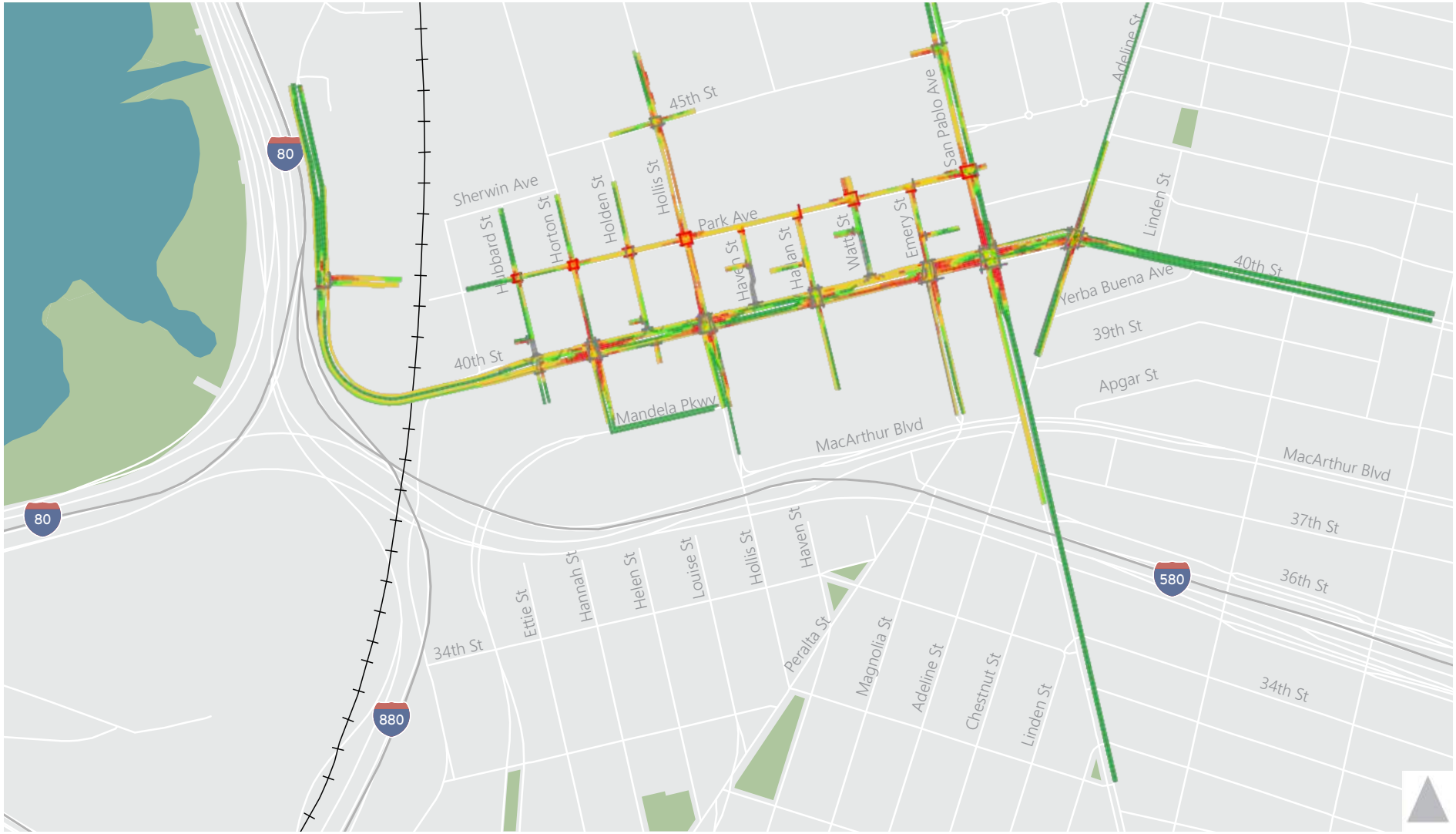
- 0 mph - 5 mph
- 5 mph - 10 mph
- 10 mph - 15 mph
- 15 mph - 20 mph
- > 20 mph

- **Alternative 1 (No Project)** – 2023 traffic volumes plus approved Major Development Projects yet to be built including Sherwin Williams and BMR buildout with 2023 geometrics and traffic signal operations.
- **Alternative 2 (Modified Project)** – Same traffic volumes as Alternative 1 with the modified project geometry approved by Council in July 2023 and optimized traffic signal timings.

Alternative 2 – Average Motor Vehicle and Bus Speeds
4:45 PM - 5:00 PM

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ATTACHMENT D



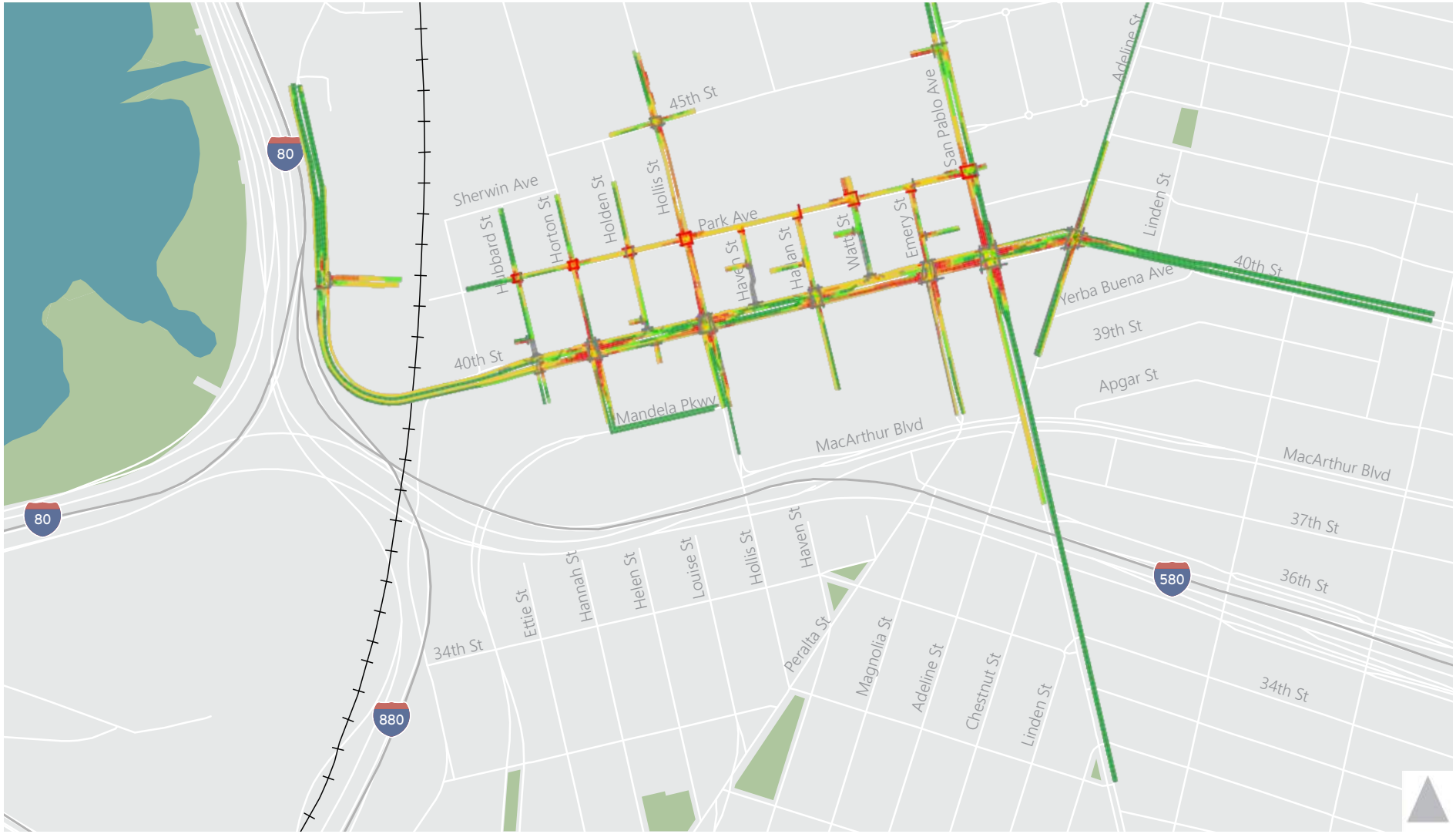
- 0 mph - 5 mph
- 5 mph - 10 mph
- 10 mph - 15 mph
- 15 mph - 20 mph
- > 20 mph

- **Alternative 1 (No Project)** – 2023 traffic volumes plus approved Major Development Projects yet to be built including Sherwin Williams and BMR buildout with 2023 geometrics and traffic signal operations.
- **Alternative 2 (Modified Project)** – Same traffic volumes as Alternative 1 with the modified project geometry approved by Council in July 2023 and optimized traffic signal timings.

Alternative 2 – Average Motor Vehicle and Bus Speeds
5 PM - 5:15 PM

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ATTACHMENT D



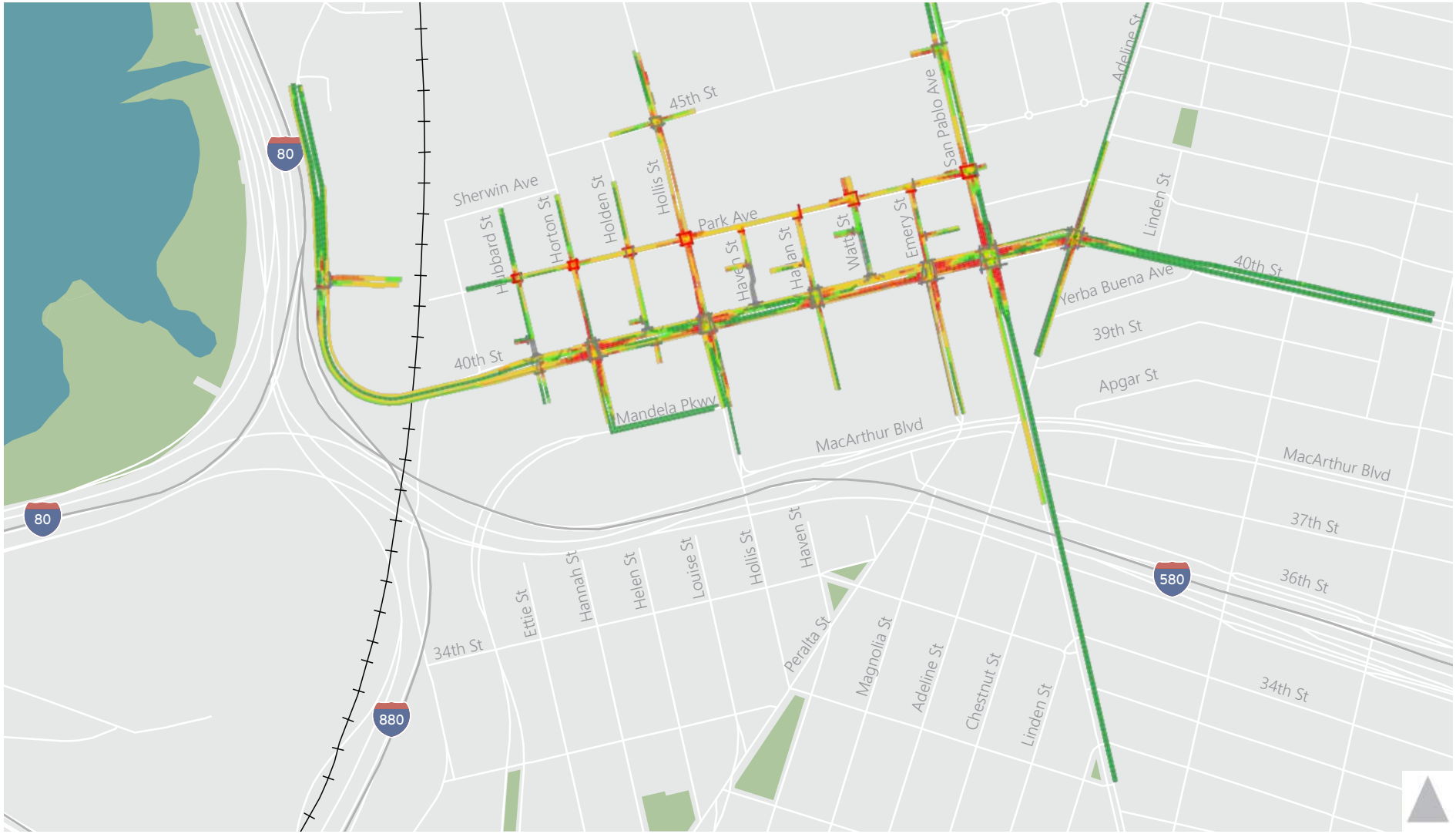
- 0 mph - 5 mph
- 5 mph - 10 mph
- 10 mph - 15 mph
- 15 mph - 20 mph
- > 20 mph

- **Alternative 1 (No Project)** – 2023 traffic volumes plus approved Major Development Projects yet to be built including Sherwin Williams and BMR buildout with 2023 geometrics and traffic signal operations.
- **Alternative 2 (Modified Project)** – Same traffic volumes as Alternative 1 with the modified project geometry approved by Council in July 2023 and optimized traffic signal timings.

Alternative 2 – Average Motor Vehicle and Bus Speeds
5:15 PM - 5:30 PM

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ATTACHMENT D



- 0 mph - 5 mph
- 5 mph - 10 mph
- 10 mph - 15 mph
- 15 mph - 20 mph
- > 20 mph

- **Alternative 1 (No Project)** – 2023 traffic volumes plus approved Major Development Projects yet to be built including Sherwin Williams and BMR buildout with 2023 geometrics and traffic signal operations.
- **Alternative 2 (Modified Project)** – Same traffic volumes as Alternative 1 with the modified project geometry approved by Council in July 2023 and optimized traffic signal timings.

Alternative 2 – Average Motor Vehicle and Bus Speeds
5:30 PM - 5:45 PM

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ATTACHMENT D

Attachment E:
Intersection LOS and Delay Calculation Worksheets (Part 1)

Vissim Post-Processor **40th St Transit Hub**
Average Results from 10 Runs **Alternative 1 (2025 Forecast)**
Volume and Delay by Movement **PM Peak Hour**

Intersection 1 **Adeline St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	21	22	104.3%	38.0	18.4	D
	Through	244	247	101.4%	41.3	3.5	D
	Right Turn	35	31	87.1%	30.5	6.5	C
	Subtotal	300	300	99.9%	39.8	3.9	D
SB	Left Turn	46	47	101.1%	58.6	17.5	E
	Through	146	150	103.0%	49.4	8.4	D
	Right Turn	62	57	91.9%	40.1	6.8	D
	Subtotal	254	254	100.0%	48.9	7.7	D
EB	Left Turn	71	66	92.3%	77.4	3.7	E
	Through	556	550	98.9%	4.1	1.1	A
	Right Turn	41	42	102.4%	8.5	4.0	A
	Subtotal	668	657	98.4%	11.8	1.7	B
WB	Left Turn	19	20	106.3%	62.7	20.3	E
	Through	477	473	99.1%	15.3	2.4	B
	Right Turn	67	67	100.1%	17.9	5.0	B
	Subtotal	563	560	99.5%	17.6	3.0	B
Total		1,785	1,771	99.2%	24.3	1.9	C

Intersection 2 **San Pablo Ave/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	206	206	100.0%	54.4	7.1	D
	Through	658	657	99.8%	29.7	2.5	C
	Right Turn	41	41	100.5%	26.5	7.8	C
	Subtotal	905	904	99.9%	35.5	3.0	D
SB	Left Turn	167	159	95.1%	81.9	19.8	F
	Through	660	654	99.1%	42.4	6.2	D
	Right Turn	63	62	97.8%	51.4	7.5	D
	Subtotal	890	874	98.2%	50.1	7.8	D
EB	Left Turn	143	138	96.2%	43.8	5.7	D
	Through	459	456	99.3%	44.1	4.2	D
	Right Turn	140	141	100.6%	46.0	4.9	D
	Subtotal	742	734	98.9%	44.6	3.4	D
WB	Left Turn	47	44	94.3%	77.7	24.9	E
	Through	365	364	99.6%	70.6	4.2	E
	Right Turn	147	142	96.8%	20.0	4.7	B
	Subtotal	559	550	98.4%	58.8	5.3	E
Total		3,096	3,063	98.9%	46.3	2.5	D

Vissim Post-Processor **40th St Transit Hub**
Average Results from 10 Runs **Alternative 1 (2025 Forecast)**
Volume and Delay by Movement **PM Peak Hour**

Intersection 3 **Emery St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	100	104	104.3%	51.0	6.7	D
	Through	91	86	94.9%	51.4	7.1	D
	Right Turn	182	182	100.0%	11.3	4.0	B
	Subtotal	373	373	99.9%	32.6	4.0	C
SB	Left Turn	28	27	95.4%	67.1	10.0	E
	Through	75	70	93.1%	54.1	8.1	D
	Right Turn	6	6	96.7%	17.7	12.4	B
	Subtotal	109	102	93.9%	56.0	6.6	E
EB	Left Turn	6	6	91.7%	53.3	47.7	D
	Through	533	528	99.1%	24.0	7.1	C
	Right Turn	57	50	87.9%	24.3	14.2	C
	Subtotal	596	584	98.0%	24.7	7.0	C
WB	Left Turn	79	83	104.6%	78.6	8.9	E
	Through	524	518	98.9%	7.0	2.8	A
	Right Turn	32	30	94.7%	4.7	2.6	A
	Subtotal	635	631	99.4%	16.9	3.1	B
Total		1,713	1,690	98.6%	25.9	3.4	C

Intersection 4 **Watts Ave/40th St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn						
	Through						
	Right Turn	16	17	105.0%	14.9	2.6	B
	Subtotal	16	17	105.0%	14.9	2.6	B
EB	Left Turn						
	Through	595	587	98.6%	15.5	7.6	C
	Right Turn						
	Subtotal	595	587	98.6%	15.5	7.6	C
WB	Left Turn						
	Through	613	608	99.1%	1.0	0.4	A
	Right Turn	17	20	118.8%	3.2	1.6	A
	Subtotal	630	628	99.7%	1.1	0.4	A
Total		1,241	1,231	99.2%	8.0	3.7	A

Intersection 5 **Harlan St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	28	28	100.7%	6.6	6.0	A
	Through	11	11	98.2%	41.4	21.8	D
	Right Turn	64	62	96.1%	9.2	3.9	A
	Subtotal	103	101	97.6%	13.0	5.9	B
SB	Left Turn	4	3	85.0%	14.1	25.2	B
	Through	16	14	86.3%	59.5	18.9	E
	Right Turn	6	4	65.0%	17.3	28.2	B
	Subtotal	26	21	81.2%	52.1	21.6	D
EB	Left Turn	5	5	102.0%	68.4	26.0	E
	Through	527	524	99.4%	7.7	2.6	A
	Right Turn	26	27	103.8%	2.9	1.7	A
	Subtotal	558	556	99.6%	8.3	2.4	A
WB	Left Turn	61	61	99.5%	66.0	5.1	E
	Through	556	553	99.5%	1.9	0.5	A
	Right Turn	12	12	100.8%	1.6	1.6	A
	Subtotal	629	626	99.5%	8.8	1.1	A
Total		1,316	1,304	99.1%	9.6	1.5	A

Intersection 6 **Haven St/40th St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn						
	Through						
	Right Turn	7	7	101.4%	9.2	1.2	A
	Subtotal	7	7	101.4%	9.2	1.2	A
EB	Left Turn						
	Through	558	556	99.6%	0.6	0.2	A
	Right Turn						
	Subtotal	558	556	99.6%	0.6	0.2	A
WB	Left Turn						
	Through	585	581	99.3%	0.4	0.2	A
	Right Turn	5	4	86.0%	0.7	0.4	A
	Subtotal	590	585	99.2%	0.4	0.2	A
Total		1,155	1,148	99.4%	0.6	0.1	A

Intersection 7 **Hollis St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	46	46	98.9%	55.2	7.1	E
	Through	244	245	100.5%	32.1	5.4	C
	Right Turn	69	66	95.4%	7.9	3.5	A
	Subtotal	359	357	99.3%	30.4	4.7	C
SB	Left Turn	26	27	103.8%	77.9	16.9	E
	Through	316	318	100.7%	47.6	8.9	D
	Right Turn	10	9	91.0%	34.6	21.2	C
	Subtotal	352	354	100.7%	49.7	9.5	D
EB	Left Turn	41	34	83.2%	64.4	14.2	E
	Through	464	463	99.8%	39.2	4.3	D
	Right Turn	96	92	95.8%	37.3	8.3	D
	Subtotal	601	589	98.0%	40.5	4.2	D
WB	Left Turn	84	80	95.4%	53.0	13.1	D
	Through	480	479	99.8%	26.1	4.0	C
	Right Turn	28	28	100.7%	18.7	4.3	B
	Subtotal	592	587	99.2%	29.5	4.1	C
Total		1,904	1,888	99.1%	36.8	3.2	D

Intersection 8 **Holden St/40th St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn	11	8	73.6%	12.7	9.9	B
	Subtotal	11	8	73.6%	12.7	9.9	B
SB	Left Turn						
	Through						
	Right Turn	21	20	95.2%	20.1	4.5	C
	Subtotal	21	20	95.2%	20.1	4.5	C
EB	Left Turn						
	Through	589	583	99.0%	1.6	0.8	A
	Right Turn	11	10	91.8%	0.4	0.1	A
	Subtotal	600	593	98.9%	1.6	0.8	A
WB	Left Turn						
	Through	522	521	99.8%	2.7	0.5	A
	Right Turn	14	13	91.4%	3.1	1.8	A
	Subtotal	536	534	99.6%	2.7	0.5	A
Total		1,168	1,155	98.9%	2.5	0.6	A

Vissim Post-Processor **40th St Transit Hub**
Average Results from 10 Runs **Alternative 1 (2025 Forecast)**
Volume and Delay by Movement **PM Peak Hour**

Intersection 9 **Horton St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	294	292	99.2%	51.2	5.7	D
	Through	117	115	97.9%	45.4	4.8	D
	Right Turn	93	91	97.5%	29.3	2.4	C
	Subtotal	504	497	98.6%	45.6	4.4	D
SB	Left Turn	18	19	102.8%	35.5	16.3	D
	Through	149	149	100.2%	49.2	6.0	D
	Right Turn	20	17	84.0%	45.2	17.0	D
	Subtotal	187	185	98.7%	48.1	5.4	D
EB	Left Turn	27	25	93.7%	70.6	16.4	E
	Through	488	484	99.1%	37.4	5.3	D
	Right Turn	188	184	97.8%	37.5	5.0	D
	Subtotal	703	693	98.6%	38.7	4.8	D
WB	Left Turn	151	147	97.1%	83.5	5.6	F
	Through	372	376	101.0%	10.6	1.7	B
	Right Turn	20	19	96.5%	14.3	8.4	B
	Subtotal	543	542	99.7%	31.5	2.3	C
Total		1,937	1,916	98.9%	39.2	2.3	D

Intersection 10 **Hubbard St/40th St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn	92	88	96.1%	14.3	8.3	B
	Subtotal	92	88	96.1%	14.3	8.3	B
SB	Left Turn						
	Through						
	Right Turn	35	34	95.7%	12.6	0.8	B
	Subtotal	35	34	95.7%	12.6	0.8	B
EB	Left Turn						
	Through	612	604	98.8%	8.5	3.3	A
	Right Turn	101	100	99.2%	9.1	4.9	A
	Subtotal	713	705	98.8%	8.5	3.4	A
WB	Left Turn	26	26	98.5%	8.6	2.2	A
	Through	659	658	99.8%	5.2	0.9	A
	Right Turn						
	Subtotal	685	683	99.7%	5.3	0.9	A
Total		1,525	1,510	99.0%	7.6	2.3	A

Intersection 11 **Shellmound St/IKEA Exit** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	617	611	99.0%	33.9	6.1	C
	Right Turn	77	78	101.7%	32.7	7.7	C
	Subtotal	694	689	99.3%	33.8	5.8	C
SB	Left Turn	62	61	97.9%	32.4	5.2	C
	Through	695	688	99.0%	2.3	0.5	A
	Right Turn						
	Subtotal	757	749	98.9%	4.8	0.8	A
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	18	15	83.9%	45.6	13.3	D
	Through						
	Right Turn	22	21	96.4%	6.8	0.8	A
	Subtotal	40	36	90.8%	22.9	5.6	C
Total		1,491	1,475	98.9%	19.0	2.9	B

Intersection 12 **San Pablo Ave/Park Ave** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	48	42	88.3%	9.8	6.1	A
	Through	892	888	99.6%	3.8	0.4	A
	Right Turn	8	8	100.0%	1.2	1.2	A
	Subtotal	948	939	99.0%	4.1	0.5	A
SB	Left Turn	4	4	92.5%	4.0	6.7	A
	Through	755	746	98.8%	15.2	4.1	B
	Right Turn	23	25	110.0%	17.0	7.5	B
	Subtotal	782	775	99.1%	15.2	4.1	B
EB	Left Turn	77	80	104.2%	45.3	6.5	D
	Through	5	6	110.0%	44.6	41.1	D
	Right Turn	129	120	92.9%	9.2	7.0	A
	Subtotal	211	206	97.4%	25.4	6.0	C
WB	Left Turn	6	5	88.3%	25.7	24.3	C
	Through	6	6	96.7%	34.7	24.4	C
	Right Turn	6	5	80.0%	14.0	26.8	B
	Subtotal	18	16	88.3%	30.1	15.4	C
Total		1,959	1,935	98.8%	11.4	1.7	B

Vissim Post-Processor **40th St Transit Hub**
Average Results from 10 Runs **Alternative 1 (2025 Forecast)**
Volume and Delay by Movement **PM Peak Hour**

Intersection 13 **Emery St/Park Ave** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn	100	96	95.6%	18.6	4.6	C
	Through						
	Right Turn	5	6	110.0%	14.4	13.2	B
	Subtotal	105	101	96.3%	18.4	4.5	C
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	206	201	97.4%	0.8	0.3	A
	Right Turn	74	70	93.9%	0.8	0.5	A
	Subtotal	280	270	96.5%	0.8	0.2	A
WB	Left Turn	6	6	96.7%	6.0	6.8	A
	Through	71	68	95.1%	1.5	0.4	A
	Right Turn						
	Subtotal	77	73	95.2%	1.9	0.7	A
Total		462	445	96.2%	5.2	1.6	A

Intersection 14 **Watts Ave/Park Ave** **All-way Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn	9	10	113.3%	11.3	5.0	B
	Through						
	Right Turn	12	8	62.5%	11.6	4.6	B
	Subtotal	21	18	84.3%	11.1	4.2	B
SB	Left Turn	137	138	100.7%	7.3	0.3	A
	Through	5	4	84.0%	5.8	4.4	A
	Right Turn	86	82	95.7%	6.2	0.3	A
	Subtotal	228	225	98.5%	6.9	0.2	A
EB	Left Turn	11	11	97.3%	6.4	4.9	A
	Through	131	124	94.9%	6.4	1.1	A
	Right Turn	5	4	76.0%	3.5	4.7	A
	Subtotal	147	139	94.4%	6.4	1.2	A
WB	Left Turn						
	Through	121	112	92.4%	8.2	1.9	A
	Right Turn	50	51	102.4%	8.0	1.9	A
	Subtotal	171	163	95.3%	8.2	1.8	A
Total		567	544	95.9%	7.3	0.8	A

Intersection 15 **Harlan St/Park Ave** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	15	17	112.7%	14.5	2.8	B
	Through						
	Right Turn	11	11	98.2%	5.4	2.6	A
	Subtotal	26	28	106.5%	11.2	2.8	B
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	137	129	94.0%	0.4	0.3	A
	Right Turn	11	11	95.5%	0.0	0.1	A
	Subtotal	148	139	94.1%	0.4	0.3	A
WB	Left Turn	16	14	85.6%	3.6	1.5	A
	Through	199	191	95.9%	0.9	0.2	A
	Right Turn						
	Subtotal	215	205	95.2%	1.1	0.2	A
Total		389	372	95.5%	1.6	0.2	A

Intersection 16 **Haven St/Park Ave** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	11	10	89.1%	15.4	3.3	C
	Through						
	Right Turn	15	15	102.0%	12.9	1.5	B
	Subtotal	26	25	96.5%	14.1	1.3	B
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	133	124	93.5%	0.2	0.2	A
	Right Turn	5	4	88.0%	0.1	0.4	A
	Subtotal	138	129	93.3%	0.2	0.2	A
WB	Left Turn						
	Through	214	208	97.1%	0.2	0.3	A
	Right Turn						
	Subtotal	214	208	97.1%	0.2	0.3	A
Total		378	362	95.7%	1.1	0.3	A

Vissim Post-Processor **40th St Transit Hub**
Average Results from 10 Runs **Alternative 1 (2025 Forecast)**
Volume and Delay by Movement **PM Peak Hour**

Intersection 17 **Hollis St/Park Ave** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	11	8	71.8%	12.5	9.9	B
	Through	292	291	99.7%	14.1	3.4	B
	Right Turn	10	8	81.0%	5.0	6.3	A
	Subtotal	313	307	98.1%	13.9	3.3	B
SB	Left Turn	49	48	97.1%	21.1	6.8	C
	Through	302	305	100.9%	15.2	7.7	B
	Right Turn	15	12	77.3%	12.3	5.3	B
	Subtotal	366	364	99.4%	15.9	7.1	B
EB	Left Turn	30	29	96.3%	15.4	7.7	B
	Through	78	73	93.2%	12.2	3.7	B
	Right Turn	16	15	92.5%	10.2	8.4	B
	Subtotal	124	116	93.9%	12.9	3.4	B
WB	Left Turn	34	35	103.8%	21.3	11.5	C
	Through	64	58	89.8%	13.8	5.9	B
	Right Turn	128	125	97.5%	10.8	1.6	B
	Subtotal	226	218	96.3%	13.1	3.1	B
Total		1,029	1,005	97.7%	14.3	2.8	B

Intersection 18 **Holden St/Park Ave** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	4	3	85.0%	6.5	5.9	A
	Through						
	Right Turn	24	25	102.5%	11.4	3.2	B
	Subtotal	28	28	100.0%	11.0	1.3	B
SB	Left Turn	16	15	92.5%	6.8	1.4	A
	Through	3	3	83.3%	4.8	4.6	A
	Right Turn	18	19	105.0%	6.4	1.9	A
	Subtotal	37	36	97.8%	6.5	0.6	A
EB	Left Turn	7	7	98.6%	0.2	0.3	A
	Through	84	77	91.3%	0.8	0.2	A
	Right Turn	9	9	96.7%	0.0	0.0	A
	Subtotal	100	92	92.3%	0.7	0.2	A
WB	Left Turn	3	2	60.0%	0.0	0.0	A
	Through	75	67	89.3%	0.1	0.1	A
	Right Turn	11	8	75.5%	0.0	0.0	A
	Subtotal	89	77	86.6%	0.1	0.1	A
Total		254	234	92.0%	2.5	0.3	A

Vissim Post-Processor **40th St Transit Hub**
Average Results from 10 Runs **Alternative 1 (2025 Forecast)**
Volume and Delay by Movement **PM Peak Hour**

Intersection 19 **Horton St/Park Ave** **All-way Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	14	13	90.7%	7.8	2.1	A
	Through	134	131	97.4%	15.3	2.4	C
	Right Turn	16	16	97.5%	11.5	4.8	B
	Subtotal	164	159	96.8%	14.4	2.2	B
SB	Left Turn	14	12	87.9%	8.0	2.7	A
	Through	131	132	100.7%	8.8	0.8	A
	Right Turn	6	3	56.7%	4.4	4.9	A
	Subtotal	151	148	97.7%	8.7	0.8	A
EB	Left Turn	13	11	86.2%	6.5	1.3	A
	Through	70	65	92.1%	7.7	0.5	A
	Right Turn	17	15	90.0%	6.5	2.9	A
	Subtotal	100	91	91.0%	7.4	0.3	A
WB	Left Turn	39	37	95.9%	5.1	0.7	A
	Through	53	48	91.1%	5.3	1.2	A
	Right Turn	5	4	80.0%	5.3	8.1	A
	Subtotal	97	90	92.5%	5.5	1.7	A
Total		512	487	95.1%	9.8	1.0	A

Intersection 20 **Hubbard St/Park Ave** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	10	10	100.0%	13.0	2.2	B
	Right Turn	15	9	57.3%	11.5	1.1	B
	Subtotal	25	19	74.4%	12.3	1.4	B
SB	Left Turn	25	23	91.6%	7.6	0.9	A
	Through	5	5	102.0%	5.0	3.5	A
	Right Turn						
	Subtotal	30	28	93.3%	7.5	0.8	A
EB	Left Turn						
	Through	60	59	99.0%	0.4	0.4	A
	Right Turn	12	13	105.8%	0.5	1.0	A
	Subtotal	72	72	100.1%	0.5	0.5	A
WB	Left Turn	14	13	90.0%	0.5	0.8	A
	Through	40	39	96.3%	0.2	0.2	A
	Right Turn	18	13	73.3%	0.1	0.4	A
	Subtotal	72	64	89.3%	0.2	0.2	A
Total		199	183	92.0%	2.8	0.4	A

Vissim Post-Processor **40th St Transit Hub**
Average Results from 10 Runs **Alternative 1 (2025 Forecast)**
Volume and Delay by Movement **PM Peak Hour**

Intersection 21 **San Pablo Ave/45th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	87	82	94.6%	18.2	3.7	B
	Through	888	889	100.1%	9.0	1.5	A
	Right Turn						
	Subtotal	975	972	99.6%	9.8	1.6	A
SB	Left Turn						
	Through	671	665	99.2%	4.0	1.1	A
	Right Turn	29	30	102.4%	2.9	2.0	A
	Subtotal	700	695	99.3%	4.0	1.0	A
EB	Left Turn	65	63	96.6%	46.6	9.3	D
	Through						
	Right Turn	111	109	97.9%	21.9	5.0	C
	Subtotal	176	172	97.4%	31.4	5.7	C
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		1,851	1,838	99.3%	9.8	1.5	A

Intersection 22 **Hollis St/45th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	4	4	90.0%	13.7	14.7	B
	Through	422	423	100.3%	10.5	2.6	B
	Right Turn	24	19	80.0%	10.1	5.1	B
	Subtotal	450	446	99.1%	10.5	2.6	B
SB	Left Turn	53	50	94.7%	17.7	4.8	B
	Through	339	340	100.3%	7.7	3.3	A
	Right Turn	11	10	86.4%	5.1	4.3	A
	Subtotal	403	400	99.2%	8.8	3.0	A
EB	Left Turn	34	35	102.4%	20.5	3.1	C
	Through	25	25	100.0%	16.4	7.2	B
	Right Turn	5	4	82.0%	2.9	3.0	A
	Subtotal	64	64	99.8%	19.1	3.2	B
WB	Left Turn	21	19	90.0%	21.2	6.8	C
	Through	31	30	96.5%	18.1	6.1	B
	Right Turn	63	63	100.0%	7.5	2.3	A
	Subtotal	115	112	97.2%	12.2	2.5	B
Total		1,032	1,022	99.0%	10.6	1.9	B

Vissim Post-Processor **40th St Transit Hub**
Average Results from 10 Runs **Alternative 2 (Modified Project)**
Volume and Delay by Movement **PM Peak Hour**

Intersection 1 **Adeline St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	21	20	92.9%	46.1	25.3	D
	Through	244	249	102.2%	44.3	7.6	D
	Right Turn	35	32	90.6%	30.5	5.6	C
	Subtotal	300	301	100.2%	43.1	7.1	D
SB	Left Turn	46	46	100.0%	72.2	21.1	E
	Through	146	147	100.5%	76.1	35.3	E
	Right Turn	62	59	95.6%	76.1	45.1	E
	Subtotal	254	252	99.2%	75.1	33.6	E
EB	Left Turn	71	68	95.8%	61.8	9.5	E
	Through	556	538	96.7%	11.4	1.7	B
	Right Turn	41	40	98.3%	17.0	5.2	B
	Subtotal	668	646	96.7%	16.5	2.6	B
WB	Left Turn	19	19	100.0%	56.1	20.1	E
	Through	477	472	99.0%	24.3	8.5	C
	Right Turn	67	67	99.9%	17.9	7.8	B
	Subtotal	563	558	99.1%	24.7	7.7	C
Total		1,785	1,757	98.4%	33.1	7.9	C

Intersection 2 **San Pablo Ave/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	204	203	99.6%	52.9	5.1	D
	Through	660	658	99.7%	34.0	2.6	C
	Right Turn	41	40	97.8%	27.8	9.3	C
	Subtotal	905	902	99.6%	37.9	2.0	D
SB	Left Turn	167	164	98.2%	79.8	15.1	E
	Through	660	657	99.5%	53.5	7.4	D
	Right Turn	63	62	98.3%	60.1	9.2	E
	Subtotal	890	883	99.2%	58.9	8.6	E
EB	Left Turn	143	134	93.4%	62.3	5.2	E
	Through	459	444	96.6%	42.4	6.6	D
	Right Turn	140	132	94.1%	31.6	8.0	C
	Subtotal	742	709	95.5%	44.1	5.2	D
WB	Left Turn	47	45	95.5%	35.1	5.8	D
	Through	362	360	99.3%	39.1	12.0	D
	Right Turn	150	148	98.5%	43.2	9.1	D
	Subtotal	559	552	98.8%	39.7	8.8	D
Total		3,096	3,045	98.4%	45.8	3.9	D

Vissim Post-Processor **40th St Transit Hub**
Average Results from 10 Runs **Alternative 2 (Modified Project)**
Volume and Delay by Movement **PM Peak Hour**

Intersection 3 **Emery St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	100	102	101.6%	57.4	12.8	E
	Through	91	86	94.3%	52.1	12.3	D
	Right Turn	182	179	98.5%	62.2	37.8	E
	Subtotal	373	367	98.3%	59.1	24.4	E
SB	Left Turn	28	23	81.8%	204.1	186.2	F
	Through	75	64	84.7%	147.0	120.2	F
	Right Turn	6	5	88.3%	121.8	151.7	F
	Subtotal	109	92	84.1%	159.7	129.6	F
EB	Left Turn	6	5	86.7%	55.2	39.7	E
	Through	533	509	95.4%	68.0	26.3	E
	Right Turn	57	52	91.8%	22.1	12.6	C
	Subtotal	596	566	95.0%	63.5	24.2	E
WB	Left Turn	79	83	105.3%	58.0	5.2	E
	Through	519	510	98.3%	21.1	6.9	C
	Right Turn	32	29	91.9%	42.7	17.2	D
	Subtotal	630	623	98.8%	27.4	5.2	C
Total		1,708	1,647	96.4%	53.2	19.4	D

Intersection 4 **Watts Ave/40th St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	595	573	96.3%	53.6	30.9	F
	Right Turn						
	Subtotal	595	573	96.3%	53.6	30.9	F
WB	Left Turn						
	Through	608	599	98.5%	6.6	1.7	A
	Right Turn	17	18	106.5%	3.3	2.2	A
	Subtotal	625	617	98.7%	6.5	1.7	A
Total		1,220	1,190	97.5%	29.2	15.7	D

Vissim Post-Processor | **40th St Transit Hub**
Average Results from 10 Runs | **Alternative 2 (Modified Project)**
Volume and Delay by Movement | **PM Peak Hour**

Intersection 5 **Harlan St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	28	26	92.1%	6.9	8.6	A
	Through	11	11	96.4%	34.5	22.0	C
	Right Turn	64	64	99.2%	11.6	5.4	B
	Subtotal	103	100	97.0%	13.7	5.8	B
SB	Left Turn	4	4	87.5%	37.8	32.5	D
	Through	16	15	93.8%	51.7	22.9	D
	Right Turn	6	6	95.0%	27.0	31.9	C
	Subtotal	26	24	93.1%	46.2	20.6	D
EB	Left Turn	5	5	94.0%	41.7	21.5	D
	Through	527	511	97.0%	13.4	9.8	B
	Right Turn	26	26	99.6%	24.1	17.6	C
	Subtotal	558	542	97.1%	14.4	10.0	B
WB	Left Turn	61	61	99.7%	60.1	16.0	E
	Through	535	528	98.7%	8.1	1.7	A
	Right Turn	12	12	103.3%	4.5	1.5	A
	Subtotal	608	601	98.8%	13.6	2.5	B
Total		1,295	1,267	97.8%	14.8	4.8	B

Intersection 6 **Haven St/40th St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	558	542	97.1%	0.3	0.1	A
	Right Turn						
	Subtotal	558	542	97.1%	0.3	0.1	A
WB	Left Turn						
	Through	569	560	98.3%	4.2	2.0	A
	Right Turn						
	Subtotal	569	560	98.3%	4.2	2.0	A
Total		1,127	1,101	97.7%	2.2	1.0	A

Vissim Post-Processor **40th St Transit Hub**
Average Results from 10 Runs **Alternative 2 (Modified Project)**
Volume and Delay by Movement **PM Peak Hour**

Intersection 7 **Hollis St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	46	46	99.6%	58.2	8.9	E
	Through	244	245	100.4%	36.1	4.2	D
	Right Turn	69	66	95.5%	6.9	4.0	A
	Subtotal	359	357	99.4%	34.0	4.0	C
SB	Left Turn	26	26	99.6%	89.8	22.6	F
	Through	316	314	99.5%	50.9	8.0	D
	Right Turn						
	Subtotal	342	340	99.5%	53.9	8.2	D
EB	Left Turn	11	8	74.5%	46.3	21.8	D
	Through	464	451	97.1%	12.0	2.8	B
	Right Turn	96	96	99.9%	3.7	1.0	A
	Subtotal	571	555	97.1%	11.2	2.5	B
WB	Left Turn	84	80	95.6%	70.0	12.6	E
	Through	458	452	98.8%	19.7	5.7	B
	Right Turn	28	26	93.2%	15.1	7.1	B
	Subtotal	570	559	98.0%	26.3	6.0	C
Total		1,842	1,810	98.3%	27.8	3.2	C

Intersection 8 **Holden St/40th St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn	11	8	74.5%	9.3	1.9	A
	Subtotal	11	8	74.5%	9.3	1.9	A
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	559	548	98.1%	1.3	0.3	A
	Right Turn	11	11	100.0%	0.8	0.9	A
	Subtotal	570	559	98.1%	1.3	0.3	A
WB	Left Turn						
	Through	490	484	98.7%	7.0	5.0	A
	Right Turn	14	14	100.0%	1.6	3.0	A
	Subtotal	504	498	98.8%	6.8	4.8	A
Total		1,085	1,065	98.2%	3.9	2.1	A

Vissim Post-Processor **40th St Transit Hub**
Average Results from 10 Runs **Alternative 2 (Modified Project)**
Volume and Delay by Movement **PM Peak Hour**

Intersection 9 **Horton St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	294	296	100.7%	49.9	6.6	D
	Through	120	118	98.0%	46.4	7.1	D
	Right Turn	90	85	94.8%	25.6	7.3	C
	Subtotal	504	499	99.0%	44.7	4.9	D
SB	Left Turn	18	19	106.7%	62.2	19.5	E
	Through	149	146	98.1%	51.1	5.7	D
	Right Turn	107	95	89.0%	41.6	11.1	D
	Subtotal	274	261	95.1%	48.0	7.0	D
EB	Left Turn	55	47	86.0%	61.0	17.1	E
	Through	461	456	99.0%	39.4	4.3	D
	Right Turn	188	188	99.8%	9.2	3.1	A
	Subtotal	704	691	98.2%	33.3	3.3	C
WB	Left Turn	150	147	98.3%	53.1	12.0	D
	Through	320	317	99.1%	41.4	4.9	D
	Right Turn	20	19	96.0%	4.0	3.1	A
	Subtotal	490	484	98.7%	43.8	4.6	D
Total		1,972	1,935	98.1%	40.8	3.2	D

Intersection 10 **Hubbard St/40th St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn	92	88	95.5%	8.0	3.1	A
	Subtotal	92	88	95.5%	8.0	3.1	A
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	612	605	98.8%	6.3	1.6	A
	Right Turn	101	98	97.3%	7.1	2.5	A
	Subtotal	713	703	98.6%	6.4	1.7	A
WB	Left Turn	26	24	90.4%	10.4	4.3	B
	Through	694	686	98.8%	2.1	0.7	A
	Right Turn						
	Subtotal	720	709	98.5%	2.3	0.7	A
Total		1,525	1,500	98.4%	4.6	0.9	A

Intersection 11 **Shellmound St/IKEA Exit** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	617	611	99.0%	7.4	3.5	A
	Right Turn	77	76	99.1%	5.6	2.8	A
	Subtotal	694	687	99.0%	7.2	3.4	A
SB	Left Turn	62	59	95.8%	53.5	8.1	D
	Through	695	689	99.1%	4.8	0.9	A
	Right Turn						
	Subtotal	757	748	98.8%	8.2	1.6	A
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	18	17	93.9%	57.3	10.3	E
	Through						
	Right Turn	22	19	87.7%	6.3	0.9	A
	Subtotal	40	36	90.5%	32.2	8.9	C
Total		1,491	1,472	98.7%	8.4	2.0	A

Intersection 12 **San Pablo Ave/Park Ave** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	53	50	94.7%	21.2	5.9	C
	Through	892	880	98.7%	2.5	0.5	A
	Right Turn	8	8	100.0%	0.9	1.4	A
	Subtotal	953	938	98.5%	3.5	0.6	A
SB	Left Turn	4	4	87.5%	4.0	7.4	A
	Through	755	749	99.2%	14.2	3.6	B
	Right Turn	23	24	105.2%	18.6	9.5	B
	Subtotal	782	777	99.3%	14.2	3.5	B
EB	Left Turn	77	80	103.2%	50.4	5.9	D
	Through	5	5	92.0%	31.6	35.5	C
	Right Turn	129	129	99.7%	10.8	4.8	B
	Subtotal	211	213	100.8%	26.8	5.4	C
WB	Left Turn	6	5	80.0%	41.4	26.9	D
	Through	6	6	91.7%	41.7	31.3	D
	Right Turn	6	6	93.3%	6.5	5.8	A
	Subtotal	18	16	88.3%	32.9	17.5	C
Total		1,964	1,944	99.0%	10.7	1.9	B

Vissim Post-Processor **40th St Transit Hub**
Average Results from 10 Runs **Alternative 2 (Modified Project)**
Volume and Delay by Movement **PM Peak Hour**

Intersection 13 **Emery St/Park Ave** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	100	95	94.7%	19.4	4.4	C
	Through						
	Right Turn	5	5	90.0%	6.5	8.2	A
	Subtotal	105	99	94.5%	19.2	4.5	C
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	206	207	100.3%	0.7	0.2	A
	Right Turn	74	67	90.7%	0.7	0.4	A
	Subtotal	280	274	97.8%	0.7	0.1	A
WB	Left Turn	6	5	90.0%	1.6	2.5	A
	Through	76	74	97.5%	1.8	0.8	A
	Right Turn						
	Subtotal	82	80	97.0%	1.9	0.7	A
Total		467	453	96.9%	5.3	1.5	A

Intersection 14 **Watts Ave/Park Ave** **All-way Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	24	24	98.8%	13.2	1.2	B
	Through						
	Right Turn	12	8	70.0%	11.3	4.6	B
	Subtotal	36	32	89.2%	13.0	1.2	B
SB	Left Turn	137	134	97.4%	7.4	0.7	A
	Through	5	5	100.0%	4.3	4.1	A
	Right Turn	86	86	99.8%	6.3	0.4	A
	Subtotal	228	224	98.4%	7.0	0.5	A
EB	Left Turn	11	10	93.6%	7.3	4.7	A
	Through	131	132	100.6%	6.4	0.8	A
	Right Turn	5	4	72.0%	3.9	3.4	A
	Subtotal	147	146	99.1%	6.5	0.7	A
WB	Left Turn						
	Through	126	119	94.7%	8.4	0.9	A
	Right Turn	50	49	98.4%	8.8	1.9	A
	Subtotal	176	169	95.7%	8.5	0.9	A
Total		587	571	97.2%	7.7	0.3	A

Vissim Post-Processor **40th St Transit Hub**
Average Results from 10 Runs **Alternative 2 (Modified Project)**
Volume and Delay by Movement **PM Peak Hour**

Intersection 15 **Harlan St/Park Ave** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	15	15	97.3%	14.6	2.9	B
	Through						
	Right Turn	11	11	96.4%	6.1	2.9	A
	Subtotal	26	25	96.9%	11.3	1.2	B
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	137	136	99.3%	0.1	0.1	A
	Right Turn	11	12	106.4%	0.1	0.2	A
	Subtotal	148	148	99.9%	0.1	0.1	A
WB	Left Turn	16	15	95.6%	4.0	3.4	A
	Through	220	214	97.1%	1.0	0.3	A
	Right Turn						
	Subtotal	236	229	97.0%	1.2	0.2	A
Total		410	402	98.0%	1.5	0.3	A

Intersection 16 **Haven St/Park Ave** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	18	16	89.4%	16.3	4.3	C
	Through						
	Right Turn	15	16	107.3%	13.3	1.7	B
	Subtotal	33	32	97.6%	14.3	1.2	B
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	133	132	99.2%	0.1	0.1	A
	Right Turn	5	5	104.0%	0.0	0.0	A
	Subtotal	138	137	99.4%	0.1	0.1	A
WB	Left Turn	6	5	80.0%	2.5	4.2	A
	Through	229	223	97.4%	0.2	0.2	A
	Right Turn						
	Subtotal	235	228	96.9%	0.2	0.3	A
Total		406	397	97.8%	1.3	0.1	A

Vissim Post-Processor **40th St Transit Hub**
Average Results from 10 Runs **Alternative 2 (Modified Project)**
Volume and Delay by Movement **PM Peak Hour**

Intersection 17 **Hollis St/Park Ave** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	11	8	72.7%	21.0	12.9	C
	Through	267	264	98.9%	15.2	3.6	B
	Right Turn	5	5	104.0%	9.1	10.2	A
	Subtotal	283	277	98.0%	15.4	3.6	B
SB	Left Turn	49	51	104.7%	18.1	6.8	B
	Through	292	291	99.6%	14.2	2.9	B
	Right Turn	24	21	86.3%	15.4	5.9	B
	Subtotal	365	363	99.4%	14.9	3.1	B
EB	Left Turn	54	53	97.6%	19.1	5.1	B
	Through	84	81	96.4%	13.9	2.6	B
	Right Turn	16	15	91.3%	11.8	11.0	B
	Subtotal	154	148	96.3%	15.8	3.6	B
WB	Left Turn	34	35	104.1%	16.0	9.0	B
	Through	86	80	93.3%	12.7	3.1	B
	Right Turn	128	123	95.7%	9.9	2.4	A
	Subtotal	248	238	96.0%	11.8	2.2	B
Total		1,050	1,026	97.8%	14.5	2.1	B

Intersection 18 **Holden St/Park Ave** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	25	24	94.0%	9.4	0.5	A
	Through						
	Right Turn	24	24	101.7%	10.6	1.0	B
	Subtotal	49	48	97.8%	10.0	0.5	A
SB	Left Turn	16	15	90.6%	7.1	1.9	A
	Through	3	3	103.3%	2.7	4.5	A
	Right Turn	18	19	104.4%	7.2	1.6	A
	Subtotal	37	36	98.4%	7.2	1.1	A
EB	Left Turn	7	6	84.3%	0.1	0.2	A
	Through	114	109	95.4%	0.8	0.1	A
	Right Turn	9	8	85.6%	0.2	0.2	A
	Subtotal	130	122	94.2%	0.7	0.1	A
WB	Left Turn	3	1	46.7%	0.0	0.0	A
	Through	107	101	94.4%	0.1	0.1	A
	Right Turn	11	7	59.1%	0.0	0.0	A
	Subtotal	121	109	90.0%	0.1	0.1	A
Total		337	316	93.6%	2.7	0.3	A

Intersection 19 **Horton St/Park Ave** **All-way Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	14	11	80.0%	9.2	5.5	A
	Through	134	132	98.5%	15.6	3.3	C
	Right Turn	46	41	89.3%	10.6	3.5	B
	Subtotal	194	184	95.0%	14.4	3.2	B
SB	Left Turn	14	14	97.9%	8.4	3.4	A
	Through	131	129	98.6%	9.1	0.6	A
	Right Turn	6	4	70.0%	3.8	3.5	A
	Subtotal	151	147	97.4%	9.0	0.7	A
EB	Left Turn	13	12	94.6%	9.1	10.7	A
	Through	70	68	97.0%	9.6	2.4	A
	Right Turn	51	47	91.4%	7.4	1.5	A
	Subtotal	134	127	94.6%	8.8	2.2	A
WB	Left Turn	92	87	94.1%	8.1	3.0	A
	Through	53	52	97.2%	7.1	2.0	A
	Right Turn	5	5	96.0%	4.7	5.4	A
	Subtotal	150	143	95.3%	7.6	2.1	A
Total		629	601	95.6%	10.4	1.7	B

Intersection 20 **Hubbard St/Park Ave** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	10	9	91.0%	10.9	4.1	B
	Right Turn	48	43	89.2%	12.0	0.8	B
	Subtotal	58	52	89.5%	12.0	0.6	B
SB	Left Turn	25	23	92.0%	7.4	0.9	A
	Through	5	5	106.0%	5.5	3.0	A
	Right Turn						
	Subtotal	30	28	94.3%	7.3	0.5	A
EB	Left Turn						
	Through	60	61	102.0%	0.3	0.3	A
	Right Turn	12	11	90.8%	0.2	0.5	A
	Subtotal	72	72	100.1%	0.3	0.3	A
WB	Left Turn	14	13	90.7%	0.4	0.4	A
	Through	40	41	102.8%	0.2	0.2	A
	Right Turn	18	13	72.8%	0.4	0.7	A
	Subtotal	72	67	92.9%	0.3	0.3	A
Total		232	219	94.5%	4.0	0.2	A

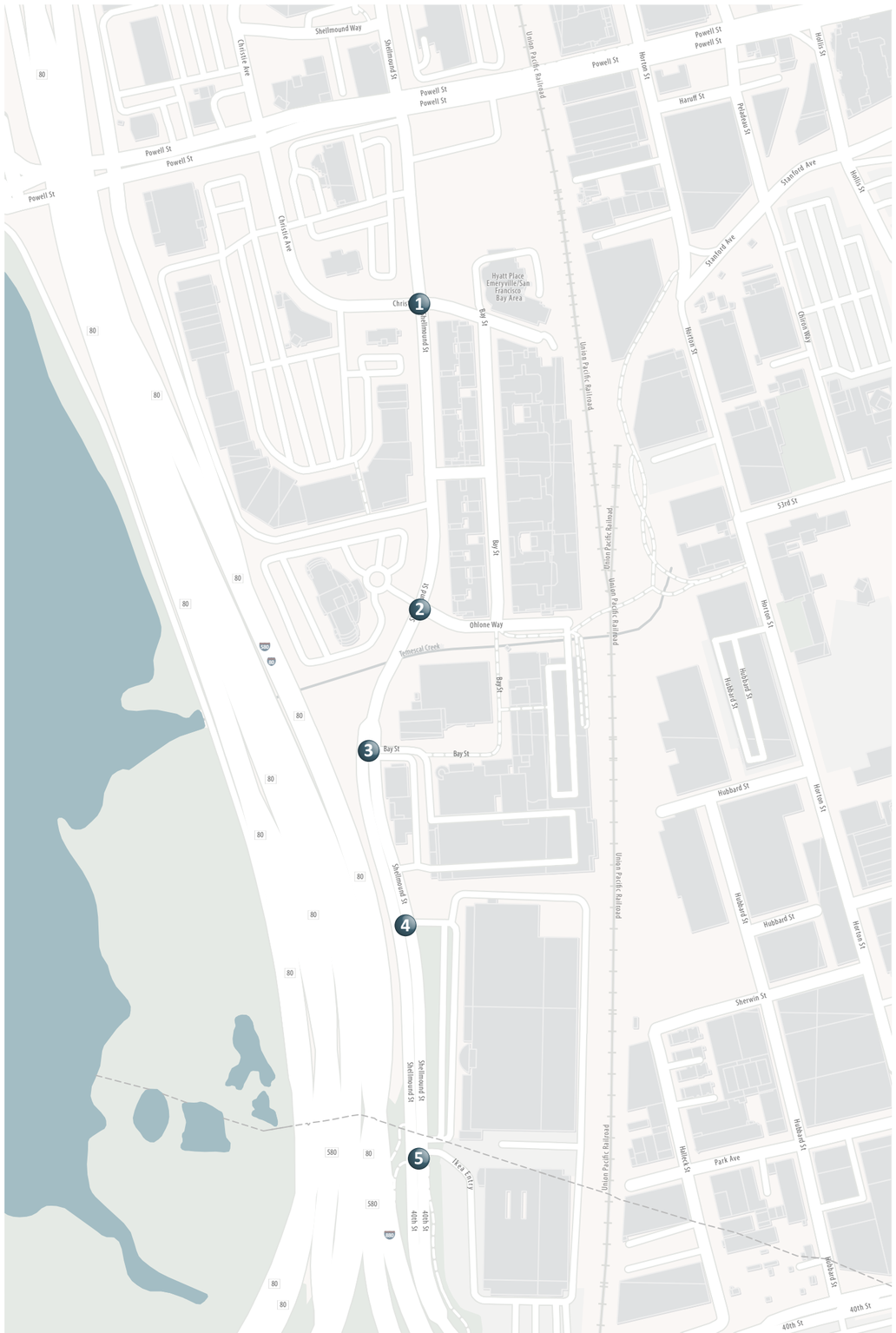
Intersection 21 **San Pablo Ave/45th St** **Signal**

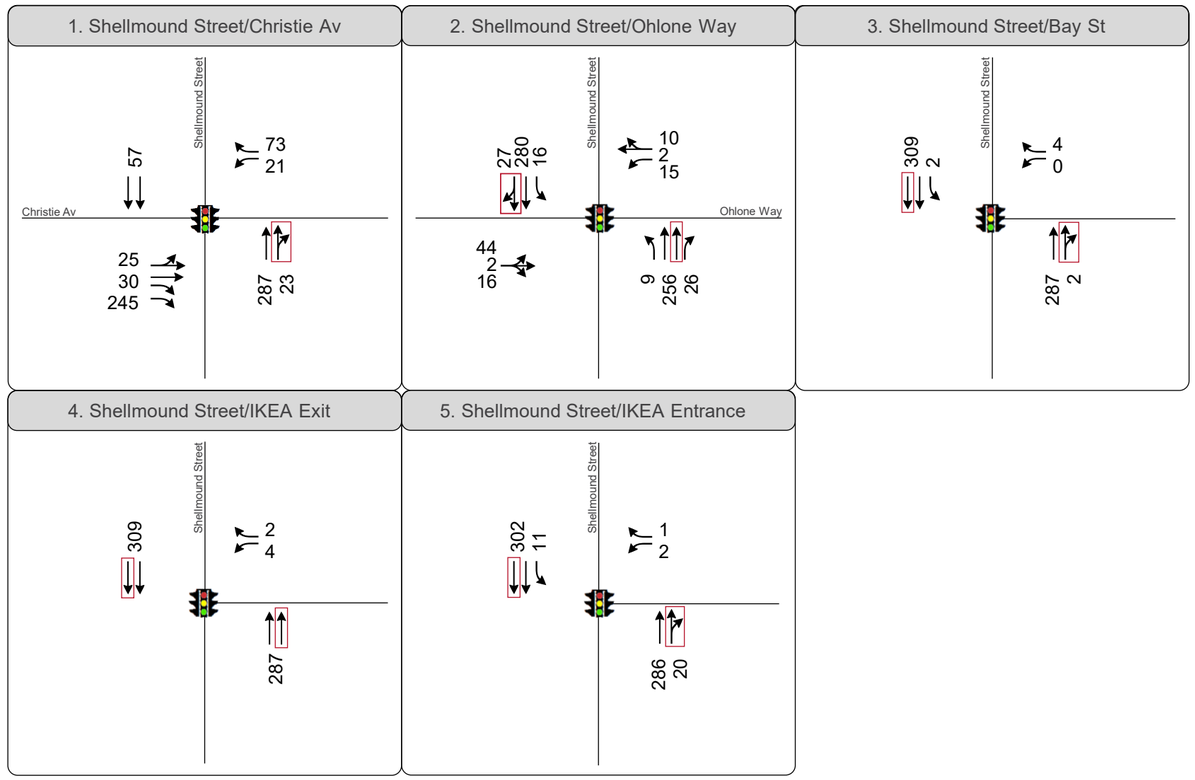
Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	87	87	99.7%	9.6	2.8	A
	Through	888	882	99.3%	6.1	1.0	A
	Right Turn						
	Subtotal	975	969	99.4%	6.4	0.9	A
SB	Left Turn						
	Through	671	667	99.4%	3.7	0.6	A
	Right Turn	29	29	98.6%	4.4	3.8	A
	Subtotal	700	696	99.4%	3.7	0.7	A
EB	Left Turn	65	65	99.2%	46.1	8.0	D
	Through						
	Right Turn	111	108	96.8%	24.5	5.7	C
	Subtotal	176	172	97.7%	32.6	5.7	C
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		1,851	1,836	99.2%	8.0	0.9	A

Intersection 22 **Hollis St/45th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	4	2	60.0%	5.3	8.2	A
	Through	422	415	98.3%	11.0	1.8	B
	Right Turn	24	22	90.0%	9.8	5.0	A
	Subtotal	450	439	97.5%	10.9	1.9	B
SB	Left Turn	53	51	95.3%	20.6	6.2	C
	Through	339	338	99.7%	7.0	1.6	A
	Right Turn	11	11	100.0%	5.2	3.2	A
	Subtotal	403	399	99.1%	8.6	1.4	A
EB	Left Turn	34	34	99.7%	20.4	4.4	C
	Through	25	25	100.4%	16.6	10.3	B
	Right Turn	5	5	96.0%	7.0	6.0	A
	Subtotal	64	64	99.7%	18.4	4.5	B
WB	Left Turn	21	20	95.7%	19.5	8.7	B
	Through	31	30	95.5%	16.3	3.9	B
	Right Turn	63	62	98.3%	7.4	1.7	A
	Subtotal	115	112	97.0%	12.6	2.1	B
Total		1,032	1,014	98.2%	10.7	1.1	B

Attachment F:
Multimodal Intersection Traffic Volumes (Part 2)





Study Intersection

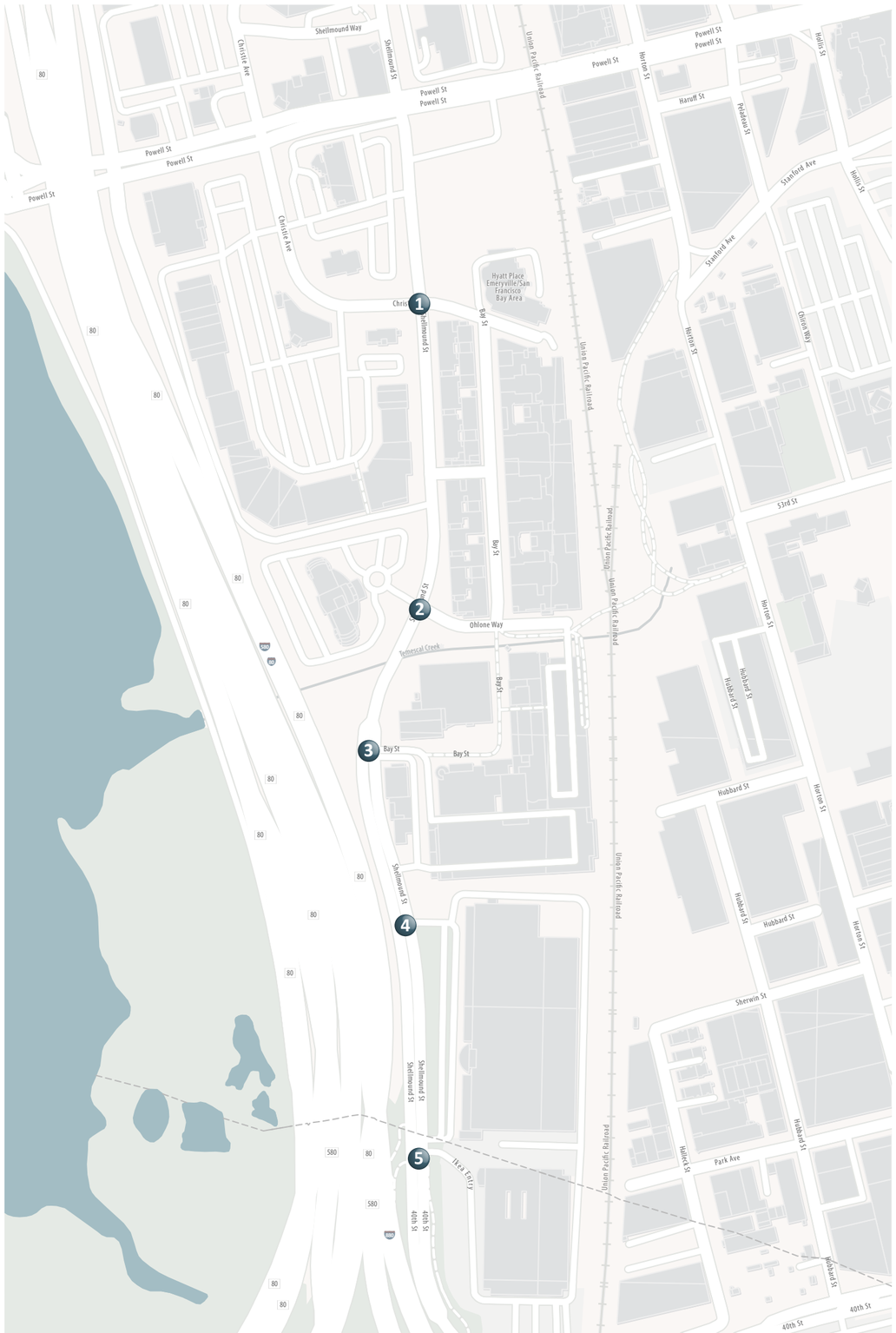
Signalized Intersection

XX AM Peak Hour Traffic Volumes

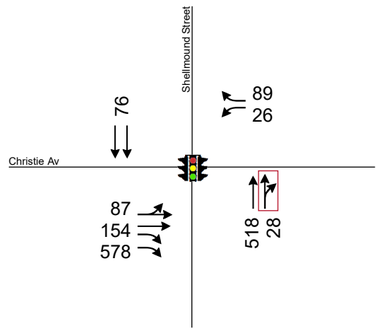
Lane to be converted to transit-only in Scenarios 2 and 3

Appendix A-1

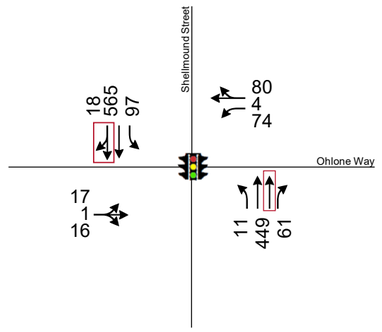
Scenario 1, 2 and 3: Weekday AM Peak Hour Intersection Traffic Volumes



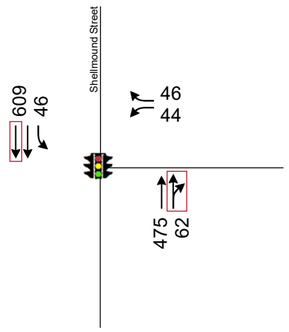
1. Shellmound Street/Christie Av



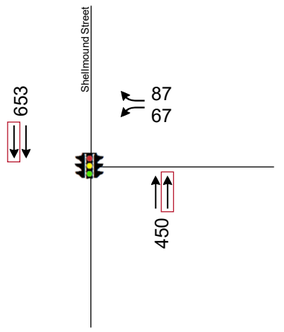
2. Shellmound Street/Ohlone Way



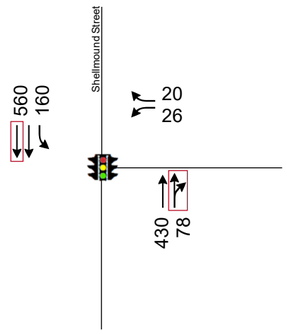
3. Shellmound Street/Bay St



4. Shellmound Street/IKEA Exit

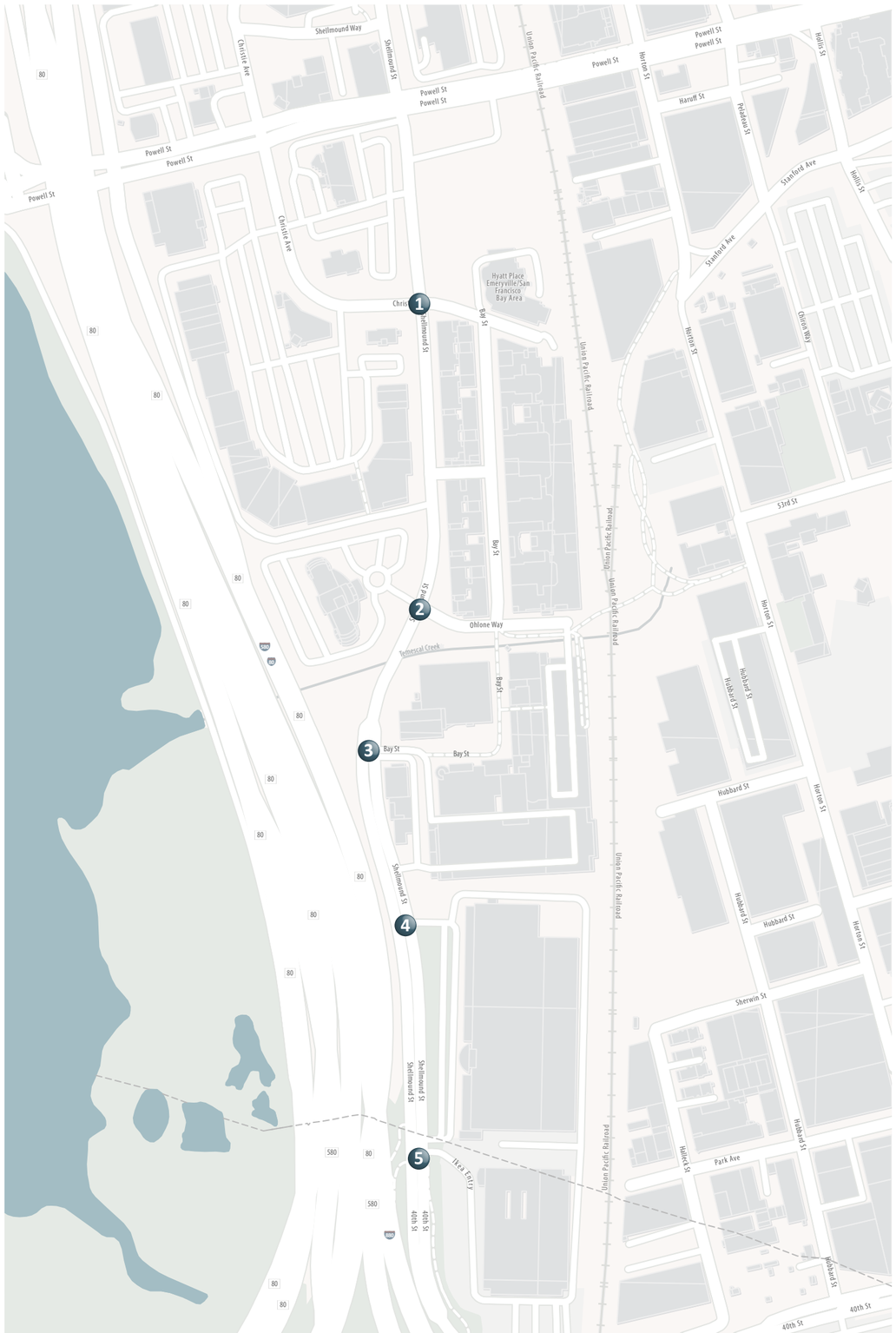


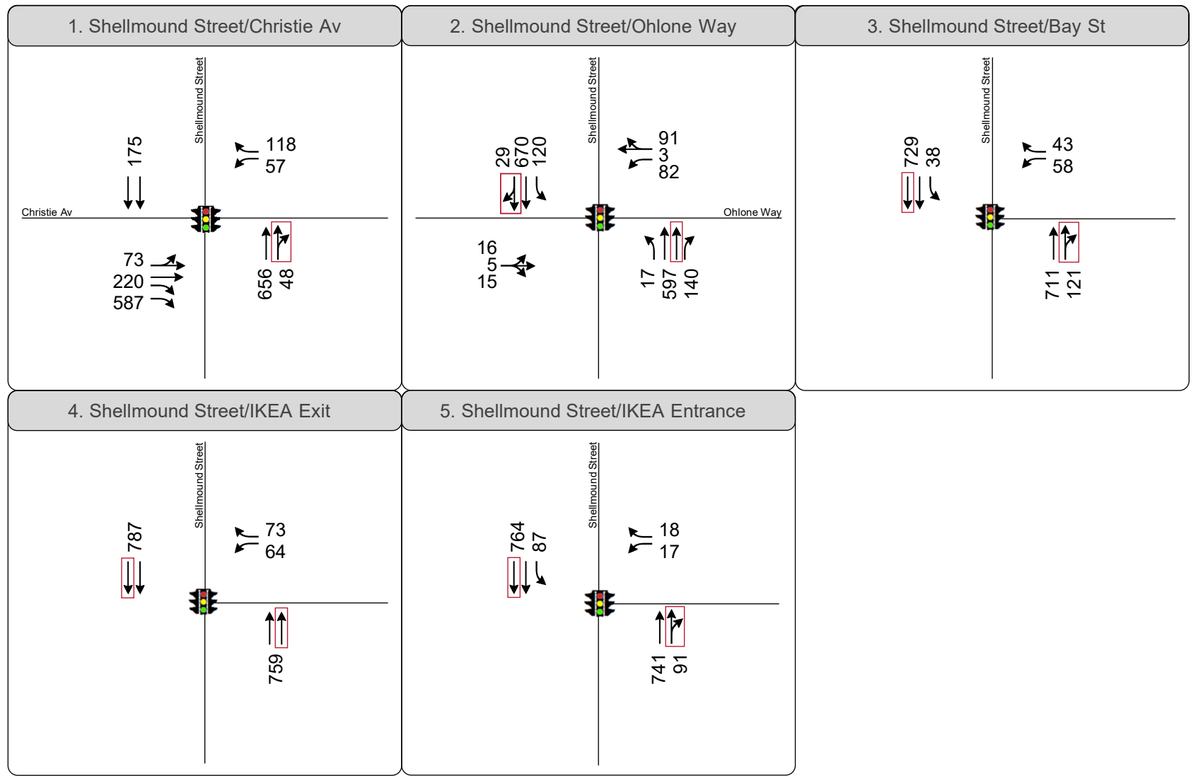
5. Shellmound Street/IKEA Entrance



Appendix A-2
Scenario 1, 2 and 3: Weekday Midday Peak Hour Intersection Traffic Volumes

Study Intersection
Signalized Intersection
XX Midday Peak Hour Traffic Volumes
Lane to be converted to transit-only in Scenarios 2 and 3



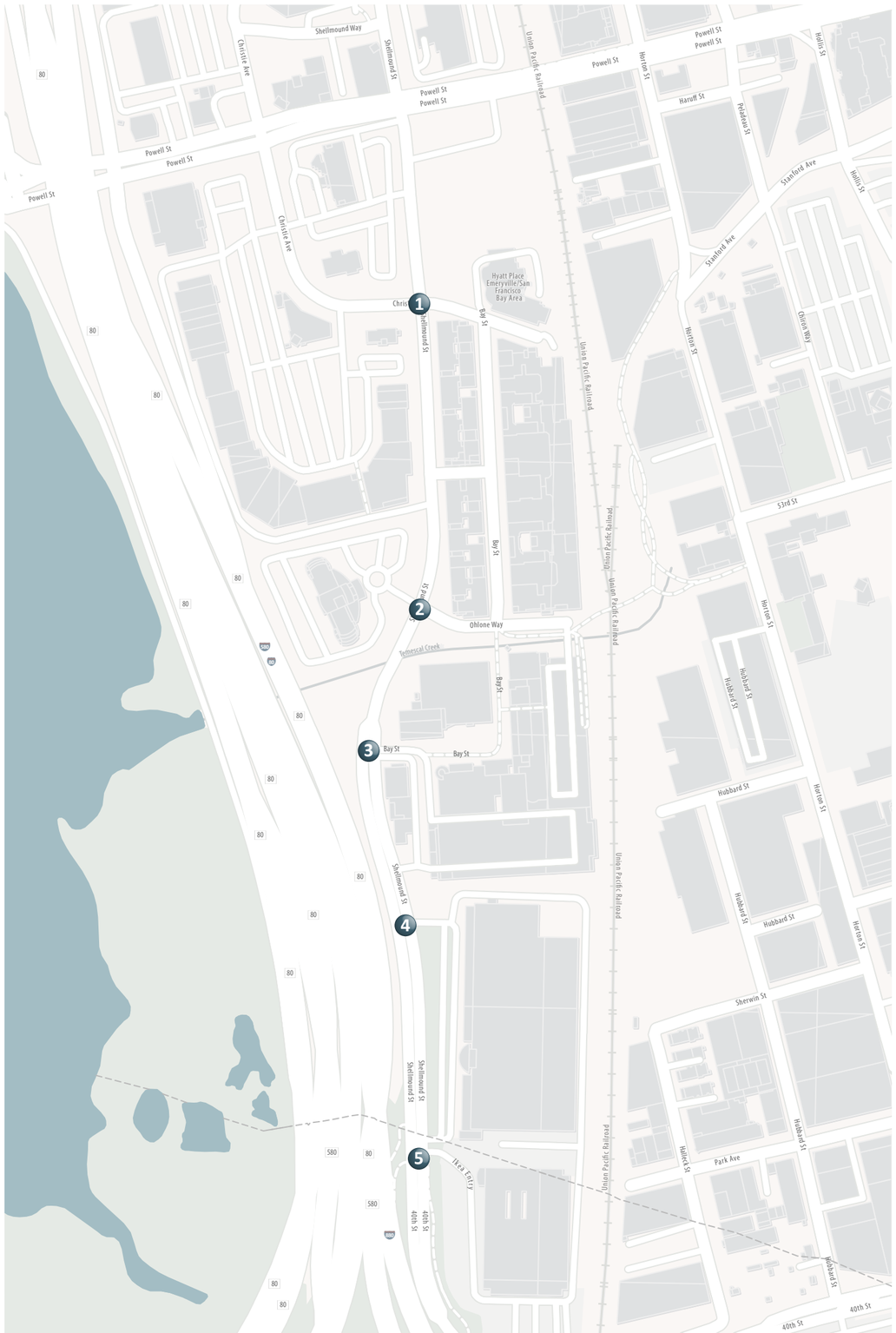


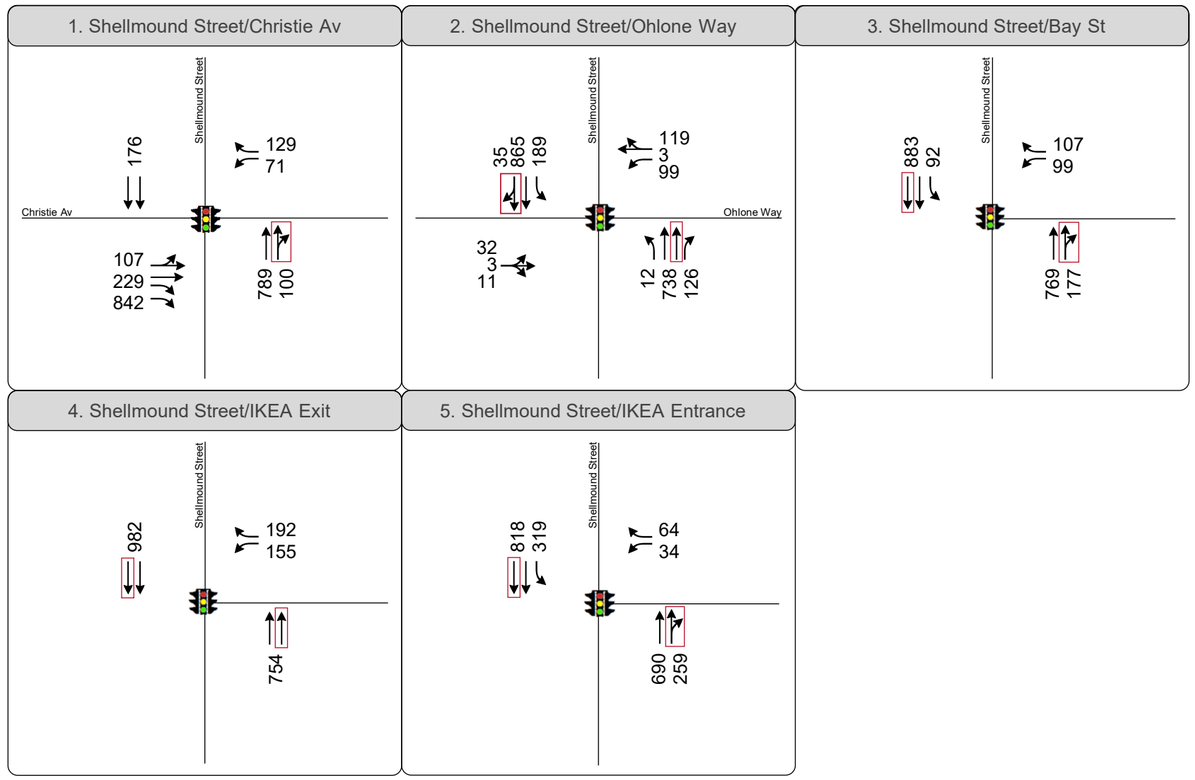
Study Intersection Signalized Intersection XX PM Peak Hour Traffic Volumes

Lane to be converted to transit-only in Scenarios 2 and 3

Appendix A-3

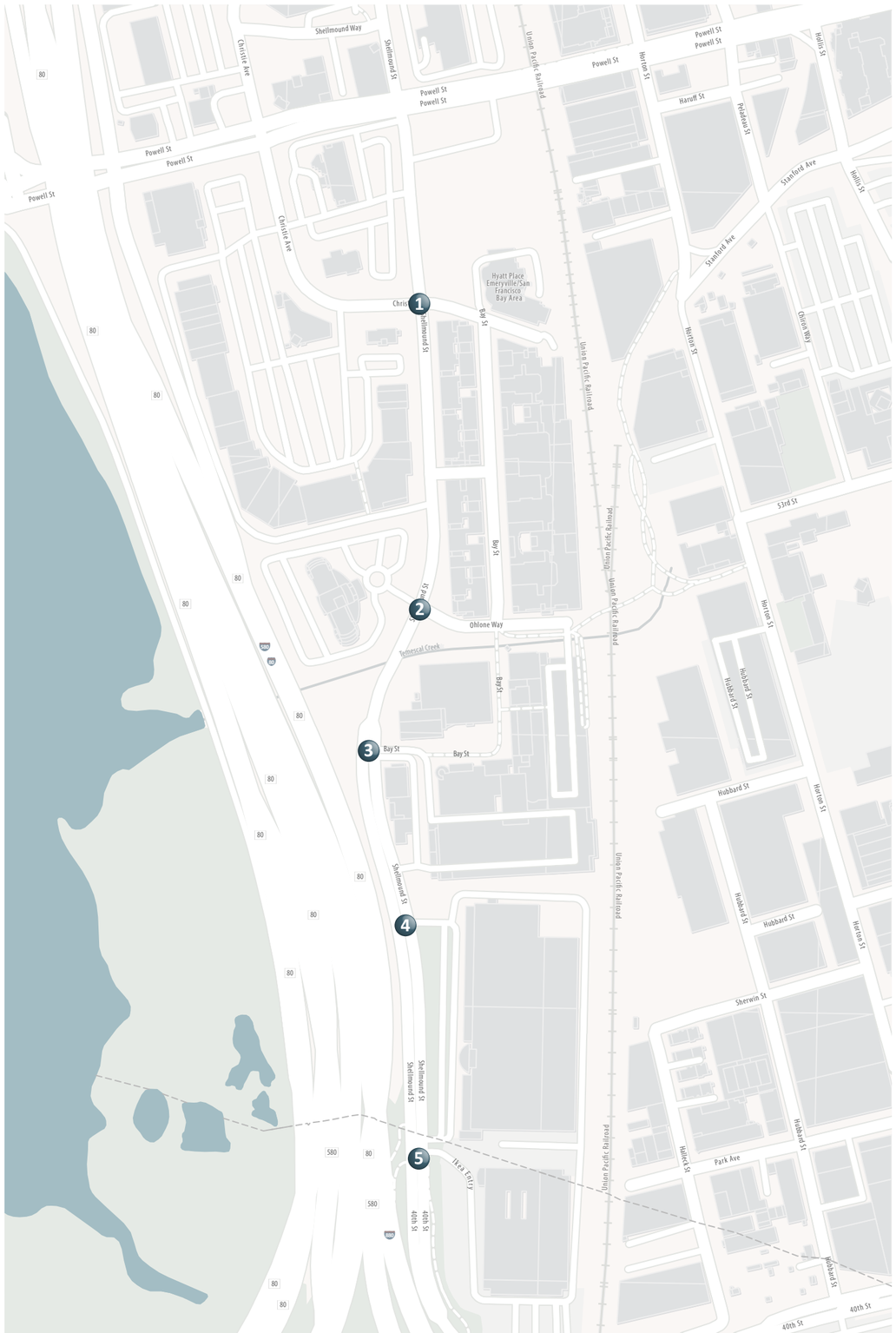
Scenario 1, 2 and 3: Weekday PM Peak Hour Intersection Traffic Volumes



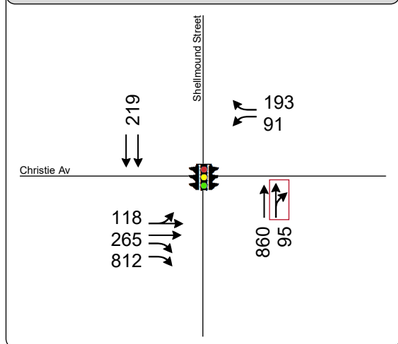


Appendix A-4
Scenario 1, 2 and 3: Weekend Midday Peak Hour Intersection Traffic Volumes

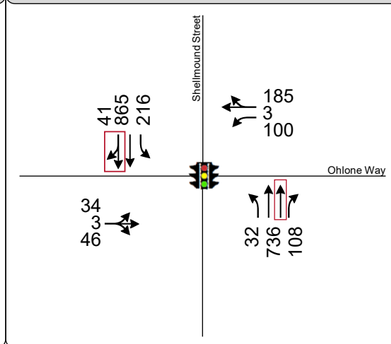
Study Intersection
Signalized Intersection
XX Midday Peak Hour Traffic Volumes
Lane to be converted to transit-only in Scenarios 2 and 3



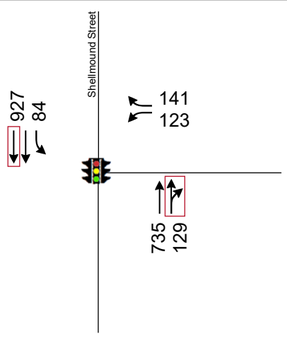
1. Shellmound Street/Christie Av



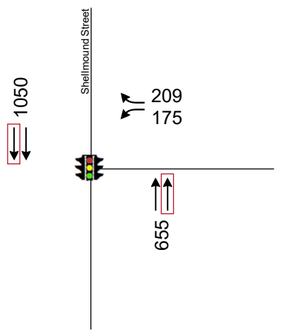
2. Shellmound Street/Ohlone Way



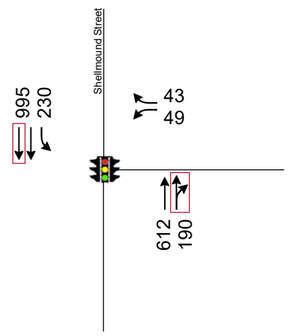
3. Shellmound Street/Bay St



4. Shellmound Street/IKEA Exit



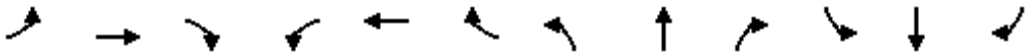
5. Shellmound Street/IKEA Entrance



Appendix A-5
Scenario 1, 2 and 3: Weekend PM
Peak Hour Intersection Traffic Volumes

Study Intersection
Signalized Intersection
XX PM Peak Hour Traffic Volumes
Lane to be converted to transit-only in Scenarios 2 and 3

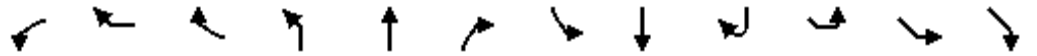
Attachment G:
Intersection LOS and Delay Calculation Worksheets (Part 2)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	30	245	21	0	73	0	287	23	0	57	0
Future Volume (vph)	25	30	245	21	0	73	0	287	23	0	57	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	10	12	11	12	9	12	12	11	12
Total Lost time (s)		4.6	4.6	4.6		4.6		4.7			4.6	
Lane Util. Factor		0.95	*0.75	1.00		1.00		0.95			0.95	
Frpb, ped/bikes		1.00	1.00	1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00			1.00	
Frt		1.00	0.85	1.00		0.85		0.99			1.00	
Flt Protected		0.98	1.00	0.95		1.00		1.00			1.00	
Satd. Flow (prot)		3278	2175	1565		1450		2981			3241	
Flt Permitted		0.98	1.00	0.95		1.00		1.00			1.00	
Satd. Flow (perm)		3278	2175	1565		1450		2981			3241	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	30	245	21	0	73	0	287	23	0	57	0
RTOR Reduction (vph)	0	0	170	0	0	68	0	3	0	0	0	0
Lane Group Flow (vph)	0	55	75	21	0	5	0	307	0	0	57	0
Confl. Bikes (#/hr)			7						2			2
Turn Type	Split	NA	custom	Prot		Perm		NA			NA	
Protected Phases	4	4	4 5	3				2			6	
Permitted Phases						3						
Actuated Green, G (s)		9.2	37.8	8.0		8.0		69.9			42.0	
Effective Green, g (s)		8.2	36.8	7.5		7.5		69.4			41.5	
Actuated g/C Ratio		0.07	0.31	0.06		0.06		0.58			0.35	
Clearance Time (s)		3.6		4.1		4.1		4.2			4.1	
Vehicle Extension (s)		2.5		2.5		2.5		3.0			3.0	
Lane Grp Cap (vph)		223	667	97		90		1724			1120	
v/s Ratio Prot		c0.02	0.03	c0.01				c0.10			0.02	
v/s Ratio Perm						0.00						
v/c Ratio		0.25	0.11	0.22		0.05		0.18			0.05	
Uniform Delay, d1		53.0	29.9	53.5		52.9		11.9			26.1	
Progression Factor		1.07	1.77	1.00		1.00		1.00			0.74	
Incremental Delay, d2		0.4	0.1	0.8		0.2		0.2			0.1	
Delay (s)		56.9	52.9	54.3		53.1		12.1			19.5	
Level of Service		E	D	D		D		B			B	
Approach Delay (s)		53.6			53.3			12.1			19.5	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	34.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.16		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.8
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	15	2	10	9	256	26	16	280	27	44	2	16
Future Volume (vph)	15	2	10	9	256	26	16	280	27	44	2	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	12	9	12	11	9	9	12	12	12	12
Total Lost time (s)	4.6	4.6		4.0	4.2	4.2	4.0	4.2			4.0	
Lane Util. Factor	1.00	1.00		1.00	0.95	1.00	1.00	0.95			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00			0.98	
Flpb, ped/bikes	0.93	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	0.99			0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.96	
Satd. Flow (prot)	1407	1400		1509	3353	1410	1509	2966			1611	
Flt Permitted	0.82	1.00		0.95	1.00	1.00	0.95	1.00			0.96	
Satd. Flow (perm)	1209	1400		1509	3353	1410	1509	2966			1611	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	2	10	9	256	26	16	280	27	44	2	16
RTOR Reduction (vph)	0	11	0	0	0	9	0	5	0	0	57	0
Lane Group Flow (vph)	15	1	0	9	256	17	16	302	0	0	5	0
Confl. Peds. (#/hr)	15		1			5			12	1		15
Confl. Bikes (#/hr)									10			1
Turn Type	Perm	Prot		Prot	NA	Perm	Prot	NA		Prot	Prot	
Protected Phases		8		5	2		1	6		7	7	
Permitted Phases	8					2						
Actuated Green, G (s)	4.9	4.9		1.6	50.4	50.4	2.0	50.8			6.4	
Effective Green, g (s)	4.9	4.9		1.1	50.9	50.9	1.5	51.3			5.9	
Actuated g/C Ratio	0.06	0.06		0.01	0.64	0.64	0.02	0.64			0.07	
Clearance Time (s)	4.6	4.6		3.5	4.7	4.7	3.5	4.7			3.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.5	2.5	2.0	2.5			2.0	
Lane Grp Cap (vph)	74	85		20	2133	897	28	1901			118	
v/s Ratio Prot		0.00		0.01	0.08		c0.01	c0.10			c0.00	
v/s Ratio Perm	c0.01					0.01						
v/c Ratio	0.20	0.01		0.45	0.12	0.02	0.57	0.16			0.04	
Uniform Delay, d1	35.7	35.3		39.1	5.7	5.4	38.9	5.7			34.4	
Progression Factor	1.00	1.00		0.99	0.73	1.00	1.00	1.00			1.00	
Incremental Delay, d2	0.5	0.0		5.7	0.1	0.0	16.3	0.2			0.0	
Delay (s)	36.2	35.3		44.4	4.3	5.4	55.2	5.9			34.5	
Level of Service	D	D		D	A	A	E	A			C	
Approach Delay (s)	35.8				5.6			8.4			34.5	
Approach LOS	D				A			A			C	

Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.16		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	4	287	2	2	309
Future Volume (vph)	0	4	287	2	2	309
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	12	9	11
Total Lost time (s)		4.0	4.2		4.0	4.2
Lane Util. Factor		1.00	0.95		1.00	0.95
Frpb, ped/bikes		1.00	1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		0.85	1.00		1.00	1.00
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		1450	3237		1509	3189
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		1450	3237		1509	3189
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	4	287	2	2	309
RTOR Reduction (vph)	0	4	0	0	0	0
Lane Group Flow (vph)	0	0	289	0	2	309
Confl. Peds. (#/hr)	14			10		
Confl. Bikes (#/hr)				18		
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)		5.2	61.5		1.6	66.6
Effective Green, g (s)		4.7	62.0		1.1	67.1
Actuated g/C Ratio		0.06	0.78		0.01	0.84
Clearance Time (s)		3.5	4.7		3.5	4.7
Vehicle Extension (s)		2.0	2.5		2.0	2.5
Lane Grp Cap (vph)		85	2508		20	2674
v/s Ratio Prot			0.09		0.00	c0.10
v/s Ratio Perm		c0.00				
v/c Ratio		0.00	0.12		0.10	0.12
Uniform Delay, d1		35.4	2.2		39.0	1.2
Progression Factor		1.00	0.81		0.78	2.72
Incremental Delay, d2		0.0	0.1		0.8	0.1
Delay (s)		35.4	1.9		31.1	3.2
Level of Service		D	A		C	A
Approach Delay (s)	35.4		1.9			3.4
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	2.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.11		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



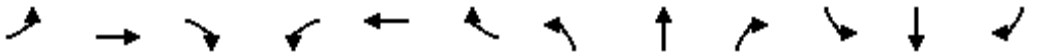
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	2	287	0	0	309
Future Volume (vph)	4	2	287	0	0	309
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	11	12	12	10
Total Lost time (s)	5.1	5.1	4.2			4.2
Lane Util. Factor	1.00	1.00	0.95			0.95
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1732	1550	3241			3129
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1732	1550	3241			3129
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	2	287	0	0	309
RTOR Reduction (vph)	0	2	0	0	0	0
Lane Group Flow (vph)	4	0	287	0	0	309
Confl. Peds. (#/hr)				5		
Confl. Bikes (#/hr)				19		
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	1.8	1.8	28.9			28.9
Effective Green, g (s)	1.3	1.3	29.4			29.4
Actuated g/C Ratio	0.03	0.03	0.73			0.73
Clearance Time (s)	4.6	4.6	4.7			4.7
Vehicle Extension (s)	2.5	2.5	3.0			3.0
Lane Grp Cap (vph)	56	50	2382			2299
v/s Ratio Prot	c0.00		0.09			c0.10
v/s Ratio Perm		0.00				
v/c Ratio	0.07	0.00	0.12			0.13
Uniform Delay, d1	18.8	18.7	1.5			1.6
Progression Factor	1.00	1.00	0.52			2.53
Incremental Delay, d2	0.4	0.0	0.1			0.1
Delay (s)	19.2	18.7	0.9			4.1
Level of Service	B	B	A			A
Approach Delay (s)	19.0		0.9			4.1
Approach LOS	B		A			A

Intersection Summary			
HCM 2000 Control Delay	2.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.13		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	9.3
Intersection Capacity Utilization	26.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	1	286	20	11	302
Future Volume (vph)	2	1	286	20	11	302
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	10	12	9	10
Total Lost time (s)	4.1	4.1	4.2		3.5	4.2
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1732	1550	3094		1509	3129
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1732	1550	3094		1509	3129
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2	1	286	20	11	302
RTOR Reduction (vph)	0	1	2	0	0	0
Lane Group Flow (vph)	2	0	304	0	11	302
Confl. Peds. (#/hr)				4		
Confl. Bikes (#/hr)				20		
Turn Type	Prot	pt+ov	NA		Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases						
Actuated Green, G (s)	1.8	7.2	65.1		1.8	69.9
Effective Green, g (s)	1.3	6.7	65.6		1.3	70.4
Actuated g/C Ratio	0.02	0.08	0.82		0.02	0.88
Clearance Time (s)	3.6		4.7		3.0	4.7
Vehicle Extension (s)	3.6		3.6		2.0	3.6
Lane Grp Cap (vph)	28	129	2537		24	2753
v/s Ratio Prot	c0.00	0.00	c0.10		c0.01	0.10
v/s Ratio Perm						
v/c Ratio	0.07	0.00	0.12		0.46	0.11
Uniform Delay, d1	38.8	33.6	1.4		39.0	0.6
Progression Factor	1.00	1.00	1.00		0.97	0.04
Incremental Delay, d2	1.3	0.0	0.1		5.0	0.1
Delay (s)	40.1	33.6	1.5		42.8	0.1
Level of Service	D	C	A		D	A
Approach Delay (s)	37.9		1.5			1.6
Approach LOS	D		A			A

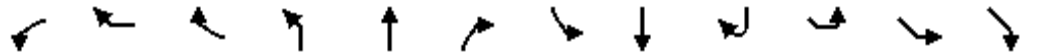
Intersection Summary			
HCM 2000 Control Delay	1.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.13		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.8
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	154	578	26	0	89	0	518	28	0	76	0
Future Volume (vph)	87	154	578	26	0	89	0	518	28	0	76	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	10	12	11	12	9	12	12	11	12
Total Lost time (s)		4.6	4.6	4.6		4.6		4.7			4.6	
Lane Util. Factor		0.95	*0.75	1.00		1.00		0.95			0.95	
Frpb, ped/bikes		1.00	1.00	1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00			1.00	
Frt		1.00	0.85	1.00		0.85		0.99			1.00	
Flt Protected		0.98	1.00	0.95		1.00		1.00			1.00	
Satd. Flow (prot)		3293	2175	1565		1450		2992			3241	
Flt Permitted		0.98	1.00	0.95		1.00		1.00			1.00	
Satd. Flow (perm)		3293	2175	1565		1450		2992			3241	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	87	154	578	26	0	89	0	518	28	0	76	0
RTOR Reduction (vph)	0	0	380	0	0	82	0	2	0	0	0	0
Lane Group Flow (vph)	0	241	198	26	0	7	0	544	0	0	76	0
Confl. Bikes (#/hr)			7						2			2
Turn Type	Split	NA	custom	Prot		Perm		NA			NA	
Protected Phases	4	4	4 5	3				2			6	
Permitted Phases						3						
Actuated Green, G (s)		13.6	42.2	10.0		10.0		63.5			35.6	
Effective Green, g (s)		12.6	41.2	9.5		9.5		63.0			35.1	
Actuated g/C Ratio		0.10	0.34	0.08		0.08		0.52			0.29	
Clearance Time (s)		3.6		4.1		4.1		4.2			4.1	
Vehicle Extension (s)		2.5		2.5		2.5		3.0			3.0	
Lane Grp Cap (vph)		345	746	123		114		1570			947	
v/s Ratio Prot		c0.07	0.09	c0.02				c0.18			0.02	
v/s Ratio Perm						0.00						
v/c Ratio		0.70	0.27	0.21		0.06		0.35			0.08	
Uniform Delay, d1		51.9	28.5	51.7		51.1		16.5			30.8	
Progression Factor		1.00	1.00	1.00		1.00		1.00			0.66	
Incremental Delay, d2		5.6	0.1	0.6		0.2		0.6			0.2	
Delay (s)		57.5	28.6	52.4		51.3		17.2			20.3	
Level of Service		E	C	D		D		B			C	
Approach Delay (s)		37.1			51.5			17.2			20.3	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.8
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	74	4	80	11	449	61	97	565	18	17	1	16
Future Volume (vph)	74	4	80	11	449	61	97	565	18	17	1	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	12	9	12	11	9	9	12	12	12	12
Total Lost time (s)	4.6	4.6		4.0	4.2	4.2	4.0	4.2			4.0	
Lane Util. Factor	1.00	1.00		1.00	0.95	1.00	1.00	0.95			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.94	1.00	1.00			0.85	
Flpb, ped/bikes	0.86	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00			0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.97	
Satd. Flow (prot)	1304	1400		1509	3353	1364	1509	2994			1362	
Flt Permitted	0.73	1.00		0.95	1.00	1.00	0.95	1.00			0.97	
Satd. Flow (perm)	1009	1400		1509	3353	1364	1509	2994			1362	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	74	4	80	11	449	61	97	565	18	17	1	16
RTOR Reduction (vph)	0	71	0	0	0	31	0	2	0	0	32	0
Lane Group Flow (vph)	74	13	0	11	449	30	97	581	0	0	2	0
Confl. Peds. (#/hr)	71		3			25			50	3		71
Confl. Bikes (#/hr)									10			1
Turn Type	Perm	Prot		Prot	NA	Perm	Prot	NA		Prot	Prot	
Protected Phases		8		5	2		1	6		7	7	
Permitted Phases	8					2						
Actuated Green, G (s)	12.0	12.0		1.6	38.5	38.5	8.4	45.3			4.8	
Effective Green, g (s)	12.0	12.0		1.1	39.0	39.0	7.9	45.8			4.3	
Actuated g/C Ratio	0.15	0.15		0.01	0.49	0.49	0.10	0.57			0.05	
Clearance Time (s)	4.6	4.6		3.5	4.7	4.7	3.5	4.7			3.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.5	2.5	2.0	2.5			2.0	
Lane Grp Cap (vph)	151	210		20	1634	664	149	1714			73	
v/s Ratio Prot		0.01		0.01	0.13		c0.06	c0.19			c0.00	
v/s Ratio Perm	c0.07					0.02						
v/c Ratio	0.49	0.06		0.55	0.27	0.04	0.65	0.34			0.03	
Uniform Delay, d1	31.2	29.2		39.2	12.1	10.7	34.7	9.1			35.9	
Progression Factor	1.00	1.00		1.45	0.27	0.26	1.00	1.00			1.00	
Incremental Delay, d2	0.9	0.0		16.9	0.4	0.1	7.5	0.5			0.1	
Delay (s)	32.1	29.2		74.0	3.7	2.9	42.2	9.6			35.9	
Level of Service	C	C		E	A	A	D	A			D	
Approach Delay (s)	30.6				5.1			14.3			35.9	
Approach LOS	C				A			B			D	

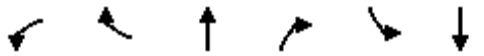
Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	44	46	475	62	46	609
Future Volume (vph)	44	46	475	62	46	609
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	12	9	11
Total Lost time (s)	4.0	4.0	4.2		4.0	4.2
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1621	1450	3163		1509	3189
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1621	1450	3163		1509	3189
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	44	46	475	62	46	609
RTOR Reduction (vph)	0	38	7	0	0	0
Lane Group Flow (vph)	44	8	530	0	46	609
Confl. Peds. (#/hr)	20			17		
Confl. Bikes (#/hr)				18		
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8	2			
Actuated Green, G (s)	14.4	14.4	48.7		5.2	57.4
Effective Green, g (s)	13.9	13.9	49.2		4.7	57.9
Actuated g/C Ratio	0.17	0.17	0.62		0.06	0.72
Clearance Time (s)	3.5	3.5	4.7		3.5	4.7
Vehicle Extension (s)	2.0	2.0	2.5		2.0	2.5
Lane Grp Cap (vph)	281	251	1945		88	2308
v/s Ratio Prot	c0.03		0.17		c0.03	c0.19
v/s Ratio Perm		0.01				
v/c Ratio	0.16	0.03	0.27		0.52	0.26
Uniform Delay, d1	28.1	27.5	7.1		36.6	3.8
Progression Factor	1.00	1.00	0.76		1.32	0.45
Incremental Delay, d2	0.1	0.0	0.3		2.5	0.3
Delay (s)	28.2	27.5	5.8		50.7	2.0
Level of Service	C	C	A		D	A
Approach Delay (s)	27.8		5.8			5.4
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



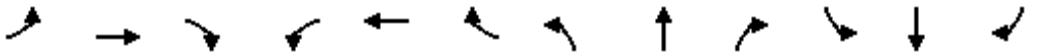
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	67	87	450	0	0	653
Future Volume (vph)	67	87	450	0	0	653
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	11	12	12	10
Total Lost time (s)	5.1	5.1	4.2			4.2
Lane Util. Factor	1.00	1.00	0.95			0.95
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1732	1550	3241			3129
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1732	1550	3241			3129
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	67	87	450	0	0	653
RTOR Reduction (vph)	0	76	0	0	0	0
Lane Group Flow (vph)	67	11	450	0	0	653
Confl. Peds. (#/hr)				11		
Confl. Bikes (#/hr)				19		
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	5.4	5.4	25.3			25.3
Effective Green, g (s)	4.9	4.9	25.8			25.8
Actuated g/C Ratio	0.12	0.12	0.65			0.65
Clearance Time (s)	4.6	4.6	4.7			4.7
Vehicle Extension (s)	2.5	2.5	3.0			3.0
Lane Grp Cap (vph)	212	189	2090			2018
v/s Ratio Prot	c0.04		0.14			c0.21
v/s Ratio Perm		0.01				
v/c Ratio	0.32	0.06	0.22			0.32
Uniform Delay, d1	16.0	15.5	2.9			3.2
Progression Factor	1.00	1.00	0.98			1.00
Incremental Delay, d2	0.6	0.1	0.2			0.4
Delay (s)	16.6	15.6	3.1			3.6
Level of Service	B	B	A			A
Approach Delay (s)	16.1		3.1			3.6
Approach LOS	B		A			A

Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	9.3
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	26	20	430	78	160	560
Future Volume (vph)	26	20	430	78	160	560
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	10	12	9	10
Total Lost time (s)	4.1	4.1	4.2		3.5	4.2
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1732	1550	3042		1509	3129
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1732	1550	3042		1509	3129
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	20	430	78	160	560
RTOR Reduction (vph)	0	14	12	0	0	0
Lane Group Flow (vph)	26	6	496	0	160	560
Confl. Peds. (#/hr)	2			14		
Confl. Bikes (#/hr)				20		
Turn Type	Prot	pt+ov	NA		Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases						
Actuated Green, G (s)	8.6	24.5	47.8		12.3	63.1
Effective Green, g (s)	8.1	24.0	48.3		11.8	63.6
Actuated g/C Ratio	0.10	0.30	0.60		0.15	0.80
Clearance Time (s)	3.6		4.7		3.0	4.7
Vehicle Extension (s)	3.6		3.6		2.0	3.6
Lane Grp Cap (vph)	175	465	1836		222	2487
v/s Ratio Prot	c0.02	0.00	c0.16		c0.11	0.18
v/s Ratio Perm						
v/c Ratio	0.15	0.01	0.27		0.72	0.23
Uniform Delay, d1	32.8	19.7	7.5		32.5	2.0
Progression Factor	1.00	1.00	1.00		1.17	0.80
Incremental Delay, d2	0.5	0.0	0.4		9.1	0.2
Delay (s)	33.3	19.7	7.9		47.1	1.9
Level of Service	C	B	A		D	A
Approach Delay (s)	27.4		7.9			11.9
Approach LOS	C		A			B

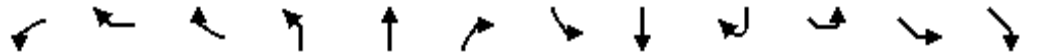
Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.8
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	220	587	57	0	118	0	656	48	0	175	0
Future Volume (vph)	73	220	587	57	0	118	0	656	48	0	175	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	10	12	11	12	9	12	12	11	12
Total Lost time (s)		4.6	4.6	4.6		4.6		4.7			4.6	
Lane Util. Factor		0.95	*0.75	1.00		1.00		0.95			0.95	
Frpb, ped/bikes		1.00	1.00	1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00			1.00	
Frt		1.00	0.85	1.00		0.85		0.99			1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00			1.00	
Satd. Flow (prot)		3312	2175	1565		1450		2984			3241	
Flt Permitted		0.99	1.00	0.95		1.00		1.00			1.00	
Satd. Flow (perm)		3312	2175	1565		1450		2984			3241	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	73	220	587	57	0	118	0	656	48	0	175	0
RTOR Reduction (vph)	0	0	377	0	0	108	0	3	0	0	0	0
Lane Group Flow (vph)	0	293	210	57	0	10	0	701	0	0	175	0
Confl. Bikes (#/hr)			7						2			2
Turn Type	Split	NA	custom	Prot		Perm		NA			NA	
Protected Phases	4	4	4 5	3				2			6	
Permitted Phases						3						
Actuated Green, G (s)		15.3	43.9	10.8		10.8		61.0			33.1	
Effective Green, g (s)		14.3	42.9	10.3		10.3		60.5			32.6	
Actuated g/C Ratio		0.12	0.36	0.09		0.09		0.50			0.27	
Clearance Time (s)		3.6		4.1		4.1		4.2			4.1	
Vehicle Extension (s)		2.5		2.5		2.5		3.0			3.0	
Lane Grp Cap (vph)		394	777	134		124		1504			880	
v/s Ratio Prot		c0.09	0.10	c0.04				c0.23			0.05	
v/s Ratio Perm						0.01						
v/c Ratio		0.74	0.27	0.43		0.08		0.47			0.20	
Uniform Delay, d1		51.1	27.4	52.0		50.5		19.3			33.6	
Progression Factor		1.00	1.00	1.00		1.00		1.00			0.48	
Incremental Delay, d2		7.0	0.1	1.6		0.2		1.0			0.5	
Delay (s)		58.1	27.6	53.6		50.7		20.3			16.5	
Level of Service		E	C	D		D		C			B	
Approach Delay (s)		37.7			51.7			20.3			16.5	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.8
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	82	3	91	17	597	140	120	670	29	16	5	15
Future Volume (vph)	82	3	91	17	597	140	120	670	29	16	5	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	12	9	12	11	9	9	12	12	12	12
Total Lost time (s)	4.6	4.6		4.0	4.2	4.2	4.0	4.2			4.0	
Lane Util. Factor	1.00	1.00		1.00	0.95	1.00	1.00	0.95			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.94	1.00	1.00			0.86	
Flpb, ped/bikes	0.87	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.97	
Satd. Flow (prot)	1307	1400		1509	3353	1368	1509	2985			1398	
Flt Permitted	0.73	1.00		0.95	1.00	1.00	0.95	1.00			0.97	
Satd. Flow (perm)	1009	1400		1509	3353	1368	1509	2985			1398	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	82	3	91	17	597	140	120	670	29	16	5	15
RTOR Reduction (vph)	0	80	0	0	0	73	0	3	0	0	34	0
Lane Group Flow (vph)	82	14	0	17	597	67	120	696	0	0	2	0
Confl. Peds. (#/hr)	70		11			23			52	11		70
Confl. Bikes (#/hr)									10			1
Turn Type	Perm	Prot		Prot	NA	Perm	Prot	NA		Prot	Prot	
Protected Phases		8		5	2		1	6		7	7	
Permitted Phases	8					2						
Actuated Green, G (s)	12.1	12.1		1.6	38.3	38.3	9.5	46.2			4.8	
Effective Green, g (s)	12.1	12.1		1.1	38.8	38.8	9.0	46.7			4.3	
Actuated g/C Ratio	0.15	0.15		0.01	0.48	0.48	0.11	0.58			0.05	
Clearance Time (s)	4.6	4.6		3.5	4.7	4.7	3.5	4.7			3.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.5	2.5	2.0	2.5			2.0	
Lane Grp Cap (vph)	150	209		20	1606	655	167	1720			74	
v/s Ratio Prot		0.01		0.01	0.18		c0.08	c0.23			c0.00	
v/s Ratio Perm	c0.08					0.05						
v/c Ratio	0.55	0.07		0.85	0.37	0.10	0.72	0.40			0.03	
Uniform Delay, d1	31.9	29.6		39.9	13.4	11.6	34.8	9.5			36.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	2.2	0.0		126.4	0.7	0.3	11.6	0.7			0.1	
Delay (s)	34.1	29.7		166.3	14.0	11.9	46.4	10.2			36.4	
Level of Service	C	C		F	B	B	D	B			D	
Approach Delay (s)	31.7				17.1			15.5			36.4	
Approach LOS	C				B			B			D	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	81.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	43	711	121	38	729
Future Volume (vph)	58	43	711	121	38	729
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	12	9	11
Total Lost time (s)	4.0	4.0	4.2		4.0	4.2
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1621	1450	3142		1509	3189
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1621	1450	3142		1509	3189
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	58	43	711	121	38	729
RTOR Reduction (vph)	0	36	10	0	0	0
Lane Group Flow (vph)	58	7	822	0	38	729
Confl. Peds. (#/hr)	24			18		
Confl. Bikes (#/hr)				18		
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8	2			
Actuated Green, G (s)	14.4	14.4	48.9		5.0	57.4
Effective Green, g (s)	13.9	13.9	49.4		4.5	57.9
Actuated g/C Ratio	0.17	0.17	0.62		0.06	0.72
Clearance Time (s)	3.5	3.5	4.7		3.5	4.7
Vehicle Extension (s)	2.0	2.0	2.5		2.0	2.5
Lane Grp Cap (vph)	281	251	1940		84	2308
v/s Ratio Prot	c0.04		c0.26		c0.03	0.23
v/s Ratio Perm		0.01				
v/c Ratio	0.21	0.03	0.42		0.45	0.32
Uniform Delay, d1	28.3	27.4	7.9		36.6	4.0
Progression Factor	1.00	1.00	1.41		1.00	1.00
Incremental Delay, d2	0.1	0.0	0.7		1.4	0.4
Delay (s)	28.5	27.5	11.9		38.0	4.3
Level of Service	C	C	B		D	A
Approach Delay (s)	28.0		11.9			6.0
Approach LOS	C		B			A

Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



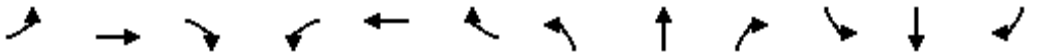
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	64	73	759	0	0	787
Future Volume (vph)	64	73	759	0	0	787
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	11	12	12	10
Total Lost time (s)	5.1	5.1	4.2			4.2
Lane Util. Factor	1.00	1.00	0.95			0.95
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1732	1550	3241			3129
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1732	1550	3241			3129
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	64	73	759	0	0	787
RTOR Reduction (vph)	0	64	0	0	0	0
Lane Group Flow (vph)	64	9	759	0	0	787
Confl. Peds. (#/hr)				15		
Confl. Bikes (#/hr)				19		
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	5.4	5.4	25.3			25.3
Effective Green, g (s)	4.9	4.9	25.8			25.8
Actuated g/C Ratio	0.12	0.12	0.65			0.65
Clearance Time (s)	4.6	4.6	4.7			4.7
Vehicle Extension (s)	2.5	2.5	3.0			3.0
Lane Grp Cap (vph)	212	189	2090			2018
v/s Ratio Prot	c0.04		0.23			c0.25
v/s Ratio Perm		0.01				
v/c Ratio	0.30	0.05	0.36			0.39
Uniform Delay, d1	16.0	15.5	3.3			3.4
Progression Factor	1.00	1.00	1.00			1.20
Incremental Delay, d2	0.6	0.1	0.5			0.6
Delay (s)	16.6	15.6	3.8			4.6
Level of Service	B	B	A			A
Approach Delay (s)	16.0		3.8			4.6
Approach LOS	B		A			A

Intersection Summary			
HCM 2000 Control Delay	5.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	9.3
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	17	18	741	91	87	764
Future Volume (vph)	17	18	741	91	87	764
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	10	12	9	10
Total Lost time (s)	4.1	4.1	4.2		3.5	4.2
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1732	1550	3066		1509	3129
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1732	1550	3066		1509	3129
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	17	18	741	91	87	764
RTOR Reduction (vph)	0	14	7	0	0	0
Lane Group Flow (vph)	17	4	825	0	87	764
Confl. Peds. (#/hr)	2			19		
Confl. Bikes (#/hr)				20		
Turn Type	Prot	pt+ov	NA		Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases						
Actuated Green, G (s)	8.6	20.6	52.3		8.4	63.7
Effective Green, g (s)	8.1	20.1	52.8		7.9	64.2
Actuated g/C Ratio	0.10	0.25	0.66		0.10	0.80
Clearance Time (s)	3.6		4.7		3.0	4.7
Vehicle Extension (s)	3.6		3.6		2.0	3.6
Lane Grp Cap (vph)	174	386	2008		147	2492
v/s Ratio Prot	c0.01	0.00	c0.27		c0.06	0.24
v/s Ratio Perm						
v/c Ratio	0.10	0.01	0.41		0.59	0.31
Uniform Delay, d1	32.9	22.8	6.6		34.8	2.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.0	0.6		4.2	0.3
Delay (s)	33.2	22.8	7.2		39.0	2.5
Level of Service	C	C	A		D	A
Approach Delay (s)	27.9		7.2			6.3
Approach LOS	C		A			A

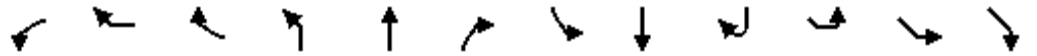
Intersection Summary			
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	80.6	Sum of lost time (s)	11.8
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	229	842	71	0	129	0	789	100	0	176	0
Future Volume (vph)	107	229	842	71	0	129	0	789	100	0	176	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	10	12	11	12	9	12	12	11	12
Total Lost time (s)		4.6	4.6	4.6		4.6		4.7			4.6	
Lane Util. Factor		0.95	*0.75	1.00		1.00		0.95			0.95	
Frpb, ped/bikes		1.00	1.00	1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00			1.00	
Frt		1.00	0.85	1.00		0.85		0.98			1.00	
Flt Protected		0.98	1.00	0.95		1.00		1.00			1.00	
Satd. Flow (prot)		3333	2197	1580		1464		2992			3273	
Flt Permitted		0.98	1.00	0.95		1.00		1.00			1.00	
Satd. Flow (perm)		3333	2197	1580		1464		2992			3273	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	107	229	842	71	0	129	0	789	100	0	176	0
RTOR Reduction (vph)	0	0	534	0	0	117	0	7	0	0	0	0
Lane Group Flow (vph)	0	336	308	71	0	12	0	882	0	0	176	0
Confl. Bikes (#/hr)			7						2			2
Turn Type	Split	NA	custom	Prot		Perm		NA			NA	
Protected Phases	4	4	4 5	3				2			6	
Permitted Phases						3						
Actuated Green, G (s)		16.3	44.9	11.4		11.4		59.4			31.5	
Effective Green, g (s)		15.3	43.9	10.9		10.9		58.9			31.0	
Actuated g/C Ratio		0.13	0.37	0.09		0.09		0.49			0.26	
Clearance Time (s)		3.6		4.1		4.1		4.2			4.1	
Vehicle Extension (s)		2.5		2.5		2.5		3.0			3.0	
Lane Grp Cap (vph)		424	803	143		132		1468			845	
v/s Ratio Prot		c0.10	0.14	c0.04				c0.29			0.05	
v/s Ratio Perm						0.01						
v/c Ratio		0.79	0.38	0.50		0.09		0.60			0.21	
Uniform Delay, d1		50.8	28.1	51.9		50.0		22.1			34.9	
Progression Factor		1.14	3.05	1.00		1.00		0.24			0.44	
Incremental Delay, d2		8.5	0.2	2.0		0.2		1.6			0.6	
Delay (s)		66.5	85.9	53.9		50.2		6.9			16.1	
Level of Service		E	F	D		D		A			B	
Approach Delay (s)		80.4			51.5			6.9			16.1	
Approach LOS		F			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	46.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.8
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	99	3	119	12	738	126	189	865	35	32	3	11
Future Volume (vph)	99	3	119	12	738	126	189	865	35	32	3	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	12	9	12	11	9	9	12	12	12	12
Total Lost time (s)	4.6	4.6		4.0	4.2	4.2	4.0	4.2			4.0	
Lane Util. Factor	1.00	1.00		1.00	0.95	1.00	1.00	0.95			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.93	1.00	0.99			0.90	
Flpb, ped/bikes	0.75	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	0.99			0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.96	
Satd. Flow (prot)	1145	1414		1524	3386	1359	1524	2993			1491	
Flt Permitted	0.73	1.00		0.95	1.00	1.00	0.95	1.00			0.96	
Satd. Flow (perm)	876	1414		1524	3386	1359	1524	2993			1491	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	99	3	119	12	738	126	189	865	35	32	3	11
RTOR Reduction (vph)	0	101	0	0	0	59	0	2	0	0	44	0
Lane Group Flow (vph)	99	21	0	12	738	67	189	898	0	0	2	0
Confl. Peds. (#/hr)	151					22			121			151
Confl. Bikes (#/hr)									10			1
Turn Type	Perm	Prot		Prot	NA	Perm	Prot	NA		Prot	Prot	
Protected Phases		8		5	2		1	6		7	7	
Permitted Phases	8					2						
Actuated Green, G (s)	20.5	20.5		3.2	47.2	47.2	29.6	73.6			6.4	
Effective Green, g (s)	20.5	20.5		2.7	47.7	47.7	29.1	74.1			5.9	
Actuated g/C Ratio	0.17	0.17		0.02	0.40	0.40	0.24	0.62			0.05	
Clearance Time (s)	4.6	4.6		3.5	4.7	4.7	3.5	4.7			3.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.5	2.5	2.0	2.5			2.0	
Lane Grp Cap (vph)	149	241		34	1345	540	369	1848			73	
v/s Ratio Prot		0.01		0.01	c0.22		0.12	c0.30			c0.00	
v/s Ratio Perm	c0.11					0.05						
v/c Ratio	0.66	0.09		0.35	0.55	0.12	0.51	0.49			0.03	
Uniform Delay, d1	46.5	41.9		57.8	27.9	22.9	39.3	12.5			54.3	
Progression Factor	1.00	1.00		0.78	0.67	0.53	0.80	0.60			1.00	
Incremental Delay, d2	8.3	0.1		2.1	1.5	0.4	0.4	0.8			0.1	
Delay (s)	54.9	41.9		47.4	20.2	12.6	31.8	8.2			54.4	
Level of Service	D	D		D	C	B	C	A			D	
Approach Delay (s)	47.7				19.5			12.3			54.4	
Approach LOS	D				B			B			D	

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	99	107	769	177	92	883
Future Volume (vph)	99	107	769	177	92	883
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	12	9	11
Total Lost time (s)	4.0	4.0	4.2		4.0	4.2
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1637	1464	3124		1524	3221
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1637	1464	3124		1524	3221
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	99	107	769	177	92	883
RTOR Reduction (vph)	0	90	11	0	0	0
Lane Group Flow (vph)	99	17	935	0	92	883
Confl. Peds. (#/hr)	41			26		
Confl. Bikes (#/hr)				18		
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8	2			
Actuated Green, G (s)	19.6	19.6	76.8		11.9	92.2
Effective Green, g (s)	19.1	19.1	77.3		11.4	92.7
Actuated g/C Ratio	0.16	0.16	0.64		0.10	0.77
Clearance Time (s)	3.5	3.5	4.7		3.5	4.7
Vehicle Extension (s)	2.0	2.0	2.5		2.0	2.5
Lane Grp Cap (vph)	260	233	2012		144	2488
v/s Ratio Prot	c0.06		c0.30		c0.06	0.27
v/s Ratio Perm		0.01				
v/c Ratio	0.38	0.07	0.46		0.64	0.35
Uniform Delay, d1	45.2	42.9	10.8		52.3	4.3
Progression Factor	1.00	1.00	0.56		0.75	1.67
Incremental Delay, d2	0.3	0.0	0.7		5.9	0.4
Delay (s)	45.5	43.0	6.8		45.0	7.5
Level of Service	D	D	A		D	A
Approach Delay (s)	44.2		6.8			11.1
Approach LOS	D		A			B

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



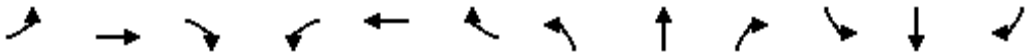
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	155	192	754	0	0	982
Future Volume (vph)	155	192	754	0	0	982
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	11	12	12	10
Total Lost time (s)	5.1	5.1	4.2			4.2
Lane Util. Factor	1.00	1.00	0.95			0.95
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1750	1565	3273			3160
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1750	1565	3273			3160
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	155	192	754	0	0	982
RTOR Reduction (vph)	0	108	0	0	0	0
Lane Group Flow (vph)	155	84	754	0	0	982
Confl. Peds. (#/hr)				35		
Confl. Bikes (#/hr)				19		
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	10.9	10.9	39.8			39.8
Effective Green, g (s)	10.4	10.4	40.3			40.3
Actuated g/C Ratio	0.17	0.17	0.67			0.67
Clearance Time (s)	4.6	4.6	4.7			4.7
Vehicle Extension (s)	2.5	2.5	3.0			3.0
Lane Grp Cap (vph)	303	271	2198			2122
v/s Ratio Prot	c0.09		0.23			c0.31
v/s Ratio Perm		0.05				
v/c Ratio	0.51	0.31	0.34			0.46
Uniform Delay, d1	22.5	21.7	4.2			4.7
Progression Factor	1.00	1.00	1.60			0.76
Incremental Delay, d2	1.1	0.5	0.4			0.7
Delay (s)	23.6	22.1	7.1			4.3
Level of Service	C	C	A			A
Approach Delay (s)	22.8		7.1			4.3
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	8.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.3
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	34	64	690	259	319	818
Future Volume (vph)	34	64	690	259	319	818
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	10	12	9	10
Total Lost time (s)	4.1	4.1	4.2		3.5	4.2
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1750	1565	2963		1524	3160
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1750	1565	2963		1524	3160
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	34	64	690	259	319	818
RTOR Reduction (vph)	0	27	20	0	0	0
Lane Group Flow (vph)	34	37	929	0	319	818
Confl. Peds. (#/hr)	6			47		
Confl. Bikes (#/hr)				20		
Turn Type	Prot	pt+ov	NA		Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases						
Actuated Green, G (s)	10.5	44.0	68.3		29.9	101.2
Effective Green, g (s)	10.0	43.5	68.8		29.4	101.7
Actuated g/C Ratio	0.08	0.36	0.57		0.24	0.85
Clearance Time (s)	3.6		4.7		3.0	4.7
Vehicle Extension (s)	3.6		3.6		2.0	3.6
Lane Grp Cap (vph)	145	567	1698		373	2678
v/s Ratio Prot	c0.02	0.02	c0.31		c0.21	0.26
v/s Ratio Perm						
v/c Ratio	0.23	0.07	0.55		0.86	0.31
Uniform Delay, d1	51.4	25.0	15.9		43.3	1.9
Progression Factor	1.00	1.00	1.00		1.03	0.66
Incremental Delay, d2	1.0	0.1	1.3		15.4	0.3
Delay (s)	52.4	25.0	17.2		60.0	1.5
Level of Service	D	C	B		E	A
Approach Delay (s)	34.5		17.2			17.9
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.8
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	265	812	91	0	193	0	860	95	0	219	0
Future Volume (vph)	118	265	812	91	0	193	0	860	95	0	219	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	10	12	11	12	9	12	12	11	12
Total Lost time (s)		4.6	4.6	4.6		4.6		4.7			4.6	
Lane Util. Factor		0.95	*0.75	1.00		1.00		0.95			0.95	
Frpb, ped/bikes		1.00	1.00	1.00		1.00		1.00			1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00			1.00	
Frt		1.00	0.85	1.00		0.85		0.99			1.00	
Flt Protected		0.98	1.00	0.95		1.00		1.00			1.00	
Satd. Flow (prot)		3335	2197	1580		1464		2998			3273	
Flt Permitted		0.98	1.00	0.95		1.00		1.00			1.00	
Satd. Flow (perm)		3335	2197	1580		1464		2998			3273	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	118	265	812	91	0	193	0	860	95	0	219	0
RTOR Reduction (vph)	0	0	507	0	0	174	0	6	0	0	0	0
Lane Group Flow (vph)	0	383	305	91	0	19	0	949	0	0	219	0
Confl. Bikes (#/hr)			7						2			2
Turn Type	Split	NA	custom	Prot		Perm		NA			NA	
Protected Phases	4	4	4 5	3				2			6	
Permitted Phases						3						
Actuated Green, G (s)		17.5	46.1	12.3		12.3		57.3			29.4	
Effective Green, g (s)		16.5	45.1	11.8		11.8		56.8			28.9	
Actuated g/C Ratio		0.14	0.38	0.10		0.10		0.47			0.24	
Clearance Time (s)		3.6		4.1		4.1		4.2			4.1	
Vehicle Extension (s)		2.5		2.5		2.5		3.0			3.0	
Lane Grp Cap (vph)		458	825	155		143		1419			788	
v/s Ratio Prot		c0.11	0.14	c0.06				c0.32			0.07	
v/s Ratio Perm						0.01						
v/c Ratio		0.84	0.37	0.59		0.13		0.67			0.28	
Uniform Delay, d1		50.4	27.1	51.8		49.4		24.4			37.1	
Progression Factor		1.07	2.94	1.00		1.00		1.00			0.42	
Incremental Delay, d2		11.0	0.2	4.6		0.3		2.5			0.9	
Delay (s)		65.1	80.0	56.4		49.7		26.9			16.3	
Level of Service		E	E	E		D		C			B	
Approach Delay (s)		75.2			51.9			26.9			16.3	
Approach LOS		E			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	50.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.8
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	100	3	185	32	736	108	216	865	41	34	3	46
Future Volume (vph)	100	3	185	32	736	108	216	865	41	34	3	46
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	12	9	12	11	9	9	12	12	12	12
Total Lost time (s)	4.6	4.6		4.0	4.2	4.2	4.0	4.2			4.0	
Lane Util. Factor	1.00	1.00		1.00	0.95	1.00	1.00	0.95			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.94	1.00	0.98			0.75	
Flpb, ped/bikes	0.72	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	0.99			0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (prot)	1101	1414		1524	3386	1378	1524	2977			1205	
Flt Permitted	0.70	1.00		0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (perm)	815	1414		1524	3386	1378	1524	2977			1205	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	3	185	32	736	108	216	865	41	34	3	46
RTOR Reduction (vph)	0	156	0	0	0	60	0	2	0	0	79	0
Lane Group Flow (vph)	100	32	0	32	736	48	216	904	0	0	4	0
Confl. Peds. (#/hr)	190					18			158			190
Confl. Bikes (#/hr)									10			1
Turn Type	Perm	Prot		Prot	NA	Perm	Prot	NA		Prot	Prot	
Protected Phases		8		5	2		1	6		7	7	
Permitted Phases	8					2						
Actuated Green, G (s)	17.5	17.5		5.1	41.0	41.0	28.8	64.7			6.4	
Effective Green, g (s)	17.5	17.5		4.6	41.5	41.5	28.3	65.2			5.9	
Actuated g/C Ratio	0.16	0.16		0.04	0.38	0.38	0.26	0.59			0.05	
Clearance Time (s)	4.6	4.6		3.5	4.7	4.7	3.5	4.7			3.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.5	2.5	2.0	2.5			2.0	
Lane Grp Cap (vph)	129	224		63	1277	519	392	1764			64	
v/s Ratio Prot		0.02		0.02	c0.22		0.14	c0.30			c0.00	
v/s Ratio Perm	c0.12					0.03						
v/c Ratio	0.78	0.14		0.51	0.58	0.09	0.55	0.51			0.07	
Uniform Delay, d1	44.4	39.8		51.6	27.3	22.1	35.4	13.1			49.4	
Progression Factor	1.00	1.00		0.69	0.67	0.83	1.00	1.00			1.00	
Incremental Delay, d2	22.8	0.1		2.2	1.8	0.3	1.0	1.1			0.2	
Delay (s)	67.1	39.9		37.6	19.9	18.6	36.3	14.2			49.6	
Level of Service	E	D		D	B	B	D	B			D	
Approach Delay (s)	49.4				20.4			18.4			49.6	
Approach LOS	D				C			B			D	

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	123	141	735	129	84	927
Future Volume (vph)	123	141	735	129	84	927
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	12	9	11
Total Lost time (s)	4.0	4.0	4.2		4.0	4.2
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1637	1464	3128		1524	3221
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1637	1464	3128		1524	3221
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	123	141	735	129	84	927
RTOR Reduction (vph)	0	116	8	0	0	0
Lane Group Flow (vph)	123	25	856	0	84	927
Confl. Peds. (#/hr)	65			52		
Confl. Bikes (#/hr)				18		
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8	2			
Actuated Green, G (s)	19.7	19.7	69.3		9.3	82.1
Effective Green, g (s)	19.2	19.2	69.8		8.8	82.6
Actuated g/C Ratio	0.17	0.17	0.63		0.08	0.75
Clearance Time (s)	3.5	3.5	4.7		3.5	4.7
Vehicle Extension (s)	2.0	2.0	2.5		2.0	2.5
Lane Grp Cap (vph)	285	255	1984		121	2418
v/s Ratio Prot	c0.08		c0.27		c0.06	0.29
v/s Ratio Perm		0.02				
v/c Ratio	0.43	0.10	0.43		0.69	0.38
Uniform Delay, d1	40.5	38.1	10.1		49.3	4.8
Progression Factor	1.00	1.00	0.48		0.73	2.54
Incremental Delay, d2	0.4	0.1	0.7		11.5	0.4
Delay (s)	40.9	38.2	5.5		47.4	12.6
Level of Service	D	D	A		D	B
Approach Delay (s)	39.5		5.5			15.5
Approach LOS	D		A			B

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	175	209	655	0	0	1050
Future Volume (vph)	175	209	655	0	0	1050
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	11	12	12	10
Total Lost time (s)	5.1	5.1	4.2			4.2
Lane Util. Factor	1.00	1.00	0.95			0.95
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1750	1565	3273			3160
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1750	1565	3273			3160
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	175	209	655	0	0	1050
RTOR Reduction (vph)	0	72	0	0	0	0
Lane Group Flow (vph)	175	137	655	0	0	1050
Confl. Peds. (#/hr)				28		
Confl. Bikes (#/hr)				19		
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	11.1	11.1	34.6			34.6
Effective Green, g (s)	10.6	10.6	35.1			35.1
Actuated g/C Ratio	0.19	0.19	0.64			0.64
Clearance Time (s)	4.6	4.6	4.7			4.7
Vehicle Extension (s)	2.5	2.5	3.0			3.0
Lane Grp Cap (vph)	337	301	2088			2016
v/s Ratio Prot	c0.10		0.20			c0.33
v/s Ratio Perm		0.09				
v/c Ratio	0.52	0.46	0.31			0.52
Uniform Delay, d1	19.9	19.6	4.5			5.4
Progression Factor	1.00	1.00	1.42			0.77
Incremental Delay, d2	1.0	0.8	0.4			0.9
Delay (s)	20.9	20.4	6.8			5.1
Level of Service	C	C	A			A
Approach Delay (s)	20.7		6.8			5.1
Approach LOS	C		A			A

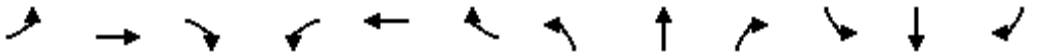
Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	9.3
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	49	43	612	190	230	995
Future Volume (vph)	49	43	612	190	230	995
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	10	12	9	10
Total Lost time (s)	4.1	4.1	4.2		3.5	4.2
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1750	1565	3008		1524	3160
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1750	1565	3008		1524	3160
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	49	43	612	190	230	995
RTOR Reduction (vph)	0	29	14	0	0	0
Lane Group Flow (vph)	49	14	788	0	230	995
Confl. Peds. (#/hr)	9			30		
Confl. Bikes (#/hr)				20		
Turn Type	Prot	pt+ov	NA		Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases						
Actuated Green, G (s)	10.7	35.6	66.7		21.3	91.0
Effective Green, g (s)	10.2	35.1	67.2		20.8	91.5
Actuated g/C Ratio	0.09	0.32	0.61		0.19	0.83
Clearance Time (s)	3.6		4.7		3.0	4.7
Vehicle Extension (s)	3.6		3.6		2.0	3.6
Lane Grp Cap (vph)	162	499	1837		288	2628
v/s Ratio Prot	c0.03	0.01	c0.26		c0.15	0.31
v/s Ratio Perm						
v/c Ratio	0.30	0.03	0.43		0.80	0.38
Uniform Delay, d1	46.6	25.7	11.3		42.6	2.3
Progression Factor	1.00	1.00	1.00		0.95	1.21
Incremental Delay, d2	1.3	0.0	0.7		12.1	0.4
Delay (s)	47.9	25.8	12.0		52.7	3.1
Level of Service	D	C	B		D	A
Approach Delay (s)	37.5		12.0			12.4
Approach LOS	D		B			B

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.8
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

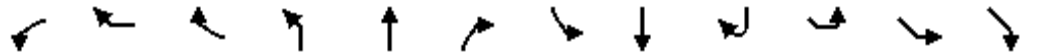
Appendix G-2:
Scenario 2 HCM 2000 Intersection Results



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	30	245	21	0	73	0	287	23	0	57	0
Future Volume (vph)	25	30	245	21	0	73	0	287	23	0	57	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	10	12	9	12	9	12	12	10	12
Total Lost time (s)		4.6	4.6	4.6		4.6		4.7	4.2		4.5	
Lane Util. Factor		0.95	*0.75	1.00		1.00		1.00	1.00		0.95	
Frpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	0.99		1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.98	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		3278	2175	1565		1350		1588	1481		3129	
Flt Permitted		0.98	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (perm)		3278	2175	1565		1350		1588	1481		3129	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	30	245	21	0	73	0	287	23	0	57	0
RTOR Reduction (vph)	0	0	0	0	0	68	0	0	11	0	0	0
Lane Group Flow (vph)	0	55	245	21	0	5	0	287	12	0	57	0
Confl. Bikes (#/hr)			7						2			2
Turn Type	Split	NA	custom	Prot		Perm		NA	Perm		NA	
Protected Phases	4	4	4 5	3				2			6	
Permitted Phases						3			2			
Actuated Green, G (s)		16.8	29.4	8.0		8.0		62.3	62.3		50.5	
Effective Green, g (s)		15.8	28.4	7.5		7.5		61.8	62.3		50.0	
Actuated g/C Ratio		0.13	0.24	0.06		0.06		0.51	0.52		0.42	
Clearance Time (s)		3.6		4.1		4.1		4.2	4.2		4.0	
Vehicle Extension (s)		2.5		2.5		2.5		3.0	3.0		3.0	
Lane Grp Cap (vph)		431	514	97		84		817	768		1303	
v/s Ratio Prot		0.02	c0.11	c0.01				c0.18			0.02	
v/s Ratio Perm						0.00			0.01			
v/c Ratio		0.13	0.48	0.22		0.05		0.35	0.02		0.04	
Uniform Delay, d1		46.0	39.4	53.5		52.9		17.2	14.0		20.8	
Progression Factor		0.94	0.96	1.00		1.00		1.00	1.00		0.67	
Incremental Delay, d2		0.1	0.5	0.8		0.2		1.2	0.0		0.1	
Delay (s)		43.5	38.2	54.3		53.1		18.4	14.0		14.0	
Level of Service		D	D	D		D		B	B		B	
Approach Delay (s)		39.1			53.4			18.1			14.0	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	30.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.7
Intersection Capacity Utilization	43.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	15	2	10	9	256	26	16	280	27	44	2	16
Future Volume (vph)	15	2	10	9	256	26	16	280	27	44	2	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	11	12	9	9	11	9	10	12	12	12	12
Total Lost time (s)	4.6	4.6		4.0	5.2	5.2	4.0	5.2	4.7		4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.96		0.97	
Flpb, ped/bikes	0.89	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.96	
Satd. Flow (prot)	1339	1450		1509	1588	1426	1509	1647	1433		1590	
Flt Permitted	0.82	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.96	
Satd. Flow (perm)	1151	1450		1509	1588	1426	1509	1647	1433		1590	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	2	10	9	256	26	16	280	27	44	2	16
RTOR Reduction (vph)	0	11	0	0	0	10	0	0	10	0	57	0
Lane Group Flow (vph)	15	1	0	9	256	16	16	280	17	0	5	0
Confl. Peds. (#/hr)	15		1			5			12	1		15
Confl. Bikes (#/hr)									10			1
Turn Type	Perm	Prot		Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	
Protected Phases		8		5	2		1	6		7	7	
Permitted Phases	8					2			6			
Actuated Green, G (s)	4.9	4.9		1.6	50.4	50.4	2.0	50.8	50.8		6.4	
Effective Green, g (s)	4.9	4.9		1.1	49.9	49.9	1.5	50.3	50.8		5.9	
Actuated g/C Ratio	0.06	0.06		0.01	0.62	0.62	0.02	0.63	0.63		0.07	
Clearance Time (s)	4.6	4.6		3.5	4.7	4.7	3.5	4.7	4.7		3.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.5	2.5	2.0	2.5	2.5		2.0	
Lane Grp Cap (vph)	70	88		20	990	889	28	1035	909		117	
v/s Ratio Prot		0.00		0.01	0.16		c0.01	c0.17			c0.00	
v/s Ratio Perm	c0.01					0.01			0.01			
v/c Ratio	0.21	0.01		0.45	0.26	0.02	0.57	0.27	0.02		0.04	
Uniform Delay, d1	35.7	35.3		39.1	6.8	5.7	38.9	6.6	5.4		34.4	
Progression Factor	1.00	1.00		1.35	0.25	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.6	0.0		5.7	0.6	0.0	16.3	0.6	0.0		0.1	
Delay (s)	36.3	35.3		58.7	2.3	5.8	55.2	7.3	5.4		34.5	
Level of Service	D	D		E	A	A	E	A	A		C	
Approach Delay (s)	35.8				4.4			9.5			34.5	
Approach LOS	D				A			A			C	

Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.8
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	4	287	2	2	309
Future Volume (vph)	0	4	287	2	2	309
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	9	10
Total Lost time (s)		4.0	5.2	4.7	4.0	5.2
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	1.00	0.95	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1400	1647	1432	1509	1594
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1400	1647	1432	1509	1594
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	4	287	2	2	309
RTOR Reduction (vph)	0	4	0	0	0	0
Lane Group Flow (vph)	0	0	287	2	2	309
Confl. Peds. (#/hr)	14			10		
Confl. Bikes (#/hr)				18		
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)		5.2	61.5	61.5	1.6	66.6
Effective Green, g (s)		4.7	61.0	61.5	1.1	66.1
Actuated g/C Ratio		0.06	0.76	0.77	0.01	0.83
Clearance Time (s)		3.5	4.7	4.7	3.5	4.7
Vehicle Extension (s)		2.0	2.5	2.5	2.0	2.5
Lane Grp Cap (vph)		82	1255	1100	20	1317
v/s Ratio Prot			0.17		0.00	c0.19
v/s Ratio Perm		c0.00		0.00		
v/c Ratio		0.00	0.23	0.00	0.10	0.23
Uniform Delay, d1		35.4	2.7	2.1	39.0	1.5
Progression Factor		1.00	0.79	1.00	1.13	0.54
Incremental Delay, d2		0.0	0.4	0.0	0.8	0.4
Delay (s)		35.4	2.6	2.1	44.8	1.2
Level of Service		D	A	A	D	A
Approach Delay (s)	35.4		2.6			1.5
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	2.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



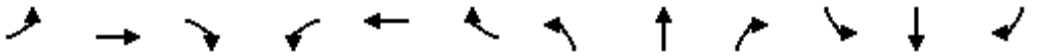
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	2	287	0	0	309
Future Volume (vph)	4	2	287	0	0	309
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	10	12	12	9
Total Lost time (s)	5.1	5.1	5.2			5.2
Lane Util. Factor	1.00	1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1732	1550	1647			1588
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1732	1550	1647			1588
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	2	287	0	0	309
RTOR Reduction (vph)	0	2	0	0	0	0
Lane Group Flow (vph)	4	0	287	0	0	309
Confl. Peds. (#/hr)				5		
Confl. Bikes (#/hr)				19		
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	1.8	1.8	28.9			28.9
Effective Green, g (s)	1.3	1.3	28.4			28.4
Actuated g/C Ratio	0.03	0.03	0.71			0.71
Clearance Time (s)	4.6	4.6	4.7			4.7
Vehicle Extension (s)	2.5	2.5	3.0			3.0
Lane Grp Cap (vph)	56	50	1169			1127
v/s Ratio Prot	c0.00		0.17			c0.19
v/s Ratio Perm		0.00				
v/c Ratio	0.07	0.00	0.25			0.27
Uniform Delay, d1	18.8	18.7	2.0			2.1
Progression Factor	1.00	1.00	0.51			0.63
Incremental Delay, d2	0.4	0.0	0.5			0.6
Delay (s)	19.2	18.7	1.5			1.9
Level of Service	B	B	A			A
Approach Delay (s)	19.0		1.5			1.9
Approach LOS	B		A			A

Intersection Summary			
HCM 2000 Control Delay	1.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	1	286	20	11	302
Future Volume (vph)	2	1	286	20	11	302
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	12	10	12	9	10
Total Lost time (s)	4.1	4.1	5.2		3.5	5.2
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1732	1500	1630		1509	1647
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1732	1500	1630		1509	1647
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2	1	286	20	11	302
RTOR Reduction (vph)	0	1	1	0	0	0
Lane Group Flow (vph)	2	0	305	0	11	302
Confl. Peds. (#/hr)				4		
Confl. Bikes (#/hr)				20		
Turn Type	Prot	pt+ov	NA		Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases						
Actuated Green, G (s)	1.8	7.2	65.1		1.8	69.9
Effective Green, g (s)	1.3	6.7	64.6		1.3	69.4
Actuated g/C Ratio	0.02	0.08	0.81		0.02	0.87
Clearance Time (s)	3.6		4.7		3.0	4.7
Vehicle Extension (s)	3.6		3.6		2.0	3.6
Lane Grp Cap (vph)	28	125	1316		24	1428
v/s Ratio Prot	c0.00	0.00	c0.19		c0.01	0.18
v/s Ratio Perm						
v/c Ratio	0.07	0.00	0.23		0.46	0.21
Uniform Delay, d1	38.8	33.6	1.8		39.0	0.9
Progression Factor	1.00	1.00	1.00		1.00	0.04
Incremental Delay, d2	1.3	0.0	0.4		4.9	0.3
Delay (s)	40.1	33.6	2.2		43.8	0.4
Level of Service	D	C	A		D	A
Approach Delay (s)	37.9		2.2			1.9
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	2.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	154	578	26	0	89	0	518	28	0	76	0
Future Volume (vph)	87	154	578	26	0	89	0	518	28	0	76	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	10	12	9	12	9	12	12	10	12
Total Lost time (s)		4.6	4.6	4.6		4.6		4.7	4.2		4.5	
Lane Util. Factor		0.95	*0.75	1.00		1.00		1.00	1.00		0.95	
Frpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	0.99		1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.98	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		3293	2175	1565		1350		1588	1480		3129	
Flt Permitted		0.98	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (perm)		3293	2175	1565		1350		1588	1480		3129	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	87	154	578	26	0	89	0	518	28	0	76	0
RTOR Reduction (vph)	0	0	0	0	0	82	0	0	18	0	0	0
Lane Group Flow (vph)	0	241	578	26	0	7	0	518	10	0	76	0
Confl. Bikes (#/hr)			7						2			2
Turn Type	Split	NA	custom	Prot		Perm		NA	Perm		NA	
Protected Phases	4	4	4 5	3				2			6	
Permitted Phases						3			2			
Actuated Green, G (s)		32.4	40.0	10.1		10.1		44.6	44.6		37.8	
Effective Green, g (s)		31.4	39.0	9.6		9.6		44.1	44.6		37.3	
Actuated g/C Ratio		0.26	0.32	0.08		0.08		0.37	0.37		0.31	
Clearance Time (s)		3.6		4.1		4.1		4.2	4.2		4.0	
Vehicle Extension (s)		2.5		2.5		2.5		3.0	3.0		3.0	
Lane Grp Cap (vph)		861	706	125		108		583	550		972	
v/s Ratio Prot		0.07	c0.27	c0.02				c0.33			0.02	
v/s Ratio Perm						0.01			0.01			
v/c Ratio		0.28	0.82	0.21		0.07		0.89	0.02		0.08	
Uniform Delay, d1		35.3	37.2	51.6		51.1		35.6	23.9		29.2	
Progression Factor		0.91	0.91	1.00		1.00		1.00	1.00		0.48	
Incremental Delay, d2		0.1	6.9	0.6		0.2		18.1	0.1		0.2	
Delay (s)		32.2	40.7	52.2		51.2		53.7	23.9		14.2	
Level of Service		C	D	D		D		D	C		B	
Approach Delay (s)		38.2			51.5			52.2			14.2	
Approach LOS		D			D			D			B	

Intersection Summary			
HCM 2000 Control Delay	42.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.7
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	74	4	80	11	449	61	97	565	18	17	1	16
Future Volume (vph)	74	4	80	11	449	61	97	565	18	17	1	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	11	12	9	9	11	9	10	12	12	12	12
Total Lost time (s)	4.6	4.6		4.0	5.2	5.2	4.0	5.2	4.7		4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.90		0.74	
Flpb, ped/bikes	0.77	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85		0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1168	1450		1509	1588	1398	1509	1647	1343		1197	
Flt Permitted	0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.97	
Satd. Flow (perm)	904	1450		1509	1588	1398	1509	1647	1343		1197	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	74	4	80	11	449	61	97	565	18	17	1	16
RTOR Reduction (vph)	0	71	0	0	0	32	0	0	8	0	32	0
Lane Group Flow (vph)	74	13	0	11	449	29	97	565	10	0	2	0
Confl. Peds. (#/hr)	71		3			25			50	3		71
Confl. Bikes (#/hr)									10			1
Turn Type	Perm	Prot		Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	
Protected Phases		8		5	2		1	6		7	7	
Permitted Phases	8					2			6			
Actuated Green, G (s)	12.0	12.0		1.6	38.9	38.9	8.0	45.3	45.3		4.8	
Effective Green, g (s)	12.0	12.0		1.1	38.4	38.4	7.5	44.8	45.3		4.3	
Actuated g/C Ratio	0.15	0.15		0.01	0.48	0.48	0.09	0.56	0.57		0.05	
Clearance Time (s)	4.6	4.6		3.5	4.7	4.7	3.5	4.7	4.7		3.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.5	2.5	2.0	2.5	2.5		2.0	
Lane Grp Cap (vph)	135	217		20	762	671	141	922	760		64	
v/s Ratio Prot		0.01		0.01	0.28		c0.06	c0.34			c0.00	
v/s Ratio Perm	c0.08					0.02			0.01			
v/c Ratio	0.55	0.06		0.55	0.59	0.04	0.69	0.61	0.01		0.03	
Uniform Delay, d1	31.5	29.2		39.2	15.1	11.0	35.1	11.8	7.6		35.9	
Progression Factor	1.00	1.00		1.38	0.48	2.13	1.00	1.00	1.00		1.00	
Incremental Delay, d2	2.4	0.0		16.0	3.1	0.1	10.6	3.0	0.0		0.1	
Delay (s)	33.9	29.2		70.0	10.4	23.6	45.7	14.8	7.6		35.9	
Level of Service	C	C		E	B	C	D	B	A		D	
Approach Delay (s)	31.4				13.2			19.0			35.9	
Approach LOS	C				B			B			D	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.8
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	44	46	475	62	46	609
Future Volume (vph)	44	46	475	62	46	609
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	9	10
Total Lost time (s)	4.0	4.0	5.2	4.7	4.0	5.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.94	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1565	1400	1647	1411	1509	1594
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1565	1400	1647	1411	1509	1594
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	44	46	475	62	46	609
RTOR Reduction (vph)	0	38	0	19	0	0
Lane Group Flow (vph)	44	8	475	43	46	609
Confl. Peds. (#/hr)	20			17		
Confl. Bikes (#/hr)				18		
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8	2	2		
Actuated Green, G (s)	14.4	14.4	48.9	48.9	5.0	57.4
Effective Green, g (s)	13.9	13.9	48.4	48.9	4.5	56.9
Actuated g/C Ratio	0.17	0.17	0.60	0.61	0.06	0.71
Clearance Time (s)	3.5	3.5	4.7	4.7	3.5	4.7
Vehicle Extension (s)	2.0	2.0	2.5	2.5	2.0	2.5
Lane Grp Cap (vph)	271	243	996	862	84	1133
v/s Ratio Prot	c0.03		0.29		0.03	c0.38
v/s Ratio Perm		0.01		0.03		
v/c Ratio	0.16	0.03	0.48	0.05	0.55	0.54
Uniform Delay, d1	28.1	27.5	8.8	6.2	36.8	5.4
Progression Factor	1.00	1.00	0.71	0.73	1.20	0.82
Incremental Delay, d2	0.1	0.0	1.6	0.1	3.4	1.6
Delay (s)	28.2	27.5	7.8	4.7	47.5	6.0
Level of Service	C	C	A	A	D	A
Approach Delay (s)	27.8		7.5			8.9
Approach LOS	C		A			A

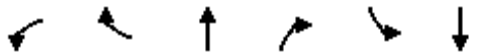
Intersection Summary			
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



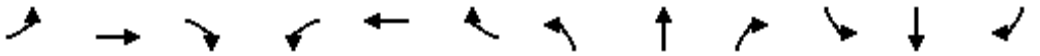
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	67	87	450	0	0	653
Future Volume (vph)	67	87	450	0	0	653
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	10	12	12	9
Total Lost time (s)	5.1	5.1	5.2			5.2
Lane Util. Factor	1.00	1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1732	1550	1647			1588
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1732	1550	1647			1588
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	67	87	450	0	0	653
RTOR Reduction (vph)	0	76	0	0	0	0
Lane Group Flow (vph)	67	11	450	0	0	653
Confl. Peds. (#/hr)				11		
Confl. Bikes (#/hr)				19		
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	5.4	5.4	25.3			25.3
Effective Green, g (s)	4.9	4.9	24.8			24.8
Actuated g/C Ratio	0.12	0.12	0.62			0.62
Clearance Time (s)	4.6	4.6	4.7			4.7
Vehicle Extension (s)	2.5	2.5	3.0			3.0
Lane Grp Cap (vph)	212	189	1021			984
v/s Ratio Prot	c0.04		0.27			c0.41
v/s Ratio Perm		0.01				
v/c Ratio	0.32	0.06	0.44			0.66
Uniform Delay, d1	16.0	15.5	4.0			4.9
Progression Factor	1.00	1.00	1.46			1.15
Incremental Delay, d2	0.6	0.1	1.2			3.1
Delay (s)	16.6	15.6	7.0			8.8
Level of Service	B	B	A			A
Approach Delay (s)	16.1		7.0			8.8
Approach LOS	B		A			A

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	26	20	430	78	160	560
Future Volume (vph)	26	20	430	78	160	560
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	12	10	12	9	10
Total Lost time (s)	4.1	4.1	5.2		3.5	5.2
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1732	1500	1605		1509	1647
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1732	1500	1605		1509	1647
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	20	430	78	160	560
RTOR Reduction (vph)	0	14	5	0	0	0
Lane Group Flow (vph)	26	6	503	0	160	560
Confl. Peds. (#/hr)	2			14		
Confl. Bikes (#/hr)				20		
Turn Type	Prot	pt+ov	NA		Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases						
Actuated Green, G (s)	8.6	24.5	47.8		12.3	63.1
Effective Green, g (s)	8.1	24.0	47.3		11.8	62.6
Actuated g/C Ratio	0.10	0.30	0.59		0.15	0.78
Clearance Time (s)	3.6		4.7		3.0	4.7
Vehicle Extension (s)	3.6		3.6		2.0	3.6
Lane Grp Cap (vph)	175	450	948		222	1288
v/s Ratio Prot	c0.02	0.00	c0.31		c0.11	0.34
v/s Ratio Perm						
v/c Ratio	0.15	0.01	0.53		0.72	0.43
Uniform Delay, d1	32.8	19.7	9.7		32.5	2.9
Progression Factor	1.00	1.00	1.00		0.95	0.63
Incremental Delay, d2	0.5	0.0	2.1		8.1	0.9
Delay (s)	33.3	19.7	11.9		39.0	2.7
Level of Service	C	B	B		D	A
Approach Delay (s)	27.4		11.9			10.8
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	220	587	57	0	118	0	656	48	0	175	0
Future Volume (vph)	73	220	587	57	0	118	0	656	48	0	175	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	10	12	9	12	9	12	12	10	12
Total Lost time (s)		4.6	4.6	4.6		4.6		4.7	4.2		4.6	
Lane Util. Factor		0.95	*0.75	1.00		1.00		1.00	1.00		0.95	
Frpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	0.99		1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		3312	2175	1565		1350		1588	1480		3129	
Flt Permitted		0.99	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (perm)		3312	2175	1565		1350		1588	1480		3129	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	73	220	587	57	0	118	0	656	48	0	175	0
RTOR Reduction (vph)	0	0	0	0	0	108	0	0	27	0	0	0
Lane Group Flow (vph)	0	293	587	57	0	10	0	656	21	0	175	0
Confl. Bikes (#/hr)			7						2			2
Turn Type	Split	NA	custom	Prot		Perm		NA	Perm		NA	
Protected Phases	4	4	4 5	3				2			6	
Permitted Phases						3			2			
Actuated Green, G (s)		24.0	44.6	10.8		10.8		52.3	52.3		32.4	
Effective Green, g (s)		23.0	43.6	10.3		10.3		51.8	52.3		31.9	
Actuated g/C Ratio		0.19	0.36	0.09		0.09		0.43	0.44		0.27	
Clearance Time (s)		3.6		4.1		4.1		4.2	4.2		4.1	
Vehicle Extension (s)		2.5		2.5		2.5		3.0	3.0		3.0	
Lane Grp Cap (vph)		634	790	134		115		685	645		831	
v/s Ratio Prot		0.09	c0.27	c0.04				c0.41			0.06	
v/s Ratio Perm						0.01			0.01			
v/c Ratio		0.46	0.74	0.43		0.09		0.96	0.03		0.21	
Uniform Delay, d1		43.0	33.3	52.0		50.5		33.0	19.4		34.3	
Progression Factor		1.01	0.90	1.00		1.00		1.00	1.00		0.32	
Incremental Delay, d2		0.4	3.4	1.6		0.2		25.4	0.1		0.6	
Delay (s)		43.8	33.5	53.6		50.8		58.5	19.5		11.7	
Level of Service		D	C	D		D		E	B		B	
Approach Delay (s)		36.9			51.7			55.8			11.7	
Approach LOS		D			D			E			B	

Intersection Summary			
HCM 2000 Control Delay	42.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.8
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	82	3	91	17	597	140	120	670	29	16	5	15
Future Volume (vph)	82	3	91	17	597	140	120	670	29	16	5	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	11	12	9	9	11	9	10	12	12	12	12
Total Lost time (s)	4.6	4.6		4.0	4.2	4.2	4.0	4.2	4.7		4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.89		0.77	
Flpb, ped/bikes	0.78	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85		0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1177	1450		1509	1588	1401	1509	1647	1339		1252	
Flt Permitted	0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.97	
Satd. Flow (perm)	909	1450		1509	1588	1401	1509	1647	1339		1252	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	82	3	91	17	597	140	120	670	29	16	5	15
RTOR Reduction (vph)	0	80	0	0	0	61	0	0	13	0	34	0
Lane Group Flow (vph)	82	14	0	17	597	79	120	670	16	0	2	0
Confl. Peds. (#/hr)	70		11			23			52	11		70
Confl. Bikes (#/hr)									10			1
Turn Type	Perm	Prot		Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	
Protected Phases		8		5	2		1	6		7	7	
Permitted Phases	8					2			6			
Actuated Green, G (s)	12.1	12.1		1.6	37.5	37.5	9.3	45.2	45.2		4.8	
Effective Green, g (s)	12.1	12.1		1.1	38.0	38.0	8.8	45.7	45.2		4.3	
Actuated g/C Ratio	0.15	0.15		0.01	0.48	0.48	0.11	0.57	0.57		0.05	
Clearance Time (s)	4.6	4.6		3.5	4.7	4.7	3.5	4.7	4.7		3.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.5	2.5	2.0	2.5	2.5		2.0	
Lane Grp Cap (vph)	137	219		20	754	665	165	940	756		67	
v/s Ratio Prot		0.01		0.01	c0.38		c0.08	0.41			c0.00	
v/s Ratio Perm	c0.09					0.06			0.01			
v/c Ratio	0.60	0.06		0.85	0.79	0.12	0.73	0.71	0.02		0.03	
Uniform Delay, d1	31.7	29.1		39.4	17.7	11.7	34.4	12.4	7.7		35.9	
Progression Factor	1.00	1.00		1.29	0.78	1.06	1.00	1.00	1.00		1.00	
Incremental Delay, d2	4.6	0.0		108.3	6.6	0.3	12.7	4.6	0.1		0.1	
Delay (s)	36.3	29.1		159.0	20.4	12.7	47.1	17.0	7.7		35.9	
Level of Service	D	C		F	C	B	D	B	A		D	
Approach Delay (s)	32.5				22.1			21.1			35.9	
Approach LOS	C				C			C			D	

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	43	711	121	38	729
Future Volume (vph)	58	43	711	121	38	729
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	9	10
Total Lost time (s)	4.0	4.0	4.2	4.7	4.0	4.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.94	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1565	1400	1647	1408	1509	1594
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1565	1400	1647	1408	1509	1594
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	58	43	711	121	38	729
RTOR Reduction (vph)	0	36	0	24	0	0
Lane Group Flow (vph)	58	7	711	97	38	729
Confl. Peds. (#/hr)	24			18		
Confl. Bikes (#/hr)				18		
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8	2	2		
Actuated Green, G (s)	14.4	14.4	48.9	48.9	5.0	57.4
Effective Green, g (s)	13.9	13.9	49.4	48.9	4.5	57.9
Actuated g/C Ratio	0.17	0.17	0.62	0.61	0.06	0.72
Clearance Time (s)	3.5	3.5	4.7	4.7	3.5	4.7
Vehicle Extension (s)	2.0	2.0	2.5	2.5	2.0	2.5
Lane Grp Cap (vph)	271	243	1017	860	84	1153
v/s Ratio Prot	c0.04		c0.43		0.03	c0.46
v/s Ratio Perm		0.01		0.07		
v/c Ratio	0.21	0.03	0.70	0.11	0.45	0.63
Uniform Delay, d1	28.4	27.5	10.3	6.5	36.6	5.6
Progression Factor	1.00	1.00	0.75	0.71	1.26	0.70
Incremental Delay, d2	0.1	0.0	3.3	0.2	1.1	2.1
Delay (s)	28.5	27.5	10.9	4.8	47.2	6.1
Level of Service	C	C	B	A	D	A
Approach Delay (s)	28.1		10.0			8.1
Approach LOS	C		B			A

Intersection Summary			
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



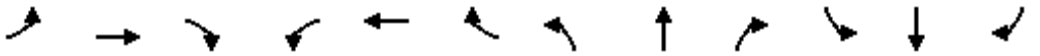
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	64	73	759	0	0	787
Future Volume (vph)	64	73	759	0	0	787
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	10	12	12	9
Total Lost time (s)	5.1	5.1	4.2			4.2
Lane Util. Factor	1.00	1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1732	1550	1647			1588
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1732	1550	1647			1588
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	64	73	759	0	0	787
RTOR Reduction (vph)	0	64	0	0	0	0
Lane Group Flow (vph)	64	9	759	0	0	787
Confl. Peds. (#/hr)				15		
Confl. Bikes (#/hr)				19		
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	5.4	5.4	25.3			25.3
Effective Green, g (s)	4.9	4.9	25.8			25.8
Actuated g/C Ratio	0.12	0.12	0.65			0.65
Clearance Time (s)	4.6	4.6	4.7			4.7
Vehicle Extension (s)	2.5	2.5	3.0			3.0
Lane Grp Cap (vph)	212	189	1062			1024
v/s Ratio Prot	c0.04		0.46			c0.50
v/s Ratio Perm		0.01				
v/c Ratio	0.30	0.05	0.71			0.77
Uniform Delay, d1	16.0	15.5	4.7			5.0
Progression Factor	1.00	1.00	1.83			1.06
Incremental Delay, d2	0.6	0.1	2.8			4.6
Delay (s)	16.6	15.6	11.3			9.9
Level of Service	B	B	B			A
Approach Delay (s)	16.0		11.3			9.9
Approach LOS	B		B			A

Intersection Summary			
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	9.3
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	17	18	741	91	87	764
Future Volume (vph)	17	18	741	91	87	764
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	12	10	12	9	10
Total Lost time (s)	4.1	4.1	4.2		3.5	4.2
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1732	1500	1616		1509	1647
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1732	1500	1616		1509	1647
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	17	18	741	91	87	764
RTOR Reduction (vph)	0	14	3	0	0	0
Lane Group Flow (vph)	17	5	829	0	87	764
Confl. Peds. (#/hr)	2			19		
Confl. Bikes (#/hr)				20		
Turn Type	Prot	pt+ov	NA		Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases						
Actuated Green, G (s)	8.6	20.5	51.8		8.3	63.1
Effective Green, g (s)	8.1	20.0	52.3		7.8	63.6
Actuated g/C Ratio	0.10	0.25	0.65		0.10	0.80
Clearance Time (s)	3.6		4.7		3.0	4.7
Vehicle Extension (s)	3.6		3.6		2.0	3.6
Lane Grp Cap (vph)	175	375	1056		147	1309
v/s Ratio Prot	c0.01	0.00	c0.51		0.06	c0.46
v/s Ratio Perm						
v/c Ratio	0.10	0.01	0.78		0.59	0.58
Uniform Delay, d1	32.6	22.6	9.9		34.6	3.1
Progression Factor	1.00	1.00	1.00		1.00	0.57
Incremental Delay, d2	0.3	0.0	5.9		3.2	1.5
Delay (s)	32.9	22.6	15.7		38.0	3.3
Level of Service	C	C	B		D	A
Approach Delay (s)	27.6		15.7			6.8
Approach LOS	C		B			A

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.8
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	229	842	71	0	129	0	789	100	0	176	0
Future Volume (vph)	107	229	842	71	0	129	0	789	100	0	176	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	10	12	9	12	9	12	12	10	12
Total Lost time (s)		4.6	4.6	4.6		4.6		4.7	4.2		4.5	
Lane Util. Factor		0.95	*0.75	1.00		1.00		1.00	1.00		0.95	
Frpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	0.99		1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.98	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		3333	2197	1580		1363		1604	1495		3160	
Flt Permitted		0.98	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (perm)		3333	2197	1580		1363		1604	1495		3160	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	107	229	842	71	0	129	0	789	100	0	176	0
RTOR Reduction (vph)	0	0	0	0	0	118	0	0	44	0	0	0
Lane Group Flow (vph)	0	336	842	71	0	11	0	789	56	0	176	0
Confl. Bikes (#/hr)			7						2			2
Turn Type	Split	NA	custom	Prot		Perm		NA	Perm		NA	
Protected Phases	4	4	4 5	3				2			6	
Permitted Phases						3			2			
Actuated Green, G (s)		31.5	52.1	11.0		11.0		44.6	44.6		24.8	
Effective Green, g (s)		30.5	51.1	10.5		10.5		44.1	44.6		24.3	
Actuated g/C Ratio		0.25	0.43	0.09		0.09		0.37	0.37		0.20	
Clearance Time (s)		3.6		4.1		4.1		4.2	4.2		4.0	
Vehicle Extension (s)		2.5		2.5		2.5		3.0	3.0		3.0	
Lane Grp Cap (vph)		847	935	138		119		589	555		639	
v/s Ratio Prot		0.10	c0.38	c0.04				c0.49			0.06	
v/s Ratio Perm						0.01			0.04			
v/c Ratio		0.40	0.90	0.51		0.09		1.34	0.10		0.28	
Uniform Delay, d1		37.1	32.1	52.3		50.4		37.9	24.6		40.4	
Progression Factor		1.03	0.89	1.00		1.00		0.72	0.90		0.32	
Incremental Delay, d2		0.2	10.5	2.4		0.3		159.1	0.2		1.0	
Delay (s)		38.3	39.0	54.7		50.6		186.5	22.2		14.2	
Level of Service		D	D	D		D		F	C		B	
Approach Delay (s)		38.8			52.1			168.0			14.2	
Approach LOS		D			D			F			B	

Intersection Summary			
HCM 2000 Control Delay	85.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.7
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	99	3	119	12	738	126	189	865	35	32	3	11
Future Volume (vph)	99	3	119	12	738	126	189	865	35	32	3	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	11	12	9	9	11	9	10	12	12	12	12
Total Lost time (s)	4.6	4.6		4.0	4.2	4.2	4.0	4.2	4.7		4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.69		0.83	
Flpb, ped/bikes	0.62	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.96	
Satd. Flow (prot)	951	1464		1524	1604	1401	1524	1663	1047		1377	
Flt Permitted	0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.96	
Satd. Flow (perm)	728	1464		1524	1604	1401	1524	1663	1047		1377	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	99	3	119	12	738	126	189	865	35	32	3	11
RTOR Reduction (vph)	0	99	0	0	0	47	0	0	14	0	44	0
Lane Group Flow (vph)	99	23	0	12	738	79	189	865	21	0	2	0
Confl. Peds. (#/hr)	151					22			121			151
Confl. Bikes (#/hr)									10			1
Turn Type	Perm	Prot		Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	
Protected Phases		8		5	2		1	6		7	7	
Permitted Phases	8					2			6			
Actuated Green, G (s)	22.6	22.6		3.2	56.1	56.1	18.6	71.5	71.5		6.4	
Effective Green, g (s)	22.6	22.6		2.7	56.6	56.6	18.1	72.0	71.5		5.9	
Actuated g/C Ratio	0.19	0.19		0.02	0.47	0.47	0.15	0.60	0.60		0.05	
Clearance Time (s)	4.6	4.6		3.5	4.7	4.7	3.5	4.7	4.7		3.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.5	2.5	2.0	2.5	2.5		2.0	
Lane Grp Cap (vph)	137	275		34	756	660	229	997	623		67	
v/s Ratio Prot		0.02		0.01	c0.46		0.12	c0.52			c0.00	
v/s Ratio Perm	c0.14					0.06			0.02			
v/c Ratio	0.72	0.08		0.35	0.98	0.12	0.83	0.87	0.03		0.03	
Uniform Delay, d1	45.8	40.2		57.8	31.0	17.8	49.4	20.0	10.0		54.3	
Progression Factor	1.00	1.00		1.29	0.71	1.24	0.80	0.53	1.00		1.00	
Incremental Delay, d2	14.7	0.0		1.7	23.0	0.3	13.0	6.4	0.1		0.1	
Delay (s)	60.5	40.2		76.5	45.1	22.3	52.7	17.1	10.1		54.4	
Level of Service	E	D		E	D	C	D	B	B		D	
Approach Delay (s)	49.3				42.2			23.1			54.4	
Approach LOS	D				D			C			D	

Intersection Summary			
HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	99	107	769	177	92	883
Future Volume (vph)	99	107	769	177	92	883
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	9	10
Total Lost time (s)	4.0	4.0	4.2	4.7	4.0	4.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.90	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1580	1414	1663	1369	1524	1610
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1580	1414	1663	1369	1524	1610
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	99	107	769	177	92	883
RTOR Reduction (vph)	0	90	0	28	0	0
Lane Group Flow (vph)	99	17	769	149	92	883
Confl. Peds. (#/hr)	41			26		
Confl. Bikes (#/hr)				18		
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8	2	2		
Actuated Green, G (s)	19.6	19.6	77.0	77.0	11.7	92.2
Effective Green, g (s)	19.1	19.1	77.5	77.0	11.2	92.7
Actuated g/C Ratio	0.16	0.16	0.65	0.64	0.09	0.77
Clearance Time (s)	3.5	3.5	4.7	4.7	3.5	4.7
Vehicle Extension (s)	2.0	2.0	2.5	2.5	2.0	2.5
Lane Grp Cap (vph)	251	225	1074	878	142	1243
v/s Ratio Prot	c0.06		0.46		0.06	c0.55
v/s Ratio Perm		0.01		0.11		
v/c Ratio	0.39	0.08	0.72	0.17	0.65	0.71
Uniform Delay, d1	45.3	42.9	14.0	8.6	52.5	6.9
Progression Factor	1.00	1.00	0.69	0.55	1.11	0.53
Incremental Delay, d2	0.4	0.1	3.2	0.3	4.0	1.9
Delay (s)	45.6	43.0	12.9	5.1	62.4	5.5
Level of Service	D	D	B	A	E	A
Approach Delay (s)	44.3		11.5			10.9
Approach LOS	D		B			B

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



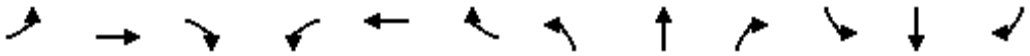
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	155	192	754	0	0	982
Future Volume (vph)	155	192	754	0	0	982
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	10	12	12	9
Total Lost time (s)	5.1	5.1	4.2			4.2
Lane Util. Factor	1.00	1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1750	1565	1663			1604
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1750	1565	1663			1604
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	155	192	754	0	0	982
RTOR Reduction (vph)	0	161	0	0	0	0
Lane Group Flow (vph)	155	31	754	0	0	982
Confl. Peds. (#/hr)				35		
Confl. Bikes (#/hr)				19		
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	10.2	10.2	40.5			40.5
Effective Green, g (s)	9.7	9.7	41.0			41.0
Actuated g/C Ratio	0.16	0.16	0.68			0.68
Clearance Time (s)	4.6	4.6	4.7			4.7
Vehicle Extension (s)	2.5	2.5	3.0			3.0
Lane Grp Cap (vph)	282	253	1136			1096
v/s Ratio Prot	c0.09		0.45			c0.61
v/s Ratio Perm		0.02				
v/c Ratio	0.55	0.12	0.66			0.90
Uniform Delay, d1	23.1	21.5	5.5			7.8
Progression Factor	1.00	1.00	1.23			1.48
Incremental Delay, d2	1.7	0.2	0.3			8.8
Delay (s)	24.9	21.7	7.1			20.3
Level of Service	C	C	A			C
Approach Delay (s)	23.1		7.1			20.3
Approach LOS	C		A			C

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.3
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	34	64	690	259	319	818
Future Volume (vph)	34	64	690	259	319	818
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	12	10	12	9	10
Total Lost time (s)	4.1	4.1	4.2		3.5	4.2
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1750	1515	1566		1524	1663
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1750	1515	1566		1524	1663
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	34	64	690	259	319	818
RTOR Reduction (vph)	0	38	11	0	0	0
Lane Group Flow (vph)	34	26	938	0	319	818
Confl. Peds. (#/hr)	6			47		
Confl. Bikes (#/hr)				20		
Turn Type	Prot	pt+ov	NA		Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases						
Actuated Green, G (s)	10.5	49.1	63.2		35.0	101.2
Effective Green, g (s)	10.0	48.6	63.7		34.5	101.7
Actuated g/C Ratio	0.08	0.41	0.53		0.29	0.85
Clearance Time (s)	3.6		4.7		3.0	4.7
Vehicle Extension (s)	3.6		3.6		2.0	3.6
Lane Grp Cap (vph)	145	613	831		438	1409
v/s Ratio Prot	c0.02	0.02	c0.60		c0.21	0.49
v/s Ratio Perm						
v/c Ratio	0.23	0.04	1.13		0.73	0.58
Uniform Delay, d1	51.4	21.6	28.1		38.5	2.7
Progression Factor	1.00	1.00	1.00		0.90	0.63
Incremental Delay, d2	1.0	0.0	73.1		2.7	0.9
Delay (s)	52.4	21.6	101.3		37.4	2.6
Level of Service	D	C	F		D	A
Approach Delay (s)	32.3		101.3			12.4
Approach LOS	C		F			B

Intersection Summary			
HCM 2000 Control Delay	51.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.8
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	265	812	91	0	193	0	860	95	0	219	0
Future Volume (vph)	118	265	812	91	0	193	0	860	95	0	219	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	10	12	9	12	9	12	12	10	12
Total Lost time (s)		4.6	4.6	4.6		4.6		4.7	4.2		4.5	
Lane Util. Factor		0.95	*0.75	1.00		1.00		1.00	1.00		0.95	
Frpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	0.99		1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.98	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		3335	2197	1580		1363		1604	1495		3160	
Flt Permitted		0.98	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (perm)		3335	2197	1580		1363		1604	1495		3160	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	118	265	812	91	0	193	0	860	95	0	219	0
RTOR Reduction (vph)	0	0	0	0	0	173	0	0	52	0	0	0
Lane Group Flow (vph)	0	383	812	91	0	20	0	860	43	0	219	0
Confl. Bikes (#/hr)			7						2			2
Turn Type	Split	NA	custom	Prot		Perm		NA	Perm		NA	
Protected Phases	4	4	4 5	3				2			6	
Permitted Phases						3			2			
Actuated Green, G (s)		31.2	51.8	11.8		11.8		34.1	34.1		14.3	
Effective Green, g (s)		30.2	50.8	11.3		11.3		33.6	34.1		13.8	
Actuated g/C Ratio		0.27	0.46	0.10		0.10		0.31	0.31		0.13	
Clearance Time (s)		3.6		4.1		4.1		4.2	4.2		4.0	
Vehicle Extension (s)		2.5		2.5		2.5		3.0	3.0		3.0	
Lane Grp Cap (vph)		915	1014	162		140		489	463		396	
v/s Ratio Prot		0.11	c0.37	c0.06				c0.54			0.07	
v/s Ratio Perm						0.01			0.03			
v/c Ratio		0.42	0.80	0.56		0.14		1.76	0.09		0.55	
Uniform Delay, d1		32.7	25.3	47.0		44.9		38.2	27.0		45.2	
Progression Factor		1.05	0.86	1.00		1.00		1.22	2.27		0.44	
Incremental Delay, d2		0.2	3.9	3.6		0.3		345.1	0.2		5.2	
Delay (s)		34.5	25.6	50.6		45.3		391.8	61.5		25.2	
Level of Service		C	C	D		D		F	E		C	
Approach Delay (s)		28.5			47.0			359.0			25.2	
Approach LOS		C			D			F			C	

Intersection Summary			
HCM 2000 Control Delay	149.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.7
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	100	3	185	32	736	108	216	865	41	34	3	46
Future Volume (vph)	100	3	185	32	736	108	216	865	41	34	3	46
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	11	12	9	9	11	9	10	12	12	12	12
Total Lost time (s)	4.6	4.6		4.0	4.2	4.2	4.0	4.2	4.7		4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.63		0.58	
Flpb, ped/bikes	0.78	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85		0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1182	1464		1524	1604	1413	1524	1663	962		933	
Flt Permitted	0.41	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (perm)	512	1464		1524	1604	1413	1524	1663	962		933	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	3	185	32	736	108	216	865	41	34	3	46
RTOR Reduction (vph)	0	151	0	0	0	61	0	0	18	0	79	0
Lane Group Flow (vph)	100	37	0	32	736	47	216	865	23	0	4	0
Confl. Peds. (#/hr)	190					18			158			190
Confl. Bikes (#/hr)									10			1
Turn Type	Perm	Prot		Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	
Protected Phases		8		5	2		1	6		7	7	
Permitted Phases	8					2			6			
Actuated Green, G (s)	20.2	20.2		6.7	47.0	47.0	20.1	60.4	60.4		6.4	
Effective Green, g (s)	20.2	20.2		6.2	47.5	47.5	19.6	60.9	60.4		5.9	
Actuated g/C Ratio	0.18	0.18		0.06	0.43	0.43	0.18	0.55	0.55		0.05	
Clearance Time (s)	4.6	4.6		3.5	4.7	4.7	3.5	4.7	4.7		3.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.5	2.5	2.0	2.5	2.5		2.0	
Lane Grp Cap (vph)	94	268		85	692	610	271	920	528		50	
v/s Ratio Prot		0.03		0.02	c0.46		c0.14	c0.52			c0.00	
v/s Ratio Perm	c0.20					0.03			0.02			
v/c Ratio	1.06	0.14		0.38	1.06	0.08	0.80	0.94	0.04		0.09	
Uniform Delay, d1	44.9	37.6		50.0	31.2	18.4	43.3	22.9	11.5		49.5	
Progression Factor	1.00	1.00		0.80	0.67	0.63	0.97	0.51	0.00		1.00	
Incremental Delay, d2	111.2	0.1		0.8	48.4	0.2	9.8	13.7	0.1		0.3	
Delay (s)	156.1	37.7		40.8	69.4	11.8	51.7	25.3	0.1		49.8	
Level of Service	F	D		D	E	B	D	C	A		D	
Approach Delay (s)	78.8				61.2			29.4			49.8	
Approach LOS	E				E			C			D	

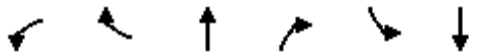
Intersection Summary			
HCM 2000 Control Delay	47.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	123	141	735	129	84	927
Future Volume (vph)	123	141	735	129	84	927
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	9	10
Total Lost time (s)	4.0	4.0	4.2	4.7	4.0	4.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.85	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1580	1414	1663	1286	1524	1610
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1580	1414	1663	1286	1524	1610
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	123	141	735	129	84	927
RTOR Reduction (vph)	0	116	0	23	0	0
Lane Group Flow (vph)	123	25	735	106	84	927
Confl. Peds. (#/hr)	65			52		
Confl. Bikes (#/hr)				18		
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8	2	2		
Actuated Green, G (s)	19.7	19.7	68.6	68.6	10.0	82.1
Effective Green, g (s)	19.2	19.2	69.1	68.6	9.5	82.6
Actuated g/C Ratio	0.17	0.17	0.63	0.62	0.09	0.75
Clearance Time (s)	3.5	3.5	4.7	4.7	3.5	4.7
Vehicle Extension (s)	2.0	2.0	2.5	2.5	2.0	2.5
Lane Grp Cap (vph)	275	246	1044	801	131	1208
v/s Ratio Prot	c0.08		0.44		0.06	c0.58
v/s Ratio Perm		0.02		0.08		
v/c Ratio	0.45	0.10	0.70	0.13	0.64	0.77
Uniform Delay, d1	40.6	38.1	13.6	8.5	48.6	8.1
Progression Factor	1.00	1.00	0.74	0.80	0.63	0.44
Incremental Delay, d2	0.4	0.1	3.3	0.3	3.3	2.0
Delay (s)	41.1	38.2	13.4	7.1	33.7	5.6
Level of Service	D	D	B	A	C	A
Approach Delay (s)	39.5		12.5			7.9
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	175	209	655	0	0	1050
Future Volume (vph)	175	209	655	0	0	1050
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	10	12	12	9
Total Lost time (s)	5.1	5.1	4.2			4.2
Lane Util. Factor	1.00	1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1750	1565	1663			1604
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1750	1565	1663			1604
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	175	209	655	0	0	1050
RTOR Reduction (vph)	0	171	0	0	0	0
Lane Group Flow (vph)	175	38	655	0	0	1050
Confl. Peds. (#/hr)				28		
Confl. Bikes (#/hr)				19		
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	10.5	10.5	35.2			35.2
Effective Green, g (s)	10.0	10.0	35.7			35.7
Actuated g/C Ratio	0.18	0.18	0.65			0.65
Clearance Time (s)	4.6	4.6	4.7			4.7
Vehicle Extension (s)	2.5	2.5	3.0			3.0
Lane Grp Cap (vph)	318	284	1079			1041
v/s Ratio Prot	c0.10		0.39			c0.65
v/s Ratio Perm		0.02				
v/c Ratio	0.55	0.13	0.61			1.01
Uniform Delay, d1	20.5	18.9	5.6			9.6
Progression Factor	1.00	1.00	1.16			1.22
Incremental Delay, d2	1.6	0.2	1.7			25.2
Delay (s)	22.1	19.0	8.2			37.0
Level of Service	C	B	A			D
Approach Delay (s)	20.4		8.2			37.0
Approach LOS	C		A			D

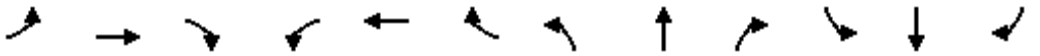
Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	9.3
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	49	43	612	190	230	995
Future Volume (vph)	49	43	612	190	230	995
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	12	10	12	9	10
Total Lost time (s)	4.1	4.1	4.2		3.5	4.2
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1750	1515	1589		1524	1663
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1750	1515	1589		1524	1663
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	49	43	612	190	230	995
RTOR Reduction (vph)	0	31	8	0	0	0
Lane Group Flow (vph)	49	12	794	0	230	995
Confl. Peds. (#/hr)	9			30		
Confl. Bikes (#/hr)				20		
Turn Type	Prot	pt+ov	NA		Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases						
Actuated Green, G (s)	10.7	32.2	70.1		17.9	91.0
Effective Green, g (s)	10.2	31.7	70.6		17.4	91.5
Actuated g/C Ratio	0.09	0.29	0.64		0.16	0.83
Clearance Time (s)	3.6		4.7		3.0	4.7
Vehicle Extension (s)	3.6		3.6		2.0	3.6
Lane Grp Cap (vph)	162	436	1019		241	1383
v/s Ratio Prot	c0.03	0.01	c0.50		c0.15	0.60
v/s Ratio Perm						
v/c Ratio	0.30	0.03	0.78		0.95	0.72
Uniform Delay, d1	46.6	28.1	14.1		45.9	3.9
Progression Factor	1.00	1.00	1.00		0.99	0.54
Incremental Delay, d2	1.3	0.0	5.9		23.7	1.2
Delay (s)	47.9	28.1	20.0		69.3	3.3
Level of Service	D	C	C		E	A
Approach Delay (s)	38.6		20.0			15.7
Approach LOS	D		C			B

Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.8
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Appendix G-3:
Scenario 3 HCM 2000 Intersection Results



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	30	245	21	0	73	0	287	23	0	57	0
Future Volume (vph)	25	30	245	21	0	73	0	287	23	0	57	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	10	12	9	12	9	12	12	10	12
Total Lost time (s)		4.6	4.6	4.6		4.6		4.7	4.2		4.5	
Lane Util. Factor		0.95	*0.75	1.00		1.00		1.00	1.00		0.95	
Frpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	0.99		1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.98	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		3278	2175	1565		1350		1588	1481		3129	
Flt Permitted		0.98	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (perm)		3278	2175	1565		1350		1588	1481		3129	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	30	245	21	0	73	0	287	23	0	57	0
RTOR Reduction (vph)	0	0	0	0	0	68	0	0	12	0	0	0
Lane Group Flow (vph)	0	55	245	21	0	5	0	287	11	0	57	0
Confl. Bikes (#/hr)			7						2			2
Turn Type	Split	NA	custom	Prot		Perm		NA	Perm		NA	
Protected Phases	4	4	4 5	3				2			6	
Permitted Phases						3			2			
Actuated Green, G (s)		15.4	31.0	8.0		8.0		53.7	53.7		38.9	
Effective Green, g (s)		14.4	30.0	7.5		7.5		53.2	53.7		38.4	
Actuated g/C Ratio		0.13	0.27	0.07		0.07		0.48	0.49		0.35	
Clearance Time (s)		3.6		4.1		4.1		4.2	4.2		4.0	
Vehicle Extension (s)		2.5		2.5		2.5		3.0	3.0		3.0	
Lane Grp Cap (vph)		429	593	106		92		768	722		1092	
v/s Ratio Prot		0.02	c0.11	c0.01				c0.18			0.02	
v/s Ratio Perm						0.00			0.01			
v/c Ratio		0.13	0.41	0.20		0.05		0.37	0.02		0.05	
Uniform Delay, d1		42.3	32.8	48.4		47.9		17.9	14.5		23.7	
Progression Factor		0.96	0.97	1.00		1.00		0.87	1.00		0.54	
Incremental Delay, d2		0.1	0.3	0.7		0.2		1.4	0.0		0.1	
Delay (s)		40.6	32.0	49.1		48.1		17.0	14.6		12.9	
Level of Service		D	C	D		D		B	B		B	
Approach Delay (s)		33.6			48.3			16.8			12.9	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.7
Intersection Capacity Utilization	43.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	15	0	10	9	256	26	16	280	27	44	0	16
Future Volume (vph)	15	0	10	9	256	26	16	280	27	44	0	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	11	12	9	9	11	9	10	12	12	12	12
Total Lost time (s)	4.6	4.6		4.0	5.2	5.2	4.0	5.2	4.7		4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.93	1.00	1.00	0.87		0.85	
Flpb, ped/bikes	0.57	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85		0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.96	
Satd. Flow (prot)	863	1450		1509	1588	1343	1509	1647	1301		1403	
Flt Permitted	0.72	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.96	
Satd. Flow (perm)	653	1450		1509	1588	1343	1509	1647	1301		1403	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	0	10	9	256	26	16	280	27	44	0	16
RTOR Reduction (vph)	0	9	0	0	0	8	0	0	8	0	57	0
Lane Group Flow (vph)	15	1	0	9	256	18	16	280	19	0	3	0
Confl. Peds. (#/hr)	71		3			25			50	3		71
Confl. Bikes (#/hr)									10			1
Turn Type	Perm	Prot		Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	
Protected Phases		8		5	2		1	6		7	7	
Permitted Phases	8					2			6			
Actuated Green, G (s)	8.4	8.4		1.6	74.9	74.9	4.0	77.3	77.3		6.4	
Effective Green, g (s)	8.4	8.4		1.1	74.4	74.4	3.5	76.8	77.3		5.9	
Actuated g/C Ratio	0.08	0.08		0.01	0.68	0.68	0.03	0.70	0.70		0.05	
Clearance Time (s)	4.6	4.6		3.5	4.7	4.7	3.5	4.7	4.7		3.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.5	2.5	2.0	2.5	2.5		2.0	
Lane Grp Cap (vph)	49	110		15	1074	908	48	1149	914		75	
v/s Ratio Prot		0.00		0.01	0.16		c0.01	c0.17			c0.00	
v/s Ratio Perm	c0.02					0.01			0.01			
v/c Ratio	0.31	0.01		0.60	0.24	0.02	0.33	0.24	0.02		0.04	
Uniform Delay, d1	48.0	46.9		54.2	6.9	5.8	52.1	6.0	4.9		49.4	
Progression Factor	1.00	1.00		0.87	0.82	1.00	1.53	0.11	1.00		1.00	
Incremental Delay, d2	1.3	0.0		36.0	0.5	0.0	1.4	0.5	0.0		0.1	
Delay (s)	49.3	47.0		83.1	6.1	5.9	81.2	1.1	5.0		49.5	
Level of Service	D	D		F	A	A	F	A	A		D	
Approach Delay (s)	48.4				8.5			5.4			49.5	
Approach LOS	D				A			A			D	

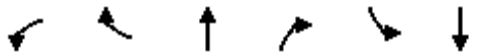
Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.8
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	4	287	2	2	309
Future Volume (vph)	0	4	287	2	2	309
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	9	10
Total Lost time (s)		4.0	5.2	4.7	4.0	5.2
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	1.00	0.95	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1400	1647	1427	1509	1594
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1400	1647	1427	1509	1594
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	4	287	2	2	309
RTOR Reduction (vph)	0	4	0	1	0	0
Lane Group Flow (vph)	0	0	287	1	2	309
Confl. Peds. (#/hr)	20			17		
Confl. Bikes (#/hr)				18		
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8	2	2		
Actuated Green, G (s)		2.0	39.7	39.7	1.6	44.8
Effective Green, g (s)		1.5	39.2	39.7	1.1	44.3
Actuated g/C Ratio		0.03	0.71	0.72	0.02	0.81
Clearance Time (s)		3.5	4.7	4.7	3.5	4.7
Vehicle Extension (s)		2.0	2.5	2.5	2.0	2.5
Lane Grp Cap (vph)		38	1173	1030	30	1283
v/s Ratio Prot			0.17		0.00	c0.19
v/s Ratio Perm		c0.00		0.00		
v/c Ratio		0.00	0.24	0.00	0.07	0.24
Uniform Delay, d1		26.0	2.7	2.1	26.4	1.3
Progression Factor		1.00	0.34	0.40	1.30	0.74
Incremental Delay, d2		0.0	0.5	0.0	0.3	0.4
Delay (s)		26.0	1.4	0.8	34.7	1.4
Level of Service		C	A	A	C	A
Approach Delay (s)	26.0		1.4			1.6
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	1.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



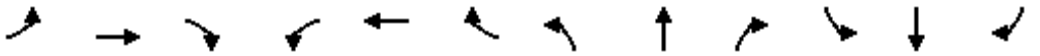
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	2	287	0	0	309
Future Volume (vph)	4	2	287	0	0	309
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	10	12	12	9
Total Lost time (s)	5.1	5.1	5.2			5.2
Lane Util. Factor	1.00	1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1732	1550	1647			1588
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1732	1550	1647			1588
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	2	287	0	0	309
RTOR Reduction (vph)	0	2	0	0	0	0
Lane Group Flow (vph)	4	0	287	0	0	309
Confl. Peds. (#/hr)				11		
Confl. Bikes (#/hr)				19		
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	1.8	1.8	43.9			43.9
Effective Green, g (s)	1.3	1.3	43.4			43.4
Actuated g/C Ratio	0.02	0.02	0.79			0.79
Clearance Time (s)	4.6	4.6	4.7			4.7
Vehicle Extension (s)	2.5	2.5	3.0			3.0
Lane Grp Cap (vph)	40	36	1299			1253
v/s Ratio Prot	c0.00		0.17			c0.19
v/s Ratio Perm		0.00				
v/c Ratio	0.10	0.00	0.22			0.25
Uniform Delay, d1	26.3	26.2	1.5			1.5
Progression Factor	1.00	1.00	0.87			0.21
Incremental Delay, d2	0.8	0.0	0.4			0.5
Delay (s)	27.1	26.2	1.7			0.8
Level of Service	C	C	A			A
Approach Delay (s)	26.8		1.7			0.8
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	1.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	1	286	20	11	302
Future Volume (vph)	2	1	286	20	11	302
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	12	10	12	9	10
Total Lost time (s)	4.1	4.1	5.2		3.5	5.2
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1732	1500	1629		1509	1647
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1732	1500	1629		1509	1647
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2	1	286	20	11	302
RTOR Reduction (vph)	0	1	1	0	0	0
Lane Group Flow (vph)	2	0	305	0	11	302
Confl. Peds. (#/hr)	2			14		
Confl. Bikes (#/hr)				20		
Turn Type	Prot	pt+ov	NA		Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases						
Actuated Green, G (s)	1.8	9.0	93.3		3.6	99.9
Effective Green, g (s)	1.3	8.5	92.8		3.1	99.4
Actuated g/C Ratio	0.01	0.08	0.84		0.03	0.90
Clearance Time (s)	3.6		4.7		3.0	4.7
Vehicle Extension (s)	3.6		3.6		2.0	3.6
Lane Grp Cap (vph)	20	115	1374		42	1488
v/s Ratio Prot	c0.00	0.00	c0.19		0.01	c0.18
v/s Ratio Perm						
v/c Ratio	0.10	0.00	0.22		0.26	0.20
Uniform Delay, d1	53.8	46.8	1.7		52.3	0.6
Progression Factor	1.00	1.00	1.00		0.81	0.45
Incremental Delay, d2	2.7	0.0	0.4		1.2	0.3
Delay (s)	56.4	46.8	2.0		43.5	0.6
Level of Service	E	D	A		D	A
Approach Delay (s)	53.2		2.0			2.1
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	2.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	154	578	26	0	89	0	518	28	0	76	0
Future Volume (vph)	87	154	578	26	0	89	0	518	28	0	76	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	10	12	9	12	9	12	12	10	12
Total Lost time (s)		4.6	4.6	4.6		4.6		4.7	4.2		4.5	
Lane Util. Factor		0.95	*0.75	1.00		1.00		1.00	1.00		0.95	
Frpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	0.99		1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.98	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		3293	2175	1565		1350		1588	1480		3129	
Flt Permitted		0.98	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (perm)		3293	2175	1565		1350		1588	1480		3129	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	87	154	578	26	0	89	0	518	28	0	76	0
RTOR Reduction (vph)	0	0	0	0	0	82	0	0	16	0	0	0
Lane Group Flow (vph)	0	241	578	26	0	7	0	518	12	0	76	0
Confl. Bikes (#/hr)			7						2			2
Turn Type	Split	NA	custom	Prot		Perm		NA	Perm		NA	
Protected Phases	4	4	4 5	3				2			6	
Permitted Phases						3			2			
Actuated Green, G (s)		24.4	51.0	10.1		10.1		52.6	52.6		26.8	
Effective Green, g (s)		23.4	50.0	9.6		9.6		52.1	52.6		26.3	
Actuated g/C Ratio		0.19	0.42	0.08		0.08		0.43	0.44		0.22	
Clearance Time (s)		3.6		4.1		4.1		4.2	4.2		4.0	
Vehicle Extension (s)		2.5		2.5		2.5		3.0	3.0		3.0	
Lane Grp Cap (vph)		642	906	125		108		689	648		685	
v/s Ratio Prot		0.07	c0.27	c0.02				c0.33			0.02	
v/s Ratio Perm						0.01			0.01			
v/c Ratio		0.38	0.64	0.21		0.07		0.75	0.02		0.11	
Uniform Delay, d1		42.0	27.8	51.6		51.1		28.5	19.1		37.5	
Progression Factor		0.98	0.88	1.00		1.00		0.62	1.00		0.53	
Incremental Delay, d2		0.3	1.2	0.6		0.2		6.8	0.0		0.3	
Delay (s)		41.4	25.8	52.2		51.2		24.5	19.1		20.4	
Level of Service		D	C	D		D		C	B		C	
Approach Delay (s)		30.4			51.5			24.2			20.4	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.7
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	74	4	80	11	449	61	97	565	18	17	1	16
Future Volume (vph)	74	4	80	11	449	61	97	565	18	17	1	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	11	12	9	9	11	9	10	12	12	12	12
Total Lost time (s)	4.6	4.6		4.0	4.2	4.2	4.0	4.2	4.7		4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.92	1.00	1.00	0.86		0.71	
Flpb, ped/bikes	0.78	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85		0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1179	1450		1509	1588	1336	1509	1647	1286		1148	
Flt Permitted	0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.97	
Satd. Flow (perm)	912	1450		1509	1588	1336	1509	1647	1286		1148	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	74	4	80	11	449	61	97	565	18	17	1	16
RTOR Reduction (vph)	0	71	0	0	0	26	0	0	6	0	33	0
Lane Group Flow (vph)	74	13	0	11	449	35	97	565	12	0	1	0
Confl. Peds. (#/hr)	71		3			25			50	3		71
Confl. Bikes (#/hr)									10			1
Turn Type	Perm	Prot		Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	
Protected Phases		8		5	2		1	6		7	7	
Permitted Phases	8					2			6			
Actuated Green, G (s)	18.6	18.6		1.6	67.5	67.5	12.8	78.7	78.7		4.8	
Effective Green, g (s)	18.6	18.6		1.1	68.0	68.0	12.3	79.2	78.7		4.3	
Actuated g/C Ratio	0.16	0.16		0.01	0.57	0.57	0.10	0.66	0.66		0.04	
Clearance Time (s)	4.6	4.6		3.5	4.7	4.7	3.5	4.7	4.7		3.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.5	2.5	2.0	2.5	2.5		2.0	
Lane Grp Cap (vph)	141	224		13	899	757	154	1087	843		41	
v/s Ratio Prot		0.01		0.01	0.28		c0.06	c0.34			c0.00	
v/s Ratio Perm	c0.08					0.03			0.01			
v/c Ratio	0.52	0.06		0.85	0.50	0.05	0.63	0.52	0.01		0.03	
Uniform Delay, d1	46.6	43.2		59.4	15.7	11.6	51.7	10.6	7.2		55.8	
Progression Factor	1.00	1.00		0.94	0.67	8.23	1.35	0.41	1.00		1.00	
Incremental Delay, d2	1.6	0.0		157.0	1.9	0.1	4.8	1.5	0.0		0.1	
Delay (s)	48.3	43.3		212.6	12.5	95.3	74.4	5.8	7.2		55.9	
Level of Service	D	D		F	B	F	E	A	A		E	
Approach Delay (s)	45.6				26.4			15.6			55.9	
Approach LOS	D				C			B			E	

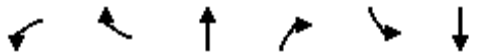
Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	44	46	475	62	46	609
Future Volume (vph)	44	46	475	62	46	609
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	9	10
Total Lost time (s)	4.0	4.0	4.2	4.7	4.0	4.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.95	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1565	1400	1647	1422	1509	1594
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1565	1400	1647	1422	1509	1594
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	44	46	475	62	46	609
RTOR Reduction (vph)	0	42	0	22	0	0
Lane Group Flow (vph)	44	4	475	40	46	609
Confl. Peds. (#/hr)	20			17		
Confl. Bikes (#/hr)				18		
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8	2	2		
Actuated Green, G (s)	6.0	6.0	39.0	39.0	3.3	45.8
Effective Green, g (s)	5.5	5.5	39.5	39.0	2.8	46.3
Actuated g/C Ratio	0.09	0.09	0.66	0.65	0.05	0.77
Clearance Time (s)	3.5	3.5	4.7	4.7	3.5	4.7
Vehicle Extension (s)	2.0	2.0	2.5	2.5	2.0	2.5
Lane Grp Cap (vph)	143	128	1084	924	70	1230
v/s Ratio Prot	c0.03		0.29		0.03	c0.38
v/s Ratio Perm		0.00		0.03		
v/c Ratio	0.31	0.03	0.44	0.04	0.66	0.50
Uniform Delay, d1	25.5	24.8	4.9	3.8	28.1	2.5
Progression Factor	1.00	1.00	0.71	0.51	0.89	1.60
Incremental Delay, d2	0.4	0.0	1.2	0.1	14.1	1.3
Delay (s)	25.9	24.9	4.7	2.0	39.2	5.3
Level of Service	C	C	A	A	D	A
Approach Delay (s)	25.4		4.4			7.7
Approach LOS	C		A			A

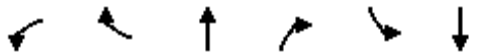
Intersection Summary			
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



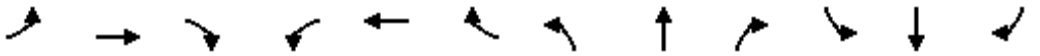
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	67	87	450	0	0	653
Future Volume (vph)	67	87	450	0	0	653
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	10	12	12	9
Total Lost time (s)	5.1	5.1	4.2			4.2
Lane Util. Factor	1.00	1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1732	1550	1647			1588
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1732	1550	1647			1588
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	67	87	450	0	0	653
RTOR Reduction (vph)	0	77	0	0	0	0
Lane Group Flow (vph)	67	10	450	0	0	653
Confl. Peds. (#/hr)				11		
Confl. Bikes (#/hr)				19		
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	7.3	7.3	43.4			43.4
Effective Green, g (s)	6.8	6.8	43.9			43.9
Actuated g/C Ratio	0.11	0.11	0.73			0.73
Clearance Time (s)	4.6	4.6	4.7			4.7
Vehicle Extension (s)	2.5	2.5	3.0			3.0
Lane Grp Cap (vph)	196	175	1205			1161
v/s Ratio Prot	c0.04		0.27			c0.41
v/s Ratio Perm		0.01				
v/c Ratio	0.34	0.06	0.37			0.56
Uniform Delay, d1	24.5	23.7	3.0			3.7
Progression Factor	1.00	1.00	1.41			1.17
Incremental Delay, d2	0.8	0.1	0.8			1.8
Delay (s)	25.3	23.8	5.0			6.1
Level of Service	C	C	A			A
Approach Delay (s)	24.5		5.0			6.1
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.3
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	26	20	430	78	160	560
Future Volume (vph)	26	20	430	78	160	560
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	12	10	12	9	10
Total Lost time (s)	4.1	4.1	4.2		3.5	4.2
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1732	1500	1604		1509	1647
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1732	1500	1604		1509	1647
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	20	430	78	160	560
RTOR Reduction (vph)	0	15	3	0	0	0
Lane Group Flow (vph)	26	5	505	0	160	560
Confl. Peds. (#/hr)	2			14		
Confl. Bikes (#/hr)				20		
Turn Type	Prot	pt+ov	NA		Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases						
Actuated Green, G (s)	8.6	29.2	83.1		17.0	103.1
Effective Green, g (s)	8.1	28.7	83.6		16.5	103.6
Actuated g/C Ratio	0.07	0.24	0.70		0.14	0.86
Clearance Time (s)	3.6		4.7		3.0	4.7
Vehicle Extension (s)	3.6		3.6		2.0	3.6
Lane Grp Cap (vph)	116	358	1117		207	1421
v/s Ratio Prot	c0.02	0.00	c0.31		c0.11	0.34
v/s Ratio Perm						
v/c Ratio	0.22	0.01	0.45		0.77	0.39
Uniform Delay, d1	53.0	34.8	8.1		49.9	1.7
Progression Factor	1.00	1.00	1.00		0.96	0.67
Incremental Delay, d2	1.2	0.0	1.3		13.2	0.7
Delay (s)	54.2	34.9	9.4		61.3	1.9
Level of Service	D	C	A		E	A
Approach Delay (s)	45.8		9.4			15.1
Approach LOS	D		A			B

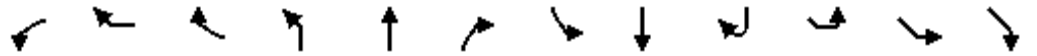
Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.8
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	220	587	57	0	118	0	656	48	0	175	0
Future Volume (vph)	73	220	587	57	0	118	0	656	48	0	175	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	10	12	9	12	9	12	12	10	12
Total Lost time (s)		4.6	4.6	4.6		4.6		4.7	4.2		4.5	
Lane Util. Factor		0.95	*0.75	1.00		1.00		1.00	1.00		0.95	
Frpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	0.99		1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		3312	2175	1565		1350		1588	1481		3129	
Flt Permitted		0.99	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (perm)		3312	2175	1565		1350		1588	1481		3129	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	73	220	587	57	0	118	0	656	48	0	175	0
RTOR Reduction (vph)	0	0	0	0	0	108	0	0	26	0	0	0
Lane Group Flow (vph)	0	293	587	57	0	10	0	656	22	0	175	0
Confl. Bikes (#/hr)			7						2			2
Turn Type	Split	NA	custom	Prot		Perm		NA	Perm		NA	
Protected Phases	4	4	4 5	3				2			6	
Permitted Phases						3			2			
Actuated Green, G (s)		22.4	51.0	10.8		10.8		53.9	53.9		26.1	
Effective Green, g (s)		21.4	50.0	10.3		10.3		53.4	53.9		25.6	
Actuated g/C Ratio		0.18	0.42	0.09		0.09		0.44	0.45		0.21	
Clearance Time (s)		3.6		4.1		4.1		4.2	4.2		4.0	
Vehicle Extension (s)		2.5		2.5		2.5		3.0	3.0		3.0	
Lane Grp Cap (vph)		590	906	134		115		706	665		667	
v/s Ratio Prot		0.09	c0.27	c0.04				c0.41			0.06	
v/s Ratio Perm						0.01			0.01			
v/c Ratio		0.50	0.65	0.43		0.09		0.93	0.03		0.26	
Uniform Delay, d1		44.4	28.0	52.0		50.5		31.5	18.5		39.3	
Progression Factor		1.00	1.00	1.00		1.00		0.58	0.39		0.38	
Incremental Delay, d2		0.5	1.4	1.6		0.2		17.3	0.1		0.9	
Delay (s)		44.9	29.4	53.6		50.8		35.6	7.3		16.0	
Level of Service		D	C	D		D		D	A		B	
Approach Delay (s)		34.6			51.7			33.6			16.0	
Approach LOS		C			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	34.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.7
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	82	3	91	17	597	140	120	670	29	16	5	15
Future Volume (vph)	82	3	91	17	597	140	120	670	29	16	5	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	11	12	9	9	11	9	10	12	12	12	12
Total Lost time (s)	4.6	4.6		4.0	4.2	4.2	4.0	4.2	4.7		4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.93	1.00	1.00	0.85		0.75	
Flpb, ped/bikes	0.79	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85		0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1190	1450		1509	1588	1343	1509	1647	1279		1209	
Flt Permitted	0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.97	
Satd. Flow (perm)	919	1450		1509	1588	1343	1509	1647	1279		1209	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	82	3	91	17	597	140	120	670	29	16	5	15
RTOR Reduction (vph)	0	79	0	0	0	49	0	0	10	0	35	0
Lane Group Flow (vph)	82	15	0	17	597	91	120	670	19	0	1	0
Confl. Peds. (#/hr)	70		11			23			52	11		70
Confl. Bikes (#/hr)									10			1
Turn Type	Perm	Prot		Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	
Protected Phases		8		5	2		1	6		7	7	
Permitted Phases	8					2			6			
Actuated Green, G (s)	18.9	18.9		3.2	65.7	65.7	14.3	76.8	76.8		4.8	
Effective Green, g (s)	18.9	18.9		2.7	66.2	66.2	13.8	77.3	76.8		4.3	
Actuated g/C Ratio	0.16	0.16		0.02	0.55	0.55	0.12	0.64	0.64		0.04	
Clearance Time (s)	4.6	4.6		3.5	4.7	4.7	3.5	4.7	4.7		3.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.5	2.5	2.0	2.5	2.5		2.0	
Lane Grp Cap (vph)	144	228		33	876	740	173	1060	818		43	
v/s Ratio Prot		0.01		0.01	c0.38		c0.08	0.41			c0.00	
v/s Ratio Perm	c0.09					0.07			0.01			
v/c Ratio	0.57	0.06		0.52	0.68	0.12	0.69	0.63	0.02		0.03	
Uniform Delay, d1	46.8	43.0		58.0	19.3	12.9	51.1	12.8	7.9		55.8	
Progression Factor	1.00	1.00		0.99	0.63	0.94	1.16	0.80	1.00		1.00	
Incremental Delay, d2	3.1	0.0		4.7	3.6	0.3	7.9	2.4	0.0		0.1	
Delay (s)	49.8	43.1		62.1	15.9	12.4	67.1	12.7	7.9		55.9	
Level of Service	D	D		E	B	B	E	B	A		E	
Approach Delay (s)	46.2				16.3			20.5			55.9	
Approach LOS	D				B			C			E	

Intersection Summary			
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	43	711	121	38	729
Future Volume (vph)	58	43	711	121	38	729
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	9	10
Total Lost time (s)	4.0	4.0	4.2	4.7	4.0	4.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.95	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1565	1400	1647	1420	1509	1594
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1565	1400	1647	1420	1509	1594
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	58	43	711	121	38	729
RTOR Reduction (vph)	0	39	0	30	0	0
Lane Group Flow (vph)	58	4	711	91	38	729
Confl. Peds. (#/hr)	24			18		
Confl. Bikes (#/hr)				18		
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8	2	2		
Actuated Green, G (s)	6.0	6.0	39.0	39.0	3.3	45.8
Effective Green, g (s)	5.5	5.5	39.5	39.0	2.8	46.3
Actuated g/C Ratio	0.09	0.09	0.66	0.65	0.05	0.77
Clearance Time (s)	3.5	3.5	4.7	4.7	3.5	4.7
Vehicle Extension (s)	2.0	2.0	2.5	2.5	2.0	2.5
Lane Grp Cap (vph)	143	128	1084	923	70	1230
v/s Ratio Prot	c0.04		c0.43		0.03	c0.46
v/s Ratio Perm		0.00		0.06		
v/c Ratio	0.41	0.03	0.66	0.10	0.54	0.59
Uniform Delay, d1	25.7	24.8	6.2	3.9	28.0	2.9
Progression Factor	1.00	1.00	0.79	0.28	0.91	1.50
Incremental Delay, d2	0.7	0.0	2.6	0.2	3.7	1.7
Delay (s)	26.4	24.9	7.5	1.3	29.1	6.0
Level of Service	C	C	A	A	C	A
Approach Delay (s)	25.7		6.6			7.2
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



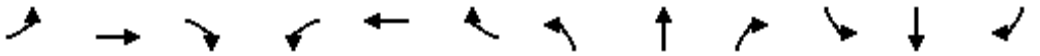
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	64	73	759	0	0	787
Future Volume (vph)	64	73	759	0	0	787
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	10	12	12	9
Total Lost time (s)	5.1	5.1	4.2			4.2
Lane Util. Factor	1.00	1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1732	1550	1647			1588
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1732	1550	1647			1588
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	64	73	759	0	0	787
RTOR Reduction (vph)	0	65	0	0	0	0
Lane Group Flow (vph)	64	8	759	0	0	787
Confl. Peds. (#/hr)				15		
Confl. Bikes (#/hr)				19		
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	7.2	7.2	43.5			43.5
Effective Green, g (s)	6.7	6.7	44.0			44.0
Actuated g/C Ratio	0.11	0.11	0.73			0.73
Clearance Time (s)	4.6	4.6	4.7			4.7
Vehicle Extension (s)	2.5	2.5	3.0			3.0
Lane Grp Cap (vph)	193	173	1207			1164
v/s Ratio Prot	c0.04		0.46			c0.50
v/s Ratio Perm		0.01				
v/c Ratio	0.33	0.05	0.63			0.68
Uniform Delay, d1	24.6	23.8	4.0			4.2
Progression Factor	1.00	1.00	1.71			0.84
Incremental Delay, d2	0.7	0.1	1.9			2.7
Delay (s)	25.3	23.9	8.7			6.3
Level of Service	C	C	A			A
Approach Delay (s)	24.6		8.7			6.3
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.3
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	17	18	741	91	87	764
Future Volume (vph)	17	18	741	91	87	764
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	12	10	12	9	10
Total Lost time (s)	4.1	4.1	4.2		3.5	4.2
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1732	1500	1615		1509	1647
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1732	1500	1615		1509	1647
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	17	18	741	91	87	764
RTOR Reduction (vph)	0	15	2	0	0	0
Lane Group Flow (vph)	17	3	830	0	87	764
Confl. Peds. (#/hr)	2			19		
Confl. Bikes (#/hr)				20		
Turn Type	Prot	pt+ov	NA		Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases						
Actuated Green, G (s)	8.6	21.6	90.7		9.4	103.1
Effective Green, g (s)	8.1	21.1	91.2		8.9	103.6
Actuated g/C Ratio	0.07	0.18	0.76		0.07	0.86
Clearance Time (s)	3.6		4.7		3.0	4.7
Vehicle Extension (s)	3.6		3.6		2.0	3.6
Lane Grp Cap (vph)	116	263	1227		111	1421
v/s Ratio Prot	c0.01	0.00	c0.51		c0.06	0.46
v/s Ratio Perm						
v/c Ratio	0.15	0.01	0.68		0.78	0.54
Uniform Delay, d1	52.7	40.8	7.1		54.6	2.1
Progression Factor	1.00	1.00	1.00		1.01	0.61
Incremental Delay, d2	0.7	0.0	3.0		22.5	1.1
Delay (s)	53.4	40.9	10.1		77.5	2.4
Level of Service	D	D	B		E	A
Approach Delay (s)	47.0		10.1			10.1
Approach LOS	D		B			B

Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.8
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	229	842	71	0	129	0	789	100	0	176	0
Future Volume (vph)	107	229	842	71	0	129	0	789	100	0	176	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	10	12	9	12	9	12	12	10	12
Total Lost time (s)		4.6	4.6	4.6		4.6		4.7	4.2		4.5	
Lane Util. Factor		0.95	*0.75	1.00		1.00		1.00	1.00		0.95	
Frpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	0.99		1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.98	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		3333	2197	1580		1363		1604	1495		3160	
Flt Permitted		0.98	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (perm)		3333	2197	1580		1363		1604	1495		3160	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	107	229	842	71	0	129	0	789	100	0	176	0
RTOR Reduction (vph)	0	0	0	0	0	120	0	0	31	0	0	0
Lane Group Flow (vph)	0	336	842	71	0	9	0	789	69	0	176	0
Confl. Bikes (#/hr)			7						2			2
Turn Type	Split	NA	custom	Prot		Perm		NA	Perm		NA	
Protected Phases	4	4	4 5	3				2			6	
Permitted Phases						3			2			
Actuated Green, G (s)		33.1	63.1	11.5		11.5		66.5	66.5		36.3	
Effective Green, g (s)		32.1	62.1	11.0		11.0		66.0	66.5		35.8	
Actuated g/C Ratio		0.21	0.41	0.07		0.07		0.44	0.44		0.24	
Clearance Time (s)		3.6		4.1		4.1		4.2	4.2		4.0	
Vehicle Extension (s)		2.5		2.5		2.5		3.0	3.0		3.0	
Lane Grp Cap (vph)		713	909	115		99		705	662		754	
v/s Ratio Prot		0.10	c0.38	c0.04				c0.49			0.06	
v/s Ratio Perm						0.01			0.05			
v/c Ratio		0.47	0.93	0.62		0.10		1.12	0.10		0.23	
Uniform Delay, d1		51.5	41.8	67.5		64.9		42.0	24.4		46.0	
Progression Factor		1.00	1.00	1.00		1.00		0.41	0.15		0.74	
Incremental Delay, d2		0.4	15.0	8.2		0.3		65.9	0.2		0.7	
Delay (s)		51.9	56.7	75.6		65.2		83.3	3.7		34.8	
Level of Service		D	E	E		E		F	A		C	
Approach Delay (s)		55.4			68.9			74.4			34.8	
Approach LOS		E			E			E			C	

Intersection Summary			
HCM 2000 Control Delay	61.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.7
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	99	3	119	12	738	126	189	865	35	32	3	11
Future Volume (vph)	99	3	119	12	738	126	189	865	35	32	3	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	11	12	9	9	11	9	10	12	12	12	12
Total Lost time (s)	4.6	4.6		4.0	4.2	4.2	4.0	4.2	4.7		4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.92	1.00	1.00	0.62		0.81	
Flpb, ped/bikes	0.54	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.96	
Satd. Flow (prot)	826	1464		1524	1604	1340	1524	1663	940		1347	
Flt Permitted	0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.96	
Satd. Flow (perm)	632	1464		1524	1604	1340	1524	1663	940		1347	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	99	3	119	12	738	126	189	865	35	32	3	11
RTOR Reduction (vph)	0	101	0	0	0	34	0	0	11	0	44	0
Lane Group Flow (vph)	99	21	0	12	738	92	189	865	24	0	2	0
Confl. Peds. (#/hr)	151					22			121			151
Confl. Bikes (#/hr)									10			1
Turn Type	Perm	Prot		Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	
Protected Phases		8		5	2		1	6		7	7	
Permitted Phases	8					2			6			
Actuated Green, G (s)	23.2	23.2		3.2	78.5	78.5	25.6	100.9	100.9		6.4	
Effective Green, g (s)	23.2	23.2		2.7	79.0	79.0	25.1	101.4	100.9		5.9	
Actuated g/C Ratio	0.15	0.15		0.02	0.53	0.53	0.17	0.68	0.67		0.04	
Clearance Time (s)	4.6	4.6		3.5	4.7	4.7	3.5	4.7	4.7		3.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.5	2.5	2.0	2.5	2.5		2.0	
Lane Grp Cap (vph)	97	226		27	844	705	255	1124	632		52	
v/s Ratio Prot		0.01		0.01	c0.46		0.12	c0.52			c0.00	
v/s Ratio Perm	c0.16					0.07			0.03			
v/c Ratio	1.02	0.09		0.44	0.87	0.13	0.74	0.77	0.04		0.03	
Uniform Delay, d1	63.4	54.4		72.9	31.1	18.0	59.4	16.4	8.2		69.3	
Progression Factor	1.00	1.00		0.86	0.63	0.68	0.77	0.51	0.84		1.00	
Incremental Delay, d2	97.1	0.1		3.1	9.5	0.3	7.4	3.9	0.1		0.1	
Delay (s)	160.5	54.5		65.5	29.2	12.5	53.4	12.2	7.0		69.4	
Level of Service	F	D		E	C	B	D	B	A		E	
Approach Delay (s)	101.9				27.3			19.2			69.4	
Approach LOS	F				C			B			E	

Intersection Summary			
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	99	107	769	177	92	883
Future Volume (vph)	99	107	769	177	92	883
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	9	10
Total Lost time (s)	4.0	4.0	4.2	4.7	4.0	4.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.93	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1580	1414	1663	1406	1524	1610
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1580	1414	1663	1406	1524	1610
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	99	107	769	177	92	883
RTOR Reduction (vph)	0	95	0	41	0	0
Lane Group Flow (vph)	99	12	769	136	92	883
Confl. Peds. (#/hr)	41			26		
Confl. Bikes (#/hr)				18		
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8	2	2		
Actuated Green, G (s)	8.6	8.6	46.6	46.6	8.1	58.2
Effective Green, g (s)	8.1	8.1	47.1	46.6	7.6	58.7
Actuated g/C Ratio	0.11	0.11	0.63	0.62	0.10	0.78
Clearance Time (s)	3.5	3.5	4.7	4.7	3.5	4.7
Vehicle Extension (s)	2.0	2.0	2.5	2.5	2.0	2.5
Lane Grp Cap (vph)	170	152	1044	873	154	1260
v/s Ratio Prot	c0.06		0.46		0.06	c0.55
v/s Ratio Perm		0.01		0.10		
v/c Ratio	0.58	0.08	0.74	0.16	0.60	0.70
Uniform Delay, d1	31.8	30.1	9.7	6.0	32.2	3.9
Progression Factor	1.00	1.00	1.00	1.11	1.03	1.15
Incremental Delay, d2	3.3	0.1	3.8	0.3	2.5	2.0
Delay (s)	35.1	30.2	13.4	6.9	35.7	6.5
Level of Service	D	C	B	A	D	A
Approach Delay (s)	32.5		12.2			9.3
Approach LOS	C		B			A

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



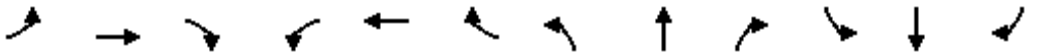
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	155	192	754	0	0	982
Future Volume (vph)	155	192	754	0	0	982
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	10	12	12	9
Total Lost time (s)	5.1	5.1	4.2			4.2
Lane Util. Factor	1.00	1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1750	1565	1663			1604
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1750	1565	1663			1604
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	155	192	754	0	0	982
RTOR Reduction (vph)	0	166	0	0	0	0
Lane Group Flow (vph)	155	26	754	0	0	982
Confl. Peds. (#/hr)				35		
Confl. Bikes (#/hr)				19		
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	10.6	10.6	55.1			55.1
Effective Green, g (s)	10.1	10.1	55.6			55.6
Actuated g/C Ratio	0.13	0.13	0.74			0.74
Clearance Time (s)	4.6	4.6	4.7			4.7
Vehicle Extension (s)	2.5	2.5	3.0			3.0
Lane Grp Cap (vph)	235	210	1232			1189
v/s Ratio Prot	c0.09		0.45			c0.61
v/s Ratio Perm		0.02				
v/c Ratio	0.66	0.12	0.61			0.83
Uniform Delay, d1	30.8	28.6	4.6			6.5
Progression Factor	1.00	1.00	1.69			0.69
Incremental Delay, d2	5.9	0.2	0.9			5.1
Delay (s)	36.7	28.7	8.7			9.5
Level of Service	D	C	A			A
Approach Delay (s)	32.3		8.7			9.5
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.3
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	34	64	690	259	319	818
Future Volume (vph)	34	64	690	259	319	818
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	12	10	12	9	10
Total Lost time (s)	4.1	3.5	4.2		3.5	4.2
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1750	1515	1559		1524	1663
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1750	1515	1559		1524	1663
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	34	64	690	259	319	818
RTOR Reduction (vph)	0	44	6	0	0	0
Lane Group Flow (vph)	34	20	943	0	319	818
Confl. Peds. (#/hr)	6			47		
Confl. Bikes (#/hr)				20		
Turn Type	Prot	pt+ov	NA		Prot	NA
Protected Phases	8	1 8	2		1	6
Permitted Phases						
Actuated Green, G (s)	10.6	50.9	91.4		36.7	131.1
Effective Green, g (s)	10.1	46.3	91.9		36.2	131.6
Actuated g/C Ratio	0.07	0.31	0.61		0.24	0.88
Clearance Time (s)	3.6		4.7		3.0	4.7
Vehicle Extension (s)	3.6		3.6		2.0	3.6
Lane Grp Cap (vph)	117	467	955		367	1459
v/s Ratio Prot	c0.02	0.01	c0.60		c0.21	0.49
v/s Ratio Perm						
v/c Ratio	0.29	0.04	0.99		0.87	0.56
Uniform Delay, d1	66.5	36.3	28.5		54.6	2.2
Progression Factor	1.00	1.00	1.00		1.02	0.88
Incremental Delay, d2	1.7	0.0	26.2		11.8	0.9
Delay (s)	68.2	36.3	54.7		67.3	2.9
Level of Service	E	D	D		E	A
Approach Delay (s)	47.4		54.7			20.9
Approach LOS	D		D			C

Intersection Summary			
HCM 2000 Control Delay	36.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	11.8
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	265	812	91	0	193	0	860	95	0	219	0
Future Volume (vph)	118	265	812	91	0	193	0	860	95	0	219	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	10	12	9	12	9	12	12	10	12
Total Lost time (s)		4.6	4.6	4.6		4.6		4.7	4.2		4.5	
Lane Util. Factor		0.95	*0.75	1.00		1.00		1.00	1.00		0.95	
Frpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	0.99		1.00	
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.98	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		3335	2197	1580		1363		1604	1495		3160	
Flt Permitted		0.98	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (perm)		3335	2197	1580		1363		1604	1495		3160	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	118	265	812	91	0	193	0	860	95	0	219	0
RTOR Reduction (vph)	0	0	0	0	0	177	0	0	31	0	0	0
Lane Group Flow (vph)	0	383	812	91	0	16	0	860	64	0	219	0
Confl. Bikes (#/hr)			7						2			2
Turn Type	Split	NA	custom	Prot		Perm		NA	Perm		NA	
Protected Phases	4	4	4 5	3				2			6	
Permitted Phases						3			2			
Actuated Green, G (s)		31.6	61.5	12.9		12.9		67.4	67.4		37.3	
Effective Green, g (s)		30.6	60.5	12.4		12.4		66.9	67.4		36.8	
Actuated g/C Ratio		0.20	0.40	0.08		0.08		0.45	0.45		0.25	
Clearance Time (s)		3.6		4.1		4.1		4.2	4.2		4.0	
Vehicle Extension (s)		2.5		2.5		2.5		3.0	3.0		3.0	
Lane Grp Cap (vph)		680	886	130		112		715	671		775	
v/s Ratio Prot		0.11	c0.37	c0.06				c0.54			0.07	
v/s Ratio Perm						0.01			0.04			
v/c Ratio		0.56	0.92	0.70		0.14		1.20	0.10		0.28	
Uniform Delay, d1		53.7	42.4	67.0		63.9		41.5	23.8		45.9	
Progression Factor		1.00	1.00	1.00		1.00		0.51	0.43		0.81	
Incremental Delay, d2		0.9	13.9	14.1		0.4		100.0	0.2		0.9	
Delay (s)		54.6	56.3	81.1		64.3		121.2	10.3		38.0	
Level of Service		D	E	F		E		F	B		D	
Approach Delay (s)		55.7			69.7			110.2			38.0	
Approach LOS		E			E			F			D	

Intersection Summary			
HCM 2000 Control Delay	75.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.7
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Traffic Volume (vph)	100	3	185	32	736	108	216	865	41	34	3	46
Future Volume (vph)	100	3	185	32	736	108	216	865	41	34	3	46
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	11	12	9	9	11	9	10	12	12	12	12
Total Lost time (s)	4.6	4.6		4.0	4.2	4.2	4.0	4.2	4.7		4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.93	1.00	1.00	0.51		0.57	
Flpb, ped/bikes	0.49	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85		0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	750	1464		1524	1604	1358	1524	1663	777		915	
Flt Permitted	0.70	1.00		0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (perm)	555	1464		1524	1604	1358	1524	1663	777		915	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	3	185	32	736	108	216	865	41	34	3	46
RTOR Reduction (vph)	0	164	0	0	0	38	0	0	13	0	79	0
Lane Group Flow (vph)	100	24	0	32	736	70	216	865	28	0	4	0
Confl. Peds. (#/hr)	190					18			158			190
Confl. Bikes (#/hr)									10			1
Turn Type	Perm	Prot		Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	
Protected Phases		8		5	2		1	6		7	7	
Permitted Phases	8					2			6			
Actuated Green, G (s)	16.8	16.8		5.6	85.5	85.5	23.3	103.2	103.2		8.1	
Effective Green, g (s)	16.8	16.8		5.1	86.0	86.0	22.8	103.7	103.2		7.6	
Actuated g/C Ratio	0.11	0.11		0.03	0.57	0.57	0.15	0.69	0.69		0.05	
Clearance Time (s)	4.6	4.6		3.5	4.7	4.7	3.5	4.7	4.7		3.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.5	2.5	2.0	2.5	2.5		2.0	
Lane Grp Cap (vph)	62	163		51	919	778	231	1149	534		46	
v/s Ratio Prot		0.02		0.02	c0.46		c0.14	0.52			c0.00	
v/s Ratio Perm	c0.18					0.05			0.04			
v/c Ratio	1.61	0.15		0.63	0.80	0.09	0.94	0.75	0.05		0.09	
Uniform Delay, d1	66.6	60.1		71.5	25.2	14.4	62.9	14.9	7.6		67.9	
Progression Factor	1.00	1.00		0.93	0.91	1.64	1.32	0.60	1.66		1.00	
Incremental Delay, d2	338.1	0.2		12.0	5.4	0.2	34.4	3.5	0.1		0.3	
Delay (s)	404.7	60.3		78.3	28.3	23.7	117.6	12.4	12.7		68.2	
Level of Service	F	E		E	C	C	F	B	B		E	
Approach Delay (s)	179.9				29.6			32.7			68.2	
Approach LOS	F				C			C			E	

Intersection Summary			
HCM 2000 Control Delay	50.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	123	141	735	129	84	927
Future Volume (vph)	123	141	735	129	84	927
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	9	10
Total Lost time (s)	4.0	4.0	4.2	4.7	4.0	4.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.89	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1580	1414	1663	1343	1524	1610
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1580	1414	1663	1343	1524	1610
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	123	141	735	129	84	927
RTOR Reduction (vph)	0	121	0	35	0	0
Lane Group Flow (vph)	123	20	735	94	84	927
Confl. Peds. (#/hr)	65			52		
Confl. Bikes (#/hr)				18		
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8	2	2		
Actuated Green, G (s)	10.9	10.9	44.6	44.6	7.8	55.9
Effective Green, g (s)	10.4	10.4	45.1	44.6	7.3	56.4
Actuated g/C Ratio	0.14	0.14	0.60	0.59	0.10	0.75
Clearance Time (s)	3.5	3.5	4.7	4.7	3.5	4.7
Vehicle Extension (s)	2.0	2.0	2.5	2.5	2.0	2.5
Lane Grp Cap (vph)	219	196	1000	798	148	1210
v/s Ratio Prot	c0.08		0.44		0.06	c0.58
v/s Ratio Perm		0.01		0.07		
v/c Ratio	0.56	0.10	0.73	0.12	0.57	0.77
Uniform Delay, d1	30.2	28.2	10.7	6.6	32.3	5.4
Progression Factor	1.00	1.00	0.81	0.37	0.92	1.67
Incremental Delay, d2	2.0	0.1	4.2	0.3	1.6	2.6
Delay (s)	32.1	28.3	12.8	2.7	31.4	11.7
Level of Service	C	C	B	A	C	B
Approach Delay (s)	30.1		11.3			13.3
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	175	209	655	0	0	1050
Future Volume (vph)	175	209	655	0	0	1050
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	13	10	12	12	9
Total Lost time (s)	5.1	5.1	4.2			4.2
Lane Util. Factor	1.00	1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1750	1565	1663			1604
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1750	1565	1663			1604
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	175	209	655	0	0	1050
RTOR Reduction (vph)	0	179	0	0	0	0
Lane Group Flow (vph)	175	30	655	0	0	1050
Confl. Peds. (#/hr)				28		
Confl. Bikes (#/hr)				19		
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	11.3	11.3	54.4			54.4
Effective Green, g (s)	10.8	10.8	54.9			54.9
Actuated g/C Ratio	0.14	0.14	0.73			0.73
Clearance Time (s)	4.6	4.6	4.7			4.7
Vehicle Extension (s)	2.5	2.5	3.0			3.0
Lane Grp Cap (vph)	252	225	1217			1174
v/s Ratio Prot	c0.10		0.39			c0.65
v/s Ratio Perm		0.02				
v/c Ratio	0.69	0.13	0.54			0.89
Uniform Delay, d1	30.5	28.0	4.4			7.8
Progression Factor	1.00	1.00	1.35			1.09
Incremental Delay, d2	7.4	0.2	1.2			7.4
Delay (s)	38.0	28.2	7.2			16.0
Level of Service	D	C	A			B
Approach Delay (s)	32.7		7.2			16.0
Approach LOS	C		A			B

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.3
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	49	43	612	190	230	995
Future Volume (vph)	49	43	612	190	230	995
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	13	12	10	12	9	10
Total Lost time (s)	4.1	3.5	4.2		3.5	4.2
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1750	1515	1584		1524	1663
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1750	1515	1584		1524	1663
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	49	43	612	190	230	995
RTOR Reduction (vph)	0	32	4	0	0	0
Lane Group Flow (vph)	49	11	798	0	230	995
Confl. Peds. (#/hr)	9			30		
Confl. Bikes (#/hr)				20		
Turn Type	Prot	pt+ov	NA		Prot	NA
Protected Phases	8	1 8	2		1	6
Permitted Phases						
Actuated Green, G (s)	13.8	44.4	97.9		27.0	127.9
Effective Green, g (s)	13.3	39.8	98.4		26.5	128.4
Actuated g/C Ratio	0.09	0.27	0.66		0.18	0.86
Clearance Time (s)	3.6		4.7		3.0	4.7
Vehicle Extension (s)	3.6		3.6		2.0	3.6
Lane Grp Cap (vph)	155	401	1039		269	1423
v/s Ratio Prot	c0.03	0.01	c0.50		c0.15	0.60
v/s Ratio Perm						
v/c Ratio	0.32	0.03	0.77		0.86	0.70
Uniform Delay, d1	64.1	40.8	17.9		59.9	3.9
Progression Factor	1.00	1.00	1.00		0.92	1.03
Incremental Delay, d2	1.4	0.0	5.4		11.9	1.4
Delay (s)	65.5	40.8	23.3		66.9	5.4
Level of Service	E	D	C		E	A
Approach Delay (s)	54.0		23.3			17.0
Approach LOS	D		C			B

Intersection Summary			
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	11.8
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Appendix E

Hazards Memorandum

Hazards Memorandum - Adjacent Regulated Facility Review

40th Street Transit Multi-Modal Project

Federal Project No. STPL 5106(010)

Emeryville, CA

Caltrans Office of Local Assistance - District 4

Mr. Dan Rivas
111 Grand Avenue #300
Oakland, CA 94612

November 7, 2025

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Collaboration. Commitment. Confidence.℠

Hazards Memorandum – Adjacent Regulated Facility Review

40th Street Transit Multi-Modal Project

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Emeryville, CA

November 7, 2025

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Attachment 1 – Deed Restriction Map

Attachment 2 – EDR Radius Report

1 Introduction

At the request of the Caltrans Office of Local Assistance (Caltrans), NCE prepared this Memorandum discussing potential impacts of regulated properties near the 40th Street Transit Multi-Modal Project (Site, Project) (Figure 1). Caltrans has requested that this Memorandum identify possible hazards that may affect worker safety and future users of the Site related to deed restricted properties that are currently protected by an engineered cap that covers soils impacted with various contaminants as further described below. The planned Project improvements along the Shellmound Street transportation corridor include light poles, pedestrian barricades, traffic signs, and traffic signals. It is assumed that constructing these improvements may involve varying depths of excavations, some of which may be below the cap into soil that may be impacted with heavy metals or other regulated constituents of concern. The thickness of the cap is a minimum of 2.1 feet deep, consisting of the roadway structural section. Hazardous materials are underlying existing infrastructure. The following planned improvements along Shellmound Street could exceed the depth of existing improvements and may reach the top of or the cap or even penetrate the cap completely. These features are identified on Figure 1 and include the following:

- 15-foot tall Pedestrian scaled lighting pole will require foundations that are 2.5-foot diameter and up to 7 feet deep. Intersection lighting will have the same maximum foundation size but support structure itself could be up to 35 feet tall.
- Signal modifications may require excavation to a depth up to 14 feet below ground surface with a diameter of 4 feet. Minor trenching for supporting conduits will be required, typically 30 inches deep and up to 42 inches deep; however, given the potential hazardous materials in the Shellmound Street area, the conduits are planned to be installed within a 24 inch depth, within and not penetrating the bottom of the cap.

1.1 Regulatory Review

The project occurs along Shellmound Street and 40th Street beginning south of Powell Street and extends eastward along 40th Street to Adeline Street (Attachment 1). Based on information provided by Diablo Engineering Group and the City of Emeryville, review of regulatory databases, review of a Radius Report provided by Environmental Data Resources Inc. (EDR), and review of design drawings, some areas slated for improvements overlap with facilities that have previously identified impacted soil and groundwater with multiple regulated chemicals.

1.1.1 Radius Map Report and Regulatory Database Review

NCE conducted a records search using electronic database services provided by EDR, the State Water Resources Control Board's GeoTracker Database, and the State of California Department of Toxic Substances Control's EnviroStor database. The Radius Report is a listing of facilities identified on select federal and state standard source environmental databases. NCE reviewed each database in the report. The discussion below details current and former facilities provided in the EDR Report and the online databases GeoTracker and EnviroStor that are adjacent to the project alignment and have stored, used, or had releases to soil and/or groundwater of hazardous substances. The Radius Report is included as Attachment 2.

Previous investigations regarding these facilities that were available in the online databases were reviewed to assess potentially adverse adjacent soil conditions along the Project corridor and evaluate groundwater elevation and flow direction as it pertains to impacts that may affect worker safety and construction. Historical depth to groundwater in the vicinity of the project is approximately 6 to 8 feet below ground surface (bgs), and groundwater flow is generally to the west. Since excavations related to project improvement are likely to reach groundwater, impacts to groundwater in the Site vicinity could potentially affect project construction or worker safety. Soil impacts adjacent to the Site were also reviewed. The following facilities may affect project construction or worker safety where the engineered cap is penetrated.

- **South Bayfront Shellmound Deed Restriction – 4650, 5500, 5600 Shellmound Street (Formerly 5700 Bay Street)**

This former industrial site in Emeryville, California is listed in the EnviroStor database as a voluntary cleanup project. This property is subject to deed restrictions as of 2000. Refer to Figure 1 for the deed restriction boundary (shown as red shading). The site was previously used for paint manufacturing, pesticide manufacturing, and vehicle maintenance, which led to soil and potentially groundwater contamination. The primary contaminants of concern include arsenic, lead, trichloroethylene (TCE), chromium VI, and copper compounds. Site cleanup occurred in 1999-2000 to address concerns primarily related to metals and chlorinated solvents in soil and groundwater. During cleanup operations, over 42,000 tons of contaminated soil and 600,000 gallons of contaminated groundwater were disposed of offsite. The site was certified by DTSC as cleaned up in August 2000, but it remains under operation and maintenance status. A Risk Management Plan (RMP) was approved by DTSC in 2000 which outlined the procedures for long-term operations and monitoring of the site related to the residual levels of hazardous substances that remain at the site.

As outlined in the RMP, the entire site must remain covered with a cap that consists of buildings, paving, or landscaping to prevent exposure to contaminated soils. In landscaped areas, a minimum of 3 feet of clean soil must be placed over a distinctive marker fabric to separate it from underlying impacted soils. This marker fabric must be water permeable, colored distinctly from brown, and have a minimum tensile strength of 50 lbs/foot. Irrigation systems in landscaped areas must be installed within the clean fill layer. Building owners and ground lessees are responsible for routinely inspecting and maintaining this cover system. Annual inspections are required to ensure the cap remains intact and effective in preventing exposure to contaminated soils.

Project-specific Soil Management Plans (and Groundwater Management Plans) are required for work at the site that involve breaching the cap and subsurface work that could potentially encounter the cap and/or contaminated soils and groundwater.

Site restrictions, required notifications, and prohibited activities are as follows:

- Day care center prohibited
- Elder care center prohibited
- Hospital use prohibited
- Maintain monitoring of groundwater
- No groundwater extraction at any depth without approval
- Notify after change of property owner

- Only extraction of groundwater for site remediation permitted
- Public or private school for persons under 21 prohibited
- Raising of food prohibited
- Requires surface covers

Conclusion: Impacted groundwater and soils associated with the Site are likely to be encountered during subsurface construction activities for the Project.

- **Pfizer Pigments/Elementis Pigments – 4650 Shellmound Street (South Bayfront Shellmound Deed Restriction)**

This is a 12-acre parcel located at 4650 Shellmound Street. The Site is bordered on the north south and west by industrial facilities. Environmental investigations show soil and groundwater contamination, attributed to leaking underground storage tanks (USTs) that contained petroleum hydrocarbons, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs). Arsenic, lead, and zinc were also detected in proximity to the UST locations.

Three UST removal events have occurred at this Site in 1987, 1989, and 1999 with a total of 14 USTs being removed. Various phases of assessment were completed between 1988 through 2000. A total of 684 cubic yards of impacted soil and 15,000 gallons of excavation water have been removed from the Site. Groundwater monitoring was conducted between 1988 and 1995.

The Site is within an area wide assessment solvent investigation under the jurisdiction of DTSC. The property is incorporated into the Shellmound Properties development and is subject to land use covenants stipulated in the South Bayfront Properties Covenant to Restrict Use of Property. According to the case closure review report in 2010, there was no estimate of hydrocarbon mass in soil. The groundwater monitoring data available from 1988 to 1995 for this site indicate that petroleum hydrocarbons are not the primary contaminant at the Site and that solvents are present in the area and under the supervision of DTSC.

Ongoing environmental management includes periodic groundwater monitoring. The most recent data from monitoring well EBS4, situated near the former UST locations, indicates non-detectable levels of benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tert-butyl ether (MTBE), diisopropyl ether (DIPE), and tert-butyl alcohol (TBA) since May 2003. The site's status transitioned to 'closed' as of August 22, 2000, according to DTSC records. However, DTSC maintains active oversight of the Corrective Action Plan (CAP) maintenance.

Conclusion: Impacted groundwater and soils associated with the Site are likely to be encountered during subsurface construction activities for the Project.

- **Shellmound Venture Deed Restriction – 5555 Shellmound Street**

The approximately 7.5 acre site is subdivided into three separate parcels and is bisected by Shellmound Street and Temescal Creek. The former Parcel III is located at 5555 Shellmound Street and is occupied by the Marriott Courtyard Hotel. The former Parcel II is a vacant lot immediately south of Parcel III, with Temescal Creek separating the two parcels. Former Parcel I and a portion of the former Parcel II are located on the east side of Shellmound Street and are a part of the Bay Street Emeryville retail complex. This property is subject to deed restrictions as of 1998. Refer to Figure 1 for the deed restriction boundary (shown as dark pink shading). The site

was formerly part of the Judson Steel Corp. founded in 1882. Judson Steel mainly used the site for storage and disposal of slag material. Potential contaminants of concern in soil include beryllium, total chromium, lead, arsenic and PCBs.

There is a "cap" that appears to be primarily the existing pavement and building structures and subject to annual inspection which includes ensuring compliance with an existing Land Use Covenant (LUC).

Results of the last soil investigation in 2019, conducted near the southwestern portion of the intersection of Ohlone way and Shellmound street, indicated no detection of VOCs and classified the soil as non-Resource Conservation and Recovery Act (RCRA) hazardous waste, with Soluble Threshold Limit Concentration (STLC) exceedances for lead, chromium, and cadmium. Maximum total contaminant concentrations were found to be 15 mg/kg for arsenic and 1,100 mg/kg for lead. Based on these results, primary exposure routes for workers were identified as dermal contact, inhalation, and ingestion of soil impacted with lead, chromium, and arsenic.

According to the LUC for the property, the following restrictions apply to the Site:

- Restricted for use as a commercial hotel, commercial office or industrial uses, and surface parking
- No residential development for human habitation except for the hotel
- No hospitals, health care clinics, or schools for persons under 21 years of age
- No drilling for drinking water
- No raising of food
- No activities which will disturb the soil (e.g., excavation, grading, removal, trenching, filling, earth movement or mining) without DTSC's prior written approval of a Soil Management Plan
- No activities which may cause a potential threat to public health and the environment
- 30 days advance notification to DTSC of any sale, lease or other conveyance of the property, or an interest in the property to a third person.

Conclusion: Impacted groundwater and soils associated with the Site are likely to be encountered during subsurface construction activities for the Project.

- **Shellmound Street Deed Restriction– 4300 Eastshore Highway**

The site was the construction of a new city street that included existing segments of Shellmound Street and a new overhead bridge structure in the City of Emeryville. The 40th Street overhead bridge construction required excavation of contaminated soils in 1994-1995. Construction of the new city street (Shellmound Street extension) required excavation of contaminated soils in 1995-1996.

The site is subject to deed restrictions as of 1996. Refer to Figure 1 for deed restriction boundary (shown as blue shading). This property was formerly used for steel manufacturing. Soil at this site is contaminated with heavy metals including arsenic, lead, and zinc in the soil, likely from fill material.

The property is covered with asphalt roadway, referred to as "Cap". No further details are provided in the deed restriction regarding the cap's structure or layers. Any disturbance or alteration to the cap requires prior written approval from DTSC, and any damage must be promptly repaired and reported.

According to the deed restriction, the following restrictions apply to the Site:

- Day care center prohibited
- Elder care center prohibited
- Hospital use prohibited
- Land use covenant
- No activities which will disturb the soil (e.g., excavation, grading, removal, trenching, filling, earth movement or mining) without DTSC's prior written approval of a Soil Management Plan
- Notify after change of property owner
- Notify damages to remedy and monitoring systems upon discovery
- Residence use prohibited

Conclusion: Impacted soils associated with the Site are likely to be encountered during construction activities for the Project.

- **Powell Street Plaza- 5500 Eastshore Highway**

Powell Street Plaza is located at 5500 Eastshore Highway in Emeryville, California, in Alameda County. The Site is directly adjacent to the north of the Shellmound Venture Deed Restriction, identified in dark pink on Figure 1. The site has a history of industrial use and contamination from underground storage tanks, including a gas tank spill in the 1970s. Eight underground tanks were removed, and contaminated soil was excavated and treated. Despite initial remediation efforts, additional contamination was found, prompting further assessment and cleanup activities. A shopping mall was eventually built on the property. Regulatory oversight included Site Screening in 1987 and a Preliminary Assessment Report in 1988. The case was closed in 2001, and no additional information about the site's status or any subsequent environmental activities is available.

Conclusion: Impacted soils associated with the Site may be encountered during construction activities for the Project.

- **Myers Drum Company/Meyers Container Corporation- 4500 Shellmound Street**

Meyers Drum Company is located at 4500 SHellmound Street in Emeryville, California, in Alameda County and was a historical industrial fabricated metal products facility. The online GeoTracker database lists this facility as having potential contaminants of concern that include metals, VOCs, organochlorine pesticides (OCPs), and chlorinated solvents. Reports, investigations, or regulatory correspondence regarding specific details pertaining to impacts at this facility were not available on the GeoTracker database. The HIST UST database lists 2 historical USTs at the Site, one listed as a 3,000-gallon waste UST, and the other listed as a 4,500-gallon waste UST. The HAZNET database indicated that approximately 14 tons of contaminated soil from a site cleanup was disposed of in 2000, .688 tons of oil/water separation sludge was recycled in 1999, 46 tons of inorganic solid waste was disposed of in 1998, and other disposals likely pertaining to the demolition of the former facility structures between 1996 and 1999. The CA HIST Cal-Sites database indicates that as of 1998, 5317 yards of contaminated soil was removed and backfilled with clean soil, and 16 wells (presumably groundwater monitoring wells) we decommissioned, indicating that groundwater monitoring and possibly remediation took place at the facility.

Conclusion: Although no records are provided documenting residual soil impacts remaining at this location, impacted soils may be encountered during construction activities for the Project.

- **6707 Bayview Apartments – 6707 Bay Street**

6707 Bayview Apartments is located at 6701, 6705, and 6707 Shellmound Street in Emeryville, California. This is the former location of an industrial development dating from 1963 to 1989 that used solvents including 4-methyl-2-pentanone and 2-butanone in the manufacture of tape labels and other industrial printing. These solvents were stored in 3 USTs which were removed in 1989. The Site buildings were demolished in 2019 and the location is undeveloped and vacant. Investigations conmducted between 2014 and 2017 identified elevated concentrations of VOCs in soil and soil vapor beneath this location. A soil vapor extraction system was installed in the southwestern portion of the Site. In 2019 and 2020, excavation of impacted soil was performed at the Site. Post excavation soil and soil vapor sampling were conduicted at the Site, and concentrations of VOCs in soil and soil vapor beneath the facility were found to be below the target cleanup levels set by Alameda County Department of Environmental Health (ACDEH). In February 2020, ACDEH granted no further action to this facility.

Apartment buildings are scheduled to be constructed at this location, and a soil cap is planned for the perimeter of the property, bounded by Shellmound Street on the east, and the Interstate 80 right-of way on the north and west.

1.2 Conclusions

Based on the review of regulatory documents for facilities within and adjacent to the Project, NCE presents the following conclusions:

- Groundwater is unlikely to be encountered in Project construction.
- Areas of the Project where construction will occur that are outside of Deed restricted areas are not subject to avoidance/minimization measures.

Attachment 1

Deed Restriction Map



Legend

- South Bayfront Deed Restriction
- Shellmound Venture Deed Restriction
- Shellmound Street Deed Restriction
- Shellmound and 40th Street Cap
- Light Standard
- Ped Barricade
- Traffic Signal
- Stormdrain
- Traffic Sign

NCE

DIABLO ENGINEERING GROUP

40th Street Multi-Modal Project

Deed Restriction Map
Emeryville, CA

N

0 1 in. = 275 ft. 550 ft. 550

FIGURE 1

SOURCE	JOB NUMBER	DRAWN	DATE	REVISED	APPROVED
Bing Aerial Basemap	803.11.55	kouthwaite	10/18/2024	-	-

Document Path: P:\Active Projects\Diablo Engineering - 803\803.11.55 - 40th Street Improvements\GIS\AGP\kouthwaite\40th Street - kouthwaite.aprx

Attachment 2

EDR Radius Report

Available upon request