SDOT

Seattle Department of Transportation

Fairview Avenue N Bridge Replacement Project

Appendix D

Contents

City of Seattle (SDOT)

Alternatives Analysis Discipline Report

Fairview Avenue North Bridge

August 2014

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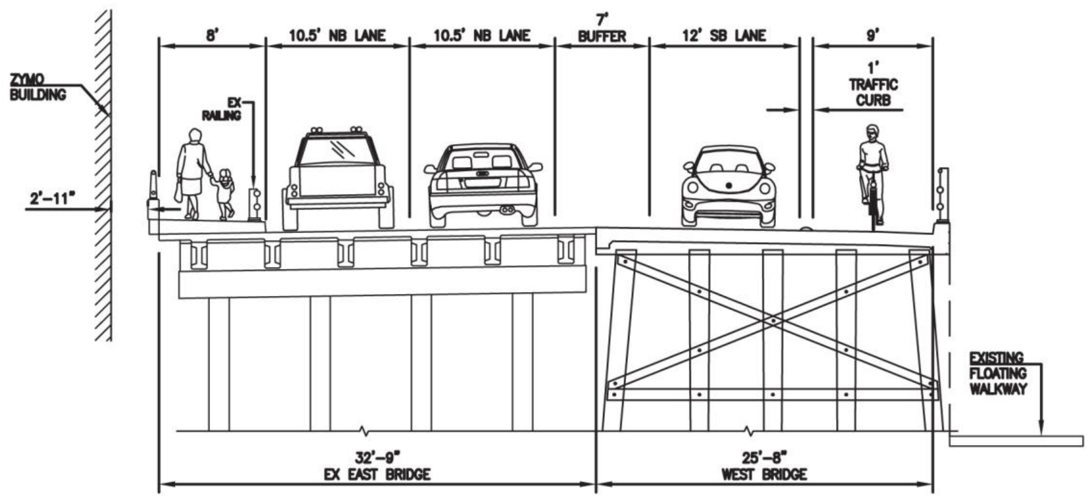
Introduction

The City of Seattle Department of Transportation (SDOT) proposes to replace two existing bridges (East and West Bridge) on Fairview Avenue North, with a single new bridge spanning a portion of the southeast shoreline of Lake Union, in Seattle, Washington (Figure 1). The project is located within the northwest quarter of Section 19, Township 25 North, Range 04 East.

Figure 1 – Vicinity Map

During the initial screening and preliminary evaluation of alternatives phase of the project, SDOT evaluated many elements as part of the preliminary design process prior to selecting the proposed project. This report has been prepared to document the process and analyses used to arrive at the decision to advance the preferred project.

The existing bridges consist of two side-by-side structures, and a floating pedestrian walkway in lake Union (Figure 2). The West Bridge, built in 1948, carries one lane of southbound traffic and one mixed use (bicycle and pedestrian) lane. The East Bridge, built in 1963 carries two northbound lanes and a sidewalk. The West Bridge has a concrete deck and is supported on creosote treated timber piles, many of which are deteriorated and in poor condition or previously repaired. The East Bridge has a superstructure consisting of prestressed concrete girders with a cast-in-place concrete deck supported on pre-cast concrete piles. The existing girders on the East Bridge have shear cracks at the ends near the piers which are impacting the bridges sufficiency rating.



EXISTING CONDITION

Figure 2. Existing Bridge Section
Source: HNTB and Perteet (2013)

Purpose and Need

The purpose of this project is to maintain the transportation function and capacity on Fairview Avenue North and improve safety within the roadway corridor by replacing the existing deteriorating bridges with a new structure. The project is needed because the existing bridges are aging and do not meet current seismic or design standards and will not accommodate a street car in the future.

The new roadway section needs to be approximately 65 feet wide to accommodate two northbound travel lanes, one southbound travel lane, a two-way cycle track, sidewalks along the east and west side of the bridge, and meet current standards for lane widths. The number of travel lanes is the same as the existing condition. The City's South Lake Union Streetcar line currently terminates approximately 0.15 mile southwest of the bridges. There are no formal proposals to extend the streetcar line northward, but SDOT has determined that the planned replacement for the existing bridges should be designed to accommodate the streetcar. The new mixed use trail/sidewalk and cycle track will provide connectivity for the Cheshiahud Lake Union Loop trail within the project corridor and will replace existing pedestrian and bicycle facilities that do not meet current design standards.

Screening and Preliminary Evaluation of Alternatives

A Type, Size and Location (TS&L) report was prepared to document and compile all the analysis and investigations that were completed to establish a preferred alternative for advancing the project to final design and construction. The design standards that apply to the project are summarized in Appendix A of the TS&L report (HNTB and Perteet, July 2013). The alternatives evaluation and screening process involved identifying, evaluating, and screening a range of roadway fill, bridge replacement, and bridge rehabilitation alternatives to identify a preferred alternative. This process included the following:

- Developing design criteria and alternative conceptual designs,
- Identifying evaluation criteria for the alternatives screening,
- Evaluating the feasibility of alternatives, and
- Conducting a series of alternatives screening meetings with the City to select a preferred alternative.

Preliminary Alternatives

SDOT directed the pre-design engineering team to evaluate three basic options to address the issues of the structural deficiency of the West and East Bridges. The first scenario was to completely replace the two existing bridge structures with a new roadway fill embankment. An embankment fill option was proposed because it addressed perceived constructability issues with a structural alternative, potentially had less impacts resulting from noise and vibration as a structural alternative and would eliminate the long term operations and maintenance cost of a structure. The second option was the complete replacement of the two existing bridges with a single new structure. The third option included the replacement of the existing West Bridge and the rehabilitation of the existing East Bridge to provide two structures with similar anticipated service lives.

Based on these options, SDOT identified 10 initial concepts that were evaluated at a preliminary screening level. These concepts included three fill alternatives, four complete bridge replacement alternatives, and three West Bridge replacement only alternatives. These initial concepts were not complete project alternatives, rather they were intended to represent a wide range of technologies and techniques available at that time to address the purpose and need of the project.

From the 10 initial concepts, SDOT developed three project alternatives for formal evaluation:

- Roadway Fill Alternative (identified as alternative F1 in the TS&L report) – Roadway embankment fill section supported by retaining walls with a fill slope extending into Lake Union.
- Complete Replacement (identified as alternative C5 in the TS&L report) – Full replacement of the West and East Bridges with a prestressed concrete girder superstructure supported on 8-foot-diameter drilled shaft foundations.
- Replace West Bridge and Rehabilitate East Bridge (identified as alternative R4 in the TS&L report) – Replace the West Bridge with a new bridge adjacent to the existing East Bridge constructed with a prestressed concrete girder superstructure supported on 8-foot-diameter drilled shaft foundations.

Roadway Fill Alternative

The Roadway Fill Alternative would completely replace the existing East and West Fairview Avenue North Bridges with a roadway fill section (Figure 3). An extensive amount of fill would be placed in Lake Union. Fill above the ordinary high water mark would be retained using structural earth walls.

During construction the roadway section would be shifted east to facilitate the staging needed to maintain two lanes of traffic and one sidewalk.

The roadway fill alternative would be constructed in two phases. During the first phase, the existing West Bridge would be demolished followed by construction of the western half of the fill, walls, and ground improvements. The second phase would demolish the East Bridge and construct the remaining portion of the fill, walls, and ground improvements.

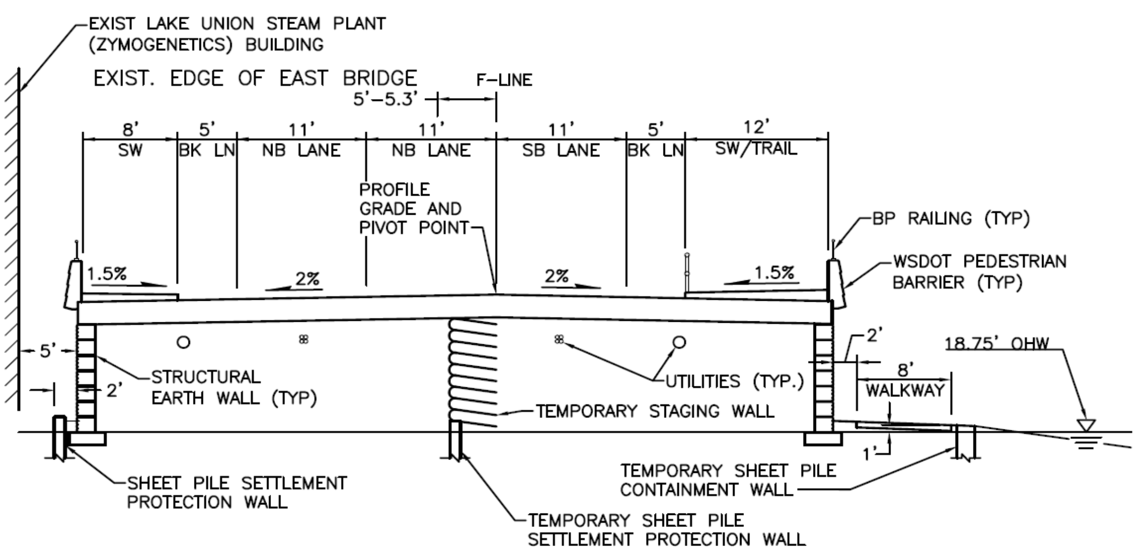


Figure 3. Fill Alternative Typical Section (TS&L)
Source: HNTB and Perteet (2013)

<u>Full Bridge Replacement Alternative</u>

The Full Bridge Replacement Alternative evaluated as part of the TS&L report would completely replace the existing East and West Fairview Avenue North Bridges with a single bridge (Figure 4). The proposed replacement bridge was a 410-foot long structure consisting of three 135-foot-long spans with the northern abutment located at the northern end of the existing bridges. The new southern abutment would be north of the existing East and West Bridge abutments by approximately 72 feet and 91 feet, respectively. This was proposed to reduce costs compared to the cost of constructing a longer structure that would more closely match the spans of the existing bridges.

The bridge substructure would consist of two intermediate piers and two abutments on drilled shaft foundations.

The full replacement bridge would be constructed in two phases. During the first phase, the existing West Bridge would be demolished followed by construction of the western half of the new bridge. The second phase would demolish the East Bridge and construct the remaining portion of the replacement bridge.

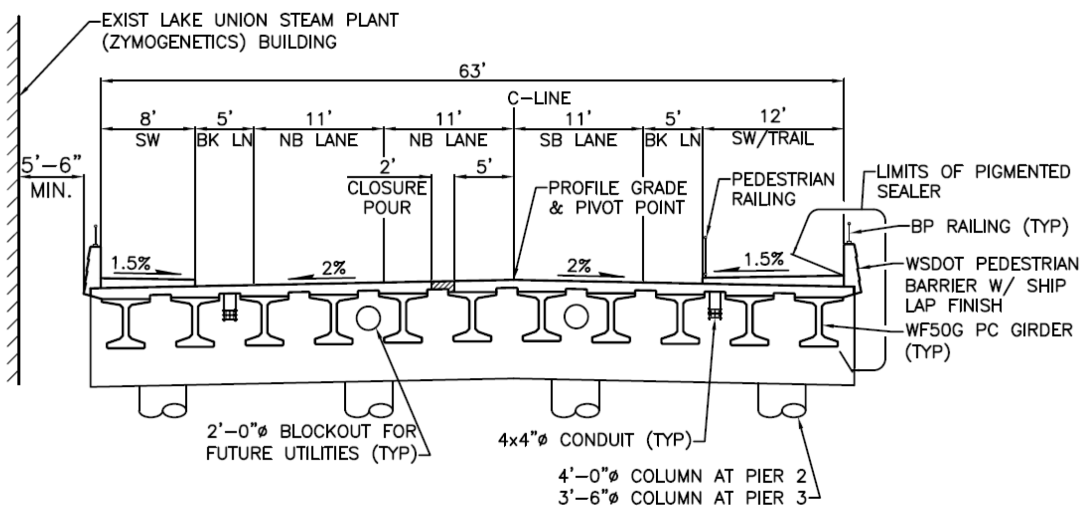


Figure 4. Full Replacement Alternative Typical Section (TS&L)
Source: HNTB and Perteet (2013)

West Bridge Replacement and East Bridge Rehabilitation Alternative

The West Bridge Replacement and East Bridge Rehabilitation Alternative (West Bridge Replacement) would replace only the existing West Bridge (Figure 5). The bridge configuration and layout would be nearly identical to the Full Bridge Replacement Alternative except that only the first phase of the bridge would be constructed during this project and would have a width of 32 feet. The second phase could be constructed at later date when it becomes necessary to replace the existing East Bridge. This would be required if the South Lake Union Streetcar line were extended across the bridge because the existing East Bridge is not capable of supporting the streetcar loading.

The key difference between Phase 1 of Full Bridge and the West Bridge Alternatives would be the placement of median barriers on the new West Bridge and the existing East Bridge due to the raised profile of the new West Bridge. A portion of the East Bridge deck would need to be reconstructed to support the barrier. In addition to this change, the existing East Bridge would be evaluated during final design for strengthening and seismic retrofit which could include jacketing of the existing prestressed pile supports.

The roadway section would be shifted west to facilitate the staging needed to maintain two lanes of traffic and one sidewalk during construction. The wider bridge would require relocation of the floating walkway. This relocation would also provide opportunities to improve ADA accessibility to the floating walkway.

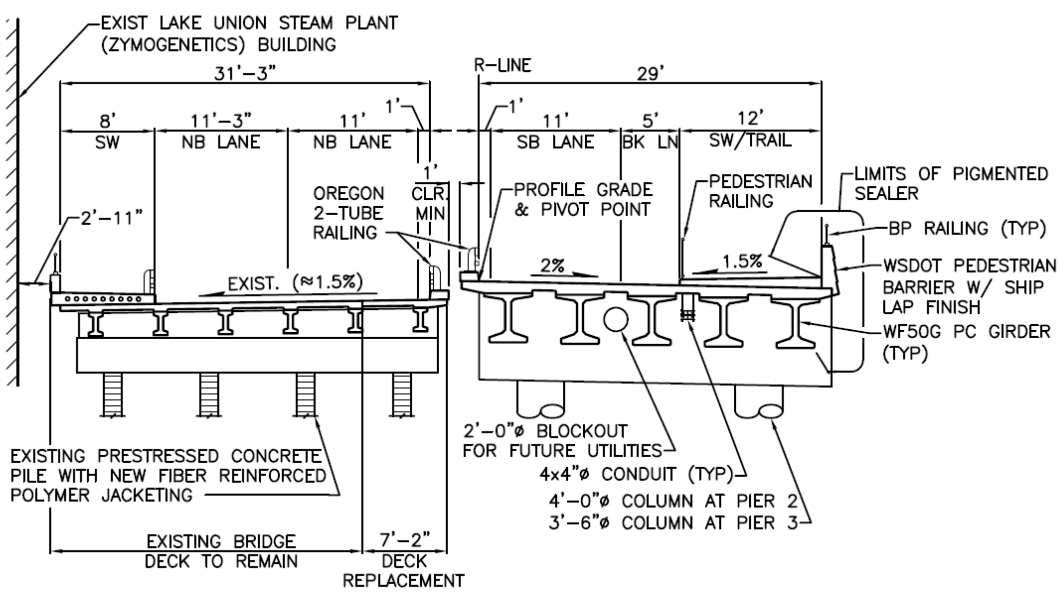


Figure 5. West Bridge Replacement East Bridge Rehabilitation Alternative Typical Section (TS&L)
Source: HNTB and Perteet (2013)

Secondary Screening and Additional Geotechnical Analysis

SDOT conducted a secondary screening process to further evaluate the three project alternatives. All of the alternatives involve significant design and constructability challenges relating to in-water work, ground improvement below the lake bottom, construction under traffic, and physical constraints such as adjacent buildings and overhead high voltage power lines.

The most substantive challenge in relation to cost was the potential need for ground improvements because of anticipated poor soil conditions. SDOT conducted additional investigations to provide more geotechnical information to assist with the secondary screening and those investigations confirmed the presence of poor soil conditions throughout most of the project corridor and also identified evidence of past landslide activity at the bridge site.

After conducting additional detailed analyses, SDOT determined that the Roadway Fill alternative was not feasible because the mass of fill in relationship to the landslide geometry decreased the stability of the embankment during a design-level seismic event, thus increasing the risk to adjacent properties. Similarly, SDOT determined that the proposed West Bridge Replacement and East Bridge Rehabilitation Alternative was not feasible because of the anticipated risks and costs needed to mitigate seismic concerns to meet suitable life safety requirements during a design-level earthquake. The Full Replacement Alternative was determined to be feasible. A summary comparison of the key differences among the alternatives is outlined in Table 1.

Table 1. Summary Comparison of Alternatives

Evaluation Criteria	Roadway Fill Alternative	Full Bridge Replacement Alternative	West Bridge Replacement and East Bridge Rehabilitation Alternative
Constructability	Geotechnical considerations are greatest with this alternative.	Need to de-energize overhead powerlines is greatest with this alternative	Requires ground improvements at bridge abutments.
Ground improvements	Need to perform ground improvement along entire alignment to account for liquefiable soils.	Longer bridge span eliminates the need for ground improvements.	Ground improvement limited to bridge abutments.
Seismic	Poor seismic performance; risk of slope failure.	Good seismic performance.	Existing East Bridge does not meet current seismic criteria.
Contaminated sediments	Potential to cap contaminated sediments in place.	Potential to disturb contaminated sediments during drilling of support shafts.	Similar to Full Bridge Replacement. Potential to disturb contaminated sediments during drilling of support shafts.
In-water fill	Fill would completely replace bridges and extend into Lake Union approximately 175 feet.	In-water fill is limited to bridge shafts and sand application to contain contaminated sediments.	Similar to Full Bridge Replacement. In-water fill is limited to bridge shafts and sand application to contain contaminated sediments.
Cost (2014 dollars)	Most expensive (estimated $52.1M).	$25.0M	Least expensive ($16.8M) but does not account for future costs to replace East Bridge.

No Action Alternative and Offsite Alternative

The structural insufficiency of the existing West Bridge indicates that without replacement it will likely be closed before the East Bridge. No action would result in Fairview Avenue North being reduced to two sub-standard width lanes on the East Bridge and no accessible bike lane and eventually the East Bridge would require replacement or rehabilitation or would need to be closed. Although not formally developed to the extent of other concepts, the complete closure of both bridges would require traffic, bicyclists, and pedestrians be accommodated by a defacto offsite alternative that would involve either constructing a new surface bypass or rerouting traffic elsewhere within the existing street network. Fairview Avenue North carries 8,700 vehicles per day, with an average weekday traffic volume of 9,900 vehicles per day (HNTB 2013), and is a major travel route along the east shore of Lake Union, connecting downtown Seattle and South Lake Union with the University of Washington to the north and the existing road network cannot accommodate this additional traffic. A bypass is not feasible because there is no upland route available within the project vicinity that would accommodate the traffic volumes and the pedestrian and bicycle volumes associated with the Cheshiahud Trail; all adjacent properties are developed or are proposed for development. Based on current and projected traffic volumes in the corridor neither the No Action Alternative nor an Offsite Alternative were considered feasible.

Proposed Project

SDOT's conclusions at the completion of the TS&L study was to construct the Full Bridge Replacement Alternative (Alternative C5 in the TS&L report). Following the TS&L study during final design, SDOT elected to modify the previously proposed Full Bridge Replacement by lengthening the bridge to allow the new structure to span locations of fill at the south end of the bridge and to set the abutment back from the bank at the north end of the bridge. This added an additional span and bent, but avoided the need for ground improvements on both the north and south ends of the bridge and the need for in-water work at the north end of the bridge.

The current proposed project is similar to Full Replacement Alternative described in the TS&L report in that it includes replacement of both the East and West Bridges (Figure 6). The current design has a longer bridge (540 feet long vs. 410 feet long under the TS&L Full Replacement Alternative) (Figure 6). The longer bridge eliminates the need for fill within Lake Union at the southern approach. The current proposal essentially replaces the existing bridges with an in-kind structure.

The proposed bridge replacement consists of four 135-foot-long spans with the northern abutment located approximately 35 feet north of the northern end of the existing bridges. The new bridge will be supported on 8 foot diameter drilled shafts installed to an approximate depth of 140 feet or more. Drilled shaft construction will also require construction of two temporary work trestles, constructed on temporary piles. The project also includes reconstruction of the roadway approaches on the north and south side of the bridge and relocation of underground and underwater utilities. The proposed new roadway will not add capacity and will include three travel lanes, a cycle track, and two sidewalks. The project will temporarily relocate and slightly modify the existing floating walkway presently connected to the West Bridge. The relocated floating walkway will have a new anchorage system of steel piles and will be located approximately 10 feet further west than its current location.

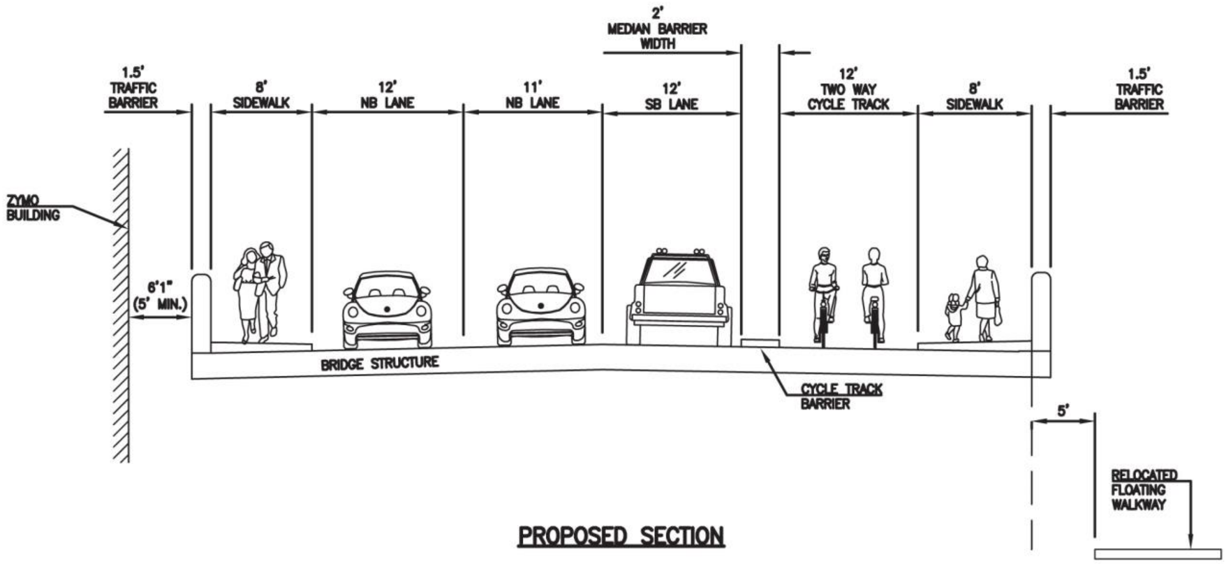


Figure 6. Proposed Bridge Replacement Typical Section
Source: HNTB and Perteet (2013)

Documentation of Environmental Baseline and Impacts

Prior to initiating the review of the Fairview Avenue North Bridge Replacement Project, SDOT and their consultant team met with Washington State Department of Transportation (WSDOT) Highways and Local Programs regional and environmental staff to review the project and identify key disciplines for additional documentation. These included: transportation, noise, contaminated materials, water resources, geology, environmental justice, and fish, wildlife, and vegetation.

SDOT has prepared stand alone discipline reports to document the existing environmental baseline and impacts of the proposed project for all these elements except Visual Analysis.

SDOT has also prepared a Biological Assessment and Cultural Resources Discipline Report to facilitate required consultation pursuant to Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act, respectively.

A brief summary of the environmental baseline and impacts related to visual quality are included below.

Visual Analysis

Replacement of the Fairview Avenue North Bridge will essentially be an in-kind replacement. The existing views within the immediate vicinity will be slightly altered from current conditions. The view changes both to and from the new bridge would be similar for all proposed alternatives, and differences between alternatives are not discernible.

During the 24-month construction period there will be heavy duty construction equipment within the project site, which could alter existing views in the area during the construction period.

This project is an in-kind replacement of the existing Fairview Avenue North Bridge structure. The views to and from Lake Union will be largely maintained; however, the entire existing bridge substructure above the mud line or existing grade will be removed which currently obscures views of the Steam Plant from the lake. Once completed, the new bridge will be slightly higher and crowned, and will extend further into Lake Union than the existing bridge. These changes with the new bridge will alter views to and from the Steam Plant (ZymoGenetics), which is a designated Seattle landmark.

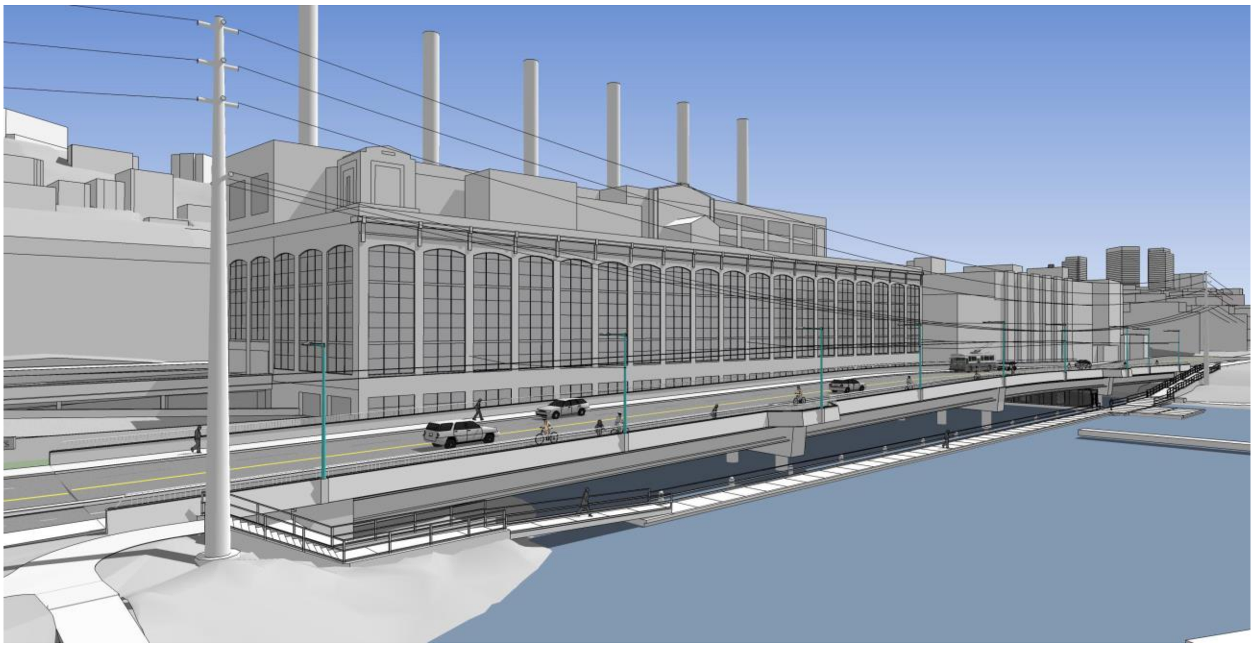


Figure 7. Schematic rendering of the proposed bridge.
Source: Via Architecture, Inc. 2014

Conclusion

Based upon the recommendations in the TS&L report and subsequent investigations and decisions by SDOT, the proposed project that is moving forward with design is a 540 feet long bridge, consisting of four 135-foot-long spans with the northern abutment located approximately 35 feet north of the northern end of the existing bridges. The new bridge will be supported on 8 foot diameter drilled shafts installed to an approximate depth of 120 feet or more. Drilled shaft construction will also require construction of two temporary work trestles, constructed on temporary piles. The project also includes reconstruction of the roadway approaches on the north and south side of the bridge and relocation of underground and underwater utilities. The proposed new bridge will not add capacity and will include three travel lanes, a cycle track, and two sidewalks. The project will temporarily relocate and slightly modify the existing floating walkway presently connected to the West Bridge. The relocated floating walkway will have a new anchorage system of steel piles and will be located approximately 10 feet further west than its current location. The bridge will essentially be an in-kind replacement; however, minor changes both to and from the bridge will occur as a result of the replacement.

References

Environmental Science Associates (ESA). 2013. Fairview Bridge Improvements Preliminary Environmental Evaluation. Prepared for SDOT. April 2013.

HNTB. 2013. Fairview Avenue North Bridge Traffic Counts. November 16 – 22, 2013.

HNTB and Perteet (HNTB Corporation and Perteet, Inc.). 2013. Fairview Avenue North Bridge Project. Final Type, Size and Location Report. Prepared for Seattle Department of Transportation. July 2013.

5.9 - Construction Methods Technical Memoranda
4-Span Bridge Alternative

1.0 - Introduction

This memorandum will identify construction methods and equipment that minimize impacts as described in the environmental documentation, minimize cost, reduce risk, and meet a reasonable construction schedule.

This Construction Methods Technical Memoranda is based upon the construction sequence planned for the 4-Span Bridge Alternative (Option 6) for the Fairview Bridge Replacement project.

2.0 - Current Construction Constraints:

2.1 Work Windows - There are a number of construction activities that require high crane booms and drilling masts that will extend into the safe zone of the energized power line and many of these same construction activities must be conducted within the In-Water-Work-Window.

Currently the In-Water-Work-Window is from October 1 to April 15 and overhead 115KV Bonneville Power Lines currently allow, upon approval, a 30 day power outage within the months of April 1 to October 1.

Unfortunately these two windows only overlap by two weeks each year (April 1 to April 15) and there are no guarantees or reassurances that either or both work windows can be extended so that they will overlap for a greater length of time.

2.2 Vibratory and Impact pile driving hammers - cannot be used due to the sensitive equipment used by an adjacent business (24 hours/day and 7 days/week).

2.3 Noise Restrictions - other than a limited number of days, the close proximity of the construction activities to the Equinox Apartments and the Silver Cloud Inn will most likely be restricted to the hours between 6 am and 10 pm.

2.4 Traffic - A minimum of one-lane in each direction must be maintained through the project site, except for night time full time closures between 9 pm and 6 am.

3.0 Assumptions Used to Develop the Construction Methods and Schedule

1) Notice to Proceed (NTP): occurs not later than January 15, 2015.
    - Bid process would be in November of 2014;
    - Contract awarded and executed in December of 2014.
    - Contractor would be able to mobilize project by January 15, 2015.
2) In-Water-Work-Window: Bid Documents will include an approved; extended In-Water-Work-Window (IWWW) from October 1 to June 1, 2015. The current IWWW is October 1 to April 15.
3) Power Outage: Bid Documents will included an approved extended power outage from Bonneville Power and SCL for a 3 month minimum power outage (April 1 to July 1, 2015) which falls within the allowable window of April 1 to Sept 15. An Outage is needed for West Bridge construction operations of drilling permanent and temporary shafts, setting of temporary trestle, and the setting of the precast girders. The East Bridge is farther away from the power lines and will not need an outage.
4) Vibration: Foundations for temporary work trestles and permanent piers will require drilled shafts to minimize the vibration that may affect sensitive experiment and testing equipment at nearby businesses.
5) Construction Work Hours: It is anticipated that during the extended outages, the contractor would be allowed to work extended hours for double shift operations and weekends in order to lessen the risk on scheduled activities during these critical time frames. Extended hours could also be allowed in order to help accelerate the overall completion of the project and mitigate the time impact on the public and adjacent businesses.
6) Contaminated Materials have been identified at the site.
7) Trolley Lines will be de-energized and removed for construction and will be re-instated upon completion of construction.
8) Walkway from ZYMOGENETICS would be out of service during construction and will be restored when construction is completed.

4.0 - Construction Planning Phase

One of the most critical phases of this Project will the construction planning stage, which is the period between the Contract Execution (Mid-December 2014) and the beginning of on-site activities (March 1, 2015). During this "Planning Phase" the Contractor must submit and receive Approvals for most of the required project "Submittals" and Permits. In addition Subcontracts and Purchase Orders must be executed, and critical

Procurements such as the precast girders must be into fabrication. Without the Approvals, it is highly unlikely that the accelerated work activities that occur in the concurrent Power Outage Window and In-Water-Work-Window will be completed by July 1, 2015 resulting in a one year shutdown and delay of the Project.

To minimize the risk of delaying the project the Contractor must accelerate the "Planning", Submittals and procurements and the Owner must also accelerate their efforts in the review and approval of the Submittals. To be successful, the Contractor, Owner, and Engineers will need to cooperatively solve and expedite any issues within the Submittals, Applications or Contract Documents.

4.1 Planning Phase Activities (December 15, 2014 to March 1, 2015)

1. Key Submittals
    - CPM Schedule
    - Health and Safety Plan
    - In-Water-Work Plan
    - TESC Plan
    - Plan for Maintaining Clearance around Power Lines
    - Traffic Control Plan
    - Work Trestle Design
    - Demolition Plan for West Bridge
    - Design for strengthening the East Bridge for girder erection cranes
    - Handling and Disposal of Contaminated Soil and materials
    - Approval of Disposal sites
    - Formwork and Falsework design
    - Concrete Mix Designs
    - Precast Concrete Girder Shop Drawings
    - Reinforcing Steel Shop Drawings

2. Permit approvals as required
3. Secure staging areas and set up on-site office
4. Sub-Contracts executed
5. Key Material Procurements
6. Secure equipment for the specialized work operations, including the watercraft, barges, Shaft Drilling equipment, cranes, and excavators.

5.0 On-Site Activities after NTP but prior to April 1, 2015 and the Power Outage Window

5.1 Preconstruction activities:

- Secure staging areas and set up on-site office
- De-Energize and remove existing Trolley lines
- Install BMP's and TESC per approved Plan
- Remove and store existing Dock
- In water debris clean up
- Testing of existing water conditions
- Set up of silt curtain and silt fencing
- Set up area for contaminated material that would need to be handled;
- Set up Traffic Control and move traffic into one-lane each way on the existing East Bridge. Close West Bridge to Traffic.
- Remove portions of existing West Bridge that can be performed without impact to the Power lines. The existing West Bridge Roadway can be removed sawing the deck into sections and lifting/removing them using Excavators that will provide clearances from the power lines.
- Pre-fabrication of the work trestle

6.0 Temporary Drilled Shafts for Work Trestle: (Power Outage Window & IWWW needed)

This activity requires it to be performed during the Power Outage and the IWWW.

Temporary Drilled Shafts are used to minimize noise and vibration to surrounding buildings, businesses, and underlying soil. Normally these temporary shafts would be driven piling that are installed using a vibratory or impact hammer.

Prior to removal of the existing West Bridge Deck, cut a 3 foot square hole in the concrete deck at the shaft locations and drill a 24-inch steel casing to the design depth through the hole. There are several pieces of drilling equipment that can perform the work, but all will have tall masts or booms that will infringe upon the setback clearances for the Power Lines.

7.0 Westbound Bridge Deck Removal and Work Trestle:

This work operation will involve 3 activities:

1. Concrete deck removal
2. Placing a 2 foot sand blanket over the contaminated lakebed under the worksite
3. Installing the steel girders and decking for the work trestle

To maintain access to the operation, the activities would be sequenced in each span until the work trestle decking is installed. The operation will then move forward to the next span. This will be repeated until the work trestle is completed across the lake.

7.1 Concrete Bridge Deck Removal: (Power Outage and IWWW Only) Saw cut the deck into sections that can be easily lifted and places onto a truck for disposal. The saw cutting will eliminate demolition debris from entering the water.

Schedule: Estimated to take 6 weeks working 2 shifts.

Equipment:

1. Track Hoe with thumb or/and demolition head attachment
2. Crane to lift sections of the deck and place into trucks
3. Dump Trucks or Tractor/Trailer with demolition bed.
4. Tractor trailer with flatbed
5. Large Concrete Saw

7.2 Sand Blanket: (IWWW only) Place during deck removal operations. The two (2) foot thick sand blanket fill is being placed to contain and minimize disruption of existing contaminated soils. The sand materials could be placed with the track hoe or a crane with a skip box.

7.3 Work Bridge: (Power Outage and IWWW) Will commence at one end of the bridge following behind the deck removal and sand blanket operation. Install steel cap beams and stringers for structural members, and set prefabricated deck sections. The deck sections will be constructed to be removable for access during construction of the new piers 2, 3, 4. This work operation will require the power outage and extended IWWW.

Pre-fabricate or panelize the decking system to help expedite the operation.

Installation of stringers and deck will follow the existing concrete deck removal operation and will set from the completed portions of the Work Bridge. This operation will require cranes to handle the steel members and deck panels.

Schedule: Estimated to take 4 weeks, working 2 shifts. The completed work trestle would lag behind the deck removal about 14 days.

Equipment:

1. Track Hoe with drill mast for piles;
2. Crane for handling of steel members and decking;
3. Welder for steel frame system;
4. Forklift for handling materials.

7.4 Remove Existing Timber Piles: (IWWW only) Will be completed during deck removal operation or work trestle operation. After a 2-foot sand blanket has been place over the contaminated lake bed, use a track mounted excavator to grab the timber pile and snap them off at or below the existing mudline.

7.5 Remove Existing Concrete Piles: (IWWW only)- These will be saw cut at the existing mudline which is below the 2-foot layer of sand. Divers will be used for this operation. This operation is not on the critical path and can be performed at any time during the In-Water-Work-Window.

8.0 West Bridge Substructure

8.1 Drill new Shafts/Rebar Cage/Place Concrete: (Power Outage and IWWW) - This operation will be accomplished from the work bridge and will require SCL power outage and an extended IWWW. The pier columns are designed to be approximately 150 feet and will require high mast equipment and crane work. The pier construction will start with set-up of equipment and materials in place. Drilling will commence and removal of materials will need to be monitored for potential contamination.

The prefabricated sections of casing are connected with a bolted connection for speed. Each section will be rotated or oscillated into the ground and as the casing is installed additional sections will be bolted onto the top of the installed section until the desired depth is achieved. If the hole is not dry then concrete plug will be placed by tremie to the bottom of the hole to seal the casing. The casing will be dewatered and water will need to be captured and monitored for contamination. When the casing is dewatered the full length rebar cage will be installed and concrete will be placed. When the casing is set to designed grade, the drill operation will commence with the next pier casing while the rebar cage is set and concrete is placed in the 1st casing, this sequence will continue till all piers are completed.

Schedule: We estimate drilling and construction of the 10 drilled shafts will take 5 weeks. This will probably be a two shift operation due to being performed during the power outage window.

Equipment:

1. Large Crane mounted with a drilling attachment;
2. Large Crane for handling of casings and rebar cage;
3. Concrete trucks/Concrete Pump for concrete placement;
4. Forklift for material handling;
5. Welder for casings.

8.2 Pier Columns at Piers 2, 3, and 4: (Power Outage and IWWW) - Following behind the shaft construction will be construction of the columns at Piers 2, 3, and 4 (6 total for West Bridge).

Schedule: Estimated at 4 weeks – 2 shifts

Equipment:

1. Small Crane for setting forms and handling rebar;
2. Forklift to get materials to crane;
3. Welder if using steel forms;
4. Concrete Pump for placement of concrete;
5. Concrete Trucks for delivery of concrete.

8.3 Crossbeams: **(Power Outage only)** – This operation follows behind columns at Piers 2, 3, 4.

Schedule: Estimated to take 3 weeks – 2 shifts

Equipment:

1. Crane for setting forms and handling rebar;
2. Forklift to get materials to crane;
3. Concrete Pump for placement of concrete;
4. Concrete Trucks for delivery of concrete.

8.4 Abutments: Pier 1 and Pier 5: (Power Outage only) - Follows behind the drilled shafts at Pier 1 and Pier 5. Precast girders will set on top of abutment wall.

9.0 West Bridge Superstructure

9.1 Remove Work Bridge Superstructure: (Power Outage only) - Work Bridge superstructure would be removed in sections immediately prior to setting precast girders.

Several spans of the work trestle superstructure will be removed to clear the span needed for precast girder erection. Once a span of the permanent bridge is cleared, the precast girders for that span can be set.

NOTE:

Fairview Ave will be closed to traffic during this night time operation.
One crane will be positioned on the work trestle during the girder erection.
A second crane will be positioned on the existing, strengthened East Bridge

The work bridge drilled shafts would be removed at a later date which will require only an IWWW.. The work bridge removal could be done on day shift and girders set on night shift

9.2 Set Girders (24 girders – 6 each span – 4 spans): (Power Outage Window only) – Prior to setting girders, the East Bridge would be strengthened, as required, to support a crane capable lifting and setting one end of a girder. This operation will require a full traffic closure most likely on a night time shifts.

Upon completion of setting the precast girders, the extended IWWW will no longer be required in the Spring of 2015. Remaining in-water-work can be performed during the next window on October 1, 2015 to April 15, 2016.

Schedule: Estimated at 3 weeks – 2 shifts (includes work bridge removal).

Equipment:

1. 2 large cranes to handle girders (maybe one really large crane?);
2. Semi-Tractor/Trailer for delivery of girders;
3. Semi-Tractor/Trailer for removal of work bridge materials;
4. Forklift for material handling

9.3 Roadway Deck: (No work windows needed) - After Girders are set the roadway deck work will commence. A plywood containment deck will be placed on the bottom flange of the precast girders to contain any material that may be dropped as well as concrete leakage. Concrete deck formwork will be placed on the underside of the top flange of the girders to support the deck reinforcing steel, imbeds, and concrete during placement. Work will proceed span to span until completed.

Schedule: Estimated to take 6 weeks (would be good work to 2 shifts).

Equipment:

1. Crane to handle rebar and form materials
2. Forklift for material handling

9.4 Place Roadway Deck: (No work windows needed) - After completion of roadway deck forming, rebar placed and embeds installed, the roadway deck concrete is placed. This could be done in sections however this will depend on the expansion joint layout

Schedule: Estimated to take 1 week for placement and 1 week for cure

Equipment:

1. Concrete Pump or line pump
2. Concrete Trucks
3. Concrete Finishing Machine (Bidwell).

9.5 Deck Improvements : (No work windows needed) - (barrier, railing, lights, striping, and ACP pavement at bridge ends): This work is all the work above the roadway deck that is required to get ready for the traffic switch onto the new West Bridge from the existing East Bridge. Bridge rails, Light poles and wiring, installation of conduit on underside of deck, Temporary barriers for traffic, Temporary HMA, Complete approaches to new bridge deck , Expansion joints.

Schedule: Estimated at 5 weeks

Equipment:

1. Concrete Trucks;
2. Forklift;
3. Small Crane or forklift for barriers
5. Small Crane or forklift for light poles;
6. ACP paving machine;
7. Asphalt Delivery Trucks;

10.0 Switch Traffic to New West Bound Deck: 1 day

11.0 East Bridge - Repeat above except:

1. **Power Outage is not Required**
2. **The In-Water-Work-Window does not need an extension.**

Schedule: Construction is estimated at 10 months for the East Bridge

Equipment: See above descriptions

City of Seattle (SDOT)

Environmental Justice and Title VI of the Civil Rights Act of 1964 Discipline Report

Fairview Avenue North
Bridge Replacement Project

October 2014

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INTRODUCTION

In compliance with the Presidential Executive Order 12898 and DOT Order 5610.2, an Environmental Justice (EJ) Analysis was conducted for the Fairview Avenue North Bridge Replacement Project. Title VI of the 1964 Civil Rights Act and the Civil Rights Restoration Act mandate that all agencies receiving federal funding must ensure non-discrimination based on race, color, or national origin in all of their programs and activities. Title VI also requires consideration of the effects of projects on people with limited-English proficiency (LEP) to avoid discrimination based on national origin. Presidential Executive Order 13166 requires improved access to federally funded activities for persons with limited-English proficiency. Similarly, Executive Order 12898 (1994) requires federal agencies to analyze their actions and environmental impacts on minority and low-income populations.

Washington State Department of Transportation's (WSDOT) *Environmental Procedures Manual* (WSDOT 2013) and The United States Environmental Protection Agency's (EPA) online Environmental Justice resources were used to guide the analysis for the Fairview Avenue North Bridge Replacement Project. As outlined in WSDOT's demographic data collection standards, a 0.5 mile radius around the project site was used as the demographic area of analysis. This report documents the extent of minority, low income, and LEP residents within the study area, as well as the public outreach efforts that have and will be conducted in compliance with Title VI of the Civil Rights Act of 1964.

PROJECT DESCRIPTION

The City of Seattle Department of Transportation (SDOT) proposes to replace two existing bridges on Fairview Avenue North along the southeast shoreline of Lake Union, in Seattle, King County, Washington (see Figure 1). The existing bridges consist of an East and a West Bridge that were built in 1948 and 1963, respectively. Based on a December 2012 inspection report, both bridges are structurally deficient.

A Type, Size, and Location study analyzed various project construction options and recommended the complete replacement of the East Bridge and West Bridge with a single new multispan bridge (HNTB and Perteet, 2013). SDOT's proposed bridge replacement is to construct a 540-foot long, 67-foot wide structure comprised of four 135-foot long spans constructed between new abutments located on either end of the new bridge. The new four span bridge will be supported on bents of four foot diameter reinforced concrete bridge columns, constructed on a foundation of eight foot diameter drilled shafts that will be installed to an approximate depth of 130 feet. The 67-foot wide structure is necessary to accommodate the new roadway section, which includes two northbound travel lanes, one southbound travel lane, a two-way cycle track, and sidewalks along the east and west side of the bridge. The number of travel lanes for the proposed structure is the same as the existing condition. The existing section also includes the addition of a mixed use trail/sidewalk and cycle track along the western side of the bridge.

Source: King County GIS; Bing Maps

Figure 1. Vicinity Map

The new mixed use trail/sidewalk and cycle track will provide connectivity for the Cheshiahud Lake Union Loop trail within the project corridor that will replace existing pedestrian and bicycle facilities that do not meet current design standards.

There is no sidewalk on the western side of the existing bridge. A floating walkway attached to the bridge currently provides north-south pedestrian access through the project corridor. In addition, the floating walkway provides public shoreline and water access to Lake Union. Following construction, the new multi-use sidewalk and cycle track constructed on the bridge will provide north-south pedestrian and bicycle access through the project corridor. The City plans to replace the floating walkway or provide a similar facility to provide public shoreline and water access within the project area following construction of the new bridge. The City's intent is to relocate and reuse components of the existing walkway, but the final configuration of the facility will be determined during final design based on federal, state, and local permit conditions. Unless precluded by permit conditions, the relocated floating walkway or other water access facility will be anchored to steel pipe piles, which will be vibrated into place, adjacent to the new bridge within existing City right of way.

The Fairview Avenue North Bridge Replacement project is being funded in two ways: Bridging the Gap, a nine-year levy for transportation maintenance and improvement, and federal funding through the Bridge Replacement Advisory Committee (BRAC).

POPULATION AND STUDY AREA DEMOGRAPHICS

To comply with WSDOT's environmental justice demographic data collection methods (WSDOT 2012), two sources of data were used to gather demographic data for this analysis:

> **US Census Bureau**. The 2010 Census and 2010 American Community Survey (ACS) Data (2006 – 2010 average) serve as the primary data sources for this analysis. EPA's *EJView* online mapping tool was used to generate the Census 2010 Summary Report (Appendix A) and the ACS Summary Report (Appendix B). These data are reported for census blocks within a 0.5 mile radius of the project centerline (see Figure 3), and provide a summary of representative populations in the project vicinity.
>
> **Washington State Report Card,** Washington State Office of Superintendent of Public Instruction**.** This online database serves as the secondary source of data for this analysis. As outlined in *TSK 458-b Demographic Data Collection: For a Social Analysis and to Determine if an EJ Population Exists* (WSDOT 2012), school enrollment data from the nearest elementary school was gathered and used to verify US Census and ACS data. The nearest elementary school to the project site is Seattle Public School's Lowell Elementary School, located approximately one mile from the Fairview Avenue North Bridge, at 1058 East Mercer Street, in the Capitol Hill neighborhood of Seattle.

Table 1 summarizes the "Population by Race" 2010 Census Data, reported at the census block level for the area within 0.5 mile of the centerline of the project, as well as the Student Demographic data for Lowell Elementary School's student enrollment, as reported in October 2012. According to the data gathered, Lowell Elementary School indicates a higher percentage of minority students than represented within the US Census and ACS data. This variance in data can be explained largely by different boundaries in areas of analysis, as illustrated in Figure 2, which shows the study area boundary and Lowell Elementary School's attendance area. These areas of analysis span different neighborhoods within the City which have varying demographic and socio-economic populations. An additional reason the Washington State Report Card data differs from the US Census Bureau data may be due to the different years of data collection.

Table 1. Population by Race

	2010 US Census – ***block level (EPA, 2014)***		**Lowell Elementary School (Washington, 2014)**	
Racial and Ethnic Makeup of Study Area Population	**Number**	**Percentage**	**Student Enrollment**	**Percentage**
TOTAL POPULATION	6,652*	---	216	---
White Alone	5,447	77 %	67	33%
American Indian and Alaskan Native	40	1%	1	<1%
Black or African American	198	3%	64	64%
Asian	560	0%	27	13%
Native Hawaiian and Other Pacific Islander	0	0%	27	13%
Some Other Race Alone	97	1%	13	<1%
Hispanic**	393	6%	23	11%

Sources:

- US Census Bureau (see appendix A)
- Washington State Report Card, Office of Superintendent of Public Instruction (see appendix C)

*The total population also includes a small percentage of people who reported their race as “Two or More Races” therefore an individual could be represented in more than one ethnicity. Therefore, the total percentages may not add up to 100 percent.

**The US Census Bureau reports the Hispanic population as a separate and distinct category and may include other races. Consequently, the population numbers may be double-counted within other reported races.

The 2010 ACS data shows that 14 percent of the households in the Census block groups that are within 0.5 mile of the project alignment are reported as being low-income. Low-income status is determined by the poverty threshold, which is set annually by the US Department of Health and Human Services. The 2013 poverty level for a 4-person household is $23,550.

Figure 2. Analysis Area Boundaries

Another method of determining income level is reviewing the number of students participating in the free or reduced-price meals program. Seattle Public School District reported that 51 percent of Lowell Elementary School students participated in the free or reduced-price meals program. To qualify for this school program, a family of four must earn $42,643 or less annually, as set by the 2012 USDA Income Eligibility Guidelines.

2010 Census data were collected for the study area census block groups to determine the English-speaking ability of populations within the study area. “Population by Ability to Speak English” 2010 Census data reveals that 3 percent of the populations within the census block groups that are within 0.5 mile of the project alignment speak English “less than well.” The Seattle Public School data reports 2 students, or 0.9 percent, that are transitional bilingual students. WSDOT outlines a 5 percent threshold value to determine when language translation is required. While none of the limited English proficient language groups exceed this threshold, the Inclusive Outreach and Public Engagement Plan identifies that some of the outreach material will be translated into Spanish (SDOT 2013).

Public Involvement and Outreach – Title VI Compliance

SDOT has developed an Inclusive Outreach and Public Engagement Plan (IOPE) (SDOT 2013) to help guide the project staff through the public involvement process, striving for multiculturalism and providing equal access and respect for all populations affected by this project. This plan outlines the following goals:

- Raise the public’s awareness about the project and gather input during the project’s design phase.
- Engage the communities affected by the project in a meaningful way by including them in decision making and promoting a sense of ownership.
- Ensure an open and transparent public involvement process.
- Minimize potential impacts to drivers, pedestrians, transit users, bicyclists, major institutions, businesses, adjacent neighbors and communities through strategic design and construction of the project.
- Create a project record of public input, responses, and outreach activities.

In order to meet these goals, the following outreach activities and various media sources have been identified to engage the public in this project:

- Open Houses
- Briefings
- Fairs and Festivals
- Traditional and Social Media
- Ethnic Media
- Use of interpreters
- Spanish language translation

Figure 3. Census Data Analysis Block Group

In order to meet these goals, the following outreach activities and various media sources have been identified to engage the public in this project:

- Open Houses
- Briefings
- Fairs and Festivals
- Traditional and Social Media
- Ethnic Media
- Use of interpreters
- Spanish language translation

A broad and overly-inclusive area of analysis surrounding the project site area was used to gather data and determine outreach goals and activities. No specific distance or geographic requirements were followed for data collection. The project team has conducted a total of 11 briefings so far including 3 city advisory boards, 6 neighboring business/business groups, and 2 neighborhood groups. The project team is in ongoing communication with government agencies including Seattle City Light and King County Metro. Future meetings are anticipated with the Seattle Design Commission as well as other businesses and community groups neighboring the project. The City has also created an informational website to provide for additional outreach for the bridge replacement project. The website includes a project background, overview, schedule, fact sheet, and contact information (http://www.seattle.gov/transportation/fairviewbridge.htm).

Project Effects

The Fairview Avenue North Bridge Replacement project is located in a developed urban area with commercial, industrial, and residential uses surrounding the project site. No acquisitions, relocations, nor permanent changes to transportation nor access are associated with this project. Parking impacts will result in a permanent reduction of less than 3 percent of the existing parking spaces in the project area. The temporary increase of noise and dust occur during the active construction time frame. No impact pile driving will occur during construction to reduce the noise levels as much as possible. During the anticipated 24-month construction phase, pedestrian, vehicle, and public transportation routes will be maintained with temporary detours on a parallel route one block east, along Eastlake Avenue East. There will be no permanent impacts to traffic or public transportation. The bridge replacement will include a new roadway configuration to better accommodate all users making it safer for people to drive, walk, bike, and access transit along Fairview Avenue North.

Determination

There will be no disproportionate impacts to Environmental Justice populations as a result of this project. No minority, low-income populations, nor Environmental Justice Communities have been identified to be adversely affected by this project as determined above. Therefore, this project has met the provisions of Executive Order 12898, as it is supported by Title VI of the Civil Rights Act.

REFERENCES

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APPENDIX A

EJView Census 2010 Summary Report

EJView Census 2010 Summary Report

Location: -122.328499,47.630630,-122.327265,47.631583

Study Area: 0.5 miles around the linear location

Summary	Census 2010
Population	6,652
Population Density (per sq. mile)	10,540
Minority Population	1,441
% Minority	22%
Households	4,116
Housing Units	4,603
Land Area (m^2)	1,634,579
% Land Area	67%
Water Area (m^2)	806,073
% Water Area	33%

Population by Race	Number	Percent
Total	6,652	-------
Population Reporting One Race	6,356	96%
White	5,447	82%
Black	198	3%
American Indian	40	1%
Asian	560	8%
Pacific Islander	14	0%
Some Other Race	97	1%
Population Reporting Two or More Races	296	4%
Total Hispanic Population	393	6%
Total Non-Hispanic Population	6,259	94%
White Alone	5,211	78%
Black Alone	190	3%
American Indian Alone	31	0%
Non-Hispanic Asian Alone	554	8%
Pacific Islander Alone	13	0%
Other Race Alone	10	0%
Two or More Races Alone	249	4%

Population by Sex	Number	Percent
Male	3,602	54%
Female	3,050	46%

Population by Age	Number	Percent
Age 0-4	142	2%
Age 0-17	353	5%
Age 18+	6,299	95%
Age 65+	485	7%

Households by Tenure	Number	Percent
Total	4,116	
Owner Occupied	1,205	29%
Renter Occupied	2,911	71%

Data Note: Detail may not sum to totals dues to rounding. Hispanic population can be of any race.

Source: U.S. Census Bureau, Census 2010 Summary File 1.

APPENDIX B

EJView ACS Summary Report

EJView ACS Summary Report

Location: -122.328499,47.630630,-122.327265,47.631583

Study Area: 0.5 miles around the linear location

Summary of ACS Estimates	2006 - 2010
Population	6,652
Population Density (per sq. mile)	10,540
Minority Population	1,441
% Minority	22%
Households	4,116
Housing Units	4,603
Housing Units Built Before 1950	1,695
Per Capita Income	61,266
Land Area (sq. miles) (Source: SF1)	1,634,579
% Land Area	67%
Water Area (sq. miles) (Source: SF1)	806,073
% Water Area	33%

	2006 - 2010 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	6,652	100%	325
Population Reporting One Race	6,356	96%	1,000
White	5,447	82%	305
Black	198	3%	160
American Indian	40	1%	138
Asian	560	8%	144
Pacific Islander	14	0%	123
Some Other Race	97	1%	130
Population Reporting Two or More Races	296	4%	123
Total Hispanic Population	393	6%	146
Total Non-Hispanic Population	5,639		
White Alone	5,211	78%	261
Black Alone	190	3%	160
American Indian Alone	31	0%	138
Non-Hispanic Asian Alone	554	8%	144
Pacific Islander Alone	13	0%	123
Other Race Alone	10	0%	123
Two or More Races Alone	249	4%	123
Population by Sex			
Male	3,602	54%	216
Female	3,050	46%	199
Population by Age			
Age 0-4	142	2%	143
Age 0-17	353	5%	160
Age 18+	6,299	95%	342
Age 65+	485	7%	176

Data Note: Detail may not sum to totals dues to rounding. Hispanic population can be of any race. N/A means not available.
Source: U.S. Census Bureau, American Community Survey (ACS) 2006 - 2010.

EJView ACS Summary Report

Location: -122.328499,47.630630,-122.327265,47.631583

Study Area: 0.5 miles around the linear location

	2006 - 2010 ACS Estimates	Percent	MOE (±)
Population 25+ by Educational Attainment			
Total	5,142	100%	290
Less than 9th Grade	17	0%	126
9th - 12th Grade, No Diploma	138	3%	160
High School Graduate	246	5%	140
Some College, No Degree	1,241	24%	195
Associate Degree	264	5%	129
Bachelor's Degree or more	3,500	68%	266
POPULATION AGE 5+ YEARS BY ABILITY TO SPEAK ENGLISH			
Total	5,951	100%	322
Speak only English	5,224	88%	315
Non-English at Home[1+2+3+4]	727	12%	181
[1]Speak English "very well"	535	9%	171
[2]Speak English "well"	193	3%	145
[3]Speak English "not well"	0	0%	123
[4]Speak English "not at all"	0	0%	123
[3+4]Speak English "less than well"	0	0%	123
[2+3+4]Speak English "less than very well"	193	3%	145
POPULATION AGE 5+ YEARS BY LANGUAGE SPOKEN AT HOME			
Total	N/A	N/A	N/A
Speak only English	N/A	N/A	N/A
Non-English Speaking	N/A	N/A	N/A
Population by Place of Birth for the Foreign-Born			
Total	N/A	N/A	N/A
Europe	N/A	N/A	N/A
Asia	N/A	N/A	N/A
Africa	N/A	N/A	N/A
Oceania	N/A	N/A	N/A
Americas	N/A	N/A	N/A
Households by Household Income in 1999			
Household Income Base	4,042	100%	197
< $15,000	325	8%	178
$15,000 - $25,000	260	6%	133
$25,000 - $50,000	1,045	26%	164
$50,000 - $75,000	871	22%	143
$75,000 +	1,542	38%	219
Occupied Housing Units by Tenure			
Total	4,116	100%	197
Owner Occupied	1,205	29%	125
Renter Occupied	2,911	71%	181

Data Note: Detail may not sum to totals dues to rounding. Hispanic population can be of any race. N/A means not avialable.

2006-2010 ACS 5-year Estimates: The American Community Survey (ACS) summary files provide nation-wide population and housing characteristic data at all Census summary levels down to the Block Group level. This data was collected between January 1, 2006 and December 31, 2010. ACS replaces the decennial census sample data, and is not the 2010 Census population counts data. (http://www.census.gov/acs/www/#fragment-3)

Margin of error (MOE): The MOE provides a measure of the uncertainty in the estimate due to sampling error in the ACS survey. Applying the MOE value yields the confidence interval for the estimate. For example, an estimate value of 50 and +/- MOE of 5 means the true value is between 45 and 55 with a 90 percenet certainty (http://www.census.gov/acs/www/Downloads/data_documentation/Accuracy/MultiyearACSAccuracyofData2010.pdf). Maximum MOE is shown for each value within study area.

Source: U.S. Census Bureau, American Community Survey (ACS) 2006 - 2010.

APPENDIX C

Washington State Report Card, Lowell Elementary School

Washington State **Report Card** reportcard.ospi.k12.wa.us

Lowell Elementary School

Principal Marion Smith, Jr
2062523020

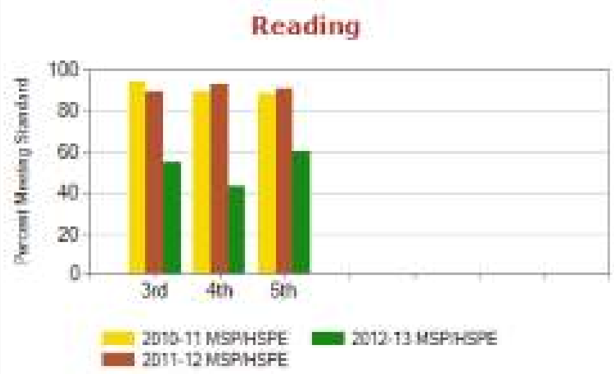
1058 E MERCER ST SEATTLE 98102
Seattle Public Schools

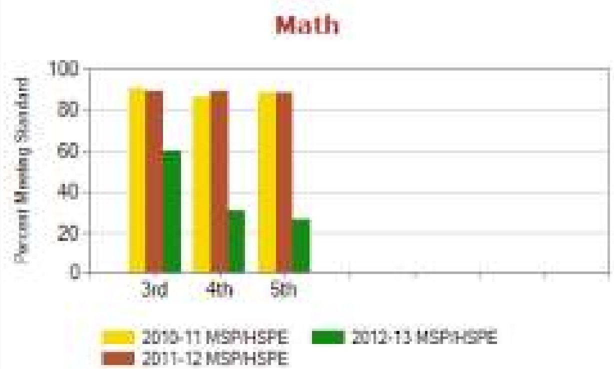
Grade Span: PK-5
9/15/2011

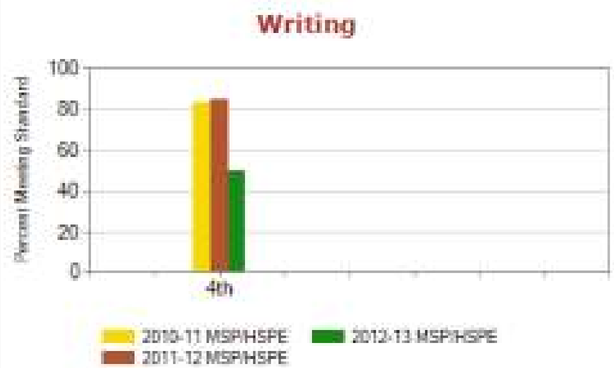
Select year: 2012-13 go

2012-13 MSP/HSPE Results (Administration Info)

Grade Level	Reading	Math	Writing	Science
3rd Grade	55.0%	60.0%		
4th Grade	43.8%	31.3%	50.0%	
5th Grade	60.0%	26.7%		53.3%





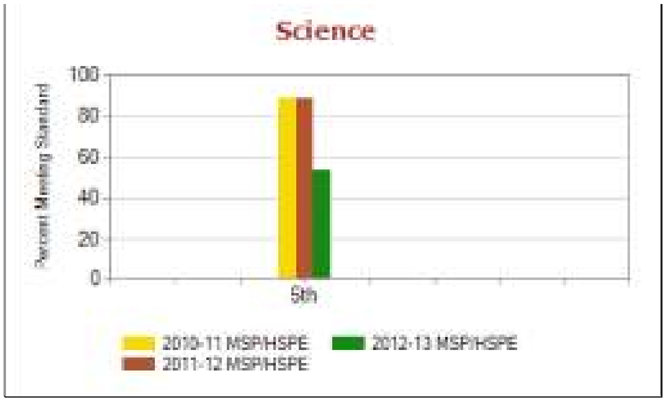


Student Demographics

Enrollment		
October 2012 Student Count		203
May 2013 Student Count		216
Gender (October 2012)		
Male	107	52.7%
Female	96	47.3%
Race/Ethnicity (October 2012)		
American Indian/Alaskan Native	1	0.5%
Asian	27	13.3%
Asian/Pacific Islander	27	13.3%
Black / African American	64	31.5%
Hispanic / Latino of any race(s)	23	11.3%
White	67	33.0%
Two or More Races	21	10.3%
Special Programs		
Free or Reduced-Price Meals (May 2013)	107	49.5%
Special Education (May 2013)	89	41.2%
Transitional Bilingual (May 2013)	2	0.9%
Migrant (May 2013)	0	0.0%
Section 504 (May 2013)	1	0.5%
Foster Care (May 2013)	0	0.0%
Other Information (more info)		
Unexcused Absence Rate (2012-13)	109	0.5%

Teacher Information (2012-13) (more info)

Classroom Teachers	40
Average Years of Teacher Experience	11.3
Teachers with at least a Master's Degree	25.0%
Total number of teachers who teach core academic classes	16
% of teachers teaching with an emergency certificate	0.0%
% of teachers teaching with a conditional certificate	0.0%
Total number of core academic classes	16
ESEA Highly Qualified Teacher Information	
% of classes taught by teachers meeting ESEA highly qualified (HQ) definition	100.0%
% of classes taught by teachers who do not meet ESEA HQ definition	0.0%
% of classes in high poverty schools taught by teachers who meet ESEA HQ definition	N/A
% of classes in high poverty schools taught by teachers who do not meet ESEA HQ definition	N/A
% of classes in low poverty schools taught by teachers who meet ESEA HQ definition	N/A
% of classes in low poverty schools taught by teachers who do not meet ESEA HQ definition	N/A


Science
100
80
60
40
20
0
Percent Meeting Standard
5th
2010-11 MSP/HSPE
2012-13 MSP/HSPE
2011-12 MSP/HSPE

PREPARED FOR:			BY:
HNTB Corporation Bellevue, Washington			Peter S. Soles PROJECT MANAGER
Glosten 1201 WESTERN AVENUE, SUITE 200 SEATTLE, WASHINGTON 98101-2953 T 206.624.7850 GLOSTEN.COM			CHECKED: John Cross-Whiter, PE SENIOR ASSOCIATE APPROVED: Justin M. Morgan, PE PRINCIPAL-IN-CHARGE
DOC:	REV: -	FILE: 15018.01	DATE: 01 February 2016

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2. City of Seattle Department of Planning & Development, *Recommendation of Capitol/First Hill Board Area #7*, September 1, 2010.
3. *Reasonable Needs of navigation White Paper*, USCG Bridge Program, Version 1.1, October 5, 2012.
4. *Glossary of Bridge Terms*, United States Coast Guard website, http://www.uscg.mil/hq/cg5/cg551/GLOSSARY.pdf, accessed 8 April 2015.
5. *Fairview Ave North Bridge Replacement: Turbidity Curtain Exhibit*, HNTB, 2016.

Introduction

This Navigation Evaluation was prepared as an attachment to United States Coast Guard (USCG) Bridge Permit Applications for the Fairview Avenue North Bridge (FANB) Replacement Project. This project involves removal of the existing twin parallel bridges along Fairview Avenue North and construction of a replacement bridge in the original location. The adjacent floating walkway will be removed during construction and reinstalled, approximately ten feet northwest of its current location, once the replacement bridge is complete. The former fuel dock that remains in the center of the waterway will be permanently removed, along with the remaining freestanding dolphins and pilings.

Waterway Layout and Geometry

The FANB spans the foot of a dead-end waterway in the southeast corner of Lake Union, known as Waterway 8.

Figure 1 Aerial photo of Lake Union and Waterway 8, looking northwest (photo reproduced from http://en.wikipedia.org)

The waterway is rectangular in shape, measuring roughly 850 feet long and 400 feet wide, and aligned northwest to southeast (~310°/130°). The water level in the Lake is managed by the US Army Corps of Engineers (USACE) and maintained between +20.0 and +22.00 feet above Mean Lower Low Water (MLLW). There is no perceptible current in the area. At Low Water of the Lake (+20.0 feet above MLLW), Waterway 8 is approximately 35 feet deep at its entrance and 20 feet deep at the edge of the bridge and 0 to 5 feet deep at its end at the side of the historic steam plant building It has no designated navigation channel.

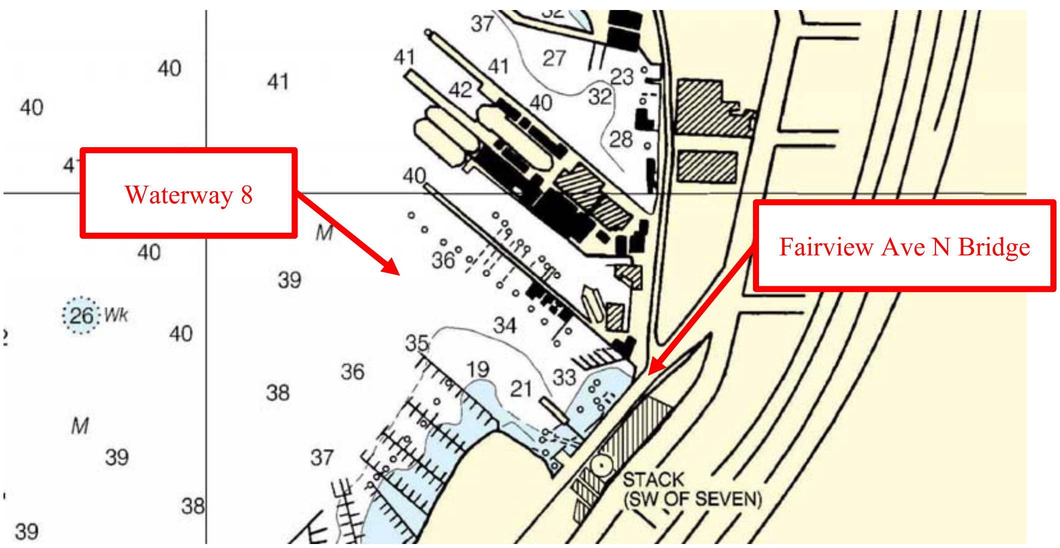

Figure 2 Capture from NOAA Nautical Chart No. 18447 showing Waterway 8 detail and FANB Site.

It is flanked on the northeast side by a wooden mooring pier extending more than 900 feet from shore, which is the defining feature of the waterway. The southwest side is bounded by a commercial waterfront lot, and a wooden float that marks one end of a recreational boat marina. The outermost point of the float lies ~360 feet from shore and ~600 feet from Fairview Avenue. A dilapidated wooden pier runs down the center of the waterway, extending roughly 195 feet to the northwest from an area near the base of the bridge. Scattered across the end of the waterway are a number of old wooden dolphins and broken/submerged pilings that pose a hazard to navigation.

Figure 3 Photo of the now dilapidated fuel dock, with dolphins and broken pilings in the foreground.

The bridge spans the waterway's endpoint, running ~040°/220°, perpendicular to the northwest-southeast alignment of the waterway. The trestle is impassable for vessels, and no navigable waters lie further to the southeast. The bridge sits directly in front of the historic Lake Union Steam Plant building and one other commercial property.

Figure 4 Bing Maps capture of Waterway 8 and the FANB (looking east).

Historical/Navigational Background

The first bridge trestle at this location was constructed prior to 1923. The record drawings of the trestle constructed in 1923 show an existing trestle on the east side of the 1923 trestle. The pre-1923 bridge trestle effectively restricted all navigation beneath or east of the bridge deck. Navigational access beneath the bridge has not been restored or improved since that time.

Figure 5 Fairview Avenue, 1924 (photo courtesy of Seattle Municipal Archives)

For many years after the first trestle was in place, the adjacent Lake Union Steam Plant was supplied with fuel-oil by barge. Barges would moor and offload at the wooden pier that still bisects the waterway. Fuel-oil was transferred to the Steam Plant via pipe runs passing beneath the bridge deck (see Figure 5). Barge traffic ceased in 1947 when an upland tank was installed to supply fuel-oil to the Steam Plant. The “fuel dock,” as it was known, is now dilapidated and unusable.

Currently FANB consists of two side-by-side bridges, the West Bridge and the East Bridge, that span Waterway 8 at its end adjacent to the Steam Plant Building. The existing West Bridge trestle was constructed in 1948 , replacing the 1923 trestle, again with no navigational access under or east of the bridge deck. In 1964, the existing East Bridge was constructed between the West Bridge Trestle and the Steam Plant Building. In 1993, the adjacent floating walkway was built and dedicated to public use by Zymogenetics, as part of its redevelopment of the Steam Plant building. The walkway offers a water-level walking alternative to the Fairview Avenue trestle; and an attached concrete float provides access to Lake Union for kayaks and other small craft.

Today, the West and East Bridges are completely enclosed on the west side by chain-link fencing, except for a locked passageway for foot traffic from the former “Hydro House,” adjacent to the Steam Plant building.

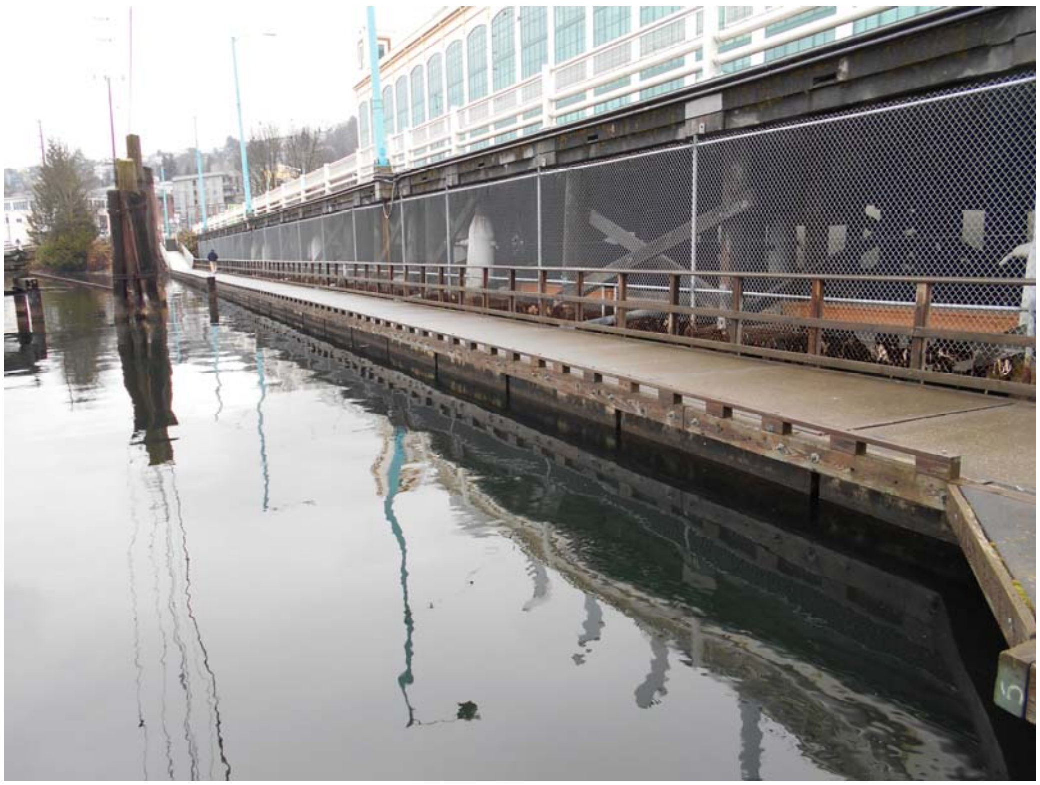

Figure 6 Present-day photo of FANB and the adjoining floating walkway.

There has been no navigational access beneath the FANB since the original trestle was built prior to 1923, more than 92 years ago. There is no reasonable need for navigation under the bridge presently, and no foreseeable need in the future.

The historic Steam Plant building, now owned by Zymogenetics, has been converted into a biotechnical/pharmaceutical research facility, which has no navigational needs. The adjacent property, The Gunn Building at 1165 Eastlake Avenue E, is in the permitting phase for a significant remodeling/expansion project, also for a proposed biotechnology research facility (Reference 1). Furthermore, recent Seattle Department of Planning and Development (DPD) interpretation (#05-001) determined that this property will be considered an upland lot and not a waterfront lot (Reference 2). As such, it has no direct shoreline access for water dependent uses.

Profile of Marine Traffic on Lake Union

Frequent Users

Lake Union and the Lake Washington Ship Canal (Ship Canal) are transited regularly by the following vessel types:

- Recreational vessels (sailing and power-driven)
- Non self-propelled recreational vessels (e.g. kayaks, rowing shells, stand-up paddleboards)
- Commercial passenger vessels (i.e. amphibious vehicles and small boats for tours and events)
- Seaplanes
- Fireboats and law enforcement vessels

These vessel types comprise much of the marine traffic in Lake Union, and the majority of traffic using the central and southern portion of the lake.

Less Frequent Users

The Lake/Ship Canal is transited less frequently by the following vessel types.

- Large yachts
- Tugs and barges
- Commercial fishing vessels (not engaged in fishing operations)
- Tribal fishing vessels engaged in gillnet fishing (during tribal gillnet openings)
- Research and survey vessels
- Salvage/assist/recovery vessels
- Mobile pumpout/sanitation vessels
- Tugs with dead ships (vessels not under power) or project cargoes in tow (e.g. concrete pontoons, houseboats, floats, etc.)
- Small ferries and other vessel types in route to/from shipyards and other facilities that provide marine services

These vessels generally remain in the north end of Lake Union, which is the main thoroughfare for marine traffic transiting the Ship Canal. Some large vessels also transit Lake Union to arrive or depart from Northlake Shipyard, Lake Union Drydock (LUDD), or United States Seafoods (the former NOAA facility).

Profile of Marine Traffic in Waterway 8 and Adjacent Docks/Facilities

Frequent Users

Waterway 8 is used regularly by the following vessel types:

- Seaplanes operating in displacement mode (below planing speed)
- Recreational vessels (sailing and power-driven)

- Non self-propelled recreational vessels (e.g. kayaks, rowing shells, stand-up paddleboards)

Most of the boat traffic in Waterway 8 comprises small recreational vessels maneuvering to and from berthing spaces on the southwest side of the LUDD South Pier, which provides some limited moorage space for sailboats and power-driven vessels. Seaplanes also arrive and depart intermittently from Seattle Seaplanes, which operates a small fleet of planes for scenic flights and private charters at the foot of the LUDD South Pier. Seaplanes moor at the end of a small finger pier that extends to the west off the LUDD South Pier. Two floats on the north side of the finger pier provide additional moorage space for up to four recreational vessels.

Non self-propelled recreational vessels use the waterway often, and occasionally access it from the concrete float adjoined to the floating walkway.

Waterway 8 is flanked on the southwest side by Fairview Marina, a private marina with 170 open slips for recreational vessels from 20 to 100 feet in length. Only the northernmost float, known as "A-Dock," directly abuts the waterway. A-Dock provides moorage space for 6-10 vessels on its northeast side. This is the only boat traffic from Fairview Marina that must enter Waterway 8 directly to access moorage space.

Less Frequent Users

Waterway 8 is used infrequently by the following vessel types:

- Commercial fishing vessels (not engaged in fishing operations)
- Small tugs and/or work skiffs with derelict vessels alongside or in tow
- Law enforcement vessels

In addition to providing limited moorage space for recreational users, the southwest side of the LUDD South Pier is used to moor a number of derelict vessels, primarily commercial fishing vessels that cannot operate under their own power. On occasion, these vessels are required to shift or depart, or a "new" derelict vessel may arrive, which requires the services of one or more small tugs. On rare occasions, commercial fishing vessels may berth here temporarily; but normally, the opposite (northeast) side of the LUDD South Pier is reserved for temporary moorage.

Law enforcement vessels may enter the waterway at any time to investigate or respond to a situation, but this happens infrequently.

Presently, there is no recreational or commercial navigation beneath the existing FANB.

Impacts to Navigation

This section provides specific information that the USCG considers when making a determination based on the reasonable needs of navigation for proposed bridge projects. The following questions/requests originate from the USCG Reasonable Needs of Navigation White Paper, dated 5 October 2012 (Reference 3). It should be noted that these questions were developed primarily to evaluate proposed bridges that span navigable water bodies (i.e. vessels are able to transit from one side of the proposed bridge site to the other). This project site is somewhat unique in that the bridge is abutted by commercial structures on one side. For this reason, some of the questions do not apply, or are not pertinent to this bridge replacement project.

NOTE: The USCG Glossary of Bridge Terms does not provide a definition of the term "waterway" (Reference 4). Hereafter, the term waterway is assumed to mean waters directly beneath the span of the proposed replacement bridge and the adjoining floating walkway, as the focal point of the USCG permitting process is determining reasonable navigational clearances for bridges (Reference 3).

Describe existing commercial users of the waterway.

- The waterway is impassible; therefore, there are no existing commercial users of the waterway.

Describe existing recreational users of the waterway.

- The waterway is impassible; therefore, there are no existing recreational users of the waterway.

What is the vessel trip frequency through the waterway.

- The waterway is impassible; therefore, there are no vessel transits (vessel trip frequency is zero).

Describe waterway stages.

- The lake elevation is managed by the USACE at the Hiram M. Chittenden Locks, in Ballard (Ballard Locks). The lake elevation is maintained between +20.0-22.0 feet above MLLW, depending on current and anticipated freshwater input. Mean Regulated Lake Level is +21.0 feet above MLLW. The vertical clearance at the FANB is zero feet (impassable) at all waterway stages.

Describe projected changes in waterway usage based upon anticipated waterway improvement projects.

- There are no projected changes is waterway usage as a result of anticipated waterway improvement projects. Vessel transits through the bridge will remain unchanged (none).
- By removing the fuel dock and associated dolphins and pilings near the floating walkway, the proposed bridge replacement project will improve safety of navigation in Waterway 8

What are the impacts to vessel owners that would be precluded from transiting the waterway if the proposed bridge project is authorized?

- None. Presently, all vessel owners are precluded from transiting beneath the bridge.

What are the impacts from bridge approaches based on associated navigational clearances?

- No impact. The impassibility of the FANB does not preclude vessels from transiting Lake Union from either direction – via University Bridge, to the east, or Fremont Bridge, to the West. Nor will there be any impacts to vessels using Waterway 8 as they approach FANB. On the contrary, there will be improvements to navigation within Waterway 8 as a result of the removal of the fuel dock, derelict piles and pile dolphins within Waterway 8.
-

Provide vertical and horizontal clearances of all bridges upstream and downstream of the proposed bridge site (including overhead transmission line clearances).

- There are no upstream or downstream bridges, relative to the FANB site.
- The existing FANB has the most restrictive vertical and horizontal clearances of the bridges over Lake Union and the Ship Canal (see Table 1), but does not preclude vessels

from transiting Lake Union from either direction – via University Bridge, to the east, or Fremont Bridge, to the west.

Table 1 Ship Canal bridge clearances at Mean Regulated Lake Level (+21.0 feet above MLLW)

Bridge Name	Type	VERT clearance at center (ft)	HOR clearance at waterline (ft)
BN Bridge No. 4	Bascule	43 at MHW (leaf down)	150
Ballard	Bascule	46 (leaves down)	143
Fremont	Bascule	31 (leaves down)	150
Aurora	Fixed Truss	136	525
Fairview Ave N	Fixed Trestle	0	0
Ship Canal	Fixed Truss	138	No restriction
University	Bascule	45 (leaves down)	171
Montlake	Bascule	48 (leaves down)	146

Overhead lines in the Ship Canal have a least clearance of 155 feet at Mean High Water, at the Burlington Northern Railroad Bridge No. 4, west of the Ballard Locks.

What are the guide clearances for the waterway, if any?

- The USCG has not established guide clearances for Lake Union or the Ship Canal.

Describe waterway layout and geometry.

- See above section, *Waterway Layout and Geometry*.

Describe waterway depth and elevation fluctuations.

- Sounding data for the area beneath and southeast of the FANB span are not available, but it is apparent that the water shallows rapidly to the southeast. The ordinary high water mark is nearly flush with the structural supports at the base of the Steam Plant building.
- See above section, *Waterway Layout and Geometry* for information on Waterway 8.

Describe local river hydrology, if applicable.

- Not applicable.

Describe channel and waterway alignment.

- There is no navigable channel through the existing FANB.
- See above section, *Waterway Layout and Geometry* for information on water depths and alignment of Waterway 8.

Describe the natural flow of the waterway including currents, water velocity, water direction and velocity fluctuations (seasonal, daily, hourly etc.), that might affect navigation.

- There is no current at the proposed bridge site.

Describe current speed(s) and direction(s) for the waterway.

- Does not apply. There is no current at the FANB site.

Describe the type and size of vessels utilizing the waterway (or expected to utilize the waterway during the proposed bridge lifespan).

- There are no users of the waterway beneath the existing FANB

- For information on utilization of Waterway 8, see above section, *Profile of Marine Traffic in Waterway 8 and Adjacent Docks/Facilities*.

Describe annual cargo movements through the waterway (cargo types and quantities).

- There are no cargo movements through the waterway.

Is there a federally authorized navigation channel on this waterway; and, is it maintained at a specific depth?

- No.

Was a "design vessel" used in planning the channel? What is/was the design vessel? Was the design vessel reviewed by the USCG?

- Does not apply. There is no navigable channel beneath the bridge; therefore no design vessel was used for planning/engineering purposes.

Does levee maintenance, bridge work (other bridges), channel maintenance and emergency operations upstream of bridge require certain vessels to transit the waterway?

- No.

What is the current "governing limitation" for navigation on the waterway? This means:

What is the most restrictive vertical clearance on the waterway? This may be a fixed bridge downstream of the proposed structure or it may be a low hanging power line downstream of the bridge, or it may be some other structure which limits vertical clearance. Sometimes the existing to-be-replaced bridge is the most restrictive structure.

- The only other vertical restriction on the waterway is that imposed by overhead power lines running over the existing FANB and floating walkway, which have a minimum vertical clearance of 30.75 feet at Mean Regulated Lake Level. The FANB has a vertical clearance of zero feet at all stages; therefore, it is most restrictive.
- The most restrictive vertical clearance in the Ship Canal is the Aurora Bridge (136 feet at center), though extremely wide vessels could be further restricted at the bascule bridges by the overhang of bridge leaves in the up position.

What is the most restrictive horizontal clearance on the waterway? This may be bridge piers on another bridge downstream, it may be a navigational lock, it may be a man-made channel, it may be the actual width of the narrowest portion of the waterway.

- There are no other bridge piers over the waterway, therefore the FANB is most restrictive. The existing FANB has a horizontal clearance of zero feet.
- The most restrictive horizontal clearance in Waterway 8 is the distance between the southwest side of the fuel dock, and a small float attached to the Fairview Marina A-Dock, used for short-term moorage (~120 feet). Following removal of the fuel dock, the proposed bridge replacement project would increase the minimum horizontal clearance in Waterway 8 to the width of the waterway itself (~400 feet).
- The most restrictive horizontal clearance in the Ship Canal is the Ballard Bridge (143 feet at the waterline). Some vessels could be further restricted at the bascule bridges by the overhang of bridge leaves in the up position.

Are there other natural or man-made conditions that affect navigation (atmospherics, exclusion zones, etc).

- No.

Provide site-specific information such as historical data on vessel allisions/collisions, rammings and groundings in the waterway, bridge/waterway geometry, sailing path, stream speed, and wind speed.

- There is no available data on vessel allisions/collision, rammings, or groundings in the waterway.
- See above section, *Waterway Layout and Geometry*, for additional information on bridge/waterway geometry.

Describe all vessels and cargoes that will need to be partially disassembled/dismantled or require multiple trips (barges) in order to transit the proposed bridge and whether the vessels currently possess that capability.

- This question does not apply to this project, as there is no current or foreseeable need for navigation of the waterway.

What is the proposed bridge clearance impact on present and prospective upstream commercial activity, e.g. jobs, and economic growth and development?

- No impact, as the replacement bridge will not restrict vessel traffic beyond the level of restriction imposed by the existing bridge. Additionally, there is no reasonable need for navigation under the bridge presently, and no foreseeable need in the future (see above section, Historical/Navigational Background).

Are there any existing facilities on the waterway that are or could be considered critical infrastructure, key resources, or important/unique US industrial capability - i.e. are these facilities unique or one of only a few of the type in the area?

- No.

Describe mitigation proposed/completed for impacted waterway users and a list of those impacts that cannot be mitigated.

- Waterway users will not be negatively impacted.
- The navigability of Waterway 8 will improve significantly with the removal of the fuel dock and numerous freestanding dolphins and pilings that currently pose a navigation hazard.

Impacts to Navigation During Construction Phase

The contractor's specific means and methods will be determined by the contractor after the bid is awarded. Project-specific specifications will be included in the contract language requiring the contractor to not fully obstruct navigation as part of their operations and to illuminate and sign all their operations within the lake in accordance with USCG requirements. A turbidity curtain/fish barrier will be required to contain the site and prevent fish from entering the site during construction. It will be installed at the beginning of the project and will be removed once the in-water work is complete. The plan is to use two turbidity curtains. One will be approximately 55 feet from the West Bridge, spanning the full length of the waterway for the full duration of construction. A second will be installed further up the waterway and will encompass the fuel dock and all of the derelict piles. It will be installed for approximately one to two months during the removal of the fuel dock and the piles. The anticipated locations of the turbidity curtains are shown in Figure 7, from Reference 5.

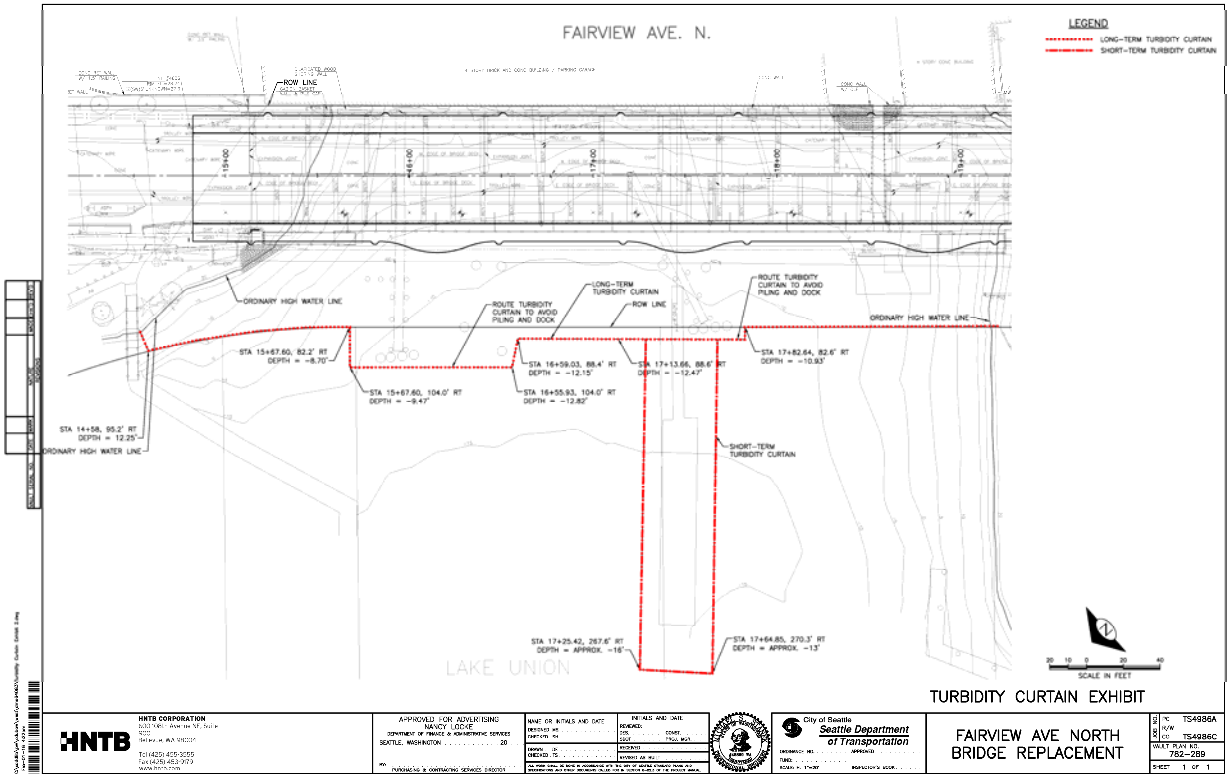

Figure 7 Turbidity curtains

ESA

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memorandum

date June 12, 2015

to Jamie O'Day, SDOT
Kurt Ahrensfeld, Perteet

from Lisa Adolfson, Claire Hoffman

subject Parking Availability Study - Fairview Avenue North Bridge Project

The purpose of this study was to document parking availability in the vicinity of the Fairview Avenue North bridge on a typical weekday. The study area was bounded by East Blaine Street to the north, Lake Union to the west, I-5 to the east, and the west side of Mercer Street to the south. Fairview Avenue North was included north of Valley Street, but not south. Figure 1 illustrates the study area. On Wednesday May 20, 2015, three ESA staff counted the number of occupied and unoccupied parking spaces between 9:30 and 11:30 a.m. to obtain a snapshot of the parking situation in the project area.

There are 907 parking spaces in the study area, not including 30 minute or less and loading zones, or private lots that serve only a particular business. During the site visit, 723 (80 percent) of the available spaces were occupied. Approximately one-third of the spaces are on-street parking (66 percent) and the on-street parking had a higher occupancy (86 percent) than the lots. Table 1 below summarizes the parking information.

Approximately one-half of the available parking spaces in the study area are paid (522 spots or 58 percent), with restrictions ranging from 1 hour to 10 hours maximum (Table 2). The free spaces also have similar restrictions, but a few spaces that do not have any posted restrictions.

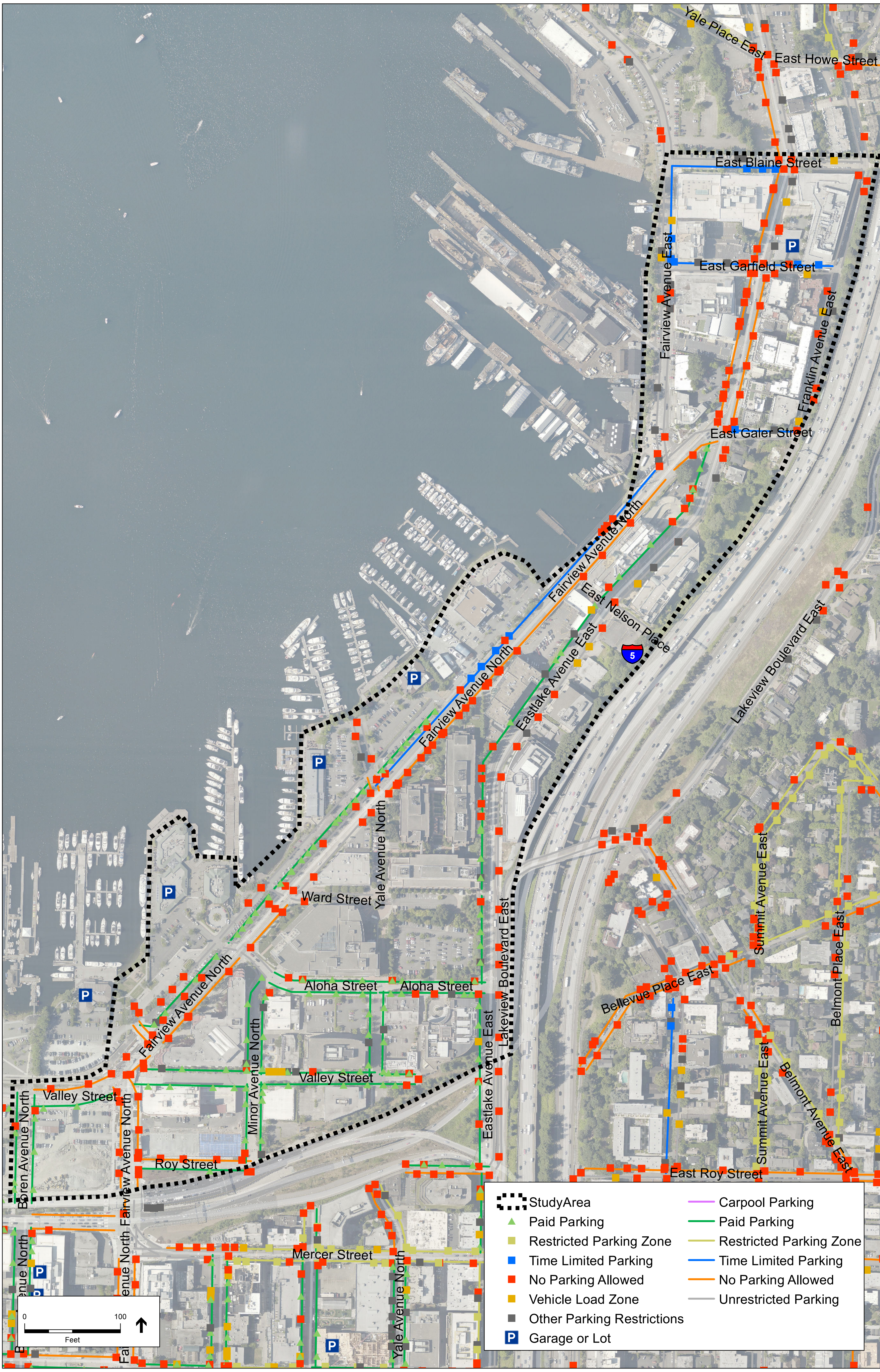
There are 10 public parking lots in the study area (Figure 1) with a total of 304 parking spaces. Any non-street parking was included as a parking lot. Only one of the lots (71 spaces) was free and served primarily dock workers. Of the paid lots, only one (24 spaces) was a monthly pay lot and the remainder were hourly/daily. There are also several private parking lots in the area that serve a particular building/business, and these lots were not counted as part of this study.

Table 1. Parking in the Study Area

	Street	Lot	Total
Number of Spaces	603	304	907
Occupied	520	203	723
% Occupied	86%	67%	80%

Table 2. Free and Paid Parking in the Study Area

	Free	Paid
Number of Spots	385	522
Occupied	376	347
% Occupied	98%	66%



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SOURCE:SOURCE: City of Seattle 2014; ESA 2015

Fairview Bridge . 210715

Figure 1

Study Area Parking

FAIRVIEW AVENUE NORTH BRIDGE PROJECT

TRAFFIC ANALYSIS REPORT

FINAL January 11, 2016

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INTRODUCTION

Two existing parallel bridges on Fairview Avenue N will be replaced with a single four-span structure that meets current seismic codes. The bridges are located between Yale Avenue N and Fairview Avenue E, at the east edge of Lake Union, and adjacent to the historic Lake Union Steam Plant, now home to Zymogenetics. Total overall width of the bridges is 60 feet with 58 feet curb to curb (see Figure 2). The existing West Bridge is founded on deteriorating timber piles, and the concrete superstructure of the existing East Bridge is deteriorating.

The Cheshiahud Lake Union Loop trail, operated by the City of Seattle Parks Department, is carried on the West Bridge and the parallel floating Fairview Walkway. There are stairs and ramp access from the trail to the north and south ends of the Fairview Walkway. The walkway connects to a hand-carried boat launch.

Similar to the existing bridge, the new bridge will provide two northbound lanes, one southbound lane, and facilities for pedestrians and bicyclists, with a total overall width of 68 feet, see Figure 3. The bridge will also accommodate future extension of the South Lake Union streetcar line to the north across the new bridge.

This report describes the existing transportation characteristics of the corridor, including traffic volumes and patterns, pedestrian and bicycle activity, parking supply and utilization, transit service, and projections of future traffic growth. The project location and analyzed intersections are shown in Figure 1. Future traffic growth in the corridor is addressed for the design year (2040) of the new bridge.

The maintenance of traffic (MOT) analysis for construction year 2016 includes an assessment of intersection operations along the detour routes, potential delays, and mitigation measures that address adverse traffic impacts during construction. The impacts are addressed for overnight and weekend closures and for full closure of the bridge during construction.

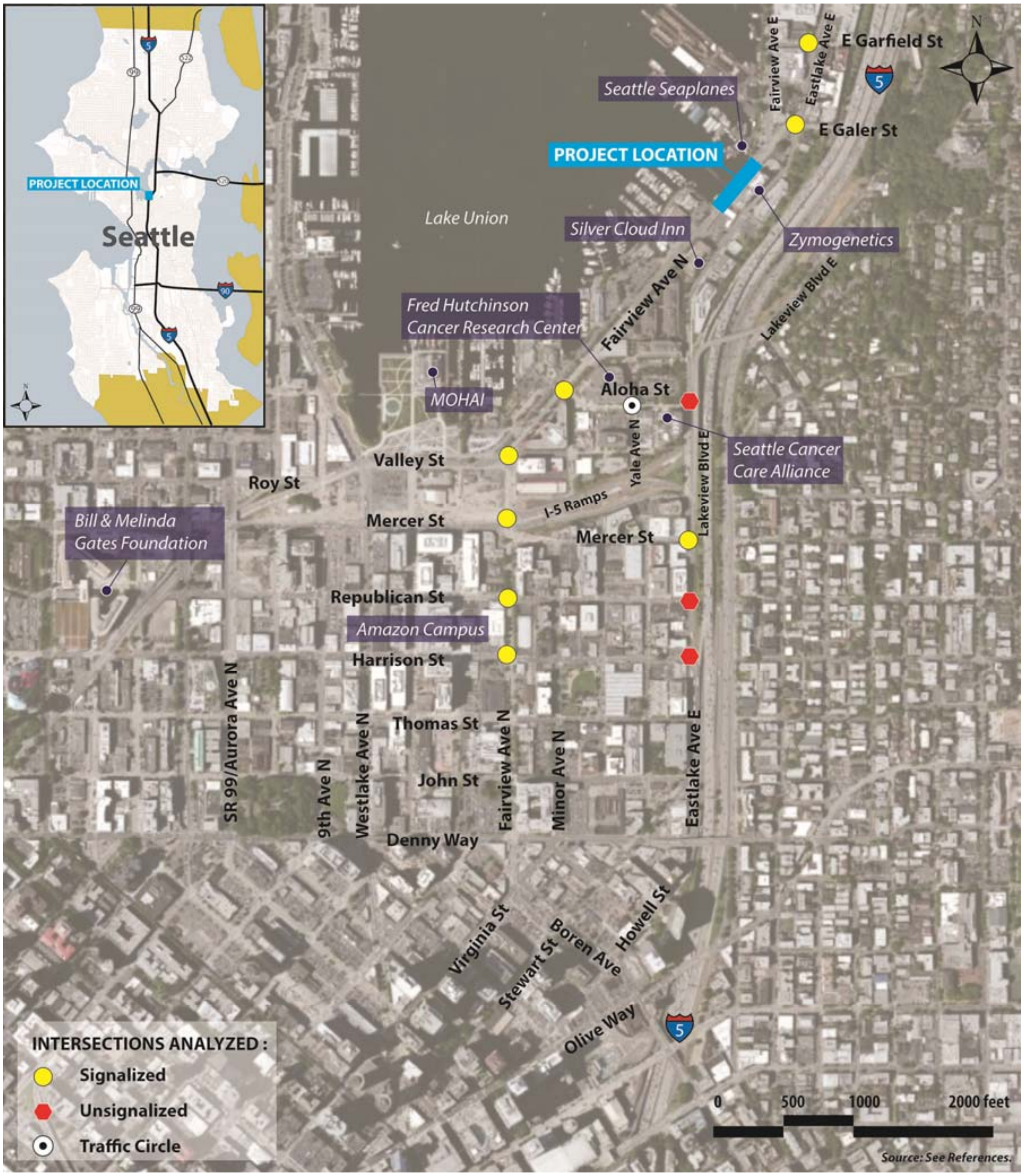

Figure 1: Project Vicinity

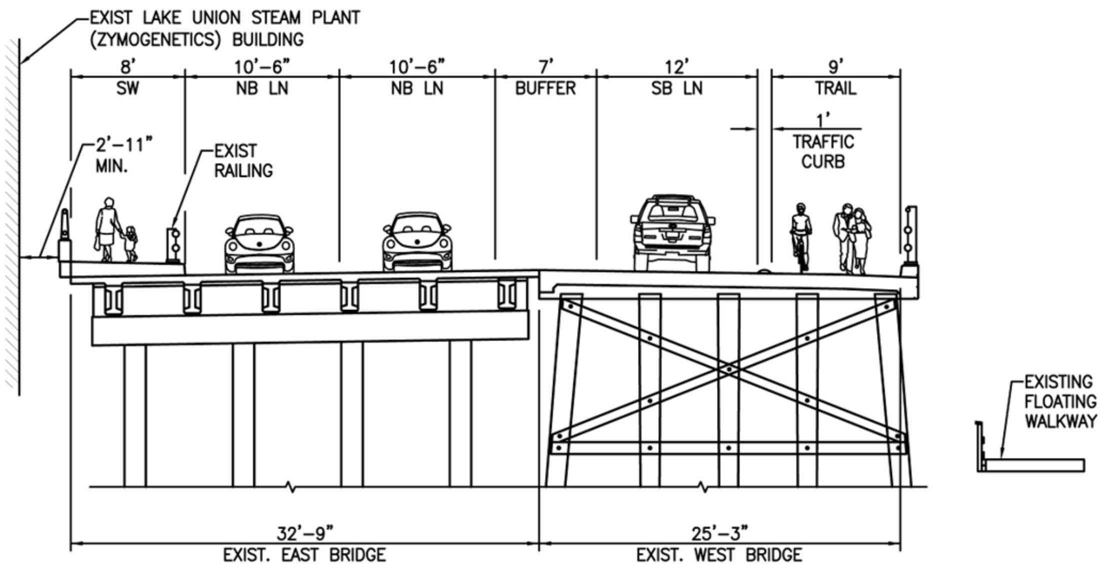

Figure 2: Existing Fairview Avenue N Bridges

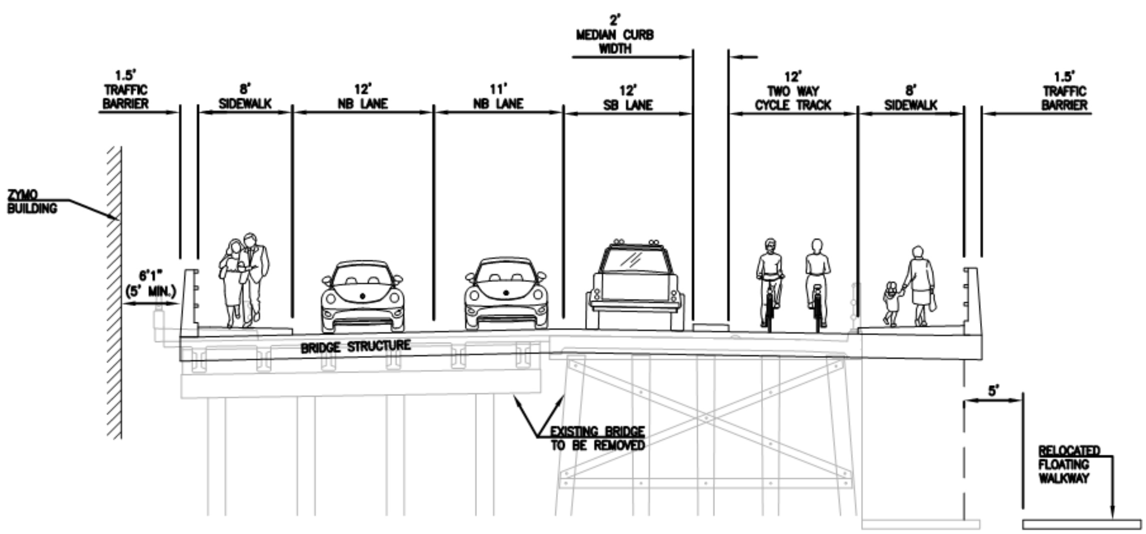

Figure 3: Proposed Fairview Avenue N Bridge

METHODOLOGY

A series of traffic analyses have been conducted for the Fairview Avenue N Bridge Replacement project. These studies address traffic conditions for two different aspects of the bridge design:

- Design year traffic – Traffic estimates for the design year are derived to demonstrate the adequacy of the bridge to accommodate future traffic growth

- Maintenance of traffic (MOT) during construction – Three alternatives were investigated for temporary treatment of traffic while the bridge is under construction

This section discusses the traffic analysis methodology for each of these conditions.

Design Year Traffic

Typical design life for bridges is 50 to 100 years, but traffic forecasting over such long periods is surrounded with uncertainties concerning future urban form and transportation technology. For this reason, forecasting for infrastructure projects generally considers a twenty-year design horizon. A design year of 2040 was selected for the bridge replacement project as representative of approximately 20 years after opening.

Future Traffic Growth

Estimates of future traffic growth on Fairview Avenue N are available from the Mercer Corridor Improvement Project Environmental Impact Statement (2006). Traffic volume forecasts for that project were prepared for a 2030 horizon year, and include the portion of Fairview Avenue N north of Valley Street. Although hourly forecast traffic volumes are higher at this location than at the bridge, the growth rates are expected to be similar. For the 2030 AM and PM peak hours, forecast growth rates were estimated to be between 1.1 percent and 1.4 percent annually.

Forecasting beyond 2030 was accomplished with a sensitivity analysis, using an average 1.25 percent annual growth for a conservative forecast, and an average 0.5 percent annual growth rate for a potentially mature business district with more intensive transit usage.

Traffic Operations Analysis

A qualitative analysis of roadway capacity was prepared using the 2040 traffic volume forecasts. This analysis uses a generalized lane capacity of 750 vph per lane, typical of saturation flows for signalized arterial streets in the City. At the bridge, this would indicate an existing northbound capacity of 1,500 vph and southbound capacity of 750 vph.

The volume/capacity ratio is used to describe the operating characteristics of Fairview Avenue N at the bridge location. A volume to capacity ratio less than 0.8 indicates acceptable traffic operations, whereas a ratio of 0.9 indicates operation near capacity.

Maintenance of Traffic (MOT) during Construction

Three alternatives have been evaluated for traffic management during construction of the Fairview Avenue N Bridge:

- Overnight and weekend closures of the bridge over a 22- to 24-month construction period, with existing channelization along the detour routes
- Full bridge closure for a 13- to 15-month period, with existing intersection channelization along the detour routes
- Full bridge closure for approximately 13- to 15-months, with mitigation to limit detour traffic using Republican Street by rechannelizing and signalizing the Eastlake Avenue E/Aloha Street intersection

Overnight and weekend bridge closure analysis considers impacts during the "shoulder hours" immediately before and after the weekday overnight closures, and during the Saturday midday periods for weekend closures. This staged construction approach would reduce the number of northbound lanes to one, resulting in minimal impacts to daytime traffic. Daytime northbound traffic volumes can be accommodated in a single travel lane. The weekday peak commute periods would not be significantly affected with overnight and weekend closures, but the closures would extend over a 22- to 24-month period.

For both full bridge closure scenarios, more significant traffic impacts would occur during the weekday peak commute periods, but over a 13- to 15-month duration. Full closure would also entail weekend impacts as exemplified by the Saturday midday conditions.

The MOT analysis of full bridge closure also provides a sensitivity analysis of conditions with a reduced detour volume. A common response by motorists in detour conditions is to revise the time or route of their trips, or to forego trips altogether. For the sensitivity analysis, a reduction of 20 percent in the volume of detour traffic is used. With a concerted public information program during construction, featuring transit as a convenient alternative, a 20 percent reduction is likely achievable.

The purpose of the sensitivity analysis is to provide a range of likely traffic operations conditions during construction of the replacement bridge. Strategies for the maintenance of traffic during construction are based on the full bridge closure volumes.

Detour Traffic Assignment

The detour routes described below are presented in Figures 4, 5 and 6.

Eastlake Avenue E will serve as the primary detour route during construction closures of the Fairview Avenue N Bridge. Traffic from the north will remain on Eastlake Avenue E, using the single southbound through lane at the Fairview Avenue N intersection. This traffic will have opportunities to return to Fairview Avenue N at Aloha Street, Republican Street, or continue on Eastlake Avenue E to Stewart Street and Denny Way. Aloha Street affords the most direct route for southbound traffic to reach local destinations along the southeast shore of Lake Union.

Traffic from the south will be routed along Mercer Street (one-way eastbound segment) between Fairview Avenue N and Eastlake Avenue E, then turning left onto Eastlake Avenue E to travel north. Bridge traffic approaching from the I-5 ramps will shift from a westbound right-turn movement to a westbound left-turn movement onto southbound Fairview Avenue N, and turn left onto eastbound Republican Street, then turn left onto northbound Eastlake Avenue E. Traffic from Valley Street would also use Republican Street as a detour route because the one-way segment of Mercer Street cannot be reached from southbound Fairview Avenue N.

Northbound detour traffic cannot use Aloha Street because raised channelization prohibits the eastbound to northbound left turn onto Eastlake Avenue E. An alternative to remove the restrictive channelization is included in the traffic analysis to reduce potential impacts on Republican Street.

On northbound Eastlake Avenue E, the northbound left turn onto southbound Fairview Avenue N is prohibited with raised channelization. Trips seeking to turn left onto southbound Fairview Avenue N will be routed north to the Garfield Street intersection, where traffic can then reach Fairview Avenue E and return south to Fairview Avenue N.

Traffic assignments were prepared for 2016 conditions, using a 1.25 percent annual growth rate. A baseline (No Build) condition, without bridge construction, is provided for comparison with the various detour alternatives.

Intersection Operations Analysis

The Synchro 8 intersection operations model was used in the preparation of 2014 and 2016 intersection level-of-service (LOS) and delay estimates. The 2014 intersection turning movement counts and SDOT-provided signal timing plans were entered into Synchro. A 1.25 percent annual traffic growth rate was used to estimate 2016 volumes. Synchro rounded the 2014 to 2016 two-year growth to 3 percent and a global 1.03 factor was applied to all 2014 intersection entering traffic volumes in the model.

Level of service categories for signalized and unsignalized intersections were determined in accordance with the 2010 *Highway Capacity Manual.* For unsignalized intersections, delay and LOS are reported for the poorest movement. The vehicle delay associated with level-of-service is shown in Table 1.

Table 1: Intersection Level-of-Service Criteria

	Control Delay* (seconds per vehicle)	
Level of Service	Signalized	Unsignalized
A	≤10	0 to 10
B	>10 to 20	>10 to 15
C	>20 to 35	>15 to 25
D	>35 to 55	>25 to 35
E	>55 to 80	>35 to 50
F	>80	>50

Source: Transportation Research Board. Highway Capacity Manual 2010. Exhibit 18-4 and Exhibit 19-1.

* Control delay is time spent slowing, stopping, moving up in a queue, and accelerating back to desired speed.

Travel Time and Queuing Estimates

Travel times for the 2016 PM peak-hour baseline and full closure options were determined using the arterial analysis package of the Synchro software. It assesses travel time by link segment as a function of the surrounding intersections and queue formation. A travel time survey was conducted along the detour routes to determine existing travel time, intersection delay and queues during the AM and PM weekday peak periods. Synchro was calibrated to these existing conditions by modifying saturation flow rates and lane utilization factors throughout the network.

Queue length estimates were prepared for the 2016 PM peak-hour baseline and full closure options using the SimTraffic feature of the Synchro package. A one-hour simulation is conducted after a 15-minute seeding period.

Network statistics also are available through the Synchro measures of effectiveness report. Total travel time in hours is selected to portray performance at the network level.

Parking

Parking surveys were conducted along Aloha Street during February 2014 to determine the supply and utilization of on-street parking on this potential detour route.

EXISTING CONDITIONS

The Fairview Avenue N Bridge provides a three-lane roadway connecting the South Lake Union neighborhood to Eastlake Avenue E. Fairview Avenue N is classified as a Principal Arterial, a Regional Connector, and a Minor Transit Street by the City of Seattle. The posted speed is 30 miles per hour (mph). Figure 1 shows the location of the bridge replacement project.

The roadway across the bridge consists of two 10.5-foot-wide lanes northbound and a 12-foot-wide lane southbound separated by a 7-foot-wide striped median. There is an 8-foot-wide raised concrete sidewalk on the east side and a 9-foot-wide bicycle/pedestrian path on the west side separated from the roadway by a 1-foot-wide traffic curb.

North of the bridge, this three-lane cross-section continues to an unsignalized T-intersection with Fairview Avenue E and a signalized intersection at Eastlake Avenue E/E Galer Street, where several minor turning movements are prohibited. The southbound lane on Fairview Avenue N develops from an exclusive right-turn lane on southbound Eastlake Avenue E.

South of the bridge, Fairview Avenue widens to provide two through lanes in each direction and a center two-way left-turn lane. There is a signalized intersection at Aloha Street, an unsignalized intersection Ward Street (Campus Drive), and a pedestrian signal at Yale Avenue N. The north terminus of the South Lake Union streetcar line is the Fairview Avenue/Campus Drive station near Ward Street, with a tail track extending nearly to Yale Avenue N.

Traffic Volumes

A 7-day traffic count was conducted at the Fairview Avenue N Bridge in November 2013, including hourly detail by direction and vehicle classification data. The Average Daily Traffic (ADT) during this period was 8,700 vehicles per day (vpd), and the Average Weekday Traffic (AWDT) was 9,900 vpd. Daily traffic on Saturday was 6,600 vpd and on Sunday, 4,800 vpd.

A directional imbalance is observed in the corridor traffic volumes, with about 52 percent destined northbound, and 48 percent southbound, which results in 200 to 600 vpd higher numerically in the northbound direction during weekdays.

The highest hourly traffic volume observed is during weekday peak commute hours. During the 8 to 9 AM hour, northbound bridge traffic reached 345 vehicles per hour (vph) and southbound traffic reached 470 vph. The directional split in morning conditions is 58-percent southbound. Maximum bridge volumes are observed on weekdays from 5 to 6 PM with 530 vph northbound and 400 vph southbound. The total volume (930 vph) represents about 9.4 percent of the AWDT. The directional split in the afternoon is 57-percent northbound. On weekends, maximum bridge volumes are observed midday, with directional hourly volumes below 275 vph throughout Saturday and Sunday.

A traffic count (7-day) was also conducted on Eastlake Avenue E, north of E Nelson Place in October 2014. This count and the 2013 count on the Bridge were used to develop estimates of Bridge detour traffic on Eastlake Avenue E.

A series of intersection turning movement counts was conducted at 12 intersections along the potential detour routes (locations shown on Figure 1). The counts covered the weekday

7 to 9 AM and 4 to 6 PM peak periods for determination of the AM and PM peak hours at each intersection and analysis of peak-hour conditions. Another set of counts at the same 12 intersections covered the weekday "shoulder hour" periods of 5 to 7 AM and 7 to 9 PM for use in setting closure hours. Another count covers the 11 AM to 1 PM hours on Saturday for analyzing weekend closure impacts. Turning movement counts are included in Appendix D.

Weekday peak-hour bidirectional traffic volumes on the detour routes are presented on Table 2.

Table 2:
Existing (2014) Peak Hour Traffic Volumes

Location	AM Peak Hour vph	PM Peak Hour vph
Fairview Ave N south of Aloha St	1109	1027
Aloha St west of Eastlake Ave E	208	316
Eastlake Ave E north of Aloha St	510	725
Fairview Ave N south of Mercer St	1345	1734
Republican St west of Eastlake Ave E	300	438
Mercer St west of Eastlake Ave E	197	307

Source: July 2014 intersection turning movement counts

Vehicle Classification

The November 2013 Fairview Avenue N Bridge traffic counts included a vehicle classification count to estimate the number of heavy vehicles using the bridge. The average results of the 7-day classification count are presented on Table 3. Trucks and buses comprise about five percent of all vehicular traffic crossing the Fairview Avenue N Bridge. Of the northbound volume, 1.3 percent consists of buses, 3.6 percent consists of single-unit trucks and 0.3 percent is heavy trucks. Of the southbound volume, 1.0 percent consists of buses, 3.6 percent consists of single unit trucks and 0.1 percent consists of heavy trucks.

Table 3:
2013 Vehicle Classification Count

Direction	Passenger Cars	Buses	Single Unit Trucks	Heavy Trucks	All Heavy Vehicles
Northbound	4,290 (94.8%)	60 (1.3%)	165 (3.6%)	10 (0.3%)	235 (5.2%)
Southbound	3,990 (95.3%)	45 (1%)	150 (3.6%)	5 (0.1%)	200 (4.7%)

Source: November 2013 automatic vehicle classification counts

Traffic Operations

Existing (2014) traffic operations were assessed with a program of intersection analyses to characterize levels of service and average delay during AM and PM peak-period conditions, and with a series of travel time observations.

Existing Intersection Operations

Table 4 presents the Synchro analysis of intersection operations. The peak hour analyses are provided for the baseline condition to evaluate weekday full (24/7) closure of the bridge, and the shoulder hour analyses are provided as the baseline for evaluation of overnight bridge closures. A Saturday midday analysis is provided for both the closure scenarios to evaluate weekend closures.

Table 4:
Existing (2014) Intersection Level-of-Service and Average Delay

Location	AM Shoulder Delay[2] / LOS	AM Peak Delay[2] / LOS	PM Peak Delay[2] / LOS	PM Shoulder Delay[2] / LOS
Eastlake Ave E/Garfield St	9.3 / A	11.6 / B	14.0 / B	11.9 / B
Eastlake Ave E/Fairview Ave E	8.8 / A	6.9 / A	16.4 / B	8.4 / A
Eastlake Ave E/Aloha St [1]	9.4 / A	12.7 / B	28.7 / D	9.5 / A
Fairview Ave N/Aloha St	6.8 / A	11.5 / B	54.5 / D	21.1 / C
Fairview Ave N/Valley St	17.7 / B	28.6 / C	82.5 / F	57.3 / E
Fairview Ave N/Mercer St	41.5 / D	51.3 / D	130.8 / F	45.9 / D
Fairview Ave N/Republican St	18.7 / B	28.6 / C	192.9 / F	25.5 / C
Eastlake Ave E/Mercer St	8.1 / A	11.4 / B	20.7 / C	11.8 / B
Eastlake Ave E/Republican St [1]	10.0 / A	14.9 / B	21.9 / C	11.8 / B

Note 1: Unsignalized – Delay value at unsignalized intersection represents the approach with the highest delay value

Note 2: Delay is average seconds per vehicle

During the AM “shoulder hour” (6 to 7 AM), the Fairview Avenue N/Mercer Street intersection operates at LOS D, with all other intersections operating at LOS A or B. During the AM peak hour (7:30 to 8:30 AM) the Fairview Avenue N/Mercer Street intersection operates at LOS D, with LOS C at the Fairview Avenue N/Valley Street and Fairview Avenue N/Republican Street intersections. All other intersections operate at LOS B or better.

During the PM peak period, many intersections are affected by congestion entering I-5, and three intersections operate at LOS F. The Fairview Avenue N/Aloha Street and Eastlake Avenue E/Aloha Street intersections operate at LOS D.

The intersection of Fairview Avenue N/Republican Street was affected by construction lane closures during the travel time surveys. The Republican Street westbound right-turn lane and one northbound lane on Fairview Avenue N were closed. This configuration produces LOS F during the PM peak hour. These lanes will reopen before 2016 and all travel lanes were utilized in the 2016 MOT analysis.

During the PM shoulder hour, the Fairview Avenue N/Valley Street intersection operates at LOS E, the Fairview Avenue N/Mercer Street intersection operates at LOS D, with LOS C at the Fairview Avenue N/Aloha Street and Fairview Avenue N/Republican Street intersections.

The queues approaching the I-5 interchange ramps affect Mercer Street, Fairview Avenue N, north and south of Mercer Street, and Valley Street. Table 5 shows PM peak hour 50th and 95th percentile queue lengths. A 95th percentile queue length would be exceeded once every 20 signal cycles or approximately once each peak hour. On southbound Fairview Avenue N, queues are encountered immediately south of Aloha Street, and northbound on Fairview Avenue N, queues extend south of Republican Street. Queues also form on westbound Republican Street approaching Fairview Avenue N.

Table 5:
Existing (2014) PM Peak Hour Queue Lengths

Location	Block Length feet	95th Percentile feet	50th Percentile feet
Southbound Fairview Ave N – Aloha St to Valley St	590	600 [1]	300 [1]
Northbound Fairview Ave N – Mercer St to Republican St	430	480 [2]	440 [2]
Westbound Republican St – Eastlake Ave E to Fairview Ave N	1180	1440	1040

Notes: 1: southbound left-turning movement at Mercer Street
2: northbound right-turn movement at Mercer Street

On Saturdays, midday traffic operations are characterized by LOS D at the Fairview Avenue N/Mercer Street intersection, with LOS C operations at the Fairview Avenue N/Valley Street and Fairview Avenue N/Republican Street intersections. Other intersections operate at LOS B or better. Saturday midday traffic operations are shown in Table 6.

Table 6:
Saturday Midday Existing (2014) Intersection Level-of-Service and Delay

Location	Delay[2] / LOS
Eastlake Ave E/Garfield St	10.9 / B
Eastlake Ave E/Fairview Ave E	11.5 / B
Eastlake Ave E/Aloha St [1]	9.5 / A
Fairview Ave N/Aloha St	7.3 / A
Fairview Ave N/Valley St	20.9 / C
Fairview Ave N /Mercer St	43.9 / D
Fairview Ave N /Republican St	25.1 / C
Eastlake Ave E/Mercer St	9.8 / A
Eastlake Ave E /Republican [1]	13.0 / B

Note 1: Unsignalized – Delay value at unsignalized intersection represents the approach with the highest delay value.
Note 2: Delay is average seconds per vehicle

Existing Travel Times

Travel times on selected routes in the project vicinity were studied in November 2014 as part of the maintenance of traffic (MOT) analysis. Table 7 provides the results of the travel time survey. During the AM peak hour, travel times on Fairview Avenue N between Eastlake Avenue E and Harrison Street range between 3 and 4 minutes. During the PM peak hour, travel times average 8.2 minutes southbound and about 5.6 minutes northbound.

Table 7:
Existing (2014) Travel Times

Location	AM Peak minutes	PM Peak minutes
Southbound Fairview Ave N – Eastlake Ave E to Harrison St	3.2	8.2
Northbound Fairview Ave N – Harrison St to Eastlake Ave E	3.8	5.6
Westbound Republican St – Eastlake Ave E to Fairview Ave N	0.9	7.9
Southbound Eastlake Ave E – Fairview Ave E to Harrison St	1.8	2.3
Northbound Eastlake Ave E – Harrison St to Fairview Ave E	2.4	2.7

Source: Travel time surveys conducted in November 2014

Transit

King County Metro Transit Division provided the Fairview Avenue N bus routes operating in December 2013 (Johnson 2013). Table 8 summarizes bus service on the bridge.

Table 8:
Fairview Avenue N Bridge Bus Routes

	Weekday		Saturday		Sunday	
Route	Trips	Riders	Trips	Riders	Trips	Riders
70	120	4,720	70	1,500	0	0
71	25	1,260	42	2,050	68	3,480
72	20	950	27	1,530	40	2,410
73	18	980	27	1,250	69	3,400
83[1]	2	<50	2	N/A	2	N/A

Sources: Johnson 2013; King County 2014.

Note 1: Route 83 is a "Night Owl" service making two round trips between downtown Seattle and the Maple Leaf neighborhood via the University District between about 2:00 and 4:30 AM. Service shown is in effect September 27, 2014.

Route 70, the primary line, operates every 15 minutes from 6 AM to 8 PM during weekdays and 9:30 AM to 6:30 PM on Saturdays. This route operates exclusively on 40 foot Gillig electric trolleys which require overhead wiring for power. When the Route 70 does not operate on Fairview Avenue N (early mornings, evenings, and on Sundays), Routes 71, 72 and 73 shift from freeway operation to Fairview Avenue N. Routes 71-72-73 operate exclusively with 60-foot New Flyer Low Floor Hybrids.

The South Lake Union Streetcar northern terminus is on Fairview Avenue N at Yale Avenue N, south of the Fairview Bridge. Streetcar operations will not be affected by construction of the replacement bridge. The street car has a 15 minute frequency throughout the day, and 10 minute frequency between 4- and 6-PM.

In the event of interruptions to streetcar service, Metro provides bus service along the same route, and utilizes a layover area immediately north of the Fairview Avenue N Bridge. Construction activities and a planned cycle track will necessitate relocation of this layover area. Curb use for relocated layover for two buses has been approved by SDOT on southwestbound Fairview Avenue N about 160 feet northeast of the Yale Avenue N intersection (Drake 2014).

For staged construction, with one travel lane in each direction on the Fairview Avenue N Bridge, buses could access the new layover zone using the turnaround at E Galer Street. For full closure of the bridge, buses would not be able to use the E Galer Street turnaround and would therefore need to turn around south of the construction zone. Planned improvements to Minor Avenue N and Valley Street for the RapidRide C Line extension would also facilitate local bus service in the South Lake Union neighborhood. Discussions with King County Metro are on-going as to the need of bus use during the construction period. Resolution is anticipated during final design.

Pedestrian and Bicycle Activity

Streets in the project area are generally provided with sidewalks on both sides of the street and crosswalks at intersections, and facilities for bicycle travel are provided on Fairview Avenue N and Eastlake Avenue E. The Cheshiahud Lake Union Loop trail runs along the west side of Fairview Avenue N in the project area. The trail connects to the floating Fairview Walkway on the west side of the Fairview Avenue N Bridge with stairways north and south of the bridge.

Pedestrian Volumes

Pedestrian counts were made at the 12 analysis intersections shown in Figure 1 in July 2014 for the 7 to 9 AM and 4 to 6 PM peak traffic periods. Counts were made at each crosswalk. On weekdays, north-south pedestrian traffic on Fairview Avenue N between Eastlake Avenue E and Mercer Street ranges between 100 and 200 pedestrians in the morning and afternoon peak hours. Pedestrian volumes crossing Fairview Avenue N east-west average 50 to 100 pedestrians per hour.

On Eastlake Avenue E, north-south pedestrian traffic averages about 110 pedestrians per hour, with about 100 pedestrians per hour crossing the street east-west at E Garfield Street and about 40 crossing east-west at each of the Fairview Avenue N and Aloha Street intersections. South of Mercer Street, pedestrian volume along Eastlake Avenue E drops below 100 pedestrians per hour, and east-west crossing volumes below 5 pedestrians per hour.

On Aloha Street, east-west pedestrian volume averages about 60 pedestrians during the AM peak hour and 110 pedestrians per hour during the PM peak hour. About 40 to 50 pedestrians per hour cross Eastlake Avenue E at the unsignalized intersection with Aloha Street during both the AM and PM peak hours.

East-west pedestrian volumes on Republican and Harrison Streets average 100 to 200 pedestrians per hour crossing Fairview Avenue N at each of these locations. North-south pedestrian volumes average about 150 pedestrians per hour on Fairview Avenue N, crossing Republican and Harrison Streets.

Bicycle Volumes

Bicycle volumes counts were made at the 12 analysis intersections shown in Figure 1 in July 2014 for the 7 to 9 AM and 4 to 6 PM peak traffic periods. Volumes along Eastlake Avenue E north of Fairview Avenue N reach about 170 bicycles per hour southbound during the morning peak hour, and 135 bicycles per hour northbound during the PM peak hour. Of the AM total, about 70 southbound bicycles remain on Eastlake Avenue E, and the remainder (about 100 bicycles) use Fairview Avenue N. Northbound in the afternoon, 80 bicycles per hour approach on Eastlake Avenue E, and 55 bicycles hourly approach on Fairview Avenue N.

On Fairview Avenue N at Aloha Street, about 70 bicycles per hour approach southbound during the AM peak hour, and 20 bicycles per hour approach northbound during the PM peak hour. From this data, it is possible to infer that usage of the trail on the west side of the bridge ranges between 30 and 35 bicycles per hour in the peak direction of travel. Cheshiahud Lake Union Loop trail usage along Fairview Avenue N and Fairview Avenue E may be subject to weekly and seasonal variation, producing higher volumes outside the commute peak hours.

Potential Detour Routes

During bridge construction, traffic will be directed to other routes with either the overnight/weekend or full closure options. Potential streets used in the detour routes include:

- **Eastlake Avenue E** is a north-south principal arterial street connecting to Fairview Avenue N north of the bridge, and to Denny Way, Stewart Street, and Howell Street at its south terminus. North of Lakeview Boulevard E, it consists of two travel lanes with bike lanes and on-street parking on both sides. South of Lakeview Boulevard E it has four travel lanes, with sharrows in both directions, and parking on the west side. North of the intersection with Fairview Avenue N, four lanes are provided. Posted speed is 30 mph. It is signalized at the intersections with E Garfield Street, Fairview Avenue N, Lakeview Boulevard/Mercer Street, and Stewart Street. It is classified as a major transit street.
- **Aloha Street** is an east-west local street connecting Eastlake Avenue E and Fairview Avenue N. It provides two travel lanes, with parking on both sides. It is signalized at Fairview Avenue N, and a traffic circle is provided at the intersection with Yale Avenue N. Aloha Street is stop-sign controlled at the Eastlake Avenue E intersection where eastbound-to-northbound left turns are prohibited.
- **Mercer Street** is an east-west one-way minor arterial between Fairview Avenue N and Eastlake Avenue E. It provides a single eastbound travel lane with parking on both sides. It is accessible only from eastbound Mercer Street and northbound Fairview Avenue N. It is signalized at Eastlake Avenue E.
- **Republican Street** is an east-west minor arterial street extending between Eastlake Avenue E and Fairview Avenue N, and continuing westward. It provides one travel lane in each direction, with parking on both sides. It is signalized at the intersection with Fairview Avenue N. There are unsignalized intersections with Minor Avenue N, Pontius Avenue N, Yale Avenue N, and Eastlake Avenue E.

- **Harrison Street** is an east-west local street connecting between Eastlake Avenue E and Fairview Avenue N, and continuing westward. It provides one travel lane in each direction, with parking on both sides. It is signalized at the intersection with Fairview Avenue N. There are unsignalized intersections at Minor Avenue N, Pontius Avenue N, and Yale Avenue N, and Eastlake Avenue E.

Traffic Safety

Collision data for the period January 1, 2003 through October 23, 2013 was obtained for Fairview Avenue N and surrounding streets. No collisions were reported on the Fairview Avenue N Bridge or in the segment of Fairview Avenue N between the Ward Street and Fairview Avenue E intersections.

Elsewhere along Fairview Avenue N, nine crashes were reported at the Fairview Avenue N/ Aloha Street intersection, including two with injuries. Nine crashes were reported between Aloha Street and Ward Street, including three with injuries. Four crashes were reported on Fairview Avenue N between Fairview Avenue E and Eastlake Avenue E, including one with injuries. No fatalities were reported on Fairview Avenue N.

During construction of the replacement Fairview Avenue N Bridge, traffic may be detoured to alternate routes. Collision experience on these potential routes was also surveyed. On Eastlake Avenue E, five crashes were reported at the Fairview Avenue N/Eastlake Avenue E intersection, including two injury crashes. Eleven crashes were reported on Eastlake Avenue E between Fairview Avenue N and E Nelson Place, with no injuries. Between Fairview Avenue N and E Garfield Street, 21 crashes were reported on Eastlake Avenue E, with ten involving injuries.

On Eastlake Avenue E between Mercer Street and Republican Street, nine crashes were reported, with one involving injuries. Nineteen crashes were reported at the Eastlake Avenue E/ Republican Street intersection, including eight with injuries. Between Harrison and Republican Streets, thirteen crashes were reported on Eastlake Avenue E, including one with injuries. No fatalities were reported on Eastlake Avenue E.

On Republican Street, fourteen crashes were reported between Yale Avenue N and Eastlake Avenue E, including one with injuries. On Harrison Street, six crashes were reported between Fairview Avenue N and Minor Avenue N.

On Fairview Avenue N between Mercer and Republican Streets, 29 crashes were reported, including seven with injuries. At the Fairview Avenue N/Republican Street intersection, 28 crashes were reported, with nine involving injuries. On Fairview Avenue N between Republican and Harrison Streets, sixteen crashes were reported, with four involving injuries. At the Fairview Avenue N/Harrison Street intersection, fifteen crashes were reported, including seven with injuries.

The collision summary does not reveal any high-accident locations (ten or more crashes per year) at intersections along the detour routes.

Parking

In the immediate project vicinity there are an estimated 600 to 650 public parking spaces. Adjacent surface lots and parking garages are also present. A parking utilization study was performed in February 2014 for the 43 spaces on Aloha Street between Minor Avenue N and Eastlake Avenue E.

Paid on-street parking is provided along both sides of Aloha Street between Minor Avenue N and Eastlake Avenue E. Both short-term (10-minute) and two-hour spaces are provided. In the block between Eastlake Avenue E and Yale Avenue N, there are 13 spaces on the north side of the street and 8 spaces on the south side, for a total of 21 spaces, all with a two-hour limit. In the block between Yale Avenue N and Minor Avenue N, there are 12 spaces on the north side and 10 spaces on the south side for a total of 22 spaces.

One short-term passenger loading zone is provided on Aloha Street between Yale Avenue N and Eastlake Avenue E.

Utilization of on-street parking reaches a maximum during late morning to mid-afternoon hours. On Aloha Street between Yale Avenue N and Minor Avenue N, utilization during this period is 100 percent. In the block between Eastlake Avenue E and Yale Avenue N, utilization is generally about 80 percent during the midday hours.

On weekdays before 7 AM, parking utilization along Aloha Street reaches a maximum of 25 percent during the 6:45 to 7 AM period. In the evenings after 7 PM, utilization reaches 37 percent in the 7 to 7:15 PM period. On Saturdays, midday parking utilization reaches about 44 percent along Aloha Street.

DESIGN TRAFFIC ANALYSIS

Design traffic for the Fairview Avenue N Bridge was developed for the year 2040, using growth rates specific to the South Lake Union neighborhood. From the Mercer Corridor Project EIS, annual traffic growth rates of 1.1 to 1.4 percent were projected for Fairview Avenue N near Valley Street through 2030. The 1.4 percent growth rate was applied to existing (2013) bridge traffic volumes to derive estimates of 2030 AM and PM peak-hour bridge traffic.

Traffic Volume Forecasts

Table 9 shows the projected 2030 hourly directional traffic volumes using the higher of the stated growth rates. Forecasts were prepared for 2040 using two scenarios: ongoing growth at an average 1.25 percent annually and a reduced growth rate of 0.5 percent annually, for the 2030-2040 period. The lower growth rate is typical of mature urban areas where land use patterns are stable.

For 2040, maximum hourly directional volumes would reach 630 to 700 vph at the lower growth rates, and 680 to 760 vph at the higher growth rates, as shown on Table 9.

Table 9:
Design Year Peak Hour Traffic Volumes (vph)

Peak Hour	Existing (2013)	2030	2040 Low Growth (0.5% per year)	2040 High Growth (1.25% per year)
Northbound AM	345	440	460	500
Southbound AM	470	600	630	680
Northbound PM	530	670	700	760
Southbound PM	400	510	540	580

Traffic Operations Analysis

A qualitative analysis of roadway capacity was prepared using the 2040 high growth traffic volume forecasts. This analysis uses a generalized lane capacity of 750 vph per lane, typical of saturation flows for signalized arterial streets in the City. At the bridge, this would indicate northbound capacity of 1,500 vph and southbound capacity of 750 vph. The volume-to-capacity ratios are shown on Table 10. A volume to capacity ratio less than 0.8 indicates acceptable traffic operations, whereas a ratio of 0.9 indicates operation near capacity.

Table 10:
Design-Year (2040) Volume-to-Capacity Ratio
Fairview Avenue N Bridge

Time	Northbound	Southbound
AM Peak	0.33	0.91
PM Peak	0.51	0.77

MAINTENANCE OF TRAFFIC DURING CONSTRUCTION

Three alternatives for maintaining traffic during construction of the Fairview Avenue N Bridge are analyzed:

- Overnight and weekend closures of the bridge over a 22- to 24-month construction period, with existing channelization along the detour routes

- Full bridge closure for a 13- to 15-month period, with existing channelization along the detour routes (see Figure 4 for Detour Scenario 1)

- Full bridge closure for a 13- to 15-months period, with mitigation to limit detour traffic using Republican Street by rechannelizing and signalizing the Eastlake Avenue E/ Aloha Street intersection (see Figure 5for Detour Scenario 2)

Potential detour routes for trucks and buses for any of the bridge closures are shown in Figure 6.

Overnight and Weekend Bridge Closures

The Fairview Avenue N Bridge would be replaced in halves, with one lane of traffic maintained in each direction on the open side of the bridge during weekday daytime hours. The bridge would be closed to all traffic during selected weeknight hours and on weekends. The west half would be constructed first, then traffic shifted onto the new portion while the east half is constructed.

Construction duration with two-stage construction would be 22 to 24 months. There would be about five weekend closures for activities such as setting bridge girders, utility replacement, and final paving. Weeknight closures may occur on about 130 nights. The contractor would be required to provide a minimum three-week notice in advance of closures to the public outreach campaign.

A 1.4 percent annual growth rate was applied to the existing (2013) Fairview Avenue N Bridge traffic volumes to estimate year of construction (2016) traffic volumes. AM peak volumes would be 360 vph northbound and 490 vph southbound. PM peak volumes would be 550 vph northbound and 415 vph southbound, as shown in Appendix A.

In the two-stage construction configuration, a single northbound lane would be provided to serve the PM peak-hour traffic demand, where two lanes are available today. The northbound traffic volume of 550 vph would result in a volume/capacity (V/C) ratio of 0.73, which is acceptable. The temporary single-lane condition would accommodate the 2016 traffic demand with a negligible increase in delay.

Southbound traffic would be provided with a single lane during construction, identical to the existing condition. During 2016 AM peak hour conditions, 490 vph would cross the bridge southbound, with a V/C ratio of 0.65.

Figure 4: Detour Routes Scenario 1

Note: Advanced signing will direct travelers to the detour route shown; other routes such as Mercer Street, Republican Street, Harrison Street and the arterial routes in Figure 6 could also be used.

Figure 5: Detour Routes Scenario 2

Figure 6: Truck and Bus Detour Routes

Closure Hours

With the bridge closed on weeknights and weekends, traffic would be detoured to adjacent streets. Closure hours are determined in accordance with the cumulative impact of existing traffic plus the detour traffic on each route. Trucks would be provided with a route that uses designated arterial streets. Transit routes will also be diverted to adjacent roadways during these overnight and weekend closures.

The volume of detour traffic can be estimated from the November 2013 counts on the Fairview Avenue N Bridge. As shown in Appendix A, directional traffic volumes on weekdays remain below about 315 vph before 7 AM, and drop below 250 vph after 7 PM. On weekends, volumes remain below 300 vph all day on Saturdays and Sundays.

On Eastlake Avenue E, southbound traffic at E Nelson Place reaches 360 vph by the 7 to 8 AM hour, peaks at 520 vph in the 8 to 9 AM hour and remains above 250 vph until 7 PM. Northbound volumes at this location remain below 150 vph during the morning peak hour and peak at 250 vph during the 5 to 6 PM hour.

Lane capacity on Eastlake Avenue E is estimated at approximately 750 vph in each direction, considering only a single directional lane is available at the critical points along the north-south route (between the intersections at Fairview Avenue E and Aloha Street). Diversion of bridge traffic onto Eastlake Avenue E would produce cumulative traffic volumes between 600 and 1,000 vph in the hour preceding closure (6 to 7 PM) and after opening (8 to 9 AM). These volumes would approach the capacity of Eastlake Avenue E, or exceed capacity by 250 vph. Traffic volumes between the hours of 7 PM and 7 AM would be below Eastlake Avenue E capacity.

On weekdays, the recommended hours for full closure of the Fairview Bridge are 7 PM to 7 AM. The bridge could remain closed for weekend work between 7 PM on Friday to 7 AM on Monday.

2016 Baseline Shoulder Hour Intersection Operations Analysis

Baseline 2016 intersection operations during the AM shoulder hour (6 to 7 AM), PM shoulder hour (7 to 8 PM), and midday Saturday (12 to 1 PM) were analyzed using Synchro. The analysis results are shown on Table 11.

Baseline traffic operations for the PM shoulder hour indicate LOS D at the Fairview Avenue N/Mercer Street intersection and LOS E at the Fairview Avenue N/Valley Street intersection. All other study intersections would operate at LOS C or better.

On Saturdays, the 2016 baseline analysis indicates LOS D at the Fairview Avenue N/ Mercer Street intersection during midday hours. All other study intersections would operate at LOS C or better.

**Table 11:
2016 Baseline (No Build) Shoulder-Hour
Intersection Level-of-Service and Average Delay**

Location	AM Shoulder Delay^2 / LOS	PM Shoulder Delay^2 / LOS	Saturday Midday Delay^2 / LOS
Eastlake Ave E/Garfield St	9.3 / A	12.0 / B	11.0 / B
Eastlake Ave E/Fairview Ave E	8.7 / A	8.4 / A	11.5 / B
Eastlake Ave E/Aloha St [1]	9.4 / A	9.6 / A	9.5 / A
Fairview Ave N /Aloha St	6.9 / A	21.5 / C	7.4 / A
Fairview Ave N/Valley St	17.9 / B	62.6 / E	21.3 / C
Fairview Ave N/Mercer St	43.0 / D	47.4 / D	45.3 / D
Fairview Ave N/Republican St	18.9 / B	22.1 / C	23.9 / C
Eastlake Ave E/Mercer St	8.5 / A	11.9 / B	10.0 / A
Eastlake Ave E/Republican St [1]	10.1 / B	11.8 / B	13.1 / B

Note 1: Unsignalized – Delay value at unsignalized intersection represents the approach with the highest delay value.

Note 2: Delay is average seconds per vehicle

Detour Traffic Operations Analysis

With the bridge closed during the AM shoulder hour, and detour Scenario 1 in place, traffic operations would remain at LOS D at the Fairview Avenue N/Mercer Street intersection, with a negligible increase in average delay per vehicle. The eastbound left turn at the Eastlake Avenue E/Republican Street intersection would experience an increase in delay of less than six seconds, with a drop in level of service from B in the baseline condition to LOS C with detour traffic. All other intersections would operate at LOS A or B, as shown on Table 12.

**Table 12:
2016 Detour Shoulder-Hour
Intersection Level-of-Service and Average Delay**

Location	AM Shoulder Delay^2 / LOS	PM Shoulder Delay^2 / LOS	Saturday Midday Delay^2 / LOS
Eastlake Ave E/Garfield St	7.4 / A	8.6 / A	7.5 / A
Eastlake Ave E/Fairview Ave E	7.0 / A	8.2 / A	9.0 / A
Eastlake Ave E/Aloha St [1]	10.2 / B	10.7 / B	10.4 / B
Fairview Ave N /Aloha St	9.2 / A	167.6 / F	20.6 / C
Fairview Ave N/Valley St	11.6 / B	15.0 / B	10.7 / B
Fairview Ave N/Mercer St	43.8 / D	51.7 / D	48.3 / D
Fairview Ave N/Republican St	17.6 / B	20.2 / C	22.7 / C
Eastlake Ave E/Mercer St	8.8 / A	16.8 / B	13.1 / B
Eastlake Ave E/Republican St [1]	15.7 / C	17.4 / C	40.1 / E

Note 1: Unsignalized – Delay value at unsignalized intersection represents the approach with the highest delay value

Note 2: Delay is average seconds per vehicle

During the PM shoulder hour, the Fairview Avenue N/Mercer Street intersection would remain at LOS D, with an increase in delay of about four seconds per vehicle. The Fairview Avenue N/ Aloha Street intersection would deteriorate to LOS F, with average delays increasing about 2.5 minutes. All other intersections would operate at LOS C or better, as shown on Table 12.

During the midday hours on Saturdays, the Fairview Avenue N/Mercer Street intersection would remain at LOS D, with about three seconds of added delay due to detour traffic.
The Eastlake Avenue E/Republican Street intersection would deteriorate to LOS E with the added impact of detour traffic.

Overnight and weekend bridge closures would affect about 20 percent of daily bridge users.

Mitigation Measures

Overnight and weekend bridge closures produce minor impacts on traffic operations. Increased delays at the Fairview Avenue N/Aloha Street intersection could be addressed by temporarily restriping westbound Aloha Street for dual left-turn lanes at the Fairview Avenue N intersection and modifying signal timing to correspond with the detour traffic patterns. The pedestrian crosswalk on the south leg of Fairview Avenue N could be closed, and pedestrians shifted to the crosswalk on the north leg. The raised median in Fairview Avenue N south of Aloha Street would also need to be modified. LOS C could be maintained with these modifications.

Impacts at the Eastlake Avenue E/Republican Street intersection could be mitigated by the addition of a traffic signal at this location. Traffic operations for the proposed mitigation measures are shown in Table 13.

Table 13:
2016 Detour Mitigation Shoulder-Hour Intersection Level-of-Service and Average Delay

Location	**AM Shoulder** Delay[1] / LOS	**PM Shoulder** Delay[1] / LOS	**Saturday Midday** Delay[1] / LOS
Fairview Ave N /Aloha St	8.6 / A	31.0 / C	14.8 / B
Eastlake Ave E/Republican St	5.8 / A	7.3 / A	9.1 / A

Note 1: Delay is average seconds per vehicle

With mitigation measures in place, increases in delay are estimated to be less than one minute for detoured Fairview Avenue N traffic traveling between E Garfield Street and Harrison Street during the AM or PM shoulder hours. Queue formation is generally not an issue along Fairview Avenue N during these early morning and evening shoulder hours.

Traffic control by uniformed police officers will not be necessary along the signed detour routes during overnight and weekend bridge closures, but may be desired at contractor workzone access points.

Pedestrian and Bicycle Detour Routes

Pedestrian and bicycle traffic would be affected by overnight and weekend closures of the bridge. During the closures, pedestrian and bicycle traffic would be shifted to adjacent parallel routes. Eastlake Avenue E will be the primary detour route during the overnight and weekend periods, where adequate facilities are available to accommodate the added activity. Connections to Fairview Avenue N are provided at Aloha Street, Mercer Street, and Republican Street, depending on the preferred destination.

Truck Detour Routes

Southbound trucks would remain on Eastlake Avenue E past Fairview Avenue N during the overnight and weekend bridge closures. The southbound detour would continue to Denny Way, where trucks could rejoin Fairview Avenue N to continue to their destination. Northbound trucks would be rerouted to Boren Avenue and Howell Street. The northbound detour would continue on Eastlake Avenue E to Fairview Avenue N. Trucks needing local access at the north end of the bridge would continue north to E Garfield Street, connecting to Fairview Avenue E to reach their destination. See Figure 6 on page 21 for the truck detour routes. Truck traffic during the weekday overnight hours consists of about 40 trucks, primarily delivery vans, in each direction between 7 PM and 7 AM. On Saturdays, about 80 trucks in each direction would use the truck detour.

Transit Impacts

During bridge construction, the overhead trolley system will be dismantled, and it is proposed to operate the Route 70 with diesel buses during the weekday 7 AM to 7 PM period. During the overnight and weekend full bridge closures, all transit operations will shift to Eastlake Avenue E, extending to Eastlake Avenue E/Stewart Street (southbound) and from Olive Way/Howell Street/ Eastlake Avenue E (northbound). See Figure 6 on page 21 for these detour routes.

With an extensive public outreach campaign, this detour was successfully implemented for an eight-month period during reconstruction of the Mercer Street corridor (Sheldon 2013). Similar to the other SDOT construction projects, contractors would be required to provide a minimum three week notice in advance of bridge closures that would affect transit users. Transit detour coordination with Metro will be ongoing. The detour route away from Fairview Avenue N could be implemented on a 24/7 basis for the duration of construction if an intermittent closure leads to confusion of transit users.

Parking Impacts

With overnight and weekend closures, westbound Aloha Street will be used by southbound detour traffic between Eastlake Avenue E and Fairview Avenue N. In this configuration, it is recommended that parking on the north side of Aloha Street between Yale Avenue N and Eastlake Avenue E be temporarily prohibited during the hours of bridge closure. This action would facilitate the flow of westbound traffic on this narrow (30 to 34 feet wide) portion of Aloha Street. The parking prohibition would extend from 7 PM to 7 AM on weeknights, and on weekends between 7 PM on Friday to 7 AM on Monday.

A total parking supply of 13 spaces would be temporarily removed during overnight and weekend hours. During the closure periods, an average of two parked vehicles would need to find alternative parking during the AM shoulder hours, five vehicles would be affected in the PM shoulder hours, and seven vehicles would be affected at the midday Saturday hours. During these periods, excess parking capacity is available on Aloha Street in the block between Minor Avenue N and Yale Avenue N, in adjacent blocks of Yale Avenue N, Minor Avenue N, and Eastlake Avenue E, and in surface lots and garages adjacent to Aloha Street.

Full Closure of Fairview Avenue N Bridge for Construction

With full closure of the Fairview Avenue N Bridge during construction, detours will be in effect 24 hours daily, seven days per week. The weekday commute hours would therefore be affected by detour traffic, and are the focus of the traffic operations analysis. Impacts on weekends would be identical to those described for the overnight/weekend closures. Two scenarios are included in the analysis of full bridge closure:

Full Closure Scenario 1

In Scenario 1, existing channelization is assumed to remain in place; specifically, the raised channelization at the Eastlake Avenue E/Aloha Street intersection that restricts eastbound left turns. This feature limits the potential use of Aloha Street as a detour route for northbound bridge traffic. Northbound detour traffic would primarily use Mercer Street and Republican Street to reach Eastlake Avenue E.

Full Closure Scenario 2

In Scenario 2, the Eastlake Avenue E/Aloha Street intersection would be signalized to accommodate eastbound left turns to northbound Eastlake Avenue E. In this way, northbound Fairview Avenue N Bridge traffic could use Aloha Street as a detour route, minimizing detour traffic on Republican and Mercer Streets.

2016 Baseline Peak-Hour Intersection Operations Analysis

Baseline 2016 AM peak hour and PM peak hour conditions were analyzed using Synchro to estimate average intersection delays and levels of service. AM and PM peak hour intersection operations are summarized on Table 14.

During the 2016 AM peak hour, operations at the Fairview Avenue N/Mercer Street intersection are characterized by LOS D, with LOS C at the intersections of Fairview Avenue N/Valley Street, Fairview Avenue N/Republican Street, and Eastlake Avenue E/Republican Street.

During the PM peak hour two intersections would operate at LOS F: Fairview Avenue N at Mercer Street and at Valley Street. Two additional intersections operate at LOS E: Fairview Avenue N at Republican Street and at Aloha Street. The Eastlake Avenue E/ Aloha Street intersection would operate at LOS D. Other study intersections operate at LOS C or better.

**Table 14:
2016 Peak-Hour Baseline
Intersection Level-of-Service and Average Delay**

Location	AM Peak Delay[2] / LOS	PM Peak Delay[2] / LOS
Eastlake Ave E/Garfield St	11.8 / B	14.1 / B
Eastlake Ave E/Fairview Ave E	6.9 / A	17.2 / B
Eastlake Ave E/Aloha St [1]	12.9 / B	31.4 / D
Fairview Ave N /Aloha St	11.9 / B	59.3 / E
Fairview Ave N/Valley St	29.4 / C	90.2 / F
Fairview Ave N/Mercer St	54.3 / D	138.4 / F
Fairview Ave N/Republican St	23.4 / C	71.2 / E
Eastlake Ave E/Mercer St	11.7 / B	21.8 / C
Eastlake Ave E/Republican St [1]	15.1 / C	22.9 / C

Note 1: Unsignalized – Delay value at unsignalized intersection represents the approach with the highest delay value

Note 2: Delay is average seconds per vehicle

Detour Traffic Operations Analysis

Lane capacity on Eastlake Avenue E is estimated at 750 vph in each direction, with a single directional lane available along the detour route between Aloha Street and Fairview Avenue E. Diversion of all bridge traffic onto Eastlake Avenue E would produce cumulative traffic volumes between 890 and 1,000 vph in the southbound direction, which would exceed the capacity of Eastlake Avenue E. Morning congested conditions would extend approximately two hours between 8 and 10 AM if all diverted traffic used the detour route. Afternoon congested conditions would extend up to four hours between 3 and 7 PM.

Cumulative volumes in the northbound direction would reach about 790 vph in the 5 to 6 PM peak hour. Volumes in all other hours would be within the capacity of Eastlake Avenue E.

The results of the 2016 AM peak hour intersection operations analysis are presented on Table 15. In Full Closure Scenario 1, the intersections experiencing the greatest impacts are: Fairview Avenue N/Mercer Street with 12 additional seconds of delay, Fairview Avenue N/ Aloha Street with 28 additional seconds of delay, and Eastlake Avenue E/Republican Street with 391 additional seconds of delay (6.5 minutes).

With Full Closure Scenario 2, the intersections experiencing the greatest impacts are: Eastlake Avenue E/Fairview Avenue N with 11 seconds of additional delay, Eastlake Avenue E/ Aloha Street with 33 seconds of additional delay, and Fairview Avenue N/Aloha Street with 20 seconds of additional delay.

Intersection operation impacts during the 2016 AM peak hour would be modest under Scenario 2, compared to Scenario 1.

PM peak-hour traffic operations for 2016 are summarized on Table 16. In Full Closure Scenario 1, the intersections experiencing the greatest impacts are: Eastlake Avenue E/ Aloha Street with 80 additional seconds of delay, Fairview Avenue N/Aloha Street with

87 additional seconds of delay, and Eastlake Avenue E/Republican Street with 370 additional seconds of delay (6.2 minutes).

**Table 15:
2016 AM Peak-Hour Detour Scenario
Intersection Level-of-Service and Average Delay**

Location	Baseline Delay[3] / LOS	Scenario 1 Delay[3] / LOS	Scenario 2 Delay[3] / LOS
Eastlake Ave E/Garfield St	11.8 / B	12.8 / B	12.8 / B
Eastlake Ave E/Fairview Ave E	6.9 / A	18.4 / B	18.3 / B
Eastlake Ave E/Aloha St	12.9 / B [1]	20.2 / C [1]	45.9 / D [2]
Fairview Ave N /Aloha St	11.9 / B	39.6 / D	31.5 / C
Fairview Ave N/Valley St	29.4 / C	13.3 / B	19.1 / B
Fairview Ave N/Mercer St	54.3 / D	66.3 / E	55.3 / E
Fairview Ave N/Republican St	23.4 / C	28.0 / C	28.9 / C
Eastlake Ave E/Mercer St	11.7 / B	17.3 / B	18.1 / B
Eastlake Ave E/Republican St	15.1 / C [1]	405.8 / F [1]	21.8 / C [1]

Note 1: Unsignalized – Delay value at unsignalized intersection represents the approach with the highest delay value.
Note 2: Intersection is converted to signal control.
Note 3: Delay is average seconds per vehicle

**Table 16:
2016 PM Peak-Hour Detour Scenario
Intersection Level-of-Service and Average Delay**

Location	Baseline Delay[3] / LOS	Scenario 1 Delay[3] / LOS	Scenario 2 Delay[3] / LOS
Eastlake Ave E/Garfield St	14.1 / B	11.1 / B	11.1 / B
Eastlake Ave E/Fairview Ave E	17.2 / B	15.2 / B	15.2 / B
Eastlake Ave E/Aloha St	31.4 / D [1]	111.8 / F [1]	117.7 / F [2]
Fairview Ave N /Aloha St	59.3 / E	146.1 / F	106.8 / F
Fairview Ave N/Valley St	90.2 / F	40.8 / D	42.2 / D
Fairview Ave N/Mercer St	138.4 / F	158.9 / F	152.3 / F
Fairview Ave N/Republican St	71.2 / E	93.0 / F	90.2 / F
Eastlake Ave E/Mercer St	21.8 / C	97.9 / F	37.3 / D
Eastlake Ave E/Republican St	22.9 / C [1]	393.3 / F [1]	23.5 / C [1]

Note 1: Unsignalized – Delay value at unsignalized intersection represents the approach with the highest delay value.
Note 2: Intersection is converted to signal control
Note 3: Delay is average seconds per vehicle

With Full Closure Scenario 2, the intersections experiencing the greatest impacts are: Fairview Avenue N/Republican Street with 19 seconds of additional delay, Eastlake Avenue E/ Aloha Street with 87 seconds of additional delay, and Fairview Avenue N/Aloha Street with 48 seconds of additional delay.

Increases in intersection delay for the PM peak hour compared to Baseline values are generally lower in Scenario 2 than Scenario 1.

Travel times for the Fairview Avenue N detour routes between Eastlake Avenue E and Harrison Street were obtained from the Synchro arterial level of service report for the 2016 PM baseline and the two full closure scenarios. As shown in Table 17, detoured motorists would experience increases in travel time of seven to thirteen minutes with Scenario 1, and one to eleven minutes with Scenario 2.

Table 17:
2016 PM Peak Detour Route Travel Times

Direction	Baseline[1] minutes	Scenario 1 minutes (increased time)	Scenario 2 minutes (increased time)
Southbound	6.9	13.8 ~[2] 16.0 (+ 6.9 ~ 9.1)	12.4 ~ 17.6 (+ 5.5 ~ 10.7)
Northbound	5.4	15.7 ~ 18.0 (+ 10.3 ~ 12.6)	5.7 ~ 10.3 (+ 0.3 ~ 4.9)

Note 1: Baseline is travel on Fairview Avenue N and Fairview Avenue E between the Fairview Avenue N/ Harrison Street intersection and Fairview Avenue E/Eastlake Avenue E intersection

Note 2: ~ approximate (typical)

A network-wide tabulation of delay is also provided by Synchro as a measure of cumulative impacts. For the 2016 PM baseline condition, network travel time totals 501 hours. Scenario 1 produces a network total of 625 hours during the 2016 PM peak hour, or 25 percent additional delay. For Scenario 2, the network travel time totals 559 hours, or 12 percent additional delay compared to the baseline.

Queue length estimates for the 2016 PM peak hour baseline and detour scenarios are shown on Table 18. In Scenario 1, the length of the southbound queue on Eastlake Avenue E at Aloha Street would extend up to 1,760 feet. With Scenario 2, this queue would extend up to 1,050 feet. The temporary traffic signal at Eastlake Avenue E/Aloha Street meters southbound traffic, allowing congestion to dissipate south of Aloha Street, resulting in shorter queues in Scenario 2.

The queue on westbound Republican Street would extend back to Eastlake Avenue E in all three analysis conditions. Queues on eastbound Republican Street would extend back to Fairview Avenue N in Scenario 1, and would be similar to baseline conditions in Scenario 2.

Westbound Aloha Street would have PM peak hour 95th percentile queues of 850 and 210 feet with Scenario 1 and 2, respectively. The Scenario 1 queue would extend back to Eastlake Avenue E. The Scenario 2 queue would extend about 100 feet beyond the Minor Avenue N intersection. Shorter queues are produced in Scenario 2 because traffic entering westbound Aloha Street is metered by the temporary traffic signal at Eastlake Avenue E.

Aloha Street eastbound 95th percentile queues from Eastlake Avenue E would extend 410 and 950 feet with Scenario 1 and 2, respectively. These queues would extend through the Yale Avenue N intersection. The Scenario 2 queue would extend through the Minor Avenue N intersection, back to Fairview Avenue N. In Scenario 1, queue lengths on eastbound Aloha Street increase compared to the baseline condition because of the higher southbound traffic volumes on Eastlake Avenue E, which decreases gaps for the stop-controlled right-turn movement from Aloha Street to Eastlake Avenue E.

**Table 18:
2016 PM Peak Queue Lengths (feet)**

Location	Block Length	Baseline 95th pctl	Scenario 1 95th pctl	Scenario 1 50th pctl	Scenario 2 95th pctl	Scenario 2 50th pctl
Southbound Eastlake Avenue E - Aloha St to Fairview Ave E	2200	50	1760	440	1050	450
Westbound Republican St – Fairview Ave N to Eastlake Ave E	1180	1770	2560 [1]	1120	2420 [1]	1050
Eastbound Republican St – Eastlake Ave E to Fairview Ave N	1180	130	1790	950	110	50
Westbound Aloha Street -- Fairview Ave N to Eastlake Ave E	840	200	850 [1]	310	210	130
Eastbound Aloha Street -- Eastlake Ave E to Fairview Ave N	840	160	410	200	950	530

Note 1: Queue exceeds available storage space, and extends onto southbound Eastlake Avenue E, north of Aloha Street.
Pctl = percentile

Sensitivity Analysis

A sensitivity analysis for the AM and PM peak full closure conditions was evaluated in which the volume of bridge detour traffic was reduced by 20 percent to reflect the actions of motorists in adapting to increased delays and queues. This could be by making the trip outside of the peak period or not making trip. The purpose of the sensitivity analysis is to provide a range of likely traffic operations conditions during full closure of the Fairview Avenue N Bridge.

**Table 19:
2016 AM Peak-Hour Detour Scenario Sensitivity Analysis
Intersection Level-of-Service and Average Delay**

Location	Scenario 1 Delay[3] / LOS	Scenario 1 20% reduction Delay[3] / LOS	Scenario 2 Delay[3] / LOS	Scenario 2 20% reduction Delay[3] / LOS
Eastlake Ave E/Garfield St	12.8 / B	11.3 / B	12.8 / B	11.3 / B
Eastlake Ave E/Fairview Ave E	18.4 / B	13.0 / B	18.3 / B	13.0 / B
Eastlake Ave E/Aloha St	20.2 / C [1]	18.2 / C [1]	45.9 / D [2]	28.2 / C [2]
Fairview Ave N /Aloha St	39.6 / D	23.0 / C	31.5 / C	19.4 / B
Fairview Ave N/Valley St	13.3 / B	14.5 / B	19.1 / B	19.2 / B
Fairview Ave N/Mercer St	66.3 / E	62.4 / E	55.3 / E	54.8 / D
Fairview Ave N/Republican St	28.0 / C	28.0 / C	28.9 / C	29.0 / C
Eastlake Ave E/Mercer St	17.3 / B	16.1 / B	18.1 / B	16.6 / B
Eastlake Ave E/Republican St	405.8 / F [1]	242.2 / F [1]	21.8 / C [1]	20.0 / C [1]

Note 1: Unsignalized – Delay value at unsignalized intersection represents the approach with the highest delay value.
Note 2: Intersection is converted to signal control.
Note 3: Delay is average seconds per vehicle

**Table 20:
2016 PM Peak-Hour Detour Scenario Sensitivity Analysis
Intersection Level-of-Service and Average Delay**

Location	**Scenario 1** Delay[3] / LOS	**Scenario 1 20% reduction** Delay[3] / LOS	**Scenario 2** Delay[3] / LOS	**Scenario 2 20% reduction** Delay[3] / LOS
Eastlake Ave E/Garfield St	11.1 / B	10.7 / B	11.1 / B	10.7 / B
Eastlake Ave E/Fairview Ave E	15.2 / B	12.8 / B	15.2 / B	12.8 / B
Eastlake Ave E/Aloha St	111.8 / F [1]	71.7 / F [1]	117.7 / F [2]	73.2 / E [2]
Fairview Ave N /Aloha St	146.1 / F	135.1 / F	106.8 / F	103.9 / F
Fairview Ave N/Valley St	40.8 / D	41.2 / D	42.2 / D	42.2 / D
Fairview Ave N/Mercer St	158.9 / F	145.3 / F	152.3 / F	147.2 / F
Fairview Ave N/Republican St	93.0 / F	74.5 / E	90.2 / F	74.7 / E
Eastlake Ave E/Mercer St	97.9 / F	74.5 / E	37.3 / D	33.5 / C
Eastlake Ave E/Republican St	393.3 / F [1]	274.6 / F [1]	23.5 / C [1]	23.4 / C [1]

Note 1: Unsignalized – Delay value at unsignalized intersection represents the approach with the highest delay value.
Note 2: Intersection is converted to signal control.
Note 3: Delay is average seconds per vehicle

A 20 percent reduction in the volume of Fairview Bridge traffic diverted to Eastlake Avenue E would produce cumulative traffic volumes between 800 and 910 vph in the southbound direction and 410 to 680 vph in the northbound direction on Eastlake Avenue E between Aloha Street and Fairview Avenue E, as shown in Appendix A. During the AM and PM peak hours, southbound traffic would exceed the available capacity (750 vph), resulting in an extension of congested conditions beyond the peak hour. The congested period would be up to two hours in the AM and up to three hours in the PM.

With the reduction in volumes in the AM peak, the intersection at Fairview Avenue N/ Mercer Street operated at LOS E and D for Scenario 1 and 2, respectively. Delays at the Eastlake Avenue E/Fairview Avenue E intersection would reduce by 5 seconds per vehicle for both scenarios and LOS B would be maintained. The intersection of Eastlake Avenue E/ Aloha Street would improve from LOS D to LOS C in Scenario 2. In Scenario 1, delays at the Eastlake Avenue E/Republican Street intersection would be reduced to 4 minutes from 7 minutes. Analysis results for the AM peak hour are shown in Table 19.

With lower volumes in the PM Peak, the Fairview Avenue N/Mercer Street intersection would continue to operate at LOS F, but with delays reduced by 13 seconds per vehicle (Scenario 1) and five seconds per vehicle (Scenario 2). The Fairview Avenue N/Republican Street intersection would improve to LOS E in both scenarios. In Scenario 2, the Eastlake Avenue E/Aloha Street intersection would improve from LOS F to LOS E. In Scenario 1, the Eastlake Avenue E/ Mercer Street intersection would improve from LOS F to LOS E, and delays at the Eastlake Avenue E/Republican Street intersection would be reduced to 4.5 minutes from 6.5 minutes. Analysis results for the PM peak hour are shown on Table 20.

Travel times would also improve slightly with lower detour volumes, as shown in Table 21. Increases in travel time for detour trips would increase zero to four minutes in Scenario 1 compared to the 2016 baseline, and zero to eleven minutes with Scenario 2. These results reflect improvements over the travel times with the full detour volume where travel times could increase up to 13 minutes.

Table 21:
2016 PM Peak Detour Scenario Sensitivity Analysis Travel Times

Direction	Baseline[1] minutes	Scenario 1 minutes	Scenario 2 minutes
Southbound	6.9	9.3 ~ 11.2	12.0 ~ 15.1
Northbound	5.4	4.5 ~ 5.5	4.5 ~ 16.4

Note 1: Baseline is travel on Fairview Avenue N and Fairview Avenue E between the Fairview Avenue N/ Harrison Street intersection and Fairview Avenue E/Eastlake Avenue E intersection

Note 2: ~ approximate (typical)

Queue lengths in the sensitivity analysis, as shown in Table 22, are generally lower than those shown in the full volume detour scenarios. Queuing on westbound Aloha Street is similar to the full detour volume condition, where the effects of the temporary traffic signal at Eastlake Avenue E/Aloha Street outweigh the reduced volumes. On eastbound Aloha Street, 95th percentile queues are reduced by as much as 400 feet in the sensitivity analysis. In Scenario 1, more gaps are available on southbound Eastlake Avenue E for the right-turn movement from Aloha Street. In Scenario 2, the shorter queue length is directly related to the reduced detour traffic volume.

Queuing on westbound Republican Street is similar to the full detour volume condition because the congestion on Mercer Street and Fairview Avenue N are unaffected.

Table 22:
PM Peak Detour Scenario Sensitivity Analysis Queue Lengths (feet)

Location	Block Length	Scenario 1		Scenario 2	
		95th pctl	50th pctl	95th pctl	50th pctl
Southbound Eastlake Avenue E - Aloha St to Fairview Ave E	2200	650	110	810	450
Westbound Republican St – Fairview Ave N to Eastlake Ave E	1180	1980	1060	2540 [1]	1110
Eastbound Republican St – Eastlake Ave E to Fairview Ave N	1180	1170	590	110	50
Westbound Aloha Street -- Fairview Ave N to Eastlake Ave E	840	850 [1]	330	220	130
Eastbound Aloha Street -- Eastlake Ave E to Fairview Ave N	840	220	100	500	320

Note 1: Queue exceeds available storage space and extends on to southbound Eastlake Ave E, north of Aloha Street.

Pctl = percentile

Mitigation Measures

An analysis of mitigation measures[1] was performed for each of the two full closure options. In both scenarios, the Fairview Avenue N/Aloha Street intersection will be heavily used by southbound detour traffic, and traffic on the north leg will be greatly reduced by the bridge closure. This feature suggests that the east leg can be restriped for dual left turns, with an optional right turn from the curb lane. The two approach lanes should extend back to Minor Avenue N. This modification will require closure of the crosswalk on the south leg of Fairview Avenue N with pedestrian traffic shifted to the north crosswalk. The raised median in Fairview Avenue N, south of Aloha Street would also need to be modified as shown in the AutoTURN Exhibits B6 and B7 in Appendix B. Traffic signal timing should also be revised to reflect the temporary detour traffic patterns. With revised channelization and signal timing this intersection would operate at LOS C or better with the full detour volumes, as shown in Table 23.

**Table 23:
2016 Detour Mitigation Peak-Hour Intersection
Level-of-Service and Average Delay**

Location	Scenario 1 AM Peak Delay[1]/LOS	Scenario 1 PM Peak Delay[1]/LOS	Scenario 2 AM Peak Delay[1]/LOS	Scenario 2 PM Peak Delay[1]/LOS
Fairview Ave N /Aloha St	15.4 / B	29.4 / C	14.4 / B	23.5 / C
Eastlake Ave E/Aloha St	--	--	26.1 / C	55.6 / E
Eastlake Ave E/Republican St	13.7 / B	13.0 / B	--	--

Note 1: Delay is average seconds per vehicle

The use of Aloha Street by southbound bridge detour traffic will require that parking be removed from the north side of Aloha Street between Yale Avenue N and Eastlake Avenue E, with existing channelization remaining at the Eastlake Avenue E intersection.

In Full Closure Scenario 2, with the Eastlake Avenue E/Aloha Street intersection signalized, the eastbound approach should be provided with separate left- and right-turn lanes extending back to Yale Avenue N. Parking will need to be removed from both sides of Aloha Street in this block to provide three travel lanes. The intersection would operate at LOS C in the AM peak hour and LOS E in the PM peak hour, as shown in Table 23.

It is also suggested that the traffic circle on Aloha Street at Yale Avenue N be temporarily removed and replaced with stop control for Yale Avenue N. Treatments such as push-button actuated flashing beacons could be added for pedestrian crosswalks on Aloha Street.

A traffic signal warrant analysis was performed for the intersections of Eastlake Avenue E/ Aloha Street and Eastlake Avenue E/Republican Street. The peak hour warrant (Warrant 3) as

[1] All traffic control devices for the mitigation measures would be required to conform to the Seattle Right-of-Way Improvements Manual Chapter 4.24 Traffic Operations Design Criteria:

> *All traffic control devices, such as traffic signals, traffic signs, or channelization shall conform to the Federal Highway Administration's Manual of Uniform Traffic Control Devices (MUTCD). Any revisions or additions to requirements specified in the MUTCD are subject to approval by the SDOT Director. Normally, modifications, additions, and installation of traffic control devices will require appropriate documentation of need.*

described in the *Manual on Uniform Traffic Control Devices* (MUTCD) 2009 edition, would be satisfied at both of these locations. The warrant analysis is included in Appendix C.

The reconstruction of the Eastlake Avenue E/Aloha Street intersection would include signalization, revised crosswalks, and modification of the curb bulbs to serve turning SU trucks. AutoTURN analysis was performed to verify the turning movements of SU trucks, and exhibits of this analysis are included in Appendix B. Potential impacts to existing curb ramps with three travel lanes on Aloha Street, and the existing channelization on Eastlake Avenue E is shown in Exhibit B3. A southbound exclusive right-turn lane on Eastlake Avenue E could be provided onto Aloha Street, but would require additional utility adjustments (Exhibit B4). This measure would reduce interruptions to southbound traffic on Eastlake Avenue E during the temporary detours. Exhibit B5 shows that the existing eastbound stop bar on Aloha Street will likely need to be set back.

In Full Closure Scenario 1, traffic operations at the Eastlake Avenue E/Republican Street intersection would benefit by the addition of a traffic signal. Operations would improve from LOS F in the unsignalized condition, to LOS B during the 2016 PM peak hour, as shown in Table 23. The addition of this signal would not significantly improve travel times for southbound detour traffic operating in this corridor, due to congestion and queuing along the detour route. AutoTURN exhibits B8 and B9 show that curb ramp modifications are not necessary to accommodate turning movements of SU trucks at the Eastlake Avenue E/Republican Street intersection.

Increases in pedestrian activity along Republican Street suggest that its role as a detour route be minimized. Additional crosswalks and four-way stop control are under consideration in this corridor. In Scenario 1, traffic from I-5 must use eastbound Republican Street as a northbound bridge detour. The use of Republican Street could be eliminated if the U-turn from the I-5 ramp onto Mercer Street were permitted. However, this action would require removal of a signal overlap serving northbound right turns onto the I-5 ramps. Removal of the overlap phase is likely to have a negative impact on overall intersection operation.

Signal retiming is recommended at the Eastlake Avenue E/Fairview Avenue N intersection to reflect the reduction in traffic on Fairview Avenue N with the detours in place. Timing for the north-south crosswalk must be retained at this location.

Traffic control by uniformed police officers will not be necessary along the signed detour routes for full bridge closure, but may be desired at contractor workzone access points.

Pedestrian/Bicycle Detour Routes

With full closure of the bridge, pedestrian and bicycle traffic would be shifted away from the Fairview Avenue N Bridge to adjacent parallel corridors. The floating walkway accommodating the Cheshiahud Lake Union Loop trail would also be closed. Eastlake Avenue E would be the primary detour corridor for pedestrian and bicycle traffic. It provides sidewalks, crosswalks, and bicycle lanes to serve detoured trips. Local trips could use Aloha, Mercer, or Republican Streets to connect back to Fairview Avenue N, depending on their preferred destination.

For through pedestrian and bicycle trips on Fairview Avenue N, the use of Eastlake Avenue E and Aloha Street would add about 560 feet to the trip distance. Maximum out of direction travel could be up to 0.65 mile between the north side of the closed bridge and the south side of the closed bridge via Eastlake Avenue E, Aloha Street, and Yale Avenue N.

Truck Detour Routes

As shown in in Figure 6, southbound trucks would remain on Eastlake Avenue E past Fairview Avenue N with the full bridge closure. The southbound detour would continue to Denny Way via Stewart Street, where trucks could rejoin Fairview Avenue N to continue to their destination. Northbound trucks would be rerouted to Boren Avenue and Howell Street. The northbound detour would continue on Eastlake Avenue E to Fairview Avenue N. Trucks needing local access at the north end of the bridge would continue north to E Garfield Street, connecting to Fairview Avenue E to reach their destination. Daily truck traffic consists of about 175 northbound trucks and 155 southbound trucks. On Saturdays, about 70 to 90 trucks cross the bridge in each direction. The majority of trucks (95 percent as measured in the 7-day vehicle classification count) currently crossing the Fairview Avenue N Bridge are SU trucks.

Transit Impacts

With a full bridge closure, transit vehicles would be unable to cross the Fairview Bridge, and would detour to adjacent parallel routes (see Figure 6). Route 70 would shift to Eastlake Avenue E, and Stewart Street (southbound) and Howell Street (northbound) to connect into downtown. Route 70 would be converted to diesel bus vehicles during the closure period. This shift would produce a longer walking distance for some transit users.

Parking Impacts

With full closure of the bridge, Scenario 1 would place detour traffic on only westbound Aloha Street, while Scenario 2 would place detour traffic in both the westbound and eastbound directions on Aloha Street. Scenario 1 would require temporary prohibition of parking from the north side of Aloha Street in the block between Eastlake Avenue E and Yale Avenue N. This action would facilitate the flow of westbound traffic on this narrow (30-34 feet) portion of Aloha Street. A total on-street parking supply of 13 spaces would be temporarily removed. With Scenario 1, about 11 parked vehicles would need to find alternative parking every 2 hours during the weekday midday hours. During these periods, there is excess on-street parking capacity along Yale Avenue N, Minor Avenue N, and Eastlake Avenue E, and in adjacent surface parking lots and garages.

With Scenario 2, it is recommended that parking be temporarily removed from both sides of Aloha Street between Eastlake Avenue E and Yale Avenue N to accommodate three travel lanes on Aloha Street. A total on-street parking supply of 21 spaces would be temporarily removed. About 17 parked vehicles would need to find alternative parking every 2 hours during the weekday midday hours. During these periods, there is excess on-street parking capacity along Yale Avenue N, Minor Avenue N, and Eastlake Avenue E, and in adjacent surface lots and garages.

SUMMARY

The Fairview Avenue N project will provide a replacement bridge that meets future demand in vehicle, pedestrian, and bicycle traffic and provides for future extension of the South Lake Union streetcar. Three alternatives were evaluated for maintenance of traffic during bridge construction:

- overnight and weekend closures of the Fairview Avenue N Bridge,
- full closure of the bridge without mitigation of the Eastlake Avenue E/Aloha Street intersection, and
- full closure of the bridge with mitigation of the Eastlake Avenue E/Aloha Street intersection.

A program of overnight and weekend closures would result in the fewest traffic impacts, by avoiding detours during peak commute hours, and producing the least amount of added delay at affected intersections. With the bridge closed during the 7 PM to 7 AM hours, about 20 percent of the daily bridge volume would be subject to detours. During these overnight and weekend closures, delays experienced by detour traffic would increase less than one minute, compared to 2016 baseline intersection delays.

Full closure of the bridge would produce more severe traffic impacts compared to overnight and weekend construction because the peak commute hours would be affected. Detour traffic may experience travel time increases up to 13 minutes during the afternoon peak hours. Background traffic would also be subject to additional delays as a result of the detour traffic. Compared to the 2016 baseline, network travel time would increase 12 percent with the option that temporarily modifies the Eastlake Avenue E/Aloha Street intersection, and 25 percent with the option that retains existing channelization.

Full closure of the bridge would shift traffic to Eastlake Avenue E. Cumulative traffic volumes on Eastlake Avenue E in the southbound direction would exceed capacity during the AM and PM peak hours by up to 190 vph, resulting in a spreading of congested peak hour conditions to the adjacent hours. Congested conditions would extend up to four hours in the PM and about one hour in the AM. A 20 percent reduction in bridge traffic diversion volumes, due to a public outreach program, would reduce the duration of PM peak period congestion to three hours. AM southbound congestion would remain about one hour in duration.

Full closure impacts can be reduced by improving the Eastlake Avenue E/Aloha Street intersection to accommodate eastbound to northbound turning movements, and installing a temporary traffic signal. This revision would allow northbound detour traffic to use Aloha Street, and would result in less detour traffic crossing Mercer Street to reach Republican Street. Temporary rechannelization of the Fairview Avenue N/Aloha Street intersection would also improve operations on the detour route.

Full closure of the bridge is considered feasible with implementation of the cited mitigation strategies. Full closure of the bridge would shorten the period of bridge closure by about nine months, resulting in a 40-percent shorter construction duration. The impacts of a full bridge closure on pedestrians, bicycles, and transit users would be manageable with an extensive public outreach program to inform bridge users of construction activities, closure periods and detour provisions, to facilitate shifts in travel patterns during the closure period.

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GIS Sources

Sources for Figures 1, 4, 5, and 6 aerial basemap:

> Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), Tom Tom, MapmyIndia, OpenstreetMap contributors, and the GIS User Community.

APPENDIX A: BASELINE AND DETOUR TRAFFIC VOLUMES

Fairview Avenue N Bridge Weekday Volumes

Hour	2013 Northbound vph	2013 Southbound vph	2016 Northbound vph	2016 Southbound vph
0:00	28	17	29	18
1:00	16	12	16	13
2:00	12	12	13	13
3:00	9	7	10	7
4:00	22	11	23	11
5:00	73	35	76	37
6:00	159	112	165	117
7:00	298	299	310	312
8:00	345	471	360	491
9:00	322	382	336	398
10:00	299	266	312	277
11:00	299	257	311	268
12:00	301	274	314	285
13:00	312	277	326	289
14:00	296	276	309	288
15:00	319	355	332	370
16:00	456	372	475	387
17:00	528	399	551	416
18:00	422	334	440	348
19:00	232	210	242	219
20:00	175	156	182	163
21:00	146	124	153	130
22:00	109	72	113	75
23:00	73	51	76	53

Note: an annual growth rate of 1.4% was used to estimate 2016 volumes.

Eastlake Avenue E Weekday Volumes

Hour	2014 Northbound vph	2014 Southbound vph	2016 Northbound vph	2016 Southbound vph
0:00	16	12	17	13
1:00	14	20	14	21
2:00	7	8	7	9
3:00	6	6	6	6
4:00	5	15	5	15
5:00	9	40	9	41
6:00	19	118	19	121
7:00	56	345	58	354
8:00	112	501	115	515
9:00	136	370	140	380
10:00	113	209	116	215
11:00	93	232	96	238
12:00	127	239	131	245
13:00	103	256	106	264
14:00	112	267	116	275
15:00	124	357	127	367
16:00	188	488	193	502
17:00	235	458	242	471
18:00	188	254	193	261
19:00	107	145	110	149
20:00	73	86	75	88
21:00	57	71	59	73
22:00	34	50	35	52
23:00	30	33	31	34

Note: an annual growth rate of 1.4% was used to estimate 2016 volumes.

Eastlake Avenue E with Fairview Avenue N Bridge Detour Traffic Weekday Volumes

Hour	2016 Northbound vph	2016 Southbound vph	80% Detour Northbound vph	80% Detour Southbound vph
0:00	46	30	40	27
1:00	31	33	27	31
2:00	20	21	17	19
3:00	16	13	14	12
4:00	28	27	24	24
5:00	86	78	70	71
6:00	185	238	152	215
7:00	368	666	306	604
8:00	475	**1007**	403	**908**
9:00	476	**778**	409	699
10:00	428	493	366	437
11:00	407	506	345	453
12:00	444	531	382	474
13:00	432	552	366	495
14:00	424	563	363	505
15:00	459	737	393	663
16:00	668	**889**	573	**812**
17:00	**792**	**887**	682	**804**
18:00	634	609	546	539
19:00	352	368	303	324
20:00	258	251	221	219
21:00	211	202	181	176
22:00	149	127	126	112
23:00	107	87	91	76

Fairview Avenue N Bridge Weekend Volumes

Hour	2013 Saturday NB vph	2013 Saturday SB vph	2013 Sunday NB vph	2013 Sunday SB vph	2016 Saturday NB vph	2016 Saturday SB vph	2016 Sunday NB vph	2016 Sunday SB vph
0:00	77	62	79	72	80	65	82	75
1:00	51	47	67	57	53	49	70	59
2:00	36	25	55	37	38	26	57	39
3:00	19	13	21	15	20	14	22	16
4:00	20	14	8	18	21	15	8	19
5:00	20	17	18	13	21	18	19	14
6:00	44	35	19	16	46	36	20	17
7:00	50	76	38	40	52	79	40	42
8:00	89	108	51	61	93	113	53	64
9:00	139	146	97	109	145	152	101	114
10:00	176	193	146	174	183	201	152	181
11:00	226	231	174	177	236	241	181	185
12:00	275	237	168	214	287	247	175	223
13:00	249	252	198	179	260	263	206	187
14:00	247	227	178	152	258	237	186	158
15:00	210	241	167	178	219	251	174	186
16:00	231	229	162	154	241	239	169	161
17:00	214	253	236	156	223	264	246	163
18:00	196	230	171	136	204	240	178	142
19:00	180	179	136	122	188	187	142	127
20:00	141	123	103	97	147	128	107	101
21:00	148	134	88	74	154	140	92	77
22:00	167	129	78	52	174	134	81	54
23:00	111	101	40	31	116	105	42	32

Note: an annual growth rate of 1.4% was used to estimate 2016 volumes.

Eastlake Avenue E Weekend Volumes

Hour	2014 Saturday NB vph	2014 Saturday SB vph	2014 Sunday NB vph	2014 Sunday SB vph	2016 Saturday NB vph	2016 Saturday SB vph	2016 Sunday NB vph	2016 Sunday SB vph
0:00	53	60	34	49	54	62	35	50
1:00	41	75	29	33	42	77	30	34
2:00	42	82	17	17	43	84	17	17
3:00	17	29	15	10	17	30	15	10
4:00	6	11	9	9	6	11	9	9
5:00	4	7	4	7	4	7	4	7
6:00	8	23	7	16	8	24	7	16
7:00	14	41	7	32	14	42	7	33
8:00	23	62	12	64	24	64	12	66
9:00	43	97	39	94	44	100	40	97
10:00	64	106	34	110	66	109	35	113
11:00	93	136	51	116	96	140	52	119
12:00	93	144	77	119	96	148	79	122
13:00	97	157	86	140	100	161	88	144
14:00	73	172	97	136	75	177	100	140
15:00	76	172	63	149	78	177	65	153
16:00	91	172	71	127	94	177	73	131
17:00	78	182	56	150	80	187	58	154
18:00	55	190	83	99	57	195	85	102
19:00	51	123	68	74	52	126	70	76
20:00	43	97	34	50	44	100	35	51
21:00	40	73	36	30	41	75	37	31
22:00	49	63	44	41	50	65	45	42
23:00	47	76	41	18	48	78	42	19

Note: an annual growth rate of 1.4% was used to estimate 2016 volumes.

Eastlake Avenue E with Fairview Avenue N Bridge Detour Traffic Weekend Volumes

Hour	2016 Saturday NB vph	2016 Saturday SB vph	2016 Sunday NB vph	2016 Sunday SB vph
0:00	135	126	117	125
1:00	95	126	100	93
2:00	81	110	75	56
3:00	37	43	37	26
4:00	27	26	18	28
5:00	25	25	23	21
6:00	54	60	27	33
7:00	67	121	47	75
8:00	116	176	66	129
9:00	189	252	141	210
10:00	249	310	187	295
11:00	331	381	234	304
12:00	382	395	254	345
13:00	359	424	295	331
14:00	333	414	285	298
15:00	297	428	239	339
16:00	334	416	242	291
17:00	303	451	304	317
18:00	261	435	264	244
19:00	240	313	212	203
20:00	191	228	142	153
21:00	195	215	129	108
22:00	224	199	127	96
23:00	164	183	84	51

2014 Existing Peak-Hour Traffic Volumes

Location	AM Peak vph	PM Peak vph
Fairview Ave N south of Aloha St	1109	1027
Aloha St west of Eastlake Ave E	208	316
Eastlake Ave E north of Aloha St	510	725
Fairview Ave N south of Mercer St	1345	1734
Republican St west of Eastlake Ave E	300	438
Mercer St west of Eastlake Ave E	197	307

2016 AM Peak-Hour Traffic Volumes

Location	Baseline vph	Full Closure Scenario 1 vph (% increase)		Full Closure Scenario 2 vph (% increase)	
Fairview Ave N south of Aloha St	1142	616	(-46%)	910	(-20%)
Aloha St west of Eastlake Ave E	215	440	(+105%)	711	(+231%)
Eastlake Ave E north of Aloha St	525	1344	(+156%)	1615	(+208%)
Fairview Ave N south of Mercer St	1386	1680	(+21%)	1417	(2%)
Republican St west of Eastlake Ave E	310	603	(+40%)	340	(+10%)
Mercer St west of Eastlake Ave E	203	295	(+45%)	295	(+45%)

2016 PM Peak-Hour Traffic Volumes

Location	Baseline vph	Full Closure Scenario 1 vph (% increase)		Full Closure Scenario 2 vph (% increase)	
Fairview Ave N south of Aloha St	1057	597	(-44%)	846	(-20%)
Aloha St west of Eastlake Ave E	325	613	(+89%)	861	(+165%)
Eastlake Ave E north of Aloha St	746	1557	(+109%)	1541	(+107%)
Fairview Ave N south of Mercer St	1785	2085	(+17%)	1836	(+3%)
Republican St west of Eastlake Ave E	451	780	(+73%)	532	(+10%)
Mercer St west of Eastlake Ave E	316	385	(+22%)	385	(+22%)

2016 AM Shoulder-Hour Traffic Volumes

Location	Baseline vph	Overnight Closure Detour vph
Fairview Ave N south of Aloha St	467	248
Aloha St west of Eastlake Ave E	71	124
Eastlake Ave E north of Aloha St	118	372
Fairview Ave N south of Mercer St	654	799
Republican St west of Eastlake Ave E	73	237
Mercer St west of Eastlake Ave E	63	85

2016 PM Shoulder-Hour Traffic Volumes

Location	Baseline vph	Overnight Closure Detour vph
Fairview Ave N south of Aloha St	538	258
Aloha St west of Eastlake Ave E	52	175
Eastlake Ave E north of Aloha St	223	619
Fairview Ave N south of Mercer St	884	1052
Republican St west of Eastlake Ave E	161	349
Mercer St west of Eastlake Ave E	180	241

2016 Saturday Midday Traffic Volumes

Location	Baseline vph	Weekend Closure Detour vph
Fairview Ave N south of Aloha St	778	460
Aloha St west of Eastlake Ave E	62	241
Eastlake Ave E north of Aloha St	321	795
Fairview Ave N south of Mercer St	1121	1314
Republican St west of Eastlake Ave E	205	411
Mercer St west of Eastlake Ave E	187	262

APPENDIX B: AUTOTURN EXHIBITS

AutoTURN Analysis was performed at the following locations:

Aloha Street/Eastlake Avenue E - Single Utility (SU-30) trucks were run to demonstrate the following turning movements:

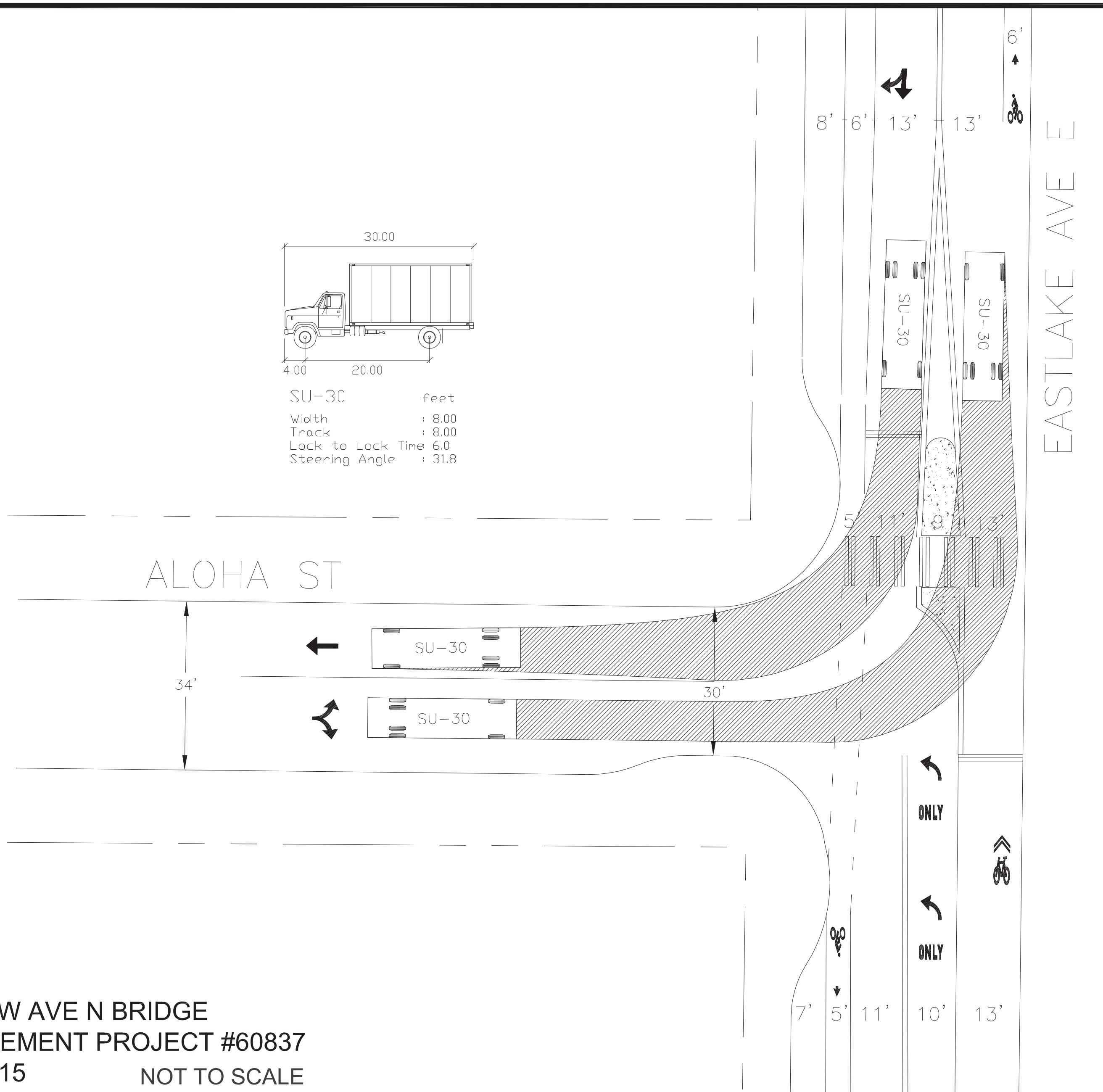
- Exhibit B1 - Existing Channelization. To accommodate the WB Aloha Street to NB Eastlake Avenue E left-turn movement, the raised median on Eastlake Avenue E would need to be removed.
- Exhibit B2 - Addition of SB Eastlake Avenue E to WB Aloha Street right-turn pocket. In addition to the raised median removal, this would require the curb ramp bulb-out and utilities to be relocated in the NW corner of the intersection.
- Exhibit B3 - Separation of left- and right- turn movements along Aloha Street. This would require removal of the raised median, relocation of curb ramp bulb-outs and utilities at the NW and SW corners of the intersection.
- Exhibit B4 – Separation of left- and right- turn movements along Aloha Street with addition of SB Eastlake Avenue E to WB Aloha Street right-turn pocket. This would require the removal of the raised median, relocation of curb ramp bulb-outs and utilities at the NW and SW corners of the intersection.
- Exhibit B5 - NB Eastlake Avenue E to WB Aloha Street. With the three lane scenario, this demonstrates the need to locate the WB left-turn stop bar further back to accommodate the NB left-turn movement.

Aloha Street/Fairview Avenue N - dual left turning movements from WB Aloha Street to SB Fairview Avenue N were investigated.

- Exhibit B6 - Dual left turns with SU-30 in the outside lane and passenger vehicle (P) in the inside lane.
- Exhibit B7 - Dual left turns with SU-30 in the inside lane and passenger vehicle (P) in the outside lane.

Eastlake Avenue E/Republican Street - Single Utility (SU-30) trucks were run to demonstrate the following turning movements:

- Exhibit B8 – SB Eastlake Avenue E to WB Republican Street and EB Republican Street to NB Eastlake Avenue E.
- Exhibit B9 – NB Eastlake Avenue E to WB Republican Street.



NOTE:
EXISTING LAYOUT FROM SDOT PROVIDED PAINT LINE SKETCHES.

EXHIBIT B1:
EASTLAKE AVE E / ALOHA ST
SU-30 TURNING MOVEMENTS
WITH EXISTING CONFIGURATION

FAIRVIEW AVE N BRIDGE
REPLACEMENT PROJECT #60837
01/28/2015

NOT TO SCALE

HNTB

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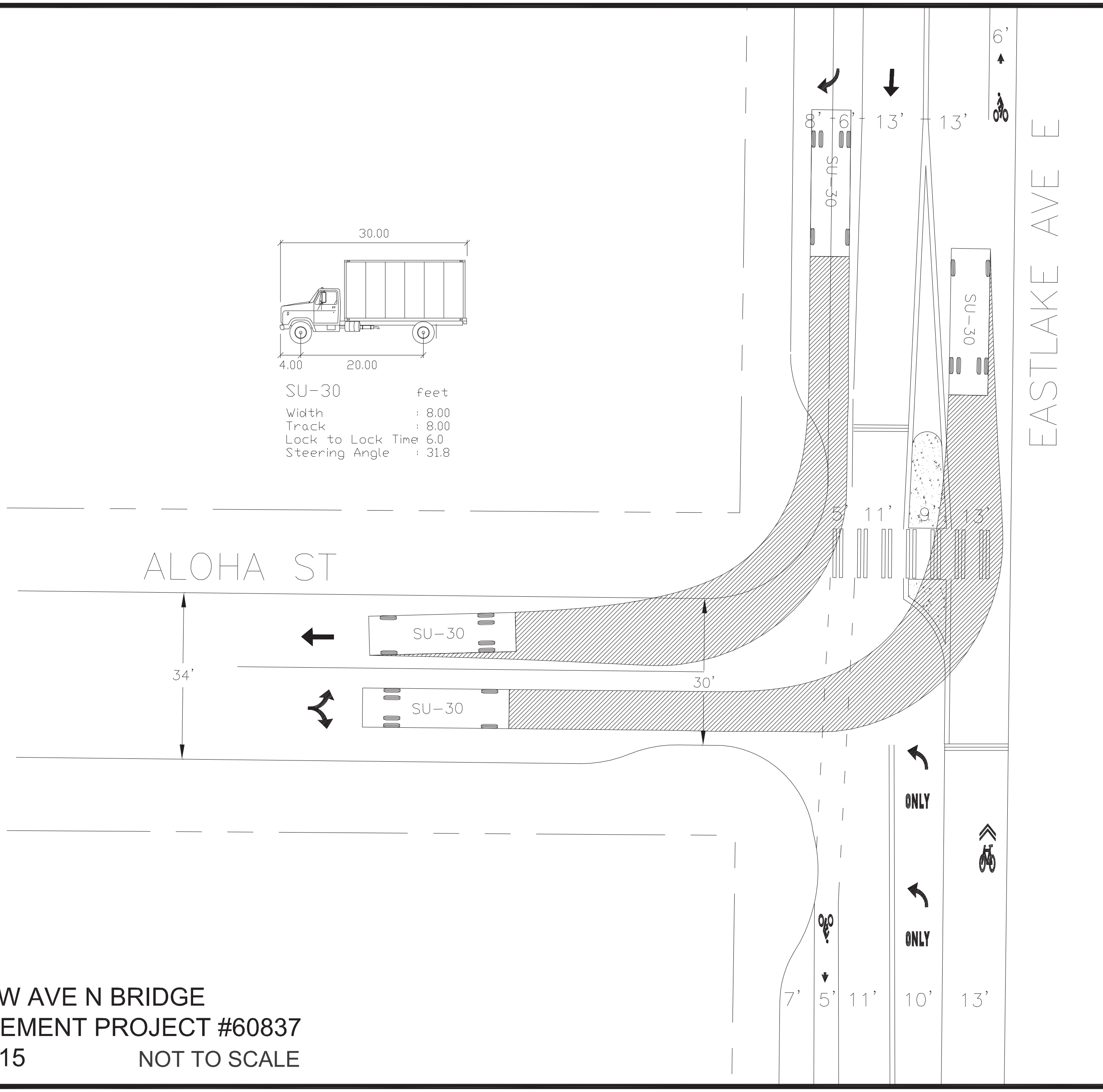

NOTE:
EXISTING LAYOUT FROM SDOT PROVIDED PAINT LINE SKETCHES.

EXHIBIT B2:
EASTLAKE AVE E / ALOHA ST SU-30 TURNING MOVEMENTS WITH SOUTHBOUND EASTLAKE AVE E RIGHT TURN POCKET

FAIRVIEW AVE N BRIDGE
REPLACEMENT PROJECT #60837
01/28/2015 NOT TO SCALE

HNTB

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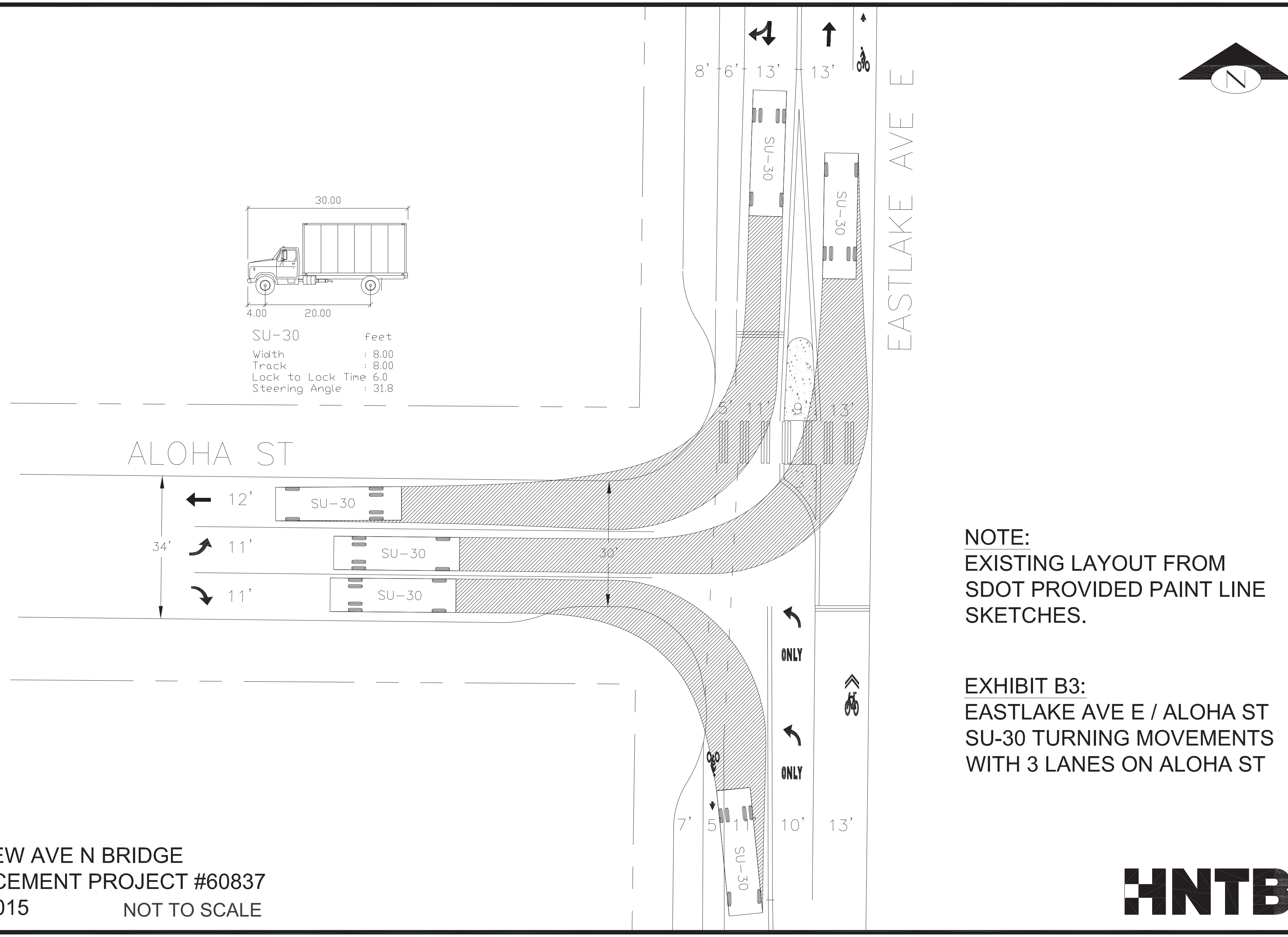

NOTE:
EXISTING LAYOUT FROM SDOT PROVIDED PAINT LINE SKETCHES.

EXHIBIT B3:
EASTLAKE AVE E / ALOHA ST
SU-30 TURNING MOVEMENTS
WITH 3 LANES ON ALOHA ST

FAIRVIEW AVE N BRIDGE
REPLACEMENT PROJECT #60837
01/28/2015

NOT TO SCALE

HNTB

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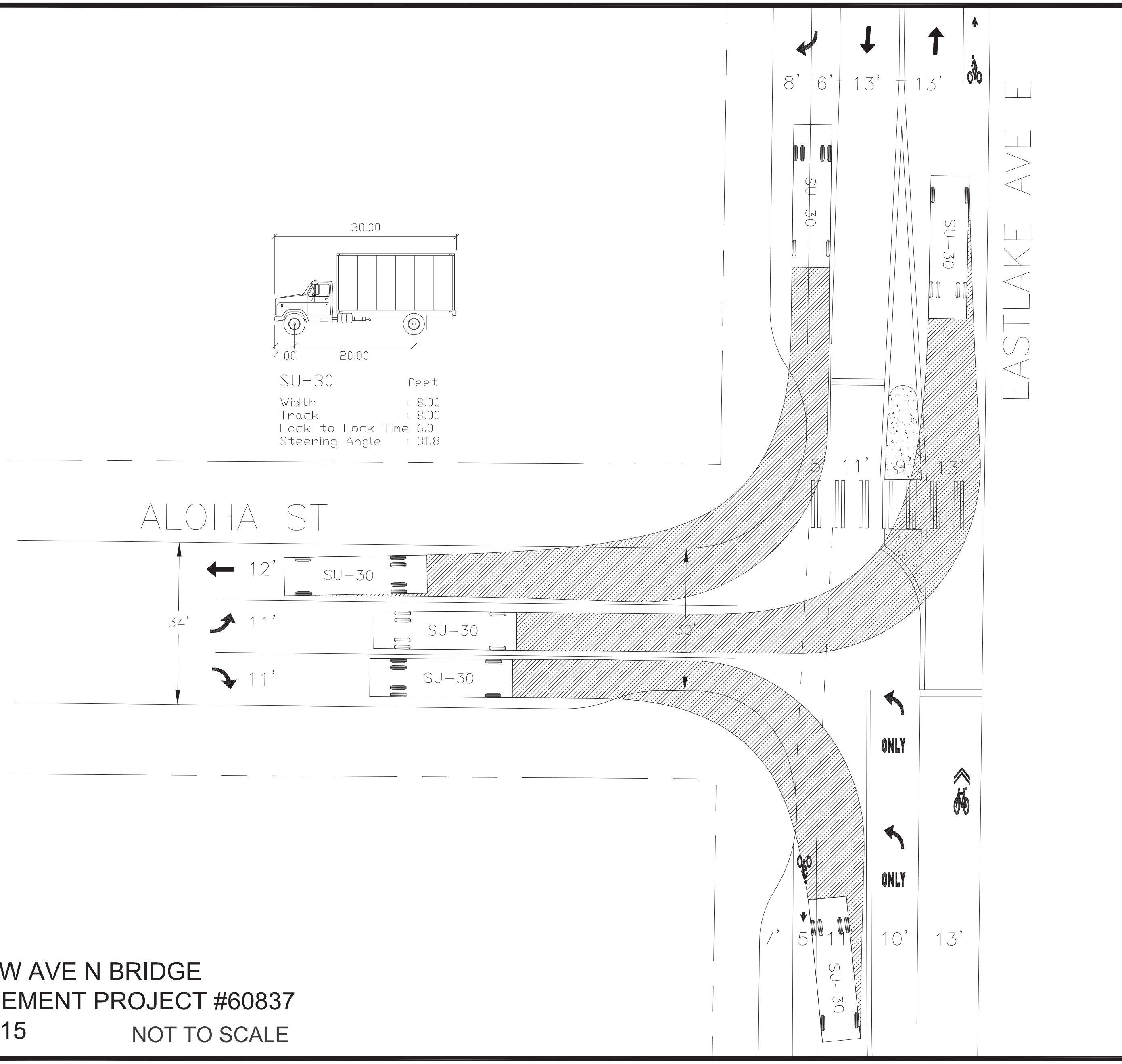

NOTE:
EXISTING LAYOUT FROM SDOT PROVIDED PAINT LINE SKETCHES.

EXHIBIT B4:
EASTLAKE AVE E / ALOHA ST SU-30 TURNING MOVEMENTS WITH 3 LANES ON ALOHA ST AND SOUTHBOUND EASTLAKE AVE E RIGHT TURN POCKET

HNTB

FAIRVIEW AVE N BRIDGE
REPLACEMENT PROJECT #60837
01/28/2015

NOT TO SCALE

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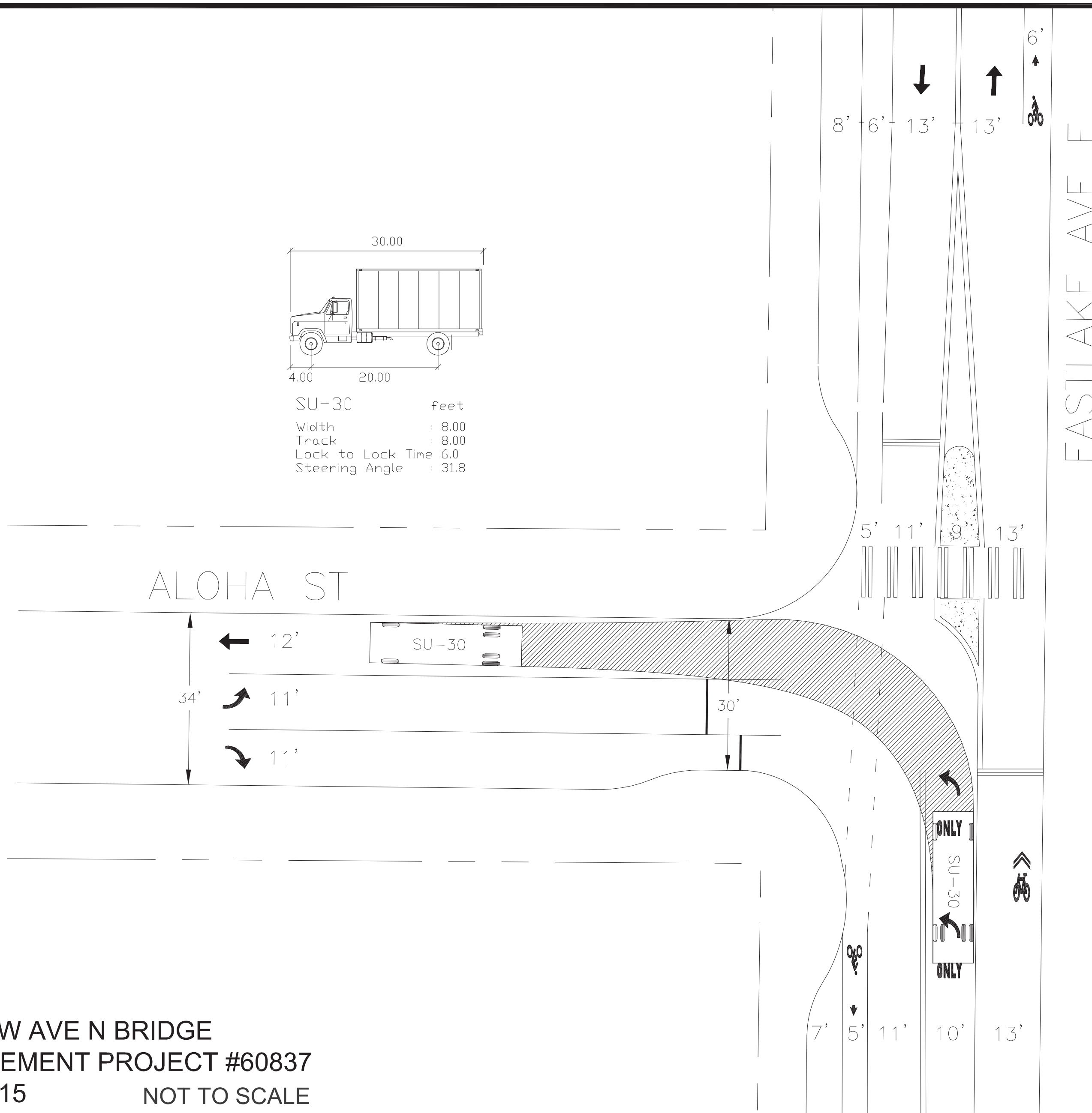

NOTE:
EXISTING LAYOUT FROM SDOT PROVIDED PAINT LINE SKETCHES.

EXHIBIT B5:
EASTLAKE AVE E / ALOHA ST SU-30 LEFT TURN MOVEMENT WITH 3 LANES ON ALOHA ST

FAIRVIEW AVE N BRIDGE
REPLACEMENT PROJECT #60837
01/28/2015

NOT TO SCALE

HNTB

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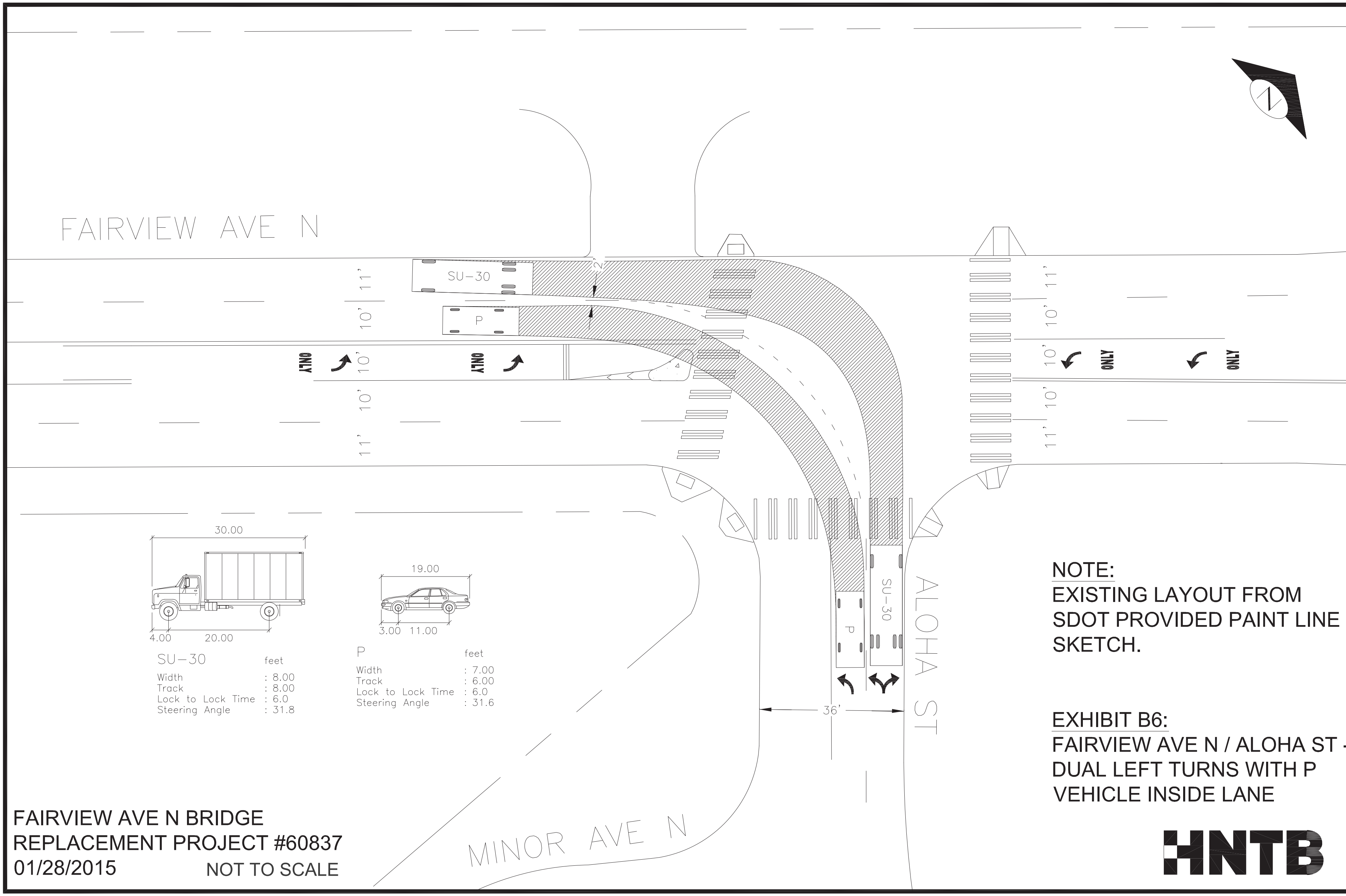

NOTE:
EXISTING LAYOUT FROM SDOT PROVIDED PAINT LINE SKETCH.

EXHIBIT B6:
FAIRVIEW AVE N / ALOHA ST - DUAL LEFT TURNS WITH P VEHICLE INSIDE LANE

FAIRVIEW AVE N BRIDGE
REPLACEMENT PROJECT #60837
01/28/2015

NOT TO SCALE

HNTB

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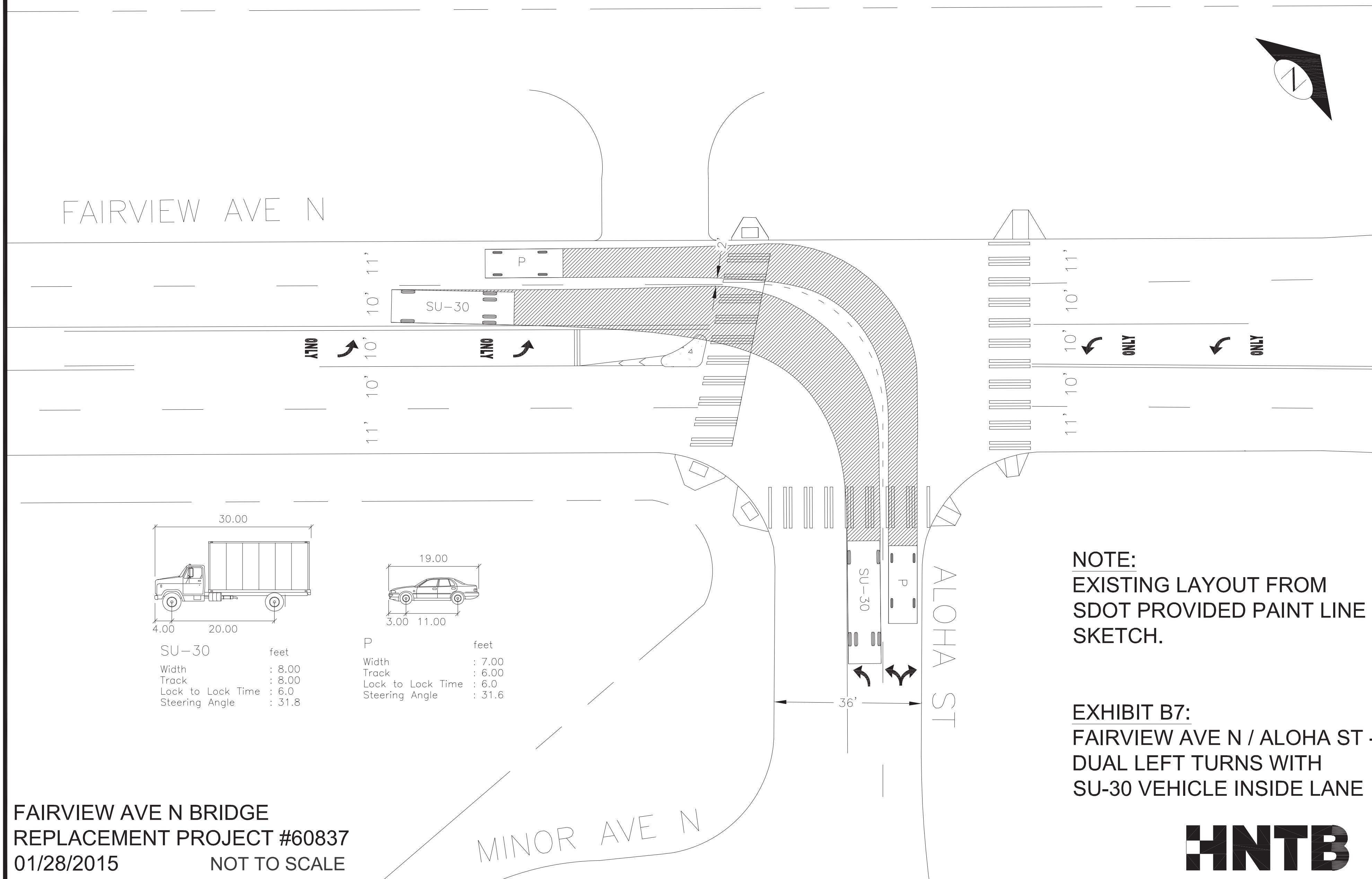

NOTE:
EXISTING LAYOUT FROM SDOT PROVIDED PAINT LINE SKETCH.

EXHIBIT B7:
FAIRVIEW AVE N / ALOHA ST - DUAL LEFT TURNS WITH SU-30 VEHICLE INSIDE LANE

FAIRVIEW AVE N BRIDGE
REPLACEMENT PROJECT #60837
01/28/2015 NOT TO SCALE

HNTB

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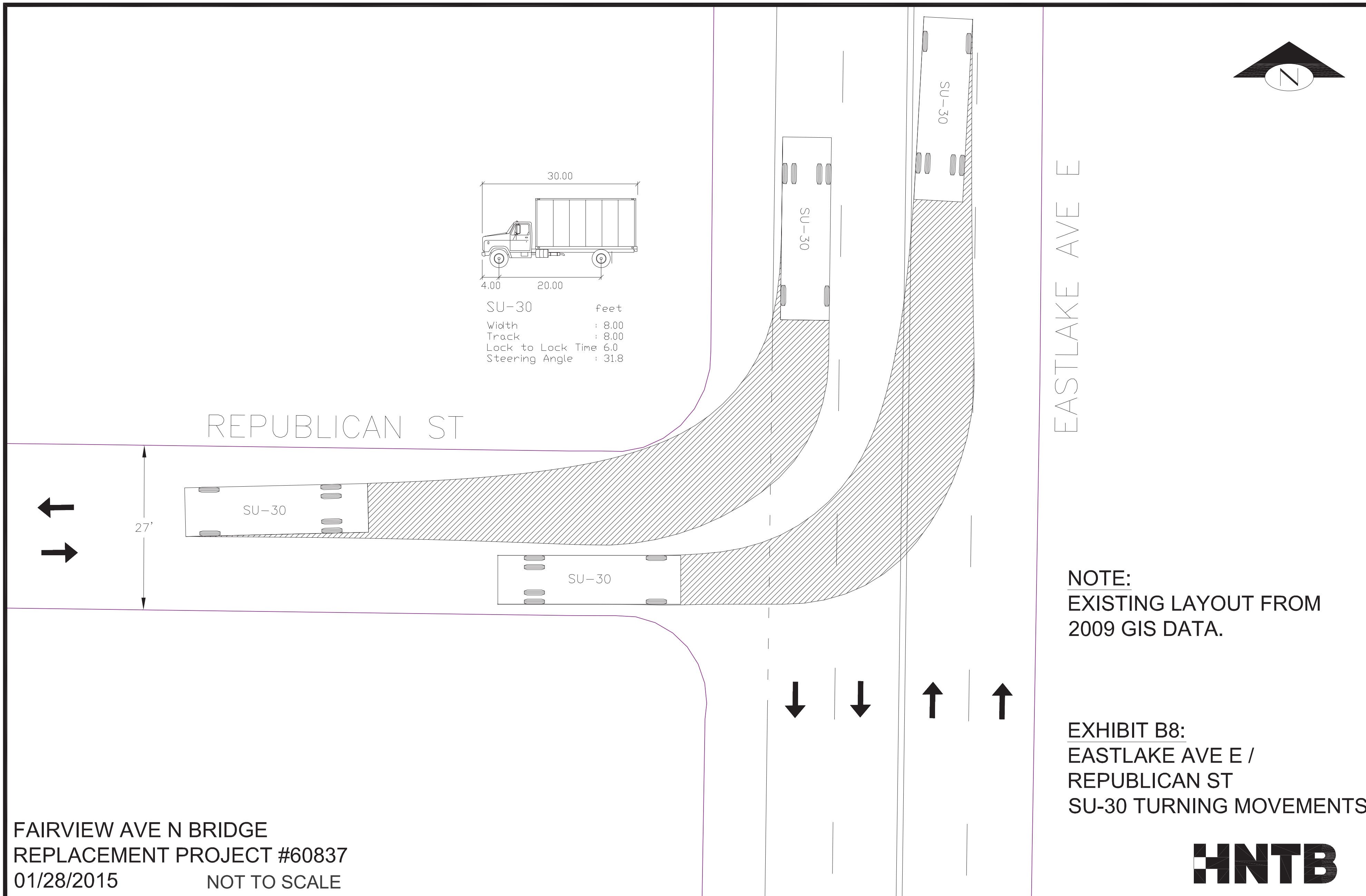

NOTE:
EXISTING LAYOUT FROM
2009 GIS DATA.

EXHIBIT B8:
EASTLAKE AVE E /
REPUBLICAN ST
SU-30 TURNING MOVEMENTS

HNTB

FAIRVIEW AVE N BRIDGE
REPLACEMENT PROJECT #60837
01/28/2015

NOT TO SCALE

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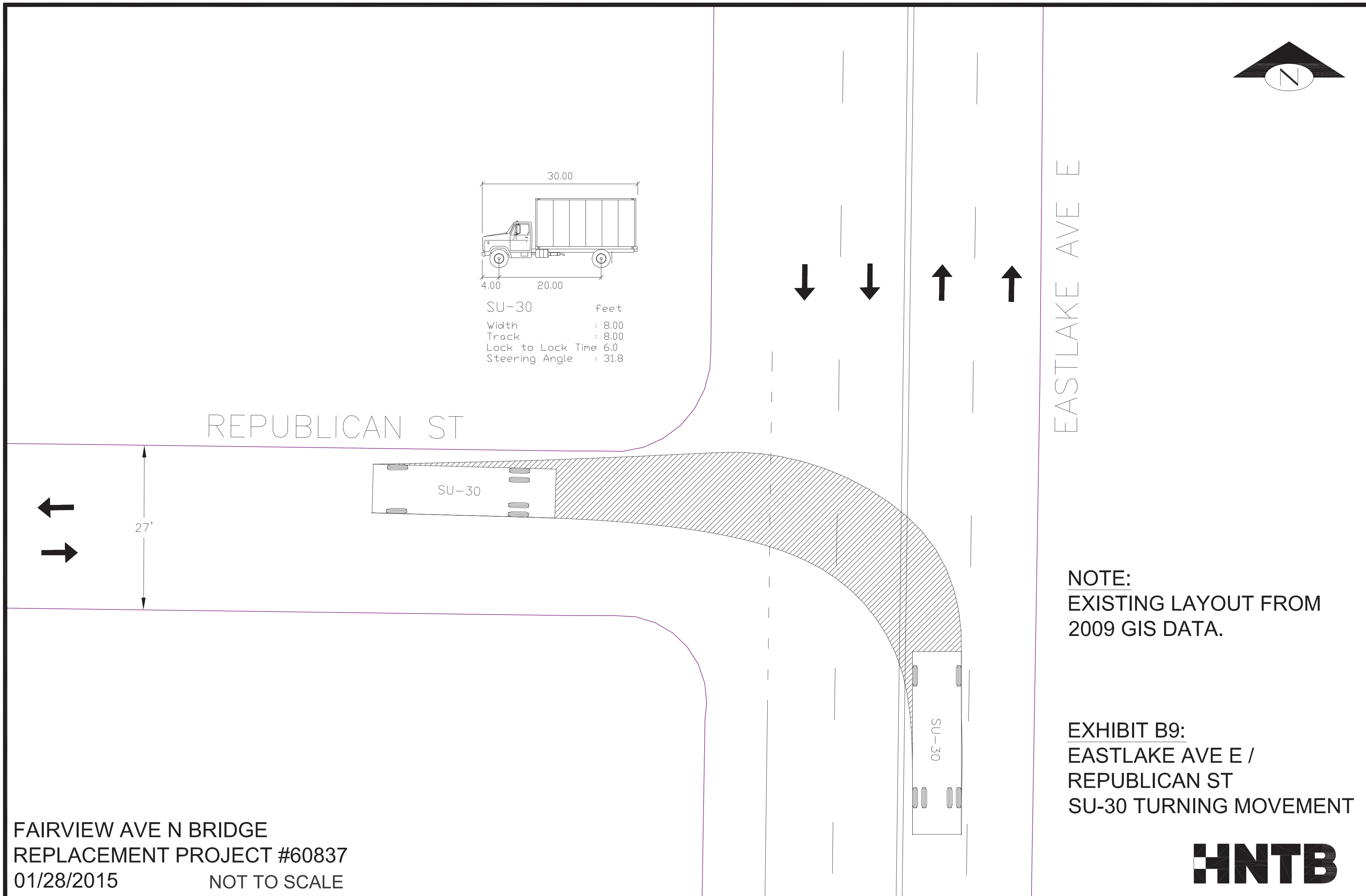

NOTE:
EXISTING LAYOUT FROM
2009 GIS DATA.

EXHIBIT B9:
EASTLAKE AVE E /
REPUBLICAN ST
SU-30 TURNING MOVEMENT

HNTB

FAIRVIEW AVE N BRIDGE
REPLACEMENT PROJECT #60837
01/28/2015

NOT TO SCALE

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APPENDIX C: TRAFFIC SIGNAL WARRANT ANALYSIS

Traffic signal warrant analysis was performed for the following intersections:

- Eastlake Avenue E/Aloha Street
- Eastlake Avenue E/Republican Street

The peak hour warrant (Warrant 3) is met at both intersections with detour traffic volumes.

Traffic Signal Warrant Analysis

Intersection:	Eastlake Ave E & Republican Street	
Analysis Year:	2016 Interim Condition, during Fairview Bridge Replacement	
		No. of Lanes
Major Street:	Eastlake Avenue E	2 or more lanes
Minor Street:	Republican Street	1 lane

Warrant 1: Eight-Hour Vehicular Volume

Table 4C-1 Not enough information available to evaluate

Warrant 2: Four-Hour Vehicular Volume

Figure 4C-1 Not enough information available to evaluate

Warrant 3: Peak Hour

Criteria A **is met**.
For Diversion Scenario 1, stop controlled delay totals 36 veh-hr. The threshold is 4 veh-hr.
The effective minor street approach volume totals 307 + 26 = 333 veh.
The threshold minor street volume for a one-lane approach is 100 veh.
The total entering volume is 1,731 vph. The threshold for a 3-leg intersection is 650 vph.
Figure 4C-3 Criteria B **is met**. The plotted point falls above the applicable curve (1398, 333).

Warrant 4: Pedestrian Volume

Figure 4C-5 not enough data available to evaluate.
Figure 4C-7 Criteria B **is not met**. The plotted point falls below the applicable curve (1398, 2)
Peak 1-hour ped volume (2 ped/hr), is below threshold value of 133 ped/hr

Warrant 5: School Crossing

Warrant 5 **is not applicable** at this location.

Warrant 6: Coordinated Signal System

Criteria A is not applicable - Eastlake Avenue E is a two-way street, and traffic is not predominantly in one direction.
Criteria B - additional analysis needed to evaluate platooning.
Guidance: this warrant should not be applied where the resultant spacing of traffic signals would be less than 1000 feet.
Warrant 6 **is not applicable** at this location.
The Eastlake Ave / Mercer St signal is one block to the north (420 feet)

Warrant 7: Crash Experience

Criteria A - not enough information available to evaluate
Criteria B - not enough information available to evaluate
The threshold is 5 or more reported crashes, of types susceptible to correction by a traffic control signal, in a 12-month period.
Table 4C-1 Criteria C - not enough information available to evaluate

Warrant 8: Roadway Network

Warrant 8 **is not met**.
Criteria A - The Diversion Scenario 1 forecast shows a PM peak volume of 1,731 vehicles.
The 5-year projected volumes are not applicable. Construction will last less than 5 years.
Criteria B - not enough information is available to evaluate
Eastlake Avenue E is classified as a Principal Arterial. Republican Street is a Minor Arterial.
Both intersecting streets need to be classified as 'major routes' for the warrant to apply.

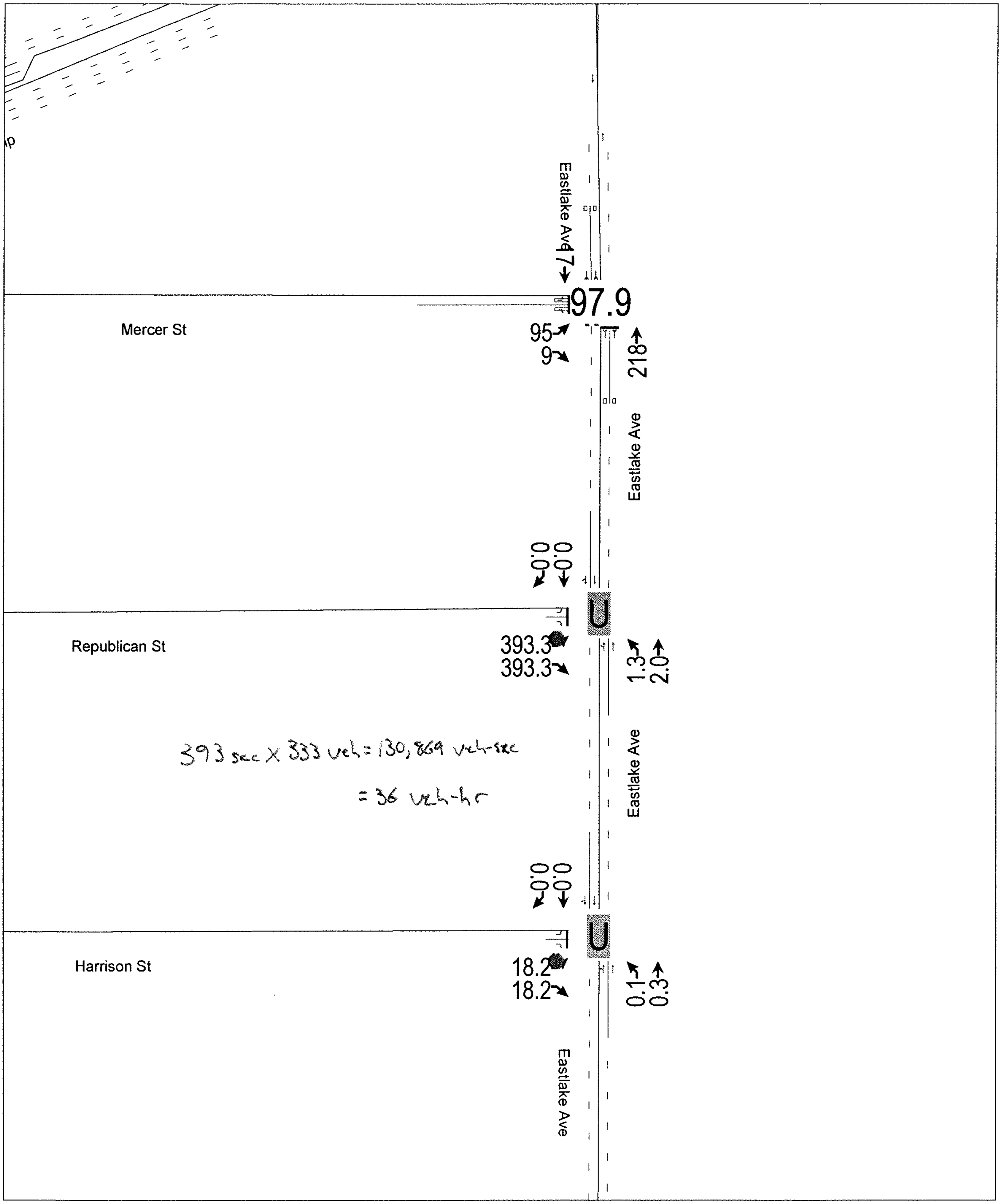
Warrant 9: Intersection Near a Grade Crossing

Warrant 9 **is not applicable** at this location.

Page 2

Map - 2016 PM
traffic volume

11/23/2015

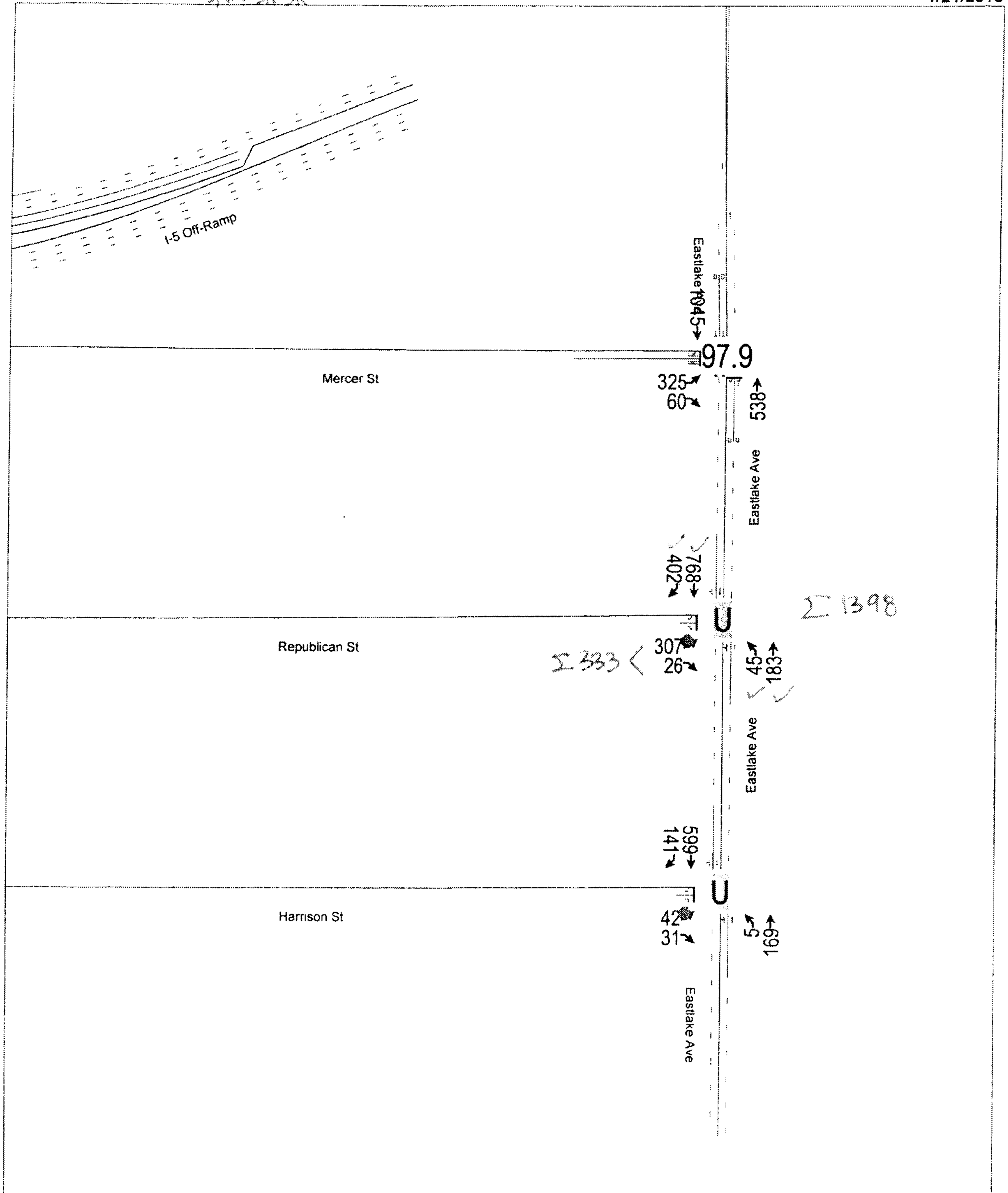


393 sec X 333 veh = 130,869 veh-sec

= 36 veh-hr

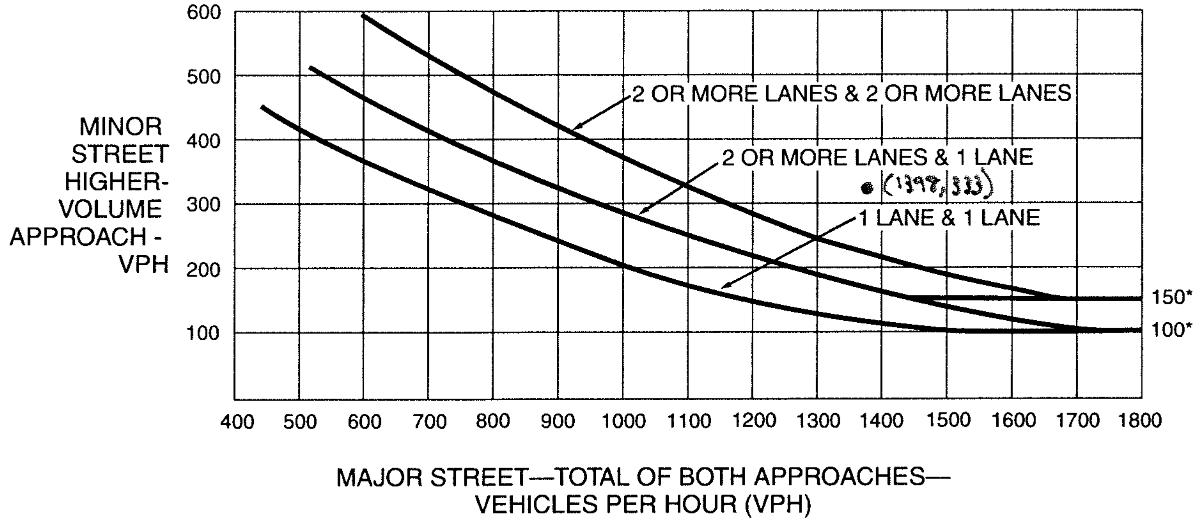
Calc. for: Fairview Signal Warrant #60837
Made By: Sherry J. Kim Date 1/21/2015 7/7
Checked by: C.J. Gore 1/21/2015

Map - 2016 PM
traffic volume ✱✱✱✱ **1/21/2015**



Eastlake Avenue / Republican Street

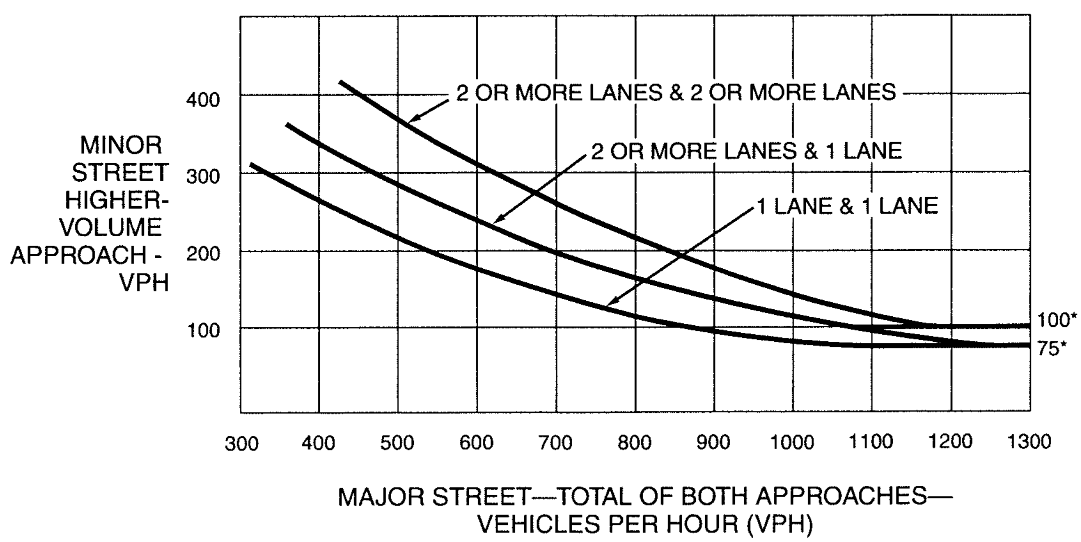
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



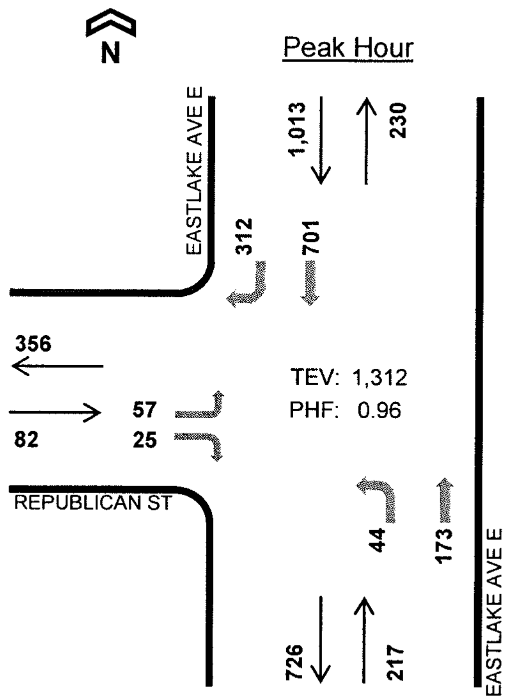
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

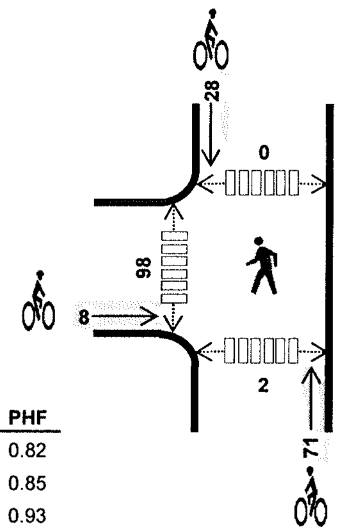
EASTLAKE AVE E
REPUBLICAN ST

idax

Date: Tue, Jul 29, 2014
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM

Peak Hour





	HV %:	PHF
EB	0.0%	0.82
NB	11.1%	0.85
SB	6.9%	0.93
TOTAL	7.2%	0.96

Two-Hour Count Summaries

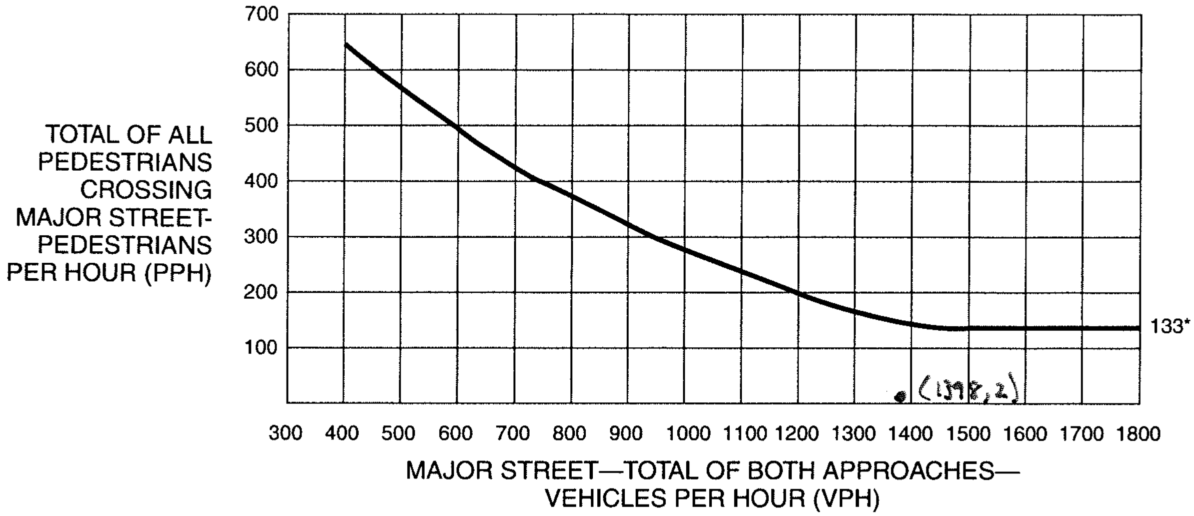
Interval Start	REPUBLICAN ST Eastbound LT	TH	RT	REPUBLICAN ST Westbound LT	TH	RT	EASTLAKE AVE E Northbound LT	TH	RT	EASTLAKE AVE E Southbound LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	13	0	4	0	0	0	6	36	0	0	178	71	308	
4:15 PM	11	0	4	0	0	0	7	41	0	0	164	60	287	
4:30 PM	**15**	**0**	**4**	**0**	**0**	**0**	**8**	**41**	**0**	**0**	**192**	**81**	**341**	
4:45 PM	**13**	**0**	**7**	**0**	**0**	**0**	**18**	**46**	**0**	**0**	**169**	**70**	**323**	1,259
5:00 PM	**17**	**0**	**8**	**0**	**0**	**0**	**8**	**40**	**0**	**0**	**172**	**91**	**336**	1,287
5:15 PM	**12**	**0**	**6**	**0**	**0**	**0**	**10**	**46**	**0**	**0**	**168**	**70**	**312**	**1,312**
5:30 PM	13	0	10	0	0	0	8	53	0	0	162	82	328	1,299
5:45 PM	21	0	8	0	0	0	9	82	0	0	145	64	329	1,305
Count Total	115	0	51	0	0	0	74	385	0	0	1,350	589	2,564	
Peak Hr	**57**	**0**	**25**	**0**	**0**	**0**	**44**	**173**	**0**	**0**	**701**	**312**	**1,312**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	0	0	5	18	*23*	1	0	5	9	*15*	0	22	0	1	*23*
4:15 PM	0	0	8	10	*18*	1	0	8	5	*14*	0	24	0	0	*24*
4:30 PM	**0**	**0**	**6**	**24**	***30***	**1**	**0**	**13**	**5**	***19***	**0**	**30**	**0**	**2**	***32***
4:45 PM	**0**	**0**	**9**	**16**	***25***	**1**	**0**	**23**	**6**	***30***	**0**	**15**	**0**	**0**	***15***
5:00 PM	**0**	**0**	**4**	**20**	***24***	**1**	**0**	**14**	**7**	***22***	**0**	**31**	**0**	**0**	***31***
5:15 PM	**0**	**0**	**5**	**10**	***15***	**5**	**0**	**21**	**10**	***36***	**0**	**22**	**0**	**0**	***22***
5:30 PM	0	0	5	9	*14*	0	0	26	6	*32*	0	28	0	0	*28*
5:45 PM	0	0	3	15	*18*	3	0	22	6	*31*	0	22	0	0	*22*
Count Total	0	0	45	122	*167*	13	0	132	54	*199*	0	194	0	3	*197*
Peak Hr	**0**	**0**	**24**	**70**	***94***	**8**	**0**	**71**	**28**	***107***	**0**	**98**	**0**	**2**	***100***

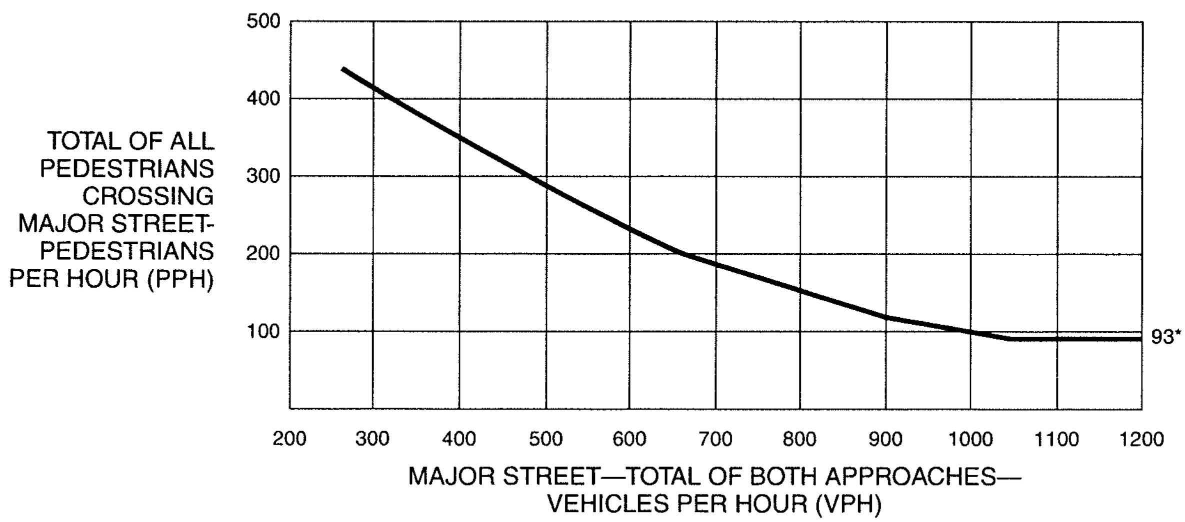
Mark Skaggs: 425 - 250 - 0777 mark.skaggs@idaxdata.com

Figure 4C-7. Warrant 4, Pedestrian Peak Hour



*Note: 133 pph applies as the lower threshold volume.

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



*Note: 93 pph applies as the lower threshold volume.

Traffic Signal Warrant Analysis

Intersection:	Eastlake Ave E & Aloha Street	
Analysis Year:	2016 Interim Condition, during Fairview Bridge Replacement	
		No. of Lanes
Major Street:	Eastlake Avenue E	1 lane
Minor Street:	Aloha Street	2 or more lanes

Warrant 1: Eight-Hour Vehicular Volume

Table 4C-1 Not enough information available to evaluate

Warrant 2: Four-Hour Vehicular Volume

Figure 4C-1 Not enough information available to evaluate

Warrant 3: Peak Hour

Criteria A **is met**.
For Diversion Scenario 2, stop controlled delay totals 64 veh-hr. The threshold is 5 veh-hr.
The effective minor street approach volume totals 248 + (237x0.5) = 367 veh. volume reduced to account for right turns on red.
The threshold minor street volume for a two-lane approach is 150 veh.
The total entering volume is 1,819 vph. The threshold for a 3-leg intersection is 650 vph.

Figure 4C-3 Criteria B **is met**. The plotted point falls above the applicable curve (1334, 367).

Warrant 4: Pedestrian Volume

Figure 4C-5 not enough data available to evaluate.
Figure 4C-7 Criteria B **is not met**. The plotted point falls below the applicable curve (1334, 43)
Peak 1-hour ped volume (43 ped/hr), is below threshold value of 133 ped/hr

Warrant 5: School Crossing

Warrant 5 **is not applicable** at this location.

Warrant 6: Coordinated Signal System

Criteria A is not applicable - Eastlake Avenue E is a two-way street, and traffic is not predominantly in one direction.
Criteria B - additional analysis needed to evaluate platooning.

Guidance: this warrant should not be applied where the resultant spacing of traffic signals would be less than 1000 feet.

Warrant 6 **is not applicable** at this location.
The Eastlake Ave / Mercer St signal is two blocks to the south (950 feet)

Warrant 7: Crash Experience

Criteria A - not enough information available to evaluate
Criteria B - not enough information available to evaluate
The threshold is 5 or more reported crashes, of types susceptible to correction by a traffic control signal, in a 12-month period.

Table 4C-1 Criteria C - not enough information available to evaluate

Warrant 8: Roadway Network

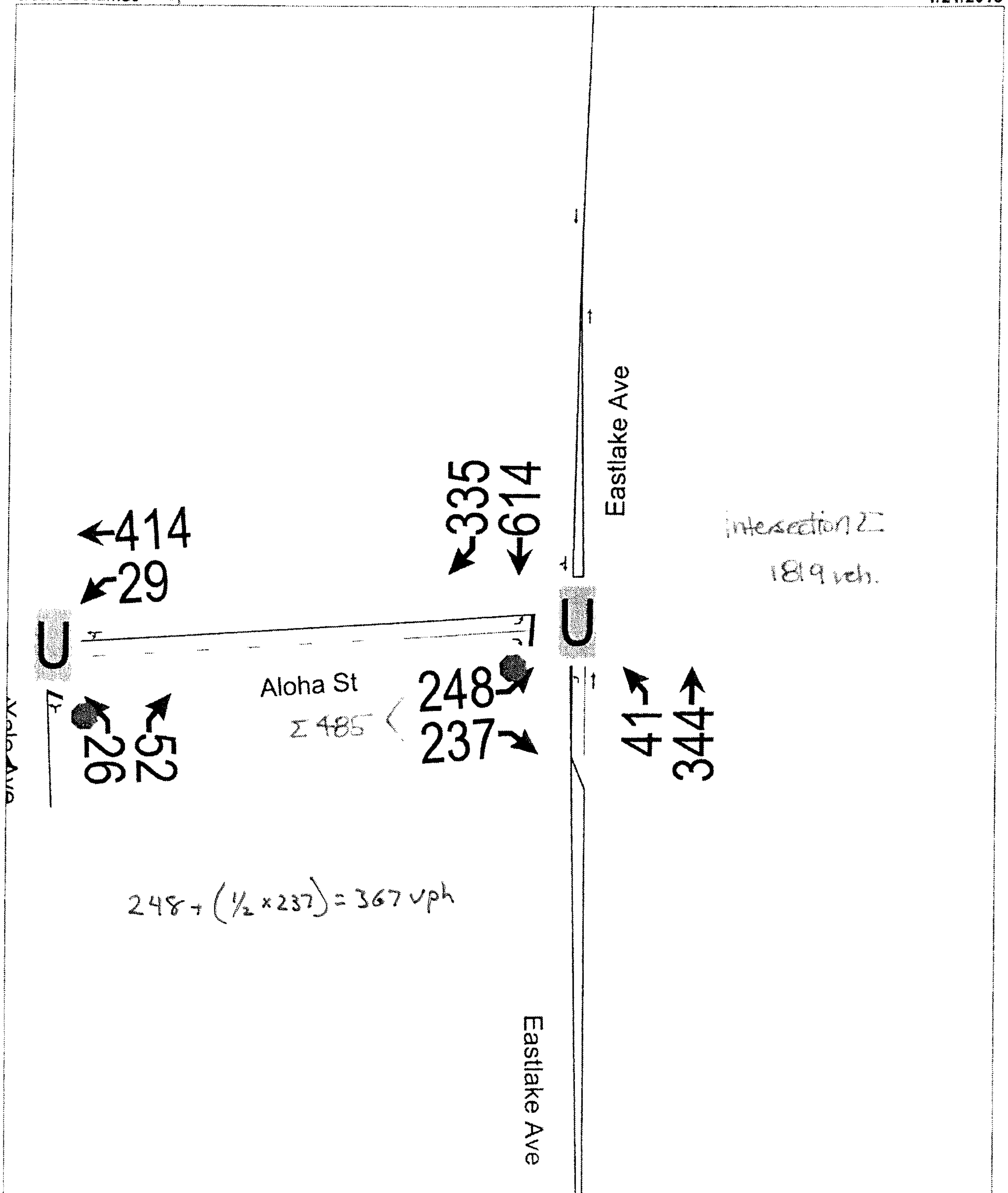
Warrant 8 **is not met**.
Criteria A - The Diversion Scenario 2 forecast shows a PM peak volume of 1,819 vehicles.
The 5-year projected volumes are not applicable. Construction will last less than 5 years.
Criteria B - not enough information is available to evaluate
Eastlake Avenue E is classified as a Principal Arterial. Aloha Street is not an Arterial.
Both intersecting streets need to be classified as 'major routes' for the warrant to apply.

Warrant 9: Intersection Near a Grade Crossing

Warrant 9 **is not applicable** at this location.

Calc for: Fairview Signal Warrant #60837
Made By: Shung J. Kim   Date 1/21/2015
Checked by: C.J. Grace 1/21/2015

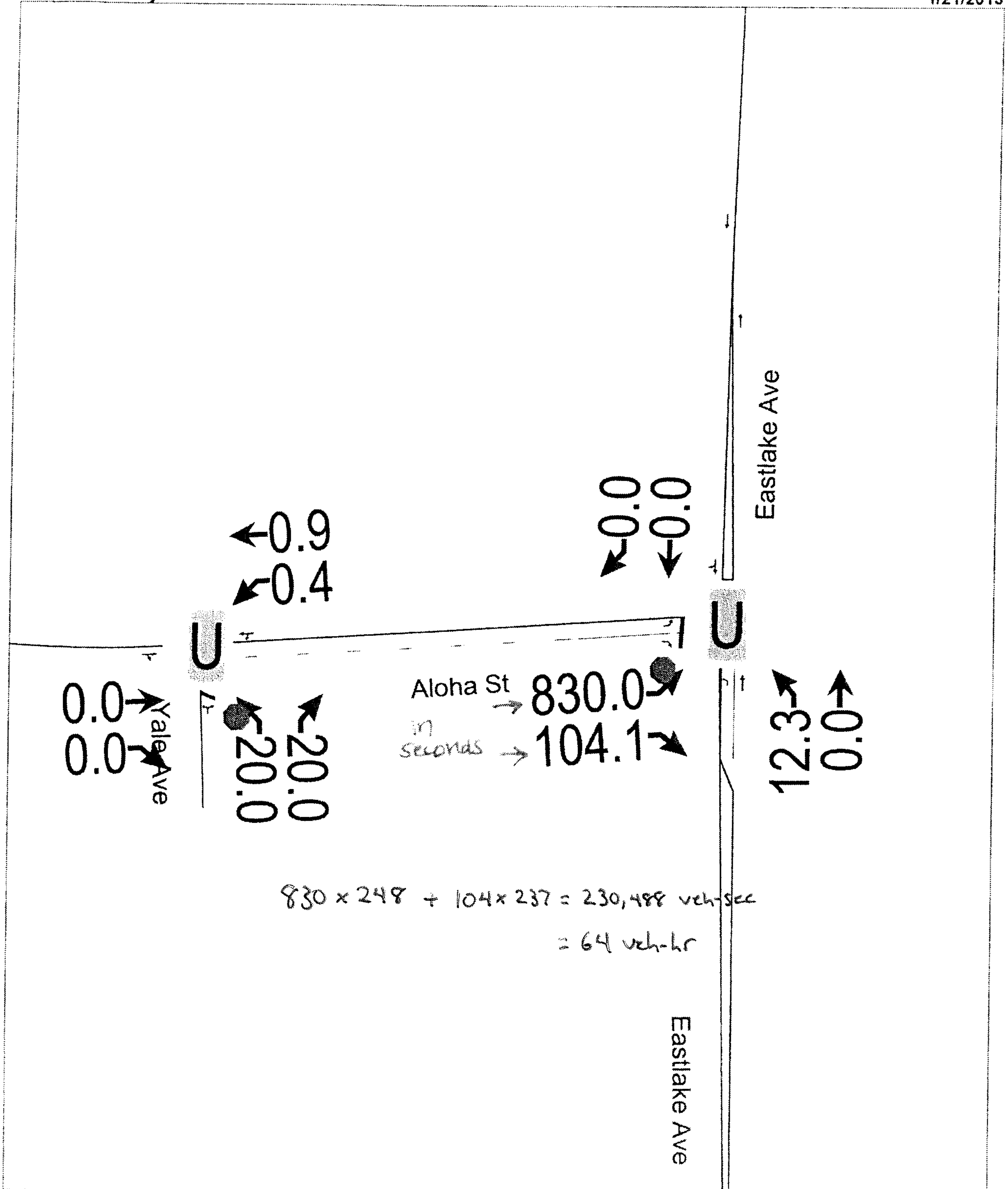
Map - 2016 PM traffic volumes *   1/21/2015



Calc for: Fairview Signal Warrant #60837
Made By: Sherry J. Kim Date: 1/21/2015
Checked by: C.J. Grove 1/21/2015

Map - 2016 PM
Movement Delay ✳✳

1/21/2015

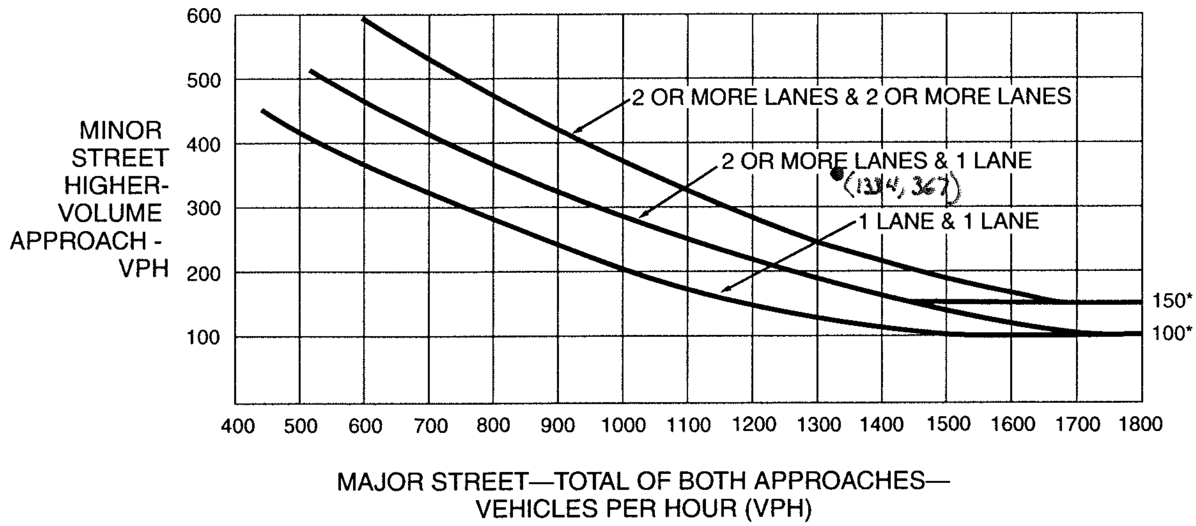


$830 \times 248 + 104 \times 237 = 230{,}488$ veh-sec

$= 64$ veh-hr

Eastlake Avenue E / Aloha Street

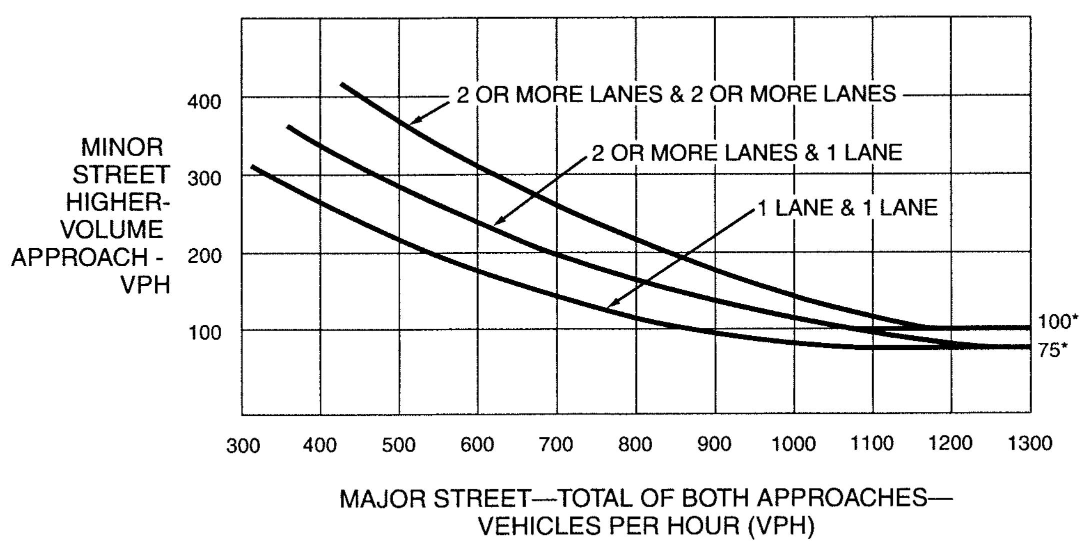
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

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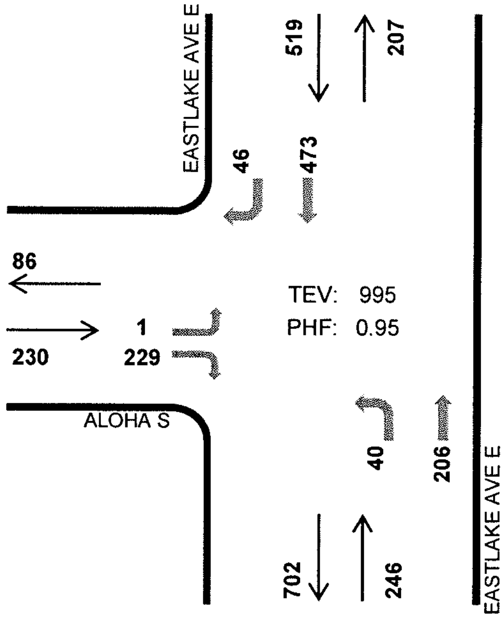
EASTLAKE AVE E
ALOHA S

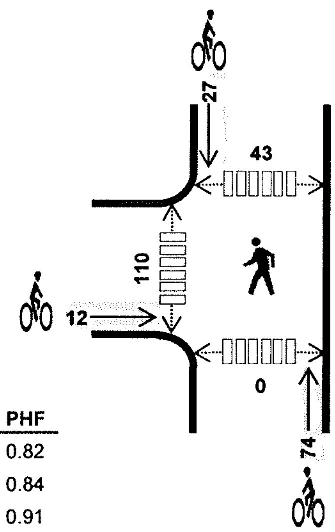
idax

N

Peak Hour



Date: Tue, Jul 29, 2014
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	2.2%	0.82
NB	4.1%	0.84
SB	5.6%	0.91
TOTAL	4.4%	0.95

Two-Hour Count Summaries

Interval Start	ALOHA S Eastbound			ALOHA S Westbound			EASTLAKE AVE E Northbound			EASTLAKE AVE E Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	46	0	0	0	12	32	0	0	118	13	221	
4:15 PM	0	0	54	0	0	0	12	31	0	0	116	12	225	
4:30 PM	**0**	**0**	**53**	**0**	**0**	**0**	**14**	**41**	**0**	**0**	**133**	**9**	**250**	
4:45 PM	**0**	**0**	**57**	**0**	**0**	**0**	**7**	**53**	**0**	**0**	**99**	**10**	**226**	922
5:00 PM	**0**	**0**	**70**	**0**	**0**	**0**	**9**	**49**	**0**	**0**	**120**	**13**	**261**	962
5:15 PM	**1**	**0**	**49**	**0**	**0**	**0**	**10**	**63**	**0**	**0**	**121**	**14**	**258**	**995**
5:30 PM	0	0	42	0	0	0	2	41	0	0	133	11	229	974
5:45 PM	0	0	29	0	0	0	12	67	0	0	95	11	214	962
Count Total	1	0	400	0	0	0	78	377	0	0	935	93	1,884	
Peak Hr	**1**	**0**	**229**	**0**	**0**	**0**	**40**	**206**	**0**	**0**	**473**	**46**	**995**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	2	0	1	8	*11*	2	0	3	6	*11*	0	18	9	0	*27*
4:15 PM	1	0	2	7	*10*	2	0	6	5	*13*	0	29	17	1	*47*
4:30 PM	**2**	**0**	**5**	**7**	***14***	**0**	**0**	**15**	**7**	***22***	**0**	**24**	**14**	**0**	***38***
4:45 PM	**1**	**0**	**2**	**7**	***10***	**4**	**0**	**21**	**5**	***30***	**0**	**25**	**12**	**0**	***37***
5:00 PM	**1**	**0**	**1**	**11**	***13***	**6**	**0**	**15**	**8**	***29***	**0**	**37**	**9**	**0**	***46***
5:15 PM	**1**	**0**	**2**	**4**	***7***	**2**	**0**	**23**	**7**	***32***	**0**	**24**	**8**	**0**	***32***
5:30 PM	1	0	0	9	*10*	7	0	14	6	*27*	0	23	13	0	*36*
5:45 PM	1	0	2	8	*11*	1	0	16	5	*22*	0	28	12	0	*40*
Count Total	10	0	15	61	*86*	24	0	113	49	*186*	0	208	94	1	*303*
Peak Hr	**5**	**0**	**10**	**29**	***44***	**12**	**0**	**74**	**27**	***113***	**0**	**110**	**43**	**0**	***153***

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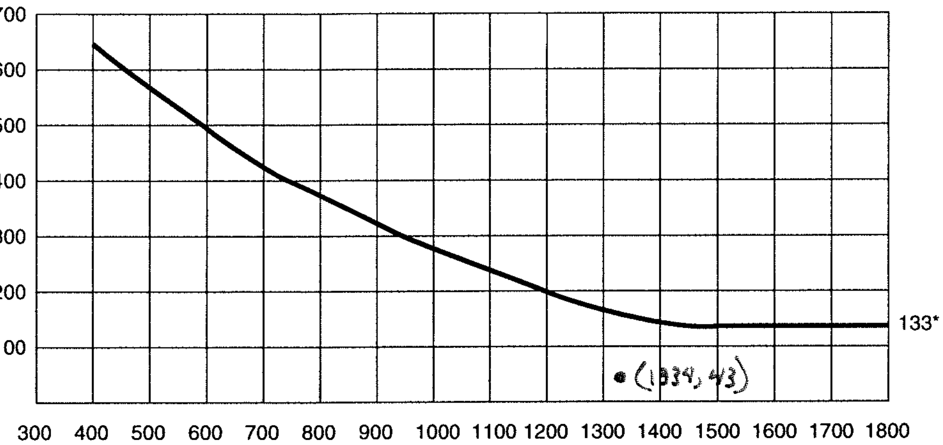
Eastlake Avenue / Aloha Street

Figure 4C-7. Warrant 4, Pedestrian Peak Hour

TOTAL OF ALL PEDESTRIANS CROSSING MAJOR STREET- PEDESTRIANS PER HOUR (PPH)

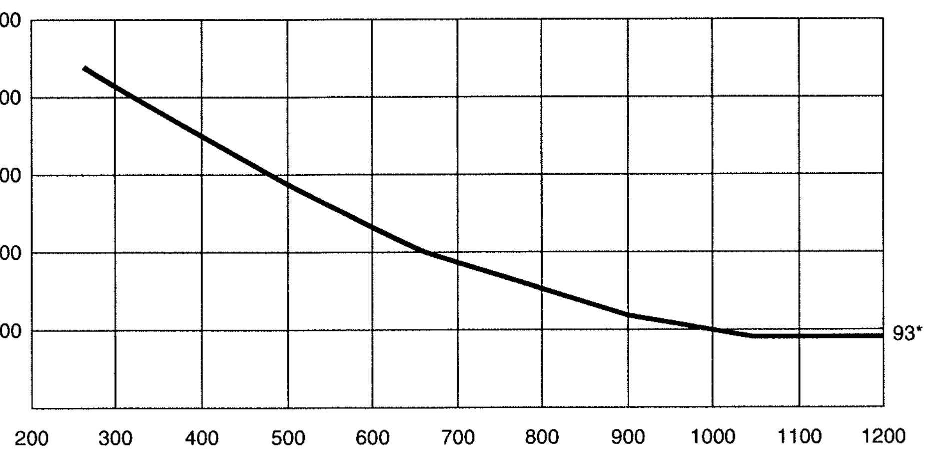


MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 133 pph applies as the lower threshold volume.

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)

TOTAL OF ALL PEDESTRIANS CROSSING MAJOR STREET- PEDESTRIANS PER HOUR (PPH)



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 93 pph applies as the lower threshold volume.

APPENDIX D: PARKING SURVEY AND TURN MOVEMENT COUNTS

Turning movement counts were collected at the following locations:

1. Fairview Ave N at Harrison St
2. Fairview Ave N at Republican St
3. Fairview Ave N at Mercer St
4. Fairview Ave N at Valley St
5. Fairview Ave N at Aloha St
6. Eastlake Ave E at Harrison St
7. Eastlake Ave E at Republican St
8. Eastlake Ave E at Mercer St
9. Eastlake Ave E at Aloha St
10. Eastlake Ave E at Fairview Ave E
11. Eastlake Ave E at E Garfield St
12. Yale Ave N at Aloha St

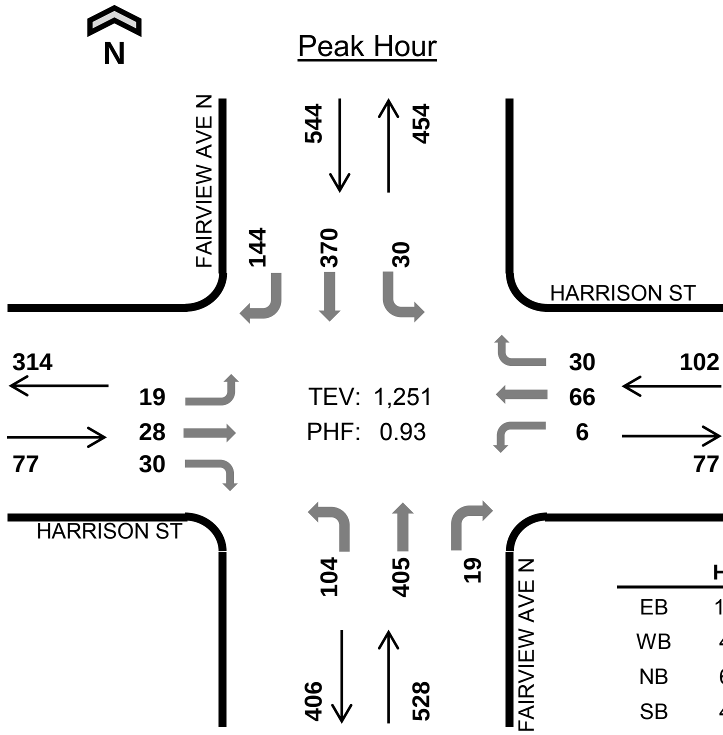
Turning movement counts were performed for the following time periods:

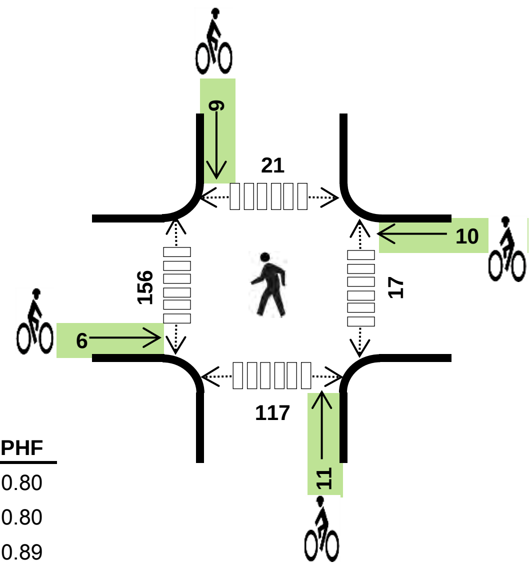
- AM Peak – Tue 7/29/2014, 7-9 AM
- PM Peak – Tue 7/29/2014, 4-6 PM
- AM Shoulder – Tue 2/4/2014, 5-7 AM
- PM Shoulder – Tue 2/4/2014, 7-9 PM
- SAT Midday – Sat 2/1/2014, 11 AM-1 PM

A parking survey was conducted along Aloha Street between Fairview Avenue N and Eastlake Avenue E from February 1, 2014 to February 8, 2014. Data was collected for the AM shoulder, PM shoulder and Saturday midday periods.

FAIRVIEW AVE N
HARRISON ST

Date: Tue, Jul 29, 2014
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM





	HV %:	PHF
EB	15.6%	0.80
WB	4.9%	0.80
NB	6.8%	0.89
SB	4.0%	0.94
TOTAL	6.0%	0.93

Two-Hour Count Summaries

Interval Start	HARRISON ST Eastbound LT	TH	RT	HARRISON ST Westbound LT	TH	RT	FAIRVIEW AVE N Northbound LT	TH	RT	FAIRVIEW AVE N Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	5	3	2	0	8	4	5	51	2	7	79	34	200	
7:15 AM	7	4	6	2	5	10	18	55	3	7	84	49	250	
7:30 AM	4	1	3	1	12	1	14	76	1	7	81	43	244	
7:45 AM	6	5	2	3	7	8	22	82	2	5	99	28	269	963
8:00 AM	**5**	**6**	**6**	**1**	**13**	**8**	**17**	**103**	**3**	**9**	**86**	**39**	**296**	1,059
8:15 AM	**3**	**3**	**8**	**2**	**14**	**6**	**23**	**98**	**3**	**7**	**91**	**27**	**285**	1,094
8:30 AM	**5**	**9**	**10**	**1**	**16**	**9**	**35**	**107**	**6**	**8**	**92**	**40**	**338**	1,188
8:45 AM	**6**	**10**	**6**	**2**	**23**	**7**	**29**	**97**	**7**	**6**	**101**	**38**	**332**	**1,251**
Count Total	41	41	43	12	98	53	163	669	27	56	713	298	2,214	
Peak Hr	**19**	**28**	**30**	**6**	**66**	**30**	**104**	**405**	**19**	**30**	**370**	**144**	**1,251**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

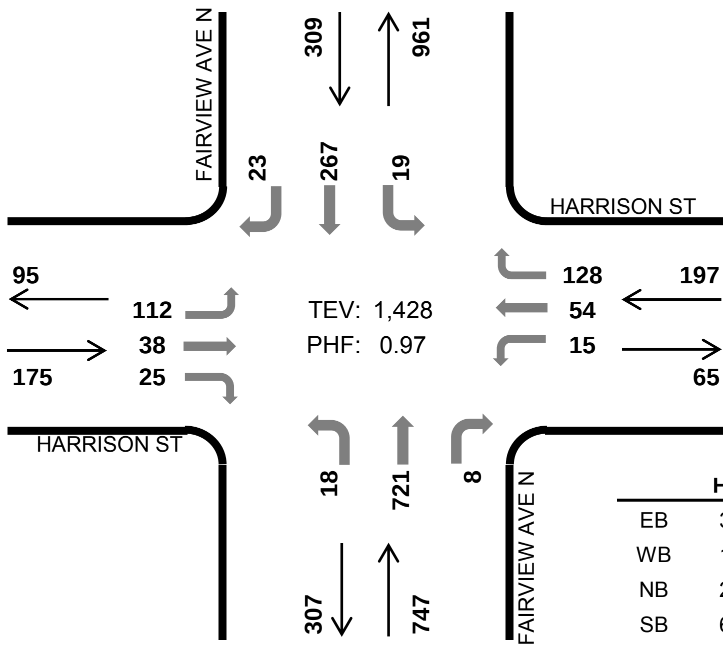
Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	1	0	3	10	*14*	0	1	2	2	*5*	1	22	1	16	*40*
7:15 AM	2	2	5	9	*18*	2	0	3	1	*6*	5	21	5	18	*49*
7:30 AM	3	0	5	5	*13*	0	0	2	3	*5*	1	37	3	28	*69*
7:45 AM	1	0	8	8	*17*	1	6	2	1	*10*	1	45	2	43	*91*
8:00 AM	**3**	**1**	**9**	**8**	***21***	**2**	**1**	**5**	**0**	***8***	**2**	**39**	**2**	**20**	***63***
8:15 AM	**2**	**3**	**10**	**2**	***17***	**3**	**2**	**1**	**6**	***12***	**4**	**31**	**5**	**25**	***65***
8:30 AM	**4**	**1**	**10**	**6**	***21***	**1**	**5**	**2**	**1**	***9***	**3**	**44**	**5**	**30**	***82***
8:45 AM	**3**	**0**	**7**	**6**	***16***	**0**	**2**	**3**	**2**	***7***	**8**	**42**	**9**	**42**	***101***
Count Total	19	7	57	54	*137*	9	17	20	16	*62*	25	281	32	222	*560*
Peak Hr	**12**	**5**	**36**	**22**	***75***	**6**	**10**	**11**	**9**	***36***	**17**	**156**	**21**	**117**	***311***

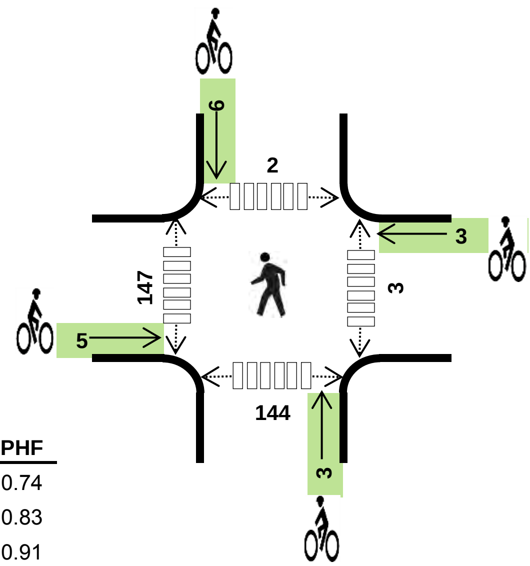
Mark Skaggs: 425 - 250 - 0777
mark.skaggs@idaxdata.com

FAIRVIEW AVE N
HARRISON ST

Date: Tue, Jul 29, 2014
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:00 PM to 5:00 PM

Peak Hour





	HV %:	PHF
EB	3.4%	0.74
WB	1.5%	0.83
NB	2.7%	0.91
SB	6.1%	0.93
TOTAL	3.4%	0.97

Two-Hour Count Summaries

Interval Start	HARRISON ST Eastbound LT	TH	RT	HARRISON ST Westbound LT	TH	RT	FAIRVIEW AVE N Northbound LT	TH	RT	FAIRVIEW AVE N Southbound LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	**26**	**9**	**4**	**5**	**16**	**30**	**3**	**190**	**3**	**8**	**68**	**7**	**369**	
4:15 PM	**18**	**9**	**5**	**3**	**10**	**26**	**5**	**199**	**1**	**5**	**65**	**8**	**354**	
4:30 PM	**29**	**7**	**9**	**4**	**9**	**35**	**5**	**183**	**1**	**1**	**68**	**5**	**356**	
4:45 PM	**39**	**13**	**7**	**3**	**19**	**37**	**5**	**149**	**3**	**5**	**66**	**3**	**349**	**1,428**
5:00 PM	38	10	6	3	19	50	1	114	2	2	47	6	298	1,357
5:15 PM	44	18	7	3	9	29	0	161	2	4	68	7	352	1,355
5:30 PM	42	23	11	2	9	29	3	141	0	2	64	6	332	1,331
5:45 PM	49	15	8	1	8	18	0	145	1	2	62	8	317	1,299
Count Total	285	104	57	24	99	254	22	1,282	13	29	508	50	2,727	
Peak Hr	**112**	**38**	**25**	**15**	**54**	**128**	**18**	**721**	**8**	**19**	**267**	**23**	**1,428**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	**0**	**1**	**4**	**6**	***11***	**1**	**2**	**1**	**0**	***4***	**2**	**32**	**1**	**35**	***70***
4:15 PM	**1**	**0**	**6**	**4**	***11***	**1**	**0**	**1**	**1**	***3***	**0**	**32**	**0**	**20**	***52***
4:30 PM	**3**	**1**	**6**	**6**	***16***	**2**	**1**	**0**	**4**	***7***	**1**	**43**	**0**	**47**	***91***
4:45 PM	**2**	**1**	**4**	**3**	***10***	**1**	**0**	**1**	**1**	***3***	**0**	**40**	**1**	**42**	***83***
5:00 PM	1	0	3	3	*7*	4	2	0	1	*7*	0	48	0	45	*93*
5:15 PM	2	1	2	9	*14*	2	2	2	1	*7*	0	75	0	61	*136*
5:30 PM	0	0	2	3	*5*	5	2	3	1	*11*	1	62	4	55	*122*
5:45 PM	1	2	3	9	*15*	7	1	2	4	*14*	0	55	0	52	*107*
Count Total	10	6	30	43	*89*	23	10	10	13	*56*	4	387	6	357	*754*
Peak Hr	**6**	**3**	**20**	**19**	***48***	**5**	**3**	**3**	**6**	***17***	**3**	**147**	**2**	**144**	***296***

Mark Skaggs: 425 - 250 - 0777
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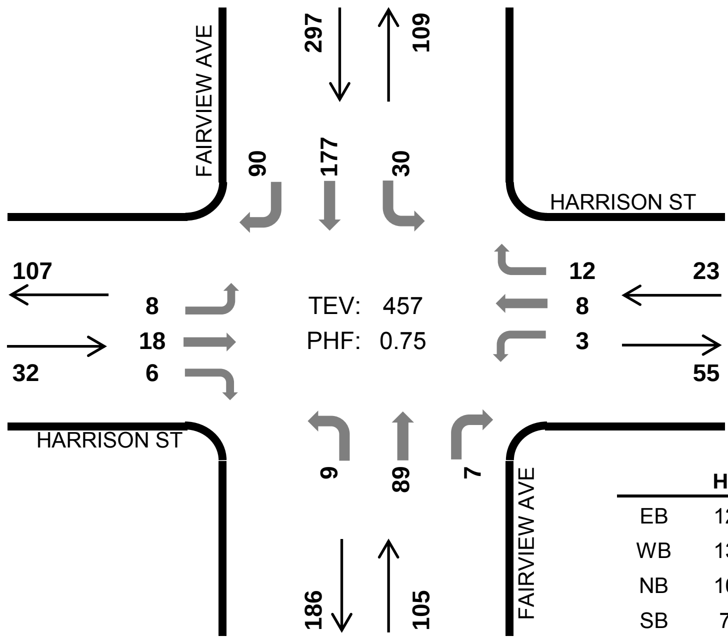
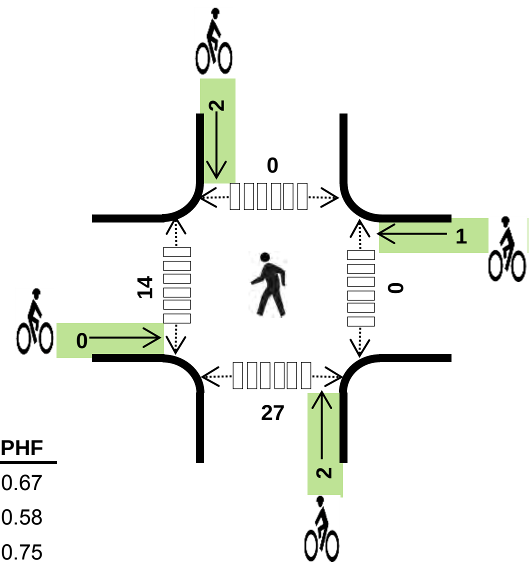
FAIRVIEW AVE
HARRISON ST

Date: Thu, Mar 13, 2014
Count Period: 5:00 AM to 7:00 AM
Peak Hour: 6:00 AM to 7:00 AM

N

Peak Hour





	HV %:	PHF
EB	12.5%	0.67
WB	13.0%	0.58
NB	10.5%	0.75
SB	7.1%	0.75
TOTAL	8.5%	0.75

Two-Hour Count Summaries

Interval Start	HARRISON ST Eastbound LT	TH	RT	HARRISON ST Westbound LT	TH	RT	FAIRVIEW AVE Northbound LT	TH	RT	FAIRVIEW AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
5:00 AM	0	0	0	0	0	0	0	6	1	1	8	4	20	
5:15 AM	1	0	0	0	1	0	0	7	0	2	14	8	33	
5:30 AM	1	0	3	0	2	1	1	8	1	2	20	3	42	
5:45 AM	0	3	2	0	4	0	2	11	1	3	28	19	73	168
6:00 AM	**0**	**1**	**1**	**0**	**0**	**1**	**1**	**18**	**2**	**4**	**34**	**17**	**79**	227
6:15 AM	**1**	**7**	**0**	**2**	**1**	**4**	**1**	**16**	**1**	**5**	**37**	**12**	**87**	281
6:30 AM	**5**	**3**	**2**	**1**	**1**	**3**	**3**	**29**	**3**	**10**	**50**	**29**	**139**	378
6:45 AM	**2**	**7**	**3**	**0**	**6**	**4**	**4**	**26**	**1**	**11**	**56**	**32**	**152**	**457**
Count Total	10	21	11	3	15	13	12	121	10	38	247	124	625	
Peak Hr	**8**	**18**	**6**	**3**	**8**	**12**	**9**	**89**	**7**	**30**	**177**	**90**	**457**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
5:00 AM	0	0	1	3	*4*	0	0	0	0	*0*	1	1	0	5	*7*
5:15 AM	0	0	1	0	*1*	0	0	0	0	*0*	0	0	1	1	*2*
5:30 AM	1	1	2	2	*6*	2	0	0	0	*2*	0	1	0	1	*2*
5:45 AM	1	2	2	3	*8*	0	0	0	0	*0*	0	7	0	8	*15*
6:00 AM	**0**	**1**	**2**	**3**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**2**	***2***
6:15 AM	**2**	**0**	**2**	**6**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**5**	**0**	**7**	***12***
6:30 AM	**1**	**2**	**4**	**4**	***11***	**0**	**0**	**1**	**1**	***2***	**0**	**3**	**0**	**9**	***12***
6:45 AM	**1**	**0**	**3**	**8**	***12***	**0**	**1**	**1**	**1**	***3***	**0**	**6**	**0**	**9**	***15***
Count Total	6	6	17	29	*58*	2	1	2	2	*7*	1	23	1	42	*67*
Peak Hr	**4**	**3**	**11**	**21**	***39***	**0**	**1**	**2**	**2**	***5***	**0**	**14**	**0**	**27**	***41***

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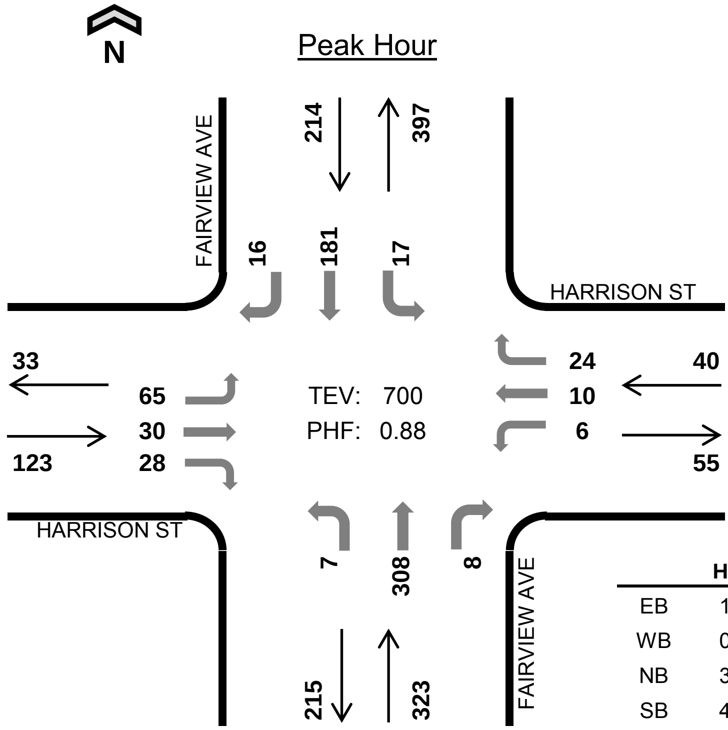
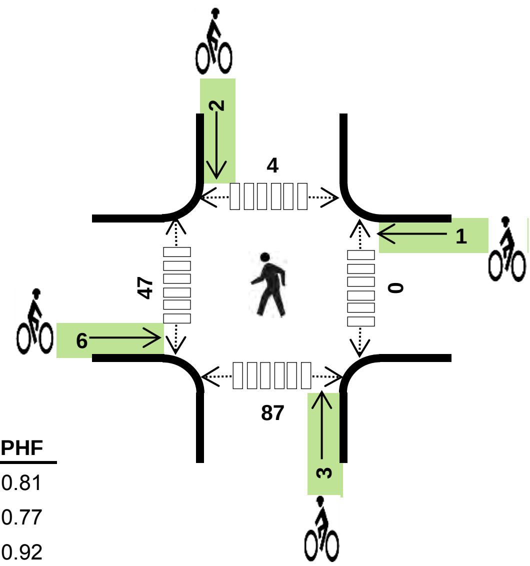
FAIRVIEW AVE
HARRISON ST

Date: Thu, Mar 13, 2014
Count Period: 7:00 PM to 9:00 PM
Peak Hour: 7:00 PM to 8:00 PM





	HV %:	PHF
EB	1.6%	0.81
WB	0.0%	0.77
NB	3.4%	0.92
SB	4.7%	0.82
TOTAL	3.3%	0.88

Two-Hour Count Summaries

Interval Start	HARRISON ST Eastbound			HARRISON ST Westbound			FAIRVIEW AVE Northbound			FAIRVIEW AVE Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 PM	**23**	**8**	**7**	**4**	**4**	**5**	**3**	**78**	**3**	**1**	**56**	**8**	**200**	
7:15 PM	**17**	**8**	**9**	**1**	**1**	**6**	**2**	**71**	**3**	**2**	**45**	**2**	**167**	
7:30 PM	**10**	**9**	**10**	**0**	**1**	**6**	**1**	**85**	**2**	**6**	**37**	**4**	**171**	
7:45 PM	**15**	**5**	**2**	**1**	**4**	**7**	**1**	**74**	**0**	**8**	**43**	**2**	**162**	**700**
8:00 PM	11	4	5	2	2	6	1	72	3	4	40	2	152	652
8:15 PM	10	5	5	2	3	13	0	95	3	1	31	2	170	655
8:30 PM	3	3	6	2	2	9	3	75	3	3	35	7	151	635
8:45 PM	1	4	2	0	1	6	2	64	5	2	33	4	124	597
Count Total	90	46	46	12	18	58	13	614	22	27	320	31	1,297	
Peak Hr	**65**	**30**	**28**	**6**	**10**	**24**	**7**	**308**	**8**	**17**	**181**	**16**	**700**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 PM	**1**	**0**	**3**	**5**	***9***	**1**	**0**	**2**	**0**	***3***	**0**	**10**	**1**	**27**	***38***
7:15 PM	**0**	**0**	**2**	**1**	***3***	**2**	**1**	**1**	**0**	***4***	**0**	**15**	**2**	**22**	***39***
7:30 PM	**0**	**0**	**4**	**2**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**15**	**0**	**23**	***38***
7:45 PM	**1**	**0**	**2**	**2**	***5***	**3**	**0**	**0**	**2**	***5***	**0**	**7**	**1**	**15**	***23***
8:00 PM	1	0	2	2	*5*	0	0	0	0	*0*	0	1	0	7	*8*
8:15 PM	0	0	2	1	*3*	0	0	0	0	*0*	0	3	0	21	*24*
8:30 PM	0	1	3	4	*8*	0	0	0	0	*0*	3	2	4	15	*24*
8:45 PM	0	0	1	4	*5*	0	0	2	0	*2*	0	0	0	8	*8*
Count Total	3	1	19	21	*44*	6	1	5	2	*14*	3	53	8	138	*202*
Peak Hr	**2**	**0**	**11**	**10**	***23***	**6**	**1**	**3**	**2**	***12***	**0**	**47**	**4**	**87**	***138***

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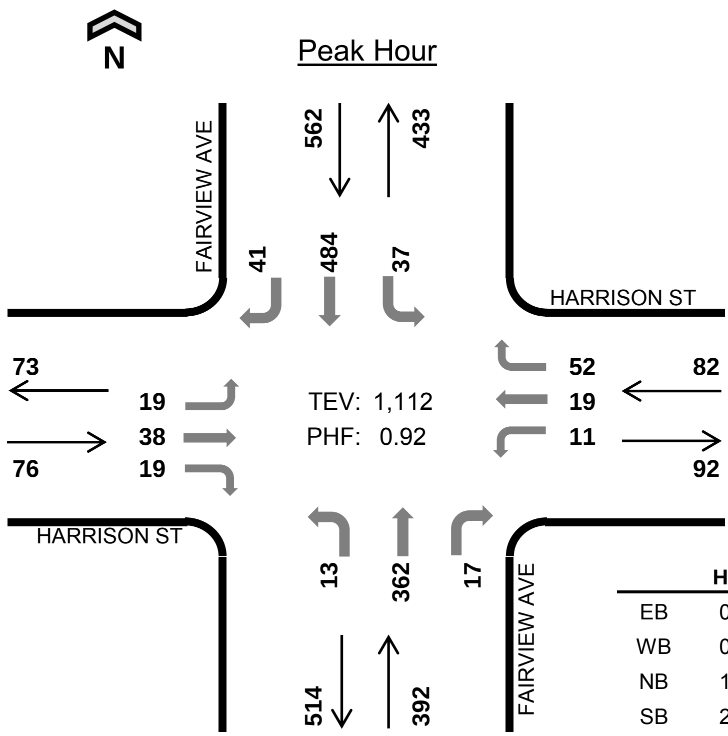
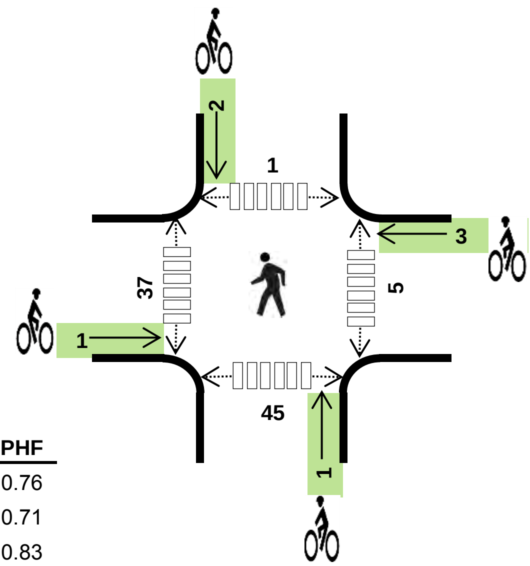
FAIRVIEW AVE
HARRISON ST

Date: Sat, Mar 15, 2014
Count Period: 11:00 AM to 1:00 PM
Peak Hour: 12:00 PM to 1:00 PM





	HV %:	PHF
EB	0.0%	0.76
WB	0.0%	0.71
NB	1.8%	0.83
SB	2.0%	0.96
TOTAL	1.6%	0.92

Two-Hour Count Summaries

Interval Start	HARRISON ST Eastbound LT	TH	RT	HARRISON ST Westbound LT	TH	RT	FAIRVIEW AVE Northbound LT	TH	RT	FAIRVIEW AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
11:00 AM	2	2	3	1	9	6	5	61	3	8	135	6	241	
11:15 AM	1	6	1	1	6	6	3	67	2	6	115	10	224	
11:30 AM	4	2	2	3	3	7	3	57	3	6	125	14	229	
11:45 AM	2	5	4	1	4	6	1	82	4	11	111	5	236	930
12:00 PM	**4**	**11**	**4**	**2**	**6**	**7**	**2**	**60**	**5**	**5**	**116**	**12**	**234**	923
12:15 PM	**4**	**9**	**7**	**4**	**5**	**20**	**2**	**92**	**5**	**16**	**114**	**9**	**287**	986
12:30 PM	**4**	**7**	**1**	**3**	**6**	**15**	**8**	**96**	**4**	**11**	**126**	**7**	**288**	1,045
12:45 PM	**7**	**11**	**7**	**2**	**2**	**10**	**1**	**114**	**3**	**5**	**128**	**13**	**303**	**1,112**
Count Total	28	53	29	17	41	77	25	629	29	68	970	76	2,042	
Peak Hr	**19**	**38**	**19**	**11**	**19**	**52**	**13**	**362**	**17**	**37**	**484**	**41**	**1,112**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
11:00 AM	0	0	1	3	*4*	0	0	0	1	*1*	2	4	0	25	*31*
11:15 AM	0	1	1	2	*4*	1	1	0	1	*3*	2	3	0	16	*21*
11:30 AM	0	0	2	2	*4*	0	0	0	0	*0*	1	1	0	11	*13*
11:45 AM	0	0	3	2	*5*	1	1	0	0	*2*	0	10	0	11	*21*
12:00 PM	**0**	**0**	**2**	**2**	***4***	**0**	**0**	**0**	**0**	***0***	**2**	**11**	**0**	**17**	***30***
12:15 PM	**0**	**0**	**2**	**4**	***6***	**0**	**0**	**0**	**0**	***0***	**1**	**7**	**1**	**13**	***22***
12:30 PM	**0**	**0**	**1**	**1**	***2***	**1**	**1**	**0**	**2**	***4***	**1**	**10**	**0**	**7**	***18***
12:45 PM	**0**	**0**	**2**	**4**	***6***	**0**	**2**	**1**	**0**	***3***	**1**	**9**	**0**	**8**	***18***
Count Total	0	1	14	20	*35*	3	5	1	4	*13*	10	55	1	108	*174*
Peak Hr	**0**	**0**	**7**	**11**	***18***	**1**	**3**	**1**	**2**	***7***	**5**	**37**	**1**	**45**	***88***

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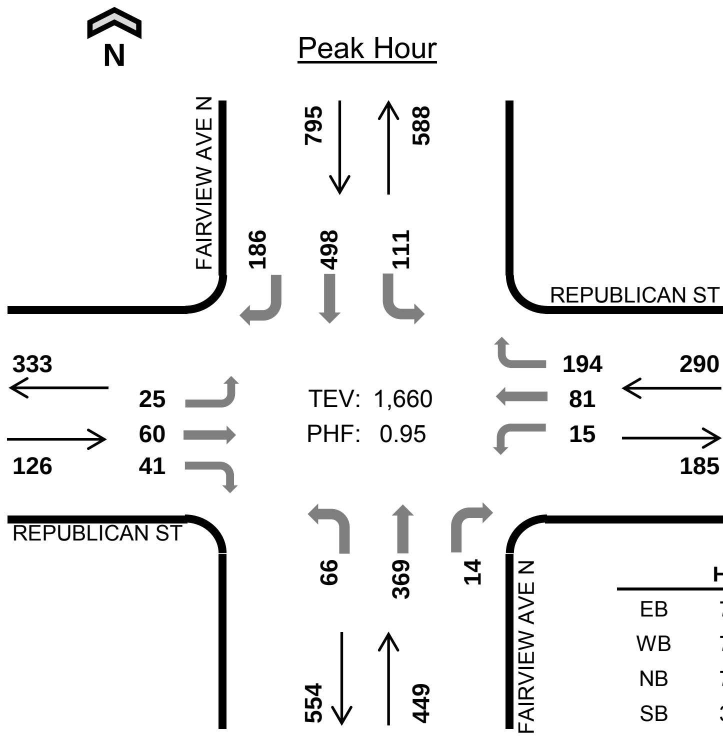
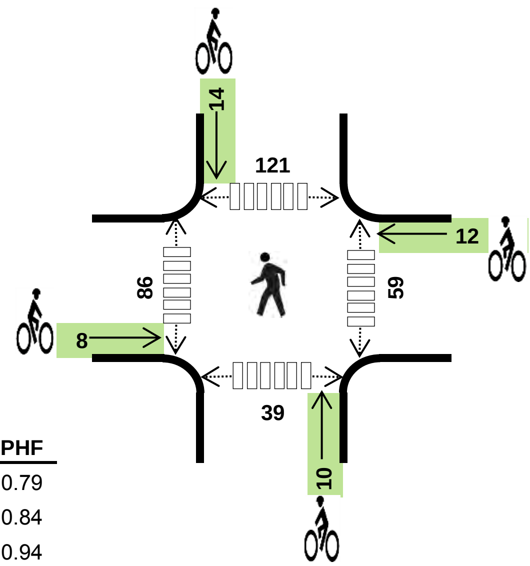
FAIRVIEW AVE N
REPUBLICAN ST

Date: Tue, Jul 29, 2014
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM



	HV %:	PHF
EB	7.1%	0.79
WB	7.2%	0.84
NB	7.3%	0.94
SB	3.0%	0.92
TOTAL	5.2%	0.95



Two-Hour Count Summaries

Interval Start	REPUBLICAN ST Eastbound			REPUBLICAN ST Westbound			FAIRVIEW AVE N Northbound			FAIRVIEW AVE N Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	1	6	6	3	3	32	1	60	0	25	105	34	276	
7:15 AM	3	14	4	2	5	25	11	55	1	33	132	41	326	
7:30 AM	6	13	6	2	11	50	8	78	3	38	126	53	394	
7:45 AM	10	12	6	3	7	41	14	72	3	31	112	49	360	1,356
8:00 AM	**12**	**16**	**12**	**3**	**19**	**49**	**13**	**94**	**4**	**29**	**121**	**51**	**423**	1,503
8:15 AM	**5**	**8**	**6**	**3**	**17**	**43**	**21**	**91**	**4**	**32**	**118**	**49**	**397**	1,574
8:30 AM	**3**	**16**	**17**	**5**	**17**	**48**	**20**	**95**	**4**	**27**	**115**	**36**	**403**	1,583
8:45 AM	**5**	**20**	**6**	**4**	**28**	**54**	**12**	**89**	**2**	**23**	**144**	**50**	**437**	**1,660**
Count Total	45	105	63	25	107	342	100	634	21	238	973	363	3,016	
Peak Hr	**25**	**60**	**41**	**15**	**81**	**194**	**66**	**369**	**14**	**111**	**498**	**186**	**1,660**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	4	5	4	7	*20*	3	1	2	1	*7*	3	7	7	5	*22*
7:15 AM	5	2	8	10	*25*	0	0	4	1	*5*	3	17	19	10	*49*
7:30 AM	3	6	7	6	*22*	1	0	0	3	*4*	3	9	15	7	*34*
7:45 AM	5	5	5	8	*23*	0	2	2	5	*9*	6	18	22	11	*57*
8:00 AM	**4**	**6**	**8**	**6**	***24***	**1**	**0**	**3**	**1**	***5***	**9**	**27**	**30**	**8**	***74***
8:15 AM	**1**	**5**	**12**	**4**	***22***	**4**	**3**	**0**	**7**	***14***	**14**	**15**	**28**	**8**	***65***
8:30 AM	**2**	**4**	**4**	**7**	***17***	**2**	**6**	**4**	**2**	***14***	**15**	**24**	**37**	**10**	***86***
8:45 AM	**2**	**6**	**9**	**7**	***24***	**1**	**3**	**3**	**4**	***11***	**21**	**20**	**26**	**13**	***80***
Count Total	26	39	57	55	*177*	12	15	18	24	*69*	74	137	184	72	*467*
Peak Hr	**9**	**21**	**33**	**24**	***87***	**8**	**12**	**10**	**14**	***44***	**59**	**86**	**121**	**39**	***305***

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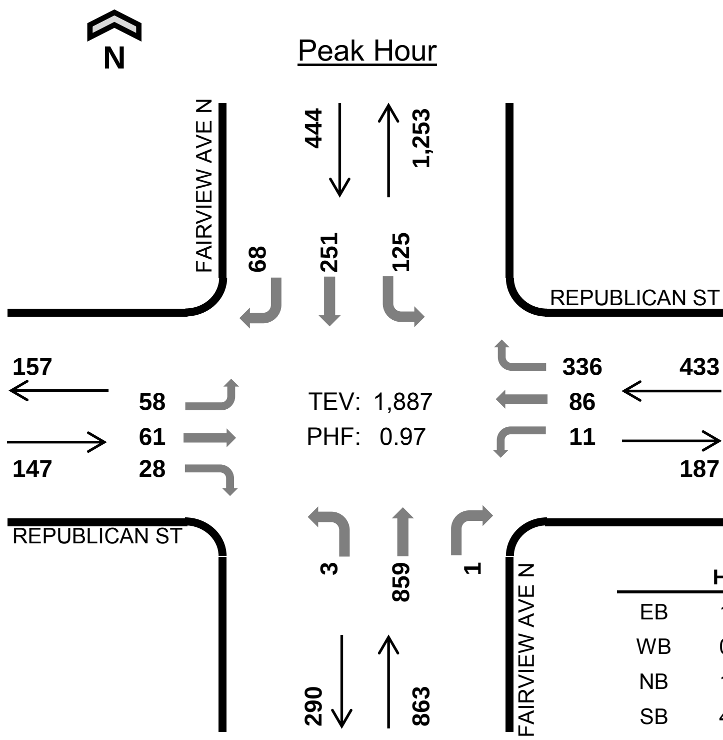
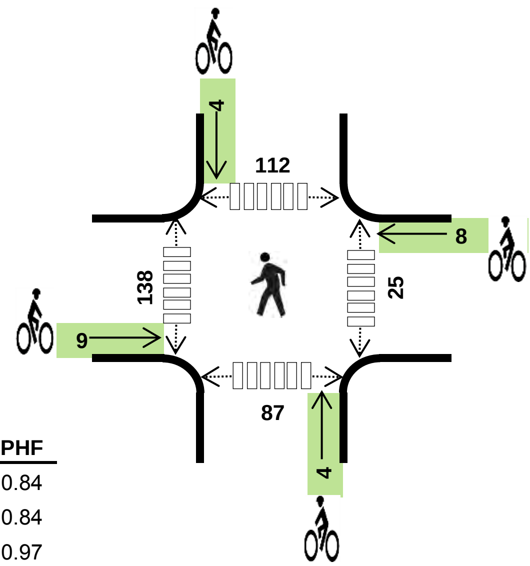
FAIRVIEW AVE N
REPUBLICAN ST

Date: Tue, Jul 29, 2014
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM





	HV %:	PHF
EB	1.4%	0.84
WB	0.7%	0.84
NB	1.7%	0.97
SB	4.7%	0.92
TOTAL	2.2%	0.97

Two-Hour Count Summaries

Interval Start	REPUBLICAN ST			REPUBLICAN ST			FAIRVIEW AVE N			FAIRVIEW AVE N			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	10	12	12	0	13	56	4	235	0	23	76	13	454	
4:15 PM	17	11	8	6	8	61	2	214	1	23	64	18	433	
4:30 PM	17	20	4	3	7	64	6	241	2	20	70	19	473	
4:45 PM	14	22	11	2	14	77	4	210	0	20	61	9	444	1,804
5:00 PM	**17**	**19**	**8**	**0**	**17**	**80**	**1**	**212**	**0**	**25**	**60**	**18**	**457**	1,807
5:15 PM	**9**	**14**	**4**	**2**	**23**	**104**	**1**	**222**	**0**	**30**	**59**	**20**	**488**	1,862
5:30 PM	**16**	**9**	**7**	**4**	**26**	**79**	**0**	**206**	**0**	**34**	**65**	**12**	**458**	1,847
5:45 PM	**16**	**19**	**9**	**5**	**20**	**73**	**1**	**219**	**1**	**36**	**67**	**18**	**484**	**1,887**
Count Total	116	126	63	22	128	594	19	1,759	4	211	522	127	3,691	
Peak Hr	**58**	**61**	**28**	**11**	**86**	**336**	**3**	**859**	**1**	**125**	**251**	**68**	**1,887**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	1	1	6	5	*13*	0	0	3	0	*3*	4	11	8	11	*34*
4:15 PM	1	1	7	4	*13*	2	1	0	3	*6*	2	12	24	18	*56*
4:30 PM	3	0	10	6	*19*	1	2	0	2	*5*	2	13	19	11	*45*
4:45 PM	0	2	9	4	*15*	2	1	1	3	*7*	5	14	11	16	*46*
5:00 PM	**2**	**0**	**4**	**5**	***11***	**0**	**2**	**0**	**1**	***3***	**6**	**22**	**28**	**30**	***86***
5:15 PM	**0**	**0**	**3**	**6**	***9***	**6**	**1**	**2**	**0**	***9***	**10**	**38**	**32**	**21**	***101***
5:30 PM	**0**	**1**	**3**	**3**	***7***	**1**	**0**	**1**	**0**	***2***	**1**	**43**	**35**	**11**	***90***
5:45 PM	**0**	**2**	**5**	**7**	***14***	**2**	**5**	**1**	**3**	***11***	**8**	**35**	**17**	**25**	***85***
Count Total	7	7	47	40	*101*	14	12	8	12	*46*	38	188	174	143	*543*
Peak Hr	**2**	**3**	**15**	**21**	***41***	**9**	**8**	**4**	**4**	***25***	**25**	**138**	**112**	**87**	***362***

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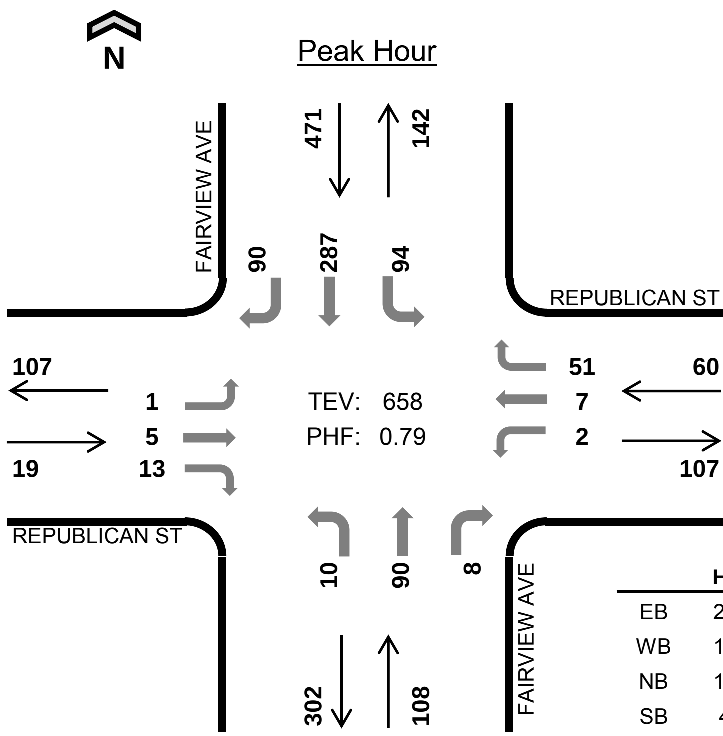
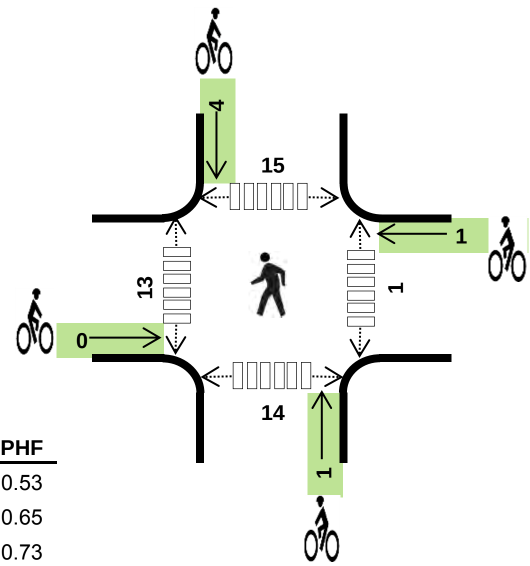
FAIRVIEW AVE
REPUBLICAN ST

Date: Thu, Mar 13, 2014
Count Period: 5:00 AM to 7:00 AM
Peak Hour: 6:00 AM to 7:00 AM

Peak Hour



	HV %:	PHF
EB	26.3%	0.53
WB	13.3%	0.65
NB	10.2%	0.73
SB	4.5%	0.82
TOTAL	6.8%	0.79



Two-Hour Count Summaries

Interval Start	REPUBLICAN ST Eastbound			REPUBLICAN ST Westbound			FAIRVIEW AVE Northbound			FAIRVIEW AVE Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
5:00 AM	0	0	0	0	0	2	1	5	0	4	13	5	30	
5:15 AM	1	0	1	0	0	3	1	7	0	4	23	5	45	
5:30 AM	1	1	1	3	1	4	1	9	1	8	24	13	67	
5:45 AM	0	0	1	1	1	7	0	11	0	17	45	19	102	244
6:00 AM	**0**	**0**	**4**	**1**	**0**	**4**	**3**	**13**	**2**	**25**	**50**	**24**	**126**	340
6:15 AM	**0**	**1**	**0**	**0**	**1**	**12**	**1**	**17**	**2**	**21**	**54**	**17**	**126**	421
6:30 AM	**0**	**2**	**3**	**0**	**3**	**16**	**1**	**33**	**3**	**23**	**88**	**26**	**198**	552
6:45 AM	**1**	**2**	**6**	**1**	**3**	**19**	**5**	**27**	**1**	**25**	**95**	**23**	**208**	**658**
Count Total	3	6	16	6	9	67	13	122	9	127	392	132	902	
Peak Hr	**1**	**5**	**13**	**2**	**7**	**51**	**10**	**90**	**8**	**94**	**287**	**90**	**658**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
5:00 AM	0	0	1	4	*5*	0	0	0	0	*0*	0	0	0	0	*0*
5:15 AM	0	0	1	1	*2*	0	0	0	0	*0*	0	1	0	0	*1*
5:30 AM	1	1	2	2	*6*	0	0	0	0	*0*	0	2	1	0	*3*
5:45 AM	0	3	2	2	*7*	0	0	0	1	*1*	0	4	0	4	*8*
6:00 AM	**0**	**0**	**1**	**4**	***5***	**0**	**0**	**0**	**0**	***0***	**1**	**1**	**1**	**1**	***4***
6:15 AM	**0**	**2**	**2**	**9**	***13***	**0**	**0**	**0**	**1**	***1***	**0**	**5**	**2**	**3**	***10***
6:30 AM	**1**	**2**	**5**	**3**	***11***	**0**	**0**	**1**	**1**	***2***	**0**	**7**	**8**	**8**	***23***
6:45 AM	**4**	**4**	**3**	**5**	***16***	**0**	**1**	**0**	**2**	***3***	**0**	**0**	**4**	**2**	***6***
Count Total	6	12	17	30	*65*	0	1	1	5	*7*	1	20	16	18	*55*
Peak Hr	**5**	**8**	**11**	**21**	***45***	**0**	**1**	**1**	**4**	***6***	**1**	**13**	**15**	**14**	***43***

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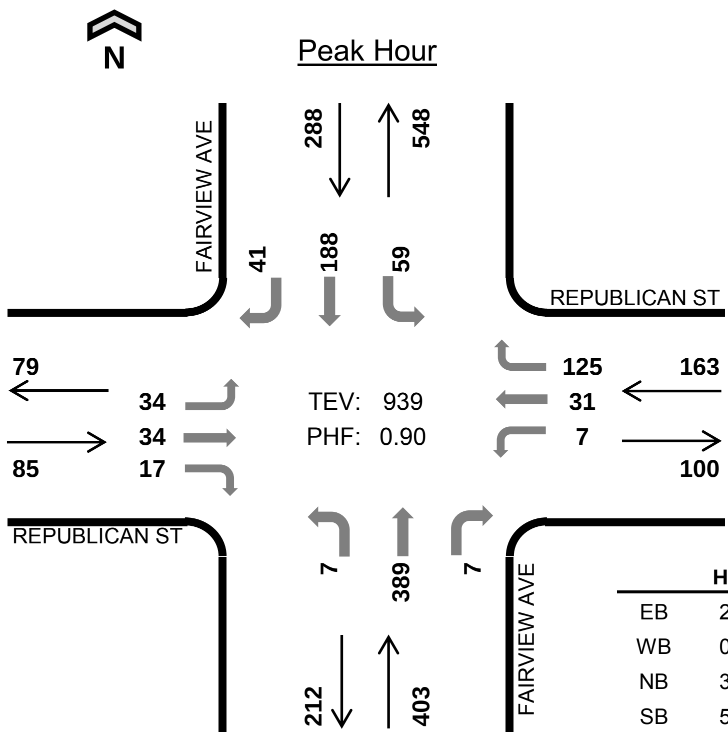
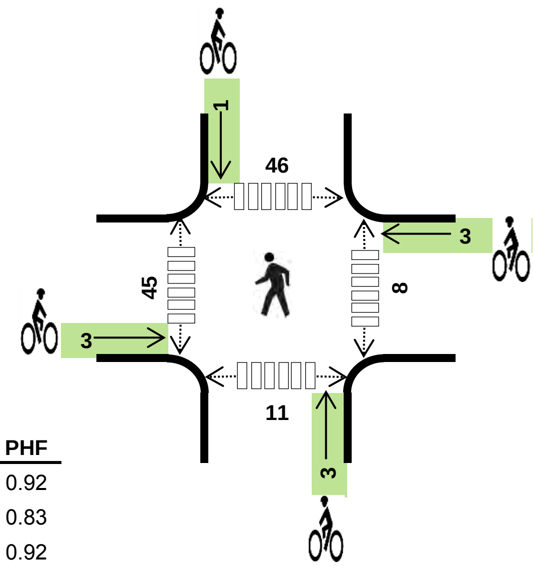
FAIRVIEW AVE
REPUBLICAN ST

Date: Thu, Mar 13, 2014
Count Period: 7:00 PM to 9:00 PM
Peak Hour: 7:00 PM to 8:00 PM





	HV %:	PHF
EB	2.4%	0.92
WB	0.6%	0.83
NB	3.2%	0.92
SB	5.2%	0.86
TOTAL	3.3%	0.90

Two-Hour Count Summaries

Interval Start	REPUBLICAN ST Eastbound LT	TH	RT	REPUBLICAN ST Westbound LT	TH	RT	FAIRVIEW AVE Northbound LT	TH	RT	FAIRVIEW AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:00 PM	**8**	**7**	**7**	**2**	**10**	**37**	**3**	**107**	**0**	**16**	**54**	**10**	**261**	
7:15 PM	**12**	**9**	**2**	**3**	**7**	**26**	**1**	**90**	**4**	**13**	**49**	**13**	**229**	
7:30 PM	**6**	**11**	**6**	**2**	**6**	**30**	**1**	**99**	**1**	**10**	**34**	**5**	**211**	
7:45 PM	**8**	**7**	**2**	**0**	**8**	**32**	**2**	**93**	**2**	**20**	**51**	**13**	**238**	**939**
8:00 PM	9	4	3	2	11	20	2	81	4	15	41	5	197	875
8:15 PM	5	6	4	3	6	26	3	116	2	19	26	5	221	867
8:30 PM	5	2	3	4	5	29	0	80	4	16	37	9	194	850
8:45 PM	1	1	4	3	11	15	0	74	0	12	33	2	156	768
Count Total	54	47	31	19	64	215	12	740	17	121	325	62	1,707	
Peak Hr	**34**	**34**	**17**	**7**	**31**	**125**	**7**	**389**	**7**	**59**	**188**	**41**	**939**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 PM	**1**	**0**	**4**	**6**	***11***	**1**	**1**	**2**	**0**	***4***	**1**	**16**	**22**	**2**	***41***
7:15 PM	**1**	**0**	**2**	**3**	***6***	**0**	**0**	**0**	**0**	***0***	**2**	**12**	**11**	**2**	***27***
7:30 PM	**0**	**1**	**4**	**2**	***7***	**1**	**1**	**0**	**0**	***2***	**4**	**9**	**5**	**7**	***25***
7:45 PM	**0**	**0**	**3**	**4**	***7***	**1**	**1**	**1**	**1**	***4***	**1**	**8**	**8**	**0**	***17***
8:00 PM	0	0	1	2	*3*	1	1	1	0	*3*	1	4	1	5	*11*
8:15 PM	0	0	1	1	*2*	2	0	0	0	*2*	0	9	8	0	*17*
8:30 PM	0	0	4	4	*8*	1	0	0	0	*1*	3	5	6	3	*17*
8:45 PM	0	0	1	5	*6*	1	0	1	0	*2*	1	1	3	1	*6*
Count Total	2	1	20	27	*50*	8	4	5	1	*18*	13	64	64	20	*161*
Peak Hr	**2**	**1**	**13**	**15**	***31***	**3**	**3**	**3**	**1**	***10***	**8**	**45**	**46**	**11**	***110***

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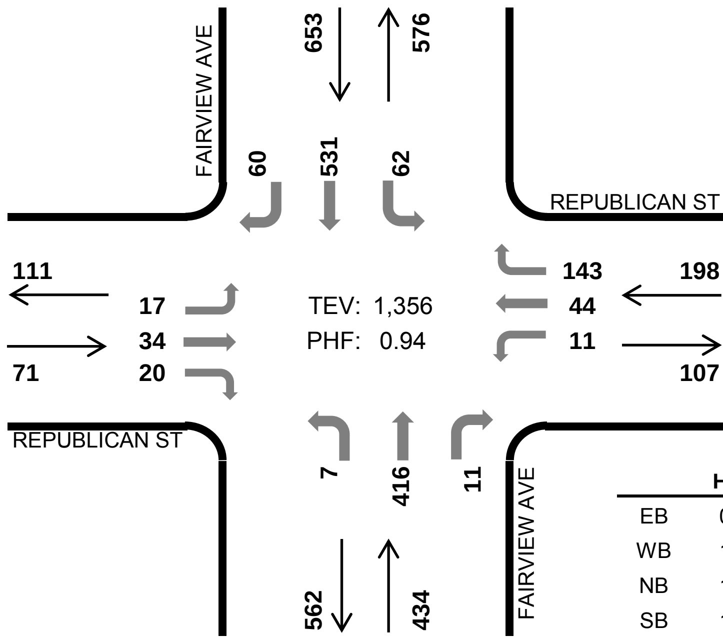
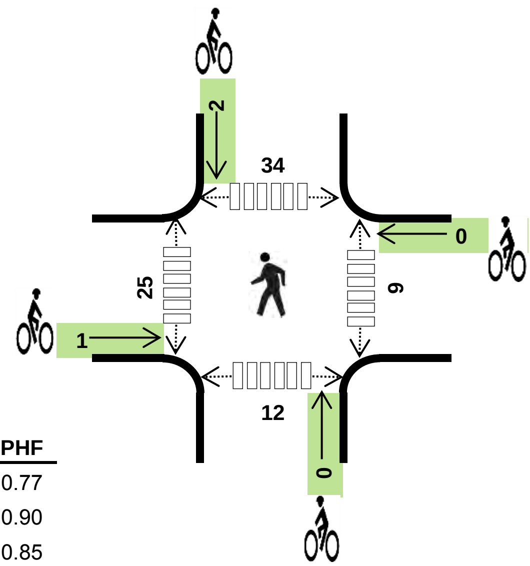
FAIRVIEW AVE
REPUBLICAN ST

Date: Sat, Mar 15, 2014
Count Period: 11:00 AM to 1:00 PM
Peak Hour: 12:00 PM to 1:00 PM





	HV %:	PHF
EB	0.0%	0.77
WB	1.0%	0.90
NB	1.6%	0.85
SB	1.5%	0.98
TOTAL	1.4%	0.94

Two-Hour Count Summaries

Interval Start	REPUBLICAN ST Eastbound			REPUBLICAN ST Westbound			FAIRVIEW AVE Northbound			FAIRVIEW AVE Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
11:00 AM	2	5	6	4	15	23	1	64	3	13	136	14	286	
11:15 AM	4	7	6	2	7	23	3	69	1	18	126	14	280	
11:30 AM	1	13	7	2	8	38	1	63	2	22	134	12	303	
11:45 AM	5	6	5	10	5	30	4	83	4	21	118	14	305	1,174
12:00 PM	**8**	**7**	**1**	**3**	**9**	**31**	**3**	**68**	**2**	**16**	**131**	**10**	**289**	1,177
12:15 PM	**5**	**7**	**11**	**1**	**9**	**45**	**1**	**115**	**2**	**20**	**130**	**14**	**360**	1,257
12:30 PM	**2**	**9**	**5**	**1**	**12**	**38**	**1**	**110**	**4**	**19**	**133**	**14**	**348**	1,302
12:45 PM	**2**	**11**	**3**	**6**	**14**	**29**	**2**	**123**	**3**	**7**	**137**	**22**	**359**	**1,356**
Count Total	29	65	44	29	79	257	16	695	21	136	1,045	114	2,530	
Peak Hr	**17**	**34**	**20**	**11**	**44**	**143**	**7**	**416**	**11**	**62**	**531**	**60**	**1,356**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
11:00 AM	0	0	1	3	*4*	0	1	0	1	*2*	0	4	5	1	*10*
11:15 AM	0	0	2	3	*5*	1	1	0	0	*2*	0	3	7	1	*11*
11:30 AM	0	1	1	3	*5*	0	1	0	1	*2*	1	2	7	2	*12*
11:45 AM	0	1	3	2	*6*	0	0	0	0	*0*	1	8	11	3	*23*
12:00 PM	**0**	**0**	**2**	**2**	***4***	**0**	**0**	**0**	**0**	***0***	**3**	**6**	**16**	**2**	***27***
12:15 PM	**0**	**1**	**2**	**3**	***6***	**0**	**0**	**0**	**0**	***0***	**2**	**9**	**10**	**1**	***22***
12:30 PM	**0**	**1**	**1**	**1**	***3***	**1**	**0**	**0**	**2**	***3***	**3**	**5**	**4**	**6**	***18***
12:45 PM	**0**	**0**	**2**	**4**	***6***	**0**	**0**	**0**	**0**	***0***	**1**	**5**	**4**	**3**	***13***
Count Total	0	4	14	21	*39*	2	3	0	4	*9*	11	42	64	19	*136*
Peak Hr	**0**	**2**	**7**	**10**	***19***	**1**	**0**	**0**	**2**	***3***	**9**	**25**	**34**	**12**	***80***

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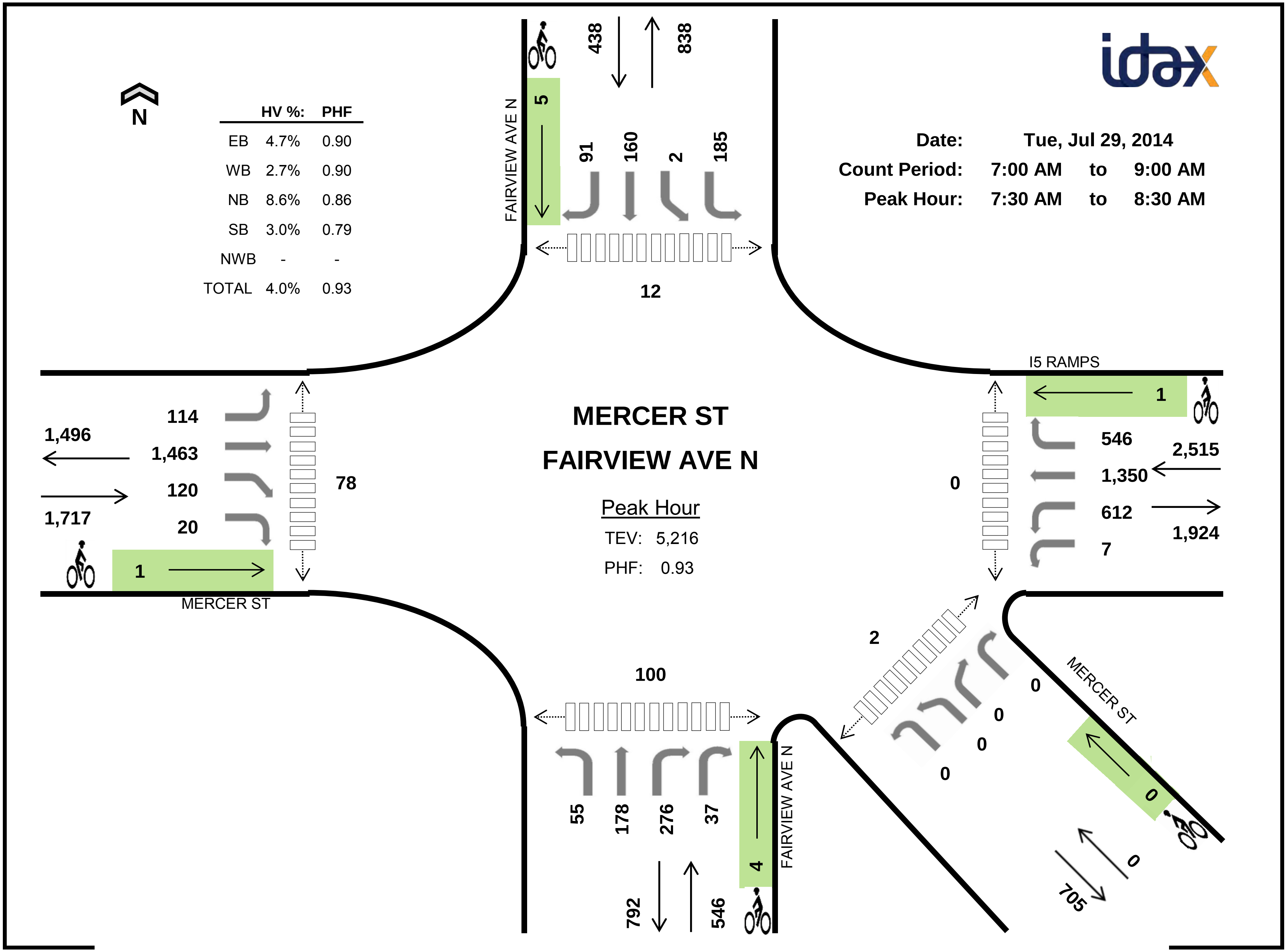
	HV %:	PHF
EB	4.7%	0.90
WB	2.7%	0.90
NB	8.6%	0.86
SB	3.0%	0.79
NWB	-	-
TOTAL	4.0%	0.93

Date:	Tue, Jul 29, 2014		
Count Period:	7:00 AM	to	9:00 AM
Peak Hour:	7:30 AM	to	8:30 AM



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Two-Hour Count Summaries

Interval Start	MERCER ST Eastbound				I5 RAMPS Westbound				FAIRVIEW AVE N Northbound				FAIRVIEW AVE N Southbound				MERCER ST Northwestbound				15-min Total	Rolling One Hour
	LT	TH	BR	RT	HL	LT	TH	RT	LT	TH	RT	HR	LT	BL	TH	RT	HL	BL	BR	HR		
7:00 AM	25	316	14	1	1	161	443	132	13	21	51	4	33	0	22	8	0	0	0	0	1,245	
7:15 AM	28	372	19	1	1	150	434	129	6	27	50	3	24	0	24	8	0	0	0	0	1,276	
7:30 AM	**32**	**411**	**27**	**5**	**2**	**173**	**377**	**146**	**9**	**38**	**69**	**9**	**49**	**0**	**34**	**21**	**0**	**0**	**0**	**0**	**1,402**	
7:45 AM	**24**	**320**	**26**	**2**	**2**	**168**	**366**	**151**	**14**	**39**	**60**	**10**	**33**	**0**	**33**	**19**	**0**	**0**	**0**	**0**	**1,267**	5,190
8:00 AM	**27**	**357**	**41**	**3**	**2**	**128**	**300**	**131**	**18**	**60**	**72**	**9**	**42**	**1**	**41**	**27**	**0**	**0**	**0**	**0**	**1,259**	5,204
8:15 AM	**31**	**375**	**26**	**10**	**1**	**143**	**307**	**118**	**14**	**41**	**75**	**9**	**61**	**1**	**52**	**24**	**0**	**0**	**0**	**0**	**1,288**	**5,216**
8:30 AM	40	300	43	10	0	151	321	124	10	50	71	9	45	0	39	22	0	0	0	0	1,235	5,049
8:45 AM	30	347	45	10	3	128	292	98	20	51	73	9	41	0	46	14	0	0	0	0	1,207	4,989
Count Total	237	2,798	241	42	12	1,202	2,840	1,029	104	327	521	62	328	2	291	143	0	0	0	0	10,179	
Peak Hr	**114**	**1,463**	**120**	**20**	**7**	**612**	**1,350**	**546**	**55**	**178**	**276**	**37**	**185**	**2**	**160**	**91**	**0**	**0**	**0**	**0**	**5,216**	

Note: Two-hour count summary volumes include heavy vehicles but excludes bicycles in overall count.

Interval Start	Heavy Vehicle Totals						Bicycles						Pedestrians (Crossing Leg)					
	EB	WB	NB	SB	NWB	Total	EB	WB	NB	SB	NWB	Total	East	West	North	South	SE	Total
7:00 AM	12	30	8	2	0	*52*	0	1	0	0	0	*1*	0	18	5	9	0	*32*
7:15 AM	18	20	6	5	0	*49*	0	0	1	0	0	*1*	0	13	3	7	0	*23*
7:30 AM	**18**	**13**	**14**	**5**	**0**	***50***	**0**	**1**	**0**	**1**	**0**	***2***	**0**	**20**	**1**	**12**	**0**	***33***
7:45 AM	**21**	**18**	**7**	**2**	**0**	***48***	**1**	**1**	**3**	**4**	**0**	***9***	**0**	**10**	**9**	**25**	**0**	***44***
8:00 AM	**24**	**17**	**15**	**3**	**0**	***59***	**0**	**0**	**0**	**0**	**0**	***0***	**0**	**24**	**2**	**33**	**2**	***61***
8:15 AM	**18**	**20**	**11**	**3**	**0**	***52***	**0**	**0**	**1**	**0**	**0**	***1***	**0**	**24**	**0**	**30**	**0**	***54***
8:30 AM	17	18	11	4	0	*50*	0	0	1	0	0	*1*	0	23	0	27	0	*50*
8:45 AM	33	22	15	3	0	*73*	1	0	0	0	0	*1*	0	24	0	53	0	*77*
Count Total	161	158	87	27	0	*433*	2	3	6	5	0	*16*	0	156	20	196	2	*374*
Peak Hr	**81**	**68**	**47**	**13**	**0**	***209***	**1**	**2**	**4**	**5**	**0**	***12***	**0**	**78**	**12**	**100**	**2**	***192***

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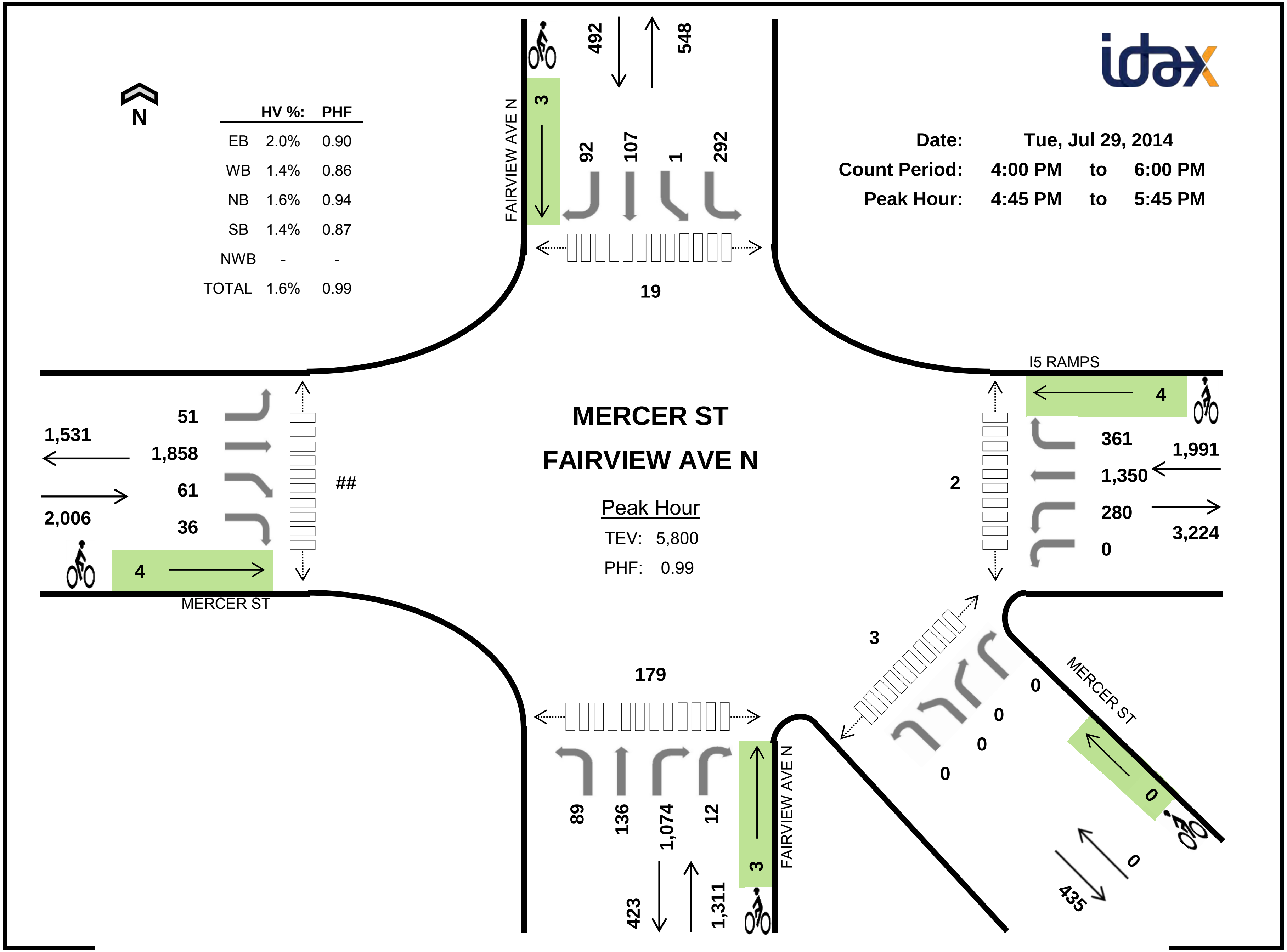

	HV %:	PHF
EB	2.0%	0.90
WB	1.4%	0.86
NB	1.6%	0.94
SB	1.4%	0.87
NWB	-	-
TOTAL	1.6%	0.99

Date:	Tue, Jul 29, 2014		
Count Period:	4:00 PM	to	6:00 PM
Peak Hour:	4:45 PM	to	5:45 PM

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Two-Hour Count Summaries

Interval Start	MERCER ST Eastbound				I5 RAMPS Westbound				FAIRVIEW AVE N Northbound				FAIRVIEW AVE N Southbound				MERCER ST Northwestbound				15-min Total	Rolling One Hour
	LT	TH	BR	RT	HL	LT	TH	RT	LT	TH	RT	HR	LT	BL	TH	RT	HL	BL	BR	HR		
4:00 PM	9	442	14	5	0	75	254	65	18	34	257	2	51	0	36	26	0	0	0	0	1,288	
4:15 PM	7	373	7	4	0	75	341	65	13	50	271	0	40	0	24	34	0	0	0	0	1,304	
4:30 PM	11	467	11	9	0	59	291	87	15	42	229	0	54	0	36	26	0	0	0	0	1,337	
4:45 PM	**8**	**439**	**15**	**4**	**0**	**70**	**325**	**99**	**33**	**30**	**281**	**4**	**66**	**0**	**25**	**28**	**0**	**0**	**0**	**0**	**1,427**	5,356
5:00 PM	**19**	**506**	**17**	**16**	**0**	**52**	**339**	**77**	**13**	**38**	**254**	**5**	**66**	**1**	**25**	**23**	**0**	**0**	**0**	**0**	**1,451**	5,519
5:15 PM	**15**	**495**	**15**	**11**	**0**	**74**	**282**	**92**	**24**	**33**	**267**	**2**	**90**	**0**	**31**	**21**	**0**	**0**	**0**	**0**	**1,452**	5,667
5:30 PM	**9**	**418**	**14**	**5**	**0**	**84**	**404**	**93**	**19**	**35**	**272**	**1**	**70**	**0**	**26**	**20**	**0**	**0**	**0**	**0**	**1,470**	**5,800**
5:45 PM	14	458	9	11	0	73	300	106	25	30	222	2	74	0	32	39	0	0	0	0	1,395	5,768
Count Total	92	3,598	102	65	0	562	2,536	684	160	292	2,053	16	511	1	235	217	0	0	0	0	11,124	
Peak Hr	**51**	**1,858**	**61**	**36**	**0**	**280**	**1,350**	**361**	**89**	**136**	**1,074**	**12**	**292**	**1**	**107**	**92**	**0**	**0**	**0**	**0**	**5,800**	

Note: Two-hour count summary volumes include heavy vehicles but excludes bicycles in overall count.

Interval Start	Heavy Vehicle Totals						Bicycles						Pedestrians (Crossing Leg)					
	EB	WB	NB	SB	NWB	Total	EB	WB	NB	SB	NWB	Total	East	West	North	South	SE	Total
4:00 PM	11	11	5	2	0	*29*	0	0	1	0	0	*1*	0	23	4	23	3	*53*
4:15 PM	12	7	9	2	0	*30*	0	0	1	2	0	*3*	0	26	7	21	1	*55*
4:30 PM	13	10	7	1	0	*31*	0	0	1	2	0	*3*	0	19	2	16	0	*37*
4:45 PM	**10**	**7**	**9**	**2**	**0**	***28***	**1**	**0**	**3**	**2**	**0**	***6***	**1**	**27**	**6**	**30**	**0**	***64***
5:00 PM	**10**	**5**	**5**	**2**	**0**	***22***	**0**	**0**	**0**	**1**	**0**	***1***	**1**	**25**	**3**	**47**	**0**	***76***
5:15 PM	**13**	**10**	**4**	**1**	**0**	***28***	**1**	**0**	**0**	**0**	**0**	***1***	**0**	**48**	**3**	**46**	**3**	***100***
5:30 PM	**7**	**5**	**3**	**2**	**0**	***17***	**2**	**0**	**0**	**0**	**0**	***2***	**0**	**39**	**7**	**56**	**0**	***102***
5:45 PM	13	5	6	2	0	*26*	0	0	0	1	0	*1*	0	30	6	33	1	*70*
Count Total	89	60	48	14	0	*211*	4	0	6	8	0	*18*	2	237	38	272	8	*557*
Peak Hr	**40**	**27**	**21**	**7**	**0**	***95***	**4**	**0**	**3**	**3**	**0**	***10***	**2**	**139**	**19**	**179**	**3**	***342***

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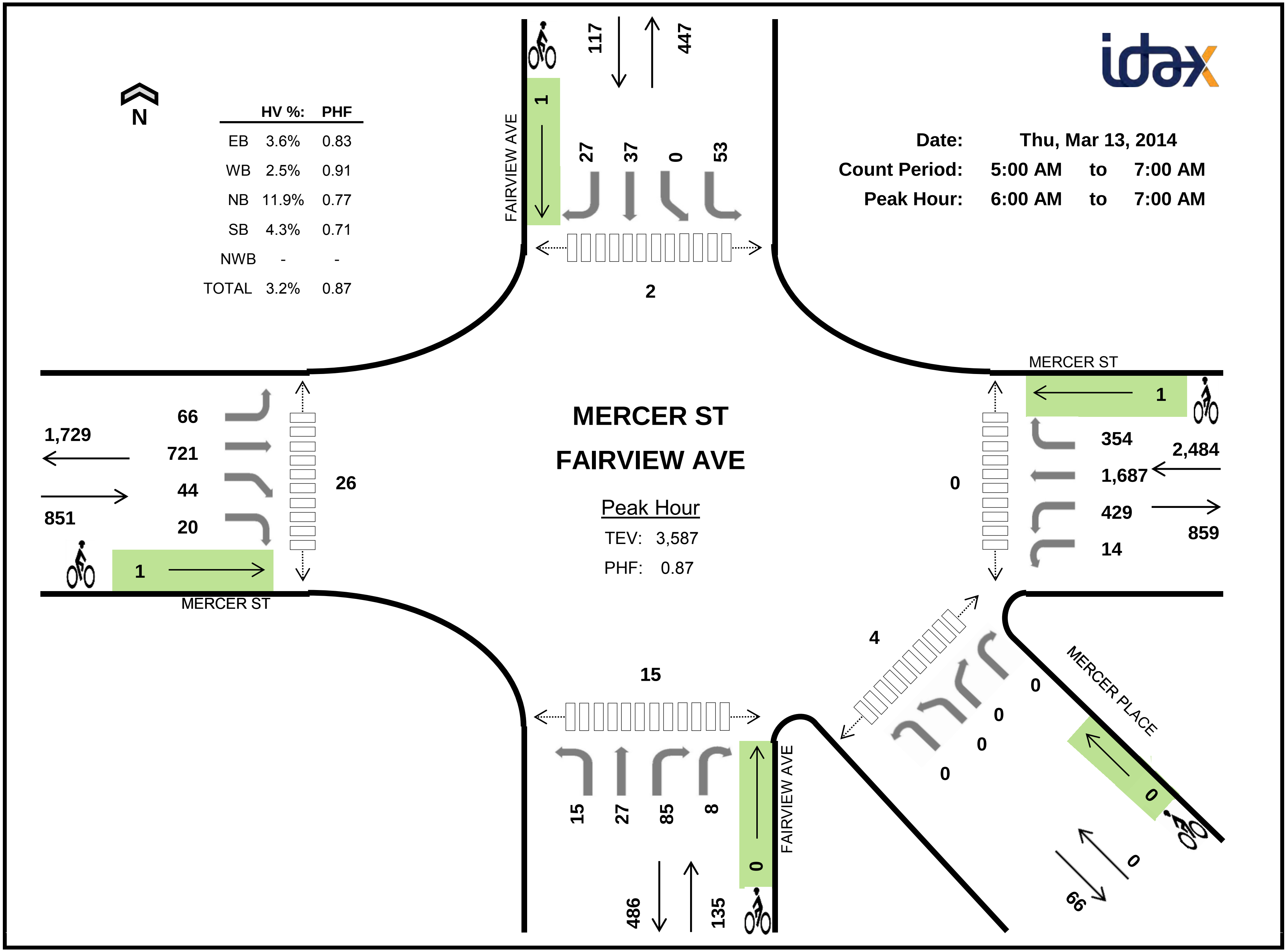

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Two-Hour Count Summaries

Interval Start	MERCER ST Eastbound				MERCER ST Westbound				FAIRVIEW AVE Northbound				FAIRVIEW AVE Southbound				MERCER PLACE Northwestbound				15-min Total	Rolling One Hour
	LT	TH	BR	RT	HL	LT	TH	RT	LT	TH	RT	HR	LT	BL	TH	RT	HL	BL	BR	HR		
5:00 AM	1	57	4	0	3	18	111	16	1	5	2	0	4	0	4	1	0	0	0	0	227	
5:15 AM	6	76	6	0	2	30	212	23	1	3	5	1	3	0	1	1	0	0	0	0	370	
5:30 AM	5	117	4	0	3	41	311	50	3	3	5	1	5	0	2	3	0	0	0	0	553	
5:45 AM	13	133	9	3	1	73	394	63	1	9	6	0	5	0	2	4	0	0	0	0	716	1,866
6:00 AM	**10**	**155**	**5**	**5**	**2**	**89**	**380**	**79**	**3**	**4**	**12**	**2**	**13**	**0**	**6**	**5**	**0**	**0**	**0**	**0**	**770**	2,409
6:15 AM	**7**	**156**	**15**	**6**	**1**	**81**	**408**	**108**	**3**	**5**	**18**	**1**	**16**	**0**	**8**	**4**	**0**	**0**	**0**	**0**	**837**	2,876
6:30 AM	**21**	**211**	**3**	**0**	**5**	**130**	**438**	**78**	**5**	**9**	**25**	**4**	**9**	**0**	**10**	**5**	**0**	**0**	**0**	**0**	**953**	3,276
6:45 AM	**28**	**199**	**21**	**9**	**6**	**129**	**461**	**89**	**4**	**9**	**30**	**1**	**15**	**0**	**13**	**13**	**0**	**0**	**0**	**0**	**1,027**	**3,587**
Count Total	91	1,104	67	23	23	591	2,715	506	21	47	103	10	70	0	46	36	0	0	0	0	5,453	
Peak Hr	**66**	**721**	**44**	**20**	**14**	**429**	**1,687**	**354**	**15**	**27**	**85**	**8**	**53**	**0**	**37**	**27**	**0**	**0**	**0**	**0**	**3,587**	

Note: Two-hour count summary volumes include heavy vehicles but excludes bicycles in overall count.

Interval Start	Heavy Vehicle Totals						Bicycles						Pedestrians (Crossing Leg)					
	EB	WB	NB	SB	NWB	Total	EB	WB	NB	SB	NWB	Total	East	West	North	South	SE	Total
5:00 AM	0	9	1	1	0	*11*	0	0	0	0	0	*0*	0	0	0	1	0	*1*
5:15 AM	5	13	1	0	0	*19*	0	0	0	0	0	*0*	0	3	0	0	0	*3*
5:30 AM	8	12	1	1	0	*22*	1	0	0	0	0	*1*	0	2	0	4	4	*10*
5:45 AM	4	5	4	0	0	*13*	1	0	0	0	0	*1*	0	3	2	2	1	*8*
6:00 AM	**5**	**19**	**1**	**1**	**0**	***26***	**0**	**1**	**0**	**0**	**0**	***1***	**0**	**7**	**1**	**1**	**1**	***10***
6:15 AM	**16**	**22**	**3**	**1**	**0**	***42***	**0**	**0**	**0**	**0**	**0**	***0***	**0**	**5**	**1**	**4**	**0**	***10***
6:30 AM	**9**	**12**	**7**	**1**	**0**	***29***	**0**	**0**	**0**	**0**	**0**	***0***	**0**	**8**	**0**	**3**	**0**	***11***
6:45 AM	**1**	**10**	**5**	**2**	**0**	***18***	**1**	**0**	**0**	**1**	**0**	***2***	**0**	**6**	**0**	**7**	**3**	***16***
Count Total	48	102	23	7	0	*180*	3	1	0	1	0	*5*	0	34	4	22	9	*69*
Peak Hr	**31**	**63**	**16**	**5**	**0**	***115***	**1**	**1**	**0**	**1**	**0**	***3***	**0**	**26**	**2**	**15**	**4**	*47*

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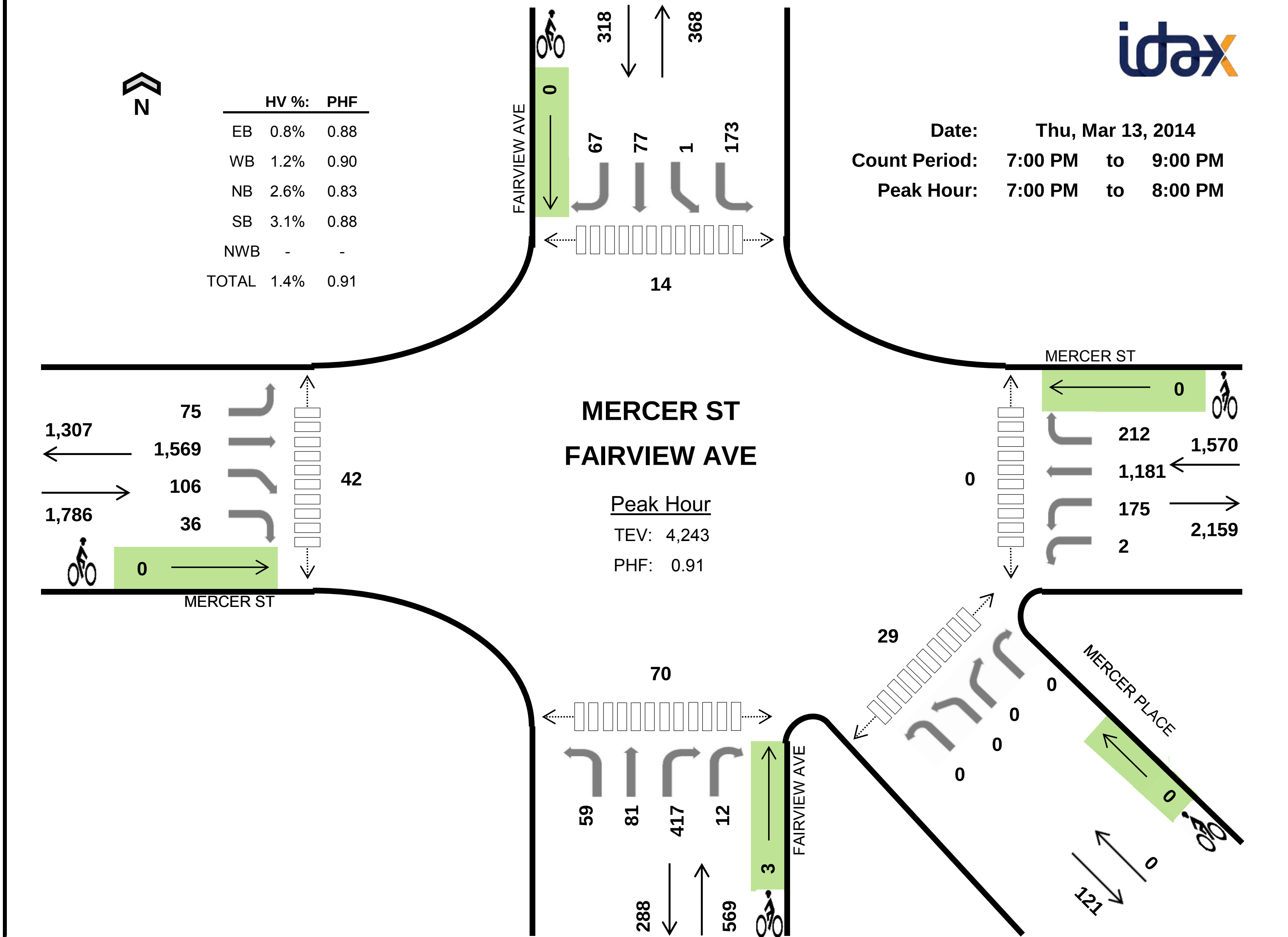
	HV %:	PHF
EB	0.8%	0.88
WB	1.2%	0.90
NB	2.6%	0.83
SB	3.1%	0.88
NWB	-	-
TOTAL	1.4%	0.91

Date: Thu, Mar 13, 2014
Count Period: 7:00 PM to 9:00 PM
Peak Hour: 7:00 PM to 8:00 PM



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Two-Hour Count Summaries

Interval Start	MERCER ST Eastbound				MERCER ST Westbound				FAIRVIEW AVE Northbound				FAIRVIEW AVE Southbound				MERCER PLACE Northwestbound				15-min Total	Rolling One Hour
	LT	TH	BR	RT	HL	LT	TH	RT	LT	TH	RT	HR	LT	BL	TH	RT	HL	BL	BR	HR		
7:00 PM	**17**	**396**	**22**	**5**	**0**	**53**	**318**	**49**	**16**	**25**	**125**	**5**	**41**	**0**	**23**	**20**	**0**	**0**	**0**	**0**	**1,115**	
7:15 PM	**26**	**434**	**35**	**11**	**1**	**42**	**321**	**72**	**13**	**17**	**100**	**1**	**55**	**0**	**21**	**14**	**0**	**0**	**0**	**0**	**1,163**	
7:30 PM	**16**	**392**	**29**	**8**	**0**	**28**	**277**	**46**	**14**	**22**	**98**	**2**	**40**	**0**	**13**	**15**	**0**	**0**	**0**	**0**	**1,000**	
7:45 PM	**16**	**347**	**20**	**12**	**1**	**52**	**265**	**45**	**16**	**17**	**94**	**4**	**37**	**1**	**20**	**18**	**0**	**0**	**0**	**0**	**965**	**4,243**
8:00 PM	27	331	27	4	2	45	235	31	14	24	76	3	39	0	18	22	0	0	0	1	899	4,027
8:15 PM	21	350	20	4	0	33	245	50	16	28	96	3	35	0	10	15	0	0	0	0	926	3,790
8:30 PM	22	339	20	10	0	43	245	34	13	21	77	1	38	0	9	11	0	0	0	0	883	3,673
8:45 PM	12	288	23	12	1	27	249	32	16	16	52	2	28	0	7	18	0	0	0	0	783	3,491
Count Total	157	2,877	196	66	5	323	2,155	359	118	170	718	21	313	1	121	133	0	0	0	1	7,734	
Peak Hr	**75**	**1,569**	**106**	**36**	**2**	**175**	**1,181**	**212**	**59**	**81**	**417**	**12**	**173**	**1**	**77**	**67**	**0**	**0**	**0**	**0**	**4,243**	

Note: Two-hour count summary volumes include heavy vehicles but excludes bicycles in overall count.

Interval Start	Heavy Vehicle Totals						Bicycles						Pedestrians (Crossing Leg)					
	EB	WB	NB	SB	NWB	Total	EB	WB	NB	SB	NWB	Total	East	West	North	South	SE	Total
7:00 PM	**5**	**6**	**5**	**4**	**0**	***20***	**0**	**0**	**2**	**0**	**0**	***2***	**0**	**14**	**5**	**13**	**7**	***39***
7:15 PM	**3**	**3**	**3**	**2**	**0**	***11***	**0**	**0**	**0**	**0**	**0**	***0***	**0**	**12**	**4**	**21**	**7**	***44***
7:30 PM	**3**	**8**	**4**	**2**	**0**	***17***	**0**	**0**	**0**	**0**	**0**	***0***	**0**	**11**	**5**	**23**	**11**	***50***
7:45 PM	**3**	**2**	**3**	**2**	**0**	***10***	**0**	**0**	**1**	**0**	**0**	***1***	**0**	**5**	**0**	**13**	**4**	***22***
8:00 PM	2	5	1	1	0	*9*	0	0	1	0	0	*1*	0	7	1	2	0	*10*
8:15 PM	3	3	1	1	0	*8*	0	0	0	0	0	*0*	0	7	2	8	0	*17*
8:30 PM	4	5	3	1	0	*13*	0	0	0	0	0	*0*	0	6	1	8	0	*15*
8:45 PM	4	4	2	1	0	*11*	0	0	2	0	0	*2*	0	5	2	7	0	*14*
Count Total	27	36	22	14	0	*99*	0	0	6	0	0	*6*	0	67	20	95	29	*211*
Peak Hr	**14**	**19**	**15**	**10**	**0**	***58***	**0**	**0**	**3**	**0**	**0**	***3***	**0**	**42**	**14**	**70**	**29**	*155*

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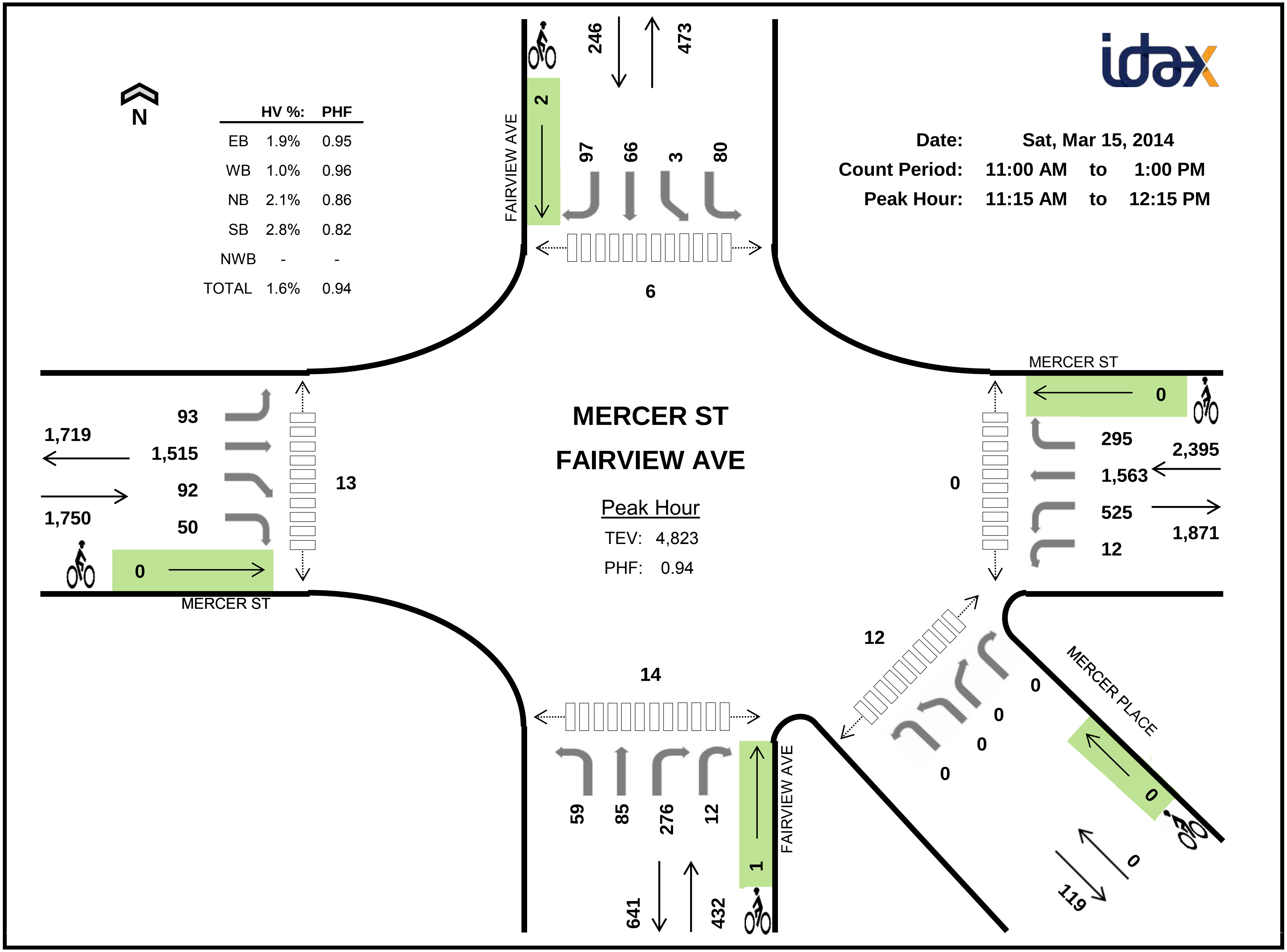

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Two-Hour Count Summaries

Interval Start	MERCER ST Eastbound				MERCER ST Westbound				FAIRVIEW AVE Northbound				FAIRVIEW AVE Southbound				MERCER PLACE Northwestbound				15-min Total	Rolling One Hour
	LT	TH	BR	RT	HL	LT	TH	RT	LT	TH	RT	HR	LT	BL	TH	RT	HL	BL	BR	HR		
11:00 AM	17	347	24	9	1	142	372	65	11	22	51	1	21	1	12	24	0	0	0	1	1,121	
11:15 AM	**28**	**346**	**19**	**12**	**4**	**133**	**386**	**72**	**13**	**23**	**64**	**0**	**19**	**0**	**13**	**17**	**0**	**0**	**0**	**0**	**1,149**	
11:30 AM	**26**	**403**	**21**	**11**	**0**	**149**	**381**	**67**	**15**	**18**	**59**	**4**	**14**	**0**	**11**	**25**	**0**	**0**	**0**	**0**	**1,204**	
11:45 AM	**16**	**401**	**25**	**14**	**4**	**117**	**414**	**89**	**17**	**23**	**83**	**3**	**19**	**1**	**24**	**31**	**0**	**0**	**0**	**0**	**1,281**	4,755
12:00 PM	**23**	**365**	**27**	**13**	**4**	**126**	**382**	**67**	**14**	**21**	**70**	**5**	**28**	**2**	**18**	**24**	**0**	**0**	**0**	**0**	**1,189**	**4,823**
12:15 PM	22	379	21	11	0	134	276	71	20	37	99	6	19	0	19	22	0	0	0	0	1,136	4,810
12:30 PM	18	319	34	8	1	129	330	90	16	35	98	3	15	0	28	26	0	0	0	1	1,151	4,757
12:45 PM	14	389	33	15	1	125	236	101	27	36	93	1	23	1	30	31	0	0	0	0	1,156	4,632
Count Total	164	2,949	204	93	15	1,055	2,777	622	133	215	617	23	158	5	155	200	0	0	0	2	9,387	
Peak Hr	**93**	**1,515**	**92**	**50**	**12**	**525**	**1,563**	**295**	**59**	**85**	**276**	**12**	**80**	**3**	**66**	**97**	**0**	**0**	**0**	**0**	**4,823**	

Note: Two-hour count summary volumes include heavy vehicles but excludes bicycles in overall count.

Interval Start	Heavy Vehicle Totals						Bicycles						Pedestrians (Crossing Leg)					
	EB	WB	NB	SB	NWB	Total	EB	WB	NB	SB	NWB	Total	East	West	North	South	SE	Total
11:00 AM	1	6	1	1	0	*9*	0	0	0	0	0	*0*	0	2	0	7	2	*11*
11:15 AM	**9**	**8**	**3**	**2**	**0**	***22***	**0**	**0**	**1**	**0**	**0**	***1***	**0**	**2**	**0**	**2**	**1**	***5***
11:30 AM	**8**	**6**	**2**	**2**	**0**	***18***	**0**	**0**	**0**	**2**	**0**	***2***	**0**	**1**	**0**	**3**	**3**	***7***
11:45 AM	**10**	**6**	**3**	**2**	**0**	***21***	**0**	**0**	**0**	**0**	**0**	***0***	**0**	**8**	**2**	**9**	**8**	***27***
12:00 PM	**7**	**5**	**1**	**1**	**0**	***14***	**0**	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**4**	**0**	**0**	***6***
12:15 PM	6	3	3	2	0	*14*	0	0	0	0	0	*0*	0	11	1	4	4	*20*
12:30 PM	6	2	2	2	0	*12*	0	0	0	0	0	*0*	0	3	1	5	1	*10*
12:45 PM	4	4	2	2	0	*12*	0	0	0	0	0	*0*	0	3	0	10	3	*16*
Count Total	51	40	17	14	0	*122*	0	0	1	2	0	*3*	0	32	8	40	22	*102*
Peak Hr	**34**	**25**	**9**	**7**	**0**	***75***	**0**	**0**	**1**	**2**	**0**	***3***	**0**	**13**	**6**	**14**	**12**	*45*

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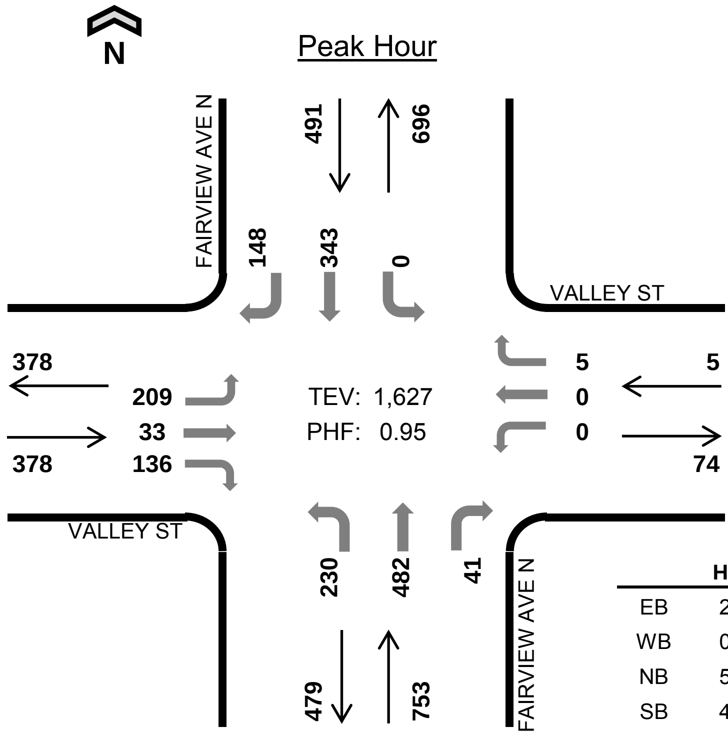
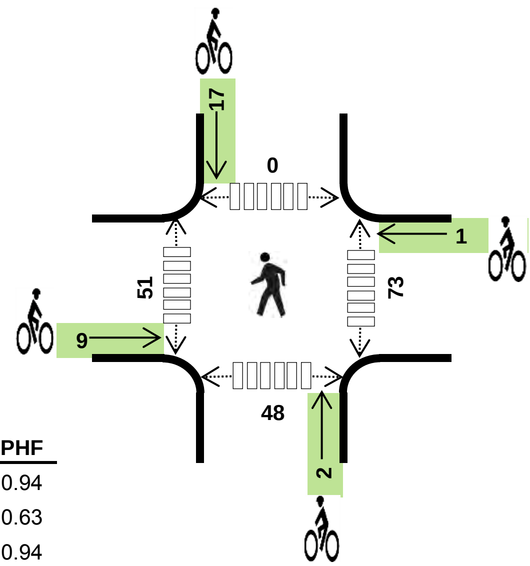
FAIRVIEW AVE N
VALLEY ST

Date: Tue, Jul 29, 2014
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM





	HV %:	PHF
EB	2.4%	0.94
WB	0.0%	0.63
NB	5.3%	0.94
SB	4.1%	0.92
TOTAL	4.2%	0.95

Two-Hour Count Summaries

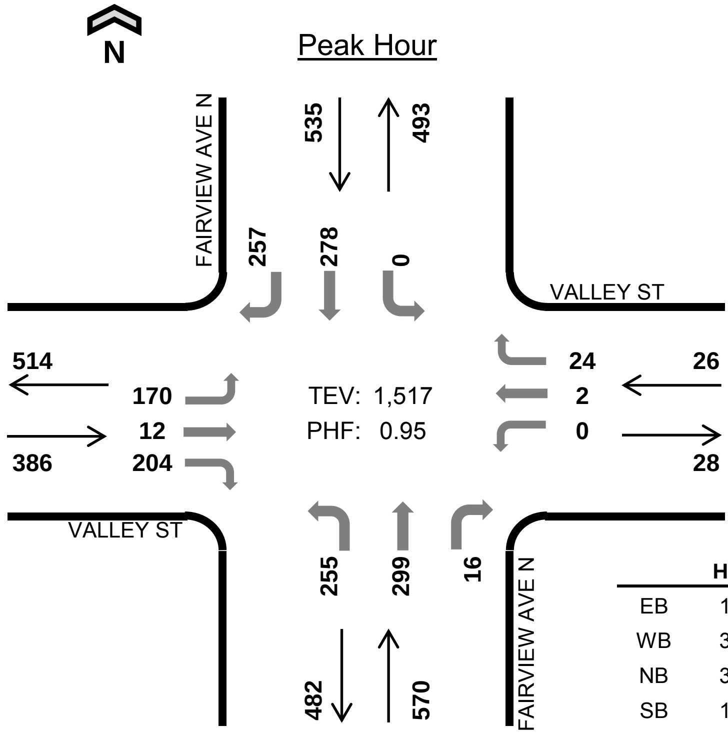
Interval Start	VALLEY ST Eastbound			VALLEY ST Westbound			FAIRVIEW AVE N Northbound			FAIRVIEW AVE N Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	25	6	14	0	0	0	44	122	17	0	43	17	288	
7:15 AM	35	3	18	0	0	0	33	119	14	0	46	17	285	
7:30 AM	35	6	30	0	0	0	50	149	17	0	73	25	385	
7:45 AM	65	6	18	0	0	0	61	134	10	0	65	25	384	1,342
8:00 AM	**44**	**6**	**39**	**0**	**0**	**2**	**65**	**121**	**14**	**0**	**83**	**28**	**402**	1,456
8:15 AM	**50**	**5**	**34**	**0**	**0**	**1**	**54**	**125**	**6**	**0**	**82**	**32**	**389**	1,560
8:30 AM	**58**	**14**	**29**	**0**	**0**	**1**	**62**	**119**	**11**	**0**	**90**	**43**	**427**	1,602
8:45 AM	**57**	**8**	**34**	**0**	**0**	**1**	**49**	**117**	**10**	**0**	**88**	**45**	**409**	**1,627**
Count Total	369	54	216	0	0	5	418	1,006	99	0	570	232	2,969	
Peak Hr	**209**	**33**	**136**	**0**	**0**	**5**	**230**	**482**	**41**	**0**	**343**	**148**	**1,627**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

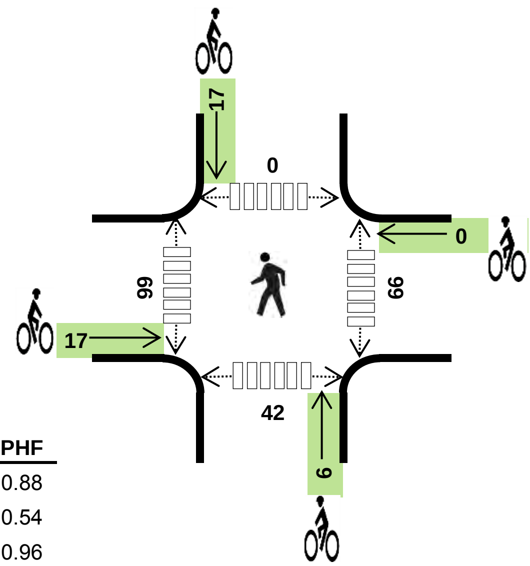
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	1	0	9	3	*13*	1	0	2	3	*6*	8	15	0	2	*25*
7:15 AM	1	0	6	8	*15*	1	0	0	4	*5*	8	18	0	2	*28*
7:30 AM	1	0	6	5	*12*	2	0	0	10	*12*	17	14	0	2	*33*
7:45 AM	1	0	2	4	*7*	4	0	0	3	*7*	19	16	0	1	*36*
8:00 AM	**2**	**0**	**12**	**7**	***21***	**0**	**1**	**0**	**6**	***7***	**13**	**17**	**0**	**15**	***45***
8:15 AM	**3**	**0**	**11**	**2**	***16***	**3**	**0**	**2**	**6**	***11***	**25**	**10**	**0**	**15**	***50***
8:30 AM	**3**	**0**	**9**	**6**	***18***	**1**	**0**	**0**	**3**	***4***	**19**	**13**	**0**	**10**	***42***
8:45 AM	**1**	**0**	**8**	**5**	***14***	**5**	**0**	**0**	**2**	***7***	**16**	**11**	**0**	**8**	***35***
Count Total	13	0	63	40	*116*	17	1	4	37	*59*	125	114	0	55	*294*
Peak Hr	**9**	**0**	**40**	**20**	***69***	**9**	**1**	**2**	**17**	***29***	**73**	**51**	**0**	**48**	***172***

FAIRVIEW AVE N
VALLEY ST

Date: Tue, Jul 29, 2014
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	1.0%	0.88
WB	3.8%	0.54
NB	3.2%	0.96
SB	1.5%	0.86
TOTAL	2.0%	0.95



Two-Hour Count Summaries

Interval Start	VALLEY ST Eastbound LT	TH	RT	VALLEY ST Westbound LT	TH	RT	FAIRVIEW AVE N Northbound LT	TH	RT	FAIRVIEW AVE N Southbound LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	31	3	35	0	1	0	48	58	2	0	85	56	319	
4:15 PM	30	0	40	0	0	0	56	65	4	0	91	52	338	
4:30 PM	**48**	**4**	**46**	**0**	**1**	**3**	**72**	**65**	**4**	**0**	**86**	**70**	**399**	
4:45 PM	**46**	**6**	**53**	**0**	**0**	**2**	**66**	**79**	**4**	**0**	**69**	**70**	**395**	1,451
5:00 PM	**30**	**1**	**42**	**0**	**1**	**11**	**55**	**83**	**2**	**0**	**62**	**59**	**346**	1,478
5:15 PM	**46**	**1**	**63**	**0**	**0**	**8**	**62**	**72**	**6**	**0**	**61**	**58**	**377**	**1,517**
5:30 PM	65	3	46	0	0	1	71	67	1	0	67	72	393	1,511
5:45 PM	45	2	29	0	0	0	78	78	2	2	90	48	374	1,490
Count Total	341	20	354	0	3	25	508	567	25	2	611	485	2,941	
Peak Hr	**170**	**12**	**204**	**0**	**2**	**24**	**255**	**299**	**16**	**0**	**278**	**257**	**1,517**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	2	0	4	2	*8*	1	0	2	0	*3*	18	26	0	4	*48*
4:15 PM	1	0	6	2	*9*	3	0	1	0	*4*	6	18	0	2	*26*
4:30 PM	**2**	**0**	**5**	**1**	***8***	**3**	**0**	**0**	**0**	***3***	**15**	**17**	**0**	**5**	***37***
4:45 PM	**0**	**0**	**6**	**2**	***8***	**5**	**0**	**2**	**1**	***8***	**11**	**23**	**0**	**0**	***34***
5:00 PM	**1**	**1**	**4**	**3**	***9***	**8**	**0**	**1**	**9**	***18***	**17**	**30**	**0**	**17**	***64***
5:15 PM	**1**	**0**	**3**	**2**	***6***	**1**	**0**	**3**	**7**	***11***	**23**	**29**	**0**	**20**	***72***
5:30 PM	1	0	4	4	*9*	13	0	5	8	*26*	20	36	0	15	*71*
5:45 PM	1	0	3	2	*6*	6	1	2	3	*12*	24	24	0	19	*67*
Count Total	9	1	35	18	*63*	40	1	16	28	*85*	134	203	0	82	*419*
Peak Hr	**4**	**1**	**18**	**8**	***31***	**17**	**0**	**6**	**17**	***40***	**66**	**99**	**0**	**42**	***207***

Mark Skaggs: 425 - 250 - 0777
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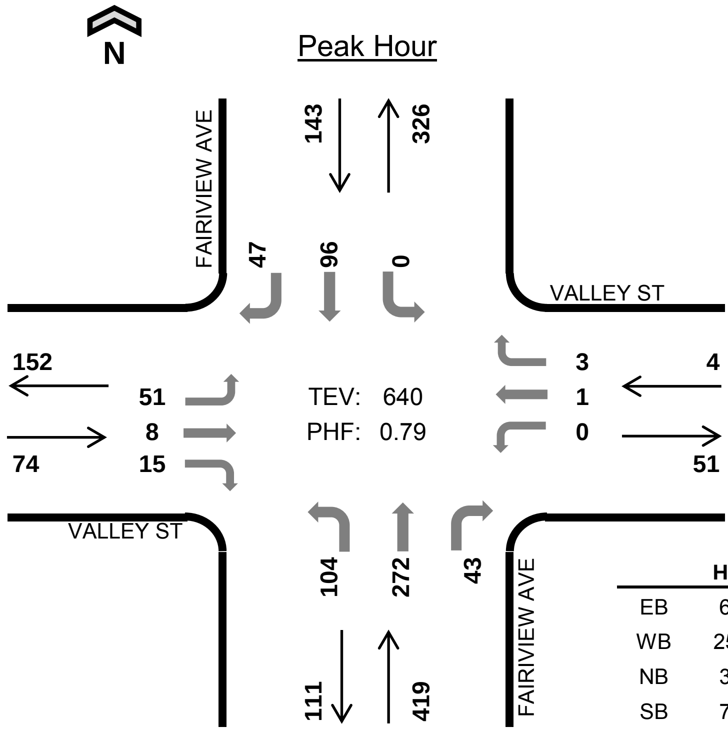
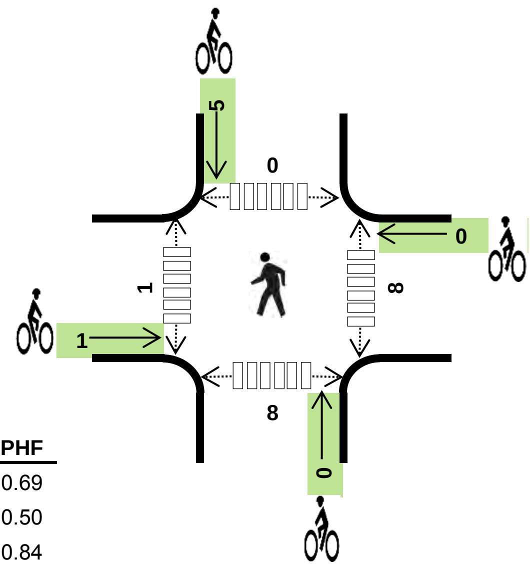
FAIRIVIEW AVE
VALLEY ST

Date: Thu, Mar 13, 2014
Count Period: 5:00 AM to 7:00 AM
Peak Hour: 6:00 AM to 7:00 AM





	HV %:	PHF
EB	6.8%	0.69
WB	25.0%	0.50
NB	3.3%	0.84
SB	7.0%	0.72
TOTAL	4.7%	0.79

Two-Hour Count Summaries

Interval Start	VALLEY ST Eastbound			VALLEY ST Westbound			FAIRIVIEW AVE Northbound			FAIRIVIEW AVE Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
5:00 AM	1	0	2	0	0	0	5	13	3	0	5	6	35	
5:15 AM	2	0	0	0	0	0	5	25	0	0	6	3	41	
5:30 AM	6	0	1	0	0	0	11	40	2	0	9	5	74	
5:45 AM	8	0	0	0	0	2	23	48	5	0	11	5	102	252
6:00 AM	**9**	**4**	**3**	**0**	**0**	**1**	**23**	**60**	**5**	**0**	**21**	**5**	**131**	348
6:15 AM	**5**	**3**	**3**	**0**	**1**	**0**	**40**	**59**	**13**	**0**	**20**	**12**	**156**	463
6:30 AM	**18**	**0**	**2**	**0**	**0**	**0**	**23**	**64**	**8**	**0**	**21**	**14**	**150**	539
6:45 AM	**19**	**1**	**7**	**0**	**0**	**2**	**18**	**89**	**17**	**0**	**34**	**16**	**203**	**640**
Count Total	68	8	18	0	1	5	148	398	53	0	127	66	892	
Peak Hr	**51**	**8**	**15**	**0**	**1**	**3**	**104**	**272**	**43**	**0**	**96**	**47**	**640**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
5:00 AM	0	0	1	1	*2*	0	0	0	0	*0*	0	0	0	0	*0*
5:15 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	1	*1*
5:30 AM	1	0	2	1	*4*	0	0	0	2	*2*	1	0	0	1	*2*
5:45 AM	2	0	3	1	*6*	0	0	0	0	*0*	0	0	0	0	*0*
6:00 AM	**1**	**0**	**4**	**4**	***9***	**0**	**0**	**0**	**0**	***0***	**3**	**1**	**0**	**3**	***7***
6:15 AM	**1**	**0**	**4**	**1**	***6***	**1**	**0**	**0**	**1**	***2***	**4**	**0**	**0**	**3**	***7***
6:30 AM	**2**	**0**	**3**	**2**	***7***	**0**	**0**	**0**	**1**	***1***	**1**	**0**	**0**	**2**	***3***
6:45 AM	**1**	**1**	**3**	**3**	***8***	**0**	**0**	**0**	**3**	***3***	**0**	**0**	**0**	**0**	***0***
Count Total	8	1	20	13	*42*	1	0	0	7	*8*	9	1	0	10	*20*
Peak Hr	**5**	**1**	**14**	**10**	***30***	**1**	**0**	**0**	**5**	***6***	**8**	**1**	**0**	**8**	***17***

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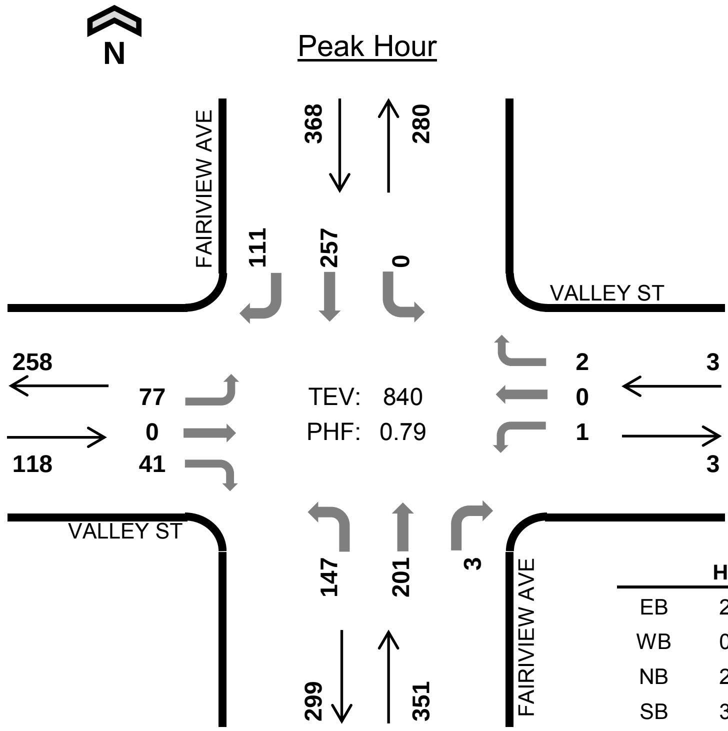
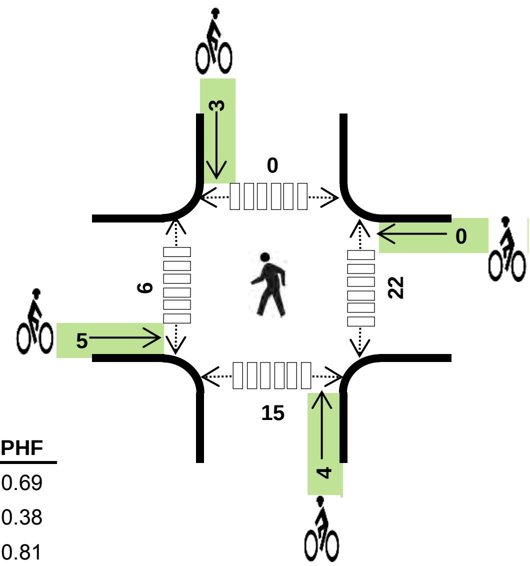
FAIRIVIEW AVE
VALLEY ST

Date: Thu, Mar 13, 2014
Count Period: 7:00 PM to 9:00 PM
Peak Hour: 7:00 PM to 8:00 PM





	HV %:	PHF
EB	2.5%	0.69
WB	0.0%	0.38
NB	2.3%	0.81
SB	3.8%	0.81
TOTAL	3.0%	0.79

Two-Hour Count Summaries

Interval Start	VALLEY ST Eastbound			VALLEY ST Westbound			FAIRIVIEW AVE Northbound			FAIRIVIEW AVE Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 PM	**21**	**0**	**9**	**0**	**0**	**0**	**34**	**50**	**2**	**0**	**71**	**28**	**215**	
7:15 PM	**29**	**0**	**14**	**0**	**0**	**2**	**44**	**63**	**1**	**0**	**76**	**37**	**266**	
7:30 PM	**13**	**0**	**9**	**0**	**0**	**0**	**32**	**51**	**0**	**0**	**50**	**24**	**179**	
7:45 PM	**14**	**0**	**9**	**1**	**0**	**0**	**37**	**37**	**0**	**0**	**60**	**22**	**180**	**840**
8:00 PM	16	0	5	0	0	2	29	48	1	0	69	26	196	821
8:15 PM	18	0	4	0	0	0	46	53	1	0	62	23	207	762
8:30 PM	11	0	3	0	0	1	21	54	0	0	49	15	154	737
8:45 PM	15	0	3	0	0	0	23	38	1	0	55	21	156	713
Count Total	137	0	56	1	0	5	266	394	6	0	492	196	1,553	
Peak Hr	**77**	**0**	**41**	**1**	**0**	**2**	**147**	**201**	**3**	**0**	**257**	**111**	**840**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 PM	**0**	**0**	**2**	**5**	***7***	**3**	**0**	**3**	**3**	***9***	**4**	**3**	**0**	**0**	***7***
7:15 PM	**1**	**0**	**2**	**4**	***7***	**2**	**0**	**0**	**0**	***2***	**7**	**1**	**0**	**9**	***17***
7:30 PM	**1**	**0**	**3**	**2**	***6***	**0**	**0**	**0**	**0**	***0***	**10**	**0**	**0**	**2**	***12***
7:45 PM	**1**	**0**	**1**	**3**	***5***	**0**	**0**	**1**	**0**	***1***	**1**	**2**	**0**	**4**	***7***
8:00 PM	1	0	1	2	*4*	1	0	1	0	*2*	7	1	0	5	*13*
8:15 PM	3	0	3	3	*9*	0	0	0	0	*0*	6	1	0	5	*12*
8:30 PM	0	0	2	2	*4*	0	0	0	1	*1*	2	1	0	3	*6*
8:45 PM	1	0	1	4	*6*	0	0	0	0	*0*	2	0	0	0	*2*
Count Total	8	0	15	25	*48*	6	0	5	4	*15*	39	9	0	28	*76*
Peak Hr	**3**	**0**	**8**	**14**	***25***	**5**	**0**	**4**	**3**	***12***	**22**	**6**	**0**	**15**	***43***

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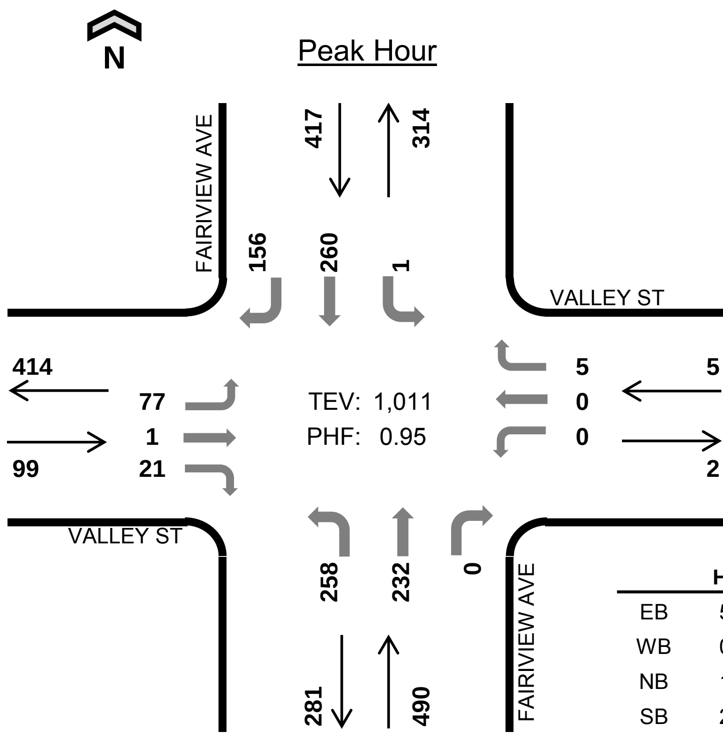
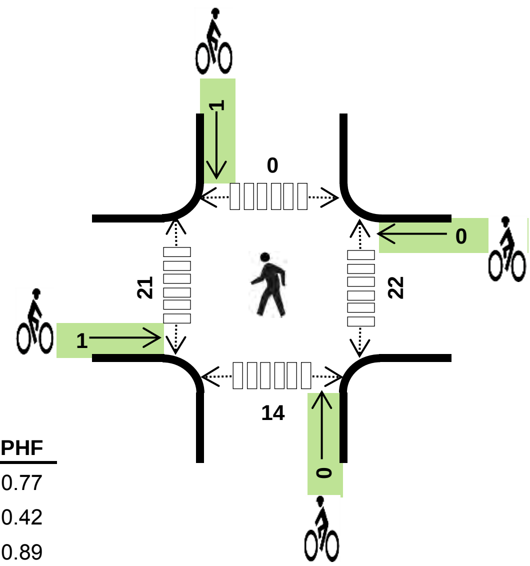
FAIRIVIEW AVE
VALLEY ST

Date: Sat, Mar 15, 2014
Count Period: 11:00 AM to 1:00 PM
Peak Hour: 12:00 PM to 1:00 PM



	HV %:	PHF
EB	5.1%	0.77
WB	0.0%	0.42
NB	1.0%	0.89
SB	2.9%	0.88
TOTAL	2.2%	0.95



Two-Hour Count Summaries

Interval Start	VALLEY ST Eastbound LT	TH	RT	VALLEY ST Westbound LT	TH	RT	FAIRIVIEW AVE Northbound LT	TH	RT	FAIRIVIEW AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
11:00 AM	16	1	6	3	0	3	53	59	0	0	50	26	217	
11:15 AM	27	0	3	0	0	6	42	71	0	0	49	28	226	
11:30 AM	21	0	4	0	0	2	51	60	0	0	53	27	218	
11:45 AM	16	0	7	1	0	1	70	62	0	0	66	21	244	905
12:00 PM	**19**	**1**	**12**	**0**	**0**	**1**	**52**	**52**	**0**	**1**	**59**	**25**	**222**	910
12:15 PM	**26**	**0**	**1**	**0**	**0**	**0**	**63**	**62**	**0**	**0**	**62**	**49**	**263**	947
12:30 PM	**13**	**0**	**5**	**0**	**0**	**1**	**74**	**64**	**0**	**0**	**61**	**41**	**259**	988
12:45 PM	**19**	**0**	**3**	**0**	**0**	**3**	**69**	**54**	**0**	**0**	**78**	**41**	**267**	**1,011**
Count Total	157	2	41	4	0	17	474	484	0	1	478	258	1,916	
Peak Hr	**77**	**1**	**21**	**0**	**0**	**5**	**258**	**232**	**0**	**1**	**260**	**156**	**1,011**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
11:00 AM	1	0	4	2	*7*	2	0	0	0	*2*	1	2	0	0	*3*
11:15 AM	1	1	1	3	*6*	2	0	1	0	*3*	4	2	0	1	*7*
11:30 AM	1	0	2	3	*6*	0	0	0	2	*2*	1	0	0	1	*2*
11:45 AM	1	2	3	2	*8*	2	0	0	0	*2*	2	3	0	0	*5*
12:00 PM	**2**	**0**	**3**	**2**	***7***	**0**	**0**	**0**	**0**	***0***	**7**	**2**	**0**	**6**	***15***
12:15 PM	**1**	**0**	**1**	**3**	***5***	**1**	**0**	**0**	**0**	***1***	**5**	**10**	**0**	**3**	***18***
12:30 PM	**1**	**0**	**1**	**3**	***5***	**0**	**0**	**0**	**1**	***1***	**5**	**3**	**0**	**4**	***12***
12:45 PM	**1**	**0**	**0**	**4**	***5***	**0**	**0**	**0**	**0**	***0***	**5**	**6**	**0**	**1**	***12***
Count Total	9	3	15	22	*49*	7	0	1	3	*11*	30	28	0	16	*74*
Peak Hr	**5**	**0**	**5**	**12**	***22***	**1**	**0**	**0**	**1**	***2***	**22**	**21**	**0**	**14**	***57***

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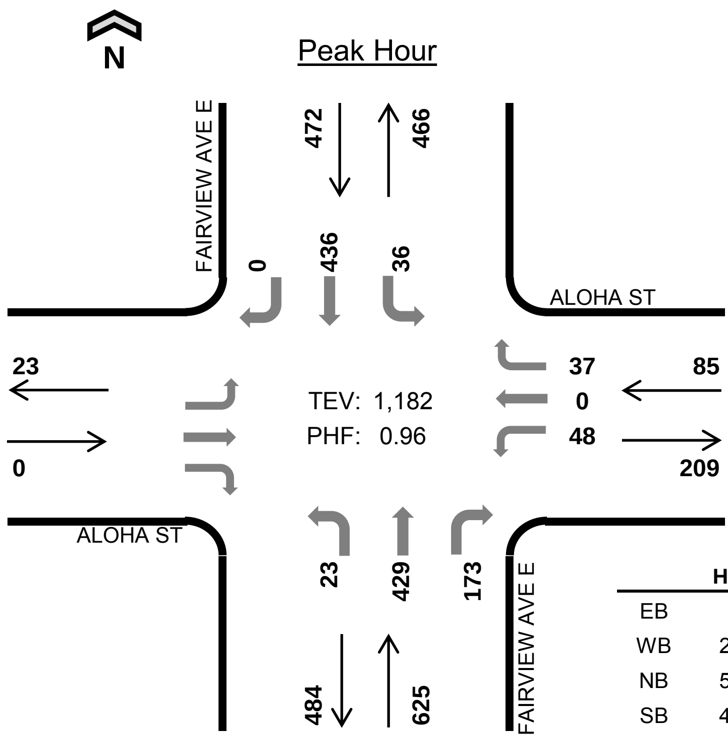
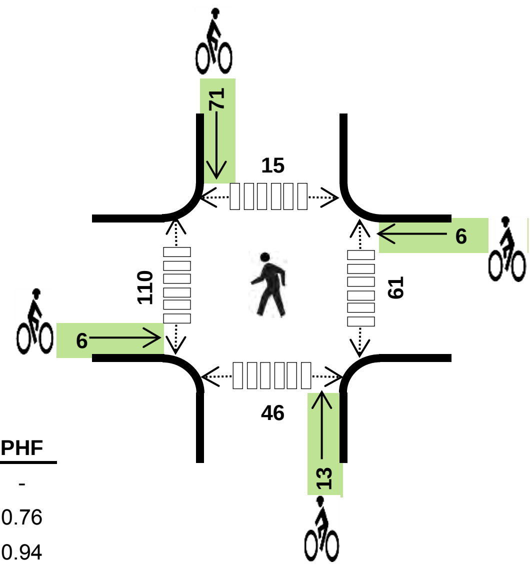
FAIRVIEW AVE E
ALOHA ST

Date: Tue, Jul 29, 2014
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM





	HV %:	PHF
EB	-	-
WB	2.4%	0.76
NB	5.3%	0.94
SB	4.4%	0.90
TOTAL	4.7%	0.96

Two-Hour Count Summaries

Interval Start	ALOHA ST Eastbound LT	TH	RT	ALOHA ST Westbound LT	TH	RT	FAIRVIEW AVE E Northbound LT	TH	RT	FAIRVIEW AVE E Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	0	0	1	7	0	4	3	93	54	4	50	0	216	
7:15 AM	0	0	1	11	0	7	1	96	54	4	51	1	226	
7:30 AM	0	0	0	17	0	8	3	117	48	7	81	0	281	
7:45 AM	0	0	0	8	0	7	0	133	50	8	72	1	279	1,002
8:00 AM	**0**	**0**	**0**	**16**	**0**	**7**	**6**	**100**	**41**	**6**	**96**	**0**	**272**	1,058
8:15 AM	**0**	**0**	**0**	**14**	**0**	**14**	**4**	**111**	**51**	**11**	**103**	**0**	**308**	1,140
8:30 AM	**0**	**0**	**0**	**6**	**0**	**6**	**8**	**106**	**44**	**10**	**121**	**0**	**301**	1,160
8:45 AM	**0**	**0**	**0**	**12**	**0**	**10**	**5**	**112**	**37**	**9**	**116**	**0**	**301**	**1,182**
Count Total	0	0	2	91	0	63	30	868	379	59	690	2	2,184	
Peak Hr	**0**	**0**	**0**	**48**	**0**	**37**	**23**	**429**	**173**	**36**	**436**	**0**	**1,182**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	0	2	9	6	*17*	0	0	2	4	*6*	4	22	2	5	*33*
7:15 AM	0	0	4	5	*9*	1	0	0	8	*9*	2	27	3	5	*37*
7:30 AM	0	2	5	5	*12*	3	2	0	15	*20*	10	23	1	5	*39*
7:45 AM	0	0	4	4	*8*	1	1	1	12	*15*	13	27	3	10	*53*
8:00 AM	**0**	**1**	**11**	**8**	***20***	**2**	**2**	**0**	**12**	***16***	**7**	**23**	**5**	**8**	***43***
8:15 AM	**0**	**1**	**9**	**3**	***13***	**2**	**0**	**5**	**24**	***31***	**16**	**36**	**5**	**21**	***78***
8:30 AM	**0**	**0**	**8**	**7**	***15***	**2**	**2**	**4**	**21**	***29***	**23**	**24**	**2**	**8**	***57***
8:45 AM	**0**	**0**	**5**	**3**	***8***	**0**	**2**	**4**	**14**	***20***	**15**	**27**	**3**	**9**	***54***
Count Total	0	6	55	41	*102*	11	9	16	110	*146*	90	209	24	71	*394*
Peak Hr	**0**	**2**	**33**	**21**	***56***	**6**	**6**	**13**	**71**	***96***	**61**	**110**	**15**	**46**	***232***

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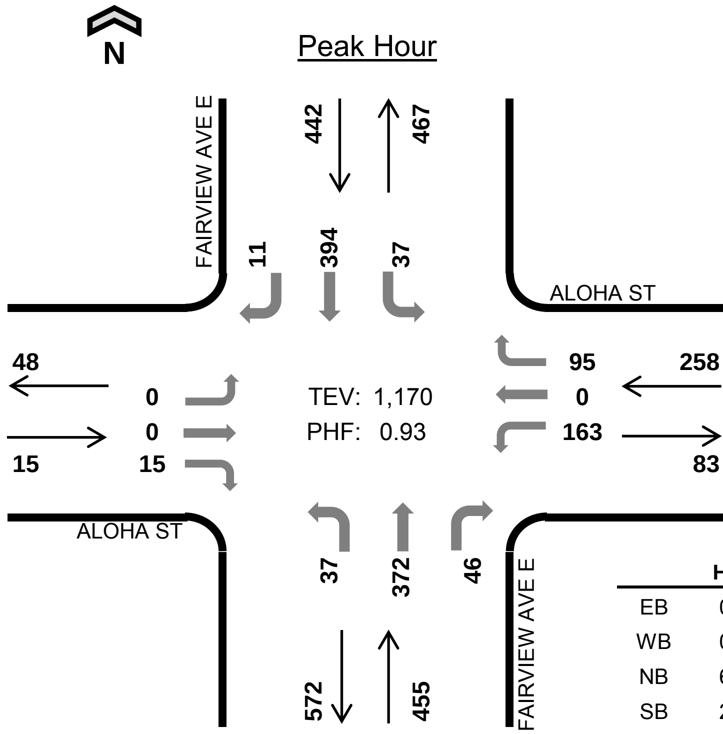
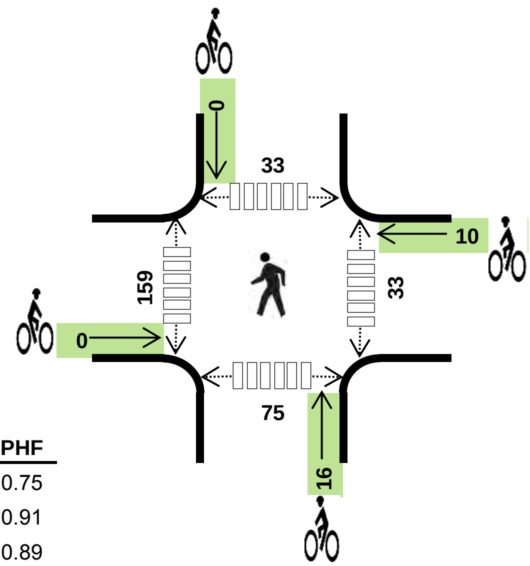
FAIRVIEW AVE E
ALOHA ST

Date: Tue, Jul 29, 2014
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	0.0%	0.75
WB	0.8%	0.91
NB	6.4%	0.89
SB	2.9%	0.91
TOTAL	3.8%	0.93



Two-Hour Count Summaries

Interval Start	ALOHA ST Eastbound LT	TH	RT	ALOHA ST Westbound LT	TH	RT	FAIRVIEW AVE E Northbound LT	TH	RT	FAIRVIEW AVE E Southbound LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	**0**	**0**	**4**	**35**	**0**	**27**	**10**	**72**	**8**	**7**	**96**	**2**	**261**	
4:15 PM	**0**	**0**	**4**	**37**	**0**	**22**	**5**	**94**	**14**	**14**	**104**	**3**	**297**	
4:30 PM	**0**	**0**	**2**	**49**	**0**	**22**	**12**	**102**	**10**	**7**	**107**	**2**	**313**	
4:45 PM	**0**	**0**	**5**	**42**	**0**	**24**	**10**	**104**	**14**	**9**	**87**	**4**	**299**	**1,170**
5:00 PM	0	0	2	35	0	28	9	95	8	14	58	0	249	1,158
5:15 PM	0	0	1	31	0	19	13	99	16	7	58	0	244	1,105
5:30 PM	0	0	3	27	0	22	15	102	13	5	101	0	288	1,080
5:45 PM	0	0	0	40	0	23	5	112	10	2	84	6	282	1,063
Count Total	0	0	21	296	0	187	79	780	93	65	695	17	2,233	
Peak Hr	**0**	**0**	**15**	**163**	**0**	**95**	**37**	**372**	**46**	**37**	**394**	**11**	**1,170**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	**0**	**0**	**6**	**3**	***9***	**0**	**0**	**3**	**0**	***3***	**6**	**44**	**9**	**20**	***79***
4:15 PM	**0**	**1**	**9**	**5**	***15***	**0**	**2**	**3**	**0**	***5***	**9**	**30**	**7**	**11**	***57***
4:30 PM	**0**	**0**	**6**	**2**	***8***	**0**	**5**	**4**	**0**	***9***	**6**	**46**	**7**	**30**	***89***
4:45 PM	**0**	**1**	**8**	**3**	***12***	**0**	**3**	**6**	**0**	***9***	**12**	**39**	**10**	**14**	***75***
5:00 PM	0	1	5	4	*10*	0	1	7	1	*9*	6	59	2	17	*84*
5:15 PM	0	0	5	1	*6*	0	2	5	1	*8*	9	54	6	28	*97*
5:30 PM	0	0	4	4	*8*	0	2	15	0	*17*	6	53	5	17	*81*
5:45 PM	0	1	4	1	*6*	0	3	7	0	*10*	10	57	4	32	*103*
Count Total	0	4	47	23	*74*	0	18	50	2	*70*	64	382	50	169	*665*
Peak Hr	**0**	**2**	**29**	**13**	***44***	**0**	**10**	**16**	**0**	***26***	**33**	**159**	**33**	**75**	***300***

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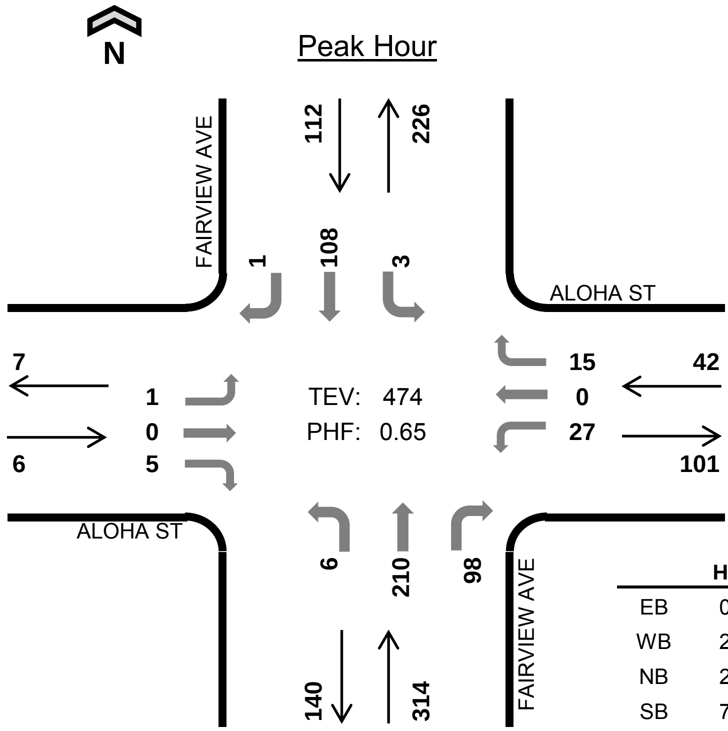
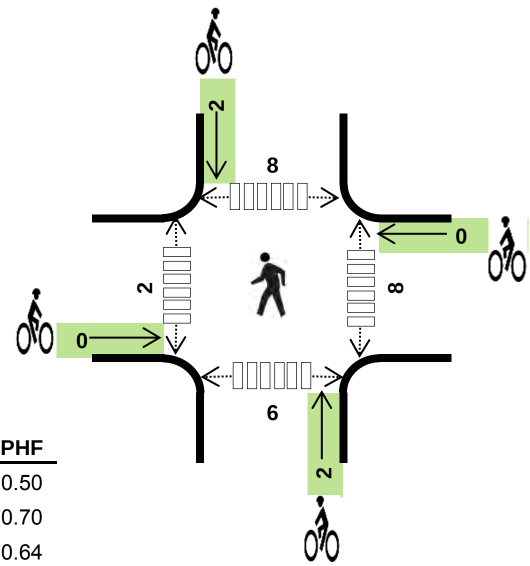
FAIRVIEW AVE
ALOHA ST

Date: Tue, Feb 04, 2014
Count Period: 5:00 AM to 7:00 AM
Peak Hour: 6:00 AM to 7:00 AM





	HV %:	PHF
EB	0.0%	0.50
WB	2.4%	0.70
NB	2.2%	0.64
SB	7.1%	0.65
TOTAL	3.4%	0.65

Two-Hour Count Summaries

Interval Start	ALOHA ST			ALOHA ST			FAIRVIEW AVE			FAIRVIEW AVE			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
5:00 AM	0	0	0	0	0	0	0	10	2	0	9	0	21	
5:15 AM	0	0	0	2	0	0	0	21	9	0	7	0	39	
5:30 AM	0	0	0	1	0	1	0	28	4	1	15	0	50	
5:45 AM	0	0	0	1	0	0	1	36	11	3	18	0	70	180
6:00 AM	**1**	**0**	**0**	**4**	**0**	**4**	**1**	**44**	**17**	**1**	**11**	**1**	**84**	243
6:15 AM	**0**	**0**	**0**	**7**	**0**	**2**	**0**	**49**	**15**	**1**	**28**	**0**	**102**	306
6:30 AM	**0**	**0**	**2**	**6**	**0**	**4**	**1**	**40**	**25**	**1**	**26**	**0**	**105**	361
6:45 AM	**0**	**0**	**3**	**10**	**0**	**5**	**4**	**77**	**41**	**0**	**43**	**0**	**183**	**474**
Count Total	1	0	5	31	0	16	7	305	124	7	157	1	654	
Peak Hr	**1**	**0**	**5**	**27**	**0**	**15**	**6**	**210**	**98**	**3**	**108**	**1**	**474**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
5:00 AM	0	0	1	1	*2*	0	0	0	0	*0*	1	0	0	2	*3*
5:15 AM	0	0	1	0	*1*	0	1	0	0	*1*	0	0	1	0	*1*
5:30 AM	0	0	2	2	*4*	0	0	0	0	*0*	1	0	0	2	*3*
5:45 AM	0	0	3	2	*5*	0	0	0	0	*0*	0	0	0	0	*0*
6:00 AM	**0**	**0**	**3**	**2**	***5***	**0**	**0**	**1**	**1**	***2***	**1**	**0**	**1**	**0**	***2***
6:15 AM	**0**	**0**	**1**	**1**	***2***	**0**	**0**	**0**	**1**	***1***	**4**	**1**	**2**	**2**	***9***
6:30 AM	**0**	**0**	**2**	**3**	***5***	**0**	**0**	**0**	**0**	***0***	**2**	**0**	**3**	**1**	***6***
6:45 AM	**0**	**1**	**1**	**2**	***4***	**0**	**0**	**1**	**0**	***1***	**1**	**1**	**2**	**3**	***7***
Count Total	0	1	14	13	*28*	0	1	2	2	*5*	10	2	9	10	*31*
Peak Hr	**0**	**1**	**7**	**8**	***16***	**0**	**0**	**2**	**2**	***4***	**8**	**2**	**8**	**6**	***24***

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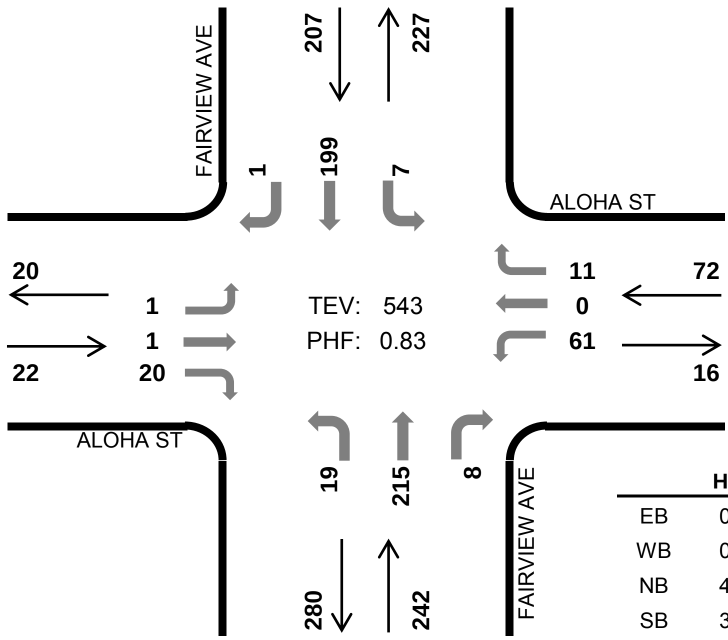
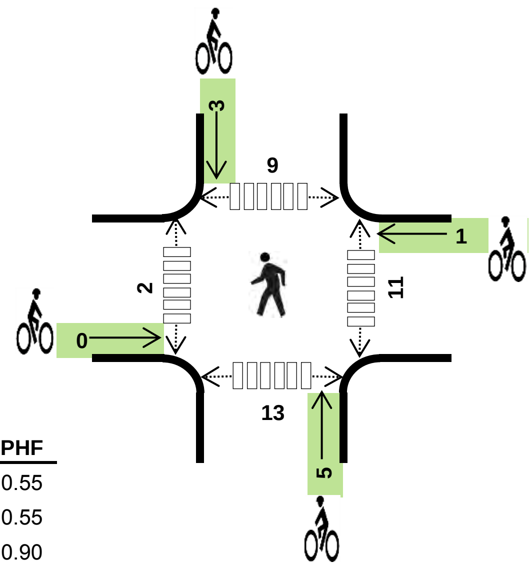
FAIRVIEW AVE
ALOHA ST

Date: Tue, Feb 04, 2014
Count Period: 7:00 PM to 9:00 PM
Peak Hour: 7:00 PM to 8:00 PM

N

Peak Hour





	HV %:	PHF
EB	0.0%	0.55
WB	0.0%	0.55
NB	4.5%	0.90
SB	3.4%	0.83
TOTAL	3.3%	0.83

Two-Hour Count Summaries

Interval Start	ALOHA ST Eastbound LT	TH	RT	ALOHA ST Westbound LT	TH	RT	FAIRVIEW AVE Northbound LT	TH	RT	FAIRVIEW AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:00 PM	**0**	**0**	**2**	**27**	**0**	**6**	**6**	**59**	**2**	**2**	**59**	**1**	**164**	
7:15 PM	**0**	**0**	**4**	**16**	**0**	**3**	**3**	**54**	**3**	**1**	**55**	**0**	**139**	
7:30 PM	**0**	**1**	**9**	**10**	**0**	**1**	**6**	**54**	**2**	**2**	**47**	**0**	**132**	
7:45 PM	**1**	**0**	**5**	**8**	**0**	**1**	**4**	**48**	**1**	**2**	**38**	**0**	**108**	**543**
8:00 PM	1	0	6	9	1	0	3	44	2	3	38	0	107	486
8:15 PM	0	0	9	7	0	2	3	43	1	2	40	0	107	454
8:30 PM	1	0	7	10	0	1	5	37	3	0	34	1	99	421
8:45 PM	0	0	1	8	0	3	2	49	2	0	32	0	97	410
Count Total	3	1	43	95	1	17	32	388	16	12	343	2	953	
Peak Hr	**1**	**1**	**20**	**61**	**0**	**11**	**19**	**215**	**8**	**7**	**199**	**1**	**543**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 PM	**0**	**0**	**2**	**2**	***4***	**0**	**0**	**2**	**1**	***3***	**0**	**0**	**0**	**2**	***2***
7:15 PM	**0**	**0**	**4**	**2**	***6***	**0**	**1**	**2**	**0**	***3***	**4**	**0**	**5**	**4**	***13***
7:30 PM	**0**	**0**	**3**	**2**	***5***	**0**	**0**	**1**	**0**	***1***	**2**	**1**	**0**	**2**	***5***
7:45 PM	**0**	**0**	**2**	**1**	***3***	**0**	**0**	**0**	**2**	***2***	**5**	**1**	**4**	**5**	***15***
8:00 PM	0	0	2	4	*6*	0	0	1	1	*2*	1	2	2	6	*11*
8:15 PM	0	1	3	2	*6*	0	0	0	0	*0*	2	1	0	0	*3*
8:30 PM	0	0	3	1	*4*	0	0	1	1	*2*	5	0	0	1	*6*
8:45 PM	0	0	1	2	*3*	0	0	0	0	*0*	1	2	1	1	*5*
Count Total	0	1	20	16	*37*	0	1	7	5	*13*	20	7	12	21	*60*
Peak Hr	**0**	**0**	**11**	**7**	***18***	**0**	**1**	**5**	**3**	***9***	**11**	**2**	**9**	**13**	***35***

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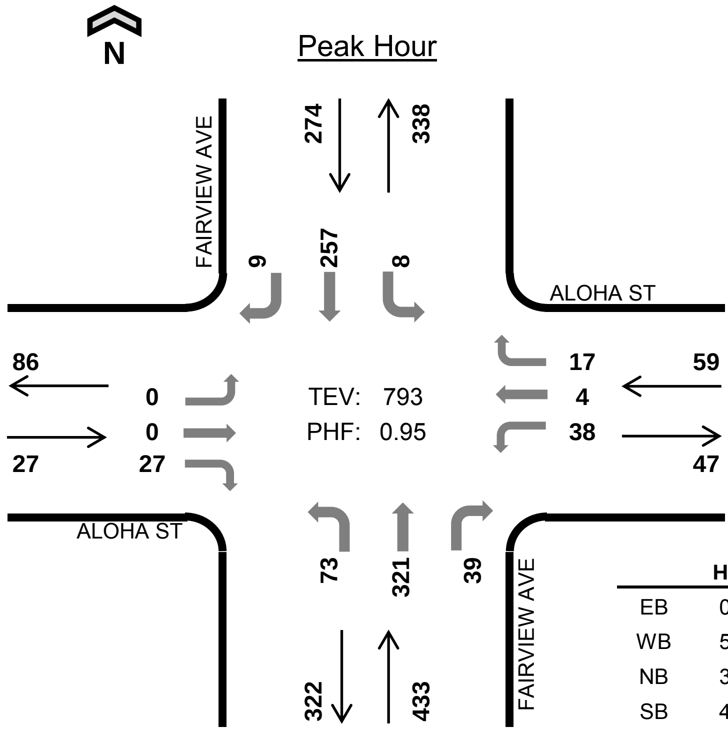
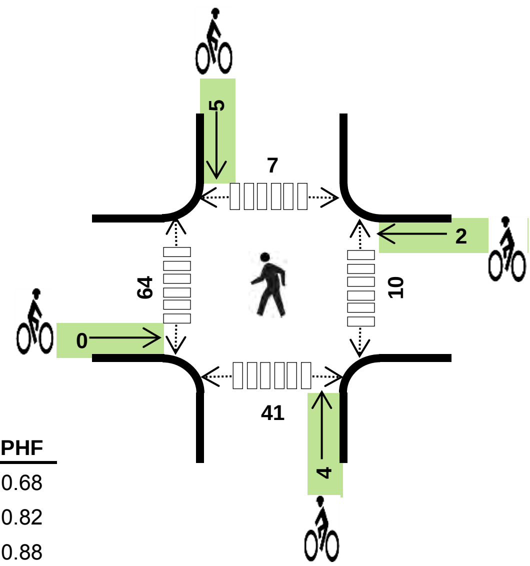
FAIRVIEW AVE
ALOHA ST

Date: Sat, Feb 01, 2014
Count Period: 11:00 AM to 1:00 PM
Peak Hour: 12:00 PM to 1:00 PM





	HV %:	PHF
EB	0.0%	0.68
WB	5.1%	0.82
NB	3.2%	0.88
SB	4.4%	0.89
TOTAL	3.7%	0.95

Two-Hour Count Summaries

Interval Start	ALOHA ST Eastbound LT	TH	RT	ALOHA ST Westbound LT	TH	RT	FAIRVIEW AVE Northbound LT	TH	RT	FAIRVIEW AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
11:00 AM	0	0	3	2	1	0	22	58	10	2	56	2	156	
11:15 AM	1	0	2	10	0	2	20	52	14	2	55	8	166	
11:30 AM	0	0	6	13	0	1	18	56	9	3	64	2	172	
11:45 AM	0	0	3	9	1	5	16	79	6	3	69	4	195	689
12:00 PM	**0**	**0**	**3**	**13**	**2**	**3**	**11**	**73**	**12**	**2**	**67**	**1**	**187**	720
12:15 PM	**0**	**0**	**6**	**9**	**1**	**7**	**24**	**90**	**9**	**1**	**60**	**1**	**208**	762
12:30 PM	**0**	**0**	**8**	**5**	**1**	**2**	**21**	**82**	**7**	**3**	**56**	**6**	**191**	781
12:45 PM	**0**	**0**	**10**	**11**	**0**	**5**	**17**	**76**	**11**	**2**	**74**	**1**	**207**	**793**
Count Total	1	0	41	72	6	25	149	566	78	18	501	25	1,482	
Peak Hr	**0**	**0**	**27**	**38**	**4**	**17**	**73**	**321**	**39**	**8**	**257**	**9**	**793**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
11:00 AM	0	0	5	3	*8*	0	0	1	1	*2*	4	25	0	21	*50*
11:15 AM	0	1	4	5	*10*	0	0	0	4	*4*	4	11	0	17	*32*
11:30 AM	0	0	3	2	*5*	0	0	3	2	*5*	3	13	2	17	*35*
11:45 AM	0	1	8	4	*13*	1	0	0	2	*3*	2	21	2	9	*34*
12:00 PM	**0**	**0**	**2**	**3**	***5***	**0**	**1**	**2**	**1**	***4***	**3**	**20**	**2**	**8**	***33***
12:15 PM	**0**	**1**	**3**	**2**	***6***	**0**	**0**	**2**	**0**	***2***	**0**	**10**	**0**	**11**	***21***
12:30 PM	**0**	**1**	**4**	**2**	***7***	**0**	**1**	**0**	**3**	***4***	**2**	**12**	**4**	**9**	***27***
12:45 PM	**0**	**1**	**5**	**5**	***11***	**0**	**0**	**0**	**1**	***1***	**5**	**22**	**1**	**13**	***41***
Count Total	0	5	34	26	*65*	1	2	8	14	*25*	23	134	11	105	*273*
Peak Hr	**0**	**3**	**14**	**12**	***29***	**0**	**2**	**4**	**5**	***11***	**10**	**64**	**7**	**41**	***122***

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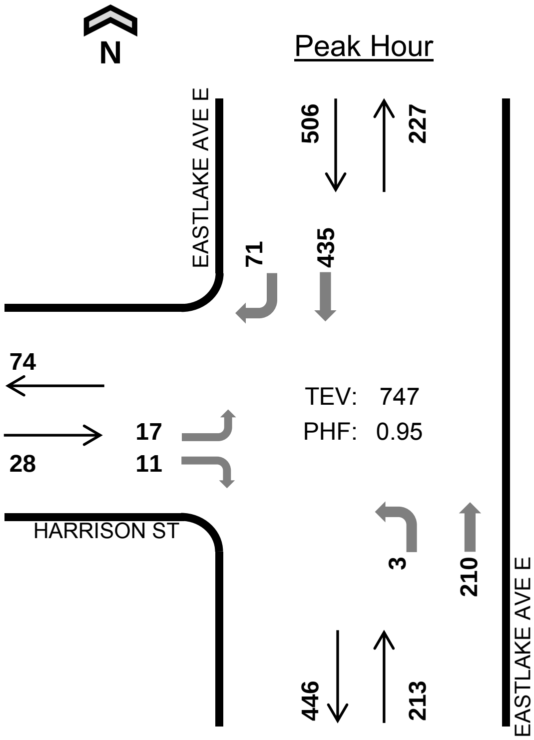
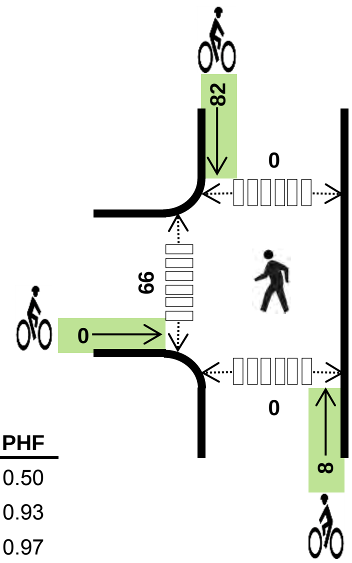
EASTLAKE AVE E
HARRISON ST

Date: Tue, Jul 29, 2014
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM

Peak Hour





	HV %:	PHF
EB	0.0%	0.50
NB	10.8%	0.93
SB	4.9%	0.97
TOTAL	6.4%	0.95

Two-Hour Count Summaries

Interval Start	HARRISON ST Eastbound LT	TH	RT	HARRISON ST Westbound LT	TH	RT	EASTLAKE AVE E Northbound LT	TH	RT	EASTLAKE AVE E Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	3	0	2	0	0	0	2	28	0	0	48	11	94	
7:15 AM	1	0	4	0	0	0	1	29	0	0	58	5	98	
7:30 AM	1	0	2	0	0	0	1	37	0	0	72	8	121	
7:45 AM	2	0	5	0	0	0	3	64	0	0	100	7	181	494
8:00 AM	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**56**	**0**	**0**	**109**	**13**	**180**	580
8:15 AM	**5**	**0**	**2**	**0**	**0**	**0**	**1**	**55**	**0**	**0**	**107**	**21**	**191**	673
8:30 AM	**1**	**0**	**4**	**0**	**0**	**0**	**1**	**43**	**0**	**0**	**114**	**17**	**180**	732
8:45 AM	**9**	**0**	**5**	**0**	**0**	**0**	**1**	**56**	**0**	**0**	**105**	**20**	**196**	**747**
Count Total	24	0	24	0	0	0	10	368	0	0	713	102	1,241	
Peak Hr	**17**	**0**	**11**	**0**	**0**	**0**	**3**	**210**	**0**	**0**	**435**	**71**	**747**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

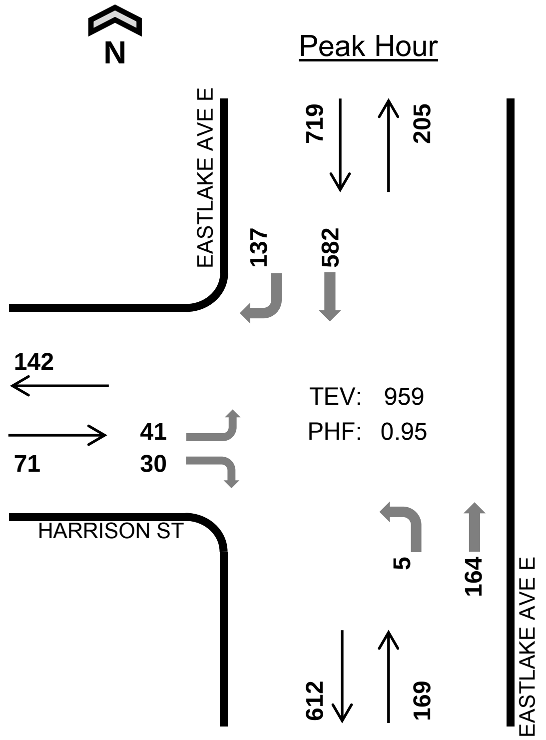
Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	2	0	4	2	*8*	0	0	3	14	*17*	0	18	0	1	*19*
7:15 AM	0	0	6	3	*9*	0	0	0	14	*14*	0	34	0	0	*34*
7:30 AM	0	0	5	2	*7*	0	0	2	13	*15*	0	25	0	0	*25*
7:45 AM	0	0	11	5	*16*	0	0	10	26	*36*	0	26	0	0	*26*
8:00 AM	**0**	**0**	**2**	**2**	***4***	**0**	**0**	**1**	**19**	***20***	**0**	**18**	**0**	**0**	***18***
8:15 AM	**0**	**0**	**7**	**10**	***17***	**0**	**0**	**3**	**13**	***16***	**0**	**14**	**0**	**0**	***14***
8:30 AM	**0**	**0**	**6**	**6**	***12***	**0**	**0**	**1**	**26**	***27***	**0**	**16**	**0**	**0**	***16***
8:45 AM	**0**	**0**	**8**	**7**	***15***	**0**	**0**	**3**	**24**	***27***	**0**	**18**	**0**	**0**	***18***
Count Total	2	0	49	37	*88*	0	0	23	149	*172*	0	169	0	1	*170*
Peak Hr	**0**	**0**	**23**	**25**	***48***	**0**	**0**	**8**	**82**	***90***	**0**	**66**	**0**	**0**	***66***

EASTLAKE AVE E
HARRISON ST

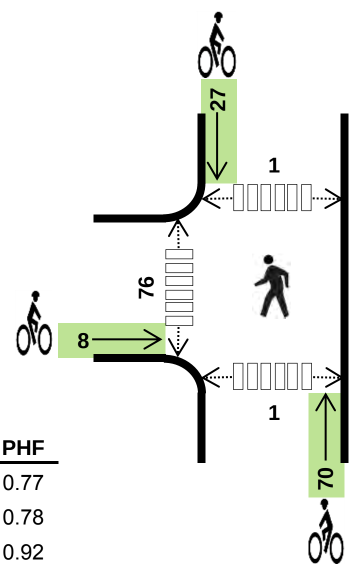
idax

Date: Tue, Jul 29, 2014
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM

Peak Hour



TEV: 959
PHF: 0.95



	HV %:	PHF
EB	0.0%	0.77
NB	14.2%	0.78
SB	8.9%	0.92
TOTAL	9.2%	0.95

Two-Hour Count Summaries

Interval Start	HARRISON ST Eastbound LT	TH	RT	HARRISON ST Westbound LT	TH	RT	EASTLAKE AVE E Northbound LT	TH	RT	EASTLAKE AVE E Southbound LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	11	0	7	0	0	0	4	30	0	0	168	22	242	
4:15 PM	7	0	6	0	0	0	1	42	0	0	151	10	217	
4:30 PM	**11**	**0**	**12**	**0**	**0**	**0**	**0**	**34**	**0**	**0**	**178**	**18**	**253**	
4:45 PM	**11**	**0**	**7**	**0**	**0**	**0**	**3**	**51**	**0**	**0**	**140**	**34**	**246**	958
5:00 PM	**7**	**0**	**4**	**0**	**0**	**0**	**1**	**37**	**0**	**0**	**115**	**58**	**222**	938
5:15 PM	**12**	**0**	**7**	**0**	**0**	**0**	**1**	**42**	**0**	**0**	**149**	**27**	**238**	**959**
5:30 PM	17	0	4	0	0	0	4	42	0	0	156	19	242	948
5:45 PM	25	0	8	0	0	0	2	62	0	0	129	17	243	945
Count Total	101	0	55	0	0	0	16	340	0	0	1,186	205	1,903	
Peak Hr	**41**	**0**	**30**	**0**	**0**	**0**	**5**	**164**	**0**	**0**	**582**	**137**	**959**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	0	0	3	16	*19*	1	0	3	4	*8*	0	16	0	0	*16*
4:15 PM	1	0	7	9	*17*	0	0	7	6	*13*	0	18	0	0	*18*
4:30 PM	**0**	**0**	**7**	**23**	***30***	**2**	**0**	**13**	**5**	***20***	**0**	**28**	**1**	**0**	***29***
4:45 PM	**0**	**0**	**9**	**12**	***21***	**1**	**0**	**21**	**7**	***29***	**0**	**10**	**0**	**0**	***10***
5:00 PM	**0**	**0**	**4**	**21**	***25***	**2**	**0**	**14**	**6**	***22***	**0**	**21**	**0**	**0**	***21***
5:15 PM	**0**	**0**	**4**	**8**	***12***	**3**	**0**	**22**	**9**	***34***	**0**	**17**	**0**	**1**	***18***
5:30 PM	0	0	5	10	*15*	5	0	21	8	*34*	0	24	1	0	*25*
5:45 PM	0	0	4	13	*17*	2	0	13	2	*17*	0	15	0	0	*15*
Count Total	1	0	43	112	*156*	16	0	114	47	*177*	0	149	2	1	*152*
Peak Hr	**0**	**0**	**24**	**64**	***88***	**8**	**0**	**70**	**27**	***105***	**0**	**76**	**1**	**1**	***78***

Mark Skaggs: 425 - 250 - 0777
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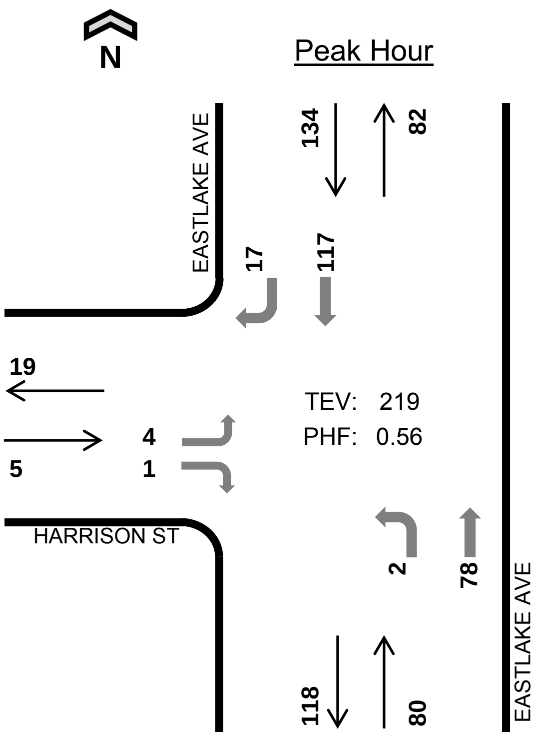
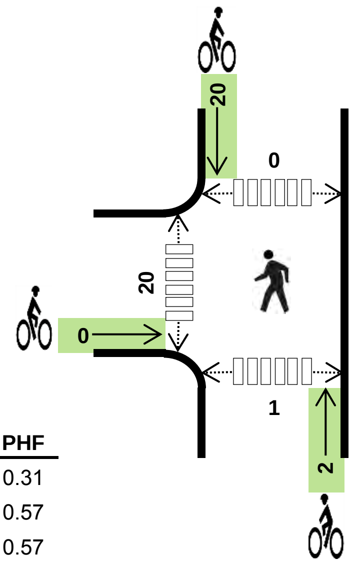
EASTLAKE AVE
HARRISON ST

Date: Thu, Mar 13, 2014
Count Period: 5:00 AM to 7:00 AM
Peak Hour: 6:00 AM to 7:00 AM





	HV %:	PHF
EB	20.0%	0.31
NB	20.0%	0.57
SB	8.2%	0.57
TOTAL	12.8%	0.56

Two-Hour Count Summaries

Interval Start	HARRISON ST Eastbound LT	TH	RT	HARRISON ST Westbound LT	TH	RT	EASTLAKE AVE Northbound LT	TH	RT	EASTLAKE AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
5:00 AM	0	0	1	0	0	0	0	2	0	0	5	0	8	
5:15 AM	1	0	0	0	0	0	1	4	0	0	9	0	15	
5:30 AM	0	0	2	0	0	0	0	5	0	0	20	1	28	
5:45 AM	1	0	2	0	0	0	0	8	0	0	20	2	33	84
6:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**9**	**0**	**0**	**18**	**3**	**31**	107
6:15 AM	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**16**	**0**	**0**	**16**	**1**	**34**	126
6:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**0**	**33**	**4**	**56**	154
6:45 AM	**3**	**0**	**1**	**0**	**0**	**0**	**1**	**34**	**0**	**0**	**50**	**9**	**98**	**219**
Count Total	6	0	6	0	0	0	3	97	0	0	171	20	303	
Peak Hr	**4**	**0**	**1**	**0**	**0**	**0**	**2**	**78**	**0**	**0**	**117**	**17**	**219**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
5:00 AM	0	0	0	0	*0*	0	0	0	1	*1*	0	0	0	0	*0*
5:15 AM	0	0	2	1	*3*	0	0	0	1	*1*	0	3	0	0	*3*
5:30 AM	0	0	4	2	*6*	0	0	0	2	*2*	0	1	0	0	*1*
5:45 AM	0	0	1	3	*4*	0	0	2	2	*4*	0	6	0	0	*6*
6:00 AM	**0**	**0**	**2**	**5**	***7***	**0**	**0**	**1**	**1**	***2***	**0**	**2**	**0**	**1**	***3***
6:15 AM	**0**	**0**	**5**	**1**	***6***	**0**	**0**	**0**	**4**	***4***	**0**	**6**	**0**	**0**	***6***
6:30 AM	**0**	**0**	**4**	**0**	***4***	**0**	**0**	**1**	**7**	***8***	**0**	**3**	**0**	**0**	***3***
6:45 AM	**1**	**0**	**5**	**5**	***11***	**0**	**0**	**0**	**8**	***8***	**0**	**9**	**0**	**0**	***9***
Count Total	1	0	23	17	*41*	0	0	4	26	*30*	0	30	0	1	*31*
Peak Hr	**1**	**0**	**16**	**11**	***28***	**0**	**0**	**2**	**20**	***22***	**0**	**20**	**0**	**1**	***21***

Mark Skaggs: 425 - 250 - 0777
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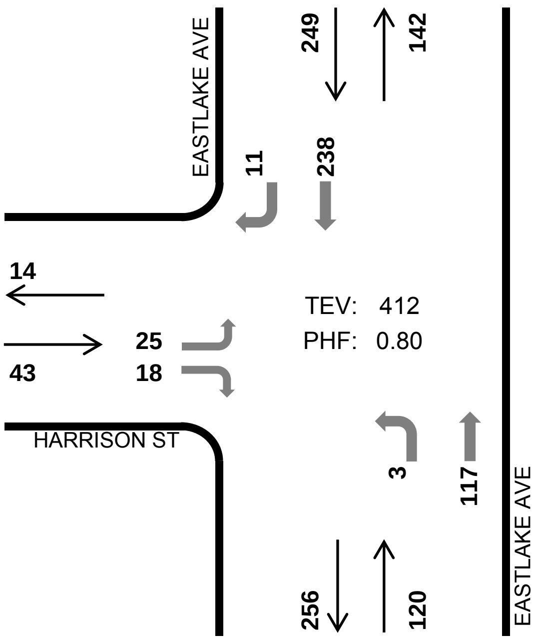
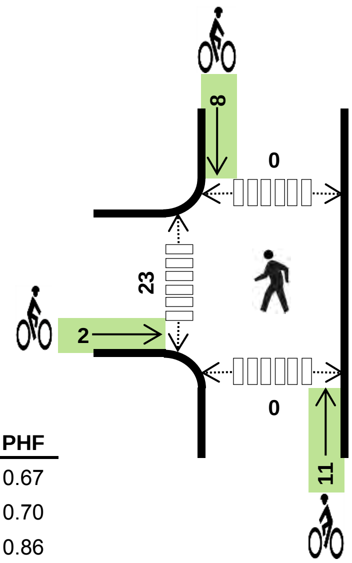
EASTLAKE AVE
HARRISON ST

Date: Thu, Mar 13, 2014
Count Period: 7:00 PM to 9:00 PM
Peak Hour: 7:00 PM to 8:00 PM

N

Peak Hour





	HV %:	PHF
EB	0.0%	0.67
NB	6.7%	0.70
SB	7.6%	0.86
TOTAL	6.6%	0.80

Two-Hour Count Summaries

Interval Start	HARRISON ST Eastbound LT	TH	RT	HARRISON ST Westbound LT	TH	RT	EASTLAKE AVE Northbound LT	TH	RT	EASTLAKE AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:00 PM	**10**	**0**	**6**	**0**	**0**	**0**	**0**	**35**	**0**	**0**	**66**	**4**	**121**	
7:15 PM	**9**	**0**	**4**	**0**	**0**	**0**	**1**	**42**	**0**	**0**	**69**	**3**	**128**	
7:30 PM	**4**	**0**	**5**	**0**	**0**	**0**	**2**	**15**	**0**	**0**	**52**	**2**	**80**	
7:45 PM	**2**	**0**	**3**	**0**	**0**	**0**	**0**	**25**	**0**	**0**	**51**	**2**	**83**	**412**
8:00 PM	1	0	1	0	0	0	3	20	0	0	43	3	71	362
8:15 PM	4	0	2	0	0	0	1	25	0	0	45	1	78	312
8:30 PM	2	0	1	0	0	0	4	19	0	0	35	2	63	295
8:45 PM	3	0	3	0	0	0	3	29	0	0	35	1	74	286
Count Total	35	0	25	0	0	0	14	210	0	0	396	18	698	
Peak Hr	**25**	**0**	**18**	**0**	**0**	**0**	**3**	**117**	**0**	**0**	**238**	**11**	**412**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 PM	**0**	**0**	**2**	**6**	***8***	**1**	**0**	**6**	**4**	***11***	**0**	**8**	**0**	**0**	***8***
7:15 PM	**0**	**0**	**3**	**5**	***8***	**1**	**0**	**3**	**4**	***8***	**0**	**11**	**0**	**0**	***11***
7:30 PM	**0**	**0**	**0**	**5**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**3**	**0**	**0**	***3***
7:45 PM	**0**	**0**	**3**	**3**	***6***	**0**	**0**	**2**	**0**	***2***	**0**	**1**	**0**	**0**	***1***
8:00 PM	0	0	0	2	*2*	0	0	1	0	*1*	0	7	1	0	*8*
8:15 PM	0	0	2	2	*4*	0	0	3	1	*4*	0	5	0	0	*5*
8:30 PM	0	0	1	2	*3*	0	0	3	1	*4*	0	8	0	0	*8*
8:45 PM	0	0	1	1	*2*	0	0	1	0	*1*	0	5	0	0	*5*
Count Total	0	0	12	26	*38*	2	0	19	10	*31*	0	48	1	0	*49*
Peak Hr	**0**	**0**	**8**	**19**	***27***	**2**	**0**	**11**	**8**	***21***	**0**	**23**	**0**	**0**	***23***

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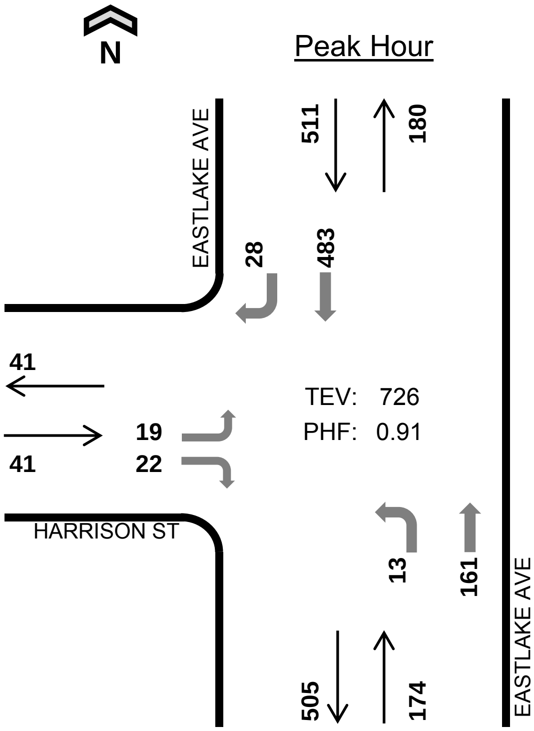
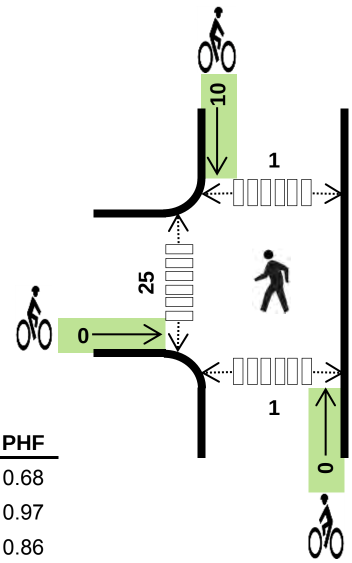
EASTLAKE AVE
HARRISON ST

Date: Sat, Mar 15, 2014
Count Period: 11:00 AM to 1:00 PM
Peak Hour: 12:00 PM to 1:00 PM



	HV %:	PHF
EB	4.9%	0.68
NB	6.3%	0.97
SB	2.3%	0.86
TOTAL	3.4%	0.91



Two-Hour Count Summaries

Interval Start	HARRISON ST Eastbound LT	TH	RT	HARRISON ST Westbound LT	TH	RT	EASTLAKE AVE Northbound LT	TH	RT	EASTLAKE AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
11:00 AM	4	0	6	0	0	0	4	27	0	0	99	8	148	
11:15 AM	0	0	5	0	0	0	3	34	0	0	71	5	118	
11:30 AM	8	0	2	0	0	0	0	30	0	0	74	6	120	
11:45 AM	6	0	3	0	0	0	0	33	0	0	111	6	159	545
12:00 PM	**3**	**0**	**12**	**0**	**0**	**0**	**3**	**41**	**0**	**0**	**93**	**7**	**159**	556
12:15 PM	**3**	**0**	**6**	**0**	**0**	**0**	**0**	**45**	**0**	**0**	**124**	**5**	**183**	621
12:30 PM	**9**	**0**	**1**	**0**	**0**	**0**	**7**	**35**	**0**	**0**	**124**	**9**	**185**	686
12:45 PM	**4**	**0**	**3**	**0**	**0**	**0**	**3**	**40**	**0**	**0**	**142**	**7**	**199**	**726**
Count Total	37	0	38	0	0	0	20	285	0	0	838	53	1,271	
Peak Hr	**19**	**0**	**22**	**0**	**0**	**0**	**13**	**161**	**0**	**0**	**483**	**28**	**726**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
11:00 AM	0	0	4	3	*7*	0	0	2	5	*7*	0	3	0	0	*3*
11:15 AM	0	0	3	1	*4*	1	0	0	2	*3*	0	6	0	0	*6*
11:30 AM	0	0	3	3	*6*	0	0	1	1	*2*	0	15	0	0	*15*
11:45 AM	0	0	4	3	*7*	2	0	1	5	*8*	0	6	0	0	*6*
12:00 PM	**0**	**0**	**3**	**3**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**8**	**0**	**0**	***8***
12:15 PM	**2**	**0**	**3**	**3**	***8***	**0**	**0**	**0**	**3**	***3***	**0**	**9**	**0**	**0**	***9***
12:30 PM	**0**	**0**	**2**	**2**	***4***	**0**	**0**	**0**	**1**	***1***	**0**	**6**	**1**	**1**	***8***
12:45 PM	**0**	**0**	**3**	**4**	***7***	**0**	**0**	**0**	**6**	***6***	**0**	**2**	**0**	**0**	***2***
Count Total	2	0	25	22	*49*	3	0	4	23	*30*	0	55	1	1	*57*
Peak Hr	**2**	**0**	**11**	**12**	***25***	**0**	**0**	**0**	**10**	***10***	**0**	**25**	**1**	**1**	***27***

Mark Skaggs: 425 - 250 - 0777
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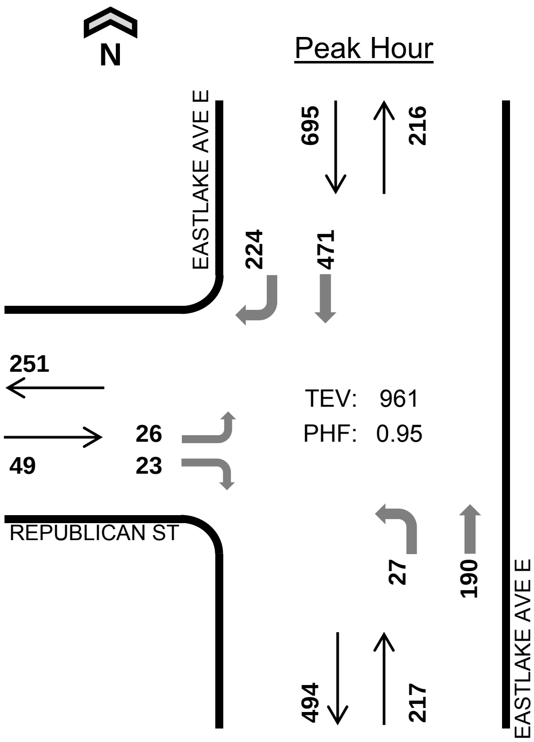
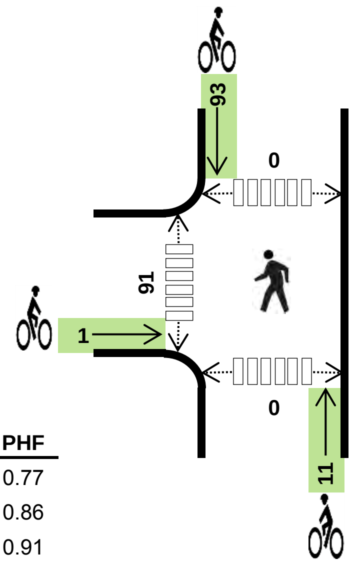
EASTLAKE AVE E
REPUBLICAN ST

Date: Tue, Jul 29, 2014
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM





	HV %:	PHF
EB	4.1%	0.77
NB	13.4%	0.86
SB	4.2%	0.91
TOTAL	6.2%	0.95

Two-Hour Count Summaries

Interval Start	REPUBLICAN ST Eastbound			REPUBLICAN ST Westbound			EASTLAKE AVE E Northbound			EASTLAKE AVE E Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	1	0	3	0	0	0	4	29	0	0	62	25	124	
7:15 AM	4	0	2	0	0	0	5	24	0	0	62	30	127	
7:30 AM	4	0	5	0	0	0	5	32	0	0	76	40	162	
7:45 AM	6	0	6	0	0	0	12	51	0	0	104	43	222	635
8:00 AM	**6**	**0**	**5**	**0**	**0**	**0**	**2**	**55**	**0**	**0**	**114**	**49**	**231**	742
8:15 AM	**4**	**0**	**3**	**0**	**0**	**0**	**8**	**46**	**0**	**0**	**120**	**47**	**228**	843
8:30 AM	**9**	**0**	**7**	**0**	**0**	**0**	**5**	**38**	**0**	**0**	**129**	**62**	**250**	931
8:45 AM	**7**	**0**	**8**	**0**	**0**	**0**	**12**	**51**	**0**	**0**	**108**	**66**	**252**	**961**
Count Total	41	0	39	0	0	0	53	326	0	0	775	362	1,596	
Peak Hr	**26**	**0**	**23**	**0**	**0**	**0**	**27**	**190**	**0**	**0**	**471**	**224**	**961**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	4	4	*8*	0	0	2	9	*11*	0	20	0	0	*20*
7:15 AM	0	0	7	4	*11*	0	0	0	15	*15*	0	36	0	0	*36*
7:30 AM	0	0	4	4	*8*	0	0	2	14	*16*	0	30	0	0	*30*
7:45 AM	0	0	11	5	*16*	0	0	4	29	*33*	0	23	0	0	*23*
8:00 AM	**0**	**0**	**5**	**5**	***10***	**0**	**0**	**3**	**18**	***21***	**0**	**20**	**0**	**0**	***20***
8:15 AM	**1**	**0**	**9**	**8**	***18***	**0**	**0**	**2**	**17**	***19***	**0**	**24**	**0**	**0**	***24***
8:30 AM	**1**	**0**	**6**	**8**	***15***	**1**	**0**	**5**	**32**	***38***	**0**	**26**	**0**	**0**	***26***
8:45 AM	**0**	**0**	**9**	**8**	***17***	**0**	**0**	**1**	**26**	***27***	**0**	**21**	**0**	**0**	***21***
Count Total	2	0	55	46	*103*	1	0	19	160	*180*	0	200	0	0	*200*
Peak Hr	**2**	**0**	**29**	**29**	***60***	**1**	**0**	**11**	**93**	***105***	**0**	**91**	**0**	**0**	***91***

Mark Skaggs: 425 - 250 - 0777
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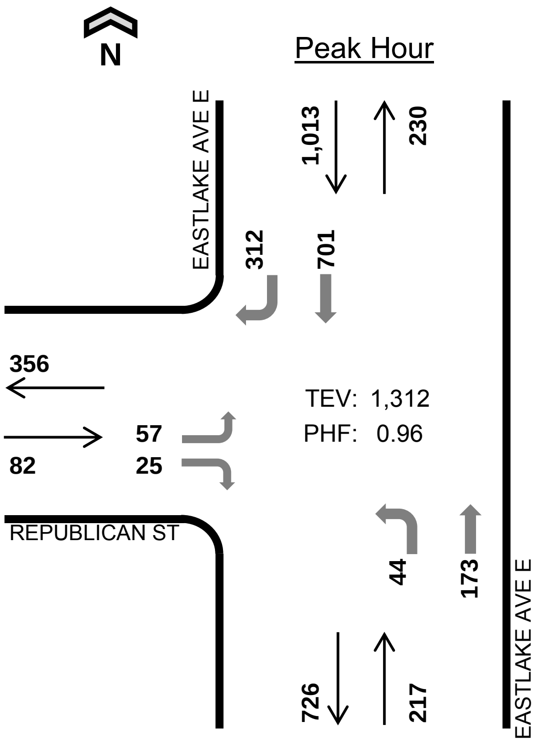
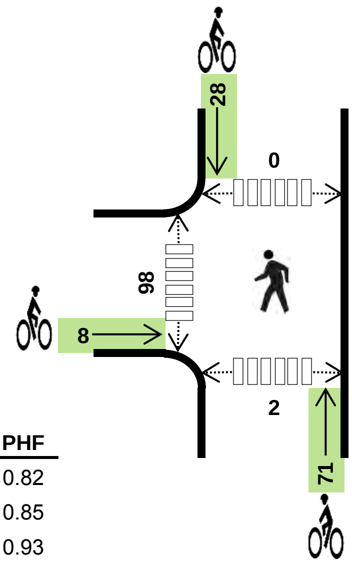
EASTLAKE AVE E
REPUBLICAN ST

Date: Tue, Jul 29, 2014
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM





	HV %:	PHF
EB	0.0%	0.82
NB	11.1%	0.85
SB	6.9%	0.93
TOTAL	7.2%	0.96

Two-Hour Count Summaries

Interval Start	REPUBLICAN ST Eastbound			REPUBLICAN ST Westbound			EASTLAKE AVE E Northbound			EASTLAKE AVE E Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	13	0	4	0	0	0	6	36	0	0	178	71	308	
4:15 PM	11	0	4	0	0	0	7	41	0	0	164	60	287	
4:30 PM	**15**	**0**	**4**	**0**	**0**	**0**	**8**	**41**	**0**	**0**	**192**	**81**	**341**	
4:45 PM	**13**	**0**	**7**	**0**	**0**	**0**	**18**	**46**	**0**	**0**	**169**	**70**	**323**	1,259
5:00 PM	**17**	**0**	**8**	**0**	**0**	**0**	**8**	**40**	**0**	**0**	**172**	**91**	**336**	1,287
5:15 PM	**12**	**0**	**6**	**0**	**0**	**0**	**10**	**46**	**0**	**0**	**168**	**70**	**312**	**1,312**
5:30 PM	13	0	10	0	0	0	8	53	0	0	162	82	328	1,299
5:45 PM	21	0	8	0	0	0	9	82	0	0	145	64	329	1,305
Count Total	115	0	51	0	0	0	74	385	0	0	1,350	589	2,564	
Peak Hr	**57**	**0**	**25**	**0**	**0**	**0**	**44**	**173**	**0**	**0**	**701**	**312**	**1,312**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	5	18	*23*	1	0	5	9	*15*	0	22	0	1	*23*
4:15 PM	0	0	8	10	*18*	1	0	8	5	*14*	0	24	0	0	*24*
4:30 PM	**0**	**0**	**6**	**24**	***30***	**1**	**0**	**13**	**5**	***19***	**0**	**30**	**0**	**2**	***32***
4:45 PM	**0**	**0**	**9**	**16**	***25***	**1**	**0**	**23**	**6**	***30***	**0**	**15**	**0**	**0**	***15***
5:00 PM	**0**	**0**	**4**	**20**	***24***	**1**	**0**	**14**	**7**	***22***	**0**	**31**	**0**	**0**	***31***
5:15 PM	**0**	**0**	**5**	**10**	***15***	**5**	**0**	**21**	**10**	***36***	**0**	**22**	**0**	**0**	***22***
5:30 PM	0	0	5	9	*14*	0	0	26	6	*32*	0	28	0	0	*28*
5:45 PM	0	0	3	15	*18*	3	0	22	6	*31*	0	22	0	0	*22*
Count Total	0	0	45	122	*167*	13	0	132	54	*199*	0	194	0	3	*197*
Peak Hr	**0**	**0**	**24**	**70**	***94***	**8**	**0**	**71**	**28**	***107***	**0**	**98**	**0**	**2**	***100***

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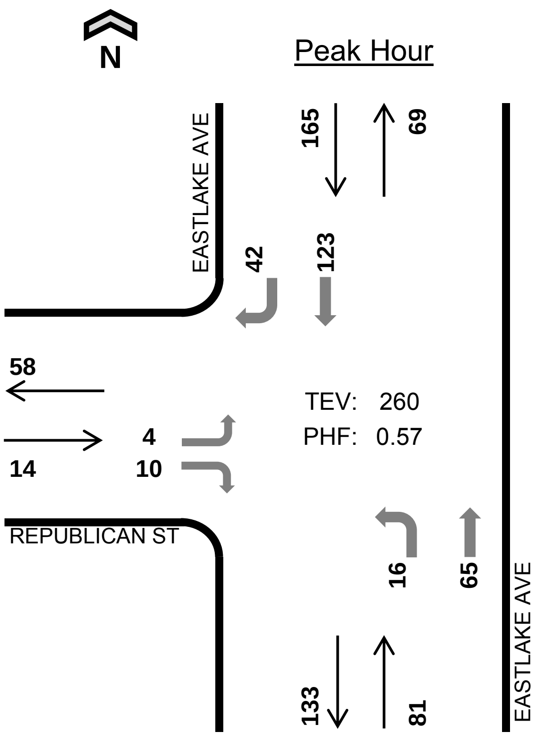
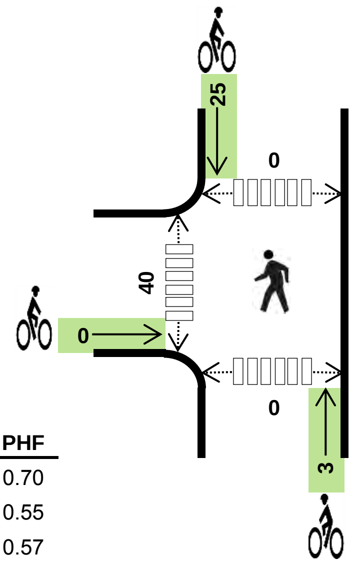
EASTLAKE AVE
REPUBLICAN ST

Date: Thu, Mar 13, 2014
Count Period: 5:00 AM to 7:00 AM
Peak Hour: 6:00 AM to 7:00 AM





	HV %:	PHF
EB	0.0%	0.70
NB	21.0%	0.55
SB	6.7%	0.57
TOTAL	10.8%	0.57

Two-Hour Count Summaries

Interval Start	REPUBLICAN ST Eastbound LT	TH	RT	REPUBLICAN ST Westbound LT	TH	RT	EASTLAKE AVE Northbound LT	TH	RT	EASTLAKE AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
5:00 AM	0	0	1	0	0	0	1	1	0	0	4	3	10	
5:15 AM	1	0	3	0	0	0	2	3	0	0	7	3	19	
5:30 AM	1	0	0	0	0	0	3	2	0	0	19	3	28	
5:45 AM	2	0	6	0	0	0	2	7	0	0	17	10	44	101
6:00 AM	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**6**	**0**	**0**	**17**	**2**	**29**	120
6:15 AM	**1**	**0**	**2**	**0**	**0**	**0**	**5**	**13**	**0**	**0**	**16**	**11**	**48**	149
6:30 AM	**2**	**0**	**2**	**0**	**0**	**0**	**2**	**16**	**0**	**0**	**37**	**10**	**69**	190
6:45 AM	**1**	**0**	**4**	**0**	**0**	**0**	**7**	**30**	**0**	**0**	**53**	**19**	**114**	**260**
Count Total	8	0	20	0	0	0	24	78	0	0	170	61	361	
Peak Hr	**4**	**0**	**10**	**0**	**0**	**0**	**16**	**65**	**0**	**0**	**123**	**42**	**260**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
5:00 AM	0	0	0	0	*0*	0	0	0	1	*1*	0	0	0	0	*0*
5:15 AM	0	0	1	1	*2*	0	0	0	1	*1*	0	2	0	0	*2*
5:30 AM	0	0	4	3	*7*	0	0	0	2	*2*	0	0	0	0	*0*
5:45 AM	0	0	1	3	*4*	0	0	2	2	*4*	0	7	0	0	*7*
6:00 AM	**0**	**0**	**2**	**5**	***7***	**0**	**0**	**1**	**5**	***6***	**0**	**7**	**0**	**0**	***7***
6:15 AM	**0**	**0**	**6**	**1**	***7***	**0**	**0**	**0**	**4**	***4***	**0**	**13**	**0**	**0**	***13***
6:30 AM	**0**	**0**	**3**	**0**	***3***	**0**	**0**	**1**	**7**	***8***	**0**	**8**	**0**	**0**	***8***
6:45 AM	**0**	**0**	**6**	**5**	***11***	**0**	**0**	**1**	**9**	***10***	**0**	**12**	**0**	**0**	***12***
Count Total	0	0	23	18	*41*	0	0	5	31	*36*	0	49	0	0	*49*
Peak Hr	**0**	**0**	**17**	**11**	***28***	**0**	**0**	**3**	**25**	***28***	**0**	**40**	**0**	**0**	***40***

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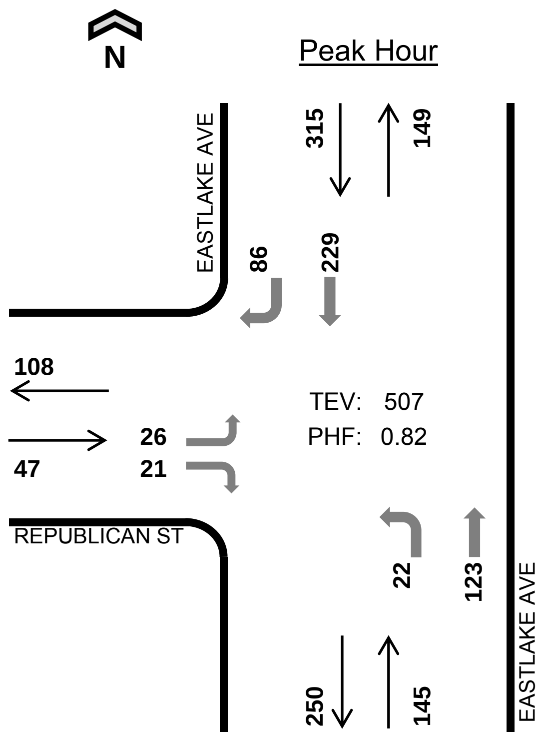
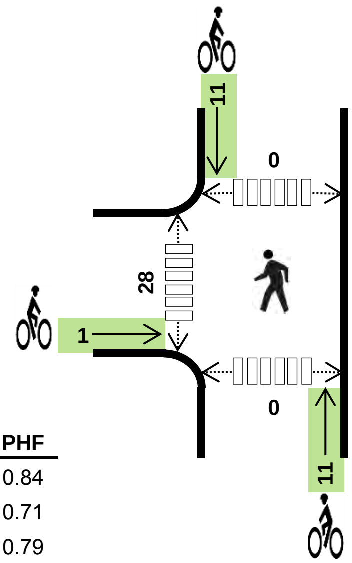
EASTLAKE AVE
REPUBLICAN ST

Date: Thu, Mar 13, 2014
Count Period: 7:00 PM to 9:00 PM
Peak Hour: 7:00 PM to 8:00 PM





	HV %:	PHF
EB	0.0%	0.84
NB	6.2%	0.71
SB	6.3%	0.79
TOTAL	5.7%	0.82

Two-Hour Count Summaries

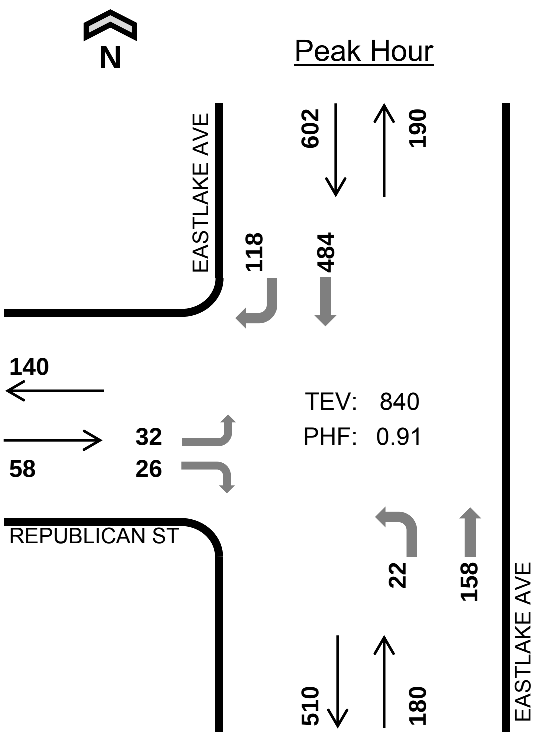
Interval Start	REPUBLICAN ST Eastbound LT	TH	RT	REPUBLICAN ST Westbound LT	TH	RT	EASTLAKE AVE Northbound LT	TH	RT	EASTLAKE AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:00 PM	**4**	**0**	**4**	**0**	**0**	**0**	**5**	**42**	**0**	**0**	**66**	**34**	**155**	
7:15 PM	**6**	**0**	**6**	**0**	**0**	**0**	**8**	**43**	**0**	**0**	**66**	**19**	**148**	
7:30 PM	**8**	**0**	**6**	**0**	**0**	**0**	**2**	**18**	**0**	**0**	**52**	**21**	**107**	
7:45 PM	**8**	**0**	**5**	**0**	**0**	**0**	**7**	**20**	**0**	**0**	**45**	**12**	**97**	**507**
8:00 PM	8	0	2	0	0	0	1	20	0	0	47	16	94	446
8:15 PM	3	0	2	0	0	0	6	23	0	0	42	12	88	386
8:30 PM	5	0	3	0	0	0	1	20	0	0	35	12	76	355
8:45 PM	3	0	4	0	0	0	2	29	0	0	35	15	88	346
Count Total	45	0	32	0	0	0	32	215	0	0	388	141	853	
Peak Hr	**26**	**0**	**21**	**0**	**0**	**0**	**22**	**123**	**0**	**0**	**229**	**86**	**507**	

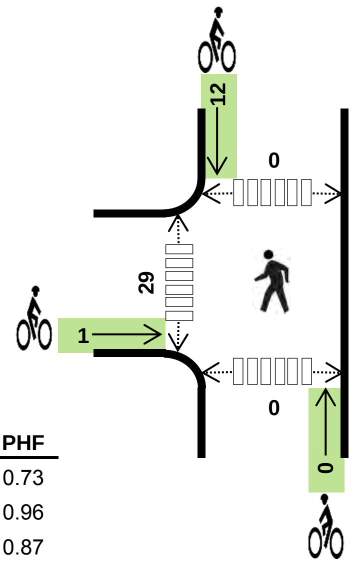
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 PM	**0**	**0**	**3**	**7**	***10***	**0**	**0**	**7**	**5**	***12***	**0**	**5**	**0**	**0**	***5***
7:15 PM	**0**	**0**	**3**	**4**	***7***	**0**	**0**	**4**	**6**	***10***	**0**	**16**	**0**	**0**	***16***
7:30 PM	**0**	**0**	**0**	**6**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**5**	**0**	**0**	***5***
7:45 PM	**0**	**0**	**3**	**3**	***6***	**1**	**0**	**0**	**0**	***1***	**0**	**2**	**0**	**0**	***2***
8:00 PM	0	0	0	2	*2*	0	0	2	0	*2*	0	12	0	0	*12*
8:15 PM	0	0	2	2	*4*	2	0	4	2	*8*	0	8	0	0	*8*
8:30 PM	0	0	1	2	*3*	1	0	3	1	*5*	0	13	0	0	*13*
8:45 PM	0	0	1	1	*2*	1	0	1	0	*2*	0	6	0	0	*6*
Count Total	0	0	13	27	*40*	5	0	21	14	*40*	0	67	0	0	*67*
Peak Hr	**0**	**0**	**9**	**20**	***29***	**1**	**0**	**11**	**11**	***23***	**0**	**28**	**0**	**0**	***28***

EASTLAKE AVE
REPUBLICAN ST

Date: Sat, Mar 15, 2014
Count Period: 11:00 AM to 1:00 PM
Peak Hour: 12:00 PM to 1:00 PM





	HV %:	PHF
EB	0.0%	0.73
NB	6.1%	0.96
SB	2.3%	0.87
TOTAL	3.0%	0.91

Two-Hour Count Summaries

Interval Start	REPUBLICAN ST Eastbound			REPUBLICAN ST Westbound			EASTLAKE AVE Northbound			EASTLAKE AVE Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
11:00 AM	2	0	9	0	0	0	4	28	0	0	99	28	170	
11:15 AM	3	0	3	0	0	0	7	26	0	0	72	21	132	
11:30 AM	6	0	3	0	0	0	4	35	0	0	83	25	156	
11:45 AM	5	0	3	0	0	0	0	38	0	0	113	24	183	641
12:00 PM	**5**	**0**	**9**	**0**	**0**	**0**	**5**	**40**	**0**	**0**	**96**	**21**	**176**	647
12:15 PM	**4**	**0**	**4**	**0**	**0**	**0**	**5**	**42**	**0**	**0**	**122**	**31**	**208**	723
12:30 PM	**12**	**0**	**8**	**0**	**0**	**0**	**4**	**42**	**0**	**0**	**125**	**34**	**225**	792
12:45 PM	**11**	**0**	**5**	**0**	**0**	**0**	**8**	**34**	**0**	**0**	**141**	**32**	**231**	**840**
Count Total	48	0	44	0	0	0	37	285	0	0	851	216	1,481	
Peak Hr	**32**	**0**	**26**	**0**	**0**	**0**	**22**	**158**	**0**	**0**	**484**	**118**	**840**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
11:00 AM	0	0	4	5	*9*	0	0	2	6	*8*	0	6	0	0	*6*
11:15 AM	0	0	2	1	*3*	0	0	1	2	*3*	0	9	0	0	*9*
11:30 AM	0	0	3	4	*7*	0	0	1	2	*3*	0	15	0	0	*15*
11:45 AM	0	0	4	3	*7*	0	0	1	5	*6*	0	12	0	0	*12*
12:00 PM	**0**	**0**	**3**	**3**	***6***	**0**	**0**	**0**	**2**	***2***	**0**	**8**	**0**	**0**	***8***
12:15 PM	**0**	**0**	**3**	**4**	***7***	**0**	**0**	**0**	**3**	***3***	**0**	**6**	**0**	**0**	***6***
12:30 PM	**0**	**0**	**2**	**3**	***5***	**1**	**0**	**0**	**1**	***2***	**0**	**9**	**0**	**0**	***9***
12:45 PM	**0**	**0**	**3**	**4**	***7***	**0**	**0**	**0**	**6**	***6***	**0**	**6**	**0**	**0**	***6***
Count Total	0	0	24	27	*51*	1	0	5	27	*33*	0	71	0	0	*71*
Peak Hr	**0**	**0**	**11**	**14**	***25***	**1**	**0**	**0**	**12**	***13***	**0**	**29**	**0**	**0**	***29***

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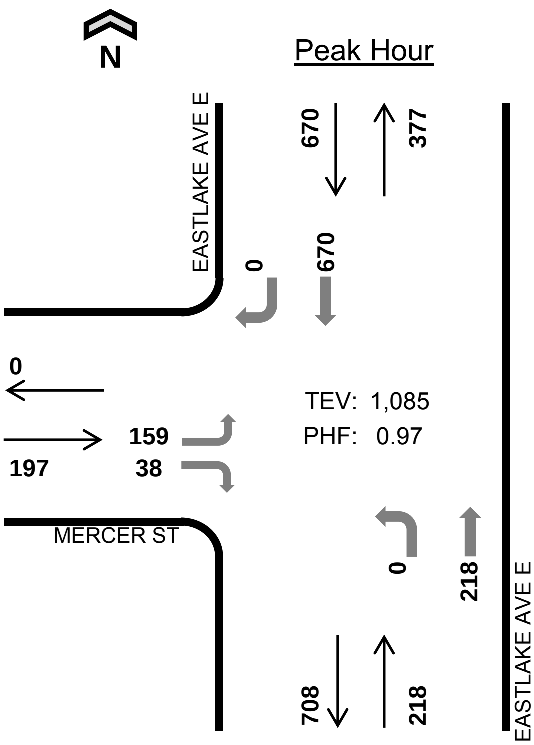
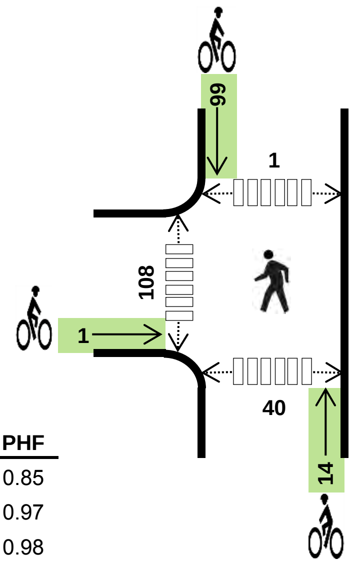
EASTLAKE AVE E
MERCER ST

Date: Tue, Jul 29, 2014
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM

Peak Hour





	HV %:	PHF
EB	4.1%	0.85
NB	6.4%	0.97
SB	3.6%	0.98
TOTAL	4.2%	0.97

Two-Hour Count Summaries

Interval Start	MERCER ST Eastbound LT	TH	RT	MERCER ST Westbound LT	TH	RT	EASTLAKE AVE E Northbound LT	TH	RT	EASTLAKE AVE E Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	17	0	6	0	0	0	0	35	0	0	75	0	133	
7:15 AM	21	0	11	0	0	0	0	30	0	0	78	0	140	
7:30 AM	28	0	7	0	0	0	0	33	0	0	110	0	178	
7:45 AM	27	0	11	0	0	0	0	60	0	0	130	0	228	679
8:00 AM	**44**	**0**	**9**	**0**	**0**	**0**	**0**	**55**	**0**	**0**	**163**	**0**	**271**	817
8:15 AM	**32**	**0**	**6**	**0**	**0**	**0**	**0**	**56**	**0**	**0**	**168**	**0**	**262**	939
8:30 AM	**38**	**0**	**10**	**0**	**0**	**0**	**0**	**54**	**0**	**0**	**171**	**0**	**273**	1,034
8:45 AM	**45**	**0**	**13**	**0**	**0**	**0**	**0**	**53**	**0**	**0**	**168**	**0**	**279**	**1,085**
Count Total	252	0	73	0	0	0	0	376	0	0	1,063	0	1,764	
Peak Hr	**159**	**0**	**38**	**0**	**0**	**0**	**0**	**218**	**0**	**0**	**670**	**0**	**1,085**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	2	0	3	3	*8*	0	0	2	14	*16*	0	18	1	2	*21*
7:15 AM	4	0	2	1	*7*	0	0	1	14	*15*	0	29	0	10	*39*
7:30 AM	1	0	1	2	*4*	0	0	2	14	*16*	0	24	0	1	*25*
7:45 AM	4	0	5	3	*12*	0	0	10	31	*41*	0	32	0	4	*36*
8:00 AM	**2**	**0**	**3**	**5**	***10***	**0**	**0**	**2**	**21**	***23***	**0**	**24**	**0**	**4**	***28***
8:15 AM	**3**	**0**	**3**	**6**	***12***	**0**	**0**	**5**	**15**	***20***	**0**	**30**	**0**	**9**	***39***
8:30 AM	**1**	**0**	**5**	**6**	***12***	**1**	**0**	**5**	**36**	***42***	**0**	**30**	**0**	**10**	***40***
8:45 AM	**2**	**0**	**3**	**7**	***12***	**0**	**0**	**2**	**27**	***29***	**0**	**24**	**1**	**17**	***42***
Count Total	19	0	25	33	*77*	1	0	29	172	*202*	0	211	2	57	*270*
Peak Hr	**8**	**0**	**14**	**24**	***46***	**1**	**0**	**14**	**99**	***114***	**0**	**108**	**1**	**40**	***149***

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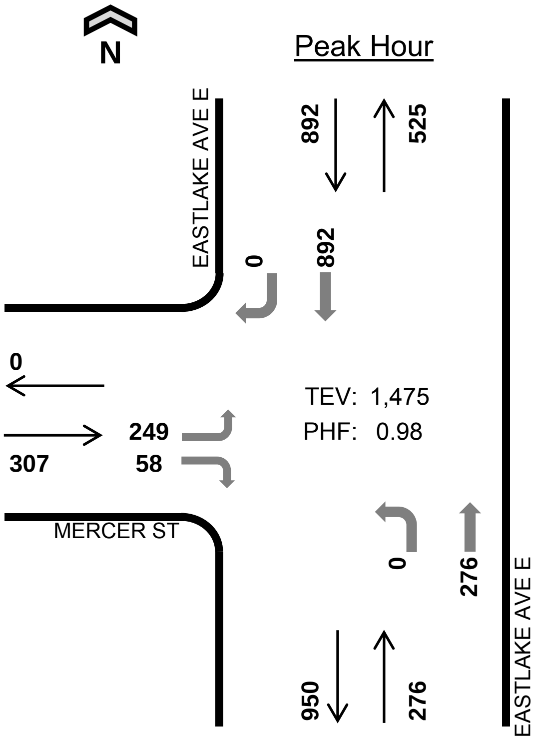
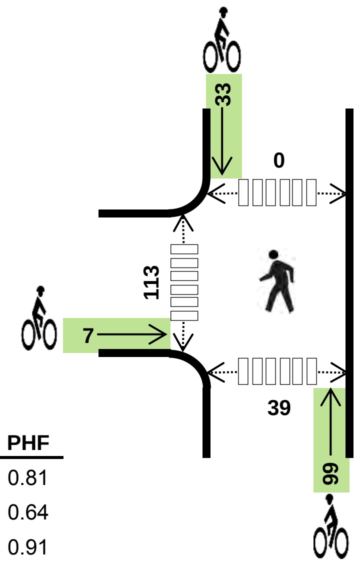
EASTLAKE AVE E
MERCER ST

Date: Tue, Jul 29, 2014
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM





	HV %:	PHF
EB	5.5%	0.81
NB	2.2%	0.64
SB	4.6%	0.91
TOTAL	4.3%	0.98

Two-Hour Count Summaries

Interval Start	MERCER ST			MERCER ST			EASTLAKE AVE E			EASTLAKE AVE E			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	39	0	13	0	0	0	0	54	0	0	247	0	353	
4:15 PM	25	0	10	0	0	0	0	56	0	0	213	0	304	
4:30 PM	40	0	14	0	0	0	0	52	0	0	258	0	364	
4:45 PM	57	0	16	0	0	0	0	65	0	0	221	0	359	1,380
5:00 PM	**58**	**0**	**14**	**0**	**0**	**0**	**0**	**48**	**0**	**0**	**245**	**0**	**365**	1,392
5:15 PM	**79**	**0**	**16**	**0**	**0**	**0**	**0**	**62**	**0**	**0**	**215**	**0**	**372**	1,460
5:30 PM	**56**	**0**	**18**	**0**	**0**	**0**	**0**	**58**	**0**	**0**	**229**	**0**	**361**	1,457
5:45 PM	**56**	**0**	**10**	**0**	**0**	**0**	**0**	**108**	**0**	**0**	**203**	**0**	**377**	**1,475**
Count Total	410	0	111	0	0	0	0	503	0	0	1,831	0	2,855	
Peak Hr	**249**	**0**	**58**	**0**	**0**	**0**	**0**	**276**	**0**	**0**	**892**	**0**	**1,475**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	6	0	1	14	*21*	0	0	7	9	*16*	0	28	0	6	*34*
4:15 PM	5	0	2	7	*14*	2	0	8	5	*15*	0	33	0	9	*42*
4:30 PM	10	0	2	15	*27*	1	0	13	6	*20*	0	32	0	9	*41*
4:45 PM	6	0	2	10	*18*	3	0	23	6	*32*	0	24	0	13	*37*
5:00 PM	**6**	**0**	**0**	**15**	***21***	**0**	**0**	**20**	**6**	***26***	**0**	**30**	**0**	**5**	***35***
5:15 PM	**6**	**0**	**2**	**4**	***12***	**2**	**0**	**28**	**13**	***43***	**0**	**26**	**0**	**11**	***37***
5:30 PM	**3**	**0**	**1**	**8**	***12***	**2**	**0**	**27**	**8**	***37***	**0**	**29**	**0**	**8**	***37***
5:45 PM	**2**	**0**	**3**	**14**	***19***	**3**	**0**	**24**	**6**	***33***	**0**	**28**	**0**	**15**	***43***
Count Total	44	0	13	87	*144*	13	0	150	59	*222*	0	230	0	76	*306*
Peak Hr	**17**	**0**	**6**	**41**	***64***	**7**	**0**	**99**	**33**	***139***	**0**	**113**	**0**	**39**	***152***

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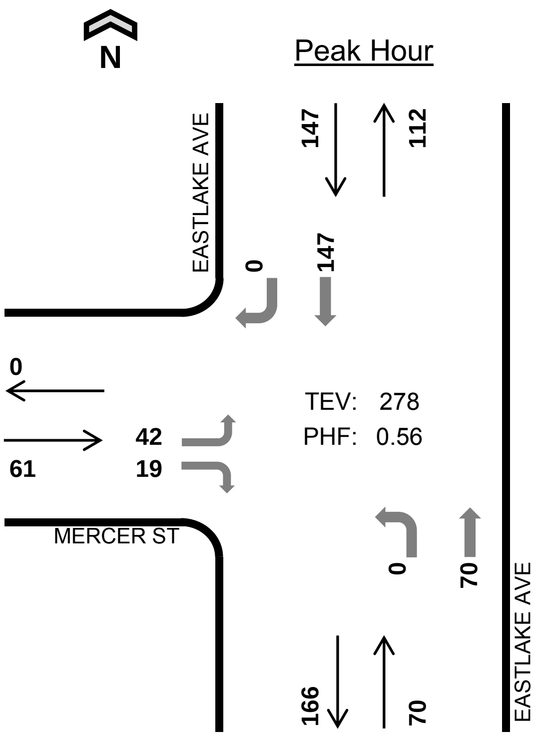
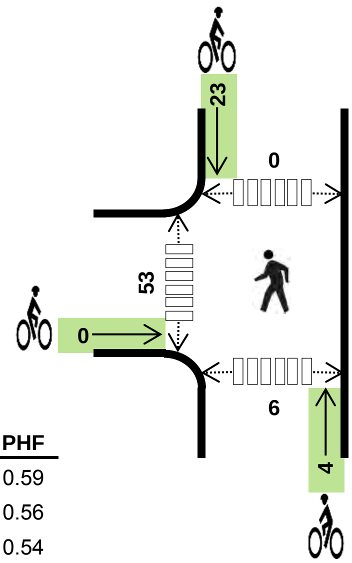
EASTLAKE AVE
MERCER ST

Date: Thu, Mar 13, 2014
Count Period: 5:00 AM to 7:00 AM
Peak Hour: 6:00 AM to 7:00 AM





	HV %:	PHF
EB	9.8%	0.59
NB	7.1%	0.56
SB	4.1%	0.54
TOTAL	6.1%	0.56

Two-Hour Count Summaries

Interval Start	MERCER ST Eastbound LT	TH	RT	MERCER ST Westbound LT	TH	RT	EASTLAKE AVE Northbound LT	TH	RT	EASTLAKE AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
5:00 AM	5	0	0	0	0	0	0	2	0	0	8	0	15	
5:15 AM	3	0	4	0	0	0	0	4	0	0	5	0	16	
5:30 AM	3	0	4	0	0	0	0	3	0	0	18	0	28	
5:45 AM	5	0	6	0	0	0	0	7	0	0	21	0	39	98
6:00 AM	**3**	**0**	**4**	**0**	**0**	**0**	**0**	**8**	**0**	**0**	**15**	**0**	**30**	113
6:15 AM	**11**	**0**	**3**	**0**	**0**	**0**	**0**	**14**	**0**	**0**	**24**	**0**	**52**	149
6:30 AM	**7**	**0**	**7**	**0**	**0**	**0**	**0**	**17**	**0**	**0**	**40**	**0**	**71**	192
6:45 AM	**21**	**0**	**5**	**0**	**0**	**0**	**0**	**31**	**0**	**0**	**68**	**0**	**125**	**278**
Count Total	58	0	33	0	0	0	0	86	0	0	199	0	376	
Peak Hr	**42**	**0**	**19**	**0**	**0**	**0**	**0**	**70**	**0**	**0**	**147**	**0**	**278**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
5:00 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
5:15 AM	1	0	0	0	*1*	0	0	0	1	*1*	0	0	0	0	*0*
5:30 AM	0	0	1	3	*4*	0	0	0	1	*1*	0	0	0	0	*0*
5:45 AM	2	0	0	1	*3*	0	0	2	1	*3*	0	0	0	0	*0*
6:00 AM	**2**	**0**	**0**	**3**	***5***	**0**	**0**	**2**	**5**	***7***	**0**	**8**	**0**	**0**	***8***
6:15 AM	**1**	**0**	**2**	**0**	***3***	**0**	**0**	**0**	**2**	***2***	**0**	**13**	**0**	**2**	***15***
6:30 AM	**0**	**0**	**1**	**2**	***3***	**0**	**0**	**1**	**7**	***8***	**0**	**12**	**0**	**0**	***12***
6:45 AM	**3**	**0**	**2**	**1**	***6***	**0**	**0**	**1**	**9**	***10***	**0**	**20**	**0**	**4**	***24***
Count Total	9	0	6	10	*25*	0	0	6	26	*32*	0	53	0	6	*59*
Peak Hr	**6**	**0**	**5**	**6**	***17***	**0**	**0**	**4**	**23**	***27***	**0**	**53**	**0**	**6**	***59***

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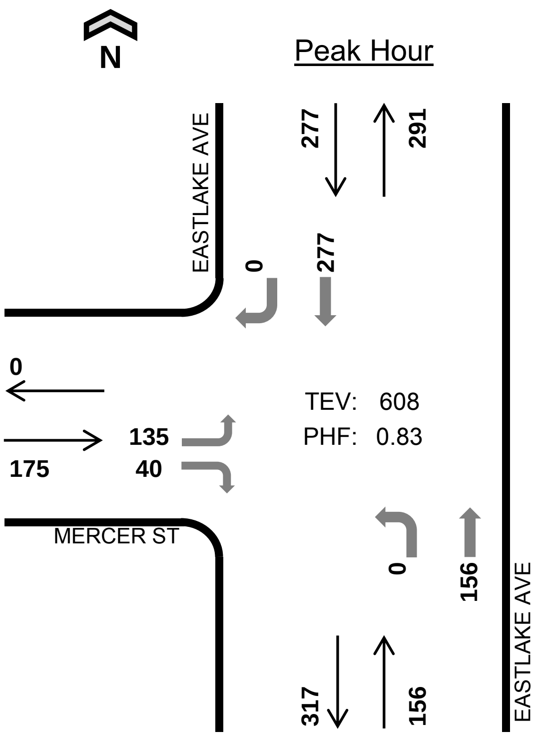
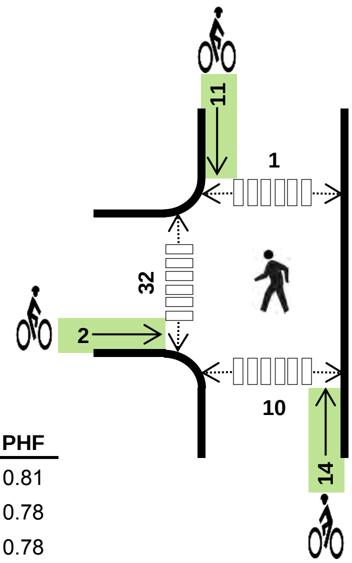
EASTLAKE AVE
MERCER ST

Date: Thu, Mar 13, 2014
Count Period: 7:00 PM to 9:00 PM
Peak Hour: 7:00 PM to 8:00 PM





	HV %:	PHF
EB	3.4%	0.81
NB	1.9%	0.78
SB	4.7%	0.78
TOTAL	3.6%	0.83

Two-Hour Count Summaries

Interval Start	MERCER ST Eastbound LT	TH	RT	MERCER ST Westbound LT	TH	RT	EASTLAKE AVE Northbound LT	TH	RT	EASTLAKE AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:00 PM	**34**	**0**	**10**	**0**	**0**	**0**	**0**	**50**	**0**	**0**	**89**	**0**	**183**	
7:15 PM	**43**	**0**	**11**	**0**	**0**	**0**	**0**	**50**	**0**	**0**	**74**	**0**	**178**	
7:30 PM	**32**	**0**	**13**	**0**	**0**	**0**	**0**	**27**	**0**	**0**	**62**	**0**	**134**	
7:45 PM	**26**	**0**	**6**	**0**	**0**	**0**	**0**	**29**	**0**	**0**	**52**	**0**	**113**	**608**
8:00 PM	34	0	4	0	0	0	0	28	0	0	58	0	124	549
8:15 PM	25	0	7	0	0	0	0	27	0	0	48	0	107	478
8:30 PM	17	0	6	0	0	0	0	25	0	0	42	0	90	434
8:45 PM	14	0	8	0	0	0	0	32	0	0	41	0	95	416
Count Total	225	0	65	0	0	0	0	268	0	0	466	0	1,024	
Peak Hr	**135**	**0**	**40**	**0**	**0**	**0**	**0**	**156**	**0**	**0**	**277**	**0**	**608**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 PM	**2**	**0**	**1**	**5**	***8***	**0**	**0**	**6**	**5**	***11***	**0**	**5**	**0**	**3**	***8***
7:15 PM	**2**	**0**	**1**	**2**	***5***	**0**	**0**	**5**	**6**	***11***	**0**	**12**	**1**	**4**	***17***
7:30 PM	**1**	**0**	**0**	**5**	***6***	**2**	**0**	**0**	**0**	***2***	**0**	**9**	**0**	**2**	***11***
7:45 PM	**1**	**0**	**1**	**1**	***3***	**0**	**0**	**3**	**0**	***3***	**0**	**6**	**0**	**1**	***7***
8:00 PM	1	0	0	1	*2*	0	0	2	0	*2*	0	5	0	2	*7*
8:15 PM	1	0	1	1	*3*	0	0	5	1	*6*	0	5	0	3	*8*
8:30 PM	1	0	0	1	*2*	0	0	2	1	*3*	0	7	0	0	*7*
8:45 PM	1	0	0	0	*1*	0	0	2	0	*2*	0	8	0	2	*10*
Count Total	10	0	4	16	*30*	2	0	25	13	*40*	0	57	1	17	*75*
Peak Hr	**6**	**0**	**3**	**13**	***22***	**2**	**0**	**14**	**11**	***27***	**0**	**32**	**1**	**10**	***43***

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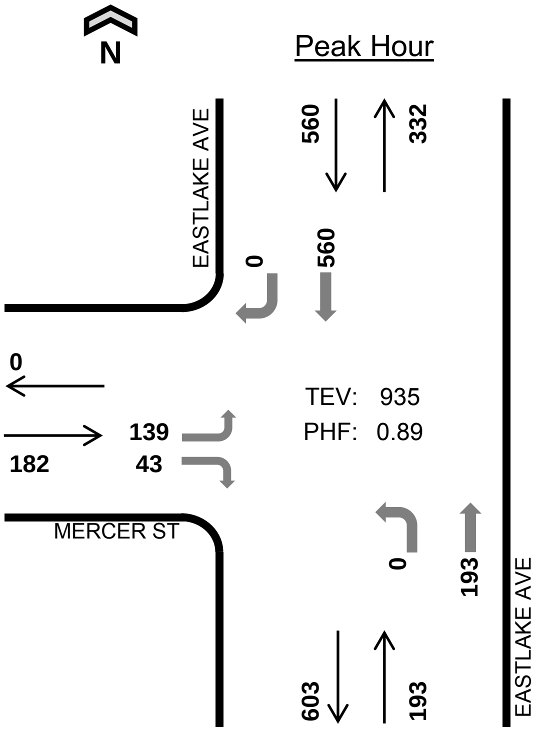
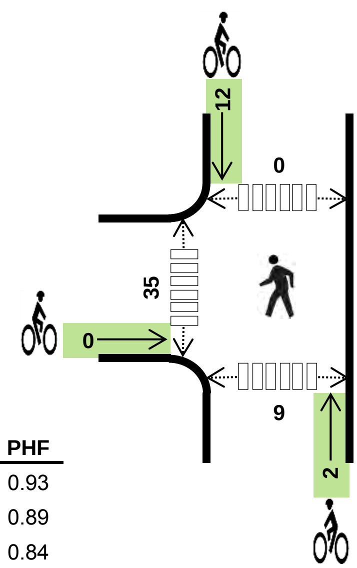
EASTLAKE AVE
MERCER ST

Date: Sat, Mar 15, 2014
Count Period: 11:00 AM to 1:00 PM
Peak Hour: 12:00 PM to 1:00 PM





	HV %:	PHF
EB	1.6%	0.93
NB	4.1%	0.89
SB	2.0%	0.84
TOTAL	2.4%	0.89

Two-Hour Count Summaries

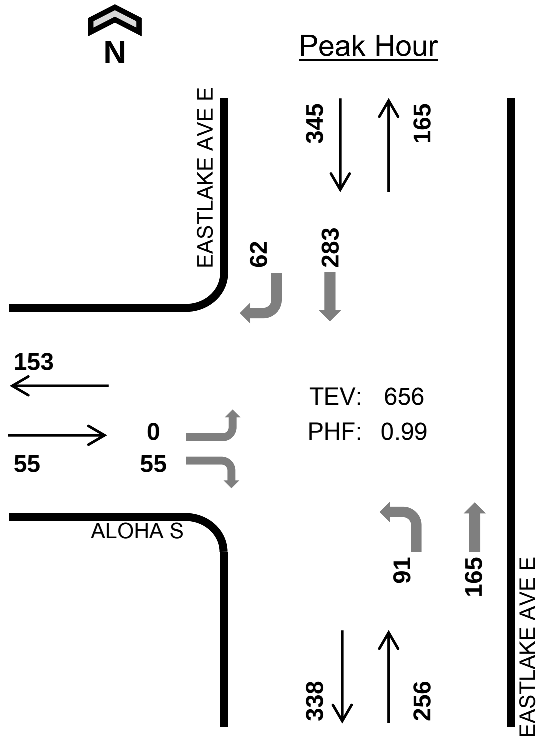
Interval Start	MERCER ST Eastbound			MERCER ST Westbound			EASTLAKE AVE Northbound			EASTLAKE AVE Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
11:00 AM	24	0	11	0	0	0	0	31	0	0	116	0	182	
11:15 AM	22	0	7	0	0	0	0	30	0	0	88	0	147	
11:30 AM	23	0	10	0	0	0	0	42	0	0	93	0	168	
11:45 AM	24	0	15	0	0	0	0	43	0	0	123	0	205	702
12:00 PM	**30**	**0**	**17**	**0**	**0**	**0**	**0**	**44**	**0**	**0**	**101**	**0**	**192**	712
12:15 PM	**31**	**0**	**10**	**0**	**0**	**0**	**0**	**47**	**0**	**0**	**143**	**0**	**231**	796
12:30 PM	**35**	**0**	**10**	**0**	**0**	**0**	**0**	**54**	**0**	**0**	**150**	**0**	**249**	877
12:45 PM	**43**	**0**	**6**	**0**	**0**	**0**	**0**	**48**	**0**	**0**	**166**	**0**	**263**	**935**
Count Total	232	0	86	0	0	0	0	339	0	0	980	0	1,637	
Peak Hr	**139**	**0**	**43**	**0**	**0**	**0**	**0**	**193**	**0**	**0**	**560**	**0**	**935**	

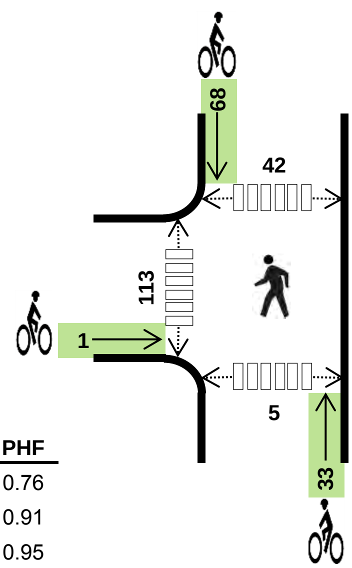
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
11:00 AM	3	0	2	3	*8*	0	0	2	6	*8*	0	8	0	1	*9*
11:15 AM	0	0	2	1	*3*	0	0	1	2	*3*	0	7	0	1	*8*
11:30 AM	3	0	2	3	*8*	0	0	1	3	*4*	0	9	0	3	*12*
11:45 AM	2	0	4	3	*9*	1	0	1	4	*6*	0	11	0	5	*16*
12:00 PM	**2**	**0**	**1**	**1**	***4***	**0**	**0**	**0**	**2**	***2***	**0**	**8**	**0**	**2**	***10***
12:15 PM	**0**	**0**	**3**	**4**	***7***	**0**	**0**	**1**	**3**	***4***	**0**	**11**	**0**	**1**	***12***
12:30 PM	**0**	**0**	**2**	**3**	***5***	**0**	**0**	**1**	**2**	***3***	**0**	**12**	**0**	**6**	***18***
12:45 PM	**1**	**0**	**2**	**3**	***6***	**0**	**0**	**0**	**5**	***5***	**0**	**4**	**0**	**0**	***4***
Count Total	11	0	18	21	*50*	1	0	7	27	*35*	0	70	0	19	*89*
Peak Hr	**3**	**0**	**8**	**11**	***22***	**0**	**0**	**2**	**12**	***14***	**0**	**35**	**0**	**9**	***44***

EASTLAKE AVE E
ALOHA S

Date: Tue, Jul 29, 2014
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM





	HV %:	PHF
EB	9.1%	0.76
NB	5.5%	0.91
SB	4.6%	0.95
TOTAL	5.3%	0.99

Two-Hour Count Summaries

Interval Start	ALOHA S			ALOHA S			EASTLAKE AVE E			EASTLAKE AVE E			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	1	0	11	0	0	0	13	17	0	0	32	9	83	
7:15 AM	0	0	15	0	0	0	14	17	0	0	43	15	104	
7:30 AM	0	0	6	0	0	0	19	27	0	0	47	13	112	
7:45 AM	0	0	11	0	0	0	24	39	0	0	66	21	161	460
8:00 AM	**0**	**0**	**11**	**0**	**0**	**0**	**23**	**41**	**0**	**0**	**74**	**12**	**161**	538
8:15 AM	**0**	**0**	**8**	**0**	**0**	**0**	**23**	**43**	**0**	**0**	**76**	**15**	**165**	599
8:30 AM	**0**	**0**	**18**	**0**	**0**	**0**	**19**	**37**	**0**	**0**	**75**	**15**	**164**	651
8:45 AM	**0**	**0**	**18**	**0**	**0**	**0**	**26**	**44**	**0**	**0**	**58**	**20**	**166**	**656**
Count Total	1	0	98	0	0	0	161	265	0	0	471	120	1,116	
Peak Hr	**0**	**0**	**55**	**0**	**0**	**0**	**91**	**165**	**0**	**0**	**283**	**62**	**656**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	1	0	1	2	*4*	0	0	4	7	*11*	0	18	1	0	*19*
7:15 AM	1	0	3	1	*5*	0	0	1	14	*15*	0	47	15	7	*69*
7:30 AM	0	0	1	2	*3*	0	0	6	12	*18*	0	27	5	0	*32*
7:45 AM	1	0	6	1	*8*	0	0	11	19	*30*	0	46	15	5	*66*
8:00 AM	**1**	**0**	**5**	**3**	***9***	**0**	**0**	**7**	**13**	***20***	**0**	**22**	**6**	**0**	***28***
8:15 AM	**0**	**0**	**3**	**6**	***9***	**0**	**0**	**6**	**20**	***26***	**0**	**29**	**14**	**2**	***45***
8:30 AM	**3**	**0**	**3**	**4**	***10***	**0**	**0**	**9**	**22**	***31***	**0**	**34**	**9**	**3**	***46***
8:45 AM	**1**	**0**	**3**	**3**	***7***	**1**	**0**	**11**	**13**	***25***	**0**	**28**	**13**	**0**	***41***
Count Total	8	0	25	22	*55*	1	0	55	120	*176*	0	251	78	17	*346*
Peak Hr	**5**	**0**	**14**	**16**	***35***	**1**	**0**	**33**	**68**	***102***	**0**	**113**	**42**	**5**	***160***

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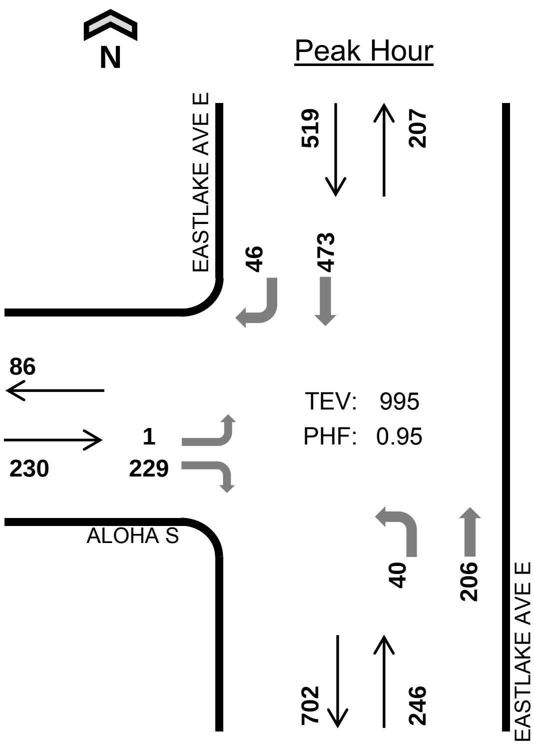
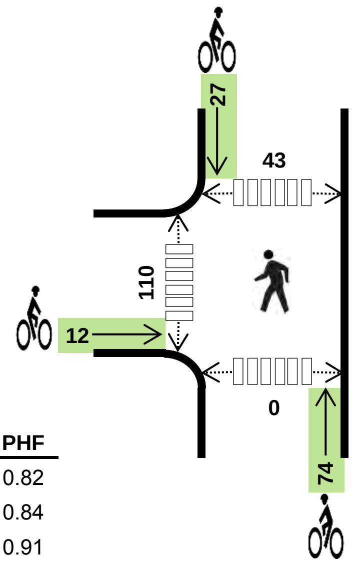
EASTLAKE AVE E
ALOHA S

Date: Tue, Jul 29, 2014
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	2.2%	0.82
NB	4.1%	0.84
SB	5.6%	0.91
TOTAL	4.4%	0.95



Two-Hour Count Summaries

Interval Start	ALOHA S Eastbound LT	TH	RT	ALOHA S Westbound LT	TH	RT	EASTLAKE AVE E Northbound LT	TH	RT	EASTLAKE AVE E Southbound LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	0	0	46	0	0	0	12	32	0	0	118	13	221	
4:15 PM	0	0	54	0	0	0	12	31	0	0	116	12	225	
4:30 PM	**0**	**0**	**53**	**0**	**0**	**0**	**14**	**41**	**0**	**0**	**133**	**9**	**250**	
4:45 PM	**0**	**0**	**57**	**0**	**0**	**0**	**7**	**53**	**0**	**0**	**99**	**10**	**226**	922
5:00 PM	**0**	**0**	**70**	**0**	**0**	**0**	**9**	**49**	**0**	**0**	**120**	**13**	**261**	962
5:15 PM	**1**	**0**	**49**	**0**	**0**	**0**	**10**	**63**	**0**	**0**	**121**	**14**	**258**	**995**
5:30 PM	0	0	42	0	0	0	2	41	0	0	133	11	229	974
5:45 PM	0	0	29	0	0	0	12	67	0	0	95	11	214	962
Count Total	1	0	400	0	0	0	78	377	0	0	935	93	1,884	
Peak Hr	**1**	**0**	**229**	**0**	**0**	**0**	**40**	**206**	**0**	**0**	**473**	**46**	**995**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	2	0	1	8	*11*	2	0	3	6	*11*	0	18	9	0	*27*
4:15 PM	1	0	2	7	*10*	2	0	6	5	*13*	0	29	17	1	*47*
4:30 PM	**2**	**0**	**5**	**7**	***14***	**0**	**0**	**15**	**7**	***22***	**0**	**24**	**14**	**0**	***38***
4:45 PM	**1**	**0**	**2**	**7**	***10***	**4**	**0**	**21**	**5**	***30***	**0**	**25**	**12**	**0**	***37***
5:00 PM	**1**	**0**	**1**	**11**	***13***	**6**	**0**	**15**	**8**	***29***	**0**	**37**	**9**	**0**	***46***
5:15 PM	**1**	**0**	**2**	**4**	***7***	**2**	**0**	**23**	**7**	***32***	**0**	**24**	**8**	**0**	***32***
5:30 PM	1	0	0	9	*10*	7	0	14	6	*27*	0	23	13	0	*36*
5:45 PM	1	0	2	8	*11*	1	0	16	5	*22*	0	28	12	0	*40*
Count Total	10	0	15	61	*86*	24	0	113	49	*186*	0	208	94	1	*303*
Peak Hr	**5**	**0**	**10**	**29**	***44***	**12**	**0**	**74**	**27**	***113***	**0**	**110**	**43**	**0**	***153***

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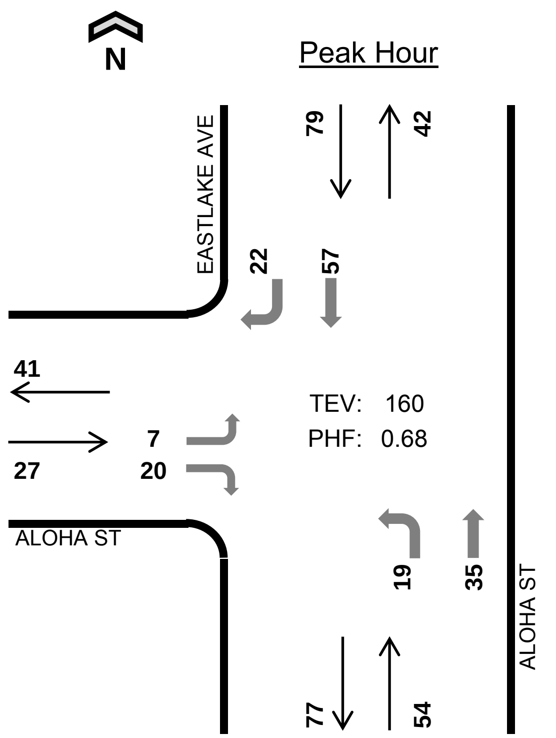
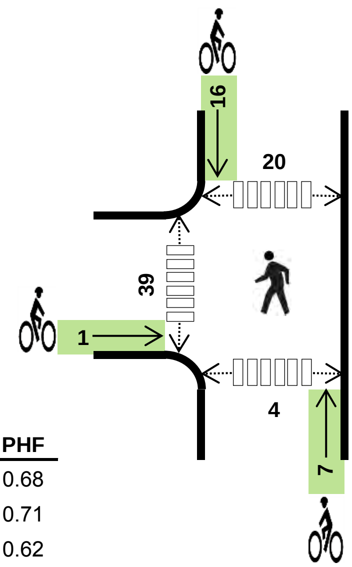
EASTLAKE AVE

Date: Tue, Feb 04, 2014
Count Period: 5:00 AM to 7:15 AM
Peak Hour: 6:00 AM to 7:00 AM





	HV %:	PHF
EB	3.7%	0.68
NB	5.6%	0.71
SB	7.6%	0.62
TOTAL	6.3%	0.68

Peak-Hour Count Summaries

Interval Start	ALOHA ST Eastbound LT	TH	RT	Westbound LT	TH	RT	ALOHA ST Northbound LT	TH	RT	EASTLAKE AVE Southbound LT	TH	RT	15-min Total
6:00 AM	3	0	1	0	0	0	3	3	0	0	9	3	22
6:15 AM	3	0	2	0	0	0	4	8	0	0	12	6	35
6:30 AM	1	0	9	0	0	0	4	13	0	0	14	3	44
6:45 AM	0	0	8	0	0	0	8	11	0	0	22	10	59
Peak Hr	**7**	**0**	**20**	**0**	**0**	**0**	**19**	**35**	**0**	**0**	**57**	**22**	**160**

Note: For all six-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
6:00 AM	0	0	0	2	*2*	0	0	2	3	*5*	0	6	0	0	*6*
6:15 AM	0	0	1	1	*2*	0	0	0	2	*2*	0	16	10	0	*26*
6:30 AM	1	0	0	2	*3*	1	0	3	5	*9*	0	9	2	0	*11*
6:45 AM	0	0	2	1	*3*	0	0	2	6	*8*	0	8	8	4	*20*
Peak Hr	**1**	**0**	**3**	**6**	***10***	**1**	**0**	**7**	**16**	***24***	**0**	**39**	**20**	**4**	***63***

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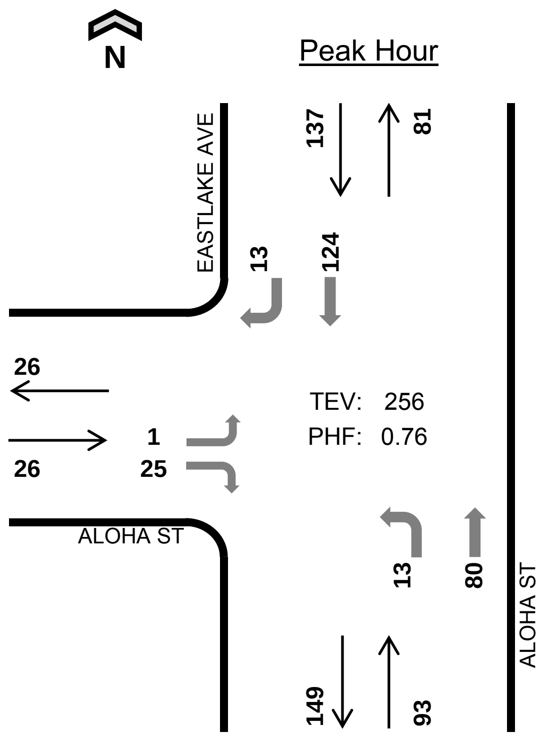
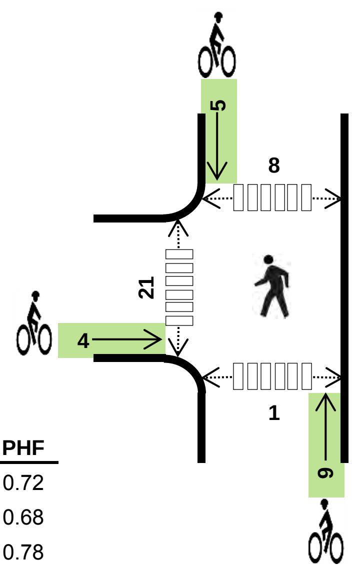
EASTLAKE AVE
ALOHA ST

Date: Tue, Feb 04, 2014
Count Period: 7:00 PM to 9:00 PM
Peak Hour: 7:00 PM to 8:00 PM





	HV %:	PHF
EB	3.8%	0.72
NB	3.2%	0.68
SB	10.9%	0.78
TOTAL	7.4%	0.76

Two-Hour Count Summaries

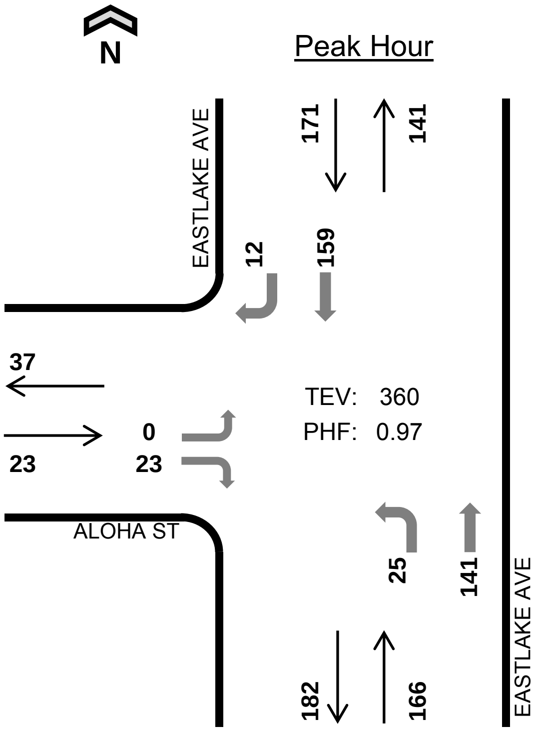
Interval Start	ALOHA ST			ALOHA ST			ALOHA ST			EASTLAKE AVE			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 PM	**0**	**0**	**6**	**0**	**0**	**0**	**6**	**28**	**0**	**0**	**41**	**3**	**84**	
7:15 PM	**0**	**0**	**7**	**0**	**0**	**0**	**0**	**21**	**0**	**0**	**33**	**4**	**65**	
7:30 PM	**1**	**0**	**8**	**0**	**0**	**0**	**2**	**20**	**0**	**0**	**28**	**3**	**62**	
7:45 PM	**0**	**0**	**4**	**0**	**0**	**0**	**5**	**11**	**0**	**0**	**22**	**3**	**45**	**256**
8:00 PM	0	0	6	0	0	0	2	11	0	0	23	0	42	214
8:15 PM	0	0	4	0	0	0	3	11	0	0	22	3	43	192
8:30 PM	0	0	7	0	0	0	6	18	0	0	24	1	56	186
8:45 PM	1	0	4	0	0	0	3	21	0	0	13	0	42	183
Count Total	2	0	46	0	0	0	27	141	0	0	206	17	439	
Peak Hr	**1**	**0**	**25**	**0**	**0**	**0**	**13**	**80**	**0**	**0**	**124**	**13**	**256**	

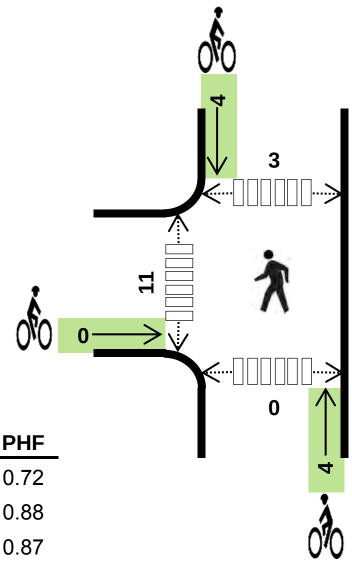
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 PM	**1**	**0**	**1**	**3**	***5***	**0**	**0**	**5**	**0**	***5***	**0**	**2**	**0**	**0**	***2***
7:15 PM	**0**	**0**	**0**	**6**	***6***	**3**	**0**	**1**	**2**	***6***	**0**	**8**	**6**	**0**	***14***
7:30 PM	**0**	**0**	**1**	**5**	***6***	**1**	**0**	**3**	**2**	***6***	**0**	**7**	**1**	**0**	***8***
7:45 PM	**0**	**0**	**1**	**1**	***2***	**0**	**0**	**0**	**1**	***1***	**0**	**4**	**1**	**1**	***6***
8:00 PM	0	0	1	1	*2*	0	0	0	1	*1*	0	2	1	1	*4*
8:15 PM	0	0	0	4	*4*	0	0	2	0	*2*	0	0	0	0	*0*
8:30 PM	0	0	2	0	*2*	1	0	0	0	*1*	0	2	0	0	*2*
8:45 PM	0	0	0	0	*0*	0	0	1	0	*1*	0	0	2	0	*2*
Count Total	1	0	6	20	*27*	5	0	12	6	*23*	0	25	11	2	*38*
Peak Hr	**1**	**0**	**3**	**15**	***19***	**4**	**0**	**9**	**5**	***18***	**0**	**21**	**8**	**1**	***30***

EASTLAKE AVE
ALOHA ST

Date: Sat, Feb 01, 2014
Count Period: 11:00 AM to 1:00 PM
Peak Hour: 12:00 PM to 1:00 PM





	HV %:	PHF
EB	0.0%	0.72
NB	7.2%	0.88
SB	5.3%	0.87
TOTAL	5.8%	0.97

Two-Hour Count Summaries

Interval Start	ALOHA ST Eastbound			ALOHA ST Westbound			EASTLAKE AVE Northbound			EASTLAKE AVE Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
11:00 AM	0	0	5	0	0	0	2	22	0	0	38	1	68	
11:15 AM	0	0	3	0	0	0	4	22	0	0	33	2	64	
11:30 AM	0	0	11	0	0	0	6	24	0	0	43	2	86	
11:45 AM	0	0	11	0	0	0	7	16	0	0	37	2	73	291
12:00 PM	**0**	**0**	**4**	**0**	**0**	**0**	**6**	**41**	**0**	**0**	**39**	**3**	**93**	316
12:15 PM	**0**	**0**	**6**	**0**	**0**	**0**	**5**	**31**	**0**	**0**	**45**	**4**	**91**	343
12:30 PM	**0**	**0**	**5**	**0**	**0**	**0**	**9**	**31**	**0**	**0**	**43**	**2**	**90**	347
12:45 PM	**0**	**0**	**8**	**0**	**0**	**0**	**5**	**38**	**0**	**0**	**32**	**3**	**86**	**360**
Count Total	0	0	53	0	0	0	44	225	0	0	310	19	651	
Peak Hr	**0**	**0**	**23**	**0**	**0**	**0**	**25**	**141**	**0**	**0**	**159**	**12**	**360**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
11:00 AM	0	0	4	4	*8*	1	0	0	2	*3*	0	1	2	0	*3*
11:15 AM	0	0	5	2	*7*	0	0	1	1	*2*	0	11	2	0	*13*
11:30 AM	0	0	2	2	*4*	0	0	0	0	*0*	0	6	2	0	*8*
11:45 AM	0	0	2	3	*5*	0	0	0	3	*3*	0	3	0	0	*3*
12:00 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**2**	**2**	***4***	**0**	**2**	**0**	**0**	***2***
12:15 PM	**0**	**0**	**3**	**5**	***8***	**0**	**0**	**1**	**1**	***2***	**0**	**5**	**0**	**0**	***5***
12:30 PM	**0**	**0**	**2**	**0**	***2***	**0**	**0**	**1**	**1**	***2***	**0**	**1**	**2**	**0**	***3***
12:45 PM	**0**	**0**	**6**	**4**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**3**	**1**	**0**	***4***
Count Total	0	0	25	20	*45*	1	0	5	10	*16*	0	32	9	0	*41*
Peak Hr	**0**	**0**	**12**	**9**	***21***	**0**	**0**	**4**	**4**	***8***	**0**	**11**	**3**	**0**	***14***

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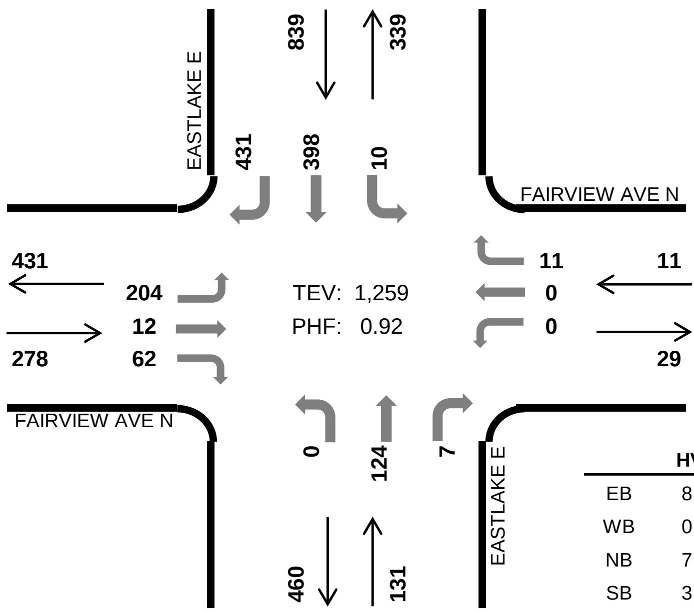
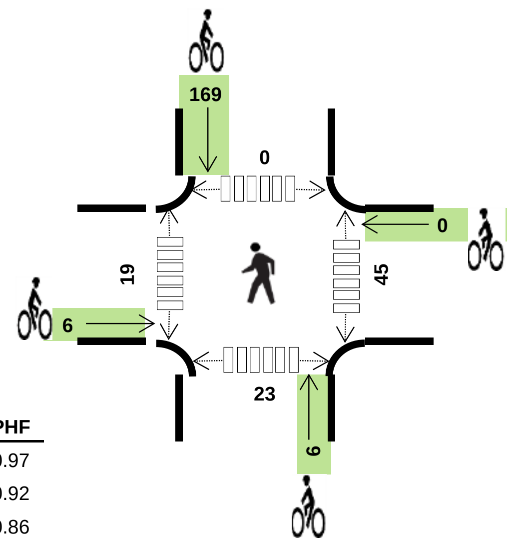
EASTLAKE E
FAIRVIEW AVE N

Date: Tue, Jul 29, 2014
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM

N

Peak Hour





	HV %:	PHF
EB	8.3%	0.97
WB	0.0%	0.92
NB	7.6%	0.86
SB	3.6%	0.91
TOTAL	5.0%	0.92

Two-Hour Count Summaries

Interval Start	FAIRVIEW AVE N Eastbound LT	TH	RT	FAIRVIEW AVE N Westbound LT	TH	RT	EASTLAKE E Northbound LT	TH	RT	EASTLAKE E Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	27	2	14	0	0	1	0	18	1	1	50	41	155	
7:15 AM	32	6	15	0	0	2	0	17	0	1	57	46	176	
7:30 AM	44	3	15	0	0	2	0	10	1	0	78	63	216	
7:45 AM	42	3	15	0	0	2	0	38	1	3	101	88	293	840
8:00 AM	**57**	**2**	**11**	**0**	**0**	**3**	**0**	**22**	**2**	**2**	**108**	**93**	**300**	985
8:15 AM	**40**	**4**	**21**	**0**	**0**	**3**	**0**	**31**	**2**	**3**	**89**	**111**	**304**	1,113
8:30 AM	**56**	**3**	**13**	**0**	**0**	**2**	**0**	**35**	**1**	**2**	**109**	**120**	**341**	1,238
8:45 AM	**51**	**3**	**17**	**0**	**0**	**3**	**0**	**36**	**2**	**3**	**92**	**107**	**314**	**1,259**
Count Total	349	26	121	0	0	18	0	207	10	15	684	669	2,099	
Peak Hr	**204**	**12**	**62**	**0**	**0**	**11**	**0**	**124**	**7**	**10**	**398**	**431**	**1,259**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

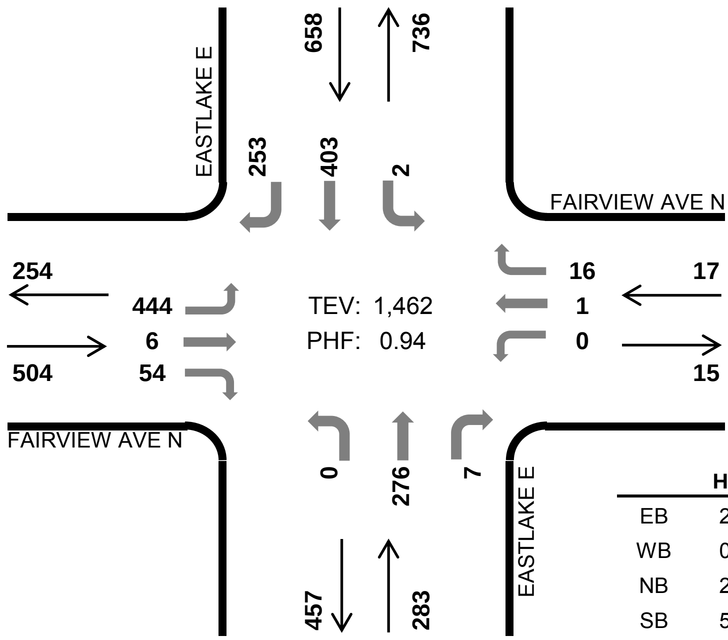
Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	5	0	1	5	*11*	0	0	1	12	*13*	4	2	0	1	*7*
7:15 AM	4	0	3	4	*11*	2	0	1	25	*28*	10	5	0	2	*17*
7:30 AM	5	0	1	5	*11*	2	0	1	36	*39*	15	8	0	9	*32*
7:45 AM	3	0	6	4	*13*	2	0	5	37	*44*	17	5	0	7	*29*
8:00 AM	**7**	**0**	**2**	**8**	***17***	**0**	**0**	**0**	**34**	***34***	**9**	**8**	**0**	**8**	***25***
8:15 AM	**8**	**0**	**1**	**8**	***17***	**4**	**0**	**1**	**45**	***50***	**13**	**5**	**0**	**4**	***22***
8:30 AM	**4**	**0**	**4**	**8**	***16***	**0**	**0**	**2**	**57**	***59***	**17**	**2**	**0**	**5**	***24***
8:45 AM	**4**	**0**	**3**	**6**	***13***	**2**	**0**	**3**	**33**	***38***	**6**	**4**	**0**	**6**	***16***
Count Total	40	0	21	48	*109*	12	0	14	279	*305*	91	39	0	42	*172*
Peak Hr	**23**	**0**	**10**	**30**	***63***	**6**	**0**	**6**	**169**	***181***	**45**	**19**	**0**	**23**	***87***

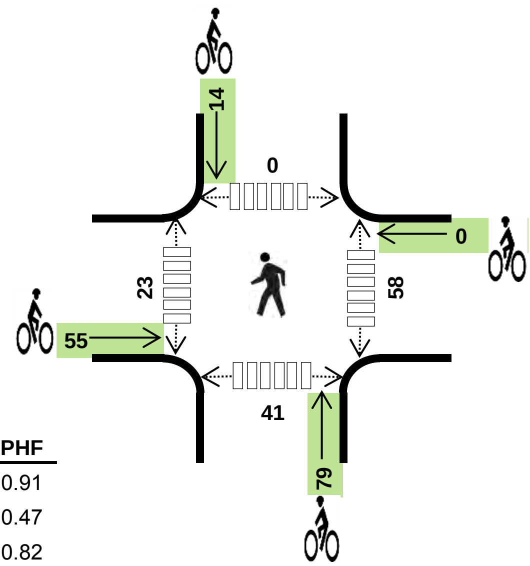
EASTLAKE E
FAIRVIEW AVE N

Date: Tue, Jul 29, 2014
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM

N

Peak Hour





	HV %:	PHF
EB	2.8%	0.91
WB	0.0%	0.47
NB	2.1%	0.82
SB	5.9%	0.95
TOTAL	4.0%	0.94

Two-Hour Count Summaries

Interval Start	FAIRVIEW AVE N Eastbound LT	TH	RT	FAIRVIEW AVE N Westbound LT	TH	RT	EASTLAKE E Northbound LT	TH	RT	EASTLAKE E Southbound LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	83	0	21	0	0	4	0	39	1	1	93	69	311	
4:15 PM	85	0	6	0	0	2	0	37	1	2	103	78	314	
4:30 PM	118	0	20	1	0	3	0	50	1	2	98	75	368	
4:45 PM	97	1	11	0	0	1	0	68	1	0	89	75	343	1,336
5:00 PM	**119**	**0**	**14**	**0**	**0**	**4**	**0**	**59**	**0**	**1**	**97**	**64**	**358**	1,383
5:15 PM	**105**	**1**	**13**	**0**	**0**	**9**	**0**	**84**	**2**	**0**	**106**	**68**	**388**	1,457
5:30 PM	**116**	**4**	**19**	**0**	**0**	**1**	**0**	**56**	**0**	**0**	**97**	**59**	**352**	1,441
5:45 PM	**104**	**1**	**8**	**0**	**1**	**2**	**0**	**77**	**5**	**1**	**103**	**62**	**364**	**1,462**
Count Total	827	7	112	1	1	26	0	470	11	7	786	550	2,798	
Peak Hr	**444**	**6**	**54**	**0**	**1**	**16**	**0**	**276**	**7**	**2**	**403**	**253**	**1,462**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	4	0	0	9	*13*	4	0	4	6	*14*	13	7	0	8	*28*
4:15 PM	4	0	0	10	*14*	8	0	5	8	*21*	7	8	0	7	*22*
4:30 PM	7	0	4	6	*17*	8	0	15	8	*31*	12	4	0	9	*25*
4:45 PM	4	0	2	7	*13*	9	0	17	4	*30*	8	8	0	5	*21*
5:00 PM	**7**	**0**	**0**	**14**	***21***	**10**	**0**	**18**	**5**	***33***	**17**	**6**	**0**	**12**	***35***
5:15 PM	**3**	**0**	**3**	**7**	***13***	**11**	**0**	**24**	**6**	***41***	**8**	**3**	**0**	**8**	***19***
5:30 PM	**1**	**0**	**1**	**8**	***10***	**20**	**0**	**19**	**1**	***40***	**20**	**7**	**0**	**12**	***39***
5:45 PM	**3**	**0**	**2**	**10**	***15***	**14**	**0**	**18**	**2**	***34***	**13**	**7**	**0**	**9**	***29***
Count Total	33	0	12	71	*116*	84	0	120	40	*244*	98	50	0	70	*218*
Peak Hr	**14**	**0**	**6**	**39**	***59***	**55**	**0**	**79**	**14**	***148***	**58**	**23**	**0**	**41**	***122***

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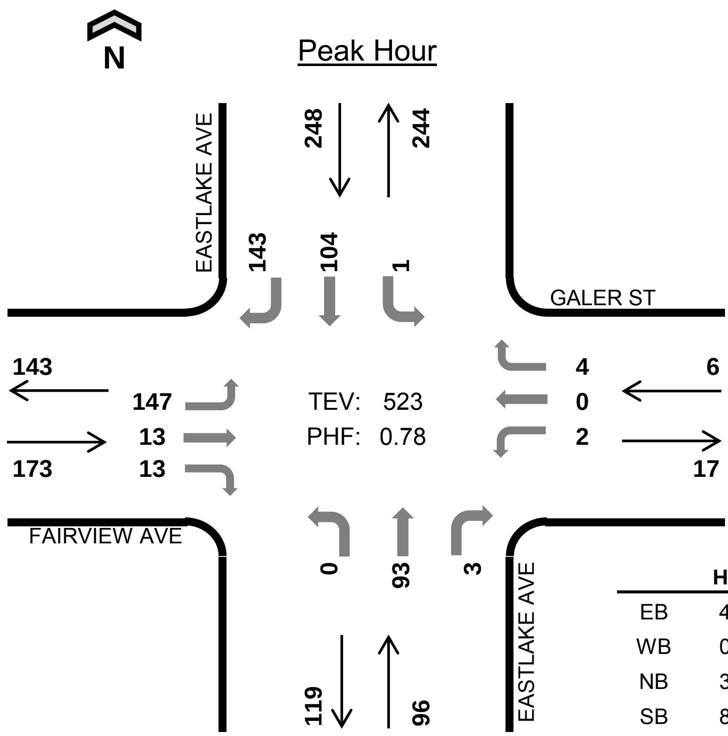
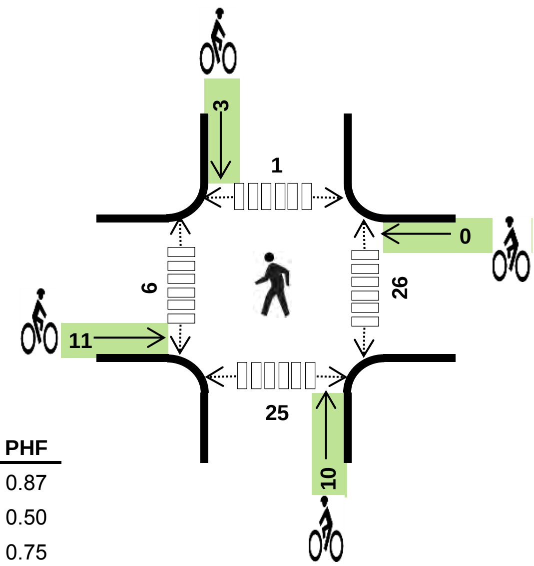
EASTLAKE AVE
GALER ST

Date: Tue, Feb 04, 2014
Count Period: 7:00 PM to 9:00 PM
Peak Hour: 7:00 PM to 8:00 PM





	HV %:	PHF
EB	4.0%	0.87
WB	0.0%	0.50
NB	3.1%	0.75
SB	8.1%	0.71
TOTAL	5.7%	0.78

Two-Hour Count Summaries

Interval Start	FAIRVIEW AVE Eastbound			GALER ST Westbound			EASTLAKE AVE Northbound			EASTLAKE AVE Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 PM	**43**	**1**	**4**	**0**	**0**	**1**	**0**	**31**	**1**	**0**	**36**	**51**	**168**	
7:15 PM	**42**	**4**	**4**	**0**	**0**	**0**	**0**	**28**	**2**	**0**	**25**	**33**	**138**	
7:30 PM	**39**	**3**	**3**	**0**	**0**	**2**	**0**	**22**	**0**	**1**	**23**	**34**	**127**	
7:45 PM	**23**	**5**	**2**	**2**	**0**	**1**	**0**	**12**	**0**	**0**	**20**	**25**	**90**	**523**
8:00 PM	27	0	1	0	0	1	0	15	0	2	22	22	90	445
8:15 PM	30	0	4	1	0	1	0	14	0	1	21	26	98	405
8:30 PM	24	1	1	1	0	2	0	14	0	1	22	23	89	367
8:45 PM	33	3	0	4	0	1	0	27	0	1	12	23	104	381
Count Total	261	17	19	8	0	9	0	163	3	6	181	237	904	
Peak Hr	**147**	**13**	**13**	**2**	**0**	**4**	**0**	**93**	**3**	**1**	**104**	**143**	**523**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 PM	**1**	**0**	**1**	**5**	***7***	**2**	**0**	**4**	**0**	***6***	**13**	**5**	**0**	**9**	***27***
7:15 PM	**3**	**0**	**0**	**6**	***9***	**2**	**0**	**3**	**2**	***7***	**8**	**0**	**1**	**7**	***16***
7:30 PM	**2**	**0**	**1**	**6**	***9***	**3**	**0**	**2**	**1**	***6***	**3**	**1**	**0**	**5**	***9***
7:45 PM	**1**	**0**	**1**	**3**	***5***	**4**	**0**	**1**	**0**	***5***	**2**	**0**	**0**	**4**	***6***
8:00 PM	2	0	0	4	*6*	3	0	0	1	*4*	5	0	0	1	*6*
8:15 PM	2	0	0	3	*5*	2	0	2	1	*5*	2	0	0	1	*3*
8:30 PM	1	0	1	0	*2*	0	0	0	0	*0*	1	0	1	1	*3*
8:45 PM	1	0	0	1	*2*	1	0	2	0	*3*	2	0	1	0	*3*
Count Total	13	0	4	28	*45*	17	0	14	5	*36*	36	6	3	28	*73*
Peak Hr	**7**	**0**	**3**	**20**	***30***	**11**	**0**	**10**	**3**	***24***	**26**	**6**	**1**	**25**	***58***

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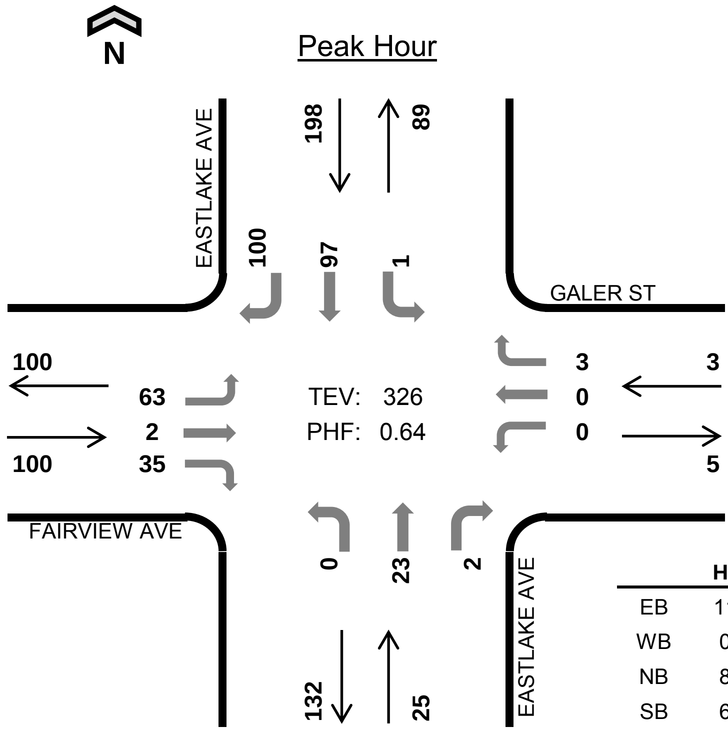
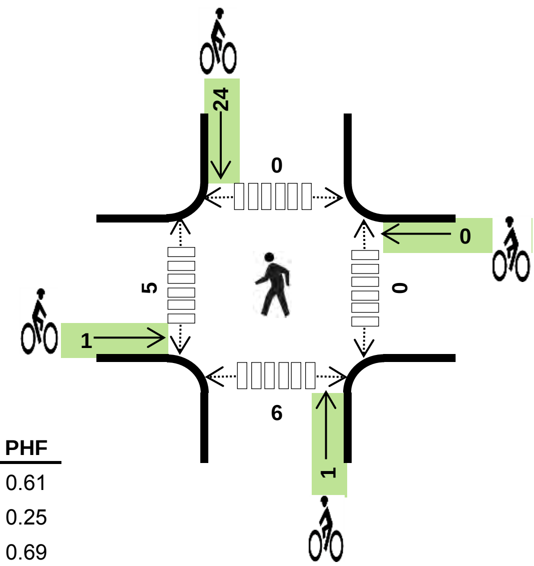
EASTLAKE AVE
GALER ST

Date: Tue, Feb 04, 2014
Count Period: 5:00 AM to 7:00 AM
Peak Hour: 6:00 AM to 7:00 AM





	HV %:	PHF
EB	11.0%	0.61
WB	0.0%	0.25
NB	8.0%	0.69
SB	6.6%	0.64
TOTAL	8.0%	0.64

Two-Hour Count Summaries

Interval Start	FAIRVIEW AVE Eastbound LT	TH	RT	GALER ST Westbound LT	TH	RT	EASTLAKE AVE Northbound LT	TH	RT	EASTLAKE AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
5:00 AM	1	0	1	0	0	0	0	0	1	0	3	8	14	
5:15 AM	3	0	3	0	0	1	0	5	0	0	6	7	25	
5:30 AM	6	0	2	0	0	0	0	0	0	0	8	11	27	
5:45 AM	5	0	4	0	0	0	0	5	0	0	9	16	39	105
6:00 AM	**12**	**0**	**6**	**0**	**0**	**0**	**0**	**3**	**1**	**0**	**14**	**12**	**48**	139
6:15 AM	**7**	**0**	**5**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**15**	**20**	**50**	164
6:30 AM	**16**	**1**	**12**	**0**	**0**	**3**	**0**	**8**	**1**	**1**	**31**	**28**	**101**	238
6:45 AM	**28**	**1**	**12**	**0**	**0**	**0**	**0**	**9**	**0**	**0**	**37**	**40**	**127**	**326**
Count Total	78	2	45	0	0	4	0	33	3	1	123	142	431	
Peak Hr	**63**	**2**	**35**	**0**	**0**	**3**	**0**	**23**	**2**	**1**	**97**	**100**	**326**	

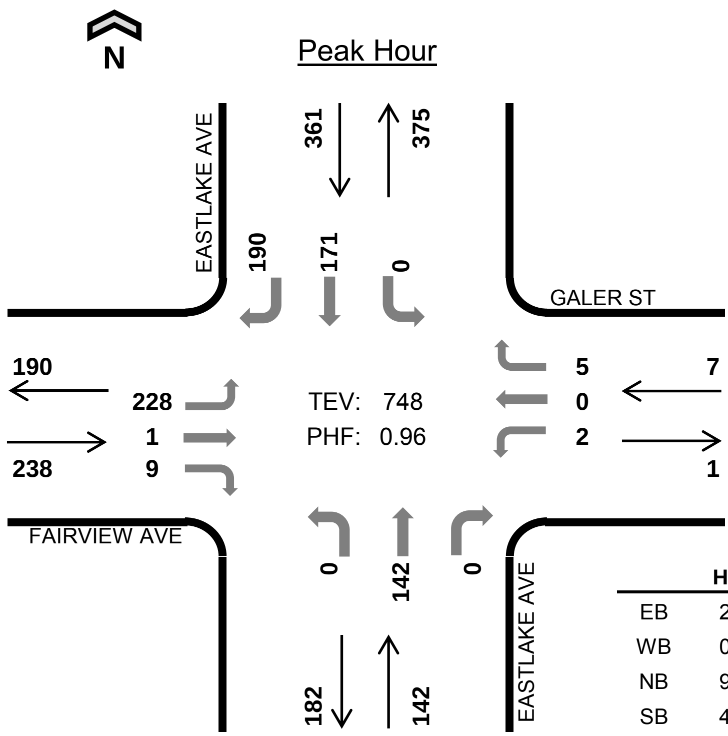
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

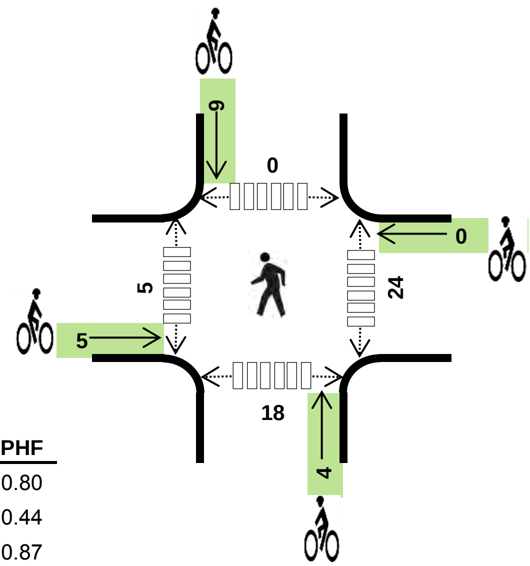
Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
5:00 AM	0	0	1	1	*2*	0	0	0	1	*1*	1	1	0	0	*2*
5:15 AM	1	0	1	1	*3*	0	0	0	5	*5*	0	0	0	0	*0*
5:30 AM	1	0	0	4	*5*	0	0	0	2	*2*	0	0	0	1	*1*
5:45 AM	2	0	0	1	*3*	1	0	0	2	*3*	0	0	0	0	*0*
6:00 AM	**1**	**0**	**0**	**4**	***5***	**0**	**0**	**0**	**1**	***1***	**0**	**2**	**0**	**0**	***2***
6:15 AM	**1**	**0**	**1**	**1**	***3***	**0**	**0**	**0**	**4**	***4***	**0**	**2**	**0**	**0**	***2***
6:30 AM	**4**	**0**	**0**	**4**	***8***	**0**	**0**	**0**	**13**	***13***	**0**	**0**	**0**	**0**	***0***
6:45 AM	**5**	**0**	**1**	**4**	***10***	**1**	**0**	**1**	**6**	***8***	**0**	**1**	**0**	**6**	***7***
Count Total	15	0	4	20	*39*	2	0	1	34	*37*	1	6	0	7	*14*
Peak Hr	**11**	**0**	**2**	**13**	***26***	**1**	**0**	**1**	**24**	***26***	**0**	**5**	**0**	**6**	***11***

EASTLAKE AVE
GALER ST

idax

Date: Sat, Feb 01, 2014
Count Period: 11:00 AM to 1:00 PM
Peak Hour: 12:00 PM to 1:00 PM





	HV %:	PHF
EB	2.5%	0.80
WB	0.0%	0.44
NB	9.2%	0.87
SB	4.4%	0.95
TOTAL	4.7%	0.96

Two-Hour Count Summaries

Interval Start	FAIRVIEW AVE Eastbound LT	TH	RT	GALER ST Westbound LT	TH	RT	EASTLAKE AVE Northbound LT	TH	RT	EASTLAKE AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
11:00 AM	36	0	4	0	0	1	0	22	0	2	34	41	140	
11:15 AM	29	1	5	1	0	0	0	23	0	1	33	45	138	
11:30 AM	29	1	7	0	0	3	0	24	0	2	45	56	167	
11:45 AM	37	3	4	2	0	3	0	19	0	0	35	56	159	604
12:00 PM	**39**	**0**	**3**	**1**	**0**	**2**	**0**	**41**	**0**	**0**	**44**	**50**	**180**	644
12:15 PM	**71**	**0**	**3**	**0**	**0**	**0**	**0**	**30**	**0**	**0**	**45**	**37**	**186**	692
12:30 PM	**59**	**1**	**1**	**0**	**0**	**0**	**0**	**31**	**0**	**0**	**46**	**49**	**187**	712
12:45 PM	**59**	**0**	**2**	**1**	**0**	**3**	**0**	**40**	**0**	**0**	**36**	**54**	**195**	**748**
Count Total	359	6	29	5	0	12	0	230	0	5	318	388	1,352	
Peak Hr	**228**	**1**	**9**	**2**	**0**	**5**	**0**	**142**	**0**	**0**	**171**	**190**	**748**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
11:00 AM	2	0	4	6	*12*	0	0	0	2	*2*	7	2	3	8	*20*
11:15 AM	4	0	6	4	*14*	0	0	1	2	*3*	9	3	1	2	*15*
11:30 AM	0	0	2	3	*5*	4	0	0	1	*5*	0	0	1	0	*1*
11:45 AM	3	0	2	4	*9*	1	0	1	5	*7*	0	2	0	0	*2*
12:00 PM	**2**	**0**	**2**	**2**	***6***	**3**	**0**	**2**	**2**	***7***	**7**	**0**	**0**	**5**	***12***
12:15 PM	**1**	**0**	**3**	**6**	***10***	**2**	**0**	**2**	**0**	***4***	**4**	**1**	**0**	**2**	***7***
12:30 PM	**1**	**0**	**2**	**2**	***5***	**0**	**0**	**0**	**4**	***4***	**2**	**2**	**0**	**3**	***7***
12:45 PM	**2**	**0**	**6**	**6**	***14***	**0**	**0**	**0**	**3**	***3***	**11**	**2**	**0**	**8**	***21***
Count Total	15	0	27	33	*75*	10	0	6	19	*35*	40	12	5	28	*85*
Peak Hr	**6**	**0**	**13**	**16**	***35***	**5**	**0**	**4**	**9**	***18***	**24**	**5**	**0**	**18**	***47***

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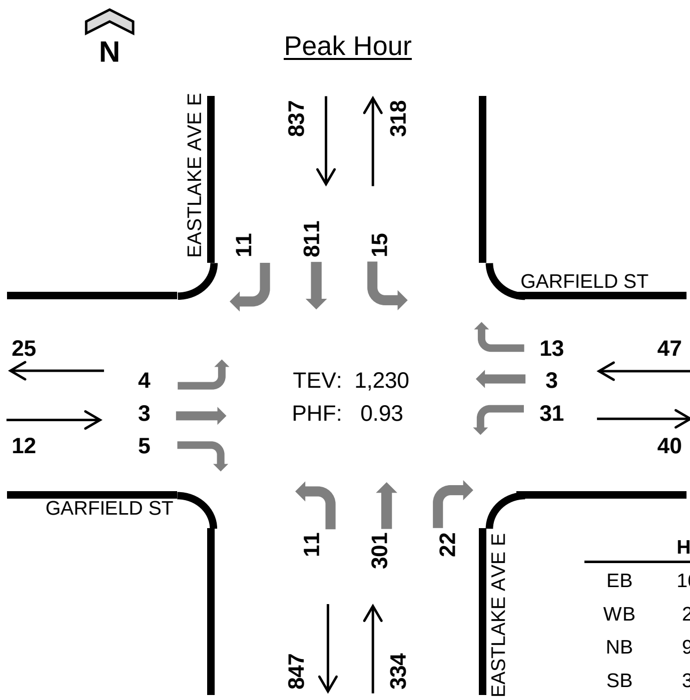
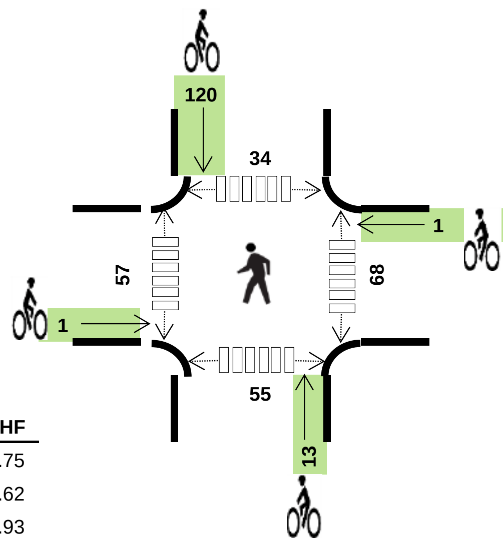
EASTLAKE AVE E
GARFIELD ST

Date: Tue, Jul 29, 2014
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM



	HV %:	PHF
EB	16.7%	0.75
WB	2.1%	0.62
NB	9.3%	0.93
SB	3.3%	0.96
TOTAL	5.0%	0.93



Two-Hour Count Summaries

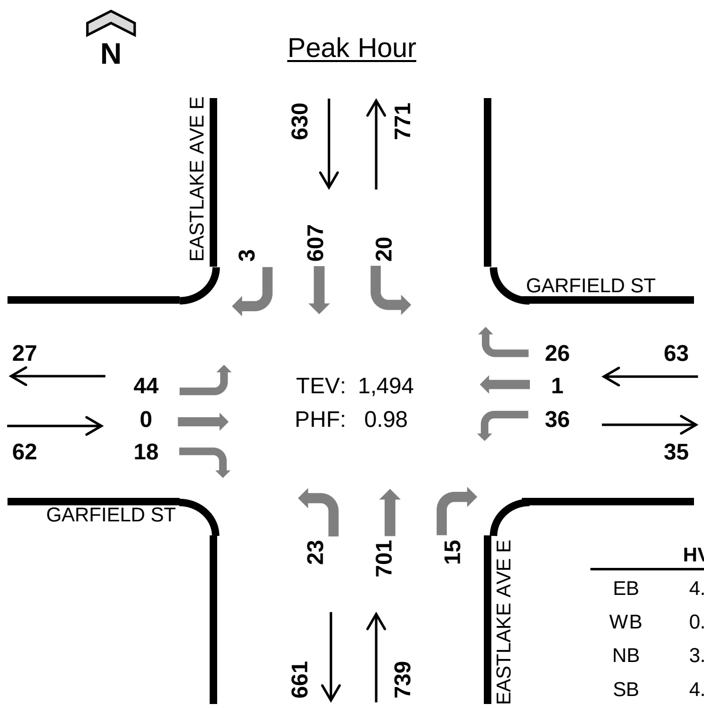
Interval Start	GARFIELD ST Eastbound LT	TH	RT	GARFIELD ST Westbound LT	TH	RT	EASTLAKE AVE E Northbound LT	TH	RT	EASTLAKE AVE E Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	0	0	0	4	0	5	5	34	2	3	79	1	133	
7:15 AM	1	0	0	6	1	2	1	42	6	3	110	4	176	
7:30 AM	1	0	1	4	0	4	3	52	4	5	141	6	221	
7:45 AM	0	0	5	9	1	6	3	75	2	7	181	1	290	820
8:00 AM	**1**	**0**	**1**	**6**	**0**	**6**	**1**	**72**	**6**	**4**	**190**	**3**	**290**	977
8:15 AM	**1**	**2**	**0**	**10**	**0**	**1**	**2**	**67**	**6**	**4**	**203**	**2**	**298**	1,099
8:30 AM	**1**	**1**	**2**	**12**	**2**	**5**	**4**	**82**	**4**	**4**	**211**	**2**	**330**	1,208
8:45 AM	**1**	**0**	**2**	**3**	**1**	**1**	**4**	**80**	**6**	**3**	**207**	**4**	**312**	**1,230**
Count Total	6	3	11	54	5	30	23	504	36	33	1,322	23	2,050	
Peak Hr	**4**	**3**	**5**	**31**	**3**	**13**	**11**	**301**	**22**	**15**	**811**	**11**	**1,230**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

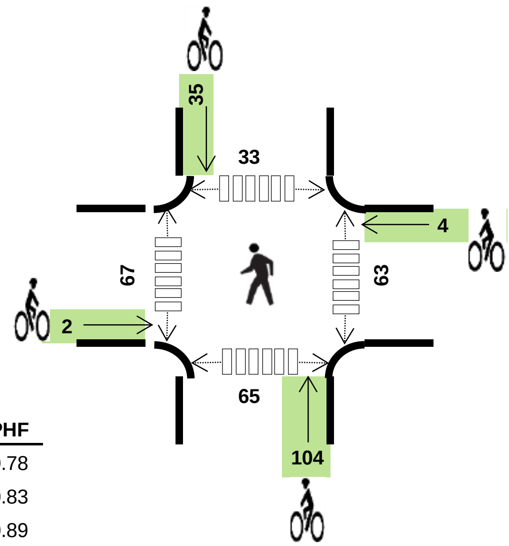
Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	0	0	4	5	*9*	0	0	2	16	*18*	11	22	6	5	*44*
7:15 AM	0	0	7	3	*10*	0	0	2	24	*26*	15	15	9	15	*54*
7:30 AM	0	1	6	6	*13*	1	0	1	33	*35*	12	13	7	8	*40*
7:45 AM	0	0	8	5	*13*	0	1	7	28	*36*	22	16	10	17	*65*
8:00 AM	**1**	**0**	**9**	**6**	***16***	**0**	**0**	**1**	**28**	***29***	**13**	**13**	**8**	**11**	***45***
8:15 AM	**0**	**0**	**7**	**9**	***16***	**1**	**0**	**4**	**34**	***39***	**19**	**15**	**2**	**18**	***54***
8:30 AM	**1**	**0**	**8**	**6**	***15***	**0**	**0**	**2**	**31**	***33***	**20**	**16**	**13**	**12**	***61***
8:45 AM	**0**	**1**	**7**	**7**	***15***	**0**	**1**	**6**	**27**	***34***	**16**	**13**	**11**	**14**	***54***
Count Total	2	2	56	47	*107*	2	2	25	221	*250*	128	123	66	100	*417*
Peak Hr	**2**	**1**	**31**	**28**	***62***	**1**	**1**	**13**	**120**	***135***	**68**	**57**	**34**	**55**	***214***

EASTLAKE AVE E
GARFIELD ST

Date: Tue, Jul 29, 2014
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	4.8%	0.78
WB	0.0%	0.83
NB	3.1%	0.89
SB	4.4%	0.93
TOTAL	3.6%	0.98



Two-Hour Count Summaries

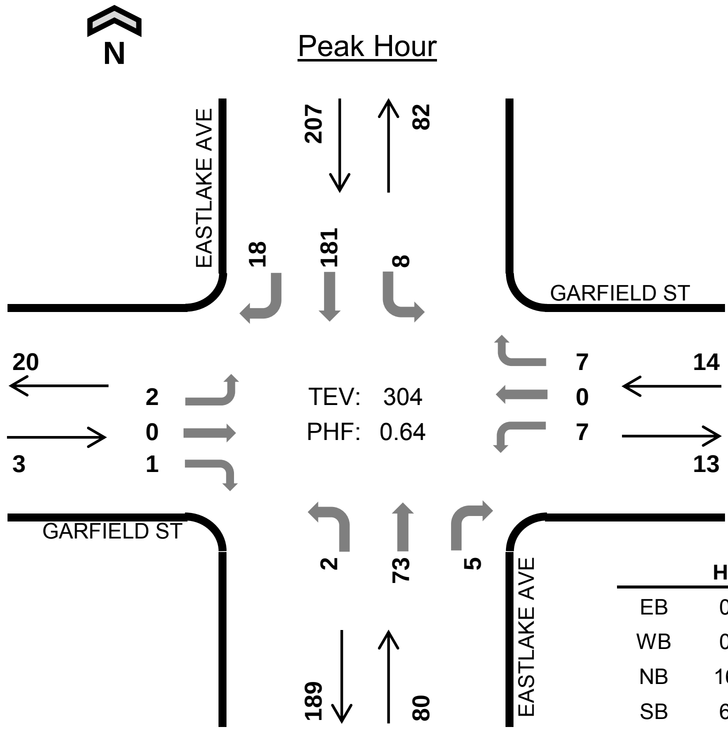
Interval Start	GARFIELD ST			GARFIELD ST			EASTLAKE AVE E			EASTLAKE AVE E			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	7	0	3	3	0	6	2	129	4	1	166	3	324	
4:15 PM	15	0	4	3	1	2	2	116	2	6	172	1	324	
4:30 PM	**13**	**0**	**7**	**7**	**1**	**10**	**3**	**166**	**3**	**6**	**161**	**2**	**379**	
4:45 PM	**11**	**0**	**8**	**9**	**0**	**5**	**5**	**155**	**4**	**8**	**152**	**0**	**357**	1,384
5:00 PM	**13**	**0**	**0**	**12**	**0**	**7**	**7**	**186**	**3**	**5**	**144**	**0**	**377**	1,437
5:15 PM	**7**	**0**	**3**	**8**	**0**	**4**	**8**	**194**	**5**	**1**	**150**	**1**	**381**	**1,494**
5:30 PM	7	0	3	3	0	2	3	169	1	3	149	2	342	1,457
5:45 PM	4	1	3	4	0	6	2	174	5	3	126	1	329	1,429
Count Total	77	1	31	49	2	42	32	1,289	27	33	1,220	10	2,813	
Peak Hr	**44**	**0**	**18**	**36**	**1**	**26**	**23**	**701**	**15**	**20**	**607**	**3**	**1,494**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

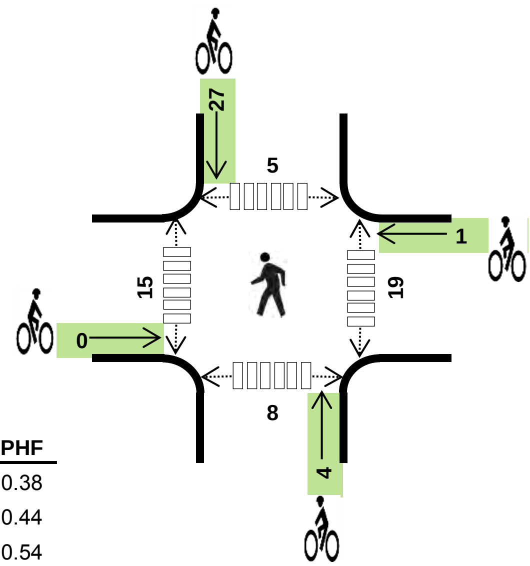
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	1	0	3	10	*14*	0	0	5	7	*12*	17	21	6	8	*52*
4:15 PM	2	0	4	8	*14*	1	0	10	7	*18*	26	18	8	19	*71*
4:30 PM	**1**	**0**	**6**	**5**	***12***	**0**	**0**	**19**	**10**	***29***	**12**	**17**	**10**	**17**	***56***
4:45 PM	**2**	**0**	**5**	**8**	***15***	**0**	**1**	**25**	**10**	***36***	**18**	**20**	**7**	**17**	***62***
5:00 PM	**0**	**0**	**6**	**8**	***14***	**1**	**1**	**26**	**8**	***36***	**18**	**19**	**12**	**16**	***65***
5:15 PM	**0**	**0**	**6**	**7**	***13***	**1**	**2**	**34**	**7**	***44***	**15**	**11**	**4**	**15**	***45***
5:30 PM	2	0	1	6	*9*	1	1	40	6	*48*	23	16	5	12	*56*
5:45 PM	0	0	4	9	*13*	0	1	32	5	*38*	16	32	4	14	*66*
Count Total	8	0	35	61	*104*	4	6	191	60	*261*	145	154	56	118	*473*
Peak Hr	**3**	**0**	**23**	**28**	***54***	**2**	**4**	**104**	**35**	***145***	**63**	**67**	**33**	**65**	***228***

EASTLAKE AVE
GARFIELD ST

Date: Tue, Feb 04, 2014
Count Period: 5:00 AM to 7:00 AM
Peak Hour: 6:00 AM to 7:00 AM



	HV %:	PHF
EB	0.0%	0.38
WB	0.0%	0.44
NB	16.3%	0.54
SB	6.8%	0.72
TOTAL	8.9%	0.64



Two-Hour Count Summaries

Interval Start	GARFIELD ST Eastbound LT	TH	RT	GARFIELD ST Westbound LT	TH	RT	EASTLAKE AVE Northbound LT	TH	RT	EASTLAKE AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
5:00 AM	1	0	0	1	0	0	0	2	0	1	11	1	17	
5:15 AM	0	0	0	0	0	2	0	5	2	1	13	3	26	
5:30 AM	0	0	0	0	0	1	1	6	0	5	20	6	39	
5:45 AM	0	0	2	0	0	2	0	9	2	6	23	7	51	133
6:00 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**8**	**3**	**4**	**23**	**8**	**47**	163
6:15 AM	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**11**	**0**	**2**	**39**	**3**	**57**	194
6:30 AM	**0**	**0**	**1**	**2**	**0**	**1**	**1**	**20**	**0**	**0**	**52**	**4**	**81**	236
6:45 AM	**2**	**0**	**0**	**5**	**0**	**3**	**1**	**34**	**2**	**2**	**67**	**3**	**119**	**304**
Count Total	3	0	3	8	0	12	3	95	9	21	248	35	437	
Peak Hr	**2**	**0**	**1**	**7**	**0**	**7**	**2**	**73**	**5**	**8**	**181**	**18**	**304**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
5:00 AM	0	0	1	1	*2*	0	0	0	0	*0*	1	5	0	1	*7*
5:15 AM	0	0	1	1	*2*	0	0	0	6	*6*	0	0	0	0	*0*
5:30 AM	0	0	1	4	*5*	0	0	0	2	*2*	1	1	2	0	*4*
5:45 AM	0	0	1	0	*1*	0	0	0	2	*2*	1	6	0	1	*8*
6:00 AM	**0**	**0**	**1**	**4**	***5***	**0**	**0**	**3**	**3**	***6***	**3**	**4**	**2**	**1**	***10***
6:15 AM	**0**	**0**	**2**	**3**	***5***	**0**	**0**	**1**	**5**	***6***	**5**	**6**	**2**	**0**	***13***
6:30 AM	**0**	**0**	**4**	**2**	***6***	**0**	**0**	**0**	**12**	***12***	**4**	**3**	**1**	**5**	***13***
6:45 AM	**0**	**0**	**6**	**5**	***11***	**0**	**1**	**0**	**7**	***8***	**7**	**2**	**0**	**2**	***11***
Count Total	0	0	17	20	*37*	0	1	4	37	*42*	22	27	7	10	*66*
Peak Hr	**0**	**0**	**13**	**14**	***27***	**0**	**1**	**4**	**27**	***32***	**19**	**15**	**5**	**8**	***47***

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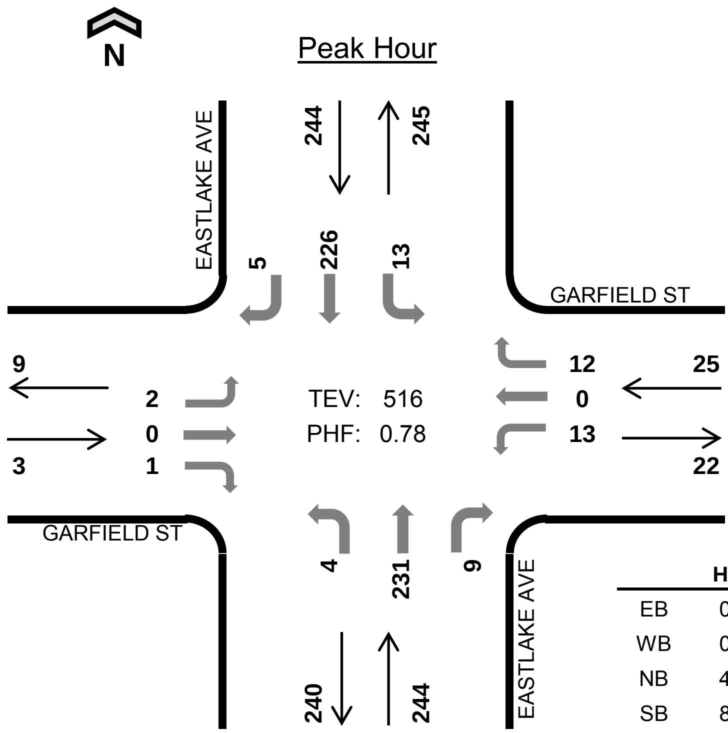
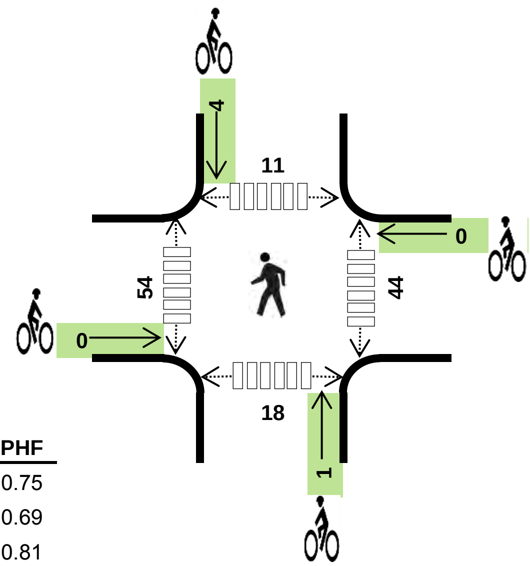
EASTLAKE AVE
GARFIELD ST

Date: Tue, Feb 04, 2014
Count Period: 7:00 PM to 9:00 PM
Peak Hour: 7:00 PM to 8:00 PM

Peak Hour



	HV %:	PHF
EB	0.0%	0.75
WB	0.0%	0.69
NB	4.1%	0.81
SB	8.6%	0.76
TOTAL	6.0%	0.78



Two-Hour Count Summaries

Interval Start	GARFIELD ST Eastbound			GARFIELD ST Westbound			EASTLAKE AVE Northbound			EASTLAKE AVE Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 PM	**0**	**0**	**1**	**5**	**0**	**4**	**1**	**70**	**4**	**0**	**76**	**4**	**165**	
7:15 PM	**0**	**0**	**0**	**1**	**0**	**2**	**2**	**63**	**1**	**6**	**54**	**1**	**130**	
7:30 PM	**1**	**0**	**0**	**6**	**0**	**1**	**1**	**58**	**4**	**3**	**55**	**0**	**129**	
7:45 PM	**1**	**0**	**0**	**1**	**0**	**5**	**0**	**40**	**0**	**4**	**41**	**0**	**92**	**516**
8:00 PM	0	1	0	4	0	2	0	40	0	0	42	1	90	441
8:15 PM	0	0	0	3	0	1	1	43	1	3	38	0	90	401
8:30 PM	0	0	0	4	0	1	0	38	1	1	42	0	87	359
8:45 PM	0	0	0	1	0	0	2	57	2	3	36	0	101	368
Count Total	2	1	1	25	0	16	7	409	13	20	384	6	884	
Peak Hr	**2**	**0**	**1**	**13**	**0**	**12**	**4**	**231**	**9**	**13**	**226**	**5**	**516**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 PM	**0**	**0**	**3**	**6**	***9***	**0**	**0**	**0**	**1**	***1***	**12**	**8**	**3**	**3**	***26***
7:15 PM	**0**	**0**	**2**	**6**	***8***	**0**	**0**	**0**	**2**	***2***	**13**	**27**	**4**	**7**	***51***
7:30 PM	**0**	**0**	**3**	**5**	***8***	**0**	**0**	**0**	**1**	***1***	**10**	**9**	**2**	**4**	***25***
7:45 PM	**0**	**0**	**2**	**4**	***6***	**0**	**0**	**1**	**0**	***1***	**9**	**10**	**2**	**4**	***25***
8:00 PM	0	0	2	3	*5*	0	0	2	1	*3*	5	5	0	5	*15*
8:15 PM	0	0	1	2	*3*	0	0	5	2	*7*	6	5	2	3	*16*
8:30 PM	0	0	2	0	*2*	1	0	0	0	*1*	4	1	0	4	*9*
8:45 PM	0	0	1	1	*2*	0	0	2	0	*2*	5	1	0	0	*6*
Count Total	0	0	16	27	*43*	1	0	10	7	*18*	64	66	13	30	*173*
Peak Hr	**0**	**0**	**10**	**21**	***31***	**0**	**0**	**1**	**4**	***5***	**44**	**54**	**11**	**18**	***127***

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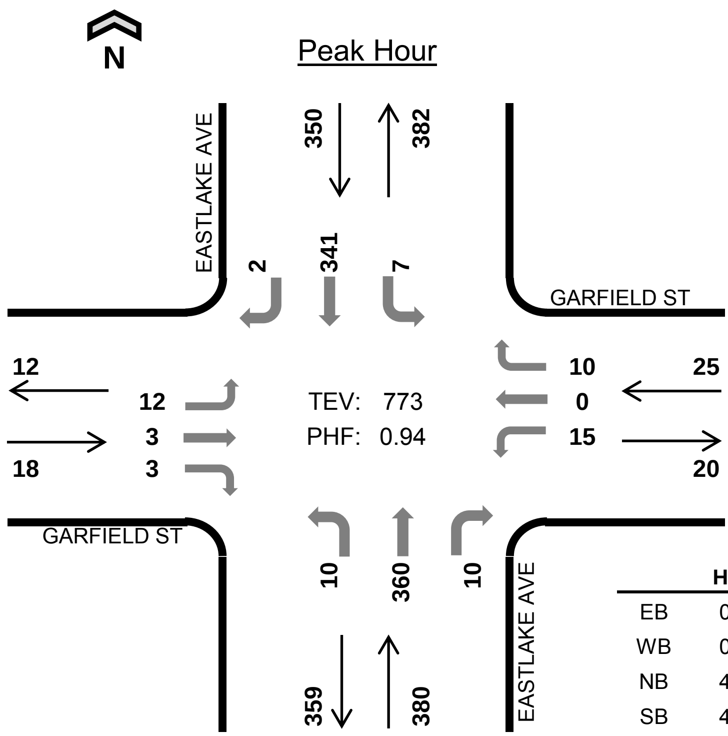
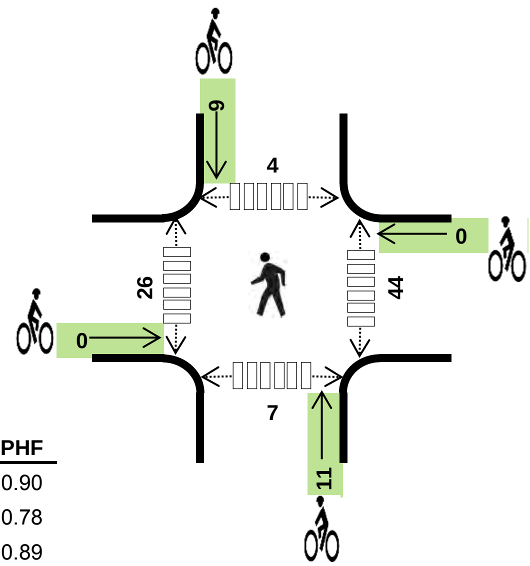
EASTLAKE AVE
GARFIELD ST

idax

Date: Sat, Feb 01, 2014
Count Period: 11:00 AM to 1:00 PM
Peak Hour: 12:00 PM to 1:00 PM





	HV %:	PHF
EB	0.0%	0.90
WB	0.0%	0.78
NB	4.7%	0.89
SB	4.6%	0.91
TOTAL	4.4%	0.94

Two-Hour Count Summaries

Interval Start	GARFIELD ST Eastbound			GARFIELD ST Westbound			EASTLAKE AVE Northbound			EASTLAKE AVE Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
11:00 AM	1	0	1	5	1	1	2	53	4	1	69	2	140	
11:15 AM	1	1	1	5	0	8	0	52	2	2	78	0	150	
11:30 AM	2	0	1	4	0	1	0	59	3	4	93	0	167	
11:45 AM	0	0	2	5	0	6	2	57	3	4	85	0	164	621
12:00 PM	**3**	**1**	**0**	**4**	**0**	**4**	**2**	**76**	**2**	**1**	**95**	**0**	**188**	669
12:15 PM	**2**	**2**	**0**	**5**	**0**	**3**	**2**	**100**	**2**	**1**	**75**	**0**	**192**	711
12:30 PM	**2**	**0**	**3**	**1**	**0**	**1**	**3**	**85**	**1**	**2**	**88**	**1**	**187**	731
12:45 PM	**5**	**0**	**0**	**5**	**0**	**2**	**3**	**99**	**5**	**3**	**83**	**1**	**206**	**773**
Count Total	16	4	8	34	1	26	14	581	22	18	666	4	1,394	
Peak Hr	**12**	**3**	**3**	**15**	**0**	**10**	**10**	**360**	**10**	**7**	**341**	**2**	**773**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
11:00 AM	0	0	6	5	*11*	0	0	0	2	*2*	10	10	2	6	*28*
11:15 AM	0	0	9	4	*13*	0	0	1	2	*3*	12	17	2	5	*36*
11:30 AM	0	0	2	3	*5*	0	0	3	2	*5*	9	7	1	2	*19*
11:45 AM	0	0	5	4	*9*	0	0	1	5	*6*	7	14	0	0	*21*
12:00 PM	**0**	**0**	**3**	**2**	***5***	**0**	**0**	**6**	**2**	***8***	**11**	**7**	**0**	**2**	***20***
12:15 PM	**0**	**0**	**4**	**6**	***10***	**0**	**0**	**5**	**0**	***5***	**12**	**7**	**0**	**1**	***20***
12:30 PM	**0**	**0**	**3**	**2**	***5***	**0**	**0**	**0**	**4**	***4***	**9**	**9**	**0**	**3**	***21***
12:45 PM	**0**	**0**	**8**	**6**	***14***	**0**	**0**	**0**	**3**	***3***	**12**	**3**	**4**	**1**	***20***
Count Total	0	0	40	32	*72*	0	0	16	20	*36*	82	74	9	20	*185*
Peak Hr	**0**	**0**	**18**	**16**	***34***	**0**	**0**	**11**	**9**	***20***	**44**	**26**	**4**	**7**	***81***

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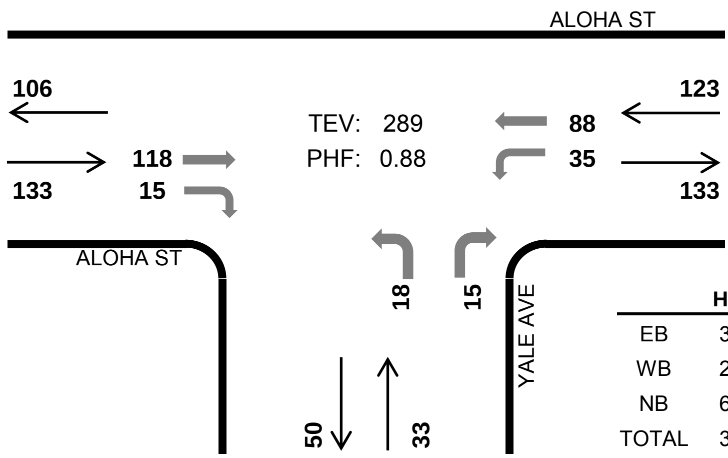
YALE AVE
ALOHA ST

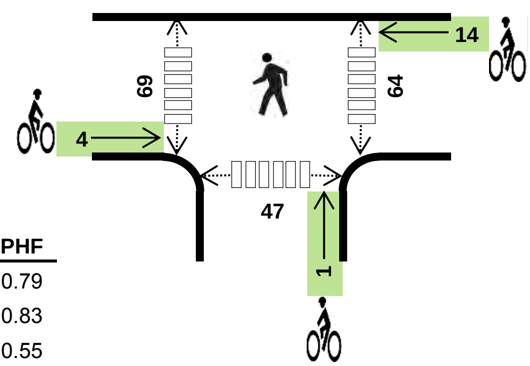
N

Peak Hour

Date: Tue, Jul 29, 2014
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM



	HV %:	PHF
EB	3.0%	0.79
WB	2.4%	0.83
NB	6.1%	0.55
TOTAL	3.1%	0.88



Two-Hour Count Summaries

Interval Start	ALOHA ST Eastbound LT	TH	RT	ALOHA ST Westbound LT	TH	RT	YALE AVE Northbound LT	TH	RT	YALE AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	0	32	3	1	11	0	1	0	2	0	0	0	50	
7:15 AM	0	33	6	7	19	0	3	0	6	0	0	0	74	
7:30 AM	0	34	5	5	18	0	7	0	3	0	0	0	72	
7:45 AM	0	37	2	5	18	0	1	0	5	0	0	0	68	264
8:00 AM	**0**	**28**	**4**	**8**	**22**	**0**	**7**	**0**	**2**	**0**	**0**	**0**	**71**	285
8:15 AM	**0**	**36**	**6**	**7**	**22**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**73**	284
8:30 AM	**0**	**28**	**1**	**8**	**19**	**0**	**3**	**0**	**4**	**0**	**0**	**0**	**63**	275
8:45 AM	**0**	**26**	**4**	**12**	**25**	**0**	**6**	**0**	**9**	**0**	**0**	**0**	**82**	**289**
Count Total	0	254	31	53	154	0	30	0	31	0	0	0	553	
Peak Hr	**0**	**118**	**15**	**35**	**88**	**0**	**18**	**0**	**15**	**0**	**0**	**0**	**289**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	0	1	0	0	*1*	0	0	0	0	*0*	8	12	0	8	*28*
7:15 AM	0	0	0	0	*0*	1	0	0	0	*1*	10	10	0	14	*34*
7:30 AM	1	1	1	0	*3*	2	4	0	0	*6*	25	11	0	14	*50*
7:45 AM	0	0	0	0	*0*	1	3	0	0	*4*	17	10	0	14	*41*
8:00 AM	**0**	**2**	**1**	**0**	***3***	**1**	**3**	**0**	**0**	***4***	**26**	**13**	**0**	**11**	***50***
8:15 AM	**0**	**1**	**0**	**0**	***1***	**1**	**3**	**0**	**0**	***4***	**11**	**25**	**0**	**16**	***52***
8:30 AM	**3**	**0**	**0**	**0**	***3***	**1**	**3**	**0**	**0**	***4***	**14**	**9**	**0**	**8**	***31***
8:45 AM	**1**	**0**	**1**	**0**	***2***	**1**	**5**	**1**	**0**	***7***	**13**	**22**	**0**	**12**	***47***
Count Total	5	5	3	0	*13*	8	21	1	0	*30*	124	112	0	97	*333*
Peak Hr	**4**	**3**	**2**	**0**	***9***	**4**	**14**	**1**	**0**	***19***	**64**	**69**	**0**	**47**	***180***

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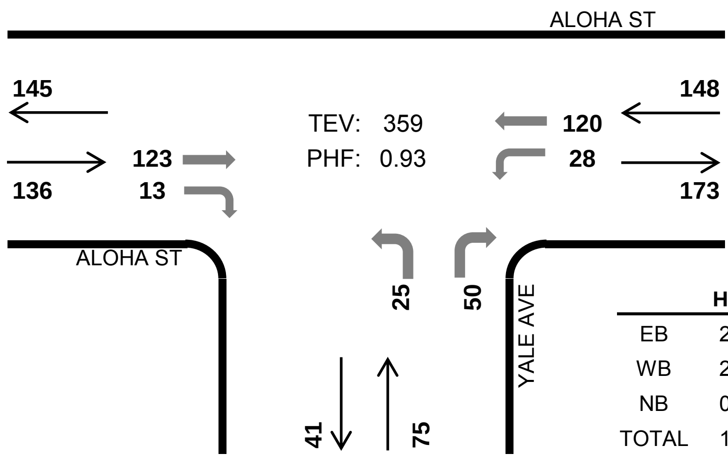
YALE AVE
ALOHA ST

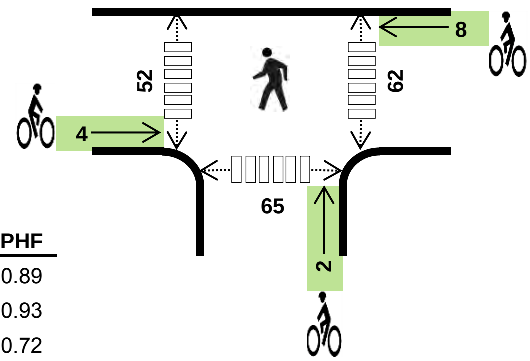
N

Peak Hour

Date: Tue, Jul 29, 2014
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM



	HV %:	PHF
EB	2.2%	0.89
WB	2.0%	0.93
NB	0.0%	0.72
TOTAL	1.7%	0.93



Two-Hour Count Summaries

Interval Start	ALOHA ST Eastbound LT	TH	RT	ALOHA ST Westbound LT	TH	RT	YALE AVE Northbound LT	TH	RT	YALE AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	0	22	3	5	38	0	4	0	9	0	0	0	81	
4:15 PM	**0**	**31**	**5**	**6**	**34**	**0**	**6**	**0**	**13**	**0**	**0**	**0**	**95**	
4:30 PM	**0**	**26**	**3**	**4**	**30**	**0**	**6**	**0**	**6**	**0**	**0**	**0**	**75**	
4:45 PM	**0**	**29**	**4**	**7**	**27**	**0**	**8**	**0**	**18**	**0**	**0**	**0**	**93**	344
5:00 PM	**0**	**37**	**1**	**11**	**29**	**0**	**5**	**0**	**13**	**0**	**0**	**0**	**96**	**359**
5:15 PM	0	31	6	9	28	0	8	0	12	0	0	0	94	358
5:30 PM	0	20	4	6	26	0	6	0	9	0	0	0	71	354
5:45 PM	0	19	1	4	30	0	4	0	7	0	0	0	65	326
Count Total	0	215	27	52	242	0	47	0	87	0	0	0	670	
Peak Hr	**0**	**123**	**13**	**28**	**120**	**0**	**25**	**0**	**50**	**0**	**0**	**0**	**359**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	1	0	0	0	*1*	1	0	1	0	*2*	20	21	0	14	*55*
4:15 PM	**1**	**1**	**0**	**0**	***2***	**2**	**0**	**1**	**0**	***3***	**15**	**10**	**0**	**21**	***46***
4:30 PM	**0**	**1**	**0**	**0**	***1***	**0**	**1**	**0**	**0**	***1***	**12**	**18**	**0**	**21**	***51***
4:45 PM	**1**	**0**	**0**	**0**	***1***	**0**	**4**	**0**	**0**	***4***	**14**	**10**	**0**	**11**	***35***
5:00 PM	**1**	**1**	**0**	**0**	***2***	**2**	**3**	**1**	**0**	***6***	**21**	**14**	**0**	**12**	***47***
5:15 PM	1	0	0	0	*1*	1	2	1	0	*4*	21	13	0	13	*47*
5:30 PM	0	0	0	0	*0*	1	2	3	0	*6*	6	6	0	6	*18*
5:45 PM	1	1	0	0	*2*	0	3	1	0	*4*	11	5	0	12	*28*
Count Total	6	4	0	0	*10*	7	15	8	0	*30*	120	97	0	110	*327*
Peak Hr	**3**	**3**	**0**	**0**	***6***	**4**	**8**	**2**	**0**	***14***	**62**	**52**	**0**	**65**	***179***

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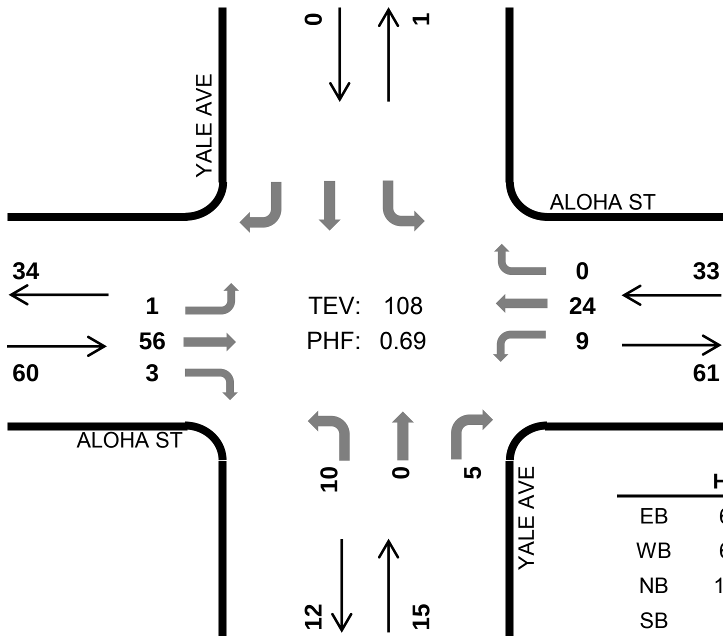
YALE AVE
ALOHA ST

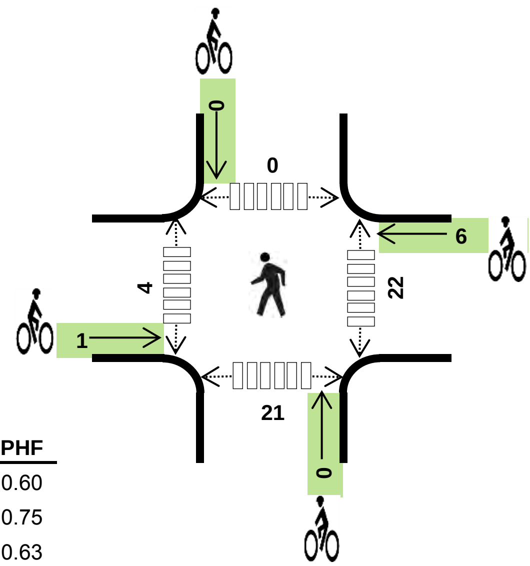
Date: Tue, Feb 04, 2014
Count Period: 5:00 AM to 7:00 AM
Peak Hour: 6:00 AM to 7:00 AM

N

Peak Hour



	HV %:	PHF
EB	6.7%	0.60
WB	6.1%	0.75
NB	13.3%	0.63
SB	-	-
TOTAL	7.4%	0.69



Two-Hour Count Summaries

Interval Start	ALOHA ST			ALOHA ST			YALE AVE			YALE AVE			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
5:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	
5:15 AM	0	6	0	0	1	0	0	0	0	0	0	0	7	
5:30 AM	0	4	0	1	0	0	0	0	2	0	0	0	7	
5:45 AM	0	6	1	1	1	0	0	0	2	0	0	0	11	26
6:00 AM	**0**	**7**	**0**	**0**	**6**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**14**	39
6:15 AM	**1**	**11**	**1**	**6**	**5**	**0**	**2**	**0**	**1**	**0**	**0**	**0**	**27**	59
6:30 AM	**0**	**14**	**1**	**0**	**7**	**0**	**3**	**0**	**3**	**0**	**0**	**0**	**28**	80
6:45 AM	**0**	**24**	**1**	**3**	**6**	**0**	**4**	**0**	**1**	**0**	**0**	**0**	**39**	**108**
Count Total	1	73	4	11	26	0	10	0	9	0	0	0	134	
Peak Hr	**1**	**56**	**3**	**9**	**24**	**0**	**10**	**0**	**5**	**0**	**0**	**0**	**108**	

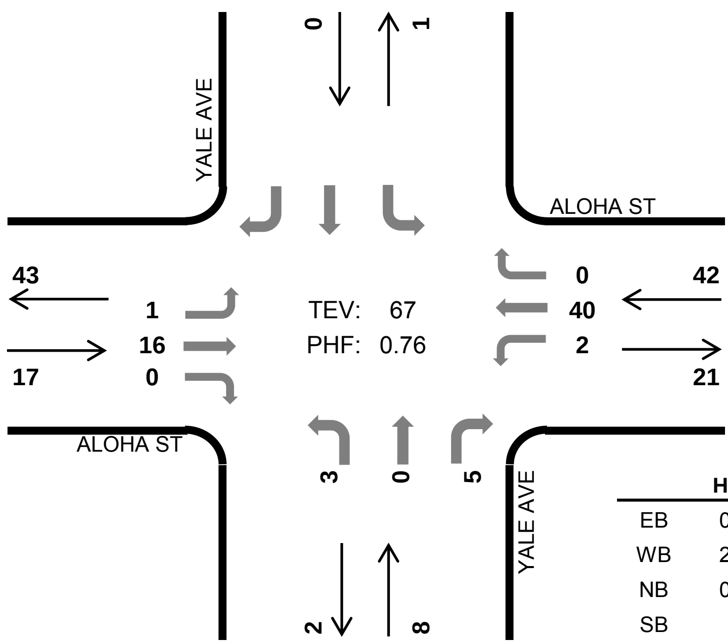
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

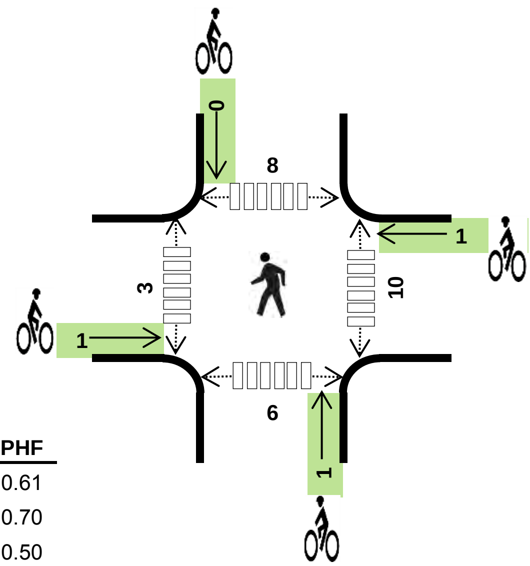
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
5:00 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
5:15 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	1	0	1	*2*
5:30 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 AM	0	0	1	0	*1*	0	0	0	0	*0*	0	1	1	2	*4*
6:00 AM	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	***1***	**2**	**2**	**0**	**1**	***5***
6:15 AM	**1**	**2**	**1**	**0**	***4***	**0**	**0**	**0**	**0**	***0***	**4**	**0**	**0**	**7**	***11***
6:30 AM	**1**	**0**	**0**	**0**	***1***	**1**	**3**	**0**	**0**	***4***	**5**	**1**	**0**	**3**	***9***
6:45 AM	**2**	**0**	**1**	**0**	***3***	**0**	**2**	**0**	**0**	***2***	**11**	**1**	**0**	**10**	***22***
Count Total	4	2	3	0	*9*	1	6	0	0	*7*	22	6	1	24	*53*
Peak Hr	**4**	**2**	**2**	**0**	***8***	**1**	**6**	**0**	**0**	***7***	**22**	**4**	**0**	**21**	***47***

YALE AVE
ALOHA ST

Date: Tue, Feb 04, 2014
Count Period: 7:00 PM to 9:00 PM
Peak Hour: 7:00 PM to 8:00 PM

Peak Hour





	HV %:	PHF
EB	0.0%	0.61
WB	2.4%	0.70
NB	0.0%	0.50
SB	-	-
TOTAL	1.5%	0.76

Two-Hour Count Summaries

Interval Start	ALOHA ST Eastbound LT	TH	RT	ALOHA ST Westbound LT	TH	RT	YALE AVE Northbound LT	TH	RT	YALE AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:00 PM	**1**	**1**	**0**	**1**	**14**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**18**	
7:15 PM	**0**	**7**	**0**	**1**	**11**	**0**	**1**	**0**	**2**	**0**	**0**	**0**	**22**	
7:30 PM	**0**	**3**	**0**	**0**	**5**	**0**	**2**	**0**	**2**	**0**	**0**	**0**	**12**	
7:45 PM	**0**	**5**	**0**	**0**	**10**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**15**	**67**
8:00 PM	0	6	0	0	3	0	0	0	0	0	0	0	9	58
8:15 PM	0	4	0	0	7	0	1	0	0	0	0	0	12	48
8:30 PM	1	3	0	1	9	0	0	0	1	0	0	0	15	51
8:45 PM	0	2	0	1	5	0	1	0	0	0	0	0	9	45
Count Total	2	31	0	4	64	0	5	0	6	0	0	0	112	
Peak Hr	**1**	**16**	**0**	**2**	**40**	**0**	**3**	**0**	**5**	**0**	**0**	**0**	**67**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**5**	**2**	**4**	**0**	***11***
7:15 PM	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	***1***	**2**	**1**	**2**	**2**	***7***
7:30 PM	**0**	**1**	**0**	**0**	***1***	**0**	**1**	**1**	**0**	***2***	**2**	**0**	**2**	**2**	***6***
7:45 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**2**	***3***
8:00 PM	0	0	0	0	*0*	0	0	0	0	*0*	1	0	4	1	*6*
8:15 PM	0	0	1	0	*1*	0	0	0	0	*0*	1	1	1	0	*3*
8:30 PM	0	0	0	0	*0*	0	0	0	0	*0*	2	2	4	0	*8*
8:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	1	1	1	*3*
Count Total	0	1	1	0	*2*	1	1	1	0	*3*	14	7	18	8	*47*
Peak Hr	**0**	**1**	**0**	**0**	***1***	**1**	**1**	**1**	**0**	***3***	**10**	**3**	**8**	**6**	***27***

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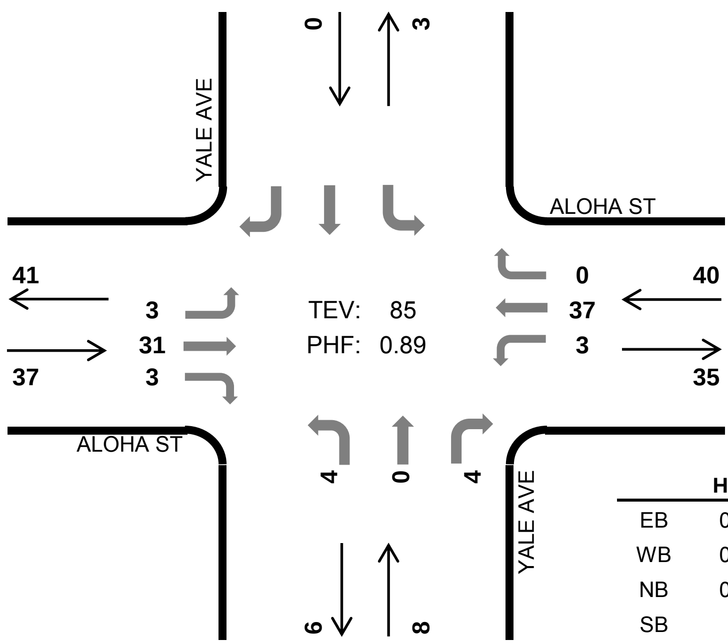
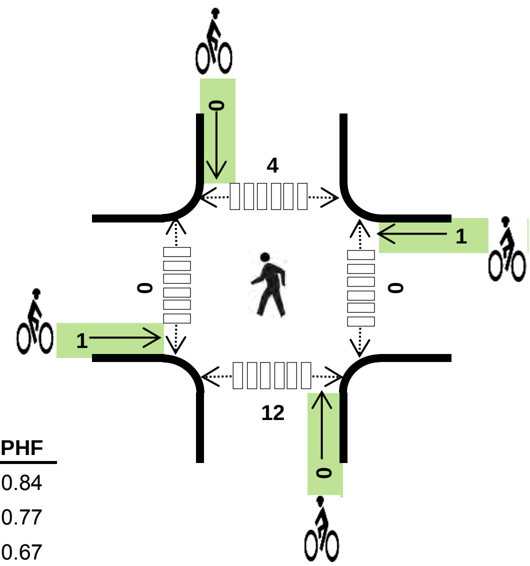
YALE AVE
ALOHA ST

Date: Sat, Feb 01, 2014
Count Period: 11:00 AM to 1:00 PM
Peak Hour: 12:00 PM to 1:00 PM

N

Peak Hour





	HV %:	PHF
EB	0.0%	0.84
WB	0.0%	0.77
NB	0.0%	0.67
SB	-	-
TOTAL	0.0%	0.89

Two-Hour Count Summaries

Interval Start	ALOHA ST Eastbound LT	TH	RT	ALOHA ST Westbound LT	TH	RT	YALE AVE Northbound LT	TH	RT	YALE AVE Southbound LT	TH	RT	15-min Total	Rolling One Hour
11:00 AM	1	8	0	1	4	0	0	0	0	0	0	0	14	
11:15 AM	0	7	1	0	7	0	1	0	0	0	0	0	16	
11:30 AM	0	11	1	1	8	0	1	0	0	0	0	0	22	
11:45 AM	0	4	1	1	8	0	3	0	0	0	0	0	17	69
12:00 PM	**1**	**8**	**0**	**0**	**13**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**24**	79
12:15 PM	**1**	**8**	**0**	**1**	**10**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**21**	84
12:30 PM	**1**	**5**	**2**	**2**	**7**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**19**	81
12:45 PM	**0**	**10**	**1**	**0**	**7**	**0**	**2**	**0**	**1**	**0**	**0**	**0**	**21**	**85**
Count Total	4	61	6	6	64	0	9	0	4	0	0	0	154	
Peak Hr	**3**	**31**	**3**	**3**	**37**	**0**	**4**	**0**	**4**	**0**	**0**	**0**	**85**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
11:00 AM	0	1	0	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
11:15 AM	0	1	0	0	*1*	0	0	0	0	*0*	0	0	2	2	*4*
11:30 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	1	5	*6*
11:45 AM	0	0	0	0	*0*	0	0	0	0	*0*	1	0	2	0	*3*
12:00 PM	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**2**	**1**	***3***
12:15 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
12:30 PM	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**2**	**3**	***5***
12:45 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**8**	***8***
Count Total	0	2	0	0	*2*	1	1	0	0	*2*	1	0	9	19	*29*
Peak Hr	**0**	**0**	**0**	**0**	***0***	**1**	**1**	**0**	**0**	***2***	**0**	**0**	**4**	**12**	***16***

Mark Skaggs: 425 - 250 - 0777
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	ALOHA PARKING STUDY SATURDAY FEB 1ST					
	BETWEEN FAIRVIEW & MINOR		BETWEEN MINOR & YALE		BETWEEN YALE & EASTLAKE	
	NORTH SIDE	SOUTH SIDE	NORTH SIDE	SOUTH SIDE	NORTH SIDE	SOUTH SIDE
11:00	0	0	5	3	6	2
11:15	0	0	5	4	7	3
11:30	0	0	6	4	4	3
11:45	0	0	4	6	4	3
12:00	0	0	4	7	3	2
12:15	0	0	4	6	3	1
12:30	0	0	4	5	3	2
12:45	0	0	6	6	5	1
13:00	0	0	6	5	6	2

	ALOHA PARKING STUDY TUESDAY FEB 4TH					
	BETWEEN FAIRVIEW & MINOR		BETWEEN MINOR & YALE		BETWEEN YALE & EASTLAKE	
	NORTH SIDE	SOUTH SIDE	NORTH SIDE	SOUTH SIDE	NORTH SIDE	SOUTH SIDE
5:00	0	0	0	0	0	0
5:15	0	0	0	0	0	0
5:30	0	0	0	0	0	0
5:45	0	0	0	0	1	0
6:00	0	0	0	0	1	0
6:15	0	0	1	0	1	1
6:30	0	0	0	0	1	2
6:45	0	0	1	1	1	2
7:00	0	0	2	4	1	3

	ALOHA PARKING STUDY TUESDAY FEB 4TH					
	BETWEEN FAIRVIEW & MINOR		BETWEEN MINOR & YALE		BETWEEN YALE & EASTLAKE	
	NORTH SIDE	SOUTH SIDE	NORTH SIDE	SOUTH SIDE	NORTH SIDE	SOUTH SIDE
19:00	0	0	0	2	5	3
19:15	0	0	0	2	5	2
19:30	0	0	0	1	4	3
19:45	0	0	0	1	4	3
20:00	0	0	0	1	3	3
20:15	0	0	0	1	6	3
20:30	0	0	0	1	5	2
20:45	0	0	1	1	4	2
21:00	0	0	1	0	3	2

	ALOHA PARKING STUDY THURSDAY FEB 6TH					
	BETWEEN FAIRVIEW & MINOR		BETWEEN MINOR & YALE		BETWEEN YALE & EASTLAKE	
	NORTH SIDE	SOUTH SIDE	NORTH SIDE	SOUTH SIDE	NORTH SIDE	SOUTH SIDE
5:00	0	0	1	0	0	0
5:15	0	0	1	0	0	0
5:30	0	0	1	0	0	0
5:45	0	0	1	0	0	0
6:00	0	0	1	1	0	0
6:15	0	0	1	1	0	1
6:30	0	0	0	1	0	2
6:45	0	0	0	1	0	3
7:00	0	0	1	4	2	3

	ALOHA PARKING STUDY THURSDAY FEB 6TH					
	BETWEEN FAIRVIEW & MINOR		BETWEEN MINOR & YALE		BETWEEN YALE & EASTLAKE	
	NORTH SIDE	SOUTH SIDE	NORTH SIDE	SOUTH SIDE	NORTH SIDE	SOUTH SIDE
19:00	0	0	4	4	6	1
19:15	0	0	3	3	7	3
19:30	0	0	2	3	6	4
19:45	0	0	2	3	5	4
20:00	0	0	2	3	5	4
20:15	0	0	3	3	6	3
20:30	0	0	2	1	4	3
20:45	0	0	2	1	3	2
21:00	0	0	2	1	3	2

	ALOHA PARKING STUDY SATURDAY FEB 8TH					
	BETWEEN FAIRVIEW & MINOR		BETWEEN MINOR & YALE		BETWEEN YALE & EASTLAKE	
	NORTH SIDE	SOUTH SIDE	NORTH SIDE	SOUTH SIDE	NORTH SIDE	SOUTH SIDE
11:00	0	0	1	0	4	3
11:15	0	0	1	0	6	4
11:30	0	0	1	0	6	4
11:45	0	0	2	0	6	5
12:00	0	0	2	0	6	4
12:15	0	0	1	0	7	4
12:30	0	0	0	0	6	3
12:45	0	0	0	0	5	4
13:00	0	0	0	0	5	4

FAIRVIEW AVENUE NORTH
BRIDGE REPLACEMENT PROJECT

Traffic Analysis Report Supplement: Bus Detour Analysis

Final January 14, 2016

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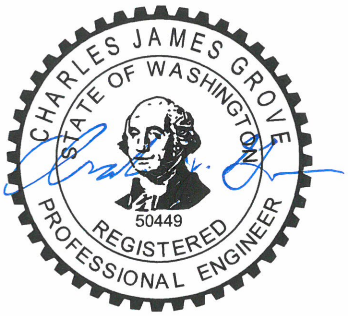
LICENSED ENGINEER STAMP PAGE

This report and the associated traffic analysis have been prepared under the direction of the following licensed civil engineer:



1/14/2016

Charles J. Grove, P.E.

Date

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SUMMARY

The Fairview Avenue North Bridge Replacement Project will provide a replacement bridge that meets future demand in vehicle, pedestrian, and bicycle traffic and provides for future extension of the South Lake Union streetcar. Both Aloha Street and Republican Street are being considered as detour routes during full closure of Fairview Avenue North for replacement bridge construction.

This bus detour analysis supplements the January 2016 final Traffic Analysis Report with evaluation of the two potential bus detour routes. Between Eastlake Avenue East and Fairview Avenue North, the bus detour alternatives would either use Aloha Street with the general traffic detour (Full Closure Scenario 2), or use Republican Street with the general traffic detour on both Aloha Street and Republican Street (Full Closure Scenario 1). A Republican Street bus detour was also evaluated with general detour traffic on Aloha Street (Full Closure Scenario 2).

For the Aloha Street detour option, the roadway would be re-channelized for general purpose traffic. A temporary traffic signal would be installed at the Eastlake Avenue East intersection with Aloha Street and the intersection would be rechannelized to allow eastbound left turns to northbound Eastlake Avenue East. Aloha Street was evaluated with and without allowing left turns at Fairview Avenue North from the westbound curb lane and adding a left-only eastbound lane at Eastlake Avenue East.

Traffic operations analyses of the bus detour routes were conducted for weekday AM and PM peak hours at nine study area intersections. The number of detoured buses, six in each direction, would have little or no effect (less than 5 seconds) on average vehicle delay at eight of the nine intersections. Delays at the Aloha Street/Eastlake Avenue East intersection would increase by up to 17 seconds. A temporary traffic signal at Eastlake Avenue East/Republican Street for the Republican Street bus detour with Full Closure Scenario 1 would decrease vehicle delay at this location compared to the existing stop sign control for Republican Street.

The Aloha Street bus detour, without adding turn lanes on Aloha Street, is recommended during replacement of the Fairview Avenue North Bridge. Compared to the Aloha Street detour with added turn lanes, this detour option provides the same level of service at the Aloha Street/ Eastlake Avenue East intersection during the AM peak. PM peak intersection operations are worse without the added turn lanes (LOS F, compared to LOS E). The Aloha Street detour without added lanes meets guidelines for stop line locations with reconstruction of the southwest corner of the intersection. The Aloha Street detour with added turn lanes would require additional reconstruction of the northwest corner of the Aloha Street/Eastlake Avenue East intersection in order to meet MUTCD guidelines for stop line location. A center two-way turn-lane is also recommended on Aloha Street between Eastlake Avenue East and Yale Avenue North, and in the vicinity of Minor Avenue North, to improve access to adjacent properties during construction of the Fairview Avenue North Bridge replacement.

BACKGROUND

The Traffic Analysis Report evaluated three alternatives for managing traffic during construction of the Fairview Avenue North Bridge replacement:

- **Staged Construction** with overnight and weekend closures of the bridge over a 22- to 24-month construction period, with existing channelization along the detour routes
- **Full Closure Scenario 1** for a 13- to 15-month period, with existing intersection channelization along the detour routes
- **Full Closure Scenario 2** for approximately 13- to 15-months, **with mitigation** to limit detour traffic using Republican Street by rechannelizing and signalizing the Eastlake Avenue East and Aloha Street intersection

The staged construction alternative would replace the four-lane bridge in halves, with one lane of traffic maintained in each direction on the open side of the bridge during weekday daytime hours. The intersection operations analysis in the Traffic Analysis Report compares a No Build condition with bridge closure during the AM and PM shoulder hours immediately before and immediately after the peak periods and midday when two lanes would be open.

The No Build and two full closure alternatives were analyzed for the weekday AM and PM peak hours. A sensitivity analysis for the AM and PM peak full closure conditions was also evaluated in which the volume of bridge detour traffic was reduced by 20 percent to reflect the actions of motorists in adapting to increased delays and queues. With a concerted public information program during construction, identifying alternative routes and featuring transit as a convenient alternative, a 20 percent reduction is likely achievable.

Both King County Metro and the Mayor's office executive team have identified maintaining transit access to South Lake Union during the full closure an important need, and both expressed concerns about transit access to South Lake Union if Stewart Street southbound and Howell Street northbound are used for the Metro bus detour as proposed in the Traffic Analysis Report.

This Bus Detour Analysis builds on the full bridge closure Scenario 1 and Scenario 2 analyses described in the Traffic Analysis Report. No Build and Staged Construction traffic impacts and potential mitigation are addressed in that report. This analysis updates the full closure scenarios to include the approved extension of Metro's RapidRide C Line to South Lake Union, and evaluates traffic operations of bus detour alternatives using Aloha Street with Scenario 2 and Republican Street with either full closure scenario. Mitigation requirements are identified for general purpose traffic and Metro buses. Figure 1 shows the bridge replacement location and the nine evaluated intersections.

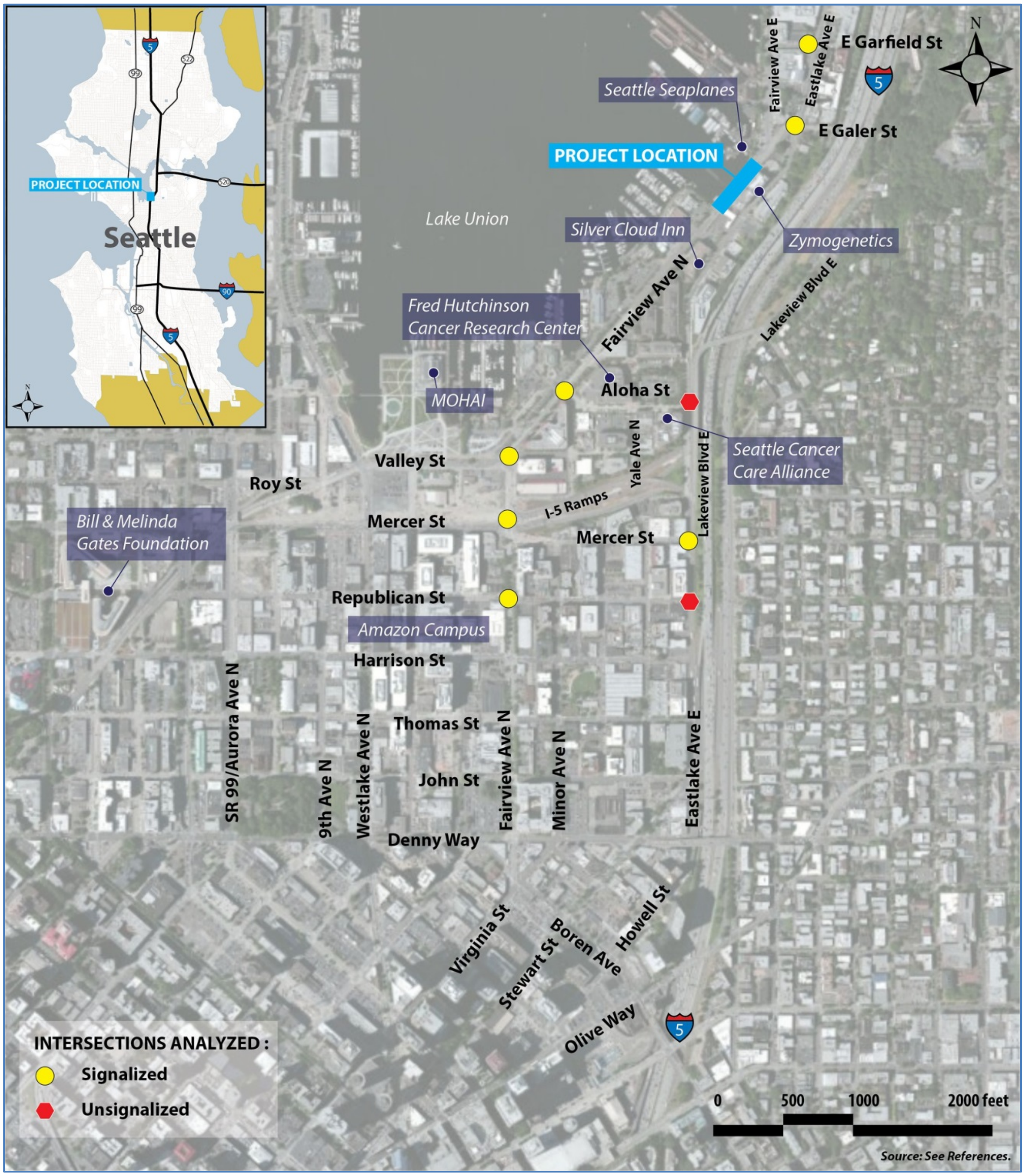


Figure 1: Project Vicinity

METHODOLOGY

Construction Year Traffic

Traffic Data

Intersection turning movement counts were conducted at 12 locations along potential detour routes in July 2014 for the morning (7 to 9 AM) and afternoon (4 to 6 PM) peak periods. These counts included heavy vehicles, bicycles, and pedestrians. Appendix D of the Traffic Analysis Report contains the traffic count sheets. The Traffic Analysis Report analyzed maintenance of traffic during construction for a 2016 construction year. Traffic assignments were prepared for 2016 conditions, using a 1.25 percent annual growth rate.

Advertisement of the Fairview Avenue North Bridge Replacement Project is currently scheduled for late 2016 with construction beginning in early 2017. The baseline 2016 intersection operations reported in the Traffic Analysis Report remains representative of conditions for detours during bridge construction and are the baseline conditions for this bus detour study.

Transit Operations

The King County Metro Transit Division provided March 2015 operations data for Routes 70 and 66X in the 6 to 9 AM and 3 to 6 PM peak periods. For each bus trip, data included scheduled and actual arrival times at each bus stop and time point, and dwell times. Route 66X operates with limited stops on Eastlake Avenue East between North 41st Street and Stewart Street. Route 66X northbound and southbound stops in the study area are at East Garfield Street, Aloha Street, and Mercer Street. King County has proposed deleting Route 66X and replacing it with other service, including Route 70, as part of the University Link Bus Integration and Service Changes under consideration by the King County Council. These service changes would be effective March 26, 2016. Bus stop dwell time data for Route 66X on Eastlake Avenue East is used in this bus detour analysis, but the route is assumed to be deleted when the bridge replacement bus detour is in operation in 2017.

Route 70: University District, Eastlake, Downtown Seattle

Route 70 is a “Very Frequent” service with less than 15-minute peak, and 15-minute off-peak and night service frequencies. Table 1 lists the stop locations within the detour study area.

Table 1: Route 70 Study Area Bus Stops

Northbound	Stop ID	Southbound	Stop ID
Fairview Ave south of Denny Way	10280	Eastlake Ave E south of E Garfield St	9240
Fairview Ave N south of Harrison St	10305	Fairview Ave N vicinity of E Nelson Pl	10170
Fairview Ave N north of Valley St	10325	Fairview Ave N south of Yale Ave N	10180
Fairview Ave N north of Yale Ave N	10340	Fairview Ave N south of Aloha St	10190
Fairview Ave N vicinity of E Nelson Pl	10350	Fairview Ave N south of Republican St	10210
Eastlake Ave E north of E Garfield St	9460	Fairview Ave N south of Thomas St	10225
		Boren Ave south of Virginia St	10240

Table 2 shows the scheduled AM and PM peak period service for the route segment that includes the study area. Actual Route 70 travel times between East Garfield Street and Denny Way were averaged for six trips in the AM peak and six trips in PM peak for all Tuesdays, Wednesdays, and Thursdays in March 2015. These average northbound and southbound travel times represent the baseline travel time. The detour route bus travel time effects are determined by comparing the average baseline travel times with estimated travel time on the detour routes. Changes in travel time are due to changes in route distance and the intersection delay including both general detour traffic and the diverted buses. King County Metro does not expect a marked change in the number of boardings and alightings at the Fairview Avenue North bus stops after the March 2016 service changes[1]. The existing (2015) boardings and alightings, and their associated dwell times, are assumed to remain the demand for Route 70 during the detour operation. The numbers of peak hour northbound and southbound buses through the study area shown in Table 2 are also assumed to remain the same during the bus detour period.

[1] Jeremy Fichter, King County Metro, email to Ken Madden, King County Metro, September 15, 2015.

Table 2: Route 70 March 2015 Peak Period Schedule through Study Area

To Downtown				To University District			
AM Peak							
Eastlake Ave E & Harvard Ave E	Fairview Ave & Denny Way	Scheduled Travel Time	Trip ID	Fairview Ave & Denny Way	Eastlake Ave E & Harvard Ave E	Scheduled Travel Time	Trip ID
6:44	6:57	0:13	26064674	6:07	6:19	0:12	26064614
6:59	7:12	0:13	26064675	6:19	6:31	0:12	26064615
7:15	**7:29**	**0:14**	**26064676**	6:31	6:43	0:12	26064616
7:30	**7:44**	**0:14**	**26064677**	6:43	6:54	0:11	26064617
7:43	**7:57**	**0:14**	**26064678**	6:55	7:07	0:12	26064618
7:56	**8:10**	**0:14**	**26064679**	7:07	7:19	0:12	26064619
8:09	**8:23**	**0:14**	**26064680**	**7:19**	**7:31**	**0:12**	**26064620**
8:21	**8:35**	**0:14**	**26064681**	**7:31**	**7:44**	**0:13**	**26064621**
8:32	8:46	0:14	26064682	**7:44**	**7:57**	**0:13**	**26064622**
				7:57	**8:10**	**0:13**	**26064623**
				8:10	**8:23**	**0:13**	**26064624**
				8:24	**8:37**	**0:13**	**26064625**
				8:37	**8:50**	**0:13**	26064626
PM Peak							
3:02	3:17	0:15	26064709	3:09	3:21	0:12	26064653
3:17	3:32	0:15	26064710	3:21	3:33	0:12	26064654
3:29	3:44	0:15	26064711	3:33	3:45	0:12	26064655
3:41	3:55	0:14	26064712	3:45	3:57	0:12	26064656
3:53	4:08	0:15	26064713	3:57	4:09	0:12	26064657
4:05	4:20	0:15	26064714	4:09	4:21	0:12	26064658
4:17	**4:32**	**0:15**	**26064715**	4:21	4:34	0:13	26064659
4:29	**4:44**	**0:15**	**26064716**	**4:33**	**4:46**	**0:13**	**26064660**
4:41	**4:55**	**0:14**	**26064717**	**4:44**	**4:57**	**0:13**	**26064661**
4:53	**5:09**	**0:16**	**26064718**	**4:55**	**5:11**	**0:16**	**26064662**
5:05	**5:21**	**0:16**	**26064719**	**5:05**	**5:21**	**0:16**	**26064663**
5:17	**5:33**	**0:16**	**26064720**	**5:15**	**5:31**	**0:16**	**26064664**
5:29	5:45	0:16	26064721	**5:25**	**5:41**	**0:16**	**26064665**

Source: King County Metro, Routes 66 and Route 70 data for March 2 through March 31 2015, 6 to 9 a.m. and 3 to 6 p.m. trips. Provided to SDOT on September 22, 2015.

Bolded text are the typical runs in the traffic AM and PM peak hours that were used to determine Route 70 average travel time through the study area for baseline conditions.

RapidRide C Line Extension

At the request of the City of Seattle and with City funding, King County will extend the RapidRide C Line between downtown and South Lake Union in 2016. In the bus detour study area, the RapidRide C would operate east on Valley Street to Fairview Avenue North, north on Fairview Avenue North to Aloha Street, east on Aloha Street, south on Minor Avenue North, and west on Valley Street through the Fairview Avenue North intersection. The buses will use the existing northbound Fairview Avenue North stop north of Valley Street and new layover zones on Minor Avenue North and Valley Street west of Minor Avenue North.

The Fairview Avenue North/Valley Street intersection islands and traffic signal will be modified to allow westbound transit-only movements through the intersection. Bus detour traffic operations analyses account for the additional bus movements through the Fairview Avenue North intersections with Valley Street and Aloha Street, and the traffic signal modifications at Valley Street. The number of bus movements in the AM and PM hours are based on the existing (September 26, 2015 service change) RapidRide C schedule. Appendix B describes the intersection turning movement volumes and heavy vehicle percentages adjusted for RapidRide C Line service. These adjustments are baseline conditions, independent of the Fairview Avenue North Bridge Replacement detours.

Traffic Operations Analysis

The Synchro 8 intersection operations software was used in the 2016 intersection level-of-service (LOS) and delay estimates. Turning movement counts and SDOT-provided signal timing plans were entered into Synchro. The 2014 to 2016 two-year growth was rounded to three percent and a global 1.03 factor was applied to all 2014 intersection entering traffic volumes in the Synchro model.

Intersection peak hour factor (PHF) values were used in the bus detour analysis, in accordance with the 2010 Highway Capacity Manual. In the Traffic Analysis Report, intersection approach PHF values were used as part of the model calibration process. As a result, average delay values reported in this memo are generally lower than those shown in the Traffic Analysis Report.

Level of service categories for signalized and unsignalized intersections were determined in accordance with the 2010 Highway Capacity Manual. For unsignalized intersections, delay and LOS are reported for the poorest movement. The vehicle delay associated with level-of-service is shown in Table 3.

Table 3: Intersection Level-of-Service Criteria

	Control Delay* (seconds per vehicle)	
Level of Service	**Signalized**	**Unsignalized**
A	≤10	0 to 10
B	>10 to 20	>10 to 15
C	>20 to 35	>15 to 25
D	>35 to 55	>25 to 35
E	>55 to 80	>35 to 50
F	>80	>50

Source: Transportation Research Board. Highway Capacity Manual 2010. Exhibit 18-4 and Exhibit 19-1.

* Control delay is time spent slowing, stopping, moving up in a queue, and accelerating back to desired speed.

Baseline 2016 Peak Hour

Table 4 shows the full bridge closure scenarios for general traffic detours used to evaluate bus detour options on Republican Street and Aloha Street. Scenario 1 is used to evaluate detoured Route 70 buses operating on Republican Street along with general detour traffic. While buses would operate both eastbound and westbound on Republican Street, general detour traffic would operate eastbound on both Republican Street and Mercer Street. Westbound general traffic would operate on Aloha Street. Mitigation at Aloha Street and Fairview Avenue North would allow left turns from the westbound curb lane, in addition to the through and right turn movements from this lane. This would provide two westbound to southbound left turn lanes. The Republican Street and Eastlake Avenue E intersection would be signalized for Scenario 1. The Aloha Street and Eastlake Avenue E intersection would remain unsignalized with eastbound traffic limited to right turns only to southbound Eastlake Avenue E.

Full Bridge Closure Scenario 2 would provide a traffic signal at Aloha Street and Eastlake Avenue E and would allow eastbound left turns. This would allow both eastbound and westbound detour general traffic to use Aloha Street. An eastbound left-turn lane would be added by prohibiting parking on Aloha Street between Yale Avenue North and Eastlake Avenue East. A Scenario 2 configuration without added left turn lanes would provide single-lane Aloha Street approaches eastbound at Eastlake Avenue E and westbound at Fairview Avenue North, and would reduce the amount of intersection reconstruction required to accommodate the full closure detour traffic. The Republican Street and Eastlake Avenue East intersection would remain unsignalized in Scenario 2.

Table 4: Baseline Intersection Configuration

Full Bridge Closure	Republican St at Eastlake Ave E	Aloha St at Eastlake Ave E	Aloha St at Fairview Ave E
Scenario 1	Signalized	Unsignalized 1 eastbound lane No eastbound left turn	Signalized 2 westbound left turn lanes
Scenario 2 with Added Turn Lanes	Unsignalized	Signalized 2 eastbound lanes	Signalized 2 westbound left turn lanes
Scenario 2 without Added Turn Lanes	Unsignalized	Signalized 1 eastbound lane	Signalized 1 westbound left turn lane

As described above under “RapidRide C Line Extension,” the Fairview Avenue North intersection with Valley Street will be modified in both full closure scenarios to provide a westbound transit-only movement for the RapidRide C line buses.

Table 5 shows projected delay and LOS for baseline conditions at eight signalized intersections and one stop-sign controlled intersection. All intersections would operate at LOS C or better (average delay of 35 seconds or less per vehicle at signalized intersection) in the AM peak except for Fairview Avenue North at Mercer Street which would operate at LOS E (58 seconds of delay) in Scenario 1, and LOS D (50 seconds of delay) in Scenario 2.

In the PM peak hour, the Fairview Avenue North/Mercer Street intersection would operate at LOS F with delays ranging from 138 to 142 seconds. The intersections of Fairview Avenue North/Valley Street and Fairview Avenue N/Republican Street are forecast to operate at LOS E. The Eastlake Avenue East/Aloha Street intersection would operate at LOS F in Scenario 1 and Scenario 2 without the added turn lanes. In Scenario 2 with the added turn lanes, Eastlake Avenue East/Aloha Street would operate at LOS D. The other five intersections would operate at LOS C or better.

Table 5: 2016 Baseline AM and PM Peak Hour Intersection Level of Service (LOS) and Delay (seconds per vehicle)

	Full Closure Scenario 1		Full Closure Scenario 2			
			With Added Turn Lanes[4]		Without Added Turn Lanes	
Location	AM Peak Delay/LOS	PM Peak Delay/LOS	AM Peak Delay/LOS	PM Peak Delay/LOS	AM Peak Delay/LOS	PM Peak Delay/LOS
Eastlake Ave E/Garfield St	15.4 / B	12.4 / B	15.3 / B	10.6 / B	15.3 / B	10.6 / B
Eastlake Ave E/Fairview Ave E	15.5 / B	14.3 / B	15.6 / B	11.4 / B	16.0 / B	11.4 / B
Eastlake Ave E/Aloha St	18.3 / C [1]	64.3 / F [1]	28.4 / C [2]	53.4 / D [2]	32.5 / C [2]	85.0 / F [2]
Fairview Ave N/Aloha St	17.6 / B	19.7 / B	27.0 / C	18.0 / B	21.0 / C	34.6 / C
Fairview Ave N/Valley St	23.7 / C	67.8 / E	19.5 / B	67.4 / E	23.2 / C	67.4 / E
Fairview Ave N/Mercer St	58.4 / E	141.9 / F	49.9 / D	138.5 / F	49.9 / D	138.5 / F
Fairview Ave N/Republican St	26.1 / C	78.3 / E	27.0 / C	76.4 / E	27.0 / C	76.4 / E
Eastlake Ave E/Mercer St	15.4 / B	27.5 / C	16.0 / B	23.5 / C	16.0 / B	23.5 / C
Eastlake Ave E/Republican St	12.2 / B [3]	12.2 / B [3]	19.9 / C [1]	23.2 / C [1]	19.9 / C [1]	23.2 / C [1]

Notes:
1. Unsignalized – Delay value is the approach with the highest delay value.
2. The Eastlake Ave E and Aloha Street intersection is converted to signal control for Full Closure Scenario 2.
3. The Eastlake Ave E and Republican Street intersection is converted to signal control for Full Closure Scenario 1.
4. Added turn lanes are a second Aloha Street westbound left turn at Fairview Avenue N and an eastbound left turn lane at Eastlake Avenue E.

Bus Detour Operations

Study area traffic operations are affected by the number of buses using the detour routes and changes in intersection geometry required for Metro buses. Appendix A shows the required reconstructed pavement areas and adjacent lane encroachments for the Metro design vehicle which is a 40-foot long, 25-foot wheelbase bus with a 3-foot front extension for a bicycle rack. Turning requirements, without additional construction, have been met by locating stop bars further back from intersections. The increased distance adds delay for vehicles to clear the intersection at the end of a green signal before a green signal is given to a conflicting movement. In the Synchro software, this increased delay is accounted for by increasing “Red” times for the affected movements. Appendix B lists the intersection turning movements where signal timing plans were adjusted for revised stop bar locations.

The AM and PM bus detour traffic models were modified to represent conditions with the diverted buses, and additional signal red time for turning movements affected by relocated stop bars.

DETOUR ALTERNATIVES

Republican Street Bus Detour

Full Closure Scenario 1

Figure 2 shows the Republican Street bus detour with the Full Closure Scenario 1 general traffic detour. Southbound general traffic would be detoured from southbound Eastlake Avenue East to westbound Aloha Street and southbound Fairview Avenue North. Northbound general traffic would detour from Fairview Avenue North to eastbound Republican Street and eastbound Mercer Street to northbound Eastlake Avenue East. Route 70 northbound and southbound buses would use Republican Street in both directions between Fairview Avenue North and Eastlake Avenue East.

No mitigation is proposed for Aloha Street and it would remain unsignalized with eastbound right turns only at Eastlake Avenue East. The Eastlake Avenue East/Republican Street intersection would be signalized. Stop bar locations would be modified at the Eastlake Avenue East/ Republican Street intersection as shown in Appendix A Exhibit 8 and at the Fairview Avenue North/Republican Street intersection as shown in Exhibit 11. Exhibits 8A and 10 show the impacts to curbs and sidewalks at the Republican Street intersections with Eastlake Avenue E and Fairview Avenue N, if the existing stop bar locations are maintained.

Full Closure Scenario 2

Figure 3 shows the Republican Street bus detour with general traffic detoured to Aloha Street. The Aloha Street/Eastlake Avenue East intersection would be signalized with added turn lanes. The Republican Street/Eastlake Avenue East intersection would remain stop-sign controlled on the Republican Street approach, and the stop bar would be relocated as shown in Appendix A Exhibit 8. This would require eastbound vehicles on Republican Street to stop at the stop bar, then pull forward and stop again at a point where they could see in both directions along Eastlake Avenue East.

The stop bar modifications to Fairview Avenue North/Republican Street (Appendix A, Exhibit 11) would also apply in this scenario. Exhibits 8A and 10 show the impacts to curbs and sidewalks at the Republican Street intersections with Eastlake Avenue E and Fairview Avenue N, if the existing stop bar locations are maintained.

Aloha Street Bus Detour

Full Closure Scenario 2 with Added Turn Lanes on Aloha Street

Northbound (University District) Route 70 buses would turn right onto Aloha Street from Fairview Avenue North (Figure 4). The existing bus stop on Fairview Avenue North, north of Valley Street, would remain in use. The detour route would bypass two existing northbound Fairview Avenue North bus stops north of Yale Avenue North (#10340) and south of the Fairview Avenue North Bridge (#10350). From eastbound Aloha Street, detoured buses would turn left onto northbound Eastlake Avenue East. On northbound Eastlake Avenue East, buses would serve a relocated stop in the vicinity of the signalized pedestrian crossing in the 1100 block. The existing northbound stop at Aloha Street is too close to the intersection to be used by buses turning north from eastbound Aloha Street. The Route 70 detour would end at East Galer Street. The southbound Route 70 detour would serve a relocated Eastlake Avenue East stop north of Aloha Street and a relocated Fairview Avenue North stop (#10190) south of Aloha Street. The detour route is about 630 feet longer than the existing route. Walking distances for transit users north of Valley Street and east of Fairview Avenue North would be similar to the existing route.

At the Eastlake Avenue East/Aloha Street intersection, accommodating design vehicle southbound to westbound right turns would require moving the eastbound lane stop line about 56 feet west to avoid lane encroachment (Appendix A, Exhibit 1). Exhibit 2 in Appendix A shows the impacts to the northwest and southwest curbs if the eastbound stop bar remains 4 feet in advance of the crosswalk.

At the Fairview Avenue North/Aloha Street intersection, accommodating design vehicle northeastbound to southeastbound right turns would require moving the northwestbound inside left turn stop line about 53 feet southeast to avoid lane encroachment (Appendix A, Exhibits 5 and 6). Exhibit 4 shows the impacts to the southwest curb if the westbound stop bar remains 4 feet in advance of the crosswalk.

Full Closure Scenario 2 without Added Turn Lanes on Aloha Street

The Full Closure Scenario 2 configuration with single-lane Aloha Street approaches eastbound at Eastlake Avenue E and westbound at Fairview Avenue North would have general traffic and bus detours as shown in Figure 4. The Republican Street/Eastlake Avenue East intersection would remain unsignalized.

At the Eastlake Avenue East/Aloha Street intersection, accommodating design vehicle southbound to westbound right turns would require moving the eastbound lane stop line about 45 feet west to avoid lane encroachment (Appendix A, Exhibit 2A). Exhibits 2B and 2C in Appendix A show the impacts to the southwest curb if the eastbound stop bar is placed 10 feet in advance of the crosswalk. The channelization in Exhibits 2B and 2C also includes a two-way center turn-lane on Aloha Street, which would maintain access to Seattle Cancer Care Alliance and Fred Hutchinson Cancer Research Center, and maintain the flow of detour traffic on Aloha Street.

At the Fairview Avenue North/Aloha Street intersection, accommodating design vehicle northeastbound to southeastbound right turns would require moving the northwestbound stop line about 22 feet southeast to avoid lane encroachment (Appendix A, Exhibit 6A). Exhibit 6A also shows a two-way center turn-lane on Aloha Street in the vicinity of Minor Avenue N and the Fred Hutchinson Cancer Research Center parking garage entrances.

Figure 2: Republican Street Bus Detour with Full Closure Scenario 1

Figure 3: Republican Street Bus Detour with Full Closure Scenario 2

Figure 4: Aloha Street Bus Detour with Full Closure Scenario 2

BUS DETOUR INTERSECTION OPERATIONS

Republican Street Bus Detour

Full Closure Scenario 1

With installation of a traffic signal, the Eastlake Avenue East/Republican Street intersection would operate at LOS B with less than 20 seconds of average delay per vehicle in the AM and PM peak hours (Table 6). The Fairview Avenue North/Republican Street intersection would operate at slightly higher delay and the same LOS C in the AM peak compared to baseline conditions. PM peak operation of this intersection would remain unchanged at 78 seconds of delay and LOS E.

The Aloha Street intersections with Fairview Avenue North and Eastlake Avenue East would operate similar to baseline conditions, with changes of less than 2 seconds in average delay. The Eastlake Avenue East/Aloha Street intersection would operate with about 64 seconds of delay (LOS F) in the PM peak. Route 70 would operate as through north and south movements at the Eastlake Avenue East intersection.

Table 6: Republican Street Bus Detour with Full Closure Scenario 1 Intersection Delay and LOS

	Baseline		With Bus Detour	
Location	**AM Peak Delay/LOS**	**PM Peak Delay/LOS**	**AM Peak Delay/LOS**	**PM Peak Delay/LOS**
Eastlake Ave E/Garfield St	15.4 / B	12.4 / B	15.2 / B	12.4 / B
Eastlake Ave E/Fairview Ave E	15.5 / B	14.3 / B	15.7 / B	14.3 / B
Eastlake Ave E/Aloha St [1]	18.3 / C [1]	64.3 / F [1]	18.3 / C [1]	64.3 / F [1]
Fairview Ave N/Aloha St	17.6 / B	19.7 / B	15.5 / B	20.0 / B
Fairview Ave N/Valley St	23.7 / C	67.8 / E	23.3 / C	67.8 / E
Fairview Ave N/Mercer St	58.4 / E	141.9 / F	58.4 / E	141.9 / F
Fairview Ave N/Republican St	26.1 / C	78.3 / E	26.4 / C	78.3 / E
Eastlake Ave E/Mercer St	15.4 / B	27.5 / C	15.4 / B	27.5 / C
Eastlake Ave E/Republican St[2]	12.2 / B [2]	12.2 / B [2]	14.5 / B [2]	14.6 / B [2]

Notes:
1 Eastlake Ave E/Aloha Street would remain unsignalized under baseline and bus detour conditions
2 Eastlake Ave E/Republican Street would be signalized in Scenario 1.

Full Closure Scenario 2

Table 7 shows intersection operations with general detour traffic on Aloha Street and Route 70 buses detoured to Republican Street without a traffic signal at Eastlake Avenue East.
The Aloha Street intersection with Eastlake Avenue East would be signalized. Additional turn lanes would be provided on Aloha Street westbound at Fairview Avenue North and eastbound at Eastlake Avenue East. At Republican Street/Fairview Avenue North, average intersection delays in the AM and PM peaks would change by less than 1 second, and LOS values would remain the same as the baseline, LOS C and E, respectively. The Eastlake Avenue East and Republican Street unsignalized intersection would operate at LOS C in the AM and PM peaks, with delay increases of less than 2 seconds.

Table 7: Republican Street Bus Detour with Full Closure Scenario 2 Intersection Delay and LOS

	Baseline		With Bus Detour	
Location	**AM Peak Delay/LOS**	**PM Peak Delay/LOS**	**AM Peak Delay/LOS**	**PM Peak Delay/LOS**
Eastlake Ave E/Garfield St	15.3 / B	10.6 / B	15.3 / B	10.6 / B
Eastlake Ave E/Fairview Ave E	15.6 / B	11.4 / B	15.6 / B	11.4 / B
Eastlake Ave E/Aloha St [1]	28.4 / C [1]	53.4 / D [1]	28.4 / C [1]	53.4 / D [1]
Fairview Ave N/Aloha St	27.0 / C	18.0 / B	27.0 / C	18.0 / B
Fairview Ave N/Valley St	19.5 / B	67.4 / E	19.5 / B	67.4 / E
Fairview Ave N/Mercer St	49.9 / D	138.5 / F	49.9 / D	138.5 / F
Fairview Ave N/Republican St	27.0 / C	76.4 / E	27.4 / C	76.3 / E
Eastlake Ave E/Mercer St	16.0 / B	23.5 / C	16.0 / B	23.5 / C
Eastlake Ave E/Republican St [2]	19.9 / C [2]	23.2 / C [2]	21.1 / C [2]	24.8 / C [2]

Notes:

1 Eastlake Ave E/Aloha Street would be signalized under baseline and bus detour conditions with Full Closure Scenario 2.

2 Eastlake Ave E/Republican Street would remain unsignalized with Full Closure Scenario 2.

Aloha Street Bus Detour

Full Closure Scenario 2 with Added Turn Lanes on Aloha Street

Table 8 shows intersection operations with the bus detour and general traffic detour on Aloha Street with the added turn lanes on Aloha Street. Study area intersections experienced delay increases of less than 2 seconds, and LOS values were unchanged from the baseline, except for the intersection of Aloha Street/Eastlake Avenue E.

Intersection operations at Aloha Street/Eastlake Avenue E would deteriorate from LOS C to D in the AM peak and LOS D to E in the PM peak, with 10 to 14 seconds of additional delay.

Table 8: Aloha Street Bus Detour with Full Closure Scenario 2 (With Added Lanes on Aloha Street) Intersection Delay and LOS

	Baseline		With Bus Detour	
Location	AM Peak Delay/LOS	PM Peak Delay/LOS	AM Peak Delay/LOS	PM Peak Delay/LOS
Eastlake Ave E/Garfield St	15.3 / B	10.6 / B	15.3 / B	10.6 / B
Eastlake Ave E/Fairview Ave E	15.6 / B	11.4 / B	15.3 / B	11.4 / B
Eastlake Ave E/Aloha St [2]	28.4 / C [1]	53.4 / D [1]	38.0 / D [1]	66.9 / E [1]
Fairview Ave N/Aloha St [3]	27.0 / C	18.0 / B	27.8 / C	18.4 / B
Fairview Ave N/Valley St	19.5 / B	67.4 / E	20.0 / B	65.7 / E
Fairview Ave N/Mercer St	49.9 / D	138.5 / F	49.9 / D	138.5 / F
Fairview Ave N/Republican St	27.0 / C	76.4 / E	27.0 / C	76.4 / E
Eastlake Ave E/Mercer St	16.0 / B	23.5 / C	16.0 / B	23.5 / C
Eastlake Ave E/Republican St [4]	19.9 / C [4]	23.2 / C [4]	19.9 / C [4]	23.2 / C [4]

Notes:

1 Eastlake Ave E/Aloha Street would be signalized under baseline and bus detour conditions with Full Closure Scenario 2.

2 The Aloha Street eastbound approach would have one left-only lane and one right-only lane.

3 The Aloha Street westbound approach would have one left-only lane and one left-through-right lane.

4 Eastlake Ave E/Republican Street would remain unsignalized with Full Closure Scenario 2.

Full Closure Scenario 2 without Added Turn Lanes on Aloha Street

Table 9 shows intersection operations with the bus detour and general traffic detour on Aloha Street without the added turn lanes on Aloha Street. Study area intersections experienced delay increases of less than 2 seconds, and LOS values were unchanged from the baseline, except for the intersections of Aloha Street at Fairview Avenue North and Eastlake Avenue E.

Intersection operations at Aloha Street/Eastlake Avenue E would deteriorate from LOS C to D in the AM peak and remain at LOS F in the PM peak, with 13 to 17 seconds of additional delay.

Delays at the intersection of Aloha Street/Fairview Avenue N increased by as much as 3 seconds, and the baseline LOS values were maintained. The single westbound approach lane on Aloha Street allowed for an overlap of the westbound signal phase with the northbound right-turn signal phase. These are the two movements affected by the detour route, and the overlap phase was an effective way to limit delays at this intersection. The overlap phase would not be possible with the two-lane westbound approach, due to northbound right-turning buses encroaching on the path of westbound left-turning vehicles as shown in Appendix A Exhibit 6.

Table 9: Aloha Street Bus Detour with Full Closure Scenario 2 (Without Added Lanes on Aloha Street) Intersection Delay and LOS

	Baseline		With Bus Detour	
Location	**AM Peak Delay/LOS**	**PM Peak Delay/LOS**	**AM Peak Delay/LOS**	**PM Peak Delay/LOS**
Eastlake Ave E/Garfield St	15.3 / B	10.6 / B	15.3 / B	10.6 / B
Eastlake Ave E/Fairview Ave E	16.0 / B	11.4 / B	15.1 / B	11.4 / B
Eastlake Ave E/Aloha St [1]	32.5 / C [1]	85.0 / F [1]	45.5 / D [1]	101.6 / F [1]
Fairview Ave N/Aloha St	21.0 / C	34.6 / C	23.5 / C	31.3 / C
Fairview Ave N/Valley St	23.2 / C	67.4 / E	23.3 / C	65.7 / E
Fairview Ave N/Mercer St	49.9 / D	138.5 / F	49.9 / D	138.5 / F
Fairview Ave N/Republican St	27.0 / C	76.4 / E	27.0 / C	76.4 / E
Eastlake Ave E/Mercer St	16.0 / B	23.5 / C	16.0 / B	23.5 / C
Eastlake Ave E/Republican St [2]	19.9 / C [2]	23.2 / C [2]	19.9 / C [2]	23.2 / C [2]

Notes:

1 Eastlake Ave E/Aloha Street would be signalized under baseline and bus detour conditions with Full Closure Scenario 2.

2 Eastlake Ave E/Republican Street would remain unsignalized with Full Closure Scenario 2.

BUS DETOUR TRAVEL TIME

Table 10 shows the estimated Route 70 travel times through the study area with the Route 70 detour operating on Aloha Street or Republican Street. Baseline average weekday AM and PM peak hour travel times are based on March 2015 arrival times at each bus stop for all bus trips in the peak hours for all Tuesdays, Wednesdays, and Thursdays. The travel times between the Eastlake Avenue East/East Garfield Street bus stops and the Fairview Avenue North/Denny Way bus stops average about 9 minutes in either direction in the AM peak hour. The PM peak hour weekday travel time average is nearly 16 minutes southbound and nearly 12 minutes northbound.

Bus travel time on the detour routes was based on SimTraffic modeled 2016 AM and PM peak arterial travel times with all detour traffic and bus dwell times for the Route 70 and Route 66X March 2015 data.

Republican Street Bus Detour

Full Closure Scenario 1

Southbound bus travel times with the Republican Street detour would be slightly less than the baseline travel time of 9 minutes, 15 seconds in the AM peak and 5 minutes longer in the PM than the baseline travel time of 15 minutes, 46 seconds. The increase in PM travel times is due to recurring delays on westbound Republican Street during weekday afternoons.

Northbound travel times would decrease by about 2 minutes in both the AM and PM peaks due to less congestion on Eastlake Avenue East than on Fairview Avenue North in the vicinity of Mercer Street. The AM baseline travel time (9 minutes, 5 seconds) would decrease to 7 minutes, 27 seconds. The PM baseline travel time (11 minutes, 40 seconds) would decrease to 9 minutes, 11 seconds. Bus detour travel times on Republican Street assume a new traffic signal at Eastlake Avenue East.

Full Closure Scenario 2

With general traffic detoured to Aloha Street, the Republican Street/Eastlake Avenue East intersection would remain unsignalized with stop-control for eastbound Republican Street. Compared to the baseline, southbound detoured Route 70 travel times would increase by 2 minutes, 17 seconds in the AM peak and by 8 minutes, 40 seconds in the PM peak. Compared to the baseline, northbound Route 70 travel times would decrease by 1 minute, 33 seconds and 2 minutes, 12 seconds in the AM and PM peaks, respectively.

The time penalty of almost 9 minutes southbound in the PM peak is attributed to the temporary traffic signal at Aloha Street/Eastlake Avenue East, and the recurring delays on westbound Republican Street during weekday afternoons. The increase in southbound AM travel times compared to the baseline, and the Full Closure Scenario 1 condition is due to the temporary traffic signal at Aloha Street/Eastlake Avenue East.

Eastbound travel times on Republican Street vary by less than 30 seconds between the Scenario 1 and Scenario 2 conditions. Traffic volumes are lower in the unsignalized Scenario 2 condition, and traffic volumes are higher in the signalized Scenario 1 condition, resulting in similar travel times.

Aloha Street Bus Detour

Full Closure Scenario 2 with Added Aloha Street Turn Lanes

Compared with the baseline, southbound detoured Route 70 travel times would increase by 3 minutes, 31 seconds and 4 minutes, 55 seconds in the AM and PM peaks, respectively. Northbound detoured Route 70 travel times in the AM and PM peaks would be about the same as the baseline, increasing by 18 seconds or less.

Full Closure Scenario 2 without Added Aloha Street Turn Lanes

Southbound bus travel times increase by 2 minutes, and 5 minutes in the AM and PM peaks, respectively, compared to the baseline. The increase in the AM peak is about 90 seconds less than the condition with added turn lanes. The increase in the PM peak is the same as the condition with added turn lanes.

Northbound bus travel times increase by 25 seconds and 2 minutes, 50 seconds in the AM and PM peaks, respectively, compared to the baseline. The increase in the AM peak is less than 10 seconds higher than the condition with added turn lanes, and the increase in the PM peak is 3 minutes higher. The additional 3 minutes were experienced on Aloha Street, where longer delays were produced by the single travel lane.

Travel times on the Aloha Street detour without added turn lanes would comparable to the condition with added turn lanes, except in the northbound direction during the PM peak, where a difference of 3 minutes would be experienced.

Table 10: Bus Detour Weekday Peak Hour Travel Times (minutes:seconds)

	AM Peak		PM Peak	
Detour and Detour Segment	**SB**	**NB**	**SB**	**NB**
Baseline Route 70 travel times between Eastlake Ave E/Garfield St and Fairview Ave/Denny Way	9:15	9:05	15:46	11:40
Republican Street Detour (Full Closure Scenario 1)				
Eastlake Ave E/E Garfield St to Eastlake Ave E/Republican St	3:42	2:46	10:48	3:33
Eastlake Ave E/Republican St to Fairview Ave N/Republican St	1:44	1:34	6:36	2:08
Fairview Ave N/Republican St to Fairview Ave/Denny Way	3:37	3:07	3:44	3:30
Republican Street Detour total travel time	9:03	7:27	21:08	9:11
Change from baseline travel time	-0:12	-1:38	+5:22	-2:29
Republican Street Detour (Full Closure Scenario 2)				
Eastlake Ave E/E Garfield St to Eastlake Ave E/Republican St	6:20	2:48	14:30	3:23
Eastlake Ave E/Republican St to Fairview Ave N/Republican St	1:35	1:37	6:12	2:35
Fairview Ave N/Republican St to Fairview Ave/Denny Way	3:37	3:07	3:44	3:30
Republican Street Detour total travel time	11:32	7:32	24:26	9:28
Change from baseline travel time	+2:17	-1:33	+8:40	-2:12
Aloha Street Detour (Full Closure Scenario 2) With Added Aloha Street Turn Lanes				
Eastlake Ave E/E Garfield St to Eastlake Ave E/Aloha St	5:09	1:32	11:22	1:57
Eastlake Ave E/Aloha St to Fairview Ave North/Aloha St	0:57	0:57	0:45	1:05
Fairview Ave North/Aloha St to Fairview Ave/Denny Way	6:40	6:54	8:34	8:26
Aloha Street Detour total travel time	12:46	9:23	20:41	11:28
Change from baseline travel time	+3:31	+0:18	+4:55	-0:12
Aloha Street Detour (Full Closure Scenario 2) Without Added Aloha Street Turn Lanes				
Eastlake Ave E/E Garfield St to Eastlake Ave E/Aloha St	4:01	1:31	11:26	1:57
Eastlake Ave E/Aloha St to Fairview Ave North/Aloha St	0:33	1:05	0:44	4:07
Fairview Ave North/Aloha St to Fairview Ave/Denny Way	6:40	6:54	8:34	8:26
Aloha Street Detour total travel time	11:14	9:30	20:44	14:30
Change from baseline travel time	+1:59	+0:25	+4:58	+2:50

MITIGATION STRATEGIES

Bus operations on either the Aloha Street detour route, or the Republican Street detour route, would require temporary changes to the existing channelization of these streets between Fairview Avenue North and Eastlake Avenue East.

The Aloha Street bus detour without added turn lanes would require the least reconstruction of curb returns while meeting the MUTCD guidance on stop line locations.

The Aloha Street configuration without added turn lanes allows for a center two-way turn-lane, which would benefit detour traffic operations. A right-turn overlap signal phase could also be implemented at the Aloha Street/Fairview Avenue North intersection for the northbound right-turn movement and the westbound left-turn movement. These are the primary movements for detour traffic, and the overlap phase reduces overall intersection delays.

An all-way walk phase could be implemented at the Aloha Street/Eastlake Avenue East intersection to reduce the conflicts between pedestrians and motorists on the detour route.

Stop Line Relocations

Appendix A shows the intersection stop line locations required turn the Metro 40-foot design bus with the bike extension while minimizing reconstruction of pavement, curb and sidewalks. The Manual on Uniform Traffic Control Devices (MUTCD 2009) provides guidance on stop line location. MUTCD Section 3B.16 states:

> *If used, stop and yield lines should be placed a minimum of 4 feet in advance of the nearest crosswalk line at controlled intersections, except for yield lines at roundabouts as provided for in Section 3C.04 and at midblock crosswalks. In the absence of a marked crosswalk, the stop line or yield line should be placed at the desired stopping or yielding point, but should not be placed more than 30 feet or less than 4 feet from the nearest edge of the intersecting traveled way.*

With minimal curb reconstruction, the Aloha Street detour without added turn lanes would meet the MUTCD stop line placement guidelines. The eastbound stop line at the Aloha Street/ Eastlake Avenue East intersection would be located 28 feet from the edge of intersecting traveled way. The westbound stop line at the Aloha Street/Fairview Avenue North intersection would be located 22 feet from the edge of the intersecting traveled way. The other three detour options would not be able to meet these guidelines without significant reconstruction.

All-Way Walk Signal Phase

An all-way walk signal phase was analyzed at the Aloha Street/Eastlake Avenue East intersection. This signal phase would provide an exclusive time for pedestrians to cross the north and west legs of the intersection. These exclusive phases are generally implemented for pedestrian safety, or when pedestrian volumes are high enough to impede permitted vehicular turn movements.

With an all-walk phase at the Aloha Street/Eastlake Avenue East intersection without added turn lanes, AM peak hour intersection operations would deteriorate from LOS D (45 seconds of delay) to LOS F, with 104 seconds of delay. In the PM peak hour, operations would remain at LOS F with 190 seconds of delay, almost doubling the intersection delay.

The pedestrian volumes during the AM and PM peak hours are about 110 pedestrians per hour crossing Aloha Street, and 50 pedestrians per hour crossing Eastlake Avenue East. Conflicting motorists on the eastbound left-turn movement and the southbound right-turn movement should have enough gaps to complete their turns with these pedestrian volumes.

APPENDIX A: AUTOTURN MOVEMENTS

Aloha Street / Eastlake Avenue E

	Bus Detour Modifications/Impacts
Exhibit 1	With the 3-lane configuration, the stop bar would need to be located 56 feet from the edge of travelled way. The SW corner would need to be reconstructed for the second eastbound lane by removing the curb bulb out. The median island along Eastlake Ave E would need to be removed and restored after construction. Street parking on both sides of Aloha St between Eastlake Ave E. and Yale Ave N. would be temporarily removed.
Exhibit 2	With the 3-lane configuration and stop bar located 4 feet from crosswalk, both the SW and the NW corners would have to be reconstructed. Seattle City Light pole and associated high voltage transmission wires would need to be relocated. The FHRC sign and concrete foundation would need to be relocated and a new wall would be required to facilitate the relocation. Fire Hydrant and associated water connection would need to be relocated. Two trees would need to be removed. The median island along Eastlake Ave E would need to be removed and restored after construction. Street parking on both sides of Aloha St between Eastlake Ave E. and Yale Ave N. would be temporarily removed.
Exhibit 2A	With the 2-lane configuration, in order to avoid any reconstruction, the EB Aloha St stop bar would need to be located 45 feet from the edge of travelled way. The median island along Eastlake Ave E would need to be removed and restored after construction.
Exhibit 2B & 2C	With the 2-lane configuration and the stop bar located 10 feet in advance of the crosswalk (28 feet from the edge of travelled way), the SW curb return would need to be reconstructed. This configuration also allows for a center two-way left-turn lane to FHRC and SCCA parking facilities. The SU-30 Right Turn could be accomplished with the SW curb reconstruction.
Exhibit 3	Shows the SU-30 could navigate the 3-lane section from NB Eastlake Ave E. to WB Aloha Street.

Aloha Street / Fairview Avenue N

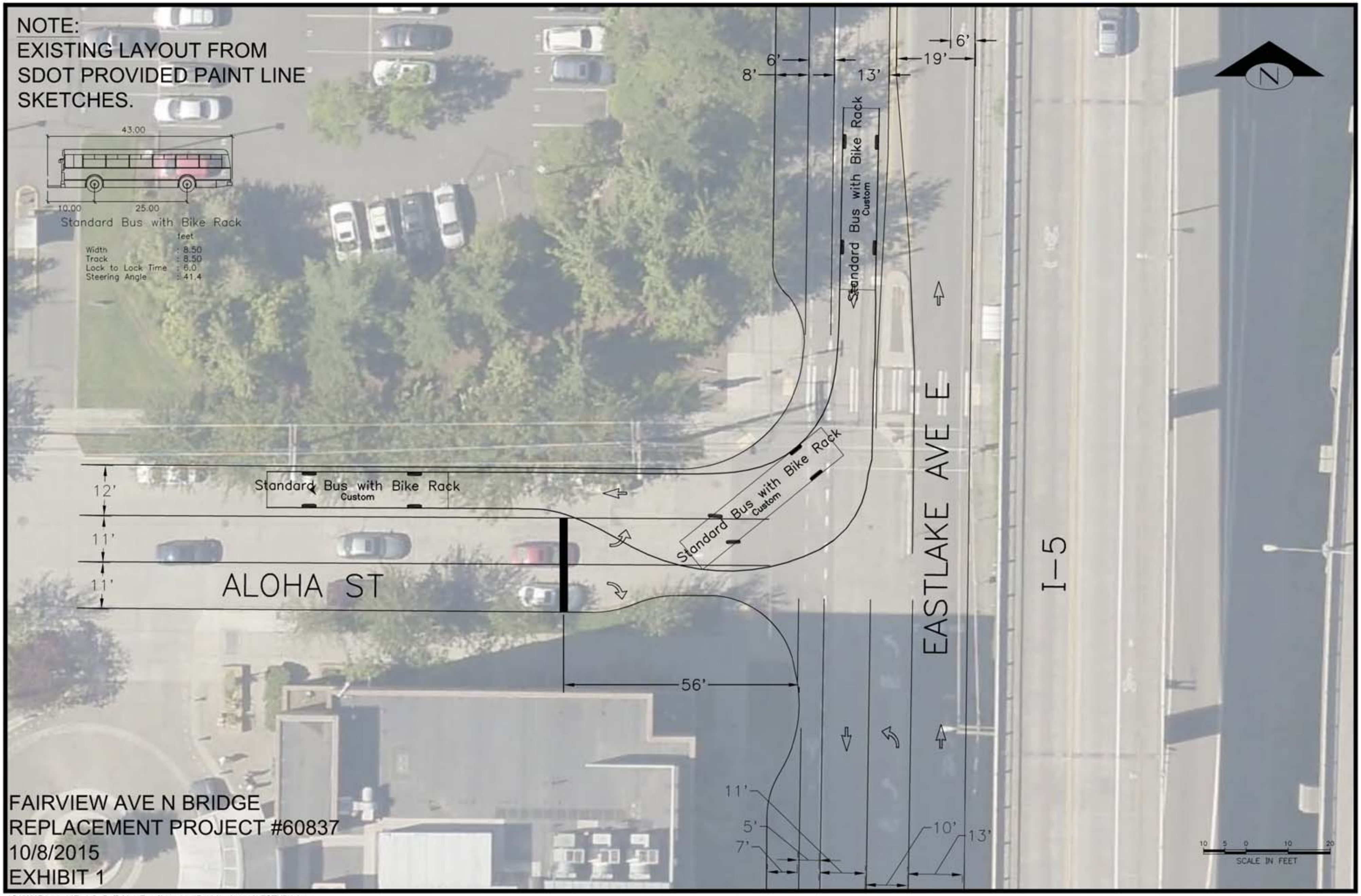
	Bus Detour Modifications/Impacts
Exhibit 4 & 4A	With the 3-lane configuration (WB dual left turn to SB Fairview Ave N.), the SW corner would need to be reconstructed as well as the median island along Fairview Ave N (south leg). The stop bar would be located 4 feet from the crosswalk. To avoid impacts to the pole and existing building, a short section of the sidewalk on the SW corner would need to be narrowed to 36-inches.
Exhibit 5	With the 3-lane configuration (WB dual left turn to SB Fairview Ave N.) and no reconstruction of the SW corner, the WB Aloha Street stop bar will need to be located 53 feet from the edge to travelled way. The median island at the south leg would also need to be removed and reconstructed after the bridge opening.
Exhibit 6	The WB Aloha Street stop bar location shown in Exhibit 5 doesn't change if northbound buses setup for the right-turn in lane 2.
Exhibit 6A	With the 2-lane configuration (1 WB Lane), buses would be able to turn from NB Fairview Ave N. to EB Aloha Street without the need to reconstruct the SW corner or the south leg median island. Buses would not encroach onto the inside NB lane, so the current stop bar location could be maintained. A center two-way left-turn lane could be provided to access Minor Ave N. and FHRC garage entrances. Street parking would not be affected on Aloha St between Minor Avenue N and Yale Avenue N.

Republican Street / Eastlake Avenue E

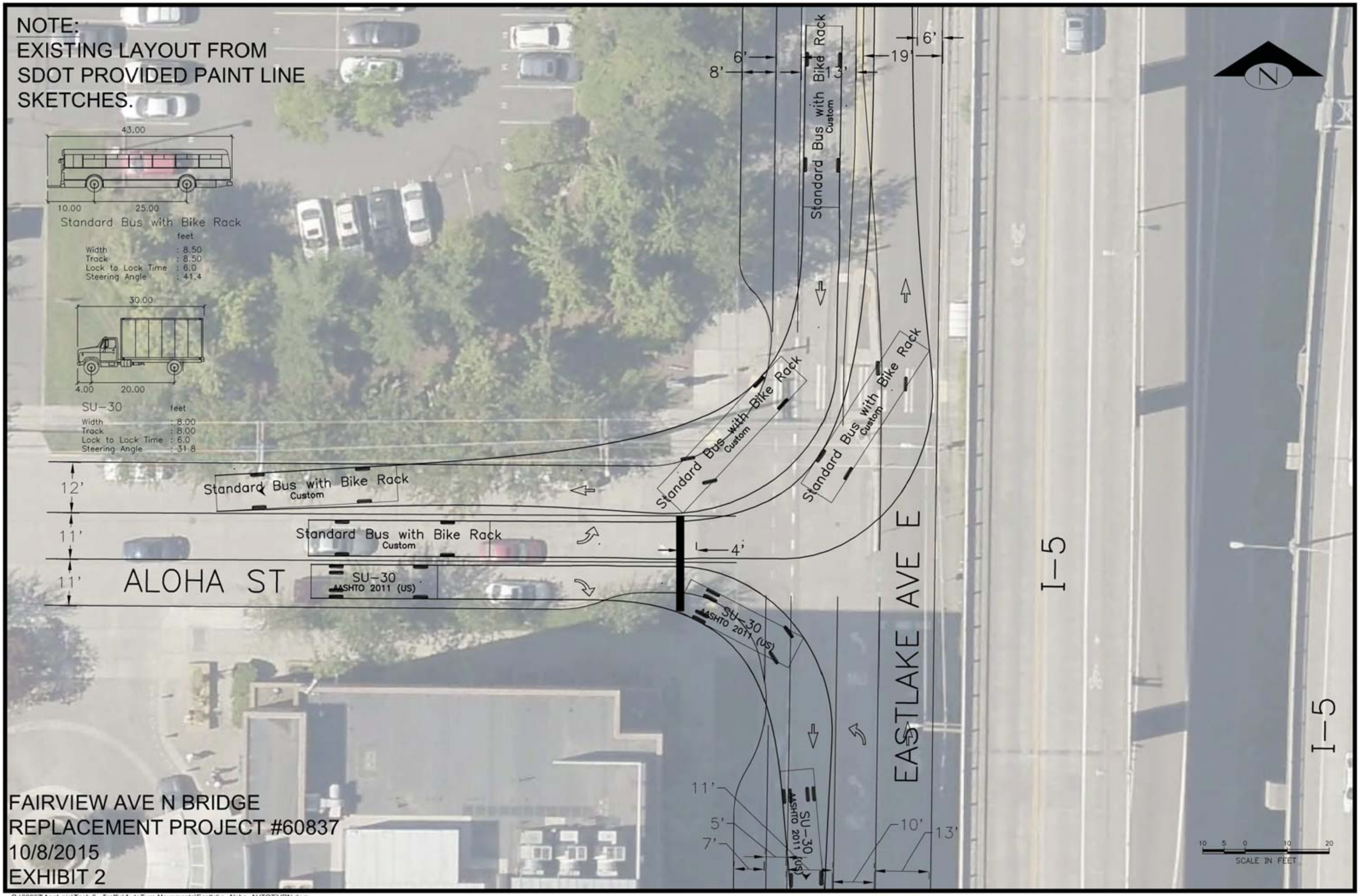
	Bus Detour Modifications/Impacts
Exhibit 7	Buses from EB Republican Street to NB Eastlake Ave E. could navigate the turn without impacting the existing curbs. Two-way bus operations on Republican St would also require temporary removal of 9 parking spaces.
Exhibit 8	In order for buses on SB Eastlake Ave E. to turn right onto WB Republican Street, without reconstruction of the curb returns, the stop bar would need to be located 58 feet from the edge of travelled way. Two-way bus operations on Republican St would also require temporary removal of 9 parking spaces.
Exhibit 8A	With the EB stop bar set 30 feet from the edge of travelled way, the curb returns on the NW corner of the intersection would be impacted. Reconstruction would impact utilities and pedestrian travel. Two-way bus operations on Republican St would also require temporary removal of 9 parking spaces.
Exhibit 9	Shows an SU-30 could navigate the left turn from NB Eastlake Ave E to WB Republican St without impacts to the curb returns.

Republican Street / Fairview Avenue N

	Bus Detour Modifications/Impacts
Exhibit 10	With the current intersection configuration, buses from NB Fairview Ave N. to EB Republican Street would impact the SE corner. The ADA Ramp, curb return, signal/pedestrian push button pole and illumination would need to be reconstructed. Two way bus operations on Republican St would require temporary removal of 4 parking spaces.
Exhibit 11	With the WB Republican Street to SB Fairview Ave N. stop bar relocated to 50 feet from the edge of travelled way or approximately 20 feet to the east from its current location, the SE corner of the intersection would not require reconstruction.



O:\60837\Analysis\Task 6 - Traffic\AutoTurn Movements\Eastlake Aloha AUTOTURN.dwg



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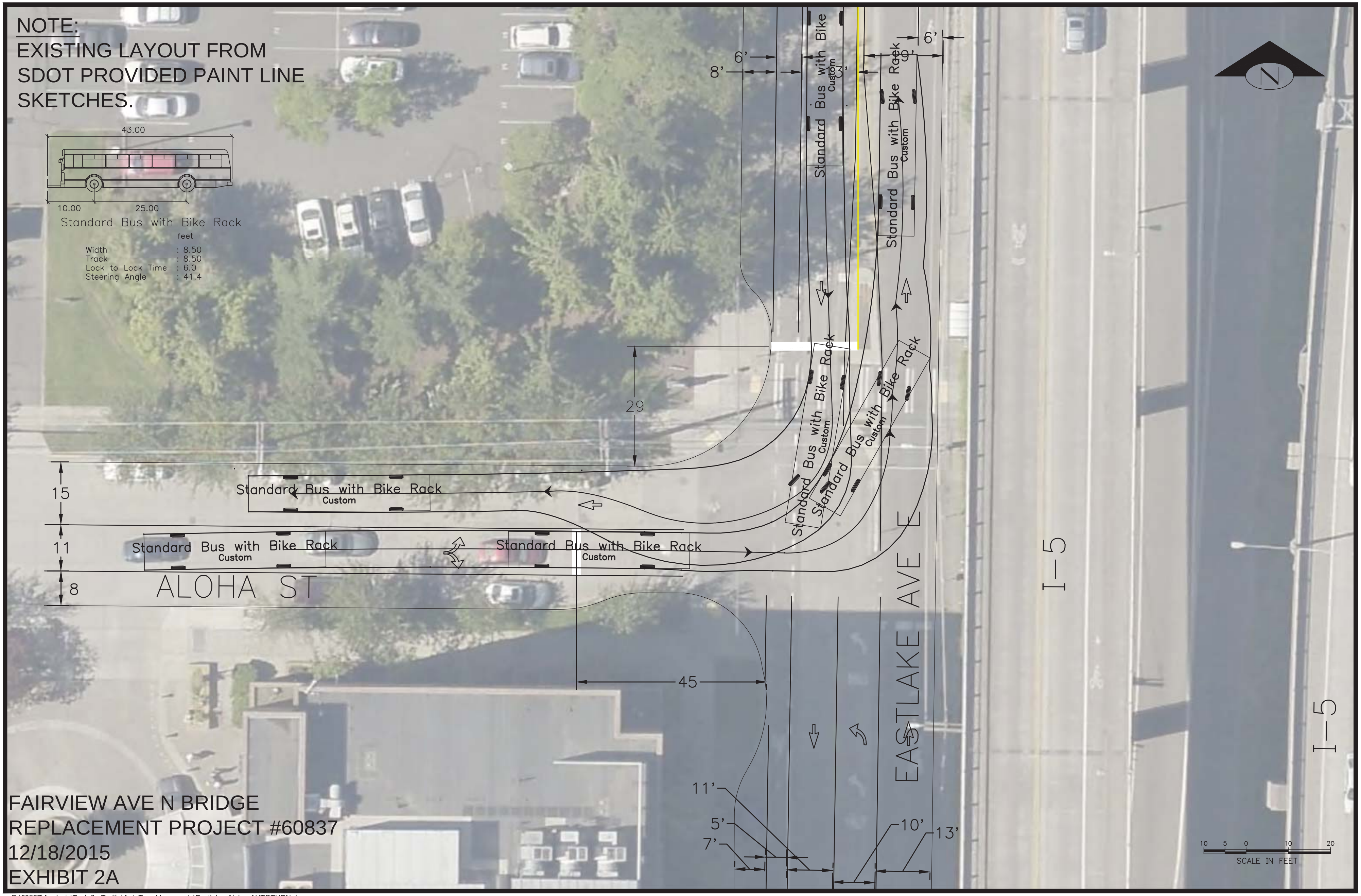
NOTE:
EXISTING LAYOUT FROM
SDOT PROVIDED PAINT LINE
SKETCHES.
43.00
10.00
25.00
Standard Bus with Bike Rack
feet
Width : 8.50
Track : 8.50
Lock to Lock Time : 6.0
Steering Angle : 41.4
N
Standard Bus with Bike Rack
Custom
6'
8'
3'
9'
29
15
11
8
ALOHA ST
45
EASTLAKE AVE E
I-5
11'
5'
7'
10'
13'
10 5 0 10 20
SCALE IN FEET
FAIRVIEW AVE N BRIDGE
REPLACEMENT PROJECT #60837
12/18/2015
EXHIBIT 2A

O:\60837\Analysis\Task 6 - Traffic\AutoTurn Movements\Eastlake_Aloha_AUTOTURN.dwg

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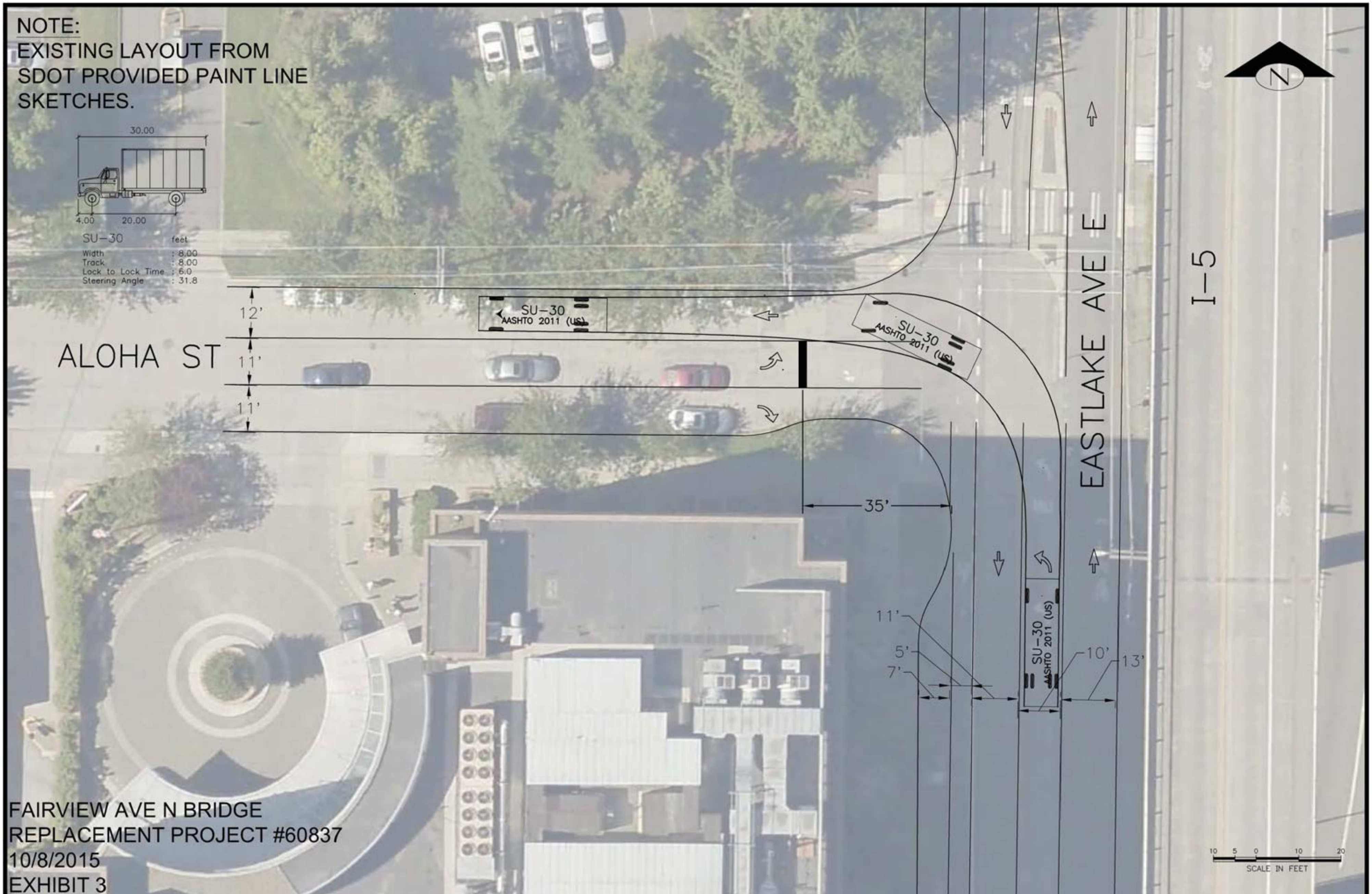
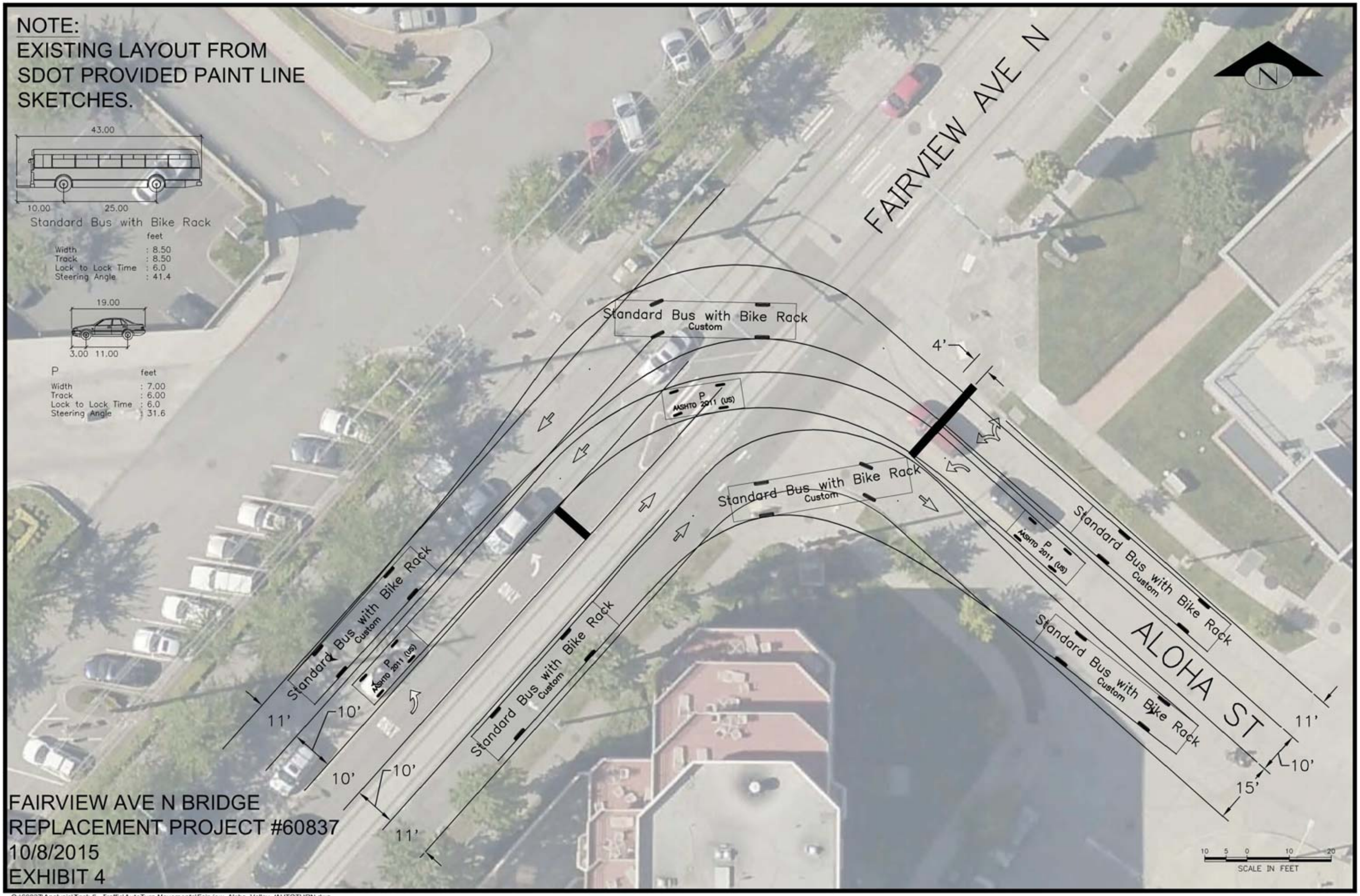
NOTE:
EXISTING LAYOUT FROM
SDOT PROVIDED PAINT LINE
SKETCHES.



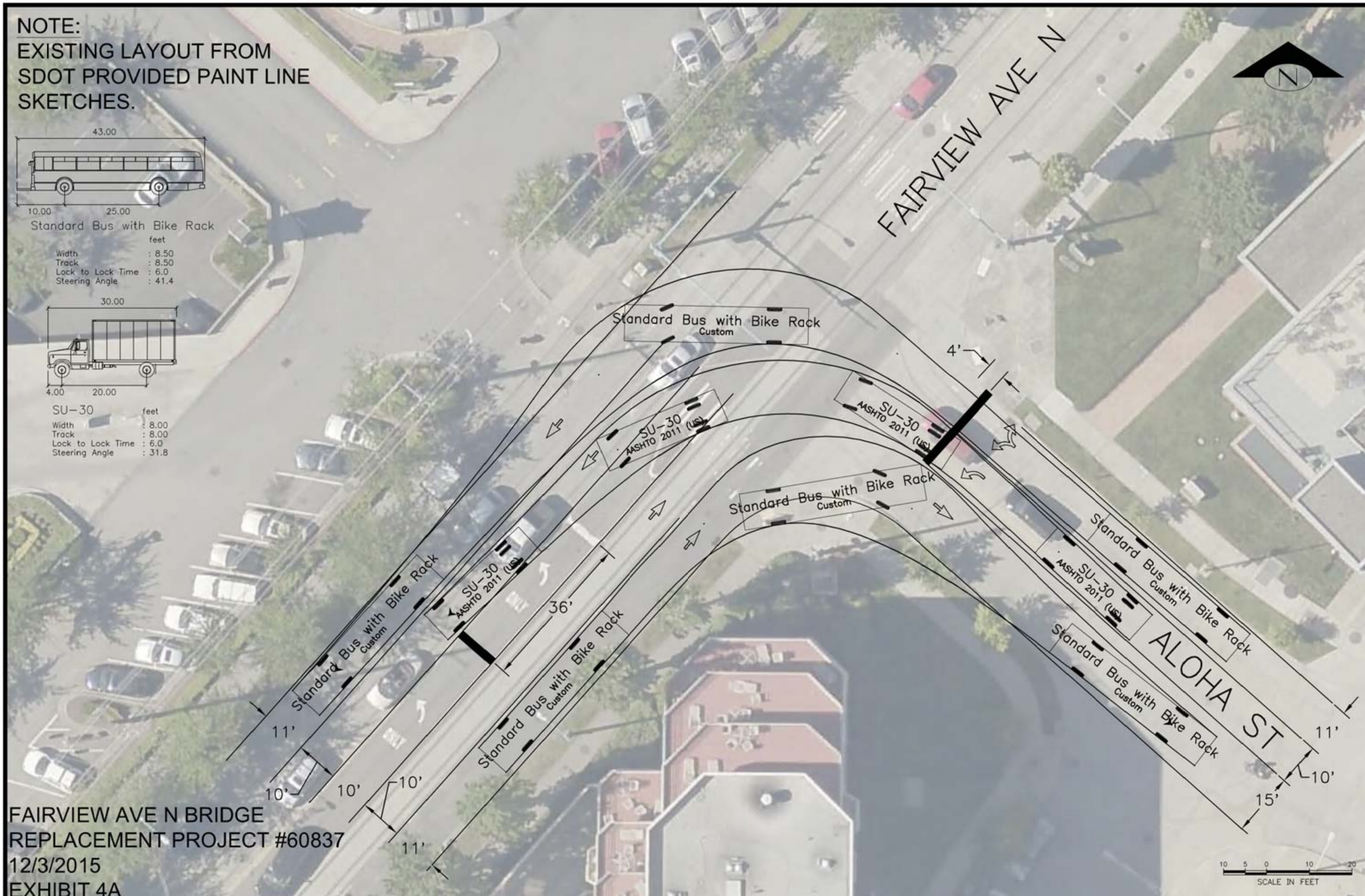
FAIRVIEW AVE N BRIDGE
REPLACEMENT PROJECT #60837
10/8/2015
EXHIBIT 3

O:\60837\Analysis\Task 6 - Traffic\AutoTurn Movements\Eastlake_Aloha_AUTOTURN.dwg



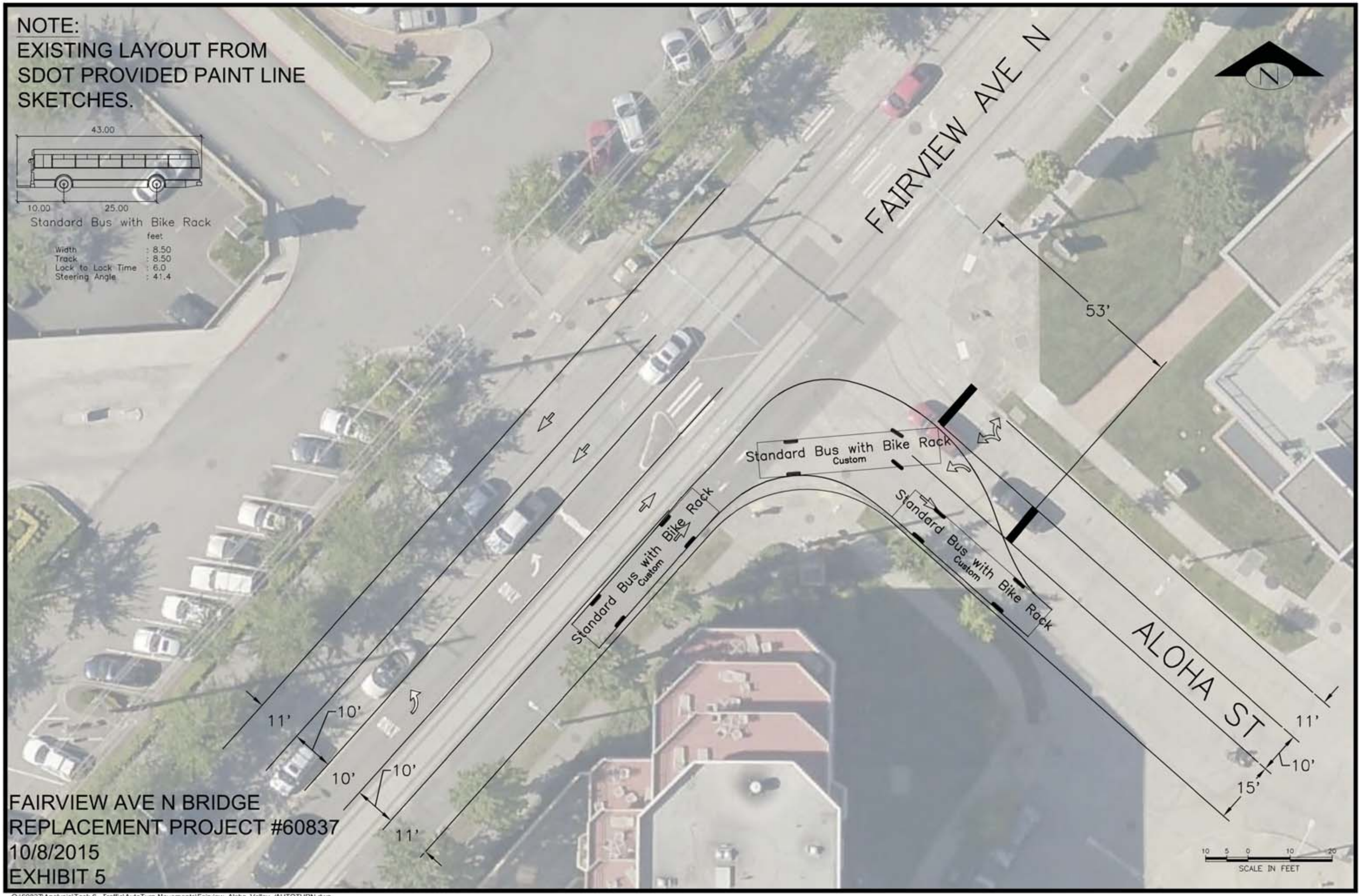
O:\60837\Analysis\Task 6 - Traffic\AutoTurn Movements\Fairview_Aloha_Valley_/AUTOTURN.dwg

NOTE:
EXISTING LAYOUT FROM SDOT PROVIDED PAINT LINE SKETCHES.



FAIRVIEW AVE N BRIDGE
REPLACEMENT PROJECT #60837
12/3/2015
EXHIBIT 4A

O:\60837\Analysis\Task 6 - Traffic\AutoTurn Movements\Fairview_Aloha_Valley_/AUTOTURN_BUS with SU.dwg



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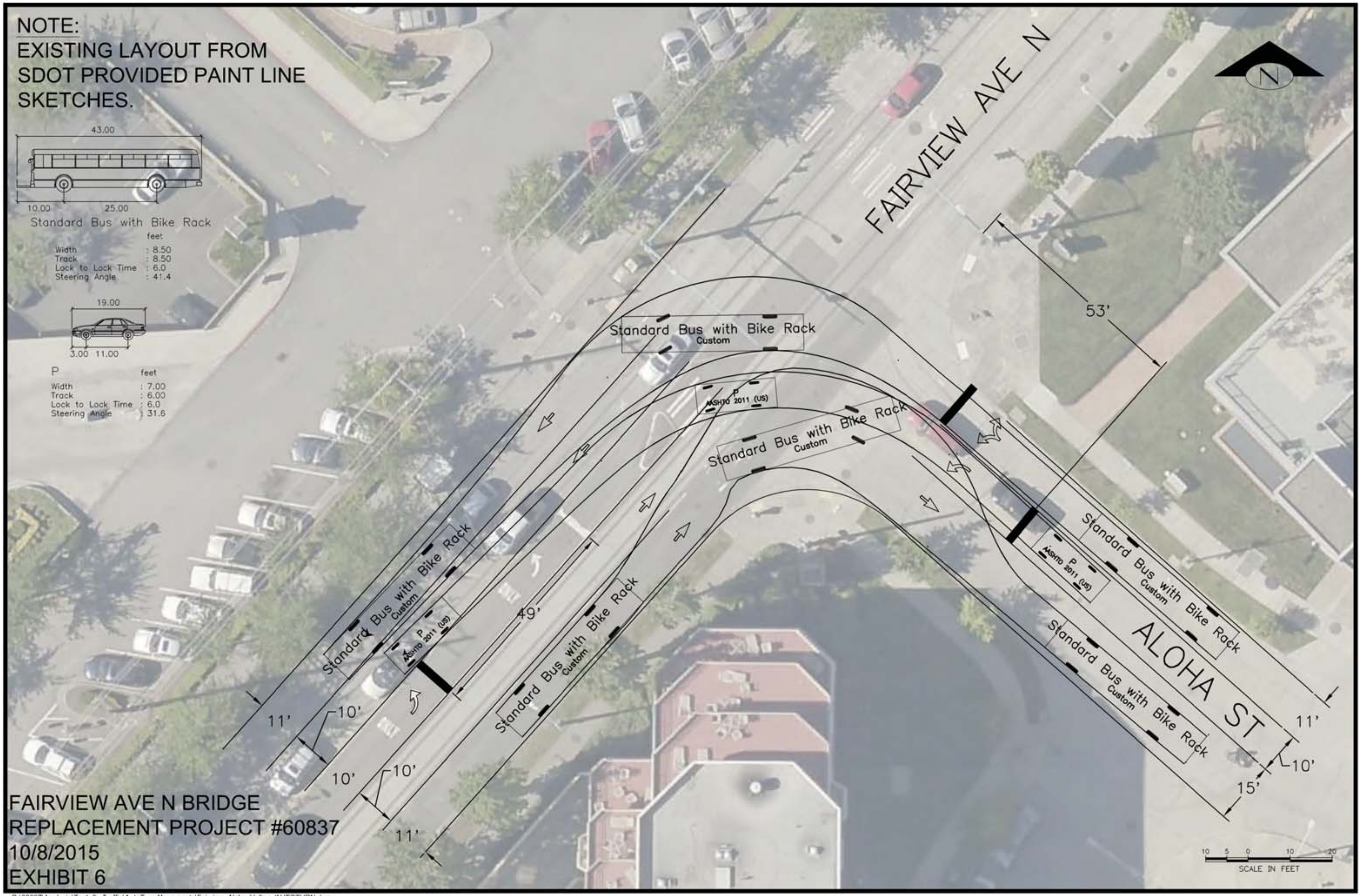

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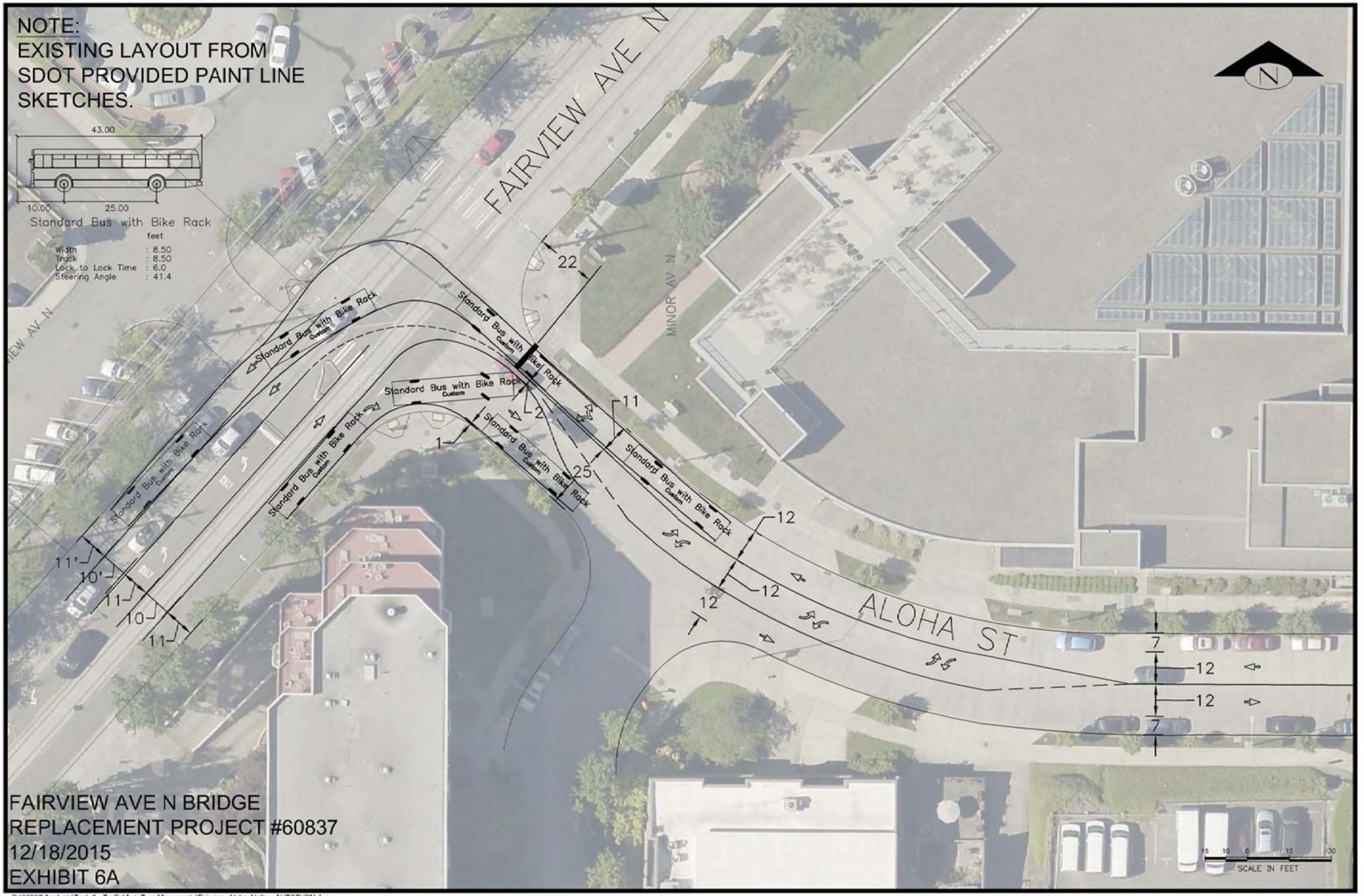
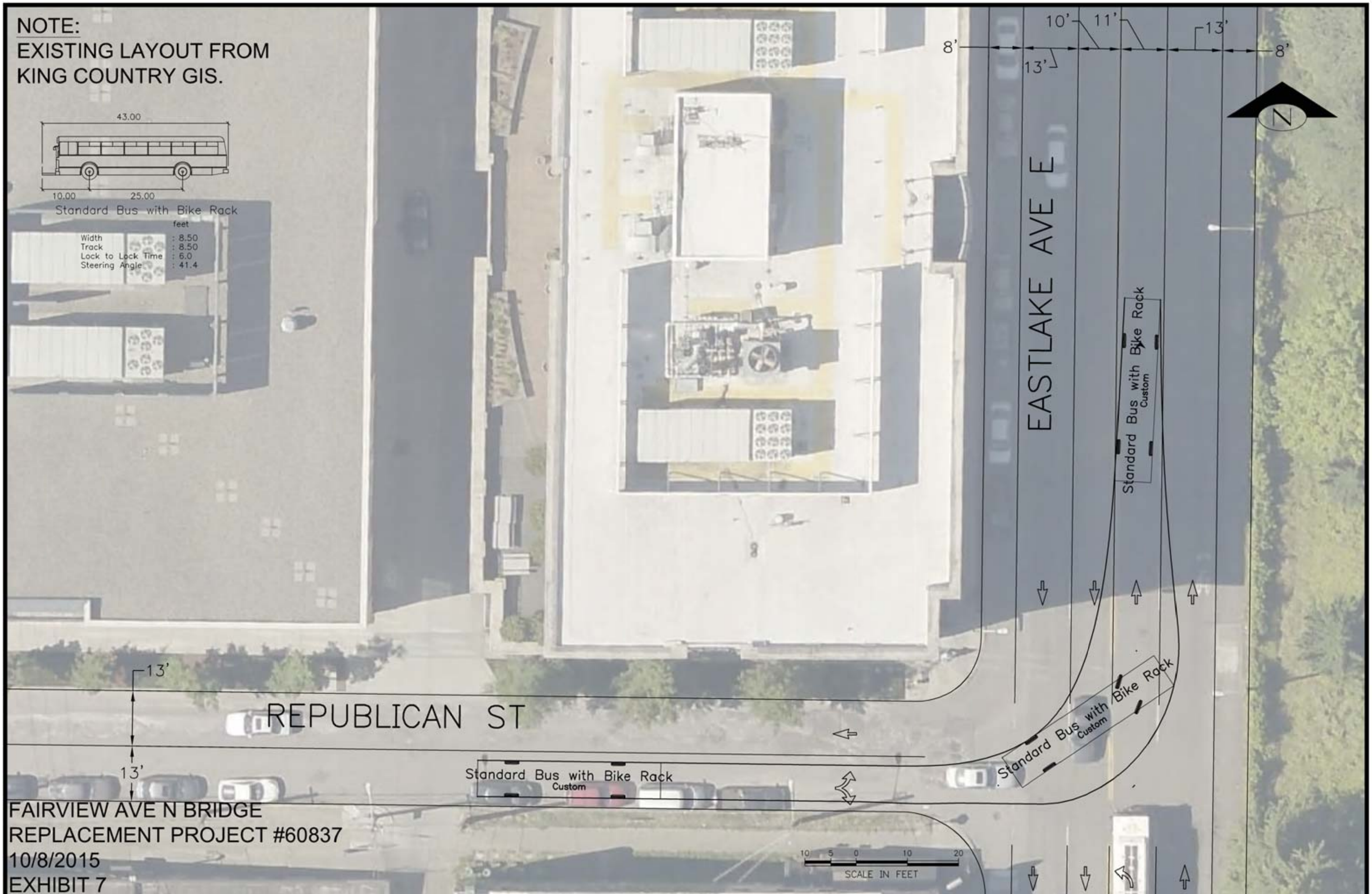
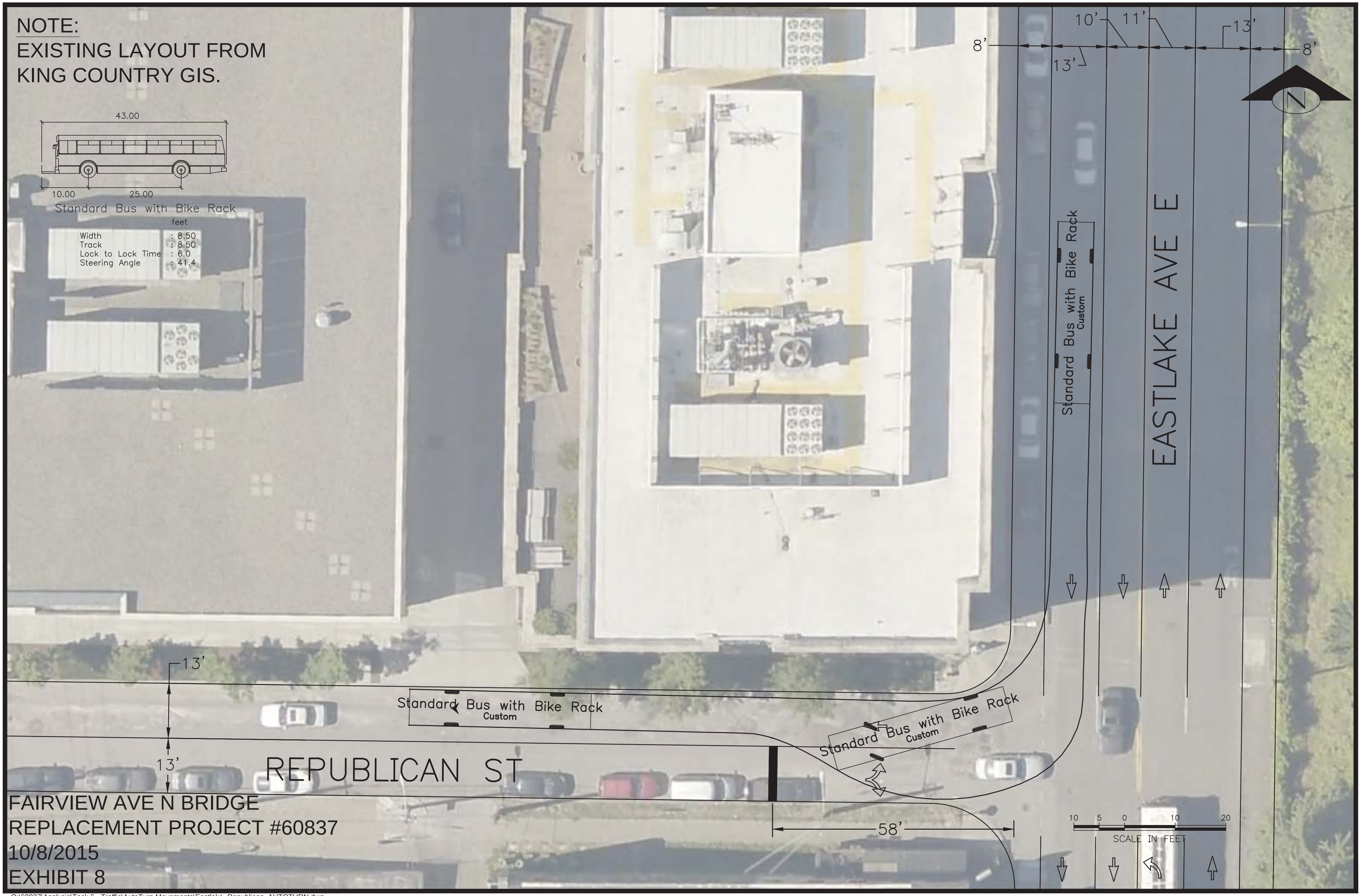


O:\60837\Analysis\Task 6 - Traffic\AutoTurn Movements\Fairview_Aloha_Valley_AUTOTURN.dwg

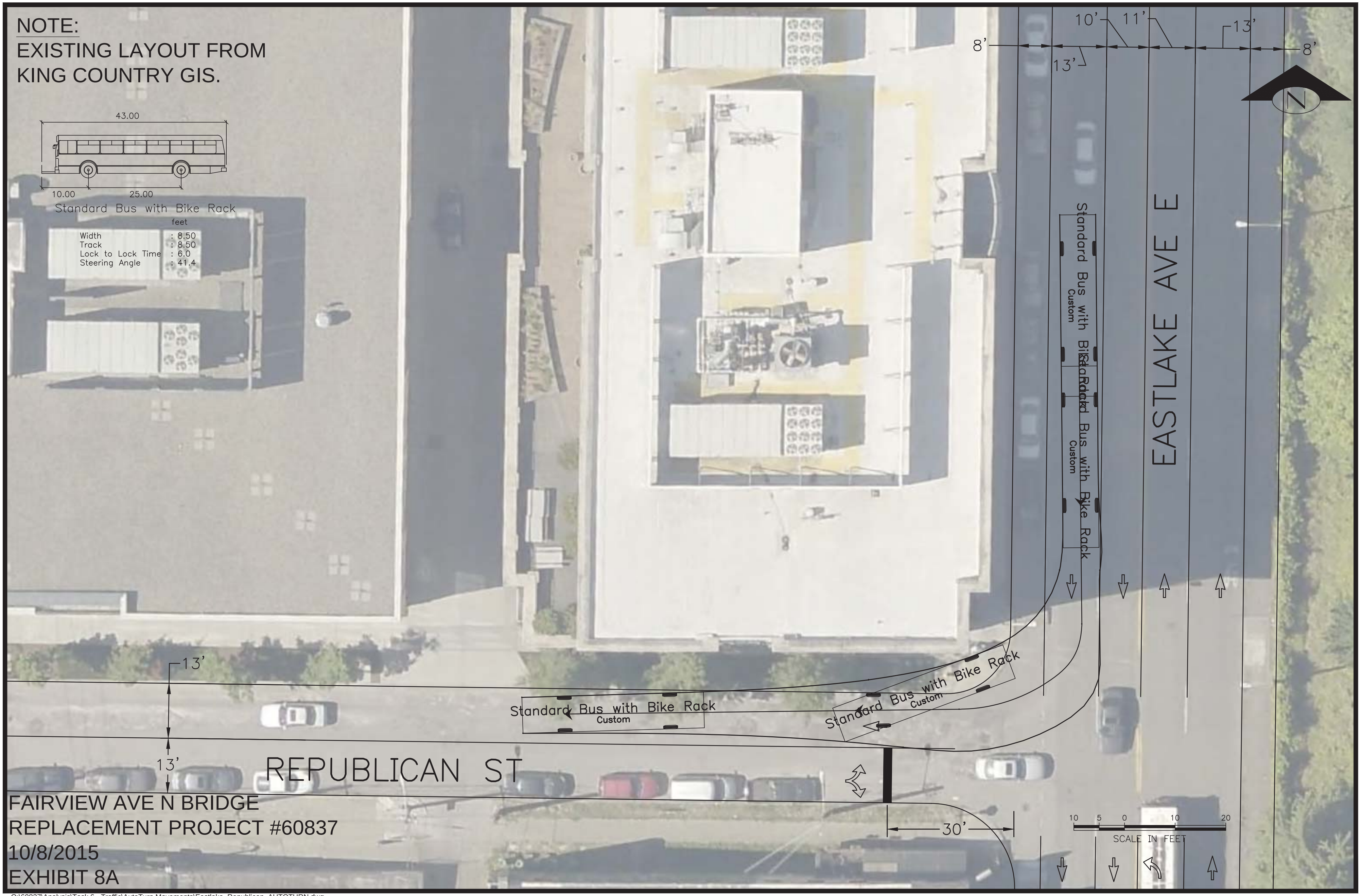


O:\60837\Analysis\Task 6 - Traffic\AutoTurn Movements\Eastlake_Republican_AUTOTURN.dwg



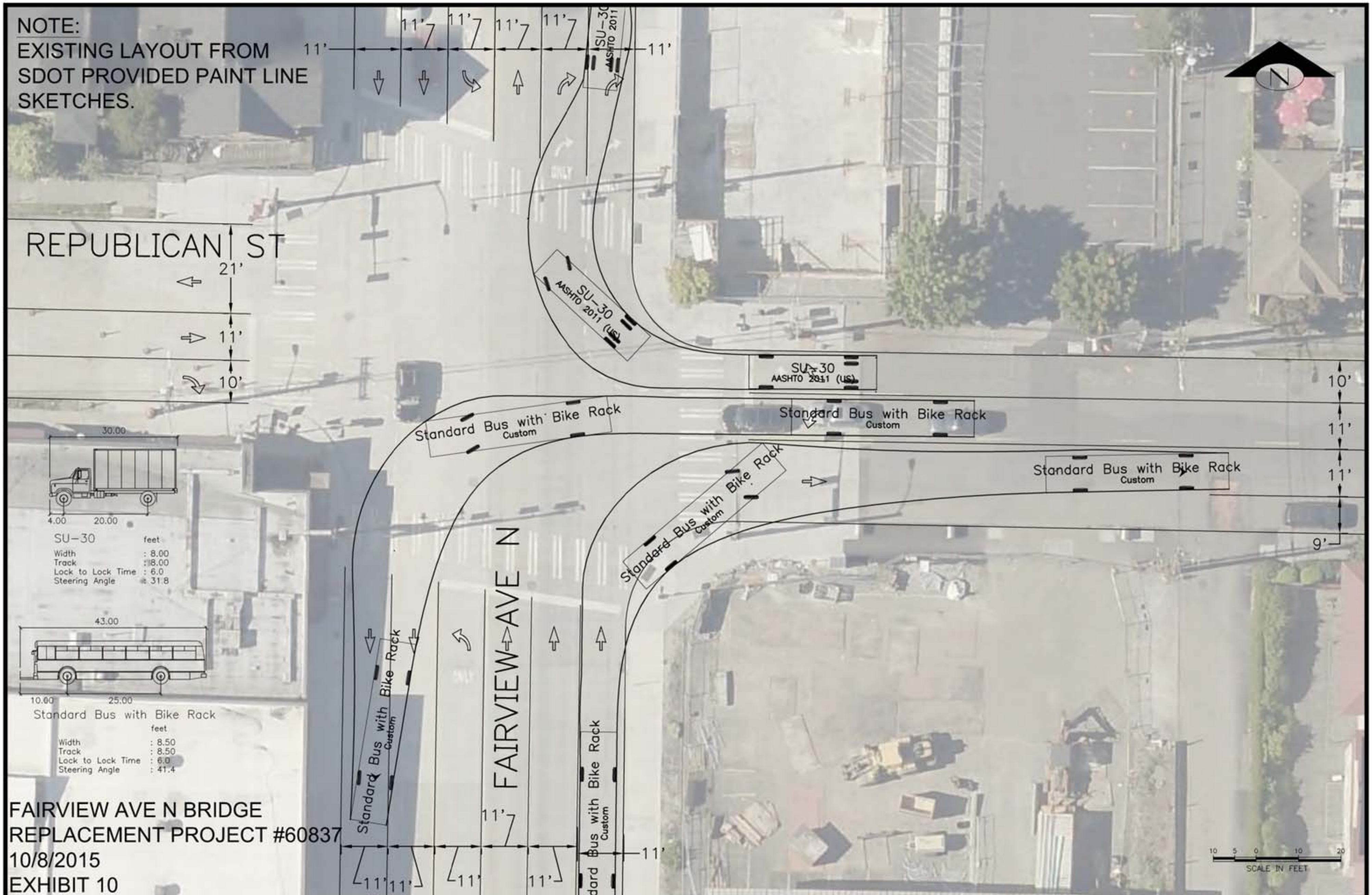
FAIRVIEW AVE N BRIDGE
REPLACEMENT PROJECT #60837
10/8/2015
EXHIBIT 8

O:\60837\Analysis\Task 6 - Traffic\AutoTurn Movements\Eastlake_Republican_AUTOTURN.dwg

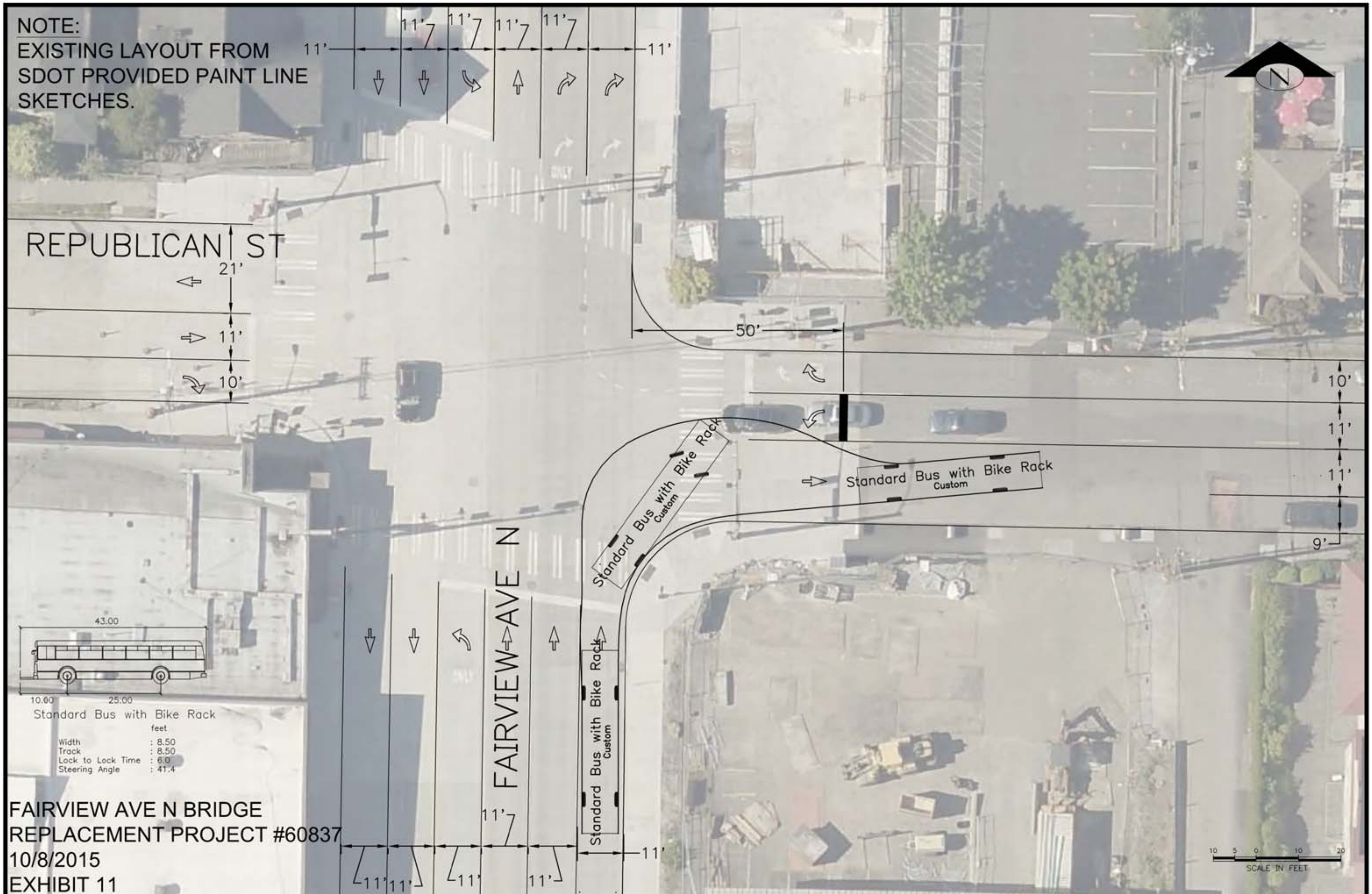


O:\60837\Analysis\Task 6 - Traffic\AutoTurn Movements\Eastlake_Republican_AUTOTURN.dwg

O:\60837\Analysis\Task 6 - Traffic\AutoTurn Movements\Eastlake_Republican_AUTOTURN.dwg



O:\60837\Analysis\Task 6 - Traffic\AutoTurn Movements\Eastlake_Aloha_AUTOTURN.dwg



O:\60837\Analysis\Task 6 - Traffic\AutoTurn Movements\Eastlake_Aloha_AUTOTURN.dwg

APPENDIX B: SYNCHRO TRAFFIC MODEL MODIFICATIONS

Changes to 2016 DivScen1 Republican Street Synchro file (PM Peak Baseline) for Fairview Ave Bus Detour Analysis

1. added WB signal phase to Fairview/Valley intersection
2. removed EBR overlap (SDOT signal ops mentioned this as a way to improve traffic flow on Fairview)
3. adjusted signal phase lengths at Fairview/Valley to show the total EB phase time for pedestrians and a protected LT
4. adjusted HV percentage and added RapidRide C bus volume (9 vph) at Fairview/Valley for EBL (10/67 = 15%) and WBT (9/9 = 100%) movements
5. increased SBT stop time from 2 sec to 4 sec, to account for large cross-hatched area through the street car tracks
6. HV percentage at Fairview/Aloha NBR increased to 22% (12/55 = 22%)
7. PHF values changed at all intersections from approach values to intersection values
8. Fairview Bridge bicycles shifted to Eastlake Avenue and Aloha Street

Changes to 2016 DivScen1 Republican Street Synchro file (AM Peak Baseline) for Fairview Ave Bus Detour Analysis

1. added WB signal phase to Fairview/Valley intersection
2. removed EBR overlap (SDOT signal ops mentioned this as a way to improve traffic flow on Fairview)
3. adjusted signal phase lengths at Fairview/Valley to show the total EB phase time for pedestrians and a protected LT
4. adjusted HV percentage and added RapidRide C bus volume (8 vph) at Fairview/Valley for EBL (11/136 = 8%) and WBT (8/8 = 100%) movements
5. increased SBT stop time from 2 sec to 4 sec, to account for large cross-hatched area through the street car tracks
6. HV percentage at Fairview/Aloha NBR increased to 9% (16/181 = 9%)
7. PHF values changed at all intersections from approach values to intersection values
8. Fairview Bridge bicycles shifted to Eastlake Avenue and Aloha Street

Bus Detour Analysis Notes:

1. HV percentages increased on the affected movements (SBR & EBL at Republican/Eastlake)

   (WBL & NBR at Republican/Fairview), percentages were increased by calculating the existing number of HVs, and adding 6 HVs
2. no volume changes - volumes were shifted in the earlier detour work, without adjusting HV %, so we are already modeling a conservative number of HVs)
3. Red Time values increased for phases where stop bars need to be relocated. Red Times were calculated using Formula 1, below.
4. It was assumed that no bus stops would be located on Republican Street

Changes to 2016 PM BusDetour Baseline Synchro file for Bus Detour Analysis

1. HV% at Republican/Eastlake adjusted. EBL increased to 2% (6/298 = 2%), and SBR increased to 8% (33/390 = 8%)
2. HV% at Republican/Fairview adjusted. WBL increased to 23% (6/26 = 23%), and NBR increased to 86% (6/7 = 86%)
3. NBR volume at Republican/Fairivew increased from 1 to 7 - volume was not high enough to capture the bus detour
4. WB Red Time at Republican/Fairview increased by 1 second, from 1sec to 2sec.
5. EB Red Time at Republican/Eastlake increased by 1.5 sec, from 1sec to 2.5 sec.
6. SB Red Time at Republican/Eastlake increased by 0.5 sec, from 1sec to 1.5sec.

Changes to 2016 AM BusDetour Baseline Synchro file for Bus Detour Analysis

1. HV% at Republican/Eastlake adjusted. EBL increased to 6% (18/311 = 6%), and SBR increased to 7% (15/224 = 7%)
2. HV% at Republican/Fairview adjusted. WBL increased to 47% (7/15 = 47%), and NBR increased to 57% (8/14 = 57%)
3. WB Red Time at Republican/Fairview increased by 1 second, from 1sec to 2sec.
4. EB Red Time at Republican/Eastlake increased by 1.5 sec, from 1sec to 2.5 sec.
5. SB Red Time at Republican/Eastlake increased by 0.5 sec, from 1sec to 1.5sec.

Formula 1

$$CP = \left[t + \frac{1.47v}{2(a + 32.2g)} \right] + \left[\frac{W + L_V}{1.47v} \right]$$

where:

CP = change period (yellow change plus red clearance intervals), s;
t = perception-reaction time to the onset of a yellow indication, s;
v = approach speed, mph;
a = deceleration rate in response to the onset of a yellow indication;
g = grade, with uphill positive and downhill negative (percent grade / 100), ft/ft;
W = width of intersection, ft; and
L_v = length of vehicle.

Changes to 2016 DivScen2 with Added Turn Lanes Synchro file (PM Peak Baseline) for Fairview Ave Bus Detour Analysis

1 added WB signal phase to Fairview/Valley intersection
2 removed EBR overlap (SDOT signal ops mentioned this as a way to improve traffic flow on Fairview)
3 adjusted signal phase lengths at Fairview/Valley to show the total EB phase time for pedestrians and a protected LT
4 adjusted HV percentage and added RapidRide C bus volume (9 vph) at Fairview/Valley for EBL (11/179 = 6%) and WBT (9/9 = 100%) movements
5 increased SBT stop time from 2 sec to 4 sec, to account for large cross-hatched area through the street car tracks
6 HV percentage at Fairview/Aloha NBR increased to 9% (26/396 = 9%)
7 PHF values changed at all intersections from approach values to intersection values
8 Fairview Bridge bicycles shifted to Eastlake Avenue and Aloha Street

Changes to 2016 DivScen2 with Added Turn Lanes Synchro file (AM Peak Baseline) for Fairview Ave Bus Detour Analysis

1 added WB signal phase to Fairview/Valley intersection
2 removed EBR overlap (SDOT signal ops mentioned this as a way to improve traffic flow on Fairview)
3 adjusted signal phase lengths at Fairview/Valley to show the total EB phase time for pedestrians and a protected LT
4 adjusted HV percentage and added RapidRide C bus volume (8 vph) at Fairview/Valley for EBL (14/250 = 6%) and WBT (8/8 = 100%) movements
5 increased SBT stop time from 2 sec to 4 sec, to account for large cross-hatched area through the street car tracks
6 HV percentage at Fairview/Aloha NBR increased to 7% (31/466 = 7%)
7 PHF values changed at all intersections from approach values to intersection values
8 Fairview Bridge bicycles shifted to Eastlake Avenue and Aloha Street

Bus Detour Analysis Notes:

1 HV percentages increased on the affected movements (SBR & EBL at Aloha/Eastlake & Republican/Eastlake) (WBL & NBR at Aloha/Fairview & Republican/Fairview), percentages were increased by calculating the existing number of HVs, and adding 6 HVs
2 no volume changes - volumes were shifted in the earlier detour work, without adjusting HV %, so we are already modeling a conservative number of HVs)
3 Red Time values increased for phases where stop bars need to be relocated. Red Times were calculated using Formula 1, below.
4 It was assumed that no bus stops would be located on Aloha Street or Republican Street
5 Both potential bus detour routes were modeled in 1 Synchro network

Changes to 2016 PM BusDetour Baseline Synchro file for Bus Detour Analysis

1 HV % at Aloha/Eastlake adjusted. EBL increased to 5% (11/241 = 5%), and SBR increased to 8% (26/325 = 8%)
2 HV % at Aloha/Fairview adjusted. WBL increased to 2% (10/412 = 2%), and NBR increased to 11% (33/296 = 11%)
3 HV% at Republican/Eastlake adjusted. EBL increased to 11% (6/57 = 11%), and SBR increased to 8% (33/390 = 8%)
4 HV% at Republican/Fairview adjusted. WBL increased to 23% (6/26 = 23%), and NBR increased to 86% (6/7 = 86%)
5 NBR volume at Republican/Fairivew increased from 1 to 7 - volume was not high enough to capture the bus detour
6 WB Red Time at Republican/Fairview increased by 1 second, from 1sec to 2sec.
7 WB Red Time at Aloha/Fairview increased by 1 sec, from 1sec to 2sec.
8 EB Red Time at Aloha/Eastlake increased by 2 sec, from 1sec to 3sec.
9 1 EB lane provided on Aloha Street. Eastlake/Aloha signal timing optimized
10 1 WB lane provided on Aloha Street, Fairview/Aloha signal timing optimized, and the NBR/WBL movements were overlapped

Changes to 2016 AM BusDetour Baseline Synchro file for Bus Detour Analysis

1 HV % at Aloha/Eastlake adjusted. EBL increased to 11% (30/263 = 11%), and SBR increased to 7% (20/281 = 7%)
2 HV % at Aloha/Fairview adjusted. WBL increased to 4% (11/267 = 4%), and NBR increased to 8% (39/466 = 8%)
3 HV% at Republican/Eastlake adjusted. EBL increased to 15% (8/55 = 15%), and SBR increased to 7% (15/224 = 7%)
4 HV% at Republican/Fairview adjusted. WBL increased to 47% (7/15 = 47%), and NBR increased to 50% (7/14 = 50%)
5 WB Red Time at Republican/Fairview increased by 1 second, from 1sec to 2sec.
6 WB Red Time at Aloha/Fairview increased by 1 sec, from 1sec to 2sec.
7 EB Red Time at Aloha/Eastlake increased by 2 sec, from 1sec to 3sec.
8 1 EB lane provided on Aloha Street. Eastlake/Aloha signal timing optimized
9 1 WB lane provided on Aloha Street, Fairview/Aloha signal timing optimized, and the NBR/WBL movements were overlapped

Formula 1

$$CP = \left[t + \frac{1.47v}{2(a + 32.2g)}\right] + \left[\frac{W + L_V}{1.47v}\right]$$

where:

CP = change period (yellow change plus red clearance intervals), s;
t = perception-reaction time to the onset of a yellow indication, s;
v = approach speed, mph;
a = deceleration rate in response to the onset of a yellow indication;
g = grade, with uphill positive and downhill negative (percent grade / 100), ft/ft;
W = width of intersection, ft; and
L_v = length of vehicle.

Changes to 2016 DivScen2 w/o Added Turn Lanes Synchro file (PM Peak Baseline) for Fairview Ave Bus Detour Analysis

1 added WB signal phase to Fairview/Valley intersection
2 removed EBR overlap (SDOT signal ops mentioned this as a way to improve traffic flow on Fairview)
3 adjusted signal phase lengths at Fairview/Valley to show the total EB phase time for pedestrians and a protected LT
4 adjusted HV percentage and added RapidRide C bus volume (9 vph) at Fairview/Valley for EBL (11/179 = 6%) and WBT (9/9 = 100%) movements
5 increased SBT stop time from 2 sec to 4 sec, to account for large cross-hatched area through the street car tracks
6 HV percentage at Fairview/Aloha NBR increased to 9% (26/396 = 9%)
7 PHF values changed at all intersections from approach values to intersection values
8 Fairview Bridge bicycles shifted to Eastlake Avenue and Aloha Street

Changes to 2016 DivScen2 w/o Added Turn Lanes Synchro file (AM Peak Baseline) for Fairview Ave Bus Detour Analysis

1 added WB signal phase to Fairview/Valley intersection
2 removed EBR overlap (SDOT signal ops mentioned this as a way to improve traffic flow on Fairview)
3 adjusted signal phase lengths at Fairview/Valley to show the total EB phase time for pedestrians and a protected LT
4 adjusted HV percentage and added RapidRide C bus volume (8 vph) at Fairview/Valley for EBL (14/250 = 6%) and WBT (8/8 = 100%) movements
5 increased SBT stop time from 2 sec to 4 sec, to account for large cross-hatched area through the street car tracks
6 HV percentage at Fairview/Aloha NBR increased to 7% (31/466 = 7%)
7 PHF values changed at all intersections from approach values to intersection values
8 Fairview Bridge bicycles shifted to Eastlake Avenue and Aloha Street

Bus Detour Analysis Notes:

1 HV percentages increased on the affected movements (SBR & EBL at Aloha/Eastlake & Republican/Eastlake) (WBL & NBR at Aloha/Fairview & Republican/Fairview), percentages were increased by calculating the existing number of HVs, and adding 6 HVs
2 no volume changes - volumes were shifted in the earlier detour work, without adjusting HV %, so we are already modeling a conservative number of HVs)
3 Red Time values increased for phases where stop bars need to be relocated. Red Times were calculated using Formula 1, below.
4 It was assumed that no bus stops would be located on Aloha Street or Republican Street
5 Both potential bus detour routes were modeled in 1 Synchro network

Changes to 2016 PM BusDetour Baseline Synchro file for Bus Detour Analysis

1 HV % at Aloha/Eastlake adjusted. EBL increased to 5% (11/241 = 5%), and SBR increased to 8% (26/325 = 8%)
2 HV % at Aloha/Fairview adjusted. WBL increased to 2% (10/412 = 2%), and NBR increased to 11% (33/296 = 11%)
3 HV% at Republican/Eastlake adjusted. EBL increased to 11% (6/57 = 11%), and SBR increased to 8% (33/390 = 8%)
4 HV% at Republican/Fairview adjusted. WBL increased to 23% (6/26 = 23%), and NBR increased to 86% (6/7 = 86%)
5 NBR volume at Republican/Fairivew increased from 1 to 7 - volume was not high enough to capture the bus detour
6 WB Red Time at Republican/Fairview increased by 1 second, from 1sec to 2sec.
7 WB Red Time at Aloha/Fairview increased by 1 sec, from 1sec to 2sec.
8 EB Red Time at Aloha/Eastlake increased by 2 sec, from 1sec to 3sec.

Changes to 2016 AM BusDetour Baseline Synchro file for Bus Detour Analysis

1 HV % at Aloha/Eastlake adjusted. EBL increased to 11% (30/263 = 11%), and SBR increased to 7% (20/281 = 7%)
2 HV % at Aloha/Fairview adjusted. WBL increased to 4% (11/267 = 4%), and NBR increased to 8% (39/466 = 8%)
3 HV% at Republican/Eastlake adjusted. EBL increased to 15% (8/55 = 15%), and SBR increased to 7% (15/224 = 7%)
4 HV% at Republican/Fairview adjusted. WBL increased to 47% (7/15 = 47%), and NBR increased to 50% (7/14 = 50%)
5 WB Red Time at Republican/Fairview increased by 1 second, from 1sec to 2sec.
6 WB Red Time at Aloha/Fairview increased by 1 sec, from 1sec to 2sec.
7 EB Red Time at Aloha/Eastlake increased by 2 sec, from 1sec to 3sec.

Formula 1

$$CP = \left[t + \frac{1.47v}{2(a + 32.2g)} \right] + \left[\frac{W + L_V}{1.47v} \right]$$

where:

CP = change period (yellow change plus red clearance intervals), s;
t = perception-reaction time to the onset of a yellow indication, s;
v = approach speed, mph;
a = deceleration rate in response to the onset of a yellow indication;
g = grade, with uphill positive and downhill negative (percent grade / 100), ft/ft;
W = width of intersection, ft; and
L_v = length of vehicle.

APPENDIX C: SYNCHRO TRAFFIC MODEL REPORTS

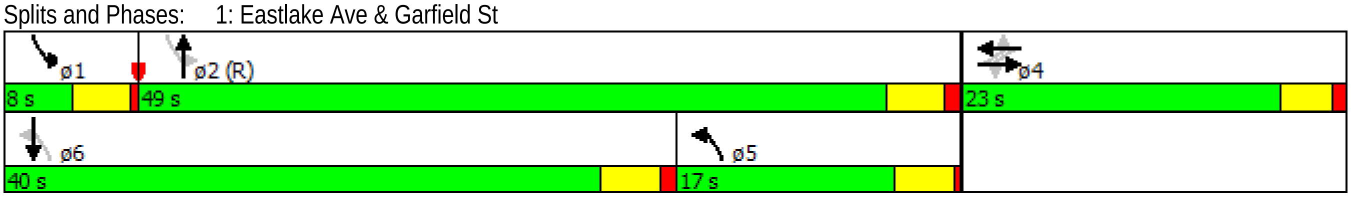
Synchro reports are included for the following conditions:

- Scenario 1 Baseline (2016 AM & PM)
- Scenario 1 Republican Street Bus Detour (2016 AM & PM)
- Scenario 2 Baseline with Added Turn Lanes (2016 AM & PM)
- Scenario 2 Republican Street Bus Detour (2016 AM & PM)
- Scenario 2 with Added Turn Lanes Aloha Street Bus Detour (2016 AM & PM)
- Scenario 2 Baseline without Added Turn Lanes (2016 AM & PM)
- Scenario 2 without Added Turn Lanes Aloha Street Bus Detour (2016 AM & PM)
- Scenario 2 without Added Turn Lanes Aloha Street All Walk Phase (2016 AM & PM)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	3	30	31	3	13	169	301	22	15	811	11
Satd. Flow (prot)	0	1475	0	0	1767	0	1546	2912	0	1636	3138	0
Flt Permitted		0.983			0.837		0.211			0.538		
Satd. Flow (perm)	0	1451	0	0	1461	0	334	2912	0	830	3138	0
Satd. Flow (RTOR)		33			14			15			2	
Confl. Peds. (#/hr)	34		55	55		34	57		68	68		57
Confl. Bikes (#/hr)			1			1			13			120
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	17%	17%	17%	2%	2%	2%	9%	9%	9%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	40	0	0	51	0	187	357	0	17	910	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Total Split (s)	23.0	23.0		23.0	23.0		17.0	49.0		8.0	40.0	
Total Lost Time (s)		4.0			4.0		4.0	4.5		4.0	4.5	
Act Effct Green (s)		19.0			19.0		49.0	44.5		49.0	35.5	
Actuated g/C Ratio		0.24			0.24		0.61	0.56		0.61	0.44	
v/c Ratio		0.11			0.14		0.47	0.22		0.03	0.65	
Control Delay		11.5			20.1		12.4	5.0		4.9	20.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		11.5			20.1		12.4	5.0		4.9	20.1	
LOS		B			C		B	A		A	C	
Approach Delay		11.5			20.1			7.5			19.9	
Approach LOS		B			C			A			B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 18 (23%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 15.4	Intersection LOS: B
Intersection Capacity Utilization 59.4%	ICU Level of Service B
Analysis Period (min) 15	

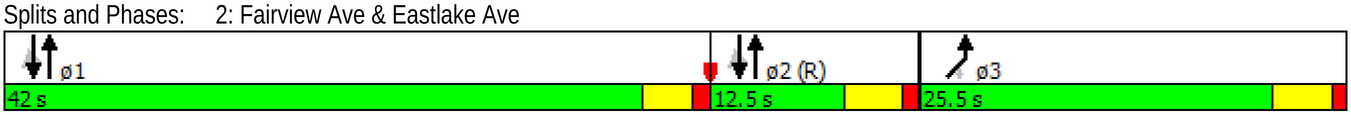
Splits and Phases: 1: Eastlake Ave & Garfield St



Lane Group	NBL	NBT	SBT	SBR	NEL	NER	ø1	ø2
Lane Configurations								
Volume (vph)	0	371	839	15	14	25		
Satd. Flow (prot)	0	1583	1754	1760	4266	1705		
Flt Permitted					0.950			
Satd. Flow (perm)	0	1583	1754	1760	4266	1584		
Satd. Flow (RTOR)				17		28		
Confl. Peds. (#/hr)						23		
Confl. Bikes (#/hr)						6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Growth Factor	103%	103%	103%	103%	103%	103%		
Heavy Vehicles (%)	8%	8%	4%	4%	8%	8%		
Parking (#/hr)		0	0					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	415	939	17	16	28		
Turn Type		NA	NA	Perm	Prot	Perm		
Protected Phases		1 2	1 2		3		1	2
Permitted Phases				1 2		3		
Total Split (s)					25.5	25.5	42.0	12.5
Total Lost Time (s)					4.5	4.5		
Act Effct Green (s)		50.5	50.5	50.5	21.0	21.0		
Actuated g/C Ratio		0.63	0.63	0.63	0.26	0.26		
v/c Ratio		0.42	0.85	0.02	0.01	0.06		
Control Delay		8.9	17.9	0.1	17.3	6.4		
Queue Delay		0.0	1.0	0.0	0.0	0.0		
Total Delay		8.9	18.9	0.1	17.3	6.4		
LOS		A	B	A	B	A		
Approach Delay		8.9	18.5		10.4			
Approach LOS		A	B		B			

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 51 (64%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 15.5	Intersection LOS: B
Intersection Capacity Utilization 70.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Fairview Ave & Eastlake Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	55	91	479	546	281
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	0	57	95	498	568	292
Pedestrians	113				47	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	9				4	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				971		
pX, platoon unblocked	0.96					
vC, conflicting volume	1562	827	973			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1565	827	973			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	100	82	85			
cM capacity (veh/h)	84	327	627			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	57	95	498	860
Volume Left	0	95	0	0
Volume Right	57	0	0	292
cSH	327	627	1700	1700
Volume to Capacity	0.18	0.15	0.29	0.51
Queue Length 95th (ft)	16	13	0	0
Control Delay (s)	18.3	11.8	0.0	0.0
Lane LOS	C	B		
Approach Delay (s)	18.3	1.9		0.0
Approach LOS	C			

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	267	0	15	23	115	181	5	20	0
Satd. Flow (prot)	0	0	0	1457	1484	0	1719	867	710	1736	3471	0
Flt Permitted				0.950	0.957		0.743			0.646		
Satd. Flow (perm)	0	0	0	1457	1484	0	934	867	574	1007	3471	0
Satd. Flow (RTOR)					20				194			
Confl. Peds. (#/hr)						61	110		61	61		110
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	5%	5%	9%	4%	4%	4%
Parking (#/hr)					0							
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	0	0	152	150	0	25	123	194	5	21	0
Turn Type				Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases				4	4			2			6	
Permitted Phases							2		2	6		
Total Split (s)				23.0	23.0		57.0	57.0	57.0	57.0	57.0	
Total Lost Time (s)				4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Act Effct Green (s)				18.5	18.5		52.5	52.5	52.5	52.5	52.5	
Actuated g/C Ratio				0.23	0.23		0.66	0.66	0.66	0.66	0.66	
v/c Ratio				0.45	0.42		0.04	0.22	0.44	0.01	0.01	
Control Delay				35.2	30.6		1.7	3.7	6.5	2.6	2.4	
Queue Delay				0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay				35.2	30.6		1.7	3.7	6.5	2.6	2.4	
LOS				D	C		A	A	A	A	A	
Approach Delay					32.9			5.1			2.4	
Approach LOS					C			A			A	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NETL and 6:SWTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.45	
Intersection Signal Delay: 17.6	Intersection LOS: B
Intersection Capacity Utilization 34.7%	ICU Level of Service A
Analysis Period (min) 15	

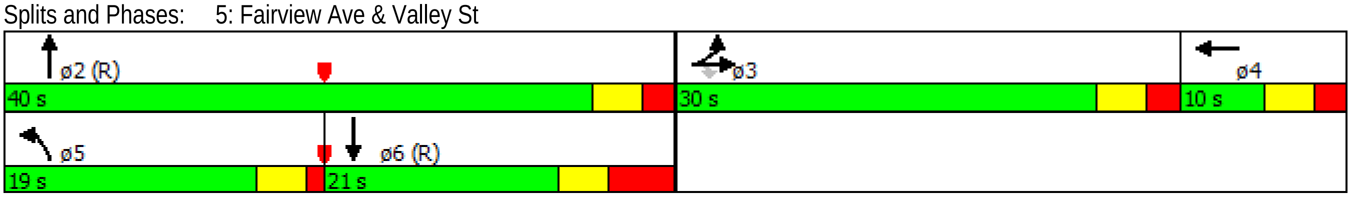
Splits and Phases: 4: Fairview Ave & Aloha St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	0	250	0	8	0	230	257	0	0	302	148
Satd. Flow (prot)	0	1671	1583	0	950	0	1719	2381	0	0	3066	0
Flt Permitted		0.950					0.950					
Satd. Flow (perm)	0	1671	1583	0	950	0	1719	2381	0	0	3066	0
Satd. Flow (RTOR)			271								91	
Confl. Peds. (#/hr)												51
Confl. Bikes (#/hr)												17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	8%	2%	2%	2%	100%	2%	5%	5%	2%	2%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	147	271	0	9	0	249	279	0	0	487	0
Turn Type	Split	NA	Perm		NA		Prot	NA			NA	
Protected Phases	3	3			4		5	2			6	
Permitted Phases			3									
Total Split (s)	30.0	30.0	30.0		10.0		19.0	40.0			21.0	
Total Lost Time (s)		5.0	5.0		5.0		4.0	5.0			7.0	
Act Effct Green (s)		25.0	25.0		5.0		15.0	35.0			14.0	
Actuated g/C Ratio		0.31	0.31		0.06		0.19	0.44			0.18	
v/c Ratio		0.28	0.40		0.15		0.77	0.27			0.80	
Control Delay		22.6	4.8		41.6		49.1	15.2			26.0	
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	
Total Delay		22.6	4.8		41.6		49.1	15.2			26.0	
LOS		C	A		D		D	B			C	
Approach Delay		11.1			41.6			31.2			26.0	
Approach LOS		B			D			C			C	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 23.7 Intersection LOS: C
Intersection Capacity Utilization 55.7% ICU Level of Service B
Analysis Period (min) 15

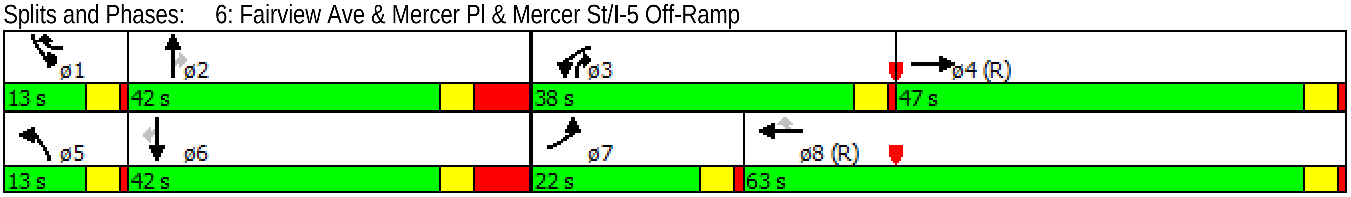
Splits and Phases: 5: Fairview Ave & Valley St



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Volume (vph)	79	1463	155	20	790	1350	375	55	123	276	92	187
Satd. Flow (prot)	1719	6011	0	0	3400	4868	1568	1656	1376	2059	0	3400
Flt Permitted	0.950				0.950			0.950				0.950
Satd. Flow (perm)	1719	6011	0	0	3400	4868	1486	1656	1376	1996	0	3400
Satd. Flow (RTOR)		2					276			47		
Confl. Peds. (#/hr)			2	100			12				2	
Confl. Bikes (#/hr)				1			1			4	4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	5%	5%	5%	3%	3%	3%	9%	9%	9%	9%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	1814	0	0	875	1495	415	61	136	408	0	207
Turn Type	Prot	NA			Prot	NA	pm+ov	Prot	NA	pm+ov		Prot
Protected Phases	7	4			3	8	1	5	2	3		1
Permitted Phases							8			2		
Total Split (s)	22.0	47.0			38.0	63.0	13.0	13.0	42.0	38.0		13.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	9.5	4.5		4.5
Act Effct Green (s)	17.5	42.5			33.5	58.5	67.0	8.5	32.5	71.0		8.5
Actuated g/C Ratio	0.12	0.30			0.24	0.42	0.48	0.06	0.23	0.51		0.06
v/c Ratio	0.41	0.99			1.08	0.74	0.48	0.61	0.43	0.39		1.00
Control Delay	62.8	67.9			103.8	36.9	8.7	89.2	50.7	17.6		128.3
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	62.8	67.9			103.8	36.9	8.7	89.2	50.7	17.6		128.3
LOS	E	E			F	D	A	F	D	B		F
Approach Delay		67.6				53.7			32.2			
Approach LOS		E				D			C			

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 57 (41%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 58.4	Intersection LOS: E
Intersection Capacity Utilization 99.2%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Fairview Ave & Mercer Pl & Mercer St/I-5 Off-Ramp



Lane Group	SBT	SBR
Lane Configurations		
Volume (vph)	274	91
Satd. Flow (prot)	1845	1568
Flt Permitted		
Satd. Flow (perm)	1845	1381
Satd. Flow (RTOR)		117
Confl. Peds. (#/hr)		78
Confl. Bikes (#/hr)		5
Peak Hour Factor	0.93	0.93
Growth Factor	103%	103%
Heavy Vehicles (%)	3%	3%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	303	101
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Total Split (s)	42.0	42.0
Total Lost Time (s)	9.5	9.5
Act Effct Green (s)	32.5	32.5
Actuated g/C Ratio	0.23	0.23
v/c Ratio	0.71	0.25
Control Delay	59.6	6.5
Queue Delay	5.4	0.0
Total Delay	65.0	6.5
LOS	E	A
Approach Delay	76.8	
Approach LOS	E	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	60	41	15	81	194	66	369	14	396	498	186
Satd. Flow (prot)	0	1751	1509	0	1227	0	1631	4517	1854	2306	3940	0
Flt Permitted		0.858			0.985		0.292			0.460		
Satd. Flow (perm)	0	1481	1360	0	1208	0	466	4517	1327	985	3940	0
Satd. Flow (RTOR)			44		69				58		49	
Confl. Peds. (#/hr)	121		39	39		121	86		59	59		86
Confl. Bikes (#/hr)			8			12			10			14
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	44	0	314	0	72	400	15	429	742	0
Turn Type	Perm	NA	pm+ov	Perm	NA		D.P+P	NA	Perm	D.P+P	NA	
Protected Phases		4	5		8		5	2		1	6	
Permitted Phases	4		4	8			6		2	2		
Total Split (s)	59.0	59.0	15.0	59.0	59.0		15.0	66.0	66.0	35.0	86.0	
Total Lost Time (s)		4.5	3.5		4.5		3.5	4.5	4.5	3.5	4.5	
Act Effct Green (s)		54.5	67.0		54.5		94.0	61.5	61.5	94.0	81.5	
Actuated g/C Ratio		0.34	0.42		0.34		0.59	0.38	0.38	0.59	0.51	
v/c Ratio		0.18	0.07		0.69		0.20	0.23	0.03	0.51	0.37	
Control Delay		38.3	6.9		43.9		10.7	28.8	3.9	17.5	22.5	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.1	1.0	
Total Delay		38.3	6.9		43.9		10.7	28.8	3.9	17.6	23.5	
LOS		D	A		D		B	C	A	B	C	
Approach Delay		28.2			43.9			25.3			21.3	
Approach LOS		C			D			C			C	

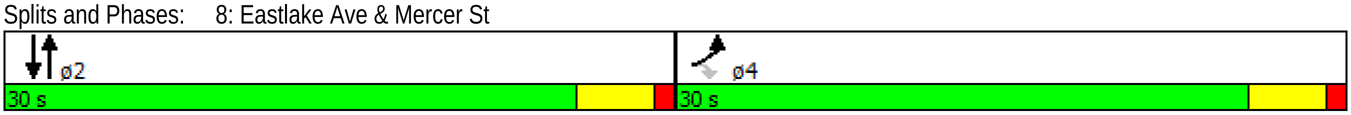
Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 49 (31%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 26.1	Intersection LOS: C
Intersection Capacity Utilization 71.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: Fairview Ave & Republican St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	249	38	0	442	933	0
Satd. Flow (prot)	950	850	0	3764	3471	0
Flt Permitted	0.950					
Satd. Flow (perm)	949	812	0	3764	3471	0
Satd. Flow (RTOR)		40				
Confl. Peds. (#/hr)	1	40				
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	4%	4%	6%	6%	4%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	264	40	0	469	991	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Total Split (s)	30.0	30.0		30.0	30.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	
Act Effct Green (s)	19.2	19.2		26.6	26.6	
Actuated g/C Ratio	0.35	0.35		0.49	0.49	
v/c Ratio	0.80	0.13		0.26	0.59	
Control Delay	34.3	5.1		10.0	13.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	34.3	5.1		10.0	13.3	
LOS	C	A		B	B	
Approach Delay	30.5			10.0	13.3	
Approach LOS	C			B	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 54.8	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 15.4	Intersection LOS: B
Intersection Capacity Utilization 54.8%	ICU Level of Service A
Analysis Period (min) 15	

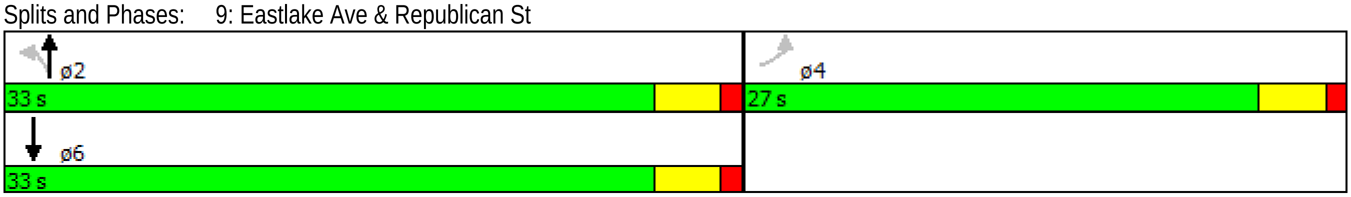
Splits and Phases: 8: Eastlake Ave & Mercer St



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	311	23	27	190	734	224
Satd. Flow (prot)	1729	0	0	3176	3157	0
Flt Permitted	0.956			0.833		
Satd. Flow (perm)	1729	0	0	2652	3157	0
Satd. Flow (RTOR)	7				93	
Confl. Peds. (#/hr)			91			91
Confl. Bikes (#/hr)		1				93
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	4%	4%	13%	13%	4%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	362	0	0	235	1039	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Total Split (s)	27.0		33.0	33.0	33.0	
Total Lost Time (s)	4.0			4.0	4.0	
Act Effct Green (s)	15.0			22.5	22.5	
Actuated g/C Ratio	0.33			0.49	0.49	
v/c Ratio	0.64			0.18	0.65	
Control Delay	19.3			7.7	10.8	
Queue Delay	0.0			0.0	0.0	
Total Delay	19.3			7.7	10.8	
LOS	B			A	B	
Approach Delay	19.3			7.7	10.8	
Approach LOS	B			A	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 45.9	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 12.2	Intersection LOS: B
Intersection Capacity Utilization 55.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 9: Eastlake Ave & Republican St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	0	68	36	1	26	139	468	15	20	607	3
Satd. Flow (prot)	0	1690	0	0	1762	0	1636	3115	0	1620	3118	0
Flt Permitted		0.878			0.823		0.337			0.443		
Satd. Flow (perm)	0	1491	0	0	1437	0	548	3115	0	700	3118	0
Satd. Flow (RTOR)		130			27			6			1	
Confl. Peds. (#/hr)	33		65	65		33	67		63	63		67
Confl. Bikes (#/hr)			2			4			104			35
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	117	0	0	66	0	146	508	0	21	641	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Total Split (s)	25.0	25.0		25.0	25.0		16.0	47.0		8.0	39.0	
Total Lost Time (s)		4.0			4.0		4.0	4.5		4.0	4.5	
Act Effct Green (s)		21.0			21.0		47.0	42.5		47.0	34.5	
Actuated g/C Ratio		0.26			0.26		0.59	0.53		0.59	0.43	
v/c Ratio		0.24			0.17		0.30	0.31		0.05	0.48	
Control Delay		5.3			16.5		7.0	8.6		5.7	17.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		5.3			16.5		7.0	8.6		5.7	17.7	
LOS		A			B		A	A		A	B	
Approach Delay		5.3			16.5			8.2			17.4	
Approach LOS		A			B			A			B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 12.4	Intersection LOS: B
Intersection Capacity Utilization 51.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Eastlake Ave & Garfield St

Lane Group	NBL	NBT	SBT	SBR	NEL	NER	ø1	ø2
Lane Configurations								
Volume (vph)	0	601	694	14	15	50		
Satd. Flow (prot)	0	1676	1721	1727	1992	1359		
Flt Permitted					0.950			
Satd. Flow (perm)	0	1676	1721	1727	1992	1141		
Satd. Flow (RTOR)				15		55		
Confl. Peds. (#/hr)						41		
Confl. Bikes (#/hr)						55		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Growth Factor	103%	103%	103%	103%	103%	103%		
Heavy Vehicles (%)	2%	2%	6%	6%	3%	3%		
Parking (#/hr)		0	0					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	659	760	15	16	55		
Turn Type		NA	NA	Perm	Prot	Perm		
Protected Phases		1 2	1 2		3		1	2
Permitted Phases				1 2		3		
Total Split (s)					28.0	28.0	26.0	26.0
Total Lost Time (s)					4.5	4.5		
Act Effct Green (s)		48.0	48.0	48.0	23.5	23.5		
Actuated g/C Ratio		0.60	0.60	0.60	0.29	0.29		
v/c Ratio		0.66	0.74	0.01	0.03	0.15		
Control Delay		14.5	14.8	0.9	20.4	7.5		
Queue Delay		0.0	0.0	0.0	0.0	0.0		
Total Delay		14.5	14.8	0.9	20.4	7.5		
LOS		B	B	A	C	A		
Approach Delay		14.5	14.6		10.4			
Approach LOS		B	B		B			

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 28 (35%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 14.3	Intersection LOS: B
Intersection Capacity Utilization 62.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Fairview Ave & Eastlake Ave

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	230	40	575	612	325
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	249	43	623	664	352
Pedestrians	110				43	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	9				4	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				966		
pX, platoon unblocked						
vC, conflicting volume	1703	950	1126			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1703	950	1126			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	13	92			
cM capacity (veh/h)	81	287	557			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	249	43	623	1016
Volume Left	0	43	0	0
Volume Right	249	0	0	352
cSH	287	557	1700	1700
Volume to Capacity	0.87	0.08	0.37	0.60
Queue Length 95th (ft)	190	6	0	0
Control Delay (s)	64.3	12.0	0.0	0.0
Lane LOS	F	B		
Approach Delay (s)	64.3	0.8		0.0
Approach LOS	F			

Intersection Summary			
Average Delay	8.6		
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	412	0	15	37	20	55	7	50	11
Satd. Flow (prot)	0	0	0	685	699	0	2241	2358	1742	922	797	0
Flt Permitted				0.950	0.956		0.664			0.743		
Satd. Flow (perm)	0	0	0	685	699	0	918	2358	1546	655	797	0
Satd. Flow (RTOR)					20				61		11	
Confl. Peds. (#/hr)						108	159		33	33		159
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	6%	6%	22%	3%	3%	3%
Parking (#/hr)					0							
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	0	0	237	236	0	41	22	61	8	67	0
Turn Type				Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases				4	4			2			6	
Permitted Phases							2		2	6		
Total Split (s)				61.5	61.5		18.5	18.5	18.5	18.5	18.5	
Total Lost Time (s)				4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Act Effct Green (s)				20.9	20.9		14.7	14.7	14.7	14.7	14.7	
Actuated g/C Ratio				0.46	0.46		0.33	0.33	0.33	0.33	0.33	
v/c Ratio				0.75	0.70		0.14	0.03	0.11	0.04	0.25	
Control Delay				24.2	20.1		17.1	15.7	6.6	16.7	17.1	
Queue Delay				0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay				24.2	20.1		17.1	15.7	6.6	16.7	17.1	
LOS				C	C		B	B	A	B	B	
Approach Delay					22.2			11.7			17.0	
Approach LOS					C			B			B	

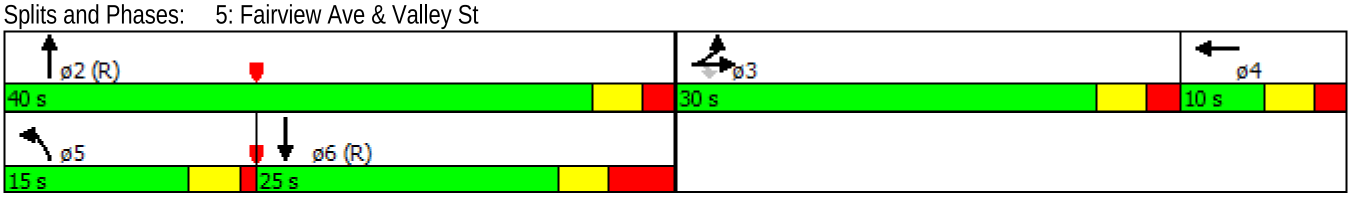
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 19.7	Intersection LOS: B
Intersection Capacity Utilization 38.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: Fairview Ave & Aloha St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	0	316	0	9	0	255	103	0	0	215	257
Satd. Flow (prot)	0	1570	1599	0	950	0	1660	1073	0	0	1170	0
Flt Permitted		0.950					0.950					
Satd. Flow (perm)	0	1570	1499	0	950	0	1660	1073	0	0	1170	0
Satd. Flow (RTOR)			343								279	
Confl. Peds. (#/hr)			42									99
Confl. Bikes (#/hr)			17									17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	15%	2%	1%	2%	100%	2%	3%	3%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	73	343	0	10	0	276	112	0	0	512	0
Turn Type	Split	NA	Perm		NA		Prot	NA			NA	
Protected Phases	3	3			4		5	2			6	
Permitted Phases			3									
Total Split (s)	30.0	30.0	30.0		10.0		15.0	40.0			25.0	
Total Lost Time (s)		5.0	5.0		5.0		4.0	5.0			7.0	
Act Effct Green (s)		25.0	25.0		5.0		11.0	35.0			18.0	
Actuated g/C Ratio		0.31	0.31		0.06		0.14	0.44			0.22	
v/c Ratio		0.15	0.49		0.17		1.21	0.24			1.07	
Control Delay		20.9	5.2		42.3		161.8	15.9			77.7	
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	
Total Delay		20.9	5.2		42.3		161.8	15.9			77.7	
LOS		C	A		D		F	B			E	
Approach Delay		8.0			42.3			119.7			77.7	
Approach LOS		A			D			F			E	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 67.8	Intersection LOS: E
Intersection Capacity Utilization 80.6%	ICU Level of Service D
Analysis Period (min) 15	

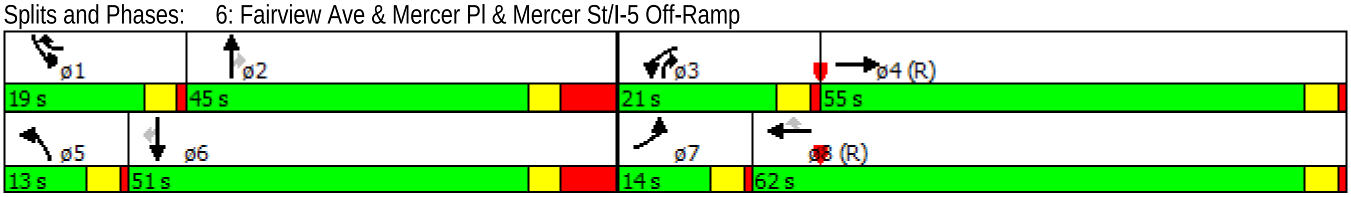
Splits and Phases: 5: Fairview Ave & Valley St



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Volume (vph)	33	1858	79	36	409	1350	232	89	87	1122	61	245
Satd. Flow (prot)	1770	6239	0	0	3467	4964	1599	1770	841	1430	0	1956
Flt Permitted	0.950				0.950			0.950				0.950
Satd. Flow (perm)	1770	6239	0	0	3467	4964	1482	1770	841	1383	0	1956
Satd. Flow (RTOR)		3					183			82		
Confl. Peds. (#/hr)			3	179			19				3	
Confl. Bikes (#/hr)				4			4			3	3	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	2052	0	0	426	1405	241	93	91	1230	0	255
Turn Type	Prot	NA			Prot	NA	pm+ov	Prot	NA	pm+ov		Prot
Protected Phases	7	4			3	8	1	5	2	3		1
Permitted Phases							8			2		
Total Split (s)	14.0	55.0			21.0	62.0	19.0	13.0	45.0	21.0		19.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	9.5	4.5		4.5
Act Effct Green (s)	9.5	50.5			16.5	57.5	72.0	8.5	35.5	57.0		14.5
Actuated g/C Ratio	0.07	0.36			0.12	0.41	0.51	0.06	0.25	0.41		0.10
v/c Ratio	0.28	0.91			1.04	0.69	0.28	0.87	0.43	1.99		1.26
Control Delay	68.5	49.7			115.0	36.1	5.2	121.3	51.2	476.3		200.5
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	68.5	49.7			115.0	36.1	5.2	121.3	51.2	476.3		200.5
LOS	E	D			F	D	A	F	D	F		F
Approach Delay		50.0				48.7			425.6			
Approach LOS		D				D			F			

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 96 (69%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.99	
Intersection Signal Delay: 141.9	Intersection LOS: F
Intersection Capacity Utilization 125.5%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 6: Fairview Ave & Mercer Pl & Mercer St/I-5 Off-Ramp



Lane Group	SBT	SBR
Lane Configurations		
Volume (vph)	219	92
Satd. Flow (prot)	1030	875
Flt Permitted		
Satd. Flow (perm)	1030	702
Satd. Flow (RTOR)		117
Confl. Peds. (#/hr)		139
Confl. Bikes (#/hr)		3
Peak Hour Factor	0.99	0.99
Growth Factor	103%	103%
Heavy Vehicles (%)	1%	1%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	228	96
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Total Split (s)	51.0	51.0
Total Lost Time (s)	9.5	9.5
Act Effct Green (s)	41.5	41.5
Actuated g/C Ratio	0.30	0.30
v/c Ratio	0.75	0.33
Control Delay	61.1	6.8
Queue Delay	0.0	0.0
Total Delay	61.1	6.8
LOS	E	A
Approach Delay	113.5	
Approach LOS	F	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	61	28	26	86	399	3	859	1	366	251	68
Satd. Flow (prot)	0	1836	1599	0	1187	985	1711	1706	700	1719	2951	0
Flt Permitted		0.759			0.910		0.529			0.162		
Satd. Flow (perm)	0	1298	1276	0	1057	734	669	1706	608	293	2951	0
Satd. Flow (RTOR)			25			115			34		35	
Confl. Peds. (#/hr)	112		87	87		112	138		25	25		138
Confl. Bikes (#/hr)			9			8			4			4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	127	30	0	119	424	3	912	1	389	339	0
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+ov	D.P+P	NA	Perm	D.P+P	NA	
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6		2	2		
Total Split (s)	40.0	40.0	25.0	40.0	40.0	25.0	25.0	95.0	95.0	25.0	95.0	
Total Lost Time (s)		4.5	3.5		4.5	3.5	3.5	4.5	4.5	3.5	4.5	
Act Effct Green (s)		35.5	58.0		35.5	58.0	113.0	90.5	90.5	113.0	90.5	
Actuated g/C Ratio		0.22	0.36		0.22	0.36	0.71	0.57	0.57	0.71	0.57	
v/c Ratio		0.44	0.06		0.51	1.14	0.00	0.95	0.00	0.98	0.20	
Control Delay		59.4	12.8		63.4	122.7	6.0	49.6	0.0	65.0	15.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	44.2	0.0	0.0	0.0	
Total Delay		59.4	12.8		63.4	122.7	6.0	93.7	0.0	65.0	15.5	
LOS		E	B		E	F	A	F	A	E	B	
Approach Delay		50.5			109.7			93.3			42.0	
Approach LOS		D			F			F			D	

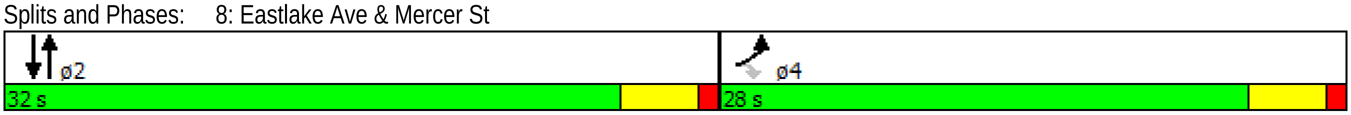
Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 77 (48%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.14	
Intersection Signal Delay: 78.3	Intersection LOS: E
Intersection Capacity Utilization 111.4%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 7: Fairview Ave & Republican St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	316	58	0	522	1015	0
Satd. Flow (prot)	946	847	0	1294	3438	0
Flt Permitted	0.950					
Satd. Flow (perm)	946	807	0	1294	3438	0
Satd. Flow (RTOR)		48				
Confl. Peds. (#/hr)		39				
Confl. Bikes (#/hr)		7				
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	6%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	332	61	0	549	1067	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Total Split (s)	28.0	28.0		32.0	32.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	
Act Effct Green (s)	22.4	22.4		27.5	27.5	
Actuated g/C Ratio	0.38	0.38		0.47	0.47	
v/c Ratio	0.92	0.18		0.91	0.66	
Control Delay	53.6	6.8		38.5	14.9	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	53.6	6.8		38.5	14.9	
LOS	D	A		D	B	
Approach Delay	46.4			38.5	14.9	
Approach LOS	D			D	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 58.9	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 27.5	Intersection LOS: C
Intersection Capacity Utilization 64.9%	ICU Level of Service C
Analysis Period (min) 15	

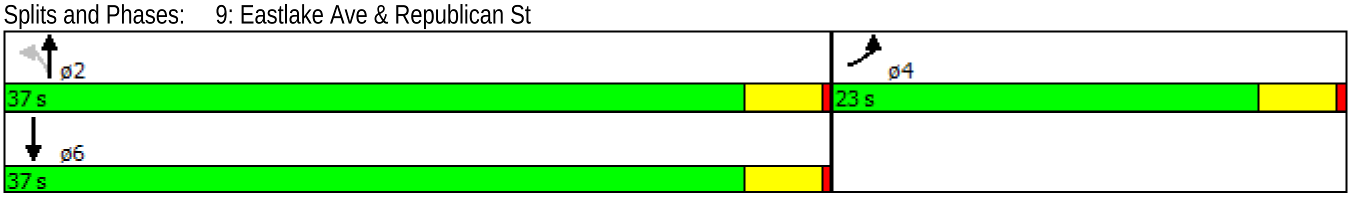
Splits and Phases: 8: Eastlake Ave & Mercer St



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	298	25	44	178	746	390
Satd. Flow (prot)	1794	0	0	3220	2965	0
Flt Permitted	0.956			0.740		
Satd. Flow (perm)	1794	0	0	2396	2965	0
Satd. Flow (RTOR)	7				250	
Confl. Peds. (#/hr)		2	98			98
Confl. Bikes (#/hr)		8				28
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	11%	11%	7%	7%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	347	0	0	238	1218	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Total Split (s)	23.0		37.0	37.0	37.0	
Total Lost Time (s)	4.0			4.0	4.0	
Act Effct Green (s)	19.0			33.0	33.0	
Actuated g/C Ratio	0.32			0.55	0.55	
v/c Ratio	0.61			0.18	0.70	
Control Delay	22.4			7.2	10.3	
Queue Delay	0.0			0.0	0.1	
Total Delay	22.4			7.2	10.3	
LOS	C			A	B	
Approach Delay	22.4			7.2	10.3	
Approach LOS	C			A	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 12.2	Intersection LOS: B
Intersection Capacity Utilization 63.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 9: Eastlake Ave & Republican St

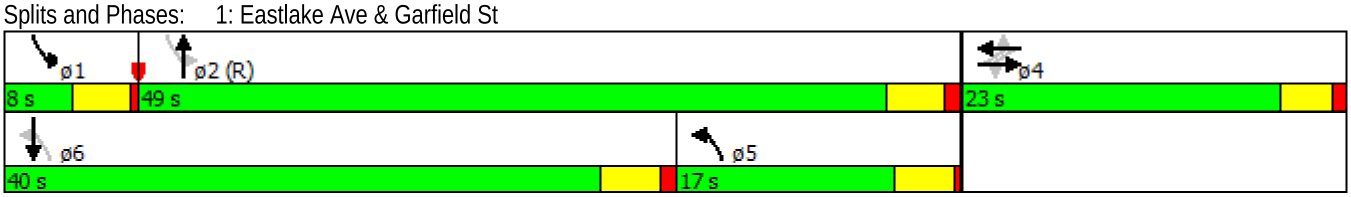


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	3	30	31	3	13	169	301	22	15	811	11
Satd. Flow (prot)	0	1475	0	0	1767	0	1546	2912	0	1636	3138	0
Flt Permitted		0.983			0.837		0.211			0.538		
Satd. Flow (perm)	0	1451	0	0	1461	0	334	2912	0	830	3138	0
Satd. Flow (RTOR)		33			14			15			2	
Confl. Peds. (#/hr)	34		55	55		34	57		68	68		57
Confl. Bikes (#/hr)			1			1			13			120
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	17%	17%	17%	2%	2%	2%	9%	9%	9%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	40	0	0	51	0	187	357	0	17	910	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Total Split (s)	23.0	23.0		23.0	23.0		17.0	49.0		8.0	40.0	
Total Lost Time (s)		4.0			4.0		4.0	4.5		4.0	4.5	
Act Effct Green (s)		19.0			19.0		49.0	44.5		49.0	35.5	
Actuated g/C Ratio		0.24			0.24		0.61	0.56		0.61	0.44	
v/c Ratio		0.11			0.14		0.47	0.22		0.03	0.65	
Control Delay		11.5			20.1		12.2	4.5		4.9	20.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		11.5			20.1		12.2	4.5		4.9	20.1	
LOS		B			C		B	A		A	C	
Approach Delay		11.5			20.1			7.1			19.9	
Approach LOS		B			C			A			B	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 63 (79%), Referenced to phase 2:NBSB, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 15.2 Intersection LOS: B
Intersection Capacity Utilization 59.4% ICU Level of Service B
Analysis Period (min) 15

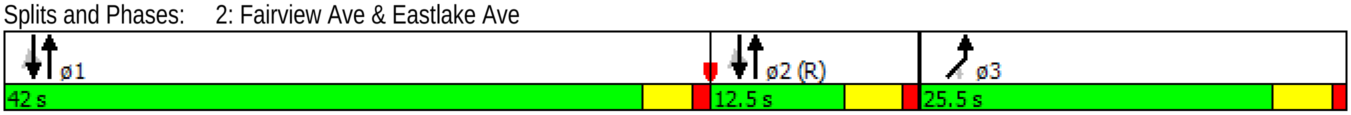
Splits and Phases: 1: Eastlake Ave & Garfield St



Lane Group	NBL	NBT	SBT	SBR	NEL	NER	ø1	ø2
Lane Configurations								
Volume (vph)	0	371	839	15	14	25		
Satd. Flow (prot)	0	1583	1754	1760	4266	1705		
Flt Permitted					0.950			
Satd. Flow (perm)	0	1583	1754	1760	4266	1584		
Satd. Flow (RTOR)				17		28		
Confl. Peds. (#/hr)						23		
Confl. Bikes (#/hr)						6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Growth Factor	103%	103%	103%	103%	103%	103%		
Heavy Vehicles (%)	8%	8%	4%	4%	8%	8%		
Parking (#/hr)		0	0					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	415	939	17	16	28		
Turn Type		NA	NA	Perm	Prot	Perm		
Protected Phases		1 2	1 2		3		1	2
Permitted Phases				1 2		3		
Total Split (s)					25.5	25.5	42.0	12.5
Total Lost Time (s)					4.5	4.5		
Act Effct Green (s)		50.5	50.5	50.5	21.0	21.0		
Actuated g/C Ratio		0.63	0.63	0.63	0.26	0.26		
v/c Ratio		0.42	0.85	0.02	0.01	0.06		
Control Delay		8.9	18.8	0.1	25.7	16.1		
Queue Delay		0.0	0.0	0.0	0.0	0.0		
Total Delay		8.9	18.8	0.1	25.7	16.1		
LOS		A	B	A	C	B		
Approach Delay		8.9	18.5		19.6			
Approach LOS		A	B		B			

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 14 (18%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 15.7	Intersection LOS: B
Intersection Capacity Utilization 70.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Fairview Ave & Eastlake Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	55	91	479	546	281
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	0	57	95	498	568	292
Pedestrians	113				47	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	9				4	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				971		
pX, platoon unblocked	0.96					
vC, conflicting volume	1562	827	973			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1565	827	973			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	100	82	85			
cM capacity (veh/h)	84	327	627			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	57	95	498	860
Volume Left	0	95	0	0
Volume Right	57	0	0	292
cSH	327	627	1700	1700
Volume to Capacity	0.18	0.15	0.29	0.51
Queue Length 95th (ft)	16	13	0	0
Control Delay (s)	18.3	11.8	0.0	0.0
Lane LOS	C	B		
Approach Delay (s)	18.3	1.9		0.0
Approach LOS	C			

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	267	0	15	23	115	181	5	20	0
Satd. Flow (prot)	0	0	0	1457	1484	0	1719	867	710	1736	3471	0
Flt Permitted				0.950	0.957		0.743			0.646		
Satd. Flow (perm)	0	0	0	1457	1484	0	934	867	574	1007	3471	0
Satd. Flow (RTOR)					20				194			
Confl. Peds. (#/hr)						61	110		61	61		110
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	5%	5%	9%	4%	4%	4%
Parking (#/hr)					0							
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	0	0	152	150	0	25	123	194	5	21	0
Turn Type				Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases				4	4			2			6	
Permitted Phases							2		2	6		
Total Split (s)				23.0	23.0		57.0	57.0	57.0	57.0	57.0	
Total Lost Time (s)				4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Act Effct Green (s)				18.5	18.5		52.5	52.5	52.5	52.5	52.5	
Actuated g/C Ratio				0.23	0.23		0.66	0.66	0.66	0.66	0.66	
v/c Ratio				0.45	0.42		0.04	0.22	0.44	0.01	0.01	
Control Delay				30.1	25.6		1.7	3.7	6.5	9.0	8.6	
Queue Delay				0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay				30.1	25.6		1.7	3.7	6.5	9.0	8.6	
LOS				C	C		A	A	A	A	A	
Approach Delay					27.8			5.1			8.7	
Approach LOS					C			A			A	

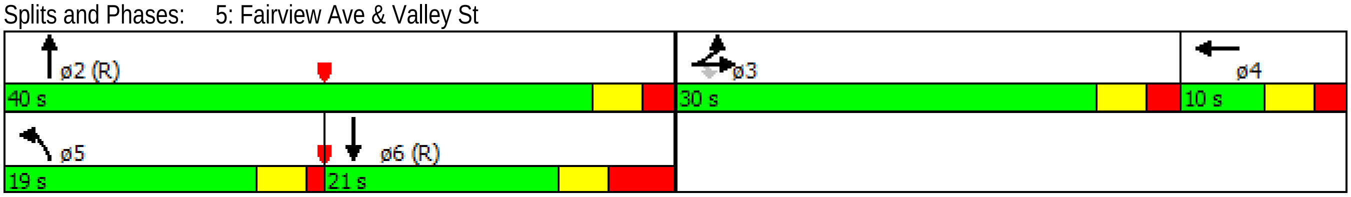
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NETL and 6:SWTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.45	
Intersection Signal Delay: 15.5	Intersection LOS: B
Intersection Capacity Utilization 34.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: Fairview Ave & Aloha St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	0	250	0	8	0	230	257	0	0	302	148
Satd. Flow (prot)	0	1671	1583	0	950	0	1719	2381	0	0	3066	0
Flt Permitted		0.950					0.950					
Satd. Flow (perm)	0	1671	1583	0	950	0	1719	2381	0	0	3066	0
Satd. Flow (RTOR)			271								91	
Confl. Peds. (#/hr)												51
Confl. Bikes (#/hr)												17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	8%	2%	2%	2%	100%	2%	5%	5%	2%	2%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	147	271	0	9	0	249	279	0	0	487	0
Turn Type	Split	NA	Perm		NA		Prot	NA			NA	
Protected Phases	3	3			4		5	2			6	
Permitted Phases			3									
Total Split (s)	30.0	30.0	30.0		10.0		19.0	40.0			21.0	
Total Lost Time (s)		5.0	5.0		5.0		4.0	5.0			7.0	
Act Effct Green (s)		25.0	25.0		5.0		15.0	35.0			14.0	
Actuated g/C Ratio		0.31	0.31		0.06		0.19	0.44			0.18	
v/c Ratio		0.28	0.40		0.15		0.77	0.27			0.80	
Control Delay		22.6	4.8		41.6		49.1	15.2			24.9	
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	
Total Delay		22.6	4.8		41.6		49.1	15.2			24.9	
LOS		C	A		D		D	B			C	
Approach Delay		11.1			41.6			31.2			24.9	
Approach LOS		B			D			C			C	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 23.3	Intersection LOS: C
Intersection Capacity Utilization 55.7%	ICU Level of Service B
Analysis Period (min) 15	

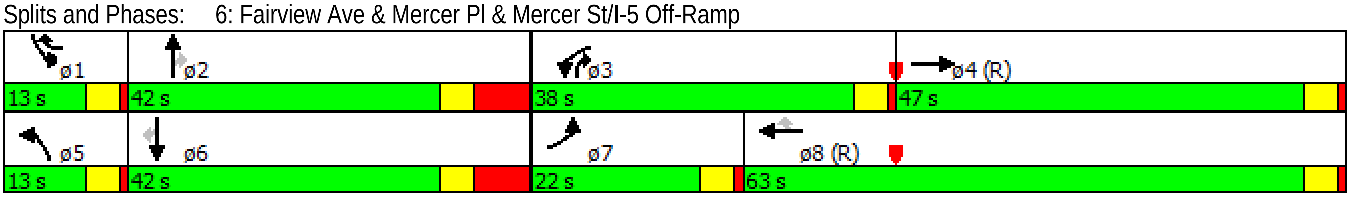
Splits and Phases: 5: Fairview Ave & Valley St



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Volume (vph)	79	1463	155	20	790	1350	375	55	123	276	92	187
Satd. Flow (prot)	1719	6011	0	0	3400	4868	1568	1656	1376	2059	0	3400
Flt Permitted	0.950				0.950			0.950				0.950
Satd. Flow (perm)	1719	6011	0	0	3400	4868	1486	1656	1376	1996	0	3400
Satd. Flow (RTOR)		2					276			47		
Confl. Peds. (#/hr)			2	100			12				2	
Confl. Bikes (#/hr)				1			1			4	4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	5%	5%	5%	3%	3%	3%	9%	9%	9%	9%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	1814	0	0	875	1495	415	61	136	408	0	207
Turn Type	Prot	NA			Prot	NA	pm+ov	Prot	NA	pm+ov		Prot
Protected Phases	7	4			3	8	1	5	2	3		1
Permitted Phases							8			2		
Total Split (s)	22.0	47.0			38.0	63.0	13.0	13.0	42.0	38.0		13.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	9.5	4.5		4.5
Act Effct Green (s)	17.5	42.5			33.5	58.5	67.0	8.5	32.5	71.0		8.5
Actuated g/C Ratio	0.12	0.30			0.24	0.42	0.48	0.06	0.23	0.51		0.06
v/c Ratio	0.41	0.99			1.08	0.74	0.48	0.61	0.43	0.39		1.00
Control Delay	62.8	67.9			103.8	36.9	8.7	89.2	50.7	17.6		128.3
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	62.8	67.9			103.8	36.9	8.7	89.2	50.7	17.6		128.3
LOS	E	E			F	D	A	F	D	B		F
Approach Delay		67.6				53.7			32.2			
Approach LOS		E				D			C			

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 57 (41%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 58.4	Intersection LOS: E
Intersection Capacity Utilization 99.2%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Fairview Ave & Mercer Pl & Mercer St/I-5 Off-Ramp



Lane Group	SBT	SBR
Lane Configurations		
Volume (vph)	274	91
Satd. Flow (prot)	1845	1568
Flt Permitted		
Satd. Flow (perm)	1845	1381
Satd. Flow (RTOR)		117
Confl. Peds. (#/hr)		78
Confl. Bikes (#/hr)		5
Peak Hour Factor	0.93	0.93
Growth Factor	103%	103%
Heavy Vehicles (%)	3%	3%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	303	101
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Total Split (s)	42.0	42.0
Total Lost Time (s)	9.5	9.5
Act Effct Green (s)	32.5	32.5
Actuated g/C Ratio	0.23	0.23
v/c Ratio	0.71	0.25
Control Delay	59.6	6.5
Queue Delay	5.4	0.0
Total Delay	65.0	6.5
LOS	E	A
Approach Delay	76.8	
Approach LOS	E	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	60	41	15	81	194	66	369	14	396	498	186
Satd. Flow (prot)	0	1751	1509	0	1204	0	1631	4517	1263	2306	3940	0
Flt Permitted		0.860			0.985		0.292			0.460		
Satd. Flow (perm)	0	1483	1360	0	1185	0	466	4517	904	985	3940	0
Satd. Flow (RTOR)			44		68				65		49	
Confl. Peds. (#/hr)	121		39	39		121	86		59	59		86
Confl. Bikes (#/hr)			8			12			10			14
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	7%	7%	7%	47%	7%	7%	7%	7%	57%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	44	0	314	0	72	400	15	429	742	0
Turn Type	Perm	NA	pm+ov	Perm	NA		D.P+P	NA	Perm	D.P+P	NA	
Protected Phases		4	5		8		5	2		1	6	
Permitted Phases	4		4	8			6		2	2		
Total Split (s)	59.0	59.0	15.0	59.0	59.0		15.0	66.0	66.0	35.0	86.0	
Total Lost Time (s)		4.5	3.5		5.5		3.5	4.5	4.5	3.5	4.5	
Act Effct Green (s)		54.5	67.0		53.5		94.0	61.5	61.5	94.0	81.5	
Actuated g/C Ratio		0.34	0.42		0.33		0.59	0.38	0.38	0.59	0.51	
v/c Ratio		0.18	0.07		0.71		0.20	0.23	0.04	0.51	0.37	
Control Delay		38.3	6.9		46.2		10.7	28.8	3.1	17.5	22.5	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.1	1.0	
Total Delay		38.3	6.9		46.2		10.7	28.8	3.1	17.6	23.5	
LOS		D	A		D		B	C	A	B	C	
Approach Delay		28.2			46.2			25.3			21.3	
Approach LOS		C			D			C			C	

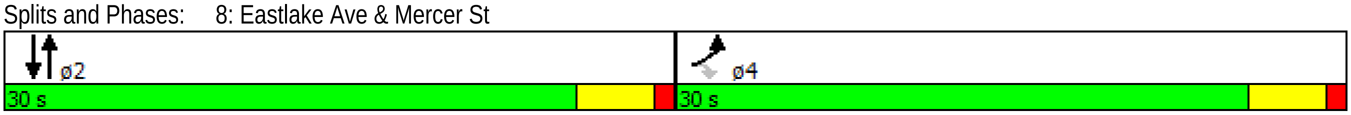
Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 49 (31%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 26.4	Intersection LOS: C
Intersection Capacity Utilization 72.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: Fairview Ave & Republican St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	249	38	0	442	933	0
Satd. Flow (prot)	950	850	0	3764	3471	0
Flt Permitted	0.950					
Satd. Flow (perm)	949	812	0	3764	3471	0
Satd. Flow (RTOR)		40				
Confl. Peds. (#/hr)	1	40				
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	4%	4%	6%	6%	4%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	264	40	0	469	991	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Total Split (s)	30.0	30.0		30.0	30.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	
Act Effct Green (s)	19.2	19.2		26.6	26.6	
Actuated g/C Ratio	0.35	0.35		0.49	0.49	
v/c Ratio	0.80	0.13		0.26	0.59	
Control Delay	34.3	5.1		10.0	13.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	34.3	5.1		10.0	13.3	
LOS	C	A		B	B	
Approach Delay	30.5			10.0	13.3	
Approach LOS	C			B	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 54.8	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 15.4	Intersection LOS: B
Intersection Capacity Utilization 54.8%	ICU Level of Service A
Analysis Period (min) 15	

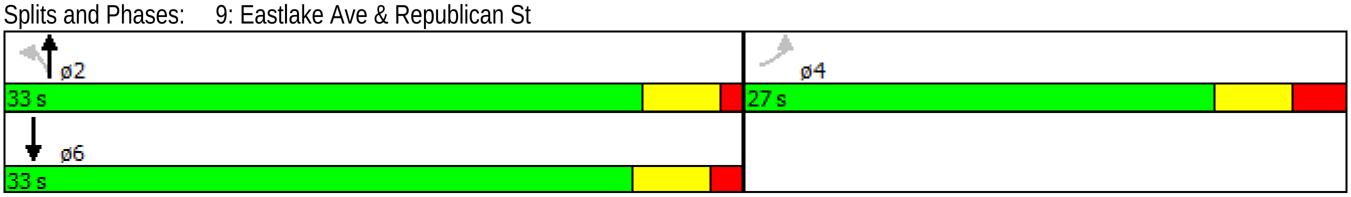
Splits and Phases: 8: Eastlake Ave & Mercer St



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	311	23	27	190	734	224
Satd. Flow (prot)	1699	0	0	3176	3134	0
Flt Permitted	0.956			0.825		
Satd. Flow (perm)	1699	0	0	2626	3134	0
Satd. Flow (RTOR)	7				90	
Confl. Peds. (#/hr)			91			91
Confl. Bikes (#/hr)		1				93
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	4%	13%	13%	4%	7%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	362	0	0	235	1039	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Total Split (s)	27.0		33.0	33.0	33.0	
Total Lost Time (s)	6.0			4.5	5.0	
Act Effct Green (s)	15.3			23.8	23.3	
Actuated g/C Ratio	0.31			0.48	0.47	
v/c Ratio	0.69			0.19	0.69	
Control Delay	23.1			8.7	12.9	
Queue Delay	0.0			0.0	0.0	
Total Delay	23.1			8.7	12.9	
LOS	C			A	B	
Approach Delay	23.1			8.7	12.9	
Approach LOS	C			A	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 14.5	Intersection LOS: B
Intersection Capacity Utilization 58.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 9: Eastlake Ave & Republican St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	0	68	36	1	26	139	468	15	20	607	3
Satd. Flow (prot)	0	1690	0	0	1762	0	1636	3115	0	1620	3118	0
Flt Permitted		0.878			0.823		0.337			0.443		
Satd. Flow (perm)	0	1491	0	0	1437	0	548	3115	0	700	3118	0
Satd. Flow (RTOR)		130			27			6			1	
Confl. Peds. (#/hr)	33		65	65		33	67		63	63		67
Confl. Bikes (#/hr)			2			4			104			35
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	117	0	0	66	0	146	508	0	21	641	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Total Split (s)	25.0	25.0		25.0	25.0		16.0	47.0		8.0	39.0	
Total Lost Time (s)		4.0			4.0		4.0	4.5		4.0	4.5	
Act Effct Green (s)		21.0			21.0		47.0	42.5		47.0	34.5	
Actuated g/C Ratio		0.26			0.26		0.59	0.53		0.59	0.43	
v/c Ratio		0.24			0.17		0.30	0.31		0.05	0.48	
Control Delay		5.3			16.5		7.0	8.6		5.7	17.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		5.3			16.5		7.0	8.6		5.7	17.7	
LOS		A			B		A	A		A	B	
Approach Delay		5.3			16.5			8.2			17.4	
Approach LOS		A			B			A			B	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.48
Intersection Signal Delay: 12.4 Intersection LOS: B
Intersection Capacity Utilization 51.6% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Eastlake Ave & Garfield St

Lane Group	NBL	NBT	SBT	SBR	NEL	NER	ø1	ø2
Lane Configurations								
Volume (vph)	0	601	694	14	15	50		
Satd. Flow (prot)	0	1676	1721	1727	1992	1359		
Flt Permitted					0.950			
Satd. Flow (perm)	0	1676	1721	1727	1992	1141		
Satd. Flow (RTOR)				15		55		
Confl. Peds. (#/hr)						41		
Confl. Bikes (#/hr)						55		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Growth Factor	103%	103%	103%	103%	103%	103%		
Heavy Vehicles (%)	2%	2%	6%	6%	3%	3%		
Parking (#/hr)		0	0					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	659	760	15	16	55		
Turn Type		NA	NA	Perm	Prot	Perm		
Protected Phases		1 2	1 2		3		1	2
Permitted Phases				1 2		3		
Total Split (s)					28.0	28.0	26.0	26.0
Total Lost Time (s)					4.5	4.5		
Act Effct Green (s)		48.0	48.0	48.0	23.5	23.5		
Actuated g/C Ratio		0.60	0.60	0.60	0.29	0.29		
v/c Ratio		0.66	0.74	0.01	0.03	0.15		
Control Delay		14.5	14.8	0.9	20.4	7.5		
Queue Delay		0.0	0.0	0.0	0.0	0.0		
Total Delay		14.5	14.8	0.9	20.4	7.5		
LOS		B	B	A	C	A		
Approach Delay		14.5	14.6		10.4			
Approach LOS		B	B		B			

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 28 (35%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 14.3	Intersection LOS: B
Intersection Capacity Utilization 62.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Fairview Ave & Eastlake Ave

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	230	40	575	612	325
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	249	43	623	664	352
Pedestrians	110				43	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	9				4	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				966		
pX, platoon unblocked						
vC, conflicting volume	1703	950	1126			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1703	950	1126			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	13	92			
cM capacity (veh/h)	81	287	557			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	249	43	623	1016
Volume Left	0	43	0	0
Volume Right	249	0	0	352
cSH	287	557	1700	1700
Volume to Capacity	0.87	0.08	0.37	0.60
Queue Length 95th (ft)	190	6	0	0
Control Delay (s)	64.3	12.0	0.0	0.0
Lane LOS	F	B		
Approach Delay (s)	64.3	0.8		0.0
Approach LOS	F			

Intersection Summary			
Average Delay	8.6		
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	412	0	15	37	20	55	7	50	11
Satd. Flow (prot)	0	0	0	685	699	0	2241	2358	1742	922	799	0
Flt Permitted				0.950	0.956		0.664			0.743		
Satd. Flow (perm)	0	0	0	685	699	0	918	2358	1546	655	799	0
Satd. Flow (RTOR)					20				61		11	
Confl. Peds. (#/hr)						108	159		33	33		159
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	6%	6%	22%	3%	3%	3%
Parking (#/hr)					0							
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	0	0	237	236	0	41	22	61	8	67	0
Turn Type				Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases				4	4			2			6	
Permitted Phases							2		2	6		
Total Split (s)				61.0	61.0		19.0	19.0	19.0	19.0	19.0	
Total Lost Time (s)				4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Act Effct Green (s)				21.2	21.2		15.2	15.2	15.2	15.2	15.2	
Actuated g/C Ratio				0.46	0.46		0.33	0.33	0.33	0.33	0.33	
v/c Ratio				0.75	0.71		0.13	0.03	0.11	0.04	0.25	
Control Delay				24.7	20.5		17.2	15.8	6.6	16.7	17.0	
Queue Delay				0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay				24.7	20.5		17.2	15.8	6.6	16.7	17.0	
LOS				C	C		B	B	A	B	B	
Approach Delay					22.6			11.7			17.0	
Approach LOS					C			B			B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 45.9	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 20.0	Intersection LOS: B
Intersection Capacity Utilization 38.7%	ICU Level of Service A
Analysis Period (min) 15	

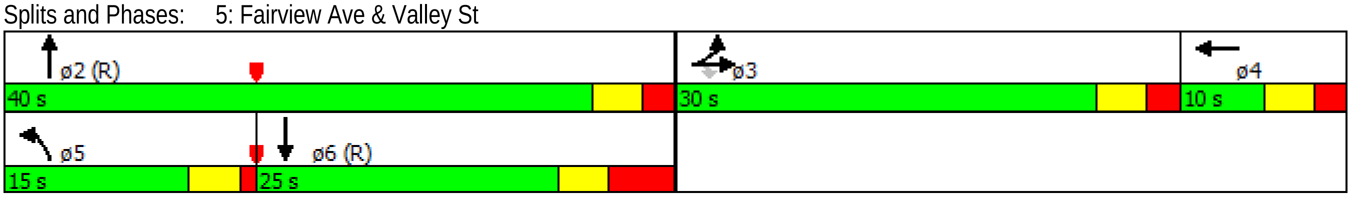
Splits and Phases: 4: Fairview Ave & Aloha St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	0	316	0	9	0	255	103	0	0	215	257
Satd. Flow (prot)	0	1570	1599	0	950	0	1660	1073	0	0	1170	0
Flt Permitted		0.950					0.950					
Satd. Flow (perm)	0	1570	1499	0	950	0	1660	1073	0	0	1170	0
Satd. Flow (RTOR)			343								279	
Confl. Peds. (#/hr)			42									99
Confl. Bikes (#/hr)			17									17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	15%	2%	1%	2%	100%	2%	3%	3%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	73	343	0	10	0	276	112	0	0	512	0
Turn Type	Split	NA	Perm		NA		Prot	NA			NA	
Protected Phases	3	3			4		5	2			6	
Permitted Phases			3									
Total Split (s)	30.0	30.0	30.0		10.0		15.0	40.0			25.0	
Total Lost Time (s)		5.0	5.0		5.0		4.0	5.0			7.0	
Act Effct Green (s)		25.0	25.0		5.0		11.0	35.0			18.0	
Actuated g/C Ratio		0.31	0.31		0.06		0.14	0.44			0.22	
v/c Ratio		0.15	0.49		0.17		1.21	0.24			1.07	
Control Delay		20.9	5.2		42.3		161.8	15.9			77.7	
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	
Total Delay		20.9	5.2		42.3		161.8	15.9			77.7	
LOS		C	A		D		F	B			E	
Approach Delay		8.0			42.3			119.7			77.7	
Approach LOS		A			D			F			E	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.21
Intersection Signal Delay: 67.8 Intersection LOS: E
Intersection Capacity Utilization 80.6% ICU Level of Service D
Analysis Period (min) 15

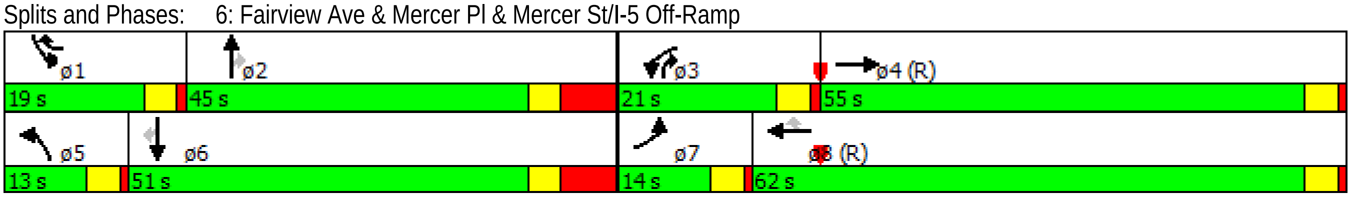
Splits and Phases: 5: Fairview Ave & Valley St



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Volume (vph)	33	1858	79	36	409	1350	232	89	87	1122	61	245
Satd. Flow (prot)	1770	6239	0	0	3467	4964	1599	1770	841	1430	0	1956
Flt Permitted	0.950				0.950			0.950				0.950
Satd. Flow (perm)	1770	6239	0	0	3467	4964	1482	1770	841	1383	0	1956
Satd. Flow (RTOR)		3					183			82		
Confl. Peds. (#/hr)			3	179			19				3	
Confl. Bikes (#/hr)				4			4			3	3	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	2052	0	0	426	1405	241	93	91	1230	0	255
Turn Type	Prot	NA			Prot	NA	pm+ov	Prot	NA	pm+ov		Prot
Protected Phases	7	4			3	8	1	5	2	3		1
Permitted Phases							8			2		
Total Split (s)	14.0	55.0			21.0	62.0	19.0	13.0	45.0	21.0		19.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	9.5	4.5		4.5
Act Effct Green (s)	9.5	50.5			16.5	57.5	72.0	8.5	35.5	57.0		14.5
Actuated g/C Ratio	0.07	0.36			0.12	0.41	0.51	0.06	0.25	0.41		0.10
v/c Ratio	0.28	0.91			1.04	0.69	0.28	0.87	0.43	1.99		1.26
Control Delay	68.5	49.7			115.0	36.1	5.2	121.3	51.2	476.3		200.5
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	68.5	49.7			115.0	36.1	5.2	121.3	51.2	476.3		200.5
LOS	E	D			F	D	A	F	D	F		F
Approach Delay		50.0				48.7			425.6			
Approach LOS		D				D			F			

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 96 (69%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.99	
Intersection Signal Delay: 141.9	Intersection LOS: F
Intersection Capacity Utilization 125.5%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 6: Fairview Ave & Mercer Pl & Mercer St/I-5 Off-Ramp



Lane Group	SBT	SBR
Lane Configurations		
Volume (vph)	219	92
Satd. Flow (prot)	1030	875
Flt Permitted		
Satd. Flow (perm)	1030	702
Satd. Flow (RTOR)		117
Confl. Peds. (#/hr)		139
Confl. Bikes (#/hr)		3
Peak Hour Factor	0.99	0.99
Growth Factor	103%	103%
Heavy Vehicles (%)	1%	1%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	228	96
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Total Split (s)	51.0	51.0
Total Lost Time (s)	9.5	9.5
Act Effct Green (s)	41.5	41.5
Actuated g/C Ratio	0.30	0.30
v/c Ratio	0.75	0.33
Control Delay	61.1	6.8
Queue Delay	0.0	0.0
Total Delay	61.1	6.8
LOS	E	A
Approach Delay	113.5	
Approach LOS	F	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	61	28	26	86	399	3	859	7	366	251	68
Satd. Flow (prot)	0	1836	1599	0	1129	985	1711	1706	384	1719	2951	0
Flt Permitted		0.780			0.906		0.529			0.162		
Satd. Flow (perm)	0	1330	1276	0	1001	734	669	1706	334	293	2951	0
Satd. Flow (RTOR)			25			115			41		35	
Confl. Peds. (#/hr)	112		87	87		112	138		25	25		138
Confl. Bikes (#/hr)			9			8			4			4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	1%	1%	1%	23%	1%	1%	2%	2%	86%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	127	30	0	119	424	3	912	7	389	339	0
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+ov	D.P+P	NA	Perm	D.P+P	NA	
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6		2	2		
Total Split (s)	40.0	40.0	25.0	40.0	40.0	25.0	25.0	95.0	95.0	25.0	95.0	
Total Lost Time (s)		4.5	3.5		5.5	3.5	3.5	4.5	4.5	3.5	4.5	
Act Effct Green (s)		35.5	58.0		34.5	58.0	113.0	90.5	90.5	113.0	90.5	
Actuated g/C Ratio		0.22	0.36		0.22	0.36	0.71	0.57	0.57	0.71	0.57	
v/c Ratio		0.43	0.06		0.55	1.14	0.00	0.95	0.03	0.98	0.20	
Control Delay		58.9	12.8		67.0	122.7	6.0	49.6	1.1	65.0	15.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	44.2	0.0	0.0	0.0	
Total Delay		58.9	12.8		67.0	122.7	6.0	93.7	1.1	65.0	15.5	
LOS		E	B		E	F	A	F	A	E	B	
Approach Delay		50.1			110.5			92.7			42.0	
Approach LOS		D			F			F			D	

Intersection Summary

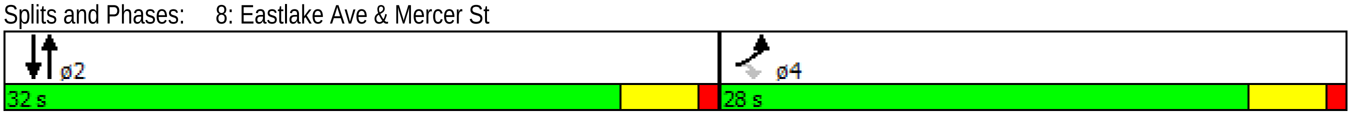
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 77 (48%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.14
Intersection Signal Delay: 78.3 Intersection LOS: E
Intersection Capacity Utilization 111.4% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 7: Fairview Ave & Republican St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	316	58	0	522	1015	0
Satd. Flow (prot)	946	847	0	1294	3438	0
Flt Permitted	0.950					
Satd. Flow (perm)	946	807	0	1294	3438	0
Satd. Flow (RTOR)		48				
Confl. Peds. (#/hr)		39				
Confl. Bikes (#/hr)		7				
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	6%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	332	61	0	549	1067	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Total Split (s)	28.0	28.0		32.0	32.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	
Act Effct Green (s)	22.4	22.4		27.5	27.5	
Actuated g/C Ratio	0.38	0.38		0.47	0.47	
v/c Ratio	0.92	0.18		0.91	0.66	
Control Delay	53.6	6.8		38.5	14.9	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	53.6	6.8		38.5	14.9	
LOS	D	A		D	B	
Approach Delay	46.4			38.5	14.9	
Approach LOS	D			D	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 58.9	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 27.5	Intersection LOS: C
Intersection Capacity Utilization 64.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 8: Eastlake Ave & Mercer St

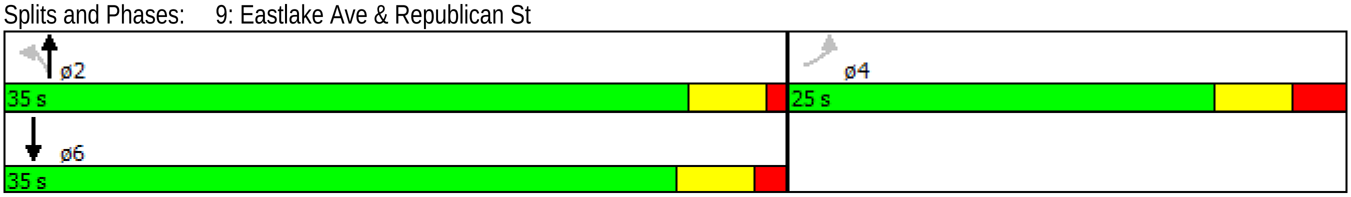


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	298	25	44	178	746	390
Satd. Flow (prot)	1761	0	0	3220	2984	0
Flt Permitted	0.956			0.721		
Satd. Flow (perm)	1761	0	0	2336	2984	0
Satd. Flow (RTOR)	7				225	
Confl. Peds. (#/hr)		2	98			98
Confl. Bikes (#/hr)		8				28
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	2%	0%	11%	11%	7%	8%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	347	0	0	238	1218	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Total Split (s)	25.0		35.0	35.0	35.0	
Total Lost Time (s)	6.0			4.5	5.0	
Act Effct Green (s)	19.0			30.5	30.0	
Actuated g/C Ratio	0.32			0.51	0.50	
v/c Ratio	0.62			0.20	0.76	
Control Delay	22.7			8.6	13.5	
Queue Delay	0.0			0.0	0.0	
Total Delay	22.7			8.6	13.5	
LOS	C			A	B	
Approach Delay	22.7			8.6	13.5	
Approach LOS	C			A	B	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 14.6 Intersection LOS: B
Intersection Capacity Utilization 65.3% ICU Level of Service C
Analysis Period (min) 15

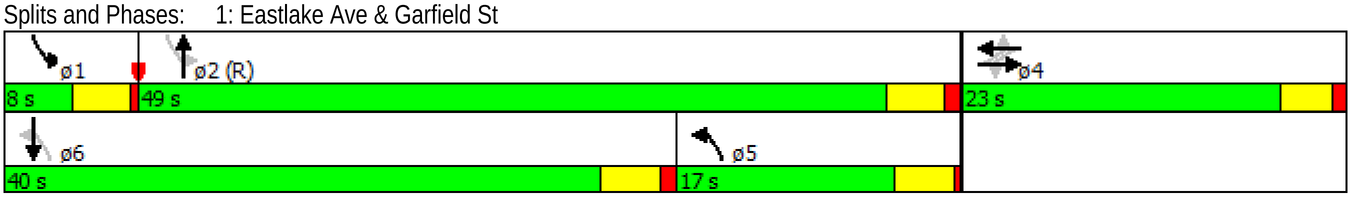
Splits and Phases: 9: Eastlake Ave & Republican St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	3	30	31	3	13	169	301	22	15	811	11
Satd. Flow (prot)	0	1475	0	0	1767	0	1546	2912	0	1636	3138	0
Flt Permitted		0.983			0.837		0.211			0.538		
Satd. Flow (perm)	0	1451	0	0	1461	0	334	2912	0	830	3138	0
Satd. Flow (RTOR)		33			14			15			2	
Confl. Peds. (#/hr)	34		55	55		34	57		68	68		57
Confl. Bikes (#/hr)			1			1			13			120
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	17%	17%	17%	2%	2%	2%	9%	9%	9%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	40	0	0	51	0	187	357	0	17	910	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Total Split (s)	23.0	23.0		23.0	23.0		17.0	49.0		8.0	40.0	
Total Lost Time (s)		4.0			4.0		4.0	4.5		4.0	4.5	
Act Effct Green (s)		19.0			19.0		49.0	44.5		49.0	35.5	
Actuated g/C Ratio		0.24			0.24		0.61	0.56		0.61	0.44	
v/c Ratio		0.11			0.14		0.47	0.22		0.03	0.65	
Control Delay		11.5			20.1		12.3	4.7		4.9	20.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		11.5			20.1		12.3	4.7		4.9	20.1	
LOS		B			C		B	A		A	C	
Approach Delay		11.5			20.1			7.3			19.9	
Approach LOS		B			C			A			B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 63 (79%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 59.4%	ICU Level of Service B
Analysis Period (min) 15	

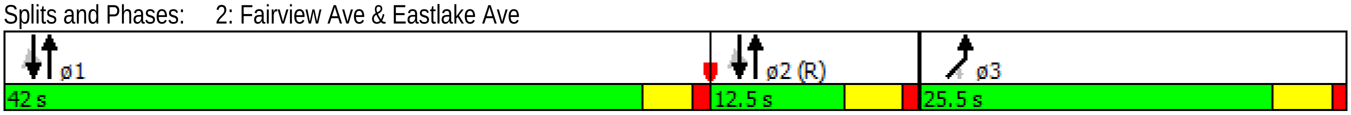
Splits and Phases: 1: Eastlake Ave & Garfield St



Lane Group	NBL	NBT	SBT	SBR	NEL	NER	ø1	ø2
Lane Configurations								
Volume (vph)	0	371	839	15	14	25		
Satd. Flow (prot)	0	1583	1754	1760	4266	1705		
Flt Permitted					0.950			
Satd. Flow (perm)	0	1583	1754	1760	4266	1584		
Satd. Flow (RTOR)				17		28		
Confl. Peds. (#/hr)						23		
Confl. Bikes (#/hr)						6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Growth Factor	103%	103%	103%	103%	103%	103%		
Heavy Vehicles (%)	8%	8%	4%	4%	8%	8%		
Parking (#/hr)		0	0					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	415	939	17	16	28		
Turn Type		NA	NA	Perm	Prot	Perm		
Protected Phases		1 2	1 2		3		1	2
Permitted Phases				1 2		3		
Total Split (s)					25.5	25.5	42.0	12.5
Total Lost Time (s)					4.5	4.5		
Act Effct Green (s)		50.5	50.5	50.5	21.0	21.0		
Actuated g/C Ratio		0.63	0.63	0.63	0.26	0.26		
v/c Ratio		0.42	0.85	0.02	0.01	0.06		
Control Delay		8.9	18.3	0.1	25.3	14.8		
Queue Delay		0.0	0.4	0.0	0.0	0.0		
Total Delay		8.9	18.7	0.1	25.3	14.8		
LOS		A	B	A	C	B		
Approach Delay		8.9	18.4		18.6			
Approach LOS		A	B		B			

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 15 (19%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 15.6	Intersection LOS: B
Intersection Capacity Utilization 70.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Fairview Ave & Eastlake Ave



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	263	55	91	479	546	281
Satd. Flow (prot)	1656	1333	1589	1852	1596	0
Flt Permitted	0.950		0.123			
Satd. Flow (perm)	1514	1333	206	1852	1596	0
Satd. Flow (RTOR)		57			47	
Confl. Peds. (#/hr)	47		113			113
Confl. Bikes (#/hr)						54
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	9%	9%	6%	6%	5%	5%
Parking (#/hr)		0				
Shared Lane Traffic (%)						
Lane Group Flow (vph)	274	57	95	498	860	0
Turn Type	Perm	Perm	D.P+P	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	6			
Total Split (s)	26.8	26.8	8.0	53.2	45.2	
Total Lost Time (s)	4.5	4.5	4.0	4.5	4.5	
Act Effct Green (s)	18.4	18.4	45.9	48.5	42.2	
Actuated g/C Ratio	0.24	0.24	0.60	0.64	0.56	
v/c Ratio	0.75	0.16	0.48	0.42	0.95	
Control Delay	40.0	7.8	14.8	8.9	39.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	40.0	7.8	14.8	8.9	39.0	
LOS	D	A	B	A	D	
Approach Delay	34.4			9.8	39.0	
Approach LOS	C			A	D	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 75.9	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 28.4	Intersection LOS: C
Intersection Capacity Utilization 80.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Eastlake Ave & Aloha St

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	267	0	15	23	115	466	5	20	0
Satd. Flow (prot)	0	0	0	1457	1484	0	1719	867	723	1736	3471	0
Flt Permitted				0.950	0.957		0.743			0.646		
Satd. Flow (perm)	0	0	0	1457	1484	0	934	867	585	1007	3471	0
Satd. Flow (RTOR)					20				500			
Confl. Peds. (#/hr)						61	110		61	61		110
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	5%	5%	7%	4%	4%	4%
Parking (#/hr)					0							
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	0	0	152	150	0	25	123	500	5	21	0
Turn Type				Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases				4	4			2			6	
Permitted Phases							2		2	6		
Total Split (s)				22.0	22.0		58.0	58.0	58.0	58.0	58.0	
Total Lost Time (s)				4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Act Effct Green (s)				17.5	17.5		53.5	53.5	53.5	53.5	53.5	
Actuated g/C Ratio				0.22	0.22		0.67	0.67	0.67	0.67	0.67	
v/c Ratio				0.48	0.44		0.04	0.21	0.90	0.01	0.01	
Control Delay				33.1	28.1		2.4	4.3	32.7	7.0	6.5	
Queue Delay				0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay				33.1	28.1		2.4	4.3	32.7	7.0	6.5	
LOS				C	C		A	A	C	A	A	
Approach Delay					30.6			26.1			6.6	
Approach LOS					C			C			A	

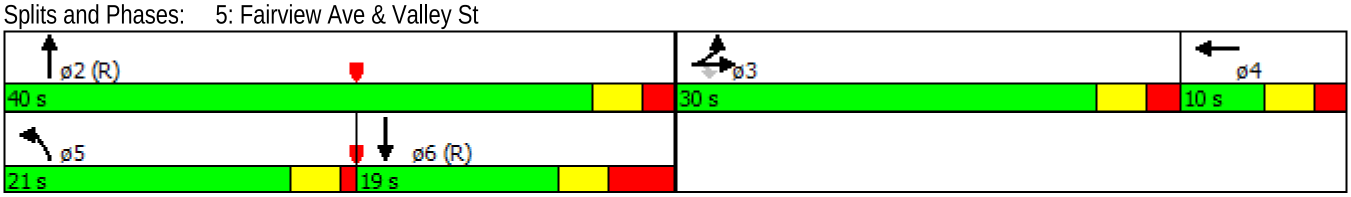
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 4 (5%), Referenced to phase 2:NETL and 6:SWTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 27.0	Intersection LOS: C
Intersection Capacity Utilization 61.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Fairview Ave & Aloha St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	0	136	0	8	0	230	428	0	0	168	148
Satd. Flow (prot)	0	1703	1583	0	950	0	1719	2381	0	0	2894	0
Flt Permitted		0.950					0.950					
Satd. Flow (perm)	0	1703	1583	0	950	0	1719	2381	0	0	2894	0
Satd. Flow (RTOR)			177								160	
Confl. Peds. (#/hr)												51
Confl. Bikes (#/hr)												17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	2%	2%	100%	100%	100%	5%	5%	2%	2%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	271	147	0	9	0	249	464	0	0	342	0
Turn Type	Split	NA	Perm		NA		Prot	NA			NA	
Protected Phases	3	3			4		5	2			6	
Permitted Phases			3									
Total Split (s)	30.0	30.0	30.0		10.0		21.0	40.0			19.0	
Total Lost Time (s)		5.0	5.0		5.0		4.0	5.0			7.0	
Act Effct Green (s)		25.0	25.0		5.0		17.0	35.0			12.0	
Actuated g/C Ratio		0.31	0.31		0.06		0.21	0.44			0.15	
v/c Ratio		0.51	0.24		0.15		0.68	0.45			0.60	
Control Delay		26.6	3.3		41.6		40.0	17.4			6.5	
Queue Delay		0.0	0.0		0.0		0.0	1.2			0.0	
Total Delay		26.6	3.3		41.6		40.0	18.6			6.5	
LOS		C	A		D		D	B			A	
Approach Delay		18.4			41.6			26.1			6.5	
Approach LOS		B			D			C			A	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 19.5	Intersection LOS: B
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: Fairview Ave & Valley St

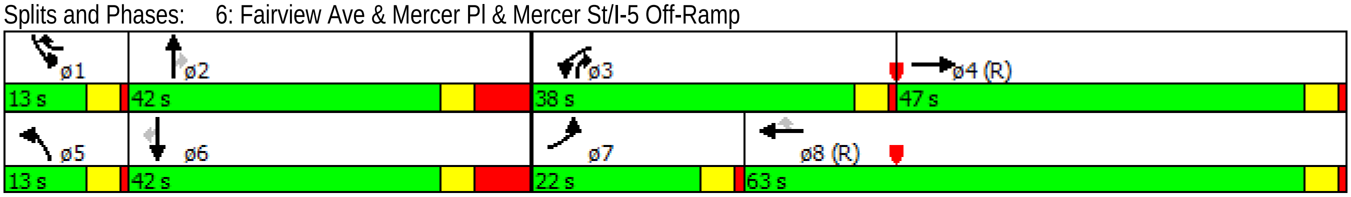


Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Volume (vph)	79	1463	155	20	619	1350	546	55	123	276	92	187
Satd. Flow (prot)	1719	6011	0	0	3400	4868	1568	1656	1376	2059	0	3400
Flt Permitted	0.950				0.950			0.950				0.950
Satd. Flow (perm)	1719	6011	0	0	3400	4868	1486	1656	1376	1996	0	3400
Satd. Flow (RTOR)		2					403			47		
Confl. Peds. (#/hr)			2	100			12				2	
Confl. Bikes (#/hr)				1			1			4	4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	5%	5%	5%	3%	3%	3%	9%	9%	9%	9%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	1814	0	0	686	1495	605	61	136	408	0	207
Turn Type	Prot	NA			Prot	NA	pm+ov	Prot	NA	pm+ov		Prot
Protected Phases	7	4			3	8	1	5	2	3		1
Permitted Phases							8			2		
Total Split (s)	22.0	47.0			38.0	63.0	13.0	13.0	42.0	38.0		13.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	9.5	4.5		4.5
Act Effct Green (s)	17.5	42.5			33.5	58.5	67.0	8.5	32.5	71.0		8.5
Actuated g/C Ratio	0.12	0.30			0.24	0.42	0.48	0.06	0.23	0.51		0.06
v/c Ratio	0.41	0.99			0.84	0.74	0.65	0.61	0.43	0.39		1.00
Control Delay	62.8	67.9			61.5	36.9	11.1	89.2	50.7	17.6		128.3
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	62.8	67.9			61.5	36.9	11.1	89.2	50.7	17.6		128.3
LOS	E	E			E	D	B	F	D	B		F
Approach Delay		67.6				37.4			32.2			
Approach LOS		E				D			C			

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 57 (41%), Referenced to phase 4:EBT and 8:WBT, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 49.9 Intersection LOS: D
Intersection Capacity Utilization 94.2% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 6: Fairview Ave & Mercer Pl & Mercer St/I-5 Off-Ramp



Lane Group	SBT	SBR
Lane Configurations		
Volume (vph)	189	91
Satd. Flow (prot)	1845	1568
Flt Permitted		
Satd. Flow (perm)	1845	1381
Satd. Flow (RTOR)		117
Confl. Peds. (#/hr)		78
Confl. Bikes (#/hr)		5
Peak Hour Factor	0.93	0.93
Growth Factor	103%	103%
Heavy Vehicles (%)	3%	3%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	209	101
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Total Split (s)	42.0	42.0
Total Lost Time (s)	9.5	9.5
Act Effct Green (s)	32.5	32.5
Actuated g/C Ratio	0.23	0.23
v/c Ratio	0.49	0.25
Control Delay	51.1	6.5
Queue Delay	0.0	0.0
Total Delay	51.1	6.5
LOS	D	A
Approach Delay	73.3	
Approach LOS	E	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	60	41	15	81	194	66	369	14	140	498	186
Satd. Flow (prot)	0	1751	1509	0	1227	0	1631	4517	1854	2306	3940	0
Flt Permitted		0.858			0.985		0.292			0.460		
Satd. Flow (perm)	0	1481	1360	0	1208	0	466	4517	1327	985	3940	0
Satd. Flow (RTOR)			44		69				58		49	
Confl. Peds. (#/hr)	121		39	39		121	86		59	59		86
Confl. Bikes (#/hr)			8			12			10			14
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	44	0	314	0	72	400	15	152	742	0
Turn Type	Perm	NA	pm+ov	Perm	NA		D.P+P	NA	Perm	D.P+P	NA	
Protected Phases		4	5		8		5	2		1	6	
Permitted Phases	4		4	8			6		2	2		
Total Split (s)	59.0	59.0	15.0	59.0	59.0		15.0	66.0	66.0	35.0	86.0	
Total Lost Time (s)		4.5	3.5		4.5		3.5	4.5	4.5	3.5	4.5	
Act Effct Green (s)		54.5	67.0		54.5		94.0	61.5	61.5	94.0	81.5	
Actuated g/C Ratio		0.34	0.42		0.34		0.59	0.38	0.38	0.59	0.51	
v/c Ratio		0.18	0.07		0.69		0.20	0.23	0.03	0.18	0.37	
Control Delay		38.3	6.9		43.9		10.7	28.8	3.9	13.7	22.5	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	1.0	
Total Delay		38.3	6.9		43.9		10.7	28.8	3.9	13.7	23.5	
LOS		D	A		D		B	C	A	B	C	
Approach Delay		28.2			43.9			25.3			21.8	
Approach LOS		C			D			C			C	

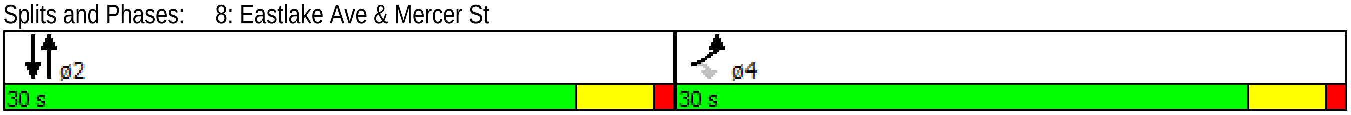
Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 49 (31%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 27.0	Intersection LOS: C
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 7: Fairview Ave & Republican St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	249	38	0	247	933	0
Satd. Flow (prot)	950	850	0	3764	3471	0
Flt Permitted	0.950					
Satd. Flow (perm)	949	812	0	3764	3471	0
Satd. Flow (RTOR)		40				
Confl. Peds. (#/hr)	1	40				
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	4%	4%	6%	6%	4%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	264	40	0	262	991	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Total Split (s)	30.0	30.0		30.0	30.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	
Act Effct Green (s)	19.2	19.2		26.6	26.6	
Actuated g/C Ratio	0.35	0.35		0.49	0.49	
v/c Ratio	0.80	0.13		0.14	0.59	
Control Delay	34.3	5.1		9.5	13.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	34.3	5.1		9.5	13.3	
LOS	C	A		A	B	
Approach Delay	30.5			9.5	13.3	
Approach LOS	C			A	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 54.8	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 16.0	Intersection LOS: B
Intersection Capacity Utilization 54.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Eastlake Ave & Mercer St



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	55	23	27	190	734	224
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	60	25	29	206	796	243
Pedestrians	91					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					399	
pX, platoon unblocked	0.79	0.79	0.79			
vC, conflicting volume	1170	610	1130			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	694	0	643			
tC, single (s)	6.9	7.0	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	77	97	95			
cM capacity (veh/h)	261	791	636			

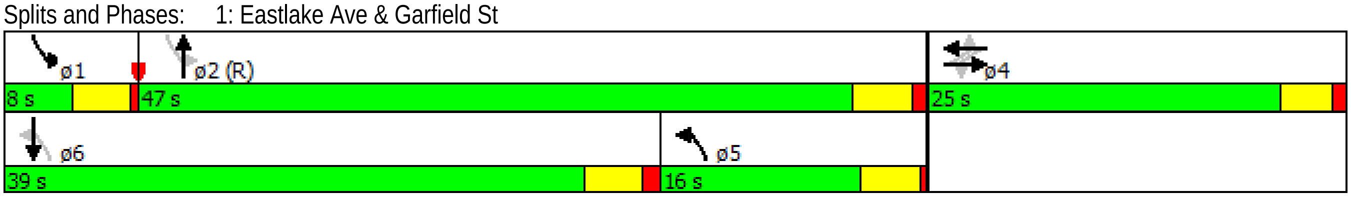
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	85	98	137	531	508
Volume Left	60	29	0	0	0
Volume Right	25	0	0	0	243
cSH	325	636	1700	1700	1700
Volume to Capacity	0.26	0.05	0.08	0.31	0.30
Queue Length 95th (ft)	26	4	0	0	0
Control Delay (s)	19.9	3.6	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	19.9	1.5		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	0	68	36	1	26	139	468	15	20	607	3
Satd. Flow (prot)	0	1690	0	0	1762	0	1636	3115	0	1620	3118	0
Flt Permitted		0.878			0.823		0.337			0.443		
Satd. Flow (perm)	0	1491	0	0	1437	0	548	3115	0	700	3118	0
Satd. Flow (RTOR)		136			27			6			1	
Confl. Peds. (#/hr)	33		65	65		33	67		63	63		67
Confl. Bikes (#/hr)			2			4			104			35
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	117	0	0	66	0	146	508	0	21	641	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Total Split (s)	25.0	25.0		25.0	25.0		16.0	47.0		8.0	39.0	
Total Lost Time (s)		4.0			4.0		4.0	4.5		4.0	4.5	
Act Effct Green (s)		21.0			21.0		47.0	42.5		47.0	34.5	
Actuated g/C Ratio		0.26			0.26		0.59	0.53		0.59	0.43	
v/c Ratio		0.24			0.17		0.30	0.31		0.05	0.48	
Control Delay		4.8			16.5		4.3	4.3		5.7	17.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		4.8			16.5		4.3	4.3		5.7	17.7	
LOS		A			B		A	A		A	B	
Approach Delay		4.8			16.5			4.3			17.4	
Approach LOS		A			B			A			B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 17 (21%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 10.6	Intersection LOS: B
Intersection Capacity Utilization 51.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Eastlake Ave & Garfield St

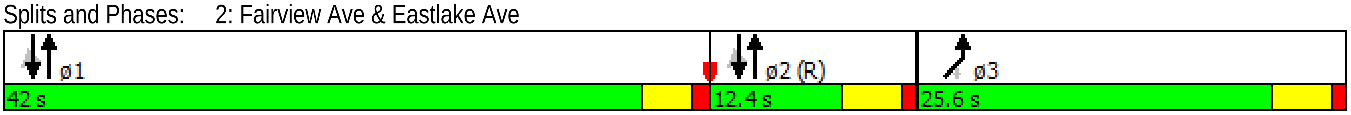


Lane Group	NBL	NBT	SBT	SBR	NEL	NER	ø1	ø2
Lane Configurations								
Volume (vph)	0	601	694	14	15	50		
Satd. Flow (prot)	0	1676	1721	1727	1992	1359		
Flt Permitted					0.950			
Satd. Flow (perm)	0	1676	1721	1727	1992	1131		
Satd. Flow (RTOR)				15		55		
Confl. Peds. (#/hr)						41		
Confl. Bikes (#/hr)						55		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Growth Factor	103%	103%	103%	103%	103%	103%		
Heavy Vehicles (%)	2%	2%	6%	6%	3%	3%		
Parking (#/hr)		0	0					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	659	760	15	16	55		
Turn Type		NA	NA	Perm	Prot	Perm		
Protected Phases		1 2	1 2		3		1	2
Permitted Phases				1 2		3		
Total Split (s)					25.6	25.6	42.0	12.4
Total Lost Time (s)					4.5	4.5		
Act Effct Green (s)		50.4	50.4	50.4	21.1	21.1		
Actuated g/C Ratio		0.63	0.63	0.63	0.26	0.26		
v/c Ratio		0.62	0.70	0.01	0.03	0.16		
Control Delay		12.3	10.8	0.2	22.2	8.2		
Queue Delay		0.0	0.0	0.0	0.0	0.0		
Total Delay		12.3	10.8	0.2	22.2	8.2		
LOS		B	B	A	C	A		
Approach Delay		12.3	10.6		11.4			
Approach LOS		B	B		B			

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 47 (59%), Referenced to phase 2:NBSB, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 11.4 Intersection LOS: B
Intersection Capacity Utilization 62.2% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Fairview Ave & Eastlake Ave



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	241	230	40	334	596	325
Satd. Flow (prot)	1681	1504	1620	1888	1584	0
Flt Permitted	0.950		0.090			
Satd. Flow (perm)	1550	1504	153	1888	1584	0
Satd. Flow (RTOR)		203			50	
Confl. Peds. (#/hr)	43		110			110
Confl. Bikes (#/hr)						19
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	2%	2%	4%	4%	6%	6%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	261	249	43	362	998	0
Turn Type	Perm	Perm	D.P+P	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	6			
Total Split (s)	26.5	26.5	8.0	53.5	45.5	
Total Lost Time (s)	6.5	6.5	4.0	4.5	4.5	
Act Effct Green (s)	20.0	20.0	47.1	49.0	44.2	
Actuated g/C Ratio	0.25	0.25	0.59	0.61	0.55	
v/c Ratio	0.67	0.47	0.26	0.31	1.11	
Control Delay	37.2	9.7	10.2	8.3	86.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	37.2	9.7	10.2	8.3	86.8	
LOS	D	A	B	A	F	
Approach Delay	23.8			8.5	86.8	
Approach LOS	C			A	F	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.11	
Intersection Signal Delay: 53.4	Intersection LOS: D
Intersection Capacity Utilization 78.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Eastlake Ave & Aloha St

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	412	0	15	37	20	296	7	50	11
Satd. Flow (prot)	0	0	0	685	699	0	2241	2358	1950	922	819	0
Flt Permitted				0.950	0.956		0.664			0.743		
Satd. Flow (perm)	0	0	0	685	699	0	918	2358	1730	655	819	0
Satd. Flow (RTOR)					20				328		12	
Confl. Peds. (#/hr)						108	159		33	33		159
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	6%	6%	9%	3%	3%	3%
Parking (#/hr)					0							
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	0	0	237	236	0	41	22	328	8	67	0
Turn Type				Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases				4	4			2			6	
Permitted Phases							2		2	6		
Total Split (s)				55.0	55.0		25.0	25.0	25.0	25.0	25.0	
Total Lost Time (s)				4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Act Effct Green (s)				24.5	24.5		21.5	21.5	21.5	21.5	21.5	
Actuated g/C Ratio				0.44	0.44		0.39	0.39	0.39	0.39	0.39	
v/c Ratio				0.78	0.74		0.12	0.02	0.38	0.03	0.21	
Control Delay				30.6	25.0		17.7	16.6	4.2	17.7	16.6	
Queue Delay				0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay				30.6	25.0		17.7	16.6	4.2	17.7	16.6	
LOS				C	C		B	B	A	B	B	
Approach Delay					27.8			6.3			16.8	
Approach LOS					C			A			B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 55.4	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 18.0	Intersection LOS: B
Intersection Capacity Utilization 38.7%	ICU Level of Service A
Analysis Period (min) 15	

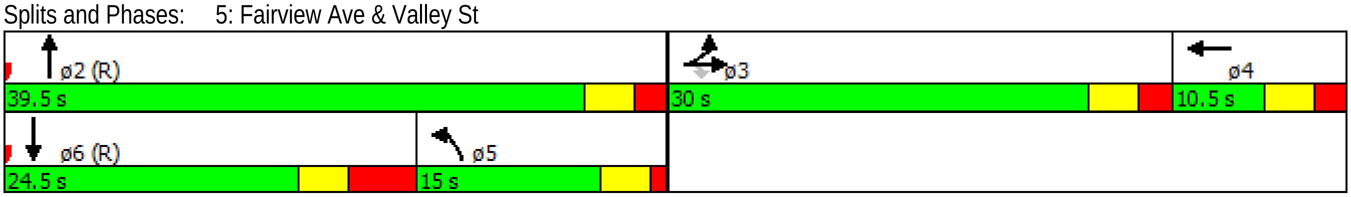
Splits and Phases: 4: Fairview Ave & Aloha St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	179	0	204	0	9	0	255	232	0	0	215	257
Satd. Flow (prot)	0	1703	1599	0	600	0	1660	1073	0	0	1170	0
Flt Permitted		0.950					0.950					
Satd. Flow (perm)	0	1703	1499	0	600	0	1660	1073	0	0	1170	0
Satd. Flow (RTOR)			221								279	
Confl. Peds. (#/hr)			42									99
Confl. Bikes (#/hr)			17									17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	2%	1%	100%	100%	100%	3%	3%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	194	221	0	10	0	276	252	0	0	512	0
Turn Type	Split	NA	Perm		NA		Prot	NA			NA	
Protected Phases	3	3			4		5	2			6	
Permitted Phases			3									
Total Split (s)	30.0	30.0	30.0		10.5		15.0	39.5			24.5	
Total Lost Time (s)		5.0	5.0		5.0		4.0	5.0			7.0	
Act Effct Green (s)		25.0	25.0		5.5		11.0	34.5			17.5	
Actuated g/C Ratio		0.31	0.31		0.07		0.14	0.43			0.22	
v/c Ratio		0.36	0.36		0.24		1.21	0.55			1.08	
Control Delay		23.8	5.0		50.0		161.8	22.4			82.4	
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	
Total Delay		23.8	5.0		50.0		161.8	22.4			82.4	
LOS		C	A		D		F	C			F	
Approach Delay		13.8			50.0			95.3			82.4	
Approach LOS		B			D			F			F	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.21
Intersection Signal Delay: 67.4 | Intersection LOS: E
Intersection Capacity Utilization 80.6% | ICU Level of Service D
Analysis Period (min) 15

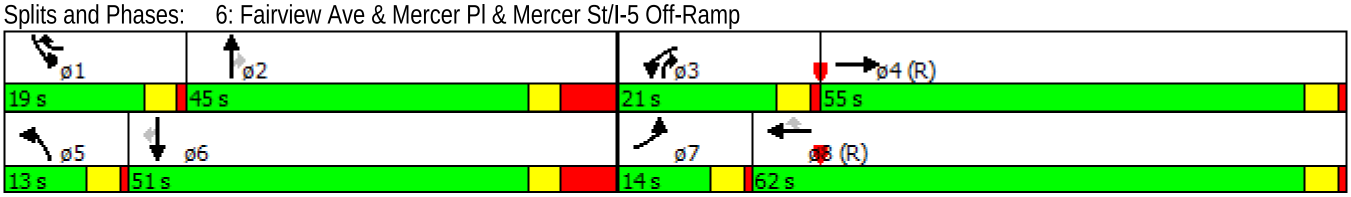
Splits and Phases: 5: Fairview Ave & Valley St



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Volume (vph)	33	1858	79	36	280	1350	361	89	87	1122	61	245
Satd. Flow (prot)	1770	6239	0	0	3467	4964	1599	1770	841	1430	0	1956
Flt Permitted	0.950				0.950			0.950				0.950
Satd. Flow (perm)	1770	6239	0	0	3467	4964	1482	1770	841	1383	0	1956
Satd. Flow (RTOR)		3					286			82		
Confl. Peds. (#/hr)			3	179			19				3	
Confl. Bikes (#/hr)				4			4			3	3	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	2052	0	0	291	1405	376	93	91	1230	0	255
Turn Type	Prot	NA			Prot	NA	pm+ov	Prot	NA	pm+ov		Prot
Protected Phases	7	4			3	8	1	5	2	3		1
Permitted Phases							8			2		
Total Split (s)	14.0	55.0			21.0	62.0	19.0	13.0	45.0	21.0		19.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	9.5	4.5		4.5
Act Effct Green (s)	9.5	50.5			16.5	57.5	72.0	8.5	35.5	57.0		14.5
Actuated g/C Ratio	0.07	0.36			0.12	0.41	0.51	0.06	0.25	0.41		0.10
v/c Ratio	0.28	0.91			0.71	0.69	0.41	0.87	0.43	1.99		1.26
Control Delay	68.5	49.7			70.0	36.1	5.7	121.3	51.2	476.3		200.5
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	68.5	49.7			70.0	36.1	5.7	121.3	51.2	476.3		200.5
LOS	E	D			E	D	A	F	D	F		F
Approach Delay		50.0				35.3			425.6			
Approach LOS		D				D			F			

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 96 (69%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.99	
Intersection Signal Delay: 138.5	Intersection LOS: F
Intersection Capacity Utilization 125.5%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 6: Fairview Ave & Mercer Pl & Mercer St/I-5 Off-Ramp



Lane Group	SBT	SBR
Lane Configurations		
Volume (vph)	107	92
Satd. Flow (prot)	1030	875
Flt Permitted		
Satd. Flow (perm)	1030	702
Satd. Flow (RTOR)		117
Confl. Peds. (#/hr)		139
Confl. Bikes (#/hr)		3
Peak Hour Factor	0.99	0.99
Growth Factor	103%	103%
Heavy Vehicles (%)	1%	1%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	111	96
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Total Split (s)	51.0	51.0
Total Lost Time (s)	9.5	9.5
Act Effct Green (s)	41.5	41.5
Actuated g/C Ratio	0.30	0.30
v/c Ratio	0.36	0.33
Control Delay	43.1	6.8
Queue Delay	0.0	0.0
Total Delay	43.1	6.8
LOS	D	A
Approach Delay	122.4	
Approach LOS	F	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	61	28	26	86	399	3	859	1	125	251	68
Satd. Flow (prot)	0	1836	1599	0	1187	985	1711	1706	700	1719	2951	0
Flt Permitted		0.759			0.910		0.529			0.162		
Satd. Flow (perm)	0	1298	1276	0	1057	734	669	1706	608	293	2951	0
Satd. Flow (RTOR)			25			115			34		35	
Confl. Peds. (#/hr)	112		87	87		112	138		25	25		138
Confl. Bikes (#/hr)			9			8			4			4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	127	30	0	119	424	3	912	1	133	339	0
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+ov	D.P+P	NA	Perm	D.P+P	NA	
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6		2	2		
Total Split (s)	40.0	40.0	25.0	40.0	40.0	25.0	25.0	95.0	95.0	25.0	95.0	
Total Lost Time (s)		4.5	3.5		4.5	3.5	3.5	4.5	4.5	3.5	4.5	
Act Effct Green (s)		35.5	58.0		35.5	58.0	113.0	90.5	90.5	113.0	90.5	
Actuated g/C Ratio		0.22	0.36		0.22	0.36	0.71	0.57	0.57	0.71	0.57	
v/c Ratio		0.44	0.06		0.51	1.14	0.00	0.95	0.00	0.33	0.20	
Control Delay		59.4	12.8		63.4	122.7	6.0	49.6	0.0	8.8	15.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	44.2	0.0	0.0	0.0	
Total Delay		59.4	12.8		63.4	122.7	6.0	93.7	0.0	8.8	15.5	
LOS		E	B		E	F	A	F	A	A	B	
Approach Delay		50.5			109.7			93.3			13.6	
Approach LOS		D			F			F			B	

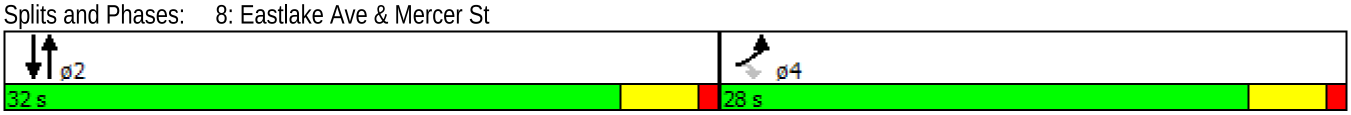
Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 77 (48%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.14	
Intersection Signal Delay: 76.4	Intersection LOS: E
Intersection Capacity Utilization 111.4%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 7: Fairview Ave & Republican St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	316	58	0	281	1015	0
Satd. Flow (prot)	899	804	0	1294	3438	0
Flt Permitted	0.950					
Satd. Flow (perm)	899	767	0	1294	3438	0
Satd. Flow (RTOR)		48				
Confl. Peds. (#/hr)		39				
Confl. Bikes (#/hr)		7				
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	6%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	332	61	0	295	1067	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Total Split (s)	28.0	28.0		32.0	32.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	
Act Effct Green (s)	23.1	23.1		27.5	27.5	
Actuated g/C Ratio	0.39	0.39		0.46	0.46	
v/c Ratio	0.95	0.19		0.49	0.67	
Control Delay	60.6	7.0		14.9	15.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	60.6	7.0		14.9	15.3	
LOS	E	A		B	B	
Approach Delay	52.3			14.9	15.3	
Approach LOS	D			B	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 59.6	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 23.5	Intersection LOS: C
Intersection Capacity Utilization 64.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 8: Eastlake Ave & Mercer St



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	57	25	44	178	746	390
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	61	27	47	191	800	418
Pedestrians	98			2		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	8			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					406	
pX, platoon unblocked	0.76	0.76	0.76			
vC, conflicting volume	1298	709	1317			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	746	0	771			
tC, single (s)	6.8	6.9	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	73	96	91			
cM capacity (veh/h)	224	755	543			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	88	111	127	534	685
Volume Left	61	47	0	0	0
Volume Right	27	0	0	0	418
cSH	285	543	1700	1700	1700
Volume to Capacity	0.31	0.09	0.07	0.31	0.40
Queue Length 95th (ft)	32	7	0	0	0
Control Delay (s)	23.2	5.9	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	23.2	2.7		0.0	
Approach LOS	C				

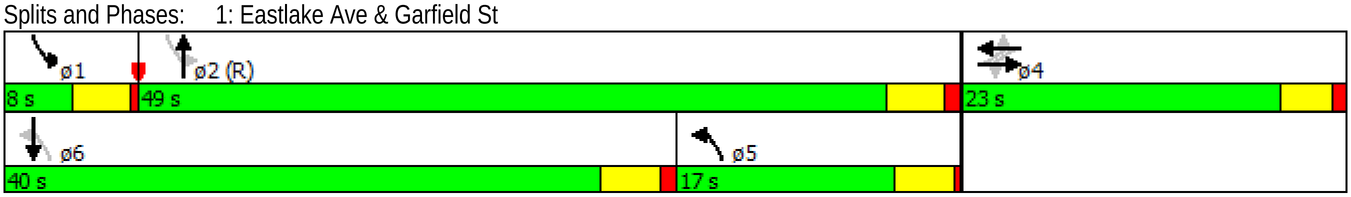
Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	3	30	31	3	13	169	301	22	15	811	11
Satd. Flow (prot)	0	1475	0	0	1767	0	1546	2912	0	1636	3138	0
Flt Permitted		0.983			0.837		0.211			0.538		
Satd. Flow (perm)	0	1451	0	0	1461	0	334	2912	0	830	3138	0
Satd. Flow (RTOR)		33			14			15			2	
Confl. Peds. (#/hr)	34		55	55		34	57		68	68		57
Confl. Bikes (#/hr)			1			1			13			120
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	17%	17%	17%	2%	2%	2%	9%	9%	9%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	40	0	0	51	0	187	357	0	17	910	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Total Split (s)	23.0	23.0		23.0	23.0		17.0	49.0		8.0	40.0	
Total Lost Time (s)		4.0			4.0		4.0	4.5		4.0	4.5	
Act Effct Green (s)		19.0			19.0		49.0	44.5		49.0	35.5	
Actuated g/C Ratio		0.24			0.24		0.61	0.56		0.61	0.44	
v/c Ratio		0.11			0.14		0.47	0.22		0.03	0.65	
Control Delay		11.5			20.1		12.3	4.7		4.9	20.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		11.5			20.1		12.3	4.7		4.9	20.1	
LOS		B			C		B	A		A	C	
Approach Delay		11.5			20.1			7.3			19.9	
Approach LOS		B			C			A			B	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 63 (79%), Referenced to phase 2:NBSB, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 15.3 Intersection LOS: B
Intersection Capacity Utilization 59.4% ICU Level of Service B
Analysis Period (min) 15

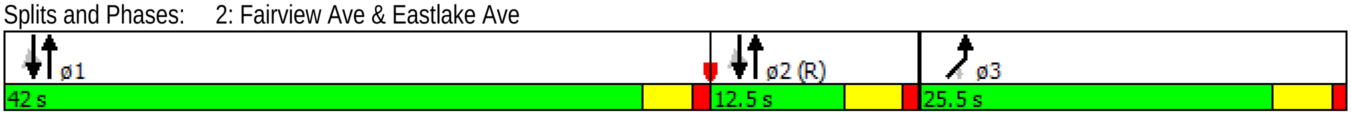
Splits and Phases: 1: Eastlake Ave & Garfield St



Lane Group	NBL	NBT	SBT	SBR	NEL	NER	ø1	ø2
Lane Configurations								
Volume (vph)	0	371	839	15	14	25		
Satd. Flow (prot)	0	1583	1754	1760	4266	1705		
Flt Permitted					0.950			
Satd. Flow (perm)	0	1583	1754	1760	4266	1584		
Satd. Flow (RTOR)				17		28		
Confl. Peds. (#/hr)						23		
Confl. Bikes (#/hr)						6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Growth Factor	103%	103%	103%	103%	103%	103%		
Heavy Vehicles (%)	8%	8%	4%	4%	8%	8%		
Parking (#/hr)		0	0					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	415	939	17	16	28		
Turn Type		NA	NA	Perm	Prot	Perm		
Protected Phases		1 2	1 2		3		1	2
Permitted Phases				1 2		3		
Total Split (s)					25.5	25.5	42.0	12.5
Total Lost Time (s)					4.5	4.5		
Act Effct Green (s)		50.5	50.5	50.5	21.0	21.0		
Actuated g/C Ratio		0.63	0.63	0.63	0.26	0.26		
v/c Ratio		0.42	0.85	0.02	0.01	0.06		
Control Delay		8.9	18.3	0.1	25.3	14.8		
Queue Delay		0.0	0.4	0.0	0.0	0.0		
Total Delay		8.9	18.7	0.1	25.3	14.8		
LOS		A	B	A	C	B		
Approach Delay		8.9	18.4		18.6			
Approach LOS		A	B		B			

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 15 (19%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 15.6	Intersection LOS: B
Intersection Capacity Utilization 70.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Fairview Ave & Eastlake Ave



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	263	55	91	479	546	281
Satd. Flow (prot)	1656	1333	1589	1852	1596	0
Flt Permitted	0.950		0.123			
Satd. Flow (perm)	1514	1333	206	1852	1596	0
Satd. Flow (RTOR)		57			47	
Confl. Peds. (#/hr)	47		113			113
Confl. Bikes (#/hr)						54
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	9%	9%	6%	6%	5%	5%
Parking (#/hr)		0				
Shared Lane Traffic (%)						
Lane Group Flow (vph)	274	57	95	498	860	0
Turn Type	Perm	Perm	D.P+P	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	6			
Total Split (s)	26.8	26.8	8.0	53.2	45.2	
Total Lost Time (s)	4.5	4.5	4.0	4.5	4.5	
Act Effct Green (s)	18.4	18.4	45.9	48.5	42.2	
Actuated g/C Ratio	0.24	0.24	0.60	0.64	0.56	
v/c Ratio	0.75	0.16	0.48	0.42	0.95	
Control Delay	40.0	7.8	14.8	8.9	39.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	40.0	7.8	14.8	8.9	39.0	
LOS	D	A	B	A	D	
Approach Delay	34.4			9.8	39.0	
Approach LOS	C			A	D	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 75.9	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 28.4	Intersection LOS: C
Intersection Capacity Utilization 80.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Eastlake Ave & Aloha St

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	267	0	15	23	115	466	5	20	0
Satd. Flow (prot)	0	0	0	1457	1484	0	1719	867	723	1736	3471	0
Flt Permitted				0.950	0.957		0.743			0.646		
Satd. Flow (perm)	0	0	0	1457	1484	0	934	867	585	1007	3471	0
Satd. Flow (RTOR)					20				500			
Confl. Peds. (#/hr)						61	110		61	61		110
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	5%	5%	7%	4%	4%	4%
Parking (#/hr)					0							
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	0	0	152	150	0	25	123	500	5	21	0
Turn Type				Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases				4	4			2			6	
Permitted Phases							2		2	6		
Total Split (s)				22.0	22.0		58.0	58.0	58.0	58.0	58.0	
Total Lost Time (s)				4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Act Effct Green (s)				17.5	17.5		53.5	53.5	53.5	53.5	53.5	
Actuated g/C Ratio				0.22	0.22		0.67	0.67	0.67	0.67	0.67	
v/c Ratio				0.48	0.44		0.04	0.21	0.90	0.01	0.01	
Control Delay				33.1	28.1		2.4	4.3	32.7	7.0	6.5	
Queue Delay				0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay				33.1	28.1		2.4	4.3	32.7	7.0	6.5	
LOS				C	C		A	A	C	A	A	
Approach Delay					30.6			26.1			6.6	
Approach LOS					C			C			A	

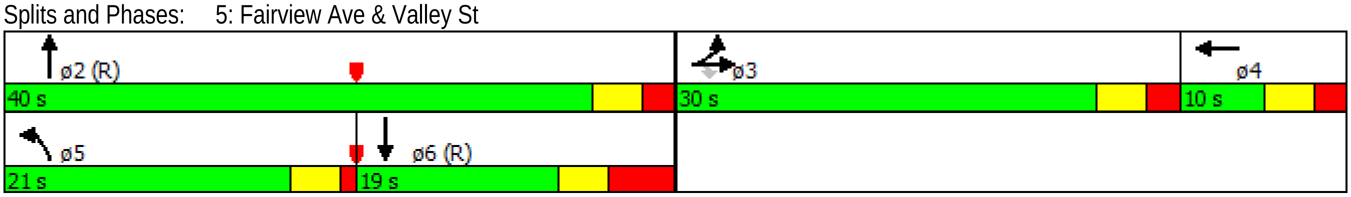
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 4 (5%), Referenced to phase 2:NETL and 6:SWTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 27.0	Intersection LOS: C
Intersection Capacity Utilization 61.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Fairview Ave & Aloha St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	0	136	0	8	0	230	428	0	0	168	148
Satd. Flow (prot)	0	1703	1583	0	950	0	1719	2381	0	0	2894	0
Flt Permitted		0.950					0.950					
Satd. Flow (perm)	0	1703	1583	0	950	0	1719	2381	0	0	2894	0
Satd. Flow (RTOR)			177								160	
Confl. Peds. (#/hr)												51
Confl. Bikes (#/hr)												17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	2%	2%	100%	100%	100%	5%	5%	2%	2%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	271	147	0	9	0	249	464	0	0	342	0
Turn Type	Split	NA	Perm		NA		Prot	NA			NA	
Protected Phases	3	3			4		5	2			6	
Permitted Phases			3									
Total Split (s)	30.0	30.0	30.0		10.0		21.0	40.0			19.0	
Total Lost Time (s)		5.0	5.0		5.0		4.0	5.0			7.0	
Act Effct Green (s)		25.0	25.0		5.0		17.0	35.0			12.0	
Actuated g/C Ratio		0.31	0.31		0.06		0.21	0.44			0.15	
v/c Ratio		0.51	0.24		0.15		0.68	0.45			0.60	
Control Delay		26.6	3.3		41.6		40.0	17.4			6.5	
Queue Delay		0.0	0.0		0.0		0.0	1.2			0.0	
Total Delay		26.6	3.3		41.6		40.0	18.6			6.5	
LOS		C	A		D		D	B			A	
Approach Delay		18.4			41.6			26.1			6.5	
Approach LOS		B			D			C			A	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 19.5	Intersection LOS: B
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	

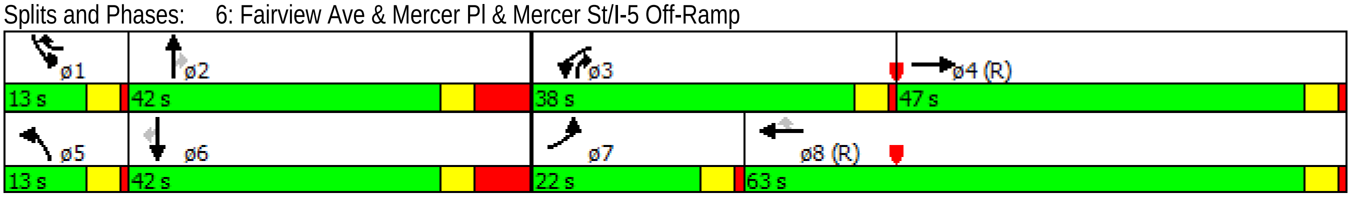
Splits and Phases: 5: Fairview Ave & Valley St



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Volume (vph)	79	1463	155	20	619	1350	546	55	123	276	92	187
Satd. Flow (prot)	1719	6011	0	0	3400	4868	1568	1656	1376	2059	0	3400
Flt Permitted	0.950				0.950			0.950				0.950
Satd. Flow (perm)	1719	6011	0	0	3400	4868	1486	1656	1376	1996	0	3400
Satd. Flow (RTOR)		2					403			47		
Confl. Peds. (#/hr)			2	100			12				2	
Confl. Bikes (#/hr)				1			1			4	4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	5%	5%	5%	3%	3%	3%	9%	9%	9%	9%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	1814	0	0	686	1495	605	61	136	408	0	207
Turn Type	Prot	NA			Prot	NA	pm+ov	Prot	NA	pm+ov		Prot
Protected Phases	7	4			3	8	1	5	2	3		1
Permitted Phases							8			2		
Total Split (s)	22.0	47.0			38.0	63.0	13.0	13.0	42.0	38.0		13.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	9.5	4.5		4.5
Act Effct Green (s)	17.5	42.5			33.5	58.5	67.0	8.5	32.5	71.0		8.5
Actuated g/C Ratio	0.12	0.30			0.24	0.42	0.48	0.06	0.23	0.51		0.06
v/c Ratio	0.41	0.99			0.84	0.74	0.65	0.61	0.43	0.39		1.00
Control Delay	62.8	67.9			61.5	36.9	11.1	89.2	50.7	17.6		128.3
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	62.8	67.9			61.5	36.9	11.1	89.2	50.7	17.6		128.3
LOS	E	E			E	D	B	F	D	B		F
Approach Delay		67.6				37.4			32.2			
Approach LOS		E				D			C			

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 57 (41%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 49.9	Intersection LOS: D
Intersection Capacity Utilization 94.2%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Fairview Ave & Mercer Pl & Mercer St/I-5 Off-Ramp



Lane Group	SBT	SBR
Lane Configurations		
Volume (vph)	189	91
Satd. Flow (prot)	1845	1568
Flt Permitted		
Satd. Flow (perm)	1845	1381
Satd. Flow (RTOR)		117
Confl. Peds. (#/hr)		78
Confl. Bikes (#/hr)		5
Peak Hour Factor	0.93	0.93
Growth Factor	103%	103%
Heavy Vehicles (%)	3%	3%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	209	101
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Total Split (s)	42.0	42.0
Total Lost Time (s)	9.5	9.5
Act Effct Green (s)	32.5	32.5
Actuated g/C Ratio	0.23	0.23
v/c Ratio	0.49	0.25
Control Delay	51.1	6.5
Queue Delay	0.0	0.0
Total Delay	51.1	6.5
LOS	D	A
Approach Delay	73.3	
Approach LOS	E	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	60	41	15	81	194	66	369	14	140	498	186
Satd. Flow (prot)	0	1751	1509	0	1204	0	1631	4517	1322	2306	3940	0
Flt Permitted		0.860			0.985		0.292			0.460		
Satd. Flow (perm)	0	1483	1360	0	1185	0	466	4517	947	985	3940	0
Satd. Flow (RTOR)			44		68				65		49	
Confl. Peds. (#/hr)	121		39	39		121	86		59	59		86
Confl. Bikes (#/hr)			8			12			10			14
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	7%	7%	7%	47%	7%	7%	7%	7%	50%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	44	0	314	0	72	400	15	152	742	0
Turn Type	Perm	NA	pm+ov	Perm	NA		D.P+P	NA	Perm	D.P+P	NA	
Protected Phases		4	5		8		5	2		1	6	
Permitted Phases	4		4	8			6		2	2		
Total Split (s)	59.0	59.0	15.0	59.0	59.0		15.0	66.0	66.0	35.0	86.0	
Total Lost Time (s)		4.5	3.5		5.5		3.5	4.5	4.5	3.5	4.5	
Act Effct Green (s)		54.5	67.0		53.5		94.0	61.5	61.5	94.0	81.5	
Actuated g/C Ratio		0.34	0.42		0.33		0.59	0.38	0.38	0.59	0.51	
v/c Ratio		0.18	0.07		0.71		0.20	0.23	0.04	0.18	0.37	
Control Delay		38.3	6.9		46.2		10.7	28.8	3.1	13.7	22.5	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	1.0	
Total Delay		38.3	6.9		46.2		10.7	28.8	3.1	13.7	23.5	
LOS		D	A		D		B	C	A	B	C	
Approach Delay		28.2			46.2			25.3			21.8	
Approach LOS		C			D			C			C	

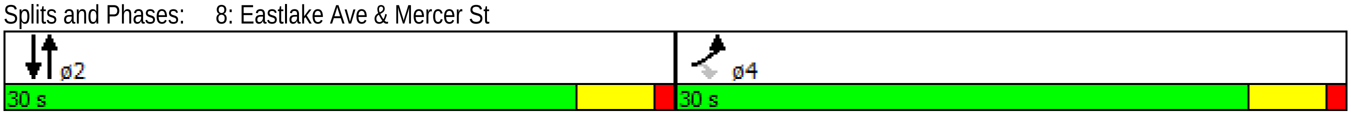
Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 49 (31%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 27.4	Intersection LOS: C
Intersection Capacity Utilization 61.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 7: Fairview Ave & Republican St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	249	38	0	247	933	0
Satd. Flow (prot)	950	850	0	3764	3471	0
Flt Permitted	0.950					
Satd. Flow (perm)	949	812	0	3764	3471	0
Satd. Flow (RTOR)		40				
Confl. Peds. (#/hr)	1	40				
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	4%	4%	6%	6%	4%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	264	40	0	262	991	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Total Split (s)	30.0	30.0		30.0	30.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	
Act Effct Green (s)	19.2	19.2		26.6	26.6	
Actuated g/C Ratio	0.35	0.35		0.49	0.49	
v/c Ratio	0.80	0.13		0.14	0.59	
Control Delay	34.3	5.1		9.5	13.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	34.3	5.1		9.5	13.3	
LOS	C	A		A	B	
Approach Delay	30.5			9.5	13.3	
Approach LOS	C			A	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 54.8	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 16.0	Intersection LOS: B
Intersection Capacity Utilization 54.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Eastlake Ave & Mercer St



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	55	23	27	190	734	224
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	60	25	29	206	796	243
Pedestrians	91					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					399	
pX, platoon unblocked	0.79	0.79	0.79			
vC, conflicting volume	1170	610	1130			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	694	0	643			
tC, single (s)	7.1	7.0	4.4			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.3			
p0 queue free %	76	97	95			
cM capacity (veh/h)	245	791	636			

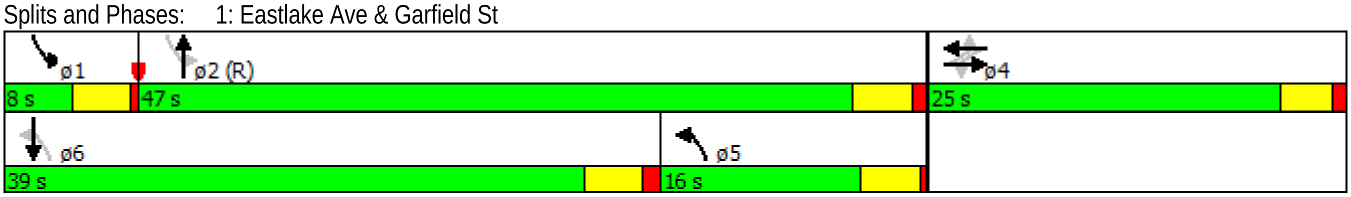
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	85	98	137	531	508
Volume Left	60	29	0	0	0
Volume Right	25	0	0	0	243
cSH	307	636	1700	1700	1700
Volume to Capacity	0.28	0.05	0.08	0.31	0.30
Queue Length 95th (ft)	27	4	0	0	0
Control Delay (s)	21.1	3.6	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	21.1	1.5		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	0	68	36	1	26	139	468	15	20	607	3
Satd. Flow (prot)	0	1690	0	0	1762	0	1636	3115	0	1620	3118	0
Flt Permitted		0.878			0.823		0.337			0.443		
Satd. Flow (perm)	0	1491	0	0	1437	0	548	3115	0	700	3118	0
Satd. Flow (RTOR)		136			27			6			1	
Confl. Peds. (#/hr)	33		65	65		33	67		63	63		67
Confl. Bikes (#/hr)			2			4			104			35
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	117	0	0	66	0	146	508	0	21	641	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Total Split (s)	25.0	25.0		25.0	25.0		16.0	47.0		8.0	39.0	
Total Lost Time (s)		4.0			4.0		4.0	4.5		4.0	4.5	
Act Effct Green (s)		21.0			21.0		47.0	42.5		47.0	34.5	
Actuated g/C Ratio		0.26			0.26		0.59	0.53		0.59	0.43	
v/c Ratio		0.24			0.17		0.30	0.31		0.05	0.48	
Control Delay		4.8			16.5		4.3	4.3		5.7	17.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		4.8			16.5		4.3	4.3		5.7	17.7	
LOS		A			B		A	A		A	B	
Approach Delay		4.8			16.5			4.3			17.4	
Approach LOS		A			B			A			B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 17 (21%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 10.6	Intersection LOS: B
Intersection Capacity Utilization 51.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Eastlake Ave & Garfield St

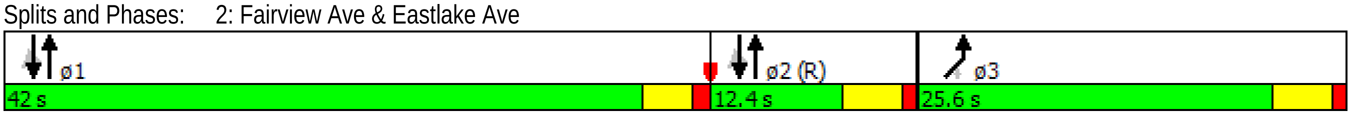


Lane Group	NBL	NBT	SBT	SBR	NEL	NER	ø1	ø2
Lane Configurations								
Volume (vph)	0	601	694	14	15	50		
Satd. Flow (prot)	0	1676	1721	1727	1992	1359		
Flt Permitted					0.950			
Satd. Flow (perm)	0	1676	1721	1727	1992	1131		
Satd. Flow (RTOR)				15		55		
Confl. Peds. (#/hr)						41		
Confl. Bikes (#/hr)						55		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Growth Factor	103%	103%	103%	103%	103%	103%		
Heavy Vehicles (%)	2%	2%	6%	6%	3%	3%		
Parking (#/hr)		0	0					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	659	760	15	16	55		
Turn Type		NA	NA	Perm	Prot	Perm		
Protected Phases		1 2	1 2		3		1	2
Permitted Phases				1 2		3		
Total Split (s)					25.6	25.6	42.0	12.4
Total Lost Time (s)					4.5	4.5		
Act Effct Green (s)		50.4	50.4	50.4	21.1	21.1		
Actuated g/C Ratio		0.63	0.63	0.63	0.26	0.26		
v/c Ratio		0.62	0.70	0.01	0.03	0.16		
Control Delay		12.3	10.8	0.2	22.2	8.2		
Queue Delay		0.0	0.0	0.0	0.0	0.0		
Total Delay		12.3	10.8	0.2	22.2	8.2		
LOS		B	B	A	C	A		
Approach Delay		12.3	10.6		11.4			
Approach LOS		B	B		B			

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 47 (59%), Referenced to phase 2:NBSB, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 11.4 Intersection LOS: B
Intersection Capacity Utilization 62.2% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Fairview Ave & Eastlake Ave



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	241	230	40	334	596	325
Satd. Flow (prot)	1681	1504	1620	1888	1584	0
Flt Permitted	0.950		0.090			
Satd. Flow (perm)	1550	1504	153	1888	1584	0
Satd. Flow (RTOR)		203			50	
Confl. Peds. (#/hr)	43		110			110
Confl. Bikes (#/hr)						19
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	2%	2%	4%	4%	6%	6%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	261	249	43	362	998	0
Turn Type	Perm	Perm	D.P+P	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	6			
Total Split (s)	26.5	26.5	8.0	53.5	45.5	
Total Lost Time (s)	6.5	6.5	4.0	4.5	4.5	
Act Effct Green (s)	20.0	20.0	47.1	49.0	44.2	
Actuated g/C Ratio	0.25	0.25	0.59	0.61	0.55	
v/c Ratio	0.67	0.47	0.26	0.31	1.11	
Control Delay	37.2	9.7	10.2	8.3	86.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	37.2	9.7	10.2	8.3	86.8	
LOS	D	A	B	A	F	
Approach Delay	23.8			8.5	86.8	
Approach LOS	C			A	F	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.11	
Intersection Signal Delay: 53.4	Intersection LOS: D
Intersection Capacity Utilization 78.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Eastlake Ave & Aloha St

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	412	0	15	37	20	296	7	50	11
Satd. Flow (prot)	0	0	0	685	699	0	2241	2358	1950	922	819	0
Flt Permitted				0.950	0.956		0.664			0.743		
Satd. Flow (perm)	0	0	0	685	699	0	918	2358	1730	655	819	0
Satd. Flow (RTOR)					20				328		12	
Confl. Peds. (#/hr)						108	159		33	33		159
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	6%	6%	9%	3%	3%	3%
Parking (#/hr)					0							
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	0	0	237	236	0	41	22	328	8	67	0
Turn Type				Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases				4	4			2			6	
Permitted Phases							2		2	6		
Total Split (s)				55.0	55.0		25.0	25.0	25.0	25.0	25.0	
Total Lost Time (s)				4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Act Effct Green (s)				24.5	24.5		21.5	21.5	21.5	21.5	21.5	
Actuated g/C Ratio				0.44	0.44		0.39	0.39	0.39	0.39	0.39	
v/c Ratio				0.78	0.74		0.12	0.02	0.38	0.03	0.21	
Control Delay				30.6	25.0		17.7	16.6	4.2	17.7	16.6	
Queue Delay				0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay				30.6	25.0		17.7	16.6	4.2	17.7	16.6	
LOS				C	C		B	B	A	B	B	
Approach Delay					27.8			6.3			16.8	
Approach LOS					C			A			B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 55.4	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 18.0	Intersection LOS: B
Intersection Capacity Utilization 38.7%	ICU Level of Service A
Analysis Period (min) 15	

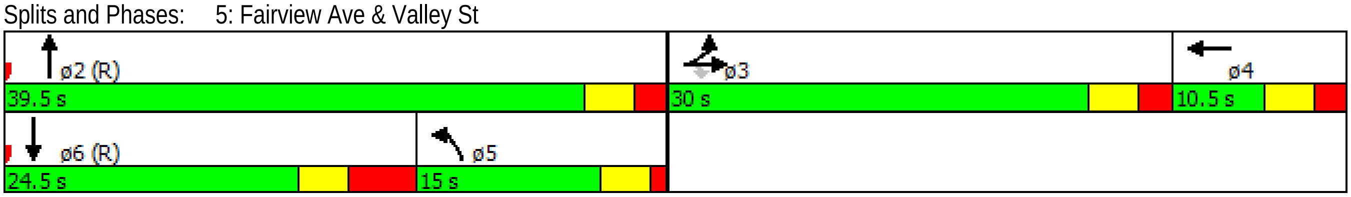
Splits and Phases: 4: Fairview Ave & Aloha St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	179	0	204	0	9	0	255	232	0	0	215	257
Satd. Flow (prot)	0	1703	1599	0	600	0	1660	1073	0	0	1170	0
Flt Permitted		0.950					0.950					
Satd. Flow (perm)	0	1703	1499	0	600	0	1660	1073	0	0	1170	0
Satd. Flow (RTOR)			221								279	
Confl. Peds. (#/hr)			42									99
Confl. Bikes (#/hr)			17									17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	2%	1%	100%	100%	100%	3%	3%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	194	221	0	10	0	276	252	0	0	512	0
Turn Type	Split	NA	Perm		NA		Prot	NA			NA	
Protected Phases	3	3			4		5	2			6	
Permitted Phases			3									
Total Split (s)	30.0	30.0	30.0		10.5		15.0	39.5			24.5	
Total Lost Time (s)		5.0	5.0		5.0		4.0	5.0			7.0	
Act Effct Green (s)		25.0	25.0		5.5		11.0	34.5			17.5	
Actuated g/C Ratio		0.31	0.31		0.07		0.14	0.43			0.22	
v/c Ratio		0.36	0.36		0.24		1.21	0.55			1.08	
Control Delay		23.8	5.0		50.0		161.8	22.4			82.4	
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	
Total Delay		23.8	5.0		50.0		161.8	22.4			82.4	
LOS		C	A		D		F	C			F	
Approach Delay		13.8			50.0			95.3			82.4	
Approach LOS		B			D			F			F	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.21
Intersection Signal Delay: 67.4 Intersection LOS: E
Intersection Capacity Utilization 80.6% ICU Level of Service D
Analysis Period (min) 15

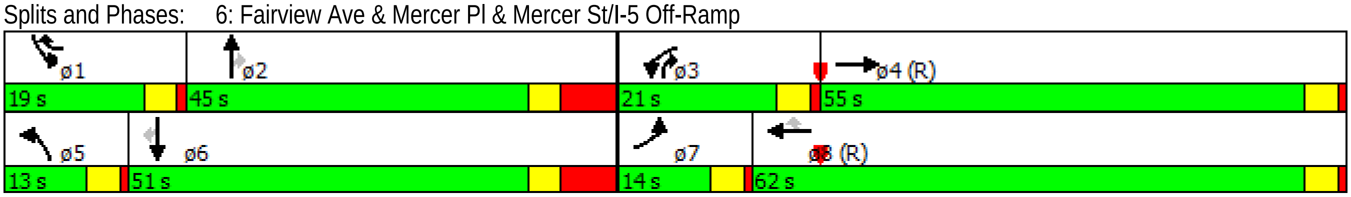
Splits and Phases: 5: Fairview Ave & Valley St



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Volume (vph)	33	1858	79	36	280	1350	361	89	87	1122	61	245
Satd. Flow (prot)	1770	6239	0	0	3467	4964	1599	1770	841	1430	0	1956
Flt Permitted	0.950				0.950			0.950				0.950
Satd. Flow (perm)	1770	6239	0	0	3467	4964	1482	1770	841	1383	0	1956
Satd. Flow (RTOR)		3					286			82		
Confl. Peds. (#/hr)			3	179			19				3	
Confl. Bikes (#/hr)				4			4			3	3	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	2052	0	0	291	1405	376	93	91	1230	0	255
Turn Type	Prot	NA			Prot	NA	pm+ov	Prot	NA	pm+ov		Prot
Protected Phases	7	4			3	8	1	5	2	3		1
Permitted Phases							8			2		
Total Split (s)	14.0	55.0			21.0	62.0	19.0	13.0	45.0	21.0		19.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	9.5	4.5		4.5
Act Effct Green (s)	9.5	50.5			16.5	57.5	72.0	8.5	35.5	57.0		14.5
Actuated g/C Ratio	0.07	0.36			0.12	0.41	0.51	0.06	0.25	0.41		0.10
v/c Ratio	0.28	0.91			0.71	0.69	0.41	0.87	0.43	1.99		1.26
Control Delay	68.5	49.7			70.0	36.1	5.7	121.3	51.2	476.3		200.5
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	68.5	49.7			70.0	36.1	5.7	121.3	51.2	476.3		200.5
LOS	E	D			E	D	A	F	D	F		F
Approach Delay		50.0				35.3			425.6			
Approach LOS		D				D			F			

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 96 (69%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.99	
Intersection Signal Delay: 138.5	Intersection LOS: F
Intersection Capacity Utilization 125.5%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 6: Fairview Ave & Mercer Pl & Mercer St/I-5 Off-Ramp



Lane Group	SBT	SBR
Lane Configurations		
Volume (vph)	107	92
Satd. Flow (prot)	1030	875
Flt Permitted		
Satd. Flow (perm)	1030	702
Satd. Flow (RTOR)		117
Confl. Peds. (#/hr)		139
Confl. Bikes (#/hr)		3
Peak Hour Factor	0.99	0.99
Growth Factor	103%	103%
Heavy Vehicles (%)	1%	1%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	111	96
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Total Split (s)	51.0	51.0
Total Lost Time (s)	9.5	9.5
Act Effct Green (s)	41.5	41.5
Actuated g/C Ratio	0.30	0.30
v/c Ratio	0.36	0.33
Control Delay	43.1	6.8
Queue Delay	0.0	0.0
Total Delay	43.1	6.8
LOS	D	A
Approach Delay	122.4	
Approach LOS	F	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	61	28	26	86	399	3	859	7	125	251	68
Satd. Flow (prot)	0	1836	1599	0	1129	985	1711	1706	384	1719	2951	0
Flt Permitted		0.780			0.906		0.529			0.162		
Satd. Flow (perm)	0	1330	1276	0	1001	734	669	1706	334	293	2951	0
Satd. Flow (RTOR)			25			115			41		35	
Confl. Peds. (#/hr)	112		87	87		112	138		25	25		138
Confl. Bikes (#/hr)			9			8			4			4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	1%	1%	1%	23%	1%	1%	2%	2%	86%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	127	30	0	119	424	3	912	7	133	339	0
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+ov	D.P+P	NA	Perm	D.P+P	NA	
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6		2	2		
Total Split (s)	40.0	40.0	25.0	40.0	40.0	25.0	25.0	95.0	95.0	25.0	95.0	
Total Lost Time (s)		4.5	3.5		5.5	3.5	3.5	4.5	4.5	3.5	4.5	
Act Effct Green (s)		35.5	58.0		34.5	58.0	113.0	90.5	90.5	113.0	90.5	
Actuated g/C Ratio		0.22	0.36		0.22	0.36	0.71	0.57	0.57	0.71	0.57	
v/c Ratio		0.43	0.06		0.55	1.14	0.00	0.95	0.03	0.33	0.20	
Control Delay		58.9	12.8		67.0	122.7	6.0	49.6	1.1	8.8	15.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	44.2	0.0	0.0	0.0	
Total Delay		58.9	12.8		67.0	122.7	6.0	93.7	1.1	8.8	15.5	
LOS		E	B		E	F	A	F	A	A	B	
Approach Delay		50.1			110.5			92.7			13.6	
Approach LOS		D			F			F			B	

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 77 (48%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.14
Intersection Signal Delay: 76.3 Intersection LOS: E
Intersection Capacity Utilization 111.4% ICU Level of Service H
Analysis Period (min) 15

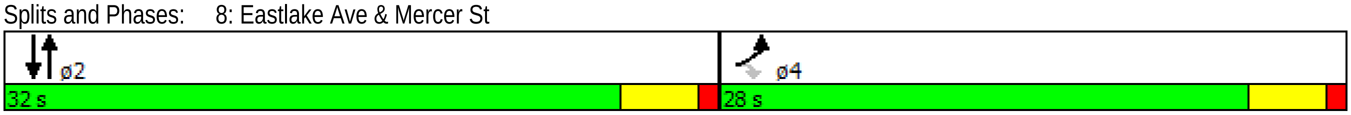
Splits and Phases: 7: Fairview Ave & Republican St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	316	58	0	281	1015	0
Satd. Flow (prot)	899	804	0	1294	3438	0
Flt Permitted	0.950					
Satd. Flow (perm)	899	767	0	1294	3438	0
Satd. Flow (RTOR)		48				
Confl. Peds. (#/hr)		39				
Confl. Bikes (#/hr)		7				
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	6%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	332	61	0	295	1067	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Total Split (s)	28.0	28.0		32.0	32.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	
Act Effct Green (s)	23.1	23.1		27.5	27.5	
Actuated g/C Ratio	0.39	0.39		0.46	0.46	
v/c Ratio	0.95	0.19		0.49	0.67	
Control Delay	60.6	7.0		14.9	15.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	60.6	7.0		14.9	15.3	
LOS	E	A		B	B	
Approach Delay	52.3			14.9	15.3	
Approach LOS	D			B	B	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 59.6
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 23.5 Intersection LOS: C
Intersection Capacity Utilization 64.9% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 8: Eastlake Ave & Mercer St



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	57	25	44	178	746	390
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	61	27	47	191	800	418
Pedestrians	98			2		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	8			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					406	
pX, platoon unblocked	0.76	0.76	0.76			
vC, conflicting volume	1298	709	1317			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	746	0	771			
tC, single (s)	7.0	6.9	4.3			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.3			
p0 queue free %	71	96	91			
cM capacity (veh/h)	210	755	543			

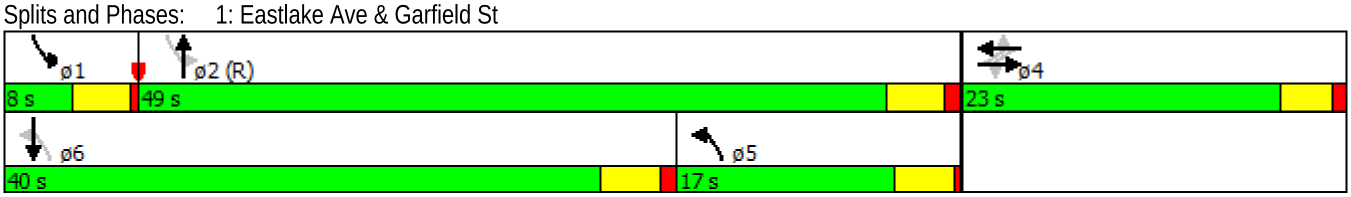
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	88	111	127	534	685
Volume Left	61	47	0	0	0
Volume Right	27	0	0	0	418
cSH	269	543	1700	1700	1700
Volume to Capacity	0.33	0.09	0.07	0.31	0.40
Queue Length 95th (ft)	34	7	0	0	0
Control Delay (s)	24.8	5.9	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	24.8	2.7		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	3	30	31	3	13	169	301	22	15	811	11
Satd. Flow (prot)	0	1475	0	0	1767	0	1546	2912	0	1636	3138	0
Flt Permitted		0.983			0.837		0.211			0.538		
Satd. Flow (perm)	0	1451	0	0	1461	0	334	2912	0	830	3138	0
Satd. Flow (RTOR)		33			14			15			2	
Confl. Peds. (#/hr)	34		55	55		34	57		68	68		57
Confl. Bikes (#/hr)			1			1			13			120
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	17%	17%	17%	2%	2%	2%	9%	9%	9%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	40	0	0	51	0	187	357	0	17	910	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Total Split (s)	23.0	23.0		23.0	23.0		17.0	49.0		8.0	40.0	
Total Lost Time (s)		4.0			4.0		4.0	4.5		4.0	4.5	
Act Effct Green (s)		19.0			19.0		49.0	44.5		49.0	35.5	
Actuated g/C Ratio		0.24			0.24		0.61	0.56		0.61	0.44	
v/c Ratio		0.11			0.14		0.47	0.22		0.03	0.65	
Control Delay		11.5			20.1		12.2	4.6		4.9	20.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		11.5			20.1		12.2	4.6		4.9	20.1	
LOS		B			C		B	A		A	C	
Approach Delay		11.5			20.1			7.2			19.9	
Approach LOS		B			C			A			B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 10 (13%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 59.4%	ICU Level of Service B
Analysis Period (min) 15	

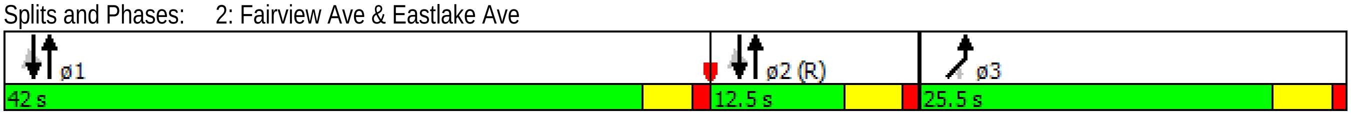
Splits and Phases: 1: Eastlake Ave & Garfield St



Lane Group	NBL	NBT	SBT	SBR	NEL	NER	ø1	ø2
Lane Configurations								
Volume (vph)	0	371	839	15	14	25		
Satd. Flow (prot)	0	1583	1754	1760	4266	1705		
Flt Permitted					0.950			
Satd. Flow (perm)	0	1583	1754	1760	4266	1584		
Satd. Flow (RTOR)				17		28		
Confl. Peds. (#/hr)						23		
Confl. Bikes (#/hr)						6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Growth Factor	103%	103%	103%	103%	103%	103%		
Heavy Vehicles (%)	8%	8%	4%	4%	8%	8%		
Parking (#/hr)		0	0					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	415	939	17	16	28		
Turn Type		NA	NA	Perm	Prot	Perm		
Protected Phases		1 2	1 2		3		1	2
Permitted Phases				1 2		3		
Total Split (s)					25.5	25.5	42.0	12.5
Total Lost Time (s)					4.5	4.5		
Act Effct Green (s)		50.5	50.5	50.5	21.0	21.0		
Actuated g/C Ratio		0.63	0.63	0.63	0.26	0.26		
v/c Ratio		0.42	0.85	0.02	0.01	0.06		
Control Delay		8.9	18.3	0.1	16.5	5.7		
Queue Delay		0.0	0.4	0.0	0.0	0.0		
Total Delay		8.9	18.7	0.1	16.5	5.7		
LOS		A	B	A	B	A		
Approach Delay		8.9	18.4		9.6			
Approach LOS		A	B		A			

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 42 (53%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 70.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Fairview Ave & Eastlake Ave



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	263	55	91	479	546	281
Satd. Flow (prot)	1626	1333	1589	1852	1585	0
Flt Permitted	0.950		0.100			
Satd. Flow (perm)	1487	1333	167	1852	1585	0
Satd. Flow (RTOR)		57			45	
Confl. Peds. (#/hr)	47		113			113
Confl. Bikes (#/hr)						54
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	11%	9%	6%	6%	5%	7%
Parking (#/hr)		0				
Shared Lane Traffic (%)						
Lane Group Flow (vph)	274	57	95	498	860	0
Turn Type	Perm	Perm	D.P+P	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	6			
Total Split (s)	28.5	28.5	8.0	51.5	43.5	
Total Lost Time (s)	8.5	8.5	4.0	4.5	4.5	
Act Effct Green (s)	16.6	16.6	43.7	46.3	40.1	
Actuated g/C Ratio	0.22	0.22	0.58	0.61	0.53	
v/c Ratio	0.85	0.17	0.56	0.44	1.00	
Control Delay	52.6	8.5	22.6	10.1	53.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	52.6	8.5	22.6	10.1	53.2	
LOS	D	A	C	B	D	
Approach Delay	45.0			12.1	53.2	
Approach LOS	D			B	D	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 76	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 38.0	Intersection LOS: D
Intersection Capacity Utilization 83.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Eastlake Ave & Aloha St

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	267	0	15	23	115	466	5	20	0
Satd. Flow (prot)	0	0	0	1429	1458	0	1719	867	716	1736	3471	0
Flt Permitted				0.950	0.957		0.743			0.646		
Satd. Flow (perm)	0	0	0	1429	1458	0	934	867	580	1007	3471	0
Satd. Flow (RTOR)					20				500			
Confl. Peds. (#/hr)						61	110		61	61		110
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	0%	4%	2%	2%	5%	5%	8%	4%	4%	4%
Parking (#/hr)					0							
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	0	0	152	150	0	25	123	500	5	21	0
Turn Type				Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases				4	4			2			6	
Permitted Phases							2		2	6		
Total Split (s)				21.5	21.5		58.5	58.5	58.5	58.5	58.5	
Total Lost Time (s)				5.5	5.5		4.5	4.5	4.5	4.5	4.5	
Act Effct Green (s)				16.0	16.0		54.0	54.0	54.0	54.0	54.0	
Actuated g/C Ratio				0.20	0.20		0.68	0.68	0.68	0.68	0.68	
v/c Ratio				0.53	0.49		0.04	0.21	0.90	0.01	0.01	
Control Delay				36.5	30.7		1.4	2.9	32.9	3.2	3.1	
Queue Delay				0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay				36.5	30.7		1.4	2.9	32.9	3.2	3.1	
LOS				D	C		A	A	C	A	A	
Approach Delay					33.6			26.0			3.2	
Approach LOS					C			C			A	

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:NETL and 6:SWTL, Start of Green

Control Type: Pretimed

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 27.8 Intersection LOS: C

Intersection Capacity Utilization 61.3% ICU Level of Service B

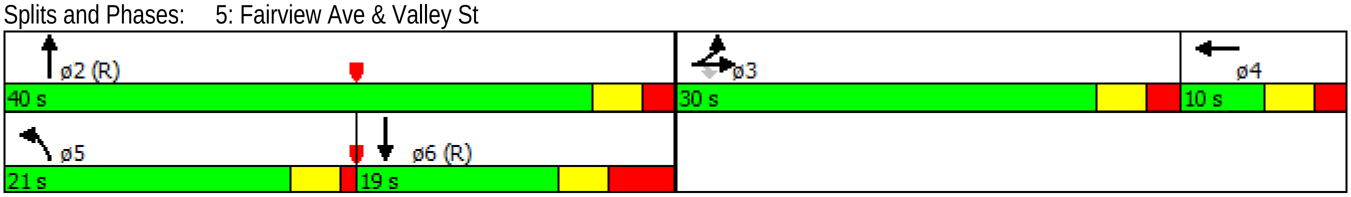
Analysis Period (min) 15

Splits and Phases: 4: Fairview Ave & Aloha St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	0	136	0	8	0	230	428	0	0	168	148
Satd. Flow (prot)	0	1703	1583	0	950	0	1719	2381	0	0	2894	0
Flt Permitted		0.950					0.950					
Satd. Flow (perm)	0	1703	1583	0	950	0	1719	2381	0	0	2894	0
Satd. Flow (RTOR)			177								160	
Confl. Peds. (#/hr)												51
Confl. Bikes (#/hr)												17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	2%	2%	100%	100%	100%	5%	5%	2%	2%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	271	147	0	9	0	249	464	0	0	342	0
Turn Type	Split	NA	Perm		NA		Prot	NA			NA	
Protected Phases	3	3			4		5	2			6	
Permitted Phases			3									
Total Split (s)	30.0	30.0	30.0		10.0		21.0	40.0			19.0	
Total Lost Time (s)		5.0	5.0		5.0		4.0	5.0			7.0	
Act Effct Green (s)		25.0	25.0		5.0		17.0	35.0			12.0	
Actuated g/C Ratio		0.31	0.31		0.06		0.21	0.44			0.15	
v/c Ratio		0.51	0.24		0.15		0.68	0.45			0.60	
Control Delay		26.6	3.3		41.6		40.0	17.4			8.9	
Queue Delay		0.0	0.0		0.0		0.0	1.2			0.0	
Total Delay		26.6	3.3		41.6		40.0	18.6			8.9	
LOS		C	A		D		D	B			A	
Approach Delay		18.4			41.6			26.1			8.9	
Approach LOS		B			D			C			A	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 20.0	Intersection LOS: C
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	

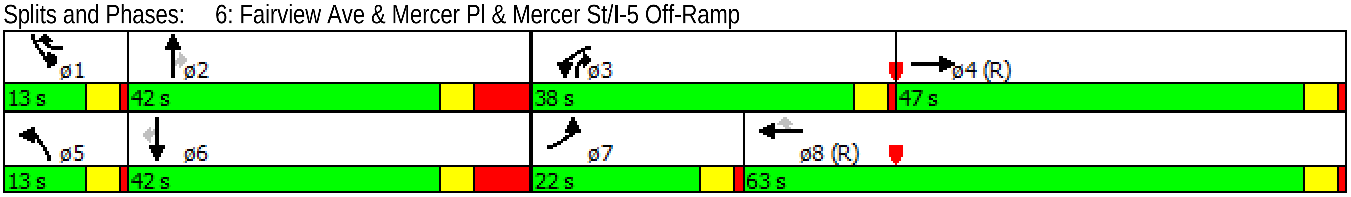
Splits and Phases: 5: Fairview Ave & Valley St



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Volume (vph)	79	1463	155	20	619	1350	546	55	123	276	92	187
Satd. Flow (prot)	1719	6011	0	0	3400	4868	1568	1656	1376	2059	0	3400
Flt Permitted	0.950				0.950			0.950				0.950
Satd. Flow (perm)	1719	6011	0	0	3400	4868	1486	1656	1376	1996	0	3400
Satd. Flow (RTOR)		2					403			47		
Confl. Peds. (#/hr)			2	100			12				2	
Confl. Bikes (#/hr)				1			1			4	4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	5%	5%	5%	3%	3%	3%	9%	9%	9%	9%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	1814	0	0	686	1495	605	61	136	408	0	207
Turn Type	Prot	NA			Prot	NA	pm+ov	Prot	NA	pm+ov		Prot
Protected Phases	7	4			3	8	1	5	2	3		1
Permitted Phases							8			2		
Total Split (s)	22.0	47.0			38.0	63.0	13.0	13.0	42.0	38.0		13.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	9.5	4.5		4.5
Act Effct Green (s)	17.5	42.5			33.5	58.5	67.0	8.5	32.5	71.0		8.5
Actuated g/C Ratio	0.12	0.30			0.24	0.42	0.48	0.06	0.23	0.51		0.06
v/c Ratio	0.41	0.99			0.84	0.74	0.65	0.61	0.43	0.39		1.00
Control Delay	62.8	67.9			61.5	36.9	11.1	89.2	50.7	17.6		128.3
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	62.8	67.9			61.5	36.9	11.1	89.2	50.7	17.6		128.3
LOS	E	E			E	D	B	F	D	B		F
Approach Delay		67.6				37.4			32.2			
Approach LOS		E				D			C			

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 57 (41%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 49.9	Intersection LOS: D
Intersection Capacity Utilization 94.2%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Fairview Ave & Mercer Pl & Mercer St/I-5 Off-Ramp



Lane Group	SBT	SBR
Lane Configurations		
Volume (vph)	189	91
Satd. Flow (prot)	1845	1568
Flt Permitted		
Satd. Flow (perm)	1845	1381
Satd. Flow (RTOR)		117
Confl. Peds. (#/hr)		78
Confl. Bikes (#/hr)		5
Peak Hour Factor	0.93	0.93
Growth Factor	103%	103%
Heavy Vehicles (%)	3%	3%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	209	101
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Total Split (s)	42.0	42.0
Total Lost Time (s)	9.5	9.5
Act Effct Green (s)	32.5	32.5
Actuated g/C Ratio	0.23	0.23
v/c Ratio	0.49	0.25
Control Delay	51.1	6.5
Queue Delay	0.0	0.0
Total Delay	51.1	6.5
LOS	D	A
Approach Delay	73.3	
Approach LOS	E	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	60	41	15	81	194	66	369	14	140	498	186
Satd. Flow (prot)	0	1751	1509	0	1227	0	1631	4517	1854	2306	3940	0
Flt Permitted		0.858			0.985		0.292			0.460		
Satd. Flow (perm)	0	1481	1360	0	1208	0	466	4517	1327	985	3940	0
Satd. Flow (RTOR)			44		69				58		49	
Confl. Peds. (#/hr)	121		39	39		121	86		59	59		86
Confl. Bikes (#/hr)			8			12			10			14
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	44	0	314	0	72	400	15	152	742	0
Turn Type	Perm	NA	pm+ov	Perm	NA		D.P+P	NA	Perm	D.P+P	NA	
Protected Phases		4	5		8		5	2		1	6	
Permitted Phases	4		4	8			6		2	2		
Total Split (s)	59.0	59.0	15.0	59.0	59.0		15.0	66.0	66.0	35.0	86.0	
Total Lost Time (s)		4.5	3.5		4.5		3.5	4.5	4.5	3.5	4.5	
Act Effct Green (s)		54.5	67.0		54.5		94.0	61.5	61.5	94.0	81.5	
Actuated g/C Ratio		0.34	0.42		0.34		0.59	0.38	0.38	0.59	0.51	
v/c Ratio		0.18	0.07		0.69		0.20	0.23	0.03	0.18	0.37	
Control Delay		38.3	6.9		43.9		10.7	28.8	3.9	13.7	22.5	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	1.0	
Total Delay		38.3	6.9		43.9		10.7	28.8	3.9	13.7	23.5	
LOS		D	A		D		B	C	A	B	C	
Approach Delay		28.2			43.9			25.3			21.8	
Approach LOS		C			D			C			C	

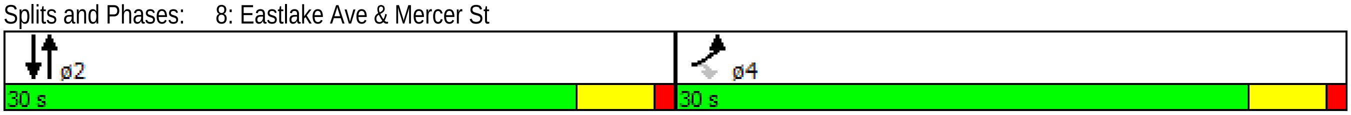
Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 49 (31%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 27.0	Intersection LOS: C
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 7: Fairview Ave & Republican St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	249	38	0	247	933	0
Satd. Flow (prot)	950	850	0	3764	3471	0
Flt Permitted	0.950					
Satd. Flow (perm)	949	812	0	3764	3471	0
Satd. Flow (RTOR)		40				
Confl. Peds. (#/hr)	1	40				
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	4%	4%	6%	6%	4%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	264	40	0	262	991	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Total Split (s)	30.0	30.0		30.0	30.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	
Act Effct Green (s)	19.2	19.2		26.6	26.6	
Actuated g/C Ratio	0.35	0.35		0.49	0.49	
v/c Ratio	0.80	0.13		0.14	0.59	
Control Delay	34.3	5.1		9.5	13.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	34.3	5.1		9.5	13.3	
LOS	C	A		A	B	
Approach Delay	30.5			9.5	13.3	
Approach LOS	C			A	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 54.8	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 16.0	Intersection LOS: B
Intersection Capacity Utilization 54.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Eastlake Ave & Mercer St



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	55	23	27	190	734	224
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	60	25	29	206	796	243
Pedestrians	91					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					399	
pX, platoon unblocked	0.79	0.79	0.79			
vC, conflicting volume	1170	610	1130			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	694	0	643			
tC, single (s)	6.9	7.0	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	77	97	95			
cM capacity (veh/h)	261	791	636			

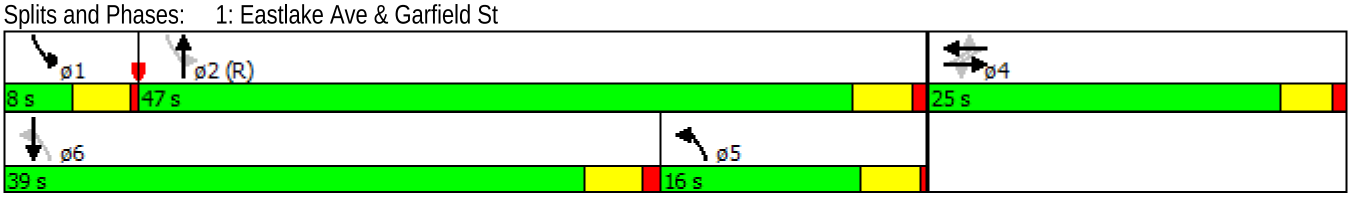
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	85	98	137	531	508
Volume Left	60	29	0	0	0
Volume Right	25	0	0	0	243
cSH	325	636	1700	1700	1700
Volume to Capacity	0.26	0.05	0.08	0.31	0.30
Queue Length 95th (ft)	26	4	0	0	0
Control Delay (s)	19.9	3.6	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	19.9	1.5		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	0	68	36	1	26	139	468	15	20	607	3
Satd. Flow (prot)	0	1690	0	0	1762	0	1636	3115	0	1620	3118	0
Flt Permitted		0.878			0.823		0.337			0.443		
Satd. Flow (perm)	0	1491	0	0	1437	0	548	3115	0	700	3118	0
Satd. Flow (RTOR)		136			27			6			1	
Confl. Peds. (#/hr)	33		65	65		33	67		63	63		67
Confl. Bikes (#/hr)			2			4			104			35
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	117	0	0	66	0	146	508	0	21	641	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Total Split (s)	25.0	25.0		25.0	25.0		16.0	47.0		8.0	39.0	
Total Lost Time (s)		4.0			4.0		4.0	4.5		4.0	4.5	
Act Effct Green (s)		21.0			21.0		47.0	42.5		47.0	34.5	
Actuated g/C Ratio		0.26			0.26		0.59	0.53		0.59	0.43	
v/c Ratio		0.24			0.17		0.30	0.31		0.05	0.48	
Control Delay		4.8			16.5		4.3	4.3		5.7	17.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		4.8			16.5		4.3	4.3		5.7	17.7	
LOS		A			B		A	A		A	B	
Approach Delay		4.8			16.5			4.3			17.4	
Approach LOS		A			B			A			B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 17 (21%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 10.6	Intersection LOS: B
Intersection Capacity Utilization 51.6%	ICU Level of Service A
Analysis Period (min) 15	

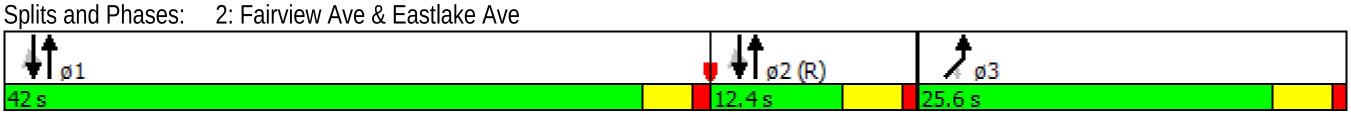
Splits and Phases: 1: Eastlake Ave & Garfield St



Lane Group	NBL	NBT	SBT	SBR	NEL	NER	ø1	ø2
Lane Configurations								
Volume (vph)	0	601	694	14	15	50		
Satd. Flow (prot)	0	1676	1721	1727	1992	1359		
Flt Permitted					0.950			
Satd. Flow (perm)	0	1676	1721	1727	1992	1131		
Satd. Flow (RTOR)				15		55		
Confl. Peds. (#/hr)						41		
Confl. Bikes (#/hr)						55		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Growth Factor	103%	103%	103%	103%	103%	103%		
Heavy Vehicles (%)	2%	2%	6%	6%	3%	3%		
Parking (#/hr)		0	0					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	659	760	15	16	55		
Turn Type		NA	NA	Perm	Prot	Perm		
Protected Phases		1 2	1 2		3		1	2
Permitted Phases				1 2		3		
Total Split (s)					25.6	25.6	42.0	12.4
Total Lost Time (s)					4.5	4.5		
Act Effct Green (s)		50.4	50.4	50.4	21.1	21.1		
Actuated g/C Ratio		0.63	0.63	0.63	0.26	0.26		
v/c Ratio		0.62	0.70	0.01	0.03	0.16		
Control Delay		12.3	10.8	0.2	22.2	8.2		
Queue Delay		0.0	0.0	0.0	0.0	0.0		
Total Delay		12.3	10.8	0.2	22.2	8.2		
LOS		B	B	A	C	A		
Approach Delay		12.3	10.6		11.4			
Approach LOS		B	B		B			

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 47 (59%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 11.4	Intersection LOS: B
Intersection Capacity Utilization 62.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Fairview Ave & Eastlake Ave



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	241	230	40	334	596	325
Satd. Flow (prot)	1633	1354	1620	1888	1573	0
Flt Permitted	0.950		0.095			
Satd. Flow (perm)	1505	1354	162	1888	1573	0
Satd. Flow (RTOR)		195			48	
Confl. Peds. (#/hr)	43		110			110
Confl. Bikes (#/hr)						19
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	2%	4%	4%	6%	8%
Parking (#/hr)		0				
Shared Lane Traffic (%)						
Lane Group Flow (vph)	261	249	43	362	998	0
Turn Type	Perm	Perm	D.P+P	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	6			
Total Split (s)	28.5	28.5	8.0	51.5	43.5	
Total Lost Time (s)	8.5	8.5	4.0	4.5	4.5	
Act Effct Green (s)	20.0	20.0	45.1	47.0	42.2	
Actuated g/C Ratio	0.25	0.25	0.56	0.59	0.53	
v/c Ratio	0.69	0.51	0.26	0.33	1.17	
Control Delay	38.6	11.2	11.0	9.4	111.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	38.6	11.2	11.0	9.4	111.4	
LOS	D	B	B	A	F	
Approach Delay	25.2			9.6	111.4	
Approach LOS	C			A	F	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.17	
Intersection Signal Delay: 66.9	Intersection LOS: E
Intersection Capacity Utilization 80.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Eastlake Ave & Aloha St

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	412	0	15	37	20	296	7	50	11
Satd. Flow (prot)	0	0	0	678	693	0	2241	2358	1914	922	816	0
Flt Permitted				0.950	0.956		0.664			0.743		
Satd. Flow (perm)	0	0	0	678	693	0	918	2358	1699	655	816	0
Satd. Flow (RTOR)					20				328		12	
Confl. Peds. (#/hr)						108	159		33	33		159
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	0%	2%	1%	1%	6%	6%	11%	3%	3%	3%
Parking (#/hr)					0							
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	0	0	237	236	0	41	22	328	8	67	0
Turn Type				Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases				4	4			2			6	
Permitted Phases							2		2	6		
Total Split (s)				56.0	56.0		24.0	24.0	24.0	24.0	24.0	
Total Lost Time (s)				5.5	5.5		4.5	4.5	4.5	4.5	4.5	
Act Effct Green (s)				24.8	24.8		20.5	20.5	20.5	20.5	20.5	
Actuated g/C Ratio				0.44	0.44		0.37	0.37	0.37	0.37	0.37	
v/c Ratio				0.79	0.74		0.12	0.03	0.39	0.03	0.22	
Control Delay				31.0	25.1		18.8	17.6	4.6	18.7	17.8	
Queue Delay				0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay				31.0	25.1		18.8	17.6	4.6	18.7	17.8	
LOS				C	C		B	B	A	B	B	
Approach Delay					28.1			6.8			17.9	
Approach LOS					C			A			B	

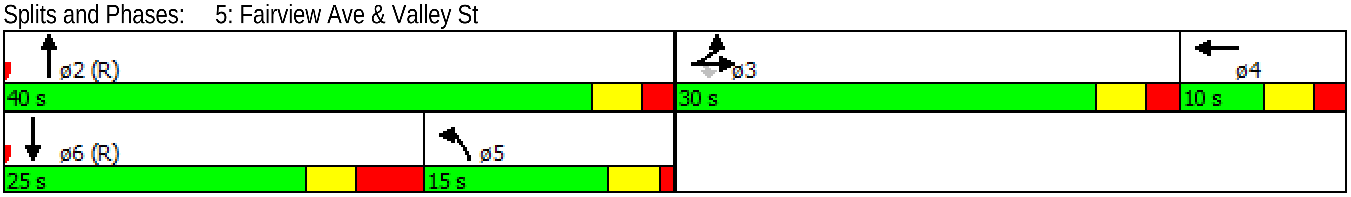
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 55.8	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 18.4	Intersection LOS: B
Intersection Capacity Utilization 39.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: Fairview Ave & Aloha St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	179	0	204	0	9	0	255	232	0	0	215	257
Satd. Flow (prot)	0	1703	1599	0	600	0	1660	1073	0	0	1170	0
Flt Permitted		0.950					0.950					
Satd. Flow (perm)	0	1703	1499	0	600	0	1660	1073	0	0	1170	0
Satd. Flow (RTOR)			221								279	
Confl. Peds. (#/hr)			42									99
Confl. Bikes (#/hr)			17									17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	2%	1%	100%	100%	100%	3%	3%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	194	221	0	10	0	276	252	0	0	512	0
Turn Type	Split	NA	Perm		NA		Prot	NA			NA	
Protected Phases	3	3			4		5	2			6	
Permitted Phases			3									
Total Split (s)	30.0	30.0	30.0		10.0		15.0	40.0			25.0	
Total Lost Time (s)		5.0	5.0		5.0		4.0	5.0			7.0	
Act Effct Green (s)		25.0	25.0		5.0		11.0	35.0			18.0	
Actuated g/C Ratio		0.31	0.31		0.06		0.14	0.44			0.22	
v/c Ratio		0.36	0.36		0.27		1.21	0.54			1.07	
Control Delay		23.8	5.0		54.0		161.8	21.8			77.7	
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	
Total Delay		23.8	5.0		54.0		161.8	21.8			77.7	
LOS		C	A		D		F	C			E	
Approach Delay		13.8			54.0			95.0			77.7	
Approach LOS		B			D			F			E	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 65.7	Intersection LOS: E
Intersection Capacity Utilization 80.6%	ICU Level of Service D
Analysis Period (min) 15	

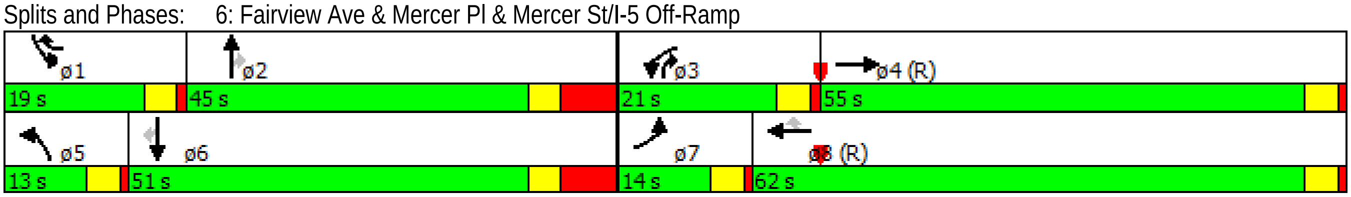
Splits and Phases: 5: Fairview Ave & Valley St



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Volume (vph)	33	1858	79	36	280	1350	361	89	87	1122	61	245
Satd. Flow (prot)	1770	6239	0	0	3467	4964	1599	1770	841	1430	0	1956
Flt Permitted	0.950				0.950			0.950				0.950
Satd. Flow (perm)	1770	6239	0	0	3467	4964	1482	1770	841	1383	0	1956
Satd. Flow (RTOR)		3					286			82		
Confl. Peds. (#/hr)			3	179			19				3	
Confl. Bikes (#/hr)				4			4			3	3	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	2052	0	0	291	1405	376	93	91	1230	0	255
Turn Type	Prot	NA			Prot	NA	pm+ov	Prot	NA	pm+ov		Prot
Protected Phases	7	4			3	8	1	5	2	3		1
Permitted Phases							8			2		
Total Split (s)	14.0	55.0			21.0	62.0	19.0	13.0	45.0	21.0		19.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	9.5	4.5		4.5
Act Effct Green (s)	9.5	50.5			16.5	57.5	72.0	8.5	35.5	57.0		14.5
Actuated g/C Ratio	0.07	0.36			0.12	0.41	0.51	0.06	0.25	0.41		0.10
v/c Ratio	0.28	0.91			0.71	0.69	0.41	0.87	0.43	1.99		1.26
Control Delay	68.5	49.7			70.0	36.1	5.7	121.3	51.2	476.3		200.5
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	68.5	49.7			70.0	36.1	5.7	121.3	51.2	476.3		200.5
LOS	E	D			E	D	A	F	D	F		F
Approach Delay		50.0				35.3			425.6			
Approach LOS		D				D			F			

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 96 (69%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.99	
Intersection Signal Delay: 138.5	Intersection LOS: F
Intersection Capacity Utilization 125.5%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 6: Fairview Ave & Mercer Pl & Mercer St/I-5 Off-Ramp



Lane Group	SBT	SBR
Lane Configurations		
Volume (vph)	107	92
Satd. Flow (prot)	1030	875
Flt Permitted		
Satd. Flow (perm)	1030	702
Satd. Flow (RTOR)		117
Confl. Peds. (#/hr)		139
Confl. Bikes (#/hr)		3
Peak Hour Factor	0.99	0.99
Growth Factor	103%	103%
Heavy Vehicles (%)	1%	1%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	111	96
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Total Split (s)	51.0	51.0
Total Lost Time (s)	9.5	9.5
Act Effct Green (s)	41.5	41.5
Actuated g/C Ratio	0.30	0.30
v/c Ratio	0.36	0.33
Control Delay	43.1	6.8
Queue Delay	0.0	0.0
Total Delay	43.1	6.8
LOS	D	A
Approach Delay	122.4	
Approach LOS	F	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	61	28	26	86	399	3	859	1	125	251	68
Satd. Flow (prot)	0	1836	1599	0	1187	985	1711	1706	700	1719	2951	0
Flt Permitted		0.759			0.910		0.529			0.162		
Satd. Flow (perm)	0	1298	1276	0	1057	734	669	1706	608	293	2951	0
Satd. Flow (RTOR)			25			115			34		35	
Confl. Peds. (#/hr)	112		87	87		112	138		25	25		138
Confl. Bikes (#/hr)			9			8			4			4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	127	30	0	119	424	3	912	1	133	339	0
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+ov	D.P+P	NA	Perm	D.P+P	NA	
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6		2	2		
Total Split (s)	40.0	40.0	25.0	40.0	40.0	25.0	25.0	95.0	95.0	25.0	95.0	
Total Lost Time (s)		4.5	3.5		4.5	3.5	3.5	4.5	4.5	3.5	4.5	
Act Effct Green (s)		35.5	58.0		35.5	58.0	113.0	90.5	90.5	113.0	90.5	
Actuated g/C Ratio		0.22	0.36		0.22	0.36	0.71	0.57	0.57	0.71	0.57	
v/c Ratio		0.44	0.06		0.51	1.14	0.00	0.95	0.00	0.33	0.20	
Control Delay		59.4	12.8		63.4	122.7	6.0	49.6	0.0	8.8	15.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	44.2	0.0	0.0	0.0	
Total Delay		59.4	12.8		63.4	122.7	6.0	93.7	0.0	8.8	15.5	
LOS		E	B		E	F	A	F	A	A	B	
Approach Delay		50.5			109.7			93.3			13.6	
Approach LOS		D			F			F			B	

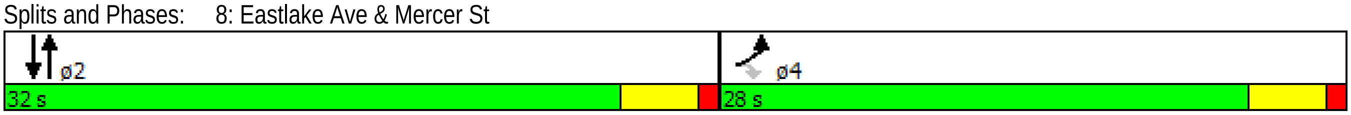
Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 77 (48%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.14	
Intersection Signal Delay: 76.4	Intersection LOS: E
Intersection Capacity Utilization 111.4%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 7: Fairview Ave & Republican St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	316	58	0	281	1015	0
Satd. Flow (prot)	899	804	0	1294	3438	0
Flt Permitted	0.950					
Satd. Flow (perm)	899	767	0	1294	3438	0
Satd. Flow (RTOR)		48				
Confl. Peds. (#/hr)		39				
Confl. Bikes (#/hr)		7				
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	6%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	332	61	0	295	1067	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Total Split (s)	28.0	28.0		32.0	32.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	
Act Effct Green (s)	23.1	23.1		27.5	27.5	
Actuated g/C Ratio	0.39	0.39		0.46	0.46	
v/c Ratio	0.95	0.19		0.49	0.67	
Control Delay	60.6	7.0		14.9	15.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	60.6	7.0		14.9	15.3	
LOS	E	A		B	B	
Approach Delay	52.3			14.9	15.3	
Approach LOS	D			B	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 59.6	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 23.5	Intersection LOS: C
Intersection Capacity Utilization 64.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 8: Eastlake Ave & Mercer St



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	57	25	44	178	746	390
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	61	27	47	191	800	418
Pedestrians	98			2		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	8			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					406	
pX, platoon unblocked	0.76	0.76	0.76			
vC, conflicting volume	1298	709	1317			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	746	0	771			
tC, single (s)	6.8	6.9	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	73	96	91			
cM capacity (veh/h)	224	755	543			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	88	111	127	534	685
Volume Left	61	47	0	0	0
Volume Right	27	0	0	0	418
cSH	285	543	1700	1700	1700
Volume to Capacity	0.31	0.09	0.07	0.31	0.40
Queue Length 95th (ft)	32	7	0	0	0
Control Delay (s)	23.2	5.9	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	23.2	2.7		0.0	
Approach LOS	C				

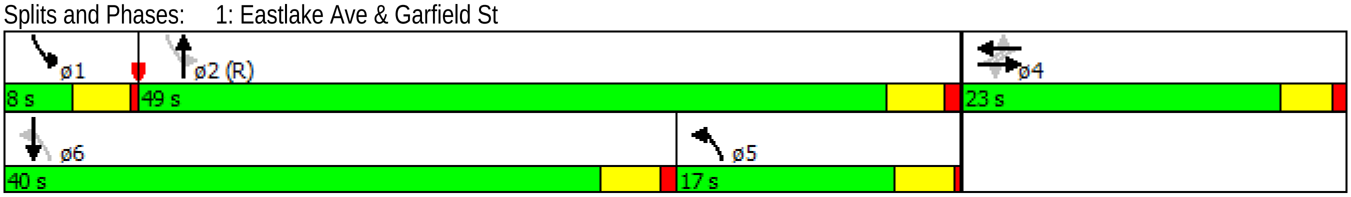
Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	3	30	31	3	13	169	301	22	15	811	11
Satd. Flow (prot)	0	1475	0	0	1767	0	1546	2912	0	1636	3138	0
Flt Permitted		0.983			0.837		0.211			0.538		
Satd. Flow (perm)	0	1451	0	0	1461	0	334	2912	0	830	3138	0
Satd. Flow (RTOR)		33			14			15			2	
Confl. Peds. (#/hr)	34		55	55		34	57		68	68		57
Confl. Bikes (#/hr)			1			1			13			120
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	17%	17%	17%	2%	2%	2%	9%	9%	9%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	40	0	0	51	0	187	357	0	17	910	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Total Split (s)	23.0	23.0		23.0	23.0		17.0	49.0		8.0	40.0	
Total Lost Time (s)		4.0			4.0		4.0	4.5		4.0	4.5	
Act Effct Green (s)		19.0			19.0		49.0	44.5		49.0	35.5	
Actuated g/C Ratio		0.24			0.24		0.61	0.56		0.61	0.44	
v/c Ratio		0.11			0.14		0.47	0.22		0.03	0.65	
Control Delay		11.5			20.1		12.3	4.8		4.9	20.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		11.5			20.1		12.3	4.8		4.9	20.1	
LOS		B			C		B	A		A	C	
Approach Delay		11.5			20.1			7.4			19.9	
Approach LOS		B			C			A			B	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 63 (79%), Referenced to phase 2:NBSB, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 15.3 Intersection LOS: B
Intersection Capacity Utilization 59.4% ICU Level of Service B
Analysis Period (min) 15

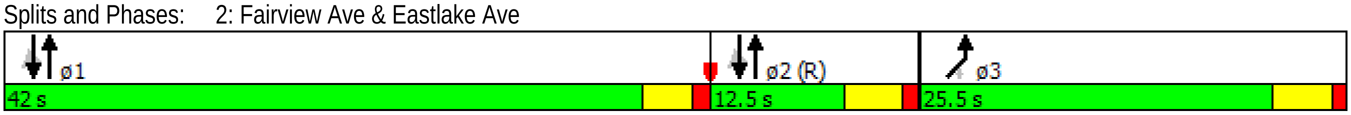
Splits and Phases: 1: Eastlake Ave & Garfield St



Lane Group	NBL	NBT	SBT	SBR	NEL	NER	ø1	ø2
Lane Configurations								
Volume (vph)	0	371	839	15	14	25		
Satd. Flow (prot)	0	1583	1754	1760	4266	1705		
Flt Permitted					0.950			
Satd. Flow (perm)	0	1583	1754	1760	4266	1584		
Satd. Flow (RTOR)				17		28		
Confl. Peds. (#/hr)						23		
Confl. Bikes (#/hr)						6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Growth Factor	103%	103%	103%	103%	103%	103%		
Heavy Vehicles (%)	8%	8%	4%	4%	8%	8%		
Parking (#/hr)		0	0					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	415	939	17	16	28		
Turn Type		NA	NA	Perm	Prot	Perm		
Protected Phases		1 2	1 2		3		1	2
Permitted Phases				1 2		3		
Total Split (s)					25.5	25.5	42.0	12.5
Total Lost Time (s)					4.5	4.5		
Act Effct Green (s)		50.5	50.5	50.5	21.0	21.0		
Actuated g/C Ratio		0.63	0.63	0.63	0.26	0.26		
v/c Ratio		0.42	0.85	0.02	0.01	0.06		
Control Delay		8.9	18.3	0.1	34.8	26.3		
Queue Delay		0.0	0.4	0.0	0.0	0.0		
Total Delay		8.9	18.7	0.1	34.8	26.3		
LOS		A	B	A	C	C		
Approach Delay		8.9	18.4		29.4			
Approach LOS		A	B		C			

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 15 (19%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 16.0	Intersection LOS: B
Intersection Capacity Utilization 70.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Fairview Ave & Eastlake Ave



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	263	55	91	479	546	281
Satd. Flow (prot)	1635	0	1589	1852	1596	0
Flt Permitted	0.960		0.112			
Satd. Flow (perm)	1519	0	187	1852	1596	0
Satd. Flow (RTOR)	13				47	
Confl. Peds. (#/hr)	47		113			113
Confl. Bikes (#/hr)						54
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	9%	9%	6%	6%	5%	5%
Parking (#/hr)		0				
Shared Lane Traffic (%)						
Lane Group Flow (vph)	331	0	95	498	860	0
Turn Type	Perm		D.P+P	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4		6			
Total Split (s)	26.6		8.0	53.4	45.4	
Total Lost Time (s)	4.5		4.0	4.5	4.5	
Act Effct Green (s)	19.4		45.2	47.8	41.6	
Actuated g/C Ratio	0.25		0.59	0.63	0.55	
v/c Ratio	0.84		0.51	0.43	0.96	
Control Delay	45.9		17.4	9.2	42.6	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	45.9		17.4	9.2	42.6	
LOS	D		B	A	D	
Approach Delay	45.9			10.5	42.6	
Approach LOS	D			B	D	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 76.2	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 32.5	Intersection LOS: C
Intersection Capacity Utilization 83.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Eastlake Ave & Aloha St

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	267	0	15	23	115	466	5	20	0
Satd. Flow (prot)	0	0	0	0	1581	0	1719	867	723	1736	3471	0
Flt Permitted					0.955		0.743			0.579		
Satd. Flow (perm)	0	0	0	0	1581	0	934	867	600	914	3471	0
Satd. Flow (RTOR)					20							
Confl. Peds. (#/hr)						61	110		61	61		110
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	5%	5%	7%	4%	4%	4%
Parking (#/hr)					0							
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	302	0	25	123	500	5	21	0
Turn Type				Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases				4	4			2	4		6	
Permitted Phases							2		2	6		
Total Split (s)				56.0	56.0		24.0	24.0	56.0	24.0	24.0	
Total Lost Time (s)					4.5		4.5	4.5	4.5	4.5	4.5	
Act Effct Green (s)					51.5		19.5	19.5	71.0	19.5	19.5	
Actuated g/C Ratio					0.64		0.24	0.24	0.89	0.24	0.24	
v/c Ratio					0.29		0.11	0.58	0.82	0.02	0.02	
Control Delay					6.7		20.7	34.6	26.0	25.8	24.9	
Queue Delay					0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay					6.7		20.7	34.6	26.0	25.8	24.9	
LOS					A		C	C	C	C	C	
Approach Delay					6.7			27.4			25.1	
Approach LOS					A			C			C	

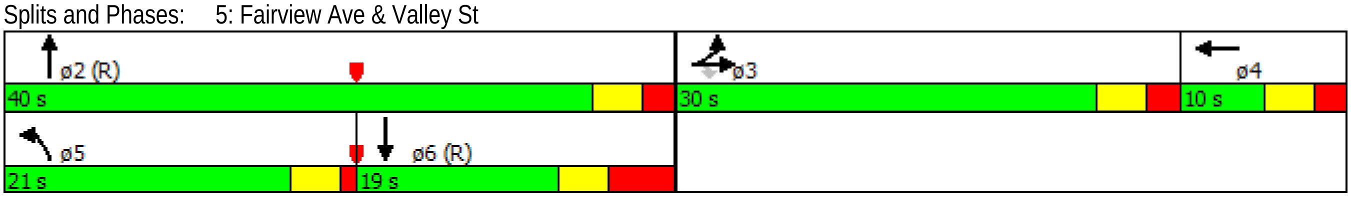
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NETL and 6:SWTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 21.0	Intersection LOS: C
Intersection Capacity Utilization 61.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Fairview Ave & Aloha St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	0	136	0	8	0	230	428	0	0	168	148
Satd. Flow (prot)	0	1703	1583	0	950	0	1719	2381	0	0	2894	0
Flt Permitted		0.950					0.950					
Satd. Flow (perm)	0	1703	1583	0	950	0	1719	2381	0	0	2894	0
Satd. Flow (RTOR)			177								160	
Confl. Peds. (#/hr)												51
Confl. Bikes (#/hr)												17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	2%	2%	100%	100%	100%	5%	5%	2%	2%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	271	147	0	9	0	249	464	0	0	342	0
Turn Type	Split	NA	Perm		NA		Prot	NA			NA	
Protected Phases	3	3			4		5	2			6	
Permitted Phases			3									
Total Split (s)	30.0	30.0	30.0		10.0		21.0	40.0			19.0	
Total Lost Time (s)		5.0	5.0		5.0		4.0	5.0			7.0	
Act Effct Green (s)		25.0	25.0		5.0		17.0	35.0			12.0	
Actuated g/C Ratio		0.31	0.31		0.06		0.21	0.44			0.15	
v/c Ratio		0.51	0.24		0.15		0.68	0.45			0.60	
Control Delay		26.6	3.3		41.6		40.0	17.4			22.6	
Queue Delay		0.0	0.0		0.0		0.0	1.2			0.0	
Total Delay		26.6	3.3		41.6		40.0	18.6			22.6	
LOS		C	A		D		D	B			C	
Approach Delay		18.4			41.6			26.1			22.6	
Approach LOS		B			D			C			C	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 23.2	Intersection LOS: C
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	

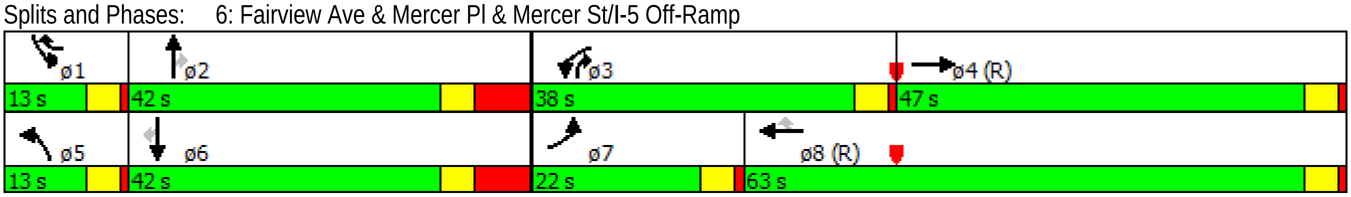
Splits and Phases: 5: Fairview Ave & Valley St



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Volume (vph)	79	1463	155	20	619	1350	546	55	123	276	92	187
Satd. Flow (prot)	1719	6011	0	0	3400	4868	1568	1656	1376	2059	0	3400
Flt Permitted	0.950				0.950			0.950				0.950
Satd. Flow (perm)	1719	6011	0	0	3400	4868	1486	1656	1376	1996	0	3400
Satd. Flow (RTOR)		2					403			47		
Confl. Peds. (#/hr)			2	100			12				2	
Confl. Bikes (#/hr)				1			1			4	4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	5%	5%	5%	3%	3%	3%	9%	9%	9%	9%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	1814	0	0	686	1495	605	61	136	408	0	207
Turn Type	Prot	NA			Prot	NA	pm+ov	Prot	NA	pm+ov		Prot
Protected Phases	7	4			3	8	1	5	2	3		1
Permitted Phases							8			2		
Total Split (s)	22.0	47.0			38.0	63.0	13.0	13.0	42.0	38.0		13.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	9.5	4.5		4.5
Act Effct Green (s)	17.5	42.5			33.5	58.5	67.0	8.5	32.5	71.0		8.5
Actuated g/C Ratio	0.12	0.30			0.24	0.42	0.48	0.06	0.23	0.51		0.06
v/c Ratio	0.41	0.99			0.84	0.74	0.65	0.61	0.43	0.39		1.00
Control Delay	62.8	67.9			61.5	36.9	11.1	89.2	50.7	17.6		128.3
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	62.8	67.9			61.5	36.9	11.1	89.2	50.7	17.6		128.3
LOS	E	E			E	D	B	F	D	B		F
Approach Delay		67.6				37.4			32.2			
Approach LOS		E				D			C			

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 57 (41%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 49.9	Intersection LOS: D
Intersection Capacity Utilization 94.2%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Fairview Ave & Mercer Pl & Mercer St/I-5 Off-Ramp



Lane Group	SBT	SBR
Lane Configurations		
Volume (vph)	189	91
Satd. Flow (prot)	1845	1568
Flt Permitted		
Satd. Flow (perm)	1845	1381
Satd. Flow (RTOR)		117
Confl. Peds. (#/hr)		78
Confl. Bikes (#/hr)		5
Peak Hour Factor	0.93	0.93
Growth Factor	103%	103%
Heavy Vehicles (%)	3%	3%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	209	101
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Total Split (s)	42.0	42.0
Total Lost Time (s)	9.5	9.5
Act Effct Green (s)	32.5	32.5
Actuated g/C Ratio	0.23	0.23
v/c Ratio	0.49	0.25
Control Delay	51.1	6.5
Queue Delay	0.0	0.0
Total Delay	51.1	6.5
LOS	D	A
Approach Delay	73.3	
Approach LOS	E	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	60	41	15	81	194	66	369	14	140	498	186
Satd. Flow (prot)	0	1751	1509	0	1227	0	1631	4517	1854	2306	3940	0
Flt Permitted		0.858			0.985		0.292			0.460		
Satd. Flow (perm)	0	1481	1360	0	1208	0	466	4517	1327	985	3940	0
Satd. Flow (RTOR)			44		69				58		49	
Confl. Peds. (#/hr)	121		39	39		121	86		59	59		86
Confl. Bikes (#/hr)			8			12			10			14
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	44	0	314	0	72	400	15	152	742	0
Turn Type	Perm	NA	pm+ov	Perm	NA		D.P+P	NA	Perm	D.P+P	NA	
Protected Phases		4	5		8		5	2		1	6	
Permitted Phases	4		4	8			6		2	2		
Total Split (s)	59.0	59.0	15.0	59.0	59.0		15.0	66.0	66.0	35.0	86.0	
Total Lost Time (s)		4.5	3.5		4.5		3.5	4.5	4.5	3.5	4.5	
Act Effct Green (s)		54.5	67.0		54.5		94.0	61.5	61.5	94.0	81.5	
Actuated g/C Ratio		0.34	0.42		0.34		0.59	0.38	0.38	0.59	0.51	
v/c Ratio		0.18	0.07		0.69		0.20	0.23	0.03	0.18	0.37	
Control Delay		38.3	6.9		43.9		10.7	28.8	3.9	13.7	22.5	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	1.0	
Total Delay		38.3	6.9		43.9		10.7	28.8	3.9	13.7	23.5	
LOS		D	A		D		B	C	A	B	C	
Approach Delay		28.2			43.9			25.3			21.8	
Approach LOS		C			D			C			C	

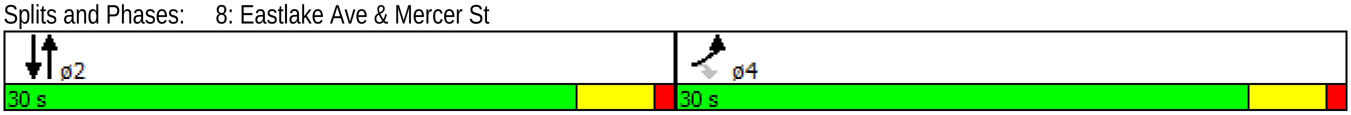
Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 49 (31%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 27.0	Intersection LOS: C
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 7: Fairview Ave & Republican St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	249	38	0	247	933	0
Satd. Flow (prot)	950	850	0	3764	3471	0
Flt Permitted	0.950					
Satd. Flow (perm)	949	812	0	3764	3471	0
Satd. Flow (RTOR)		40				
Confl. Peds. (#/hr)	1	40				
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	4%	4%	6%	6%	4%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	264	40	0	262	991	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Total Split (s)	30.0	30.0		30.0	30.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	
Act Effct Green (s)	19.2	19.2		26.6	26.6	
Actuated g/C Ratio	0.35	0.35		0.49	0.49	
v/c Ratio	0.80	0.13		0.14	0.59	
Control Delay	34.3	5.1		9.5	13.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	34.3	5.1		9.5	13.3	
LOS	C	A		A	B	
Approach Delay	30.5			9.5	13.3	
Approach LOS	C			A	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 54.8	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 16.0	Intersection LOS: B
Intersection Capacity Utilization 54.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Eastlake Ave & Mercer St



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	55	23	27	190	734	224
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	60	25	29	206	796	243
Pedestrians	91					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					399	
pX, platoon unblocked	0.79	0.79	0.79			
vC, conflicting volume	1170	610	1130			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	694	0	643			
tC, single (s)	6.9	7.0	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	77	97	95			
cM capacity (veh/h)	261	791	636			

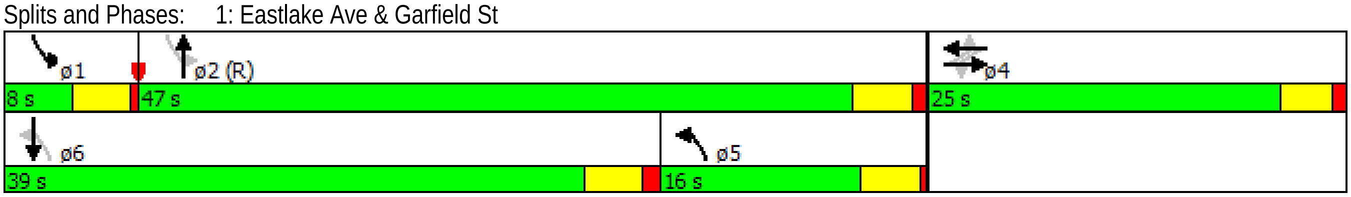
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	85	98	137	531	508
Volume Left	60	29	0	0	0
Volume Right	25	0	0	0	243
cSH	325	636	1700	1700	1700
Volume to Capacity	0.26	0.05	0.08	0.31	0.30
Queue Length 95th (ft)	26	4	0	0	0
Control Delay (s)	19.9	3.6	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	19.9	1.5		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	0	68	36	1	26	139	468	15	20	607	3
Satd. Flow (prot)	0	1690	0	0	1762	0	1636	3115	0	1620	3118	0
Flt Permitted		0.878			0.823		0.337			0.443		
Satd. Flow (perm)	0	1491	0	0	1437	0	548	3115	0	700	3118	0
Satd. Flow (RTOR)		136			27			6			1	
Confl. Peds. (#/hr)	33		65	65		33	67		63	63		67
Confl. Bikes (#/hr)			2			4			104			35
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	117	0	0	66	0	146	508	0	21	641	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Total Split (s)	25.0	25.0		25.0	25.0		16.0	47.0		8.0	39.0	
Total Lost Time (s)		4.0			4.0		4.0	4.5		4.0	4.5	
Act Effct Green (s)		21.0			21.0		47.0	42.5		47.0	34.5	
Actuated g/C Ratio		0.26			0.26		0.59	0.53		0.59	0.43	
v/c Ratio		0.24			0.17		0.30	0.31		0.05	0.48	
Control Delay		4.8			16.5		4.3	4.3		5.7	17.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		4.8			16.5		4.3	4.3		5.7	17.7	
LOS		A			B		A	A		A	B	
Approach Delay		4.8			16.5			4.3			17.4	
Approach LOS		A			B			A			B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 17 (21%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 10.6	Intersection LOS: B
Intersection Capacity Utilization 51.6%	ICU Level of Service A
Analysis Period (min) 15	

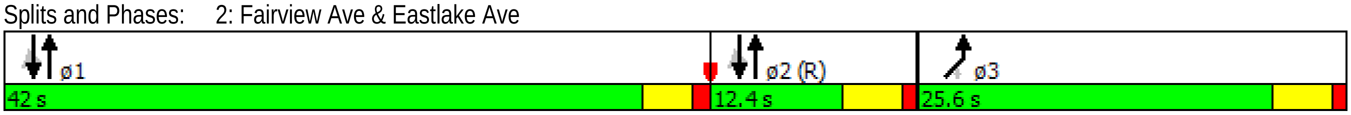
Splits and Phases: 1: Eastlake Ave & Garfield St



Lane Group	NBL	NBT	SBT	SBR	NEL	NER	ø1	ø2
Lane Configurations								
Volume (vph)	0	601	694	14	15	50		
Satd. Flow (prot)	0	1676	1721	1727	1992	1359		
Flt Permitted					0.950			
Satd. Flow (perm)	0	1676	1721	1727	1992	1131		
Satd. Flow (RTOR)				15		55		
Confl. Peds. (#/hr)						41		
Confl. Bikes (#/hr)						55		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Growth Factor	103%	103%	103%	103%	103%	103%		
Heavy Vehicles (%)	2%	2%	6%	6%	3%	3%		
Parking (#/hr)		0	0					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	659	760	15	16	55		
Turn Type		NA	NA	Perm	Prot	Perm		
Protected Phases		1 2	1 2		3		1	2
Permitted Phases				1 2		3		
Total Split (s)					25.6	25.6	42.0	12.4
Total Lost Time (s)					4.5	4.5		
Act Effct Green (s)		50.4	50.4	50.4	21.1	21.1		
Actuated g/C Ratio		0.63	0.63	0.63	0.26	0.26		
v/c Ratio		0.62	0.70	0.01	0.03	0.16		
Control Delay		12.3	10.8	0.2	22.2	8.2		
Queue Delay		0.0	0.0	0.0	0.0	0.0		
Total Delay		12.3	10.8	0.2	22.2	8.2		
LOS		B	B	A	C	A		
Approach Delay		12.3	10.6		11.4			
Approach LOS		B	B		B			

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 47 (59%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 11.4	Intersection LOS: B
Intersection Capacity Utilization 62.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Fairview Ave & Eastlake Ave



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	241	230	40	334	596	325
Satd. Flow (prot)	1611	0	1620	1888	1583	0
Flt Permitted	0.975		0.096			
Satd. Flow (perm)	1547	0	164	1888	1583	0
Satd. Flow (RTOR)	60				47	
Confl. Peds. (#/hr)	43		110			110
Confl. Bikes (#/hr)						19
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	2%	2%	4%	4%	6%	6%
Parking (#/hr)		0				
Shared Lane Traffic (%)						
Lane Group Flow (vph)	510	0	43	362	998	0
Turn Type	Perm		D.P+P	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4		6			
Total Split (s)	29.0		8.0	51.0	43.0	
Total Lost Time (s)	6.5		4.0	4.5	4.5	
Act Effct Green (s)	22.5		44.6	46.5	41.7	
Actuated g/C Ratio	0.28		0.56	0.58	0.52	
v/c Ratio	1.07		0.26	0.33	1.18	
Control Delay	87.7		11.2	9.7	114.2	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	87.7		11.2	9.7	114.2	
LOS	F		B	A	F	
Approach Delay	87.7			9.9	114.2	
Approach LOS	F			A	F	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.18	
Intersection Signal Delay: 85.0	Intersection LOS: F
Intersection Capacity Utilization 92.4%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 3: Eastlake Ave & Aloha St

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	412	0	15	37	20	296	7	50	11
Satd. Flow (prot)	0	0	0	0	707	0	2241	2358	1950	922	811	0
Flt Permitted					0.954		0.664			0.743		
Satd. Flow (perm)	0	0	0	0	707	0	1011	2358	1776	665	811	0
Satd. Flow (RTOR)					24						12	
Confl. Peds. (#/hr)						108	159		33	33		159
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	6%	6%	9%	3%	3%	3%
Parking (#/hr)					0							
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	473	0	41	22	328	8	67	0
Turn Type				Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases				4	4			2	4		6	
Permitted Phases							2		2	6		
Total Split (s)				49.0	49.0		19.5	19.5	49.0	19.5	19.5	
Total Lost Time (s)					4.5		4.5	4.5	4.5	4.5	4.5	
Act Effct Green (s)					44.5		15.0	15.0	59.5	15.0	15.0	
Actuated g/C Ratio					0.65		0.22	0.22	0.87	0.22	0.22	
v/c Ratio					1.01		0.19	0.04	0.20	0.06	0.36	
Control Delay					61.2		24.4	21.5	0.6	22.4	25.8	
Queue Delay					0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay					61.2		24.4	21.5	0.6	22.4	25.8	
LOS					E		C	C	A	C	C	
Approach Delay					61.2			4.3			25.4	
Approach LOS					E			A			C	

Intersection Summary

Cycle Length: 68.5
Actuated Cycle Length: 68.5
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 34.6 Intersection LOS: C
Intersection Capacity Utilization 58.1% ICU Level of Service B
Analysis Period (min) 15

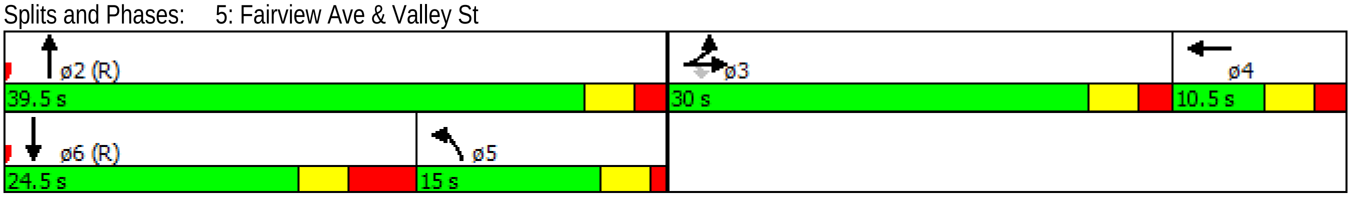
Splits and Phases: 4: Fairview Ave & Aloha St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	179	0	204	0	9	0	255	232	0	0	215	257
Satd. Flow (prot)	0	1703	1599	0	600	0	1660	1073	0	0	1170	0
Flt Permitted		0.950					0.950					
Satd. Flow (perm)	0	1703	1499	0	600	0	1660	1073	0	0	1170	0
Satd. Flow (RTOR)			221								279	
Confl. Peds. (#/hr)			42									99
Confl. Bikes (#/hr)			17									17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	2%	1%	100%	100%	100%	3%	3%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	194	221	0	10	0	276	252	0	0	512	0
Turn Type	Split	NA	Perm		NA		Prot	NA			NA	
Protected Phases	3	3			4		5	2			6	
Permitted Phases			3									
Total Split (s)	30.0	30.0	30.0		10.5		15.0	39.5			24.5	
Total Lost Time (s)		5.0	5.0		5.0		4.0	5.0			7.0	
Act Effct Green (s)		25.0	25.0		5.5		11.0	34.5			17.5	
Actuated g/C Ratio		0.31	0.31		0.07		0.14	0.43			0.22	
v/c Ratio		0.36	0.36		0.24		1.21	0.55			1.08	
Control Delay		23.8	5.0		50.0		161.8	22.4			82.4	
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	
Total Delay		23.8	5.0		50.0		161.8	22.4			82.4	
LOS		C	A		D		F	C			F	
Approach Delay		13.8			50.0			95.3			82.4	
Approach LOS		B			D			F			F	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.21
Intersection Signal Delay: 67.4 Intersection LOS: E
Intersection Capacity Utilization 80.6% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 5: Fairview Ave & Valley St

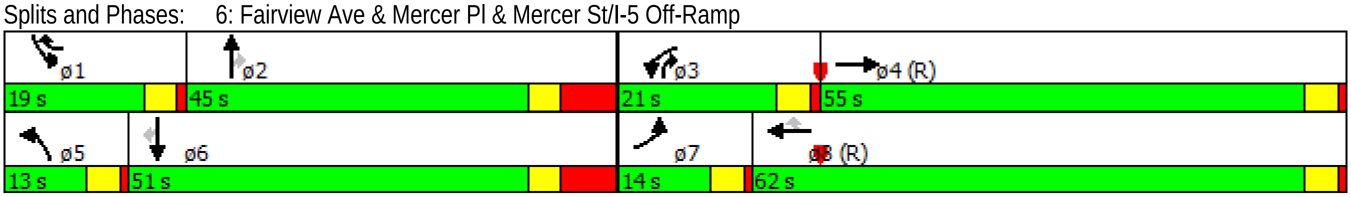


Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Volume (vph)	33	1858	79	36	280	1350	361	89	87	1122	61	245
Satd. Flow (prot)	1770	6239	0	0	3467	4964	1599	1770	841	1430	0	1956
Flt Permitted	0.950				0.950			0.950				0.950
Satd. Flow (perm)	1770	6239	0	0	3467	4964	1482	1770	841	1383	0	1956
Satd. Flow (RTOR)		3					286			82		
Confl. Peds. (#/hr)			3	179			19				3	
Confl. Bikes (#/hr)				4			4			3	3	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	2052	0	0	291	1405	376	93	91	1230	0	255
Turn Type	Prot	NA			Prot	NA	pm+ov	Prot	NA	pm+ov		Prot
Protected Phases	7	4			3	8	1	5	2	3		1
Permitted Phases							8			2		
Total Split (s)	14.0	55.0			21.0	62.0	19.0	13.0	45.0	21.0		19.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	9.5	4.5		4.5
Act Effct Green (s)	9.5	50.5			16.5	57.5	72.0	8.5	35.5	57.0		14.5
Actuated g/C Ratio	0.07	0.36			0.12	0.41	0.51	0.06	0.25	0.41		0.10
v/c Ratio	0.28	0.91			0.71	0.69	0.41	0.87	0.43	1.99		1.26
Control Delay	68.5	49.7			70.0	36.1	5.7	121.3	51.2	476.3		200.5
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	68.5	49.7			70.0	36.1	5.7	121.3	51.2	476.3		200.5
LOS	E	D			E	D	A	F	D	F		F
Approach Delay		50.0				35.3			425.6			
Approach LOS		D				D			F			

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 96 (69%), Referenced to phase 4:EBT and 8:WBT, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.99
Intersection Signal Delay: 138.5 Intersection LOS: F
Intersection Capacity Utilization 125.5% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 6: Fairview Ave & Mercer Pl & Mercer St/I-5 Off-Ramp



Lane Group	SBT	SBR
Lane Configurations		
Volume (vph)	107	92
Satd. Flow (prot)	1030	875
Flt Permitted		
Satd. Flow (perm)	1030	702
Satd. Flow (RTOR)		117
Confl. Peds. (#/hr)		139
Confl. Bikes (#/hr)		3
Peak Hour Factor	0.99	0.99
Growth Factor	103%	103%
Heavy Vehicles (%)	1%	1%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	111	96
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Total Split (s)	51.0	51.0
Total Lost Time (s)	9.5	9.5
Act Effct Green (s)	41.5	41.5
Actuated g/C Ratio	0.30	0.30
v/c Ratio	0.36	0.33
Control Delay	43.1	6.8
Queue Delay	0.0	0.0
Total Delay	43.1	6.8
LOS	D	A
Approach Delay	122.4	
Approach LOS	F	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	61	28	26	86	399	3	859	1	125	251	68
Satd. Flow (prot)	0	1836	1599	0	1187	985	1711	1706	700	1719	2951	0
Flt Permitted		0.759			0.910		0.529			0.162		
Satd. Flow (perm)	0	1298	1276	0	1057	734	669	1706	608	293	2951	0
Satd. Flow (RTOR)			25			115			34		35	
Confl. Peds. (#/hr)	112		87	87		112	138		25	25		138
Confl. Bikes (#/hr)			9			8			4			4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	127	30	0	119	424	3	912	1	133	339	0
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+ov	D.P+P	NA	Perm	D.P+P	NA	
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6		2	2		
Total Split (s)	40.0	40.0	25.0	40.0	40.0	25.0	25.0	95.0	95.0	25.0	95.0	
Total Lost Time (s)		4.5	3.5		4.5	3.5	3.5	4.5	4.5	3.5	4.5	
Act Effct Green (s)		35.5	58.0		35.5	58.0	113.0	90.5	90.5	113.0	90.5	
Actuated g/C Ratio		0.22	0.36		0.22	0.36	0.71	0.57	0.57	0.71	0.57	
v/c Ratio		0.44	0.06		0.51	1.14	0.00	0.95	0.00	0.33	0.20	
Control Delay		59.4	12.8		63.4	122.7	6.0	49.6	0.0	8.8	15.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	44.2	0.0	0.0	0.0	
Total Delay		59.4	12.8		63.4	122.7	6.0	93.7	0.0	8.8	15.5	
LOS		E	B		E	F	A	F	A	A	B	
Approach Delay		50.5			109.7			93.3			13.6	
Approach LOS		D			F			F			B	

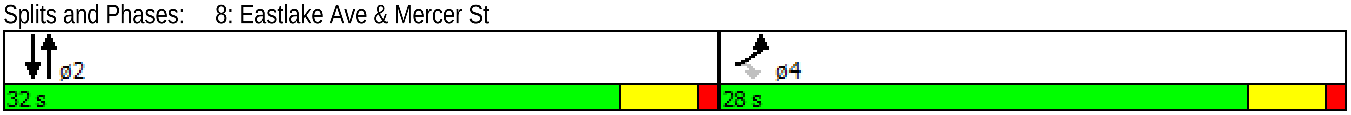
Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 77 (48%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.14	
Intersection Signal Delay: 76.4	Intersection LOS: E
Intersection Capacity Utilization 111.4%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 7: Fairview Ave & Republican St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	316	58	0	281	1015	0
Satd. Flow (prot)	899	804	0	1294	3438	0
Flt Permitted	0.950					
Satd. Flow (perm)	899	767	0	1294	3438	0
Satd. Flow (RTOR)		48				
Confl. Peds. (#/hr)		39				
Confl. Bikes (#/hr)		7				
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	6%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	332	61	0	295	1067	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Total Split (s)	28.0	28.0		32.0	32.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	
Act Effct Green (s)	23.1	23.1		27.5	27.5	
Actuated g/C Ratio	0.39	0.39		0.46	0.46	
v/c Ratio	0.95	0.19		0.49	0.67	
Control Delay	60.6	7.0		14.9	15.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	60.6	7.0		14.9	15.3	
LOS	E	A		B	B	
Approach Delay	52.3			14.9	15.3	
Approach LOS	D			B	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 59.6	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 23.5	Intersection LOS: C
Intersection Capacity Utilization 64.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 8: Eastlake Ave & Mercer St



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	57	25	44	178	746	390
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	61	27	47	191	800	418
Pedestrians	98			2		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	8			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					406	
pX, platoon unblocked	0.76	0.76	0.76			
vC, conflicting volume	1298	709	1317			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	746	0	771			
tC, single (s)	6.8	6.9	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	73	96	91			
cM capacity (veh/h)	224	755	543			

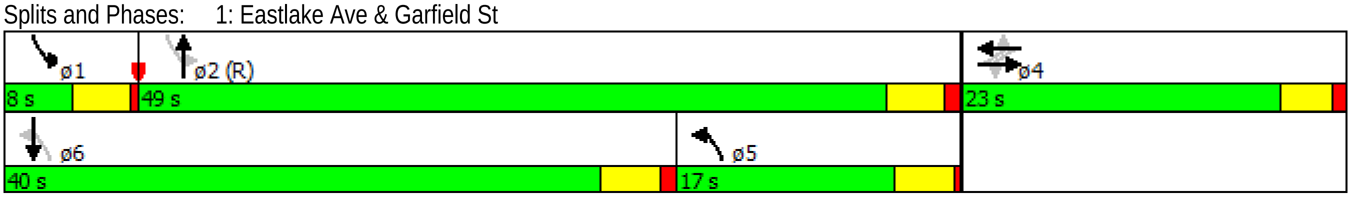
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	88	111	127	534	685
Volume Left	61	47	0	0	0
Volume Right	27	0	0	0	418
cSH	285	543	1700	1700	1700
Volume to Capacity	0.31	0.09	0.07	0.31	0.40
Queue Length 95th (ft)	32	7	0	0	0
Control Delay (s)	23.2	5.9	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	23.2	2.7		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	3	30	31	3	13	169	301	22	15	811	11
Satd. Flow (prot)	0	1475	0	0	1767	0	1546	2912	0	1636	3138	0
Flt Permitted		0.983			0.837		0.211			0.538		
Satd. Flow (perm)	0	1451	0	0	1461	0	334	2912	0	830	3138	0
Satd. Flow (RTOR)		33			14			15			2	
Confl. Peds. (#/hr)	34		55	55		34	57		68	68		57
Confl. Bikes (#/hr)			1			1			13			120
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	17%	17%	17%	2%	2%	2%	9%	9%	9%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	40	0	0	51	0	187	357	0	17	910	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Total Split (s)	23.0	23.0		23.0	23.0		17.0	49.0		8.0	40.0	
Total Lost Time (s)		4.0			4.0		4.0	4.5		4.0	4.5	
Act Effct Green (s)		19.0			19.0		49.0	44.5		49.0	35.5	
Actuated g/C Ratio		0.24			0.24		0.61	0.56		0.61	0.44	
v/c Ratio		0.11			0.14		0.47	0.22		0.03	0.65	
Control Delay		11.5			20.1		12.2	4.7		4.9	20.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		11.5			20.1		12.2	4.7		4.9	20.1	
LOS		B			C		B	A		A	C	
Approach Delay		11.5			20.1			7.3			19.9	
Approach LOS		B			C			A			B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 17 (21%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 59.4%	ICU Level of Service B
Analysis Period (min) 15	

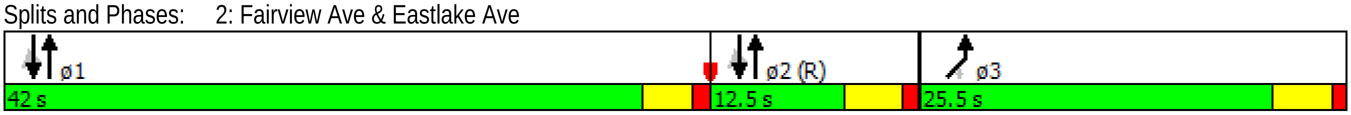
Splits and Phases: 1: Eastlake Ave & Garfield St



Lane Group	NBL	NBT	SBT	SBR	NEL	NER	ø1	ø2
Lane Configurations								
Volume (vph)	0	371	839	15	14	25		
Satd. Flow (prot)	0	1583	1754	1760	4266	1705		
Flt Permitted					0.950			
Satd. Flow (perm)	0	1583	1754	1760	4266	1584		
Satd. Flow (RTOR)				17		28		
Confl. Peds. (#/hr)						23		
Confl. Bikes (#/hr)						6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Growth Factor	103%	103%	103%	103%	103%	103%		
Heavy Vehicles (%)	8%	8%	4%	4%	8%	8%		
Parking (#/hr)		0	0					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	415	939	17	16	28		
Turn Type		NA	NA	Perm	Prot	Perm		
Protected Phases		1 2	1 2		3		1	2
Permitted Phases				1 2		3		
Total Split (s)					25.5	25.5	42.0	12.5
Total Lost Time (s)					4.5	4.5		
Act Effct Green (s)		50.5	50.5	50.5	21.0	21.0		
Actuated g/C Ratio		0.63	0.63	0.63	0.26	0.26		
v/c Ratio		0.42	0.85	0.02	0.01	0.06		
Control Delay		8.9	18.3	0.1	4.3	0.2		
Queue Delay		0.0	0.4	0.0	0.0	0.0		
Total Delay		8.9	18.7	0.1	4.3	0.2		
LOS		A	B	A	A	A		
Approach Delay		8.9	18.4		1.7			
Approach LOS		A	B		A			

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 49 (61%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 15.1	Intersection LOS: B
Intersection Capacity Utilization 70.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Fairview Ave & Eastlake Ave



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	263	55	91	479	546	281
Satd. Flow (prot)	1610	0	1589	1852	1584	0
Flt Permitted	0.960		0.103			
Satd. Flow (perm)	1497	0	172	1852	1584	0
Satd. Flow (RTOR)	13				45	
Confl. Peds. (#/hr)	47		113			113
Confl. Bikes (#/hr)						54
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	11%	9%	6%	6%	5%	7%
Parking (#/hr)		0				
Shared Lane Traffic (%)						
Lane Group Flow (vph)	331	0	95	498	860	0
Turn Type	Perm		D.P+P	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4		6			
Total Split (s)	29.0		8.0	51.0	43.0	
Total Lost Time (s)	8.5		4.0	4.5	4.5	
Act Effct Green (s)	18.1		42.4	44.9	38.8	
Actuated g/C Ratio	0.24		0.56	0.59	0.51	
v/c Ratio	0.91		0.56	0.46	1.04	
Control Delay	57.7		22.6	10.8	63.3	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	57.7		22.6	10.8	63.3	
LOS	E		C	B	E	
Approach Delay	57.7			12.7	63.3	
Approach LOS	E			B	E	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 76.1	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 45.5	Intersection LOS: D
Intersection Capacity Utilization 87.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Eastlake Ave & Aloha St

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	267	0	15	23	115	466	5	20	0
Satd. Flow (prot)	0	0	0	0	1552	0	1719	867	716	1736	3471	0
Flt Permitted					0.955		0.743			0.563		
Satd. Flow (perm)	0	0	0	0	1552	0	934	867	595	890	3471	0
Satd. Flow (RTOR)					20							
Confl. Peds. (#/hr)						61	110		61	61		110
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	0%	4%	2%	2%	5%	5%	8%	4%	4%	4%
Parking (#/hr)					0							
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	302	0	25	123	500	5	21	0
Turn Type				Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases				4	4			2	4		6	
Permitted Phases							2		2	6		
Total Split (s)				58.0	58.0		22.0	22.0	58.0	22.0	22.0	
Total Lost Time (s)					5.5		4.5	4.5	5.5	4.5	4.5	
Act Effct Green (s)					52.5		17.5	17.5	69.0	17.5	17.5	
Actuated g/C Ratio					0.66		0.22	0.22	0.86	0.22	0.22	
v/c Ratio					0.29		0.12	0.65	0.84	0.03	0.03	
Control Delay					6.3		21.9	41.1	30.0	18.6	17.7	
Queue Delay					0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay					6.3		21.9	41.1	30.0	18.6	17.7	
LOS					A		C	D	C	B	B	
Approach Delay					6.3			31.8			17.9	
Approach LOS					A			C			B	

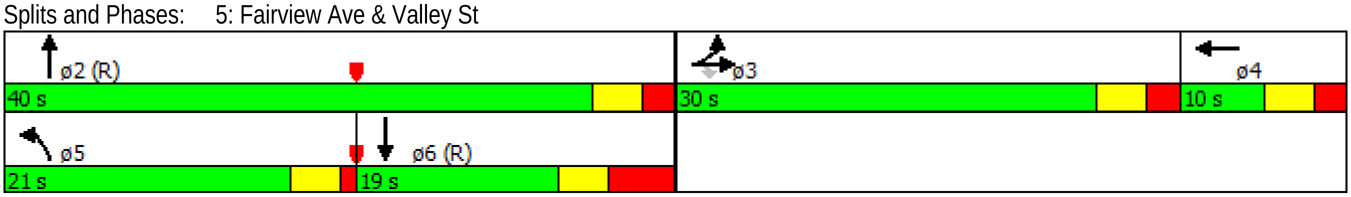
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NETL and 6:SWTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 23.5	Intersection LOS: C
Intersection Capacity Utilization 62.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Fairview Ave & Aloha St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	0	136	0	8	0	230	428	0	0	168	148
Satd. Flow (prot)	0	1703	1583	0	950	0	1719	2381	0	0	2894	0
Flt Permitted		0.950					0.950					
Satd. Flow (perm)	0	1703	1583	0	950	0	1719	2381	0	0	2894	0
Satd. Flow (RTOR)			177								160	
Confl. Peds. (#/hr)												51
Confl. Bikes (#/hr)												17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	2%	2%	100%	100%	100%	5%	5%	2%	2%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	271	147	0	9	0	249	464	0	0	342	0
Turn Type	Split	NA	Perm		NA		Prot	NA			NA	
Protected Phases	3	3			4		5	2			6	
Permitted Phases			3									
Total Split (s)	30.0	30.0	30.0		10.0		21.0	40.0			19.0	
Total Lost Time (s)		5.0	5.0		5.0		4.0	5.0			7.0	
Act Effct Green (s)		25.0	25.0		5.0		17.0	35.0			12.0	
Actuated g/C Ratio		0.31	0.31		0.06		0.21	0.44			0.15	
v/c Ratio		0.51	0.24		0.15		0.68	0.45			0.60	
Control Delay		26.6	3.3		41.6		40.0	17.4			23.1	
Queue Delay		0.0	0.0		0.0		0.0	1.2			0.0	
Total Delay		26.6	3.3		41.6		40.0	18.6			23.1	
LOS		C	A		D		D	B			C	
Approach Delay		18.4			41.6			26.1			23.1	
Approach LOS		B			D			C			C	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 23.3	Intersection LOS: C
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	

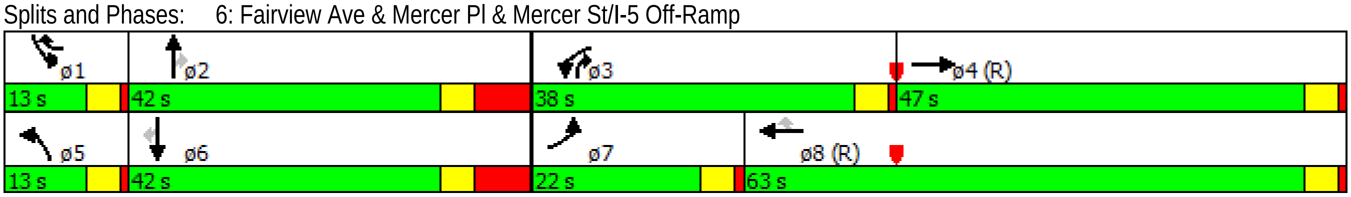
Splits and Phases: 5: Fairview Ave & Valley St



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Volume (vph)	79	1463	155	20	619	1350	546	55	123	276	92	187
Satd. Flow (prot)	1719	6011	0	0	3400	4868	1568	1656	1376	2059	0	3400
Flt Permitted	0.950				0.950			0.950				0.950
Satd. Flow (perm)	1719	6011	0	0	3400	4868	1486	1656	1376	1996	0	3400
Satd. Flow (RTOR)		2					403			47		
Confl. Peds. (#/hr)			2	100			12				2	
Confl. Bikes (#/hr)				1			1			4	4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	5%	5%	5%	3%	3%	3%	9%	9%	9%	9%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	1814	0	0	686	1495	605	61	136	408	0	207
Turn Type	Prot	NA			Prot	NA	pm+ov	Prot	NA	pm+ov		Prot
Protected Phases	7	4			3	8	1	5	2	3		1
Permitted Phases							8			2		
Total Split (s)	22.0	47.0			38.0	63.0	13.0	13.0	42.0	38.0		13.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	9.5	4.5		4.5
Act Effct Green (s)	17.5	42.5			33.5	58.5	67.0	8.5	32.5	71.0		8.5
Actuated g/C Ratio	0.12	0.30			0.24	0.42	0.48	0.06	0.23	0.51		0.06
v/c Ratio	0.41	0.99			0.84	0.74	0.65	0.61	0.43	0.39		1.00
Control Delay	62.8	67.9			61.5	36.9	11.1	89.2	50.7	17.6		128.3
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	62.8	67.9			61.5	36.9	11.1	89.2	50.7	17.6		128.3
LOS	E	E			E	D	B	F	D	B		F
Approach Delay		67.6				37.4			32.2			
Approach LOS		E				D			C			

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 57 (41%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 49.9	Intersection LOS: D
Intersection Capacity Utilization 94.2%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Fairview Ave & Mercer Pl & Mercer St/I-5 Off-Ramp



Lane Group	SBT	SBR
Lane Configurations		
Volume (vph)	189	91
Satd. Flow (prot)	1845	1568
Flt Permitted		
Satd. Flow (perm)	1845	1381
Satd. Flow (RTOR)		117
Confl. Peds. (#/hr)		78
Confl. Bikes (#/hr)		5
Peak Hour Factor	0.93	0.93
Growth Factor	103%	103%
Heavy Vehicles (%)	3%	3%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	209	101
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Total Split (s)	42.0	42.0
Total Lost Time (s)	9.5	9.5
Act Effct Green (s)	32.5	32.5
Actuated g/C Ratio	0.23	0.23
v/c Ratio	0.49	0.25
Control Delay	51.1	6.5
Queue Delay	0.0	0.0
Total Delay	51.1	6.5
LOS	D	A
Approach Delay	73.3	
Approach LOS	E	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	60	41	15	81	194	66	369	14	140	498	186
Satd. Flow (prot)	0	1751	1509	0	1227	0	1631	4517	1854	2306	3940	0
Flt Permitted		0.858			0.985		0.292			0.460		
Satd. Flow (perm)	0	1481	1360	0	1208	0	466	4517	1327	985	3940	0
Satd. Flow (RTOR)			44		69				58		49	
Confl. Peds. (#/hr)	121		39	39		121	86		59	59		86
Confl. Bikes (#/hr)			8			12			10			14
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	44	0	314	0	72	400	15	152	742	0
Turn Type	Perm	NA	pm+ov	Perm	NA		D.P+P	NA	Perm	D.P+P	NA	
Protected Phases		4	5		8		5	2		1	6	
Permitted Phases	4		4	8			6		2	2		
Total Split (s)	59.0	59.0	15.0	59.0	59.0		15.0	66.0	66.0	35.0	86.0	
Total Lost Time (s)		4.5	3.5		4.5		3.5	4.5	4.5	3.5	4.5	
Act Effct Green (s)		54.5	67.0		54.5		94.0	61.5	61.5	94.0	81.5	
Actuated g/C Ratio		0.34	0.42		0.34		0.59	0.38	0.38	0.59	0.51	
v/c Ratio		0.18	0.07		0.69		0.20	0.23	0.03	0.18	0.37	
Control Delay		38.3	6.9		43.9		10.7	28.8	3.9	13.7	22.5	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	1.0	
Total Delay		38.3	6.9		43.9		10.7	28.8	3.9	13.7	23.5	
LOS		D	A		D		B	C	A	B	C	
Approach Delay		28.2			43.9			25.3			21.8	
Approach LOS		C			D			C			C	

Intersection Summary

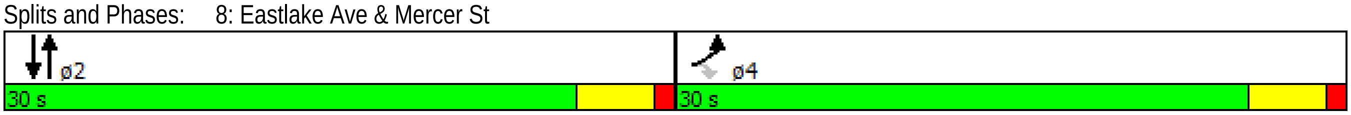
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 49 (31%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 27.0 Intersection LOS: C
Intersection Capacity Utilization 60.5% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 7: Fairview Ave & Republican St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	249	38	0	247	933	0
Satd. Flow (prot)	950	850	0	3764	3471	0
Flt Permitted	0.950					
Satd. Flow (perm)	949	812	0	3764	3471	0
Satd. Flow (RTOR)		40				
Confl. Peds. (#/hr)	1	40				
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	4%	4%	6%	6%	4%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	264	40	0	262	991	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Total Split (s)	30.0	30.0		30.0	30.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	
Act Effct Green (s)	19.2	19.2		26.6	26.6	
Actuated g/C Ratio	0.35	0.35		0.49	0.49	
v/c Ratio	0.80	0.13		0.14	0.59	
Control Delay	34.3	5.1		9.5	13.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	34.3	5.1		9.5	13.3	
LOS	C	A		A	B	
Approach Delay	30.5			9.5	13.3	
Approach LOS	C			A	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 54.8	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 16.0	Intersection LOS: B
Intersection Capacity Utilization 54.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Eastlake Ave & Mercer St



HCM Unsignalized Intersection Capacity Analysis
9: Eastlake Ave & Republican St

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	55	23	27	190	734	224
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	60	25	29	206	796	243
Pedestrians	91					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					399	
pX, platoon unblocked	0.79	0.79	0.79			
vC, conflicting volume	1170	610	1130			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	694	0	643			
tC, single (s)	6.9	7.0	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	77	97	95			
cM capacity (veh/h)	261	791	636			

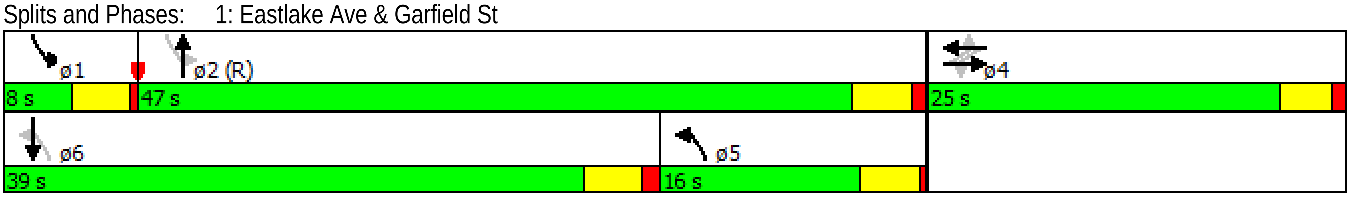
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	85	98	137	531	508
Volume Left	60	29	0	0	0
Volume Right	25	0	0	0	243
cSH	325	636	1700	1700	1700
Volume to Capacity	0.26	0.05	0.08	0.31	0.30
Queue Length 95th (ft)	26	4	0	0	0
Control Delay (s)	19.9	3.6	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	19.9	1.5		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	0	68	36	1	26	139	468	15	20	607	3
Satd. Flow (prot)	0	1690	0	0	1762	0	1636	3115	0	1620	3118	0
Flt Permitted		0.878			0.823		0.337			0.443		
Satd. Flow (perm)	0	1491	0	0	1437	0	548	3115	0	700	3118	0
Satd. Flow (RTOR)		136			27			6			1	
Confl. Peds. (#/hr)	33		65	65		33	67		63	63		67
Confl. Bikes (#/hr)			2			4			104			35
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	117	0	0	66	0	146	508	0	21	641	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Total Split (s)	25.0	25.0		25.0	25.0		16.0	47.0		8.0	39.0	
Total Lost Time (s)		4.0			4.0		4.0	4.5		4.0	4.5	
Act Effct Green (s)		21.0			21.0		47.0	42.5		47.0	34.5	
Actuated g/C Ratio		0.26			0.26		0.59	0.53		0.59	0.43	
v/c Ratio		0.24			0.17		0.30	0.31		0.05	0.48	
Control Delay		4.8			16.5		4.3	4.3		5.7	17.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		4.8			16.5		4.3	4.3		5.7	17.7	
LOS		A			B		A	A		A	B	
Approach Delay		4.8			16.5			4.3			17.4	
Approach LOS		A			B			A			B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 17 (21%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 10.6	Intersection LOS: B
Intersection Capacity Utilization 51.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Eastlake Ave & Garfield St

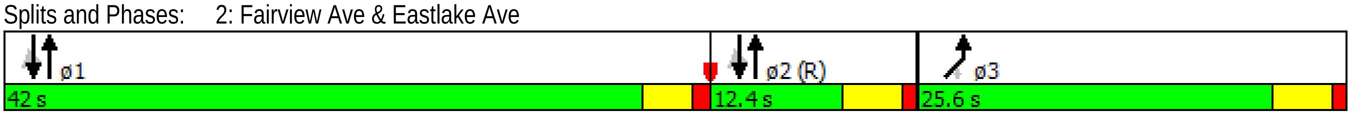


Lane Group	NBL	NBT	SBT	SBR	NEL	NER	ø1	ø2
Lane Configurations								
Volume (vph)	0	601	694	14	15	50		
Satd. Flow (prot)	0	1676	1721	1727	1992	1359		
Flt Permitted					0.950			
Satd. Flow (perm)	0	1676	1721	1727	1992	1131		
Satd. Flow (RTOR)				15		55		
Confl. Peds. (#/hr)						41		
Confl. Bikes (#/hr)						55		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Growth Factor	103%	103%	103%	103%	103%	103%		
Heavy Vehicles (%)	2%	2%	6%	6%	3%	3%		
Parking (#/hr)		0	0					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	659	760	15	16	55		
Turn Type		NA	NA	Perm	Prot	Perm		
Protected Phases		1 2	1 2		3		1	2
Permitted Phases				1 2		3		
Total Split (s)					25.6	25.6	42.0	12.4
Total Lost Time (s)					4.5	4.5		
Act Effct Green (s)		50.4	50.4	50.4	21.1	21.1		
Actuated g/C Ratio		0.63	0.63	0.63	0.26	0.26		
v/c Ratio		0.62	0.70	0.01	0.03	0.16		
Control Delay		12.3	10.8	0.2	22.2	8.2		
Queue Delay		0.0	0.0	0.0	0.0	0.0		
Total Delay		12.3	10.8	0.2	22.2	8.2		
LOS		B	B	A	C	A		
Approach Delay		12.3	10.6		11.4			
Approach LOS		B	B		B			

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 47 (59%), Referenced to phase 2:NBSB, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 11.4 Intersection LOS: B
Intersection Capacity Utilization 62.2% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Fairview Ave & Eastlake Ave

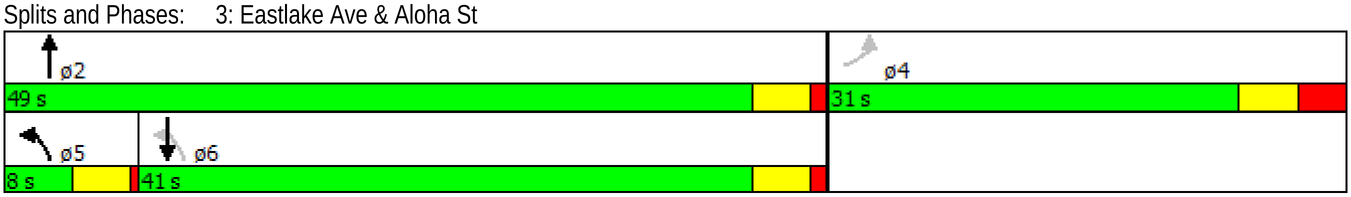


 without added turn lanes

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	241	230	40	334	596	325
Satd. Flow (prot)	1588	0	1620	1888	1572	0
Flt Permitted	0.975		0.101			
Satd. Flow (perm)	1524	0	172	1888	1572	0
Satd. Flow (RTOR)	60				45	
Confl. Peds. (#/hr)	43		110			110
Confl. Bikes (#/hr)						19
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	2%	4%	4%	6%	8%
Parking (#/hr)		0				
Shared Lane Traffic (%)						
Lane Group Flow (vph)	510	0	43	362	998	0
Turn Type	Perm		D.P+P	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4		6			
Total Split (s)	31.0		8.0	49.0	41.0	
Total Lost Time (s)	8.5		4.0	4.5	4.5	
Act Effct Green (s)	22.5		42.6	44.5	39.7	
Actuated g/C Ratio	0.28		0.53	0.56	0.50	
v/c Ratio	1.08		0.26	0.34	1.24	
Control Delay	93.0		12.0	10.9	142.7	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	93.0		12.0	10.9	142.7	
LOS	F		B	B	F	
Approach Delay	93.0			11.0	142.7	
Approach LOS	F			B	F	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.24	
Intersection Signal Delay: 101.6	Intersection LOS: F
Intersection Capacity Utilization 94.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 3: Eastlake Ave & Aloha St



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	412	0	15	37	20	296	7	50	11
Satd. Flow (prot)	0	0	0	0	699	0	2241	2358	1914	922	803	0
Flt Permitted					0.954		0.664			0.743		
Satd. Flow (perm)	0	0	0	0	699	0	918	2358	1721	655	803	0
Satd. Flow (RTOR)					20						11	
Confl. Peds. (#/hr)						108	159		33	33		159
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	0%	2%	1%	1%	6%	6%	11%	3%	3%	3%
Parking (#/hr)					0							
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	473	0	41	22	328	8	67	0
Turn Type				Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases				4	4			2	4		6	
Permitted Phases							2		2	6		
Total Split (s)				60.0	60.0		20.0	20.0	60.0	20.0	20.0	
Total Lost Time (s)					5.5		4.5	4.5	5.5	4.5	4.5	
Act Effct Green (s)					54.3		15.5	15.5	68.8	15.5	15.5	
Actuated g/C Ratio					0.68		0.19	0.19	0.86	0.19	0.19	
v/c Ratio					0.98		0.23	0.05	0.20	0.06	0.41	
Control Delay					52.6		31.2	26.7	0.8	28.0	33.0	
Queue Delay					0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay					52.6		31.2	26.7	0.8	28.0	33.0	
LOS					D		C	C	A	C	C	
Approach Delay					52.6			5.4			32.4	
Approach LOS					D			A			C	

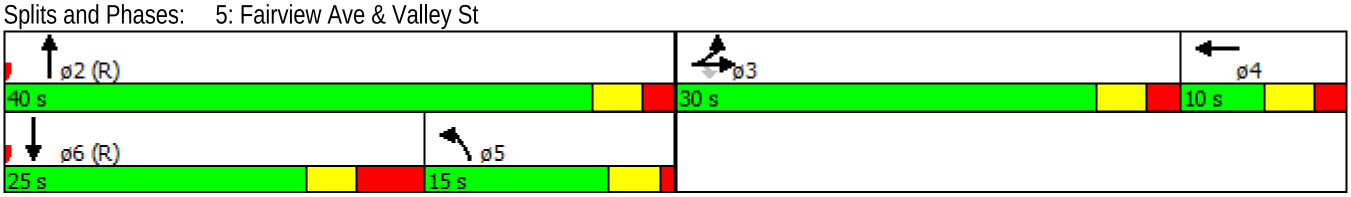
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 79.8	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 31.3	Intersection LOS: C
Intersection Capacity Utilization 58.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Fairview Ave & Aloha St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	179	0	204	0	9	0	255	232	0	0	215	257
Satd. Flow (prot)	0	1703	1599	0	600	0	1660	1073	0	0	1170	0
Flt Permitted		0.950					0.950					
Satd. Flow (perm)	0	1703	1499	0	600	0	1660	1073	0	0	1170	0
Satd. Flow (RTOR)			221								279	
Confl. Peds. (#/hr)			42									99
Confl. Bikes (#/hr)			17									17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	2%	1%	100%	100%	100%	3%	3%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	194	221	0	10	0	276	252	0	0	512	0
Turn Type	Split	NA	Perm		NA		Prot	NA			NA	
Protected Phases	3	3			4		5	2			6	
Permitted Phases			3									
Total Split (s)	30.0	30.0	30.0		10.0		15.0	40.0			25.0	
Total Lost Time (s)		5.0	5.0		5.0		4.0	5.0			7.0	
Act Effct Green (s)		25.0	25.0		5.0		11.0	35.0			18.0	
Actuated g/C Ratio		0.31	0.31		0.06		0.14	0.44			0.22	
v/c Ratio		0.36	0.36		0.27		1.21	0.54			1.07	
Control Delay		23.8	5.0		54.0		161.8	21.8			77.7	
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	
Total Delay		23.8	5.0		54.0		161.8	21.8			77.7	
LOS		C	A		D		F	C			E	
Approach Delay		13.8			54.0			95.0			77.7	
Approach LOS		B			D			F			E	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 65.7	Intersection LOS: E
Intersection Capacity Utilization 80.6%	ICU Level of Service D
Analysis Period (min) 15	

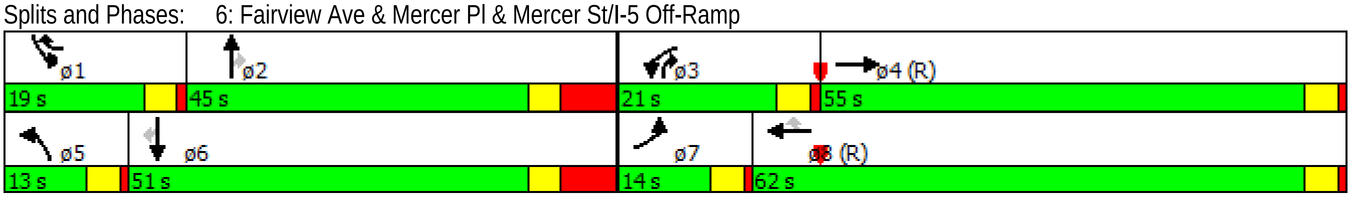
Splits and Phases: 5: Fairview Ave & Valley St



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Volume (vph)	33	1858	79	36	280	1350	361	89	87	1122	61	245
Satd. Flow (prot)	1770	6239	0	0	3467	4964	1599	1770	841	1430	0	1956
Flt Permitted	0.950				0.950			0.950				0.950
Satd. Flow (perm)	1770	6239	0	0	3467	4964	1482	1770	841	1383	0	1956
Satd. Flow (RTOR)		3					286			82		
Confl. Peds. (#/hr)			3	179			19				3	
Confl. Bikes (#/hr)				4			4			3	3	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	2052	0	0	291	1405	376	93	91	1230	0	255
Turn Type	Prot	NA			Prot	NA	pm+ov	Prot	NA	pm+ov		Prot
Protected Phases	7	4			3	8	1	5	2	3		1
Permitted Phases							8			2		
Total Split (s)	14.0	55.0			21.0	62.0	19.0	13.0	45.0	21.0		19.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	9.5	4.5		4.5
Act Effct Green (s)	9.5	50.5			16.5	57.5	72.0	8.5	35.5	57.0		14.5
Actuated g/C Ratio	0.07	0.36			0.12	0.41	0.51	0.06	0.25	0.41		0.10
v/c Ratio	0.28	0.91			0.71	0.69	0.41	0.87	0.43	1.99		1.26
Control Delay	68.5	49.7			70.0	36.1	5.7	121.3	51.2	476.3		200.5
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	68.5	49.7			70.0	36.1	5.7	121.3	51.2	476.3		200.5
LOS	E	D			E	D	A	F	D	F		F
Approach Delay		50.0				35.3			425.6			
Approach LOS		D				D			F			

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 96 (69%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.99	
Intersection Signal Delay: 138.5	Intersection LOS: F
Intersection Capacity Utilization 125.5%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 6: Fairview Ave & Mercer Pl & Mercer St/I-5 Off-Ramp



Lane Group	SBT	SBR
Lane Configurations		
Volume (vph)	107	92
Satd. Flow (prot)	1030	875
Flt Permitted		
Satd. Flow (perm)	1030	702
Satd. Flow (RTOR)		117
Confl. Peds. (#/hr)		139
Confl. Bikes (#/hr)		3
Peak Hour Factor	0.99	0.99
Growth Factor	103%	103%
Heavy Vehicles (%)	1%	1%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	111	96
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Total Split (s)	51.0	51.0
Total Lost Time (s)	9.5	9.5
Act Effct Green (s)	41.5	41.5
Actuated g/C Ratio	0.30	0.30
v/c Ratio	0.36	0.33
Control Delay	43.1	6.8
Queue Delay	0.0	0.0
Total Delay	43.1	6.8
LOS	D	A
Approach Delay	122.4	
Approach LOS	F	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	61	28	26	86	399	3	859	1	125	251	68
Satd. Flow (prot)	0	1836	1599	0	1187	985	1711	1706	700	1719	2951	0
Flt Permitted		0.759			0.910		0.529			0.162		
Satd. Flow (perm)	0	1298	1276	0	1057	734	669	1706	608	293	2951	0
Satd. Flow (RTOR)			25			115			34		35	
Confl. Peds. (#/hr)	112		87	87		112	138		25	25		138
Confl. Bikes (#/hr)			9			8			4			4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	127	30	0	119	424	3	912	1	133	339	0
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+ov	D.P+P	NA	Perm	D.P+P	NA	
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6		2	2		
Total Split (s)	40.0	40.0	25.0	40.0	40.0	25.0	25.0	95.0	95.0	25.0	95.0	
Total Lost Time (s)		4.5	3.5		4.5	3.5	3.5	4.5	4.5	3.5	4.5	
Act Effct Green (s)		35.5	58.0		35.5	58.0	113.0	90.5	90.5	113.0	90.5	
Actuated g/C Ratio		0.22	0.36		0.22	0.36	0.71	0.57	0.57	0.71	0.57	
v/c Ratio		0.44	0.06		0.51	1.14	0.00	0.95	0.00	0.33	0.20	
Control Delay		59.4	12.8		63.4	122.7	6.0	49.6	0.0	8.8	15.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	44.2	0.0	0.0	0.0	
Total Delay		59.4	12.8		63.4	122.7	6.0	93.7	0.0	8.8	15.5	
LOS		E	B		E	F	A	F	A	A	B	
Approach Delay		50.5			109.7			93.3			13.6	
Approach LOS		D			F			F			B	

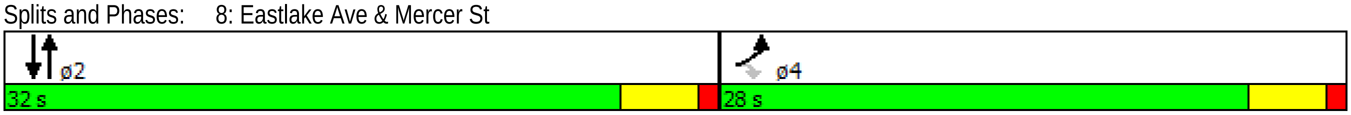
Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 77 (48%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.14	
Intersection Signal Delay: 76.4	Intersection LOS: E
Intersection Capacity Utilization 111.4%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 7: Fairview Ave & Republican St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	316	58	0	281	1015	0
Satd. Flow (prot)	899	804	0	1294	3438	0
Flt Permitted	0.950					
Satd. Flow (perm)	899	767	0	1294	3438	0
Satd. Flow (RTOR)		48				
Confl. Peds. (#/hr)		39				
Confl. Bikes (#/hr)		7				
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	6%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	332	61	0	295	1067	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Total Split (s)	28.0	28.0		32.0	32.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	
Act Effct Green (s)	23.1	23.1		27.5	27.5	
Actuated g/C Ratio	0.39	0.39		0.46	0.46	
v/c Ratio	0.95	0.19		0.49	0.67	
Control Delay	60.6	7.0		14.9	15.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	60.6	7.0		14.9	15.3	
LOS	E	A		B	B	
Approach Delay	52.3			14.9	15.3	
Approach LOS	D			B	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 59.6	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 23.5	Intersection LOS: C
Intersection Capacity Utilization 64.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 8: Eastlake Ave & Mercer St



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	57	25	44	178	746	390
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	61	27	47	191	800	418
Pedestrians	98			2		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	8			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					406	
pX, platoon unblocked	0.76	0.76	0.76			
vC, conflicting volume	1298	709	1317			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	746	0	771			
tC, single (s)	6.8	6.9	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	73	96	91			
cM capacity (veh/h)	224	755	543			

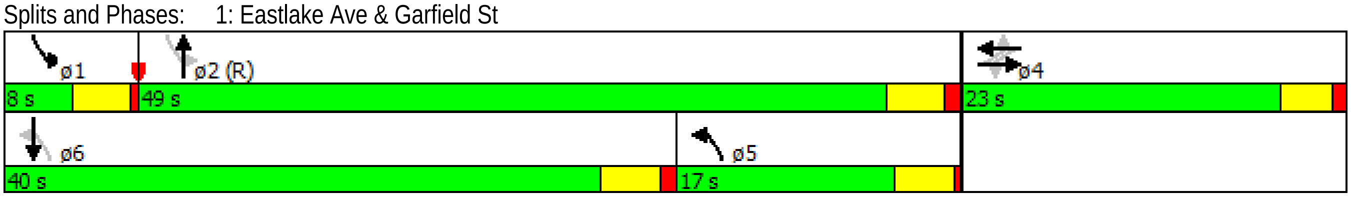
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	88	111	127	534	685
Volume Left	61	47	0	0	0
Volume Right	27	0	0	0	418
cSH	285	543	1700	1700	1700
Volume to Capacity	0.31	0.09	0.07	0.31	0.40
Queue Length 95th (ft)	32	7	0	0	0
Control Delay (s)	23.2	5.9	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	23.2	2.7		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	3	30	31	3	13	169	301	22	15	811	11
Satd. Flow (prot)	0	1475	0	0	1767	0	1546	2912	0	1636	3138	0
Flt Permitted		0.983			0.837		0.211			0.538		
Satd. Flow (perm)	0	1451	0	0	1461	0	334	2912	0	830	3138	0
Satd. Flow (RTOR)		33			14			15			2	
Confl. Peds. (#/hr)	34		55	55		34	57		68	68		57
Confl. Bikes (#/hr)			1			1			13			120
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	17%	17%	17%	2%	2%	2%	9%	9%	9%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	40	0	0	51	0	187	357	0	17	910	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Total Split (s)	23.0	23.0		23.0	23.0		17.0	49.0		8.0	40.0	
Total Lost Time (s)		4.0			4.0		4.0	4.5		4.0	4.5	
Act Effct Green (s)		19.0			19.0		49.0	44.5		49.0	35.5	
Actuated g/C Ratio		0.24			0.24		0.61	0.56		0.61	0.44	
v/c Ratio		0.11			0.14		0.47	0.22		0.03	0.65	
Control Delay		11.5			20.1		12.2	4.7		4.9	20.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		11.5			20.1		12.2	4.7		4.9	20.1	
LOS		B			C		B	A		A	C	
Approach Delay		11.5			20.1			7.3			19.9	
Approach LOS		B			C			A			B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 17 (21%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 59.4%	ICU Level of Service B
Analysis Period (min) 15	

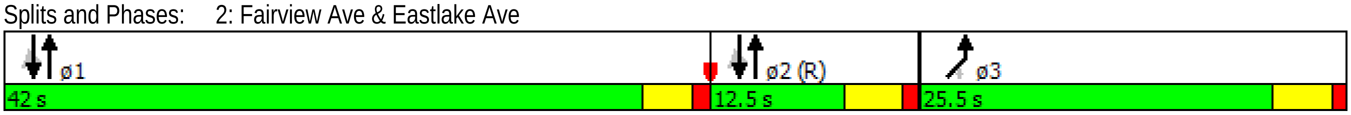
Splits and Phases: 1: Eastlake Ave & Garfield St



Lane Group	NBL	NBT	SBT	SBR	NEL	NER	ø1	ø2
Lane Configurations								
Volume (vph)	0	371	839	15	14	25		
Satd. Flow (prot)	0	1583	1754	1760	4266	1705		
Flt Permitted					0.950			
Satd. Flow (perm)	0	1583	1754	1760	4266	1584		
Satd. Flow (RTOR)				17		28		
Confl. Peds. (#/hr)						23		
Confl. Bikes (#/hr)						6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Growth Factor	103%	103%	103%	103%	103%	103%		
Heavy Vehicles (%)	8%	8%	4%	4%	8%	8%		
Parking (#/hr)		0	0					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	415	939	17	16	28		
Turn Type		NA	NA	Perm	Prot	Perm		
Protected Phases		1 2	1 2		3		1	2
Permitted Phases				1 2		3		
Total Split (s)					25.5	25.5	42.0	12.5
Total Lost Time (s)					4.5	4.5		
Act Effct Green (s)		50.5	50.5	50.5	21.0	21.0		
Actuated g/C Ratio		0.63	0.63	0.63	0.26	0.26		
v/c Ratio		0.42	0.85	0.02	0.01	0.06		
Control Delay		8.9	18.3	0.1	4.3	0.2		
Queue Delay		0.0	0.4	0.0	0.0	0.0		
Total Delay		8.9	18.7	0.1	4.3	0.2		
LOS		A	B	A	A	A		
Approach Delay		8.9	18.4		1.7			
Approach LOS		A	B		A			

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 49 (61%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 15.1	Intersection LOS: B
Intersection Capacity Utilization 70.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Fairview Ave & Eastlake Ave



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø3
Lane Configurations							
Volume (vph)	263	55	91	479	546	281	
Satd. Flow (prot)	1610	0	1589	1852	1605	0	
Flt Permitted	0.960		0.084				
Satd. Flow (perm)	1424	0	138	1852	1605	0	
Satd. Flow (RTOR)	8				30		
Confl. Peds. (#/hr)	47		113			113	
Confl. Bikes (#/hr)						54	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	
Growth Factor	103%	103%	103%	103%	103%	103%	
Heavy Vehicles (%)	11%	9%	6%	6%	5%	7%	
Parking (#/hr)		0					
Shared Lane Traffic (%)							
Lane Group Flow (vph)	331	0	95	498	860	0	
Turn Type	Prot		D.P+P	NA	NA		
Protected Phases	4		5	2	6		3
Permitted Phases			6				
Total Split (s)	27.0		8.0	60.0	52.0		23.0
Total Lost Time (s)	8.5		4.0	4.5	4.5		
Act Effct Green (s)	18.5		52.0	55.5	47.5		
Actuated g/C Ratio	0.17		0.47	0.50	0.43		
v/c Ratio	1.19		0.81	0.53	1.21		
Control Delay	157.1		62.9	21.1	137.0		
Queue Delay	0.0		0.0	0.0	0.0		
Total Delay	157.1		62.9	21.1	137.0		
LOS	F		E	C	F		
Approach Delay	157.1			27.8	137.0		
Approach LOS	F			C	F		

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 104.4	Intersection LOS: F
Intersection Capacity Utilization 87.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Eastlake Ave & Aloha St

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	267	0	15	23	115	466	5	20	0
Satd. Flow (prot)	0	0	0	0	1552	0	1719	867	716	1736	3471	0
Flt Permitted					0.955		0.743			0.563		
Satd. Flow (perm)	0	0	0	0	1552	0	934	867	595	890	3471	0
Satd. Flow (RTOR)					20							
Confl. Peds. (#/hr)						61	110		61	61		110
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	0%	4%	2%	2%	5%	5%	8%	4%	4%	4%
Parking (#/hr)					0							
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	302	0	25	123	500	5	21	0
Turn Type				Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases				4	4			2	4		6	
Permitted Phases							2		2	6		
Total Split (s)				58.0	58.0		22.0	22.0	58.0	22.0	22.0	
Total Lost Time (s)					5.5		4.5	4.5	5.5	4.5	4.5	
Act Effct Green (s)					52.5		17.5	17.5	69.0	17.5	17.5	
Actuated g/C Ratio					0.66		0.22	0.22	0.86	0.22	0.22	
v/c Ratio					0.29		0.12	0.65	0.84	0.03	0.03	
Control Delay					6.3		21.9	41.1	30.0	18.6	17.7	
Queue Delay					0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay					6.3		21.9	41.1	30.0	18.6	17.7	
LOS					A		C	D	C	B	B	
Approach Delay					6.3			31.8			17.9	
Approach LOS					A			C			B	

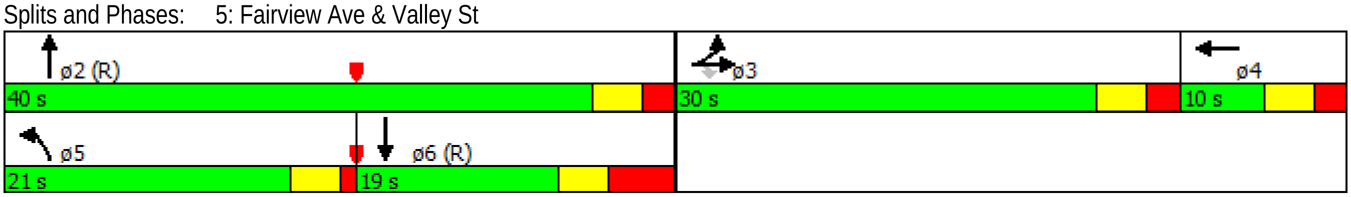
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NETL and 6:SWTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 23.5	Intersection LOS: C
Intersection Capacity Utilization 62.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Fairview Ave & Aloha St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	0	136	0	8	0	230	428	0	0	168	148
Satd. Flow (prot)	0	1703	1583	0	950	0	1719	2381	0	0	2894	0
Flt Permitted		0.950					0.950					
Satd. Flow (perm)	0	1703	1583	0	950	0	1719	2381	0	0	2894	0
Satd. Flow (RTOR)			177								160	
Confl. Peds. (#/hr)												51
Confl. Bikes (#/hr)												17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	2%	2%	100%	100%	100%	5%	5%	2%	2%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	271	147	0	9	0	249	464	0	0	342	0
Turn Type	Split	NA	Perm		NA		Prot	NA			NA	
Protected Phases	3	3			4		5	2			6	
Permitted Phases			3									
Total Split (s)	30.0	30.0	30.0		10.0		21.0	40.0			19.0	
Total Lost Time (s)		5.0	5.0		5.0		4.0	5.0			7.0	
Act Effct Green (s)		25.0	25.0		5.0		17.0	35.0			12.0	
Actuated g/C Ratio		0.31	0.31		0.06		0.21	0.44			0.15	
v/c Ratio		0.51	0.24		0.15		0.68	0.45			0.60	
Control Delay		26.6	3.3		41.6		40.0	17.4			23.1	
Queue Delay		0.0	0.0		0.0		0.0	1.2			0.0	
Total Delay		26.6	3.3		41.6		40.0	18.6			23.1	
LOS		C	A		D		D	B			C	
Approach Delay		18.4			41.6			26.1			23.1	
Approach LOS		B			D			C			C	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 23.3	Intersection LOS: C
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	

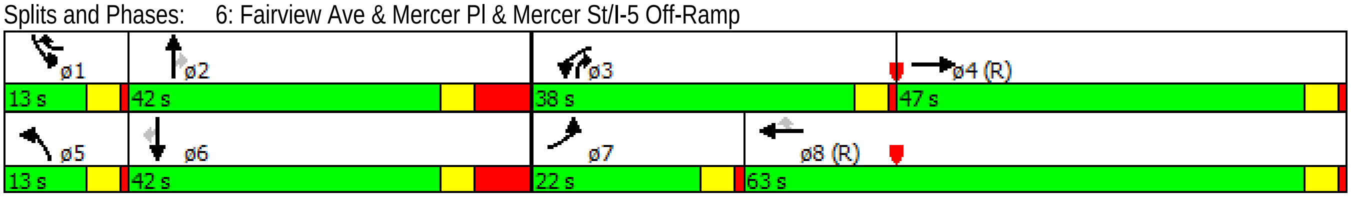
Splits and Phases: 5: Fairview Ave & Valley St



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Volume (vph)	79	1463	155	20	619	1350	546	55	123	276	92	187
Satd. Flow (prot)	1719	6011	0	0	3400	4868	1568	1656	1376	2059	0	3400
Flt Permitted	0.950				0.950			0.950				0.950
Satd. Flow (perm)	1719	6011	0	0	3400	4868	1486	1656	1376	1996	0	3400
Satd. Flow (RTOR)		2					403			47		
Confl. Peds. (#/hr)			2	100			12				2	
Confl. Bikes (#/hr)				1			1			4	4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	5%	5%	5%	3%	3%	3%	9%	9%	9%	9%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	1814	0	0	686	1495	605	61	136	408	0	207
Turn Type	Prot	NA			Prot	NA	pm+ov	Prot	NA	pm+ov		Prot
Protected Phases	7	4			3	8	1	5	2	3		1
Permitted Phases							8			2		
Total Split (s)	22.0	47.0			38.0	63.0	13.0	13.0	42.0	38.0		13.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	9.5	4.5		4.5
Act Effct Green (s)	17.5	42.5			33.5	58.5	67.0	8.5	32.5	71.0		8.5
Actuated g/C Ratio	0.12	0.30			0.24	0.42	0.48	0.06	0.23	0.51		0.06
v/c Ratio	0.41	0.99			0.84	0.74	0.65	0.61	0.43	0.39		1.00
Control Delay	62.8	67.9			61.5	36.9	11.1	89.2	50.7	17.6		128.3
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	62.8	67.9			61.5	36.9	11.1	89.2	50.7	17.6		128.3
LOS	E	E			E	D	B	F	D	B		F
Approach Delay		67.6				37.4			32.2			
Approach LOS		E				D			C			

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 57 (41%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 49.9	Intersection LOS: D
Intersection Capacity Utilization 94.2%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Fairview Ave & Mercer Pl & Mercer St/I-5 Off-Ramp



Lane Group	SBT	SBR
Lane Configurations		
Volume (vph)	189	91
Satd. Flow (prot)	1845	1568
Flt Permitted		
Satd. Flow (perm)	1845	1381
Satd. Flow (RTOR)		117
Confl. Peds. (#/hr)		78
Confl. Bikes (#/hr)		5
Peak Hour Factor	0.93	0.93
Growth Factor	103%	103%
Heavy Vehicles (%)	3%	3%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	209	101
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Total Split (s)	42.0	42.0
Total Lost Time (s)	9.5	9.5
Act Effct Green (s)	32.5	32.5
Actuated g/C Ratio	0.23	0.23
v/c Ratio	0.49	0.25
Control Delay	51.1	6.5
Queue Delay	0.0	0.0
Total Delay	51.1	6.5
LOS	D	A
Approach Delay	73.3	
Approach LOS	E	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	60	41	15	81	194	66	369	14	140	498	186
Satd. Flow (prot)	0	1751	1509	0	1227	0	1631	4517	1854	2306	3940	0
Flt Permitted		0.858			0.985		0.292			0.460		
Satd. Flow (perm)	0	1481	1360	0	1208	0	466	4517	1327	985	3940	0
Satd. Flow (RTOR)			44		69				58		49	
Confl. Peds. (#/hr)	121		39	39		121	86		59	59		86
Confl. Bikes (#/hr)			8			12			10			14
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	44	0	314	0	72	400	15	152	742	0
Turn Type	Perm	NA	pm+ov	Perm	NA		D.P+P	NA	Perm	D.P+P	NA	
Protected Phases		4	5		8		5	2		1	6	
Permitted Phases	4		4	8			6		2	2		
Total Split (s)	59.0	59.0	15.0	59.0	59.0		15.0	66.0	66.0	35.0	86.0	
Total Lost Time (s)		4.5	3.5		4.5		3.5	4.5	4.5	3.5	4.5	
Act Effct Green (s)		54.5	67.0		54.5		94.0	61.5	61.5	94.0	81.5	
Actuated g/C Ratio		0.34	0.42		0.34		0.59	0.38	0.38	0.59	0.51	
v/c Ratio		0.18	0.07		0.69		0.20	0.23	0.03	0.18	0.37	
Control Delay		38.3	6.9		43.9		10.7	28.8	3.9	13.7	22.5	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	1.0	
Total Delay		38.3	6.9		43.9		10.7	28.8	3.9	13.7	23.5	
LOS		D	A		D		B	C	A	B	C	
Approach Delay		28.2			43.9			25.3			21.8	
Approach LOS		C			D			C			C	

Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 49 (31%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 27.0	Intersection LOS: C
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

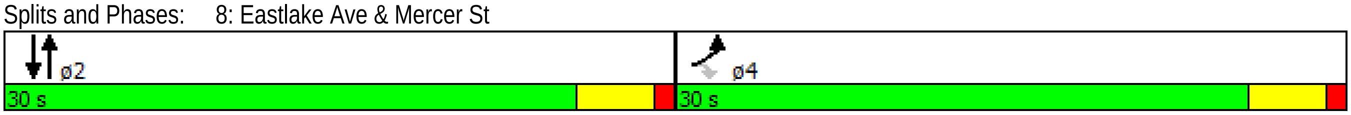
Splits and Phases: 7: Fairview Ave & Republican St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	249	38	0	247	933	0
Satd. Flow (prot)	950	850	0	3764	3471	0
Flt Permitted	0.950					
Satd. Flow (perm)	949	812	0	3764	3471	0
Satd. Flow (RTOR)		40				
Confl. Peds. (#/hr)	1	40				
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	4%	4%	6%	6%	4%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	264	40	0	262	991	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Total Split (s)	30.0	30.0		30.0	30.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	
Act Effct Green (s)	19.2	19.2		26.6	26.6	
Actuated g/C Ratio	0.35	0.35		0.49	0.49	
v/c Ratio	0.80	0.13		0.14	0.59	
Control Delay	34.3	5.1		9.5	13.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	34.3	5.1		9.5	13.3	
LOS	C	A		A	B	
Approach Delay	30.5			9.5	13.3	
Approach LOS	C			A	B	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 54.8
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 16.0 Intersection LOS: B
Intersection Capacity Utilization 54.8% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 8: Eastlake Ave & Mercer St



HCM Unsignalized Intersection Capacity Analysis
9: Eastlake Ave & Republican St

1/7/2016

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	55	23	27	190	734	224
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	60	25	29	206	796	243
Pedestrians	91					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					399	
pX, platoon unblocked	0.79	0.79	0.79			
vC, conflicting volume	1170	610	1130			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	694	0	643			
tC, single (s)	6.9	7.0	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	77	97	95			
cM capacity (veh/h)	261	791	636			

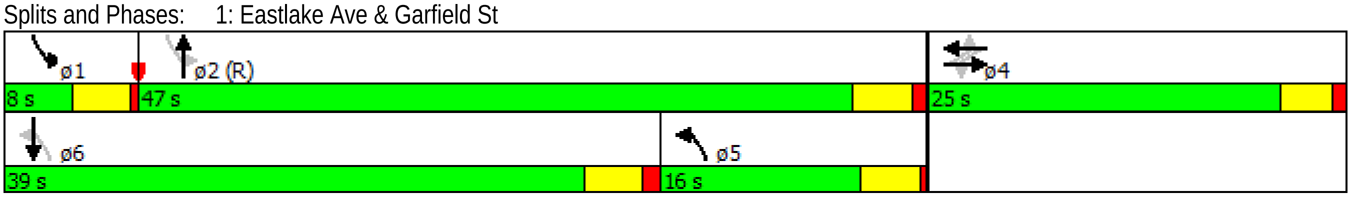
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	85	98	137	531	508
Volume Left	60	29	0	0	0
Volume Right	25	0	0	0	243
cSH	325	636	1700	1700	1700
Volume to Capacity	0.26	0.05	0.08	0.31	0.30
Queue Length 95th (ft)	26	4	0	0	0
Control Delay (s)	19.9	3.6	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	19.9	1.5		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	0	68	36	1	26	139	468	15	20	607	3
Satd. Flow (prot)	0	1690	0	0	1762	0	1636	3115	0	1620	3118	0
Flt Permitted		0.878			0.823		0.337			0.443		
Satd. Flow (perm)	0	1491	0	0	1437	0	548	3115	0	700	3118	0
Satd. Flow (RTOR)		136			27			6			1	
Confl. Peds. (#/hr)	33		65	65		33	67		63	63		67
Confl. Bikes (#/hr)			2			4			104			35
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	117	0	0	66	0	146	508	0	21	641	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Total Split (s)	25.0	25.0		25.0	25.0		16.0	47.0		8.0	39.0	
Total Lost Time (s)		4.0			4.0		4.0	4.5		4.0	4.5	
Act Effct Green (s)		21.0			21.0		47.0	42.5		47.0	34.5	
Actuated g/C Ratio		0.26			0.26		0.59	0.53		0.59	0.43	
v/c Ratio		0.24			0.17		0.30	0.31		0.05	0.48	
Control Delay		4.8			16.5		4.3	4.3		5.7	17.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		4.8			16.5		4.3	4.3		5.7	17.7	
LOS		A			B		A	A		A	B	
Approach Delay		4.8			16.5			4.3			17.4	
Approach LOS		A			B			A			B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 17 (21%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 10.6	Intersection LOS: B
Intersection Capacity Utilization 51.6%	ICU Level of Service A
Analysis Period (min) 15	

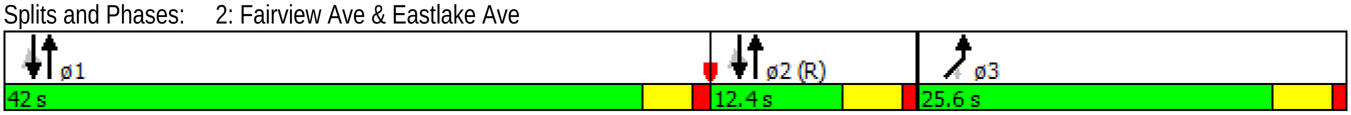
Splits and Phases: 1: Eastlake Ave & Garfield St



Lane Group	NBL	NBT	SBT	SBR	NEL	NER	ø1	ø2
Lane Configurations								
Volume (vph)	0	601	694	14	15	50		
Satd. Flow (prot)	0	1676	1721	1727	1992	1359		
Flt Permitted					0.950			
Satd. Flow (perm)	0	1676	1721	1727	1992	1131		
Satd. Flow (RTOR)				15		55		
Confl. Peds. (#/hr)						41		
Confl. Bikes (#/hr)						55		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Growth Factor	103%	103%	103%	103%	103%	103%		
Heavy Vehicles (%)	2%	2%	6%	6%	3%	3%		
Parking (#/hr)		0	0					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	659	760	15	16	55		
Turn Type		NA	NA	Perm	Prot	Perm		
Protected Phases		1 2	1 2		3		1	2
Permitted Phases				1 2		3		
Total Split (s)					25.6	25.6	42.0	12.4
Total Lost Time (s)					4.5	4.5		
Act Effct Green (s)		50.4	50.4	50.4	21.1	21.1		
Actuated g/C Ratio		0.63	0.63	0.63	0.26	0.26		
v/c Ratio		0.62	0.70	0.01	0.03	0.16		
Control Delay		12.3	10.8	0.2	22.2	8.2		
Queue Delay		0.0	0.0	0.0	0.0	0.0		
Total Delay		12.3	10.8	0.2	22.2	8.2		
LOS		B	B	A	C	A		
Approach Delay		12.3	10.6		11.4			
Approach LOS		B	B		B			

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 47 (59%), Referenced to phase 2:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 11.4	Intersection LOS: B
Intersection Capacity Utilization 62.2%	ICU Level of Service B
Analysis Period (min) 15	

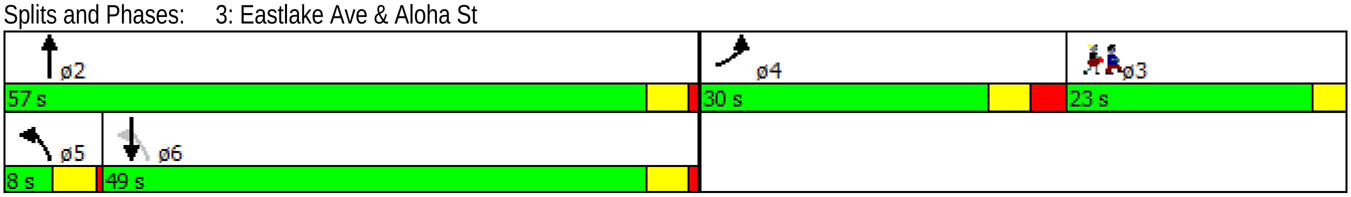
Splits and Phases: 2: Fairview Ave & Eastlake Ave



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø3
Lane Configurations							
Volume (vph)	241	230	40	334	596	325	
Satd. Flow (prot)	1588	0	1620	1888	1595	0	
Flt Permitted	0.975		0.084				
Satd. Flow (perm)	1498	0	141	1888	1595	0	
Satd. Flow (RTOR)	39				30		
Confl. Peds. (#/hr)	43		110			110	
Confl. Bikes (#/hr)						19	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	
Growth Factor	103%	103%	103%	103%	103%	103%	
Heavy Vehicles (%)	5%	2%	4%	4%	6%	8%	
Parking (#/hr)		0					
Shared Lane Traffic (%)							
Lane Group Flow (vph)	510	0	43	362	998	0	
Turn Type	Prot		D.P+P	NA	NA		
Protected Phases	4		5	2	6		3
Permitted Phases			6				
Total Split (s)	30.0		8.0	57.0	49.0		23.0
Total Lost Time (s)	8.5		4.0	4.5	4.5		
Act Effct Green (s)	21.5		50.6	52.5	47.7		
Actuated g/C Ratio	0.20		0.46	0.48	0.43		
v/c Ratio	1.50		0.36	0.40	1.41		
Control Delay	268.7		24.0	20.3	219.8		
Queue Delay	0.0		0.0	0.0	0.0		
Total Delay	268.7		24.0	20.3	219.8		
LOS	F		C	C	F		
Approach Delay	268.7			20.7	219.8		
Approach LOS	F			C	F		

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.50	
Intersection Signal Delay: 190.7	Intersection LOS: F
Intersection Capacity Utilization 94.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 3: Eastlake Ave & Aloha St



 without added turn lanes, with all-walk phase

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	412	0	15	37	20	296	7	50	11
Satd. Flow (prot)	0	0	0	0	699	0	2241	2358	1914	922	803	0
Flt Permitted					0.954		0.664			0.743		
Satd. Flow (perm)	0	0	0	0	699	0	918	2358	1721	655	803	0
Satd. Flow (RTOR)					20						11	
Confl. Peds. (#/hr)						108	159		33	33		159
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	0%	0%	0%	2%	1%	1%	6%	6%	11%	3%	3%	3%
Parking (#/hr)					0							
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	473	0	41	22	328	8	67	0
Turn Type				Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases				4	4			2	4		6	
Permitted Phases							2		2	6		
Total Split (s)				60.0	60.0		20.0	20.0	60.0	20.0	20.0	
Total Lost Time (s)					5.5		4.5	4.5	5.5	4.5	4.5	
Act Effct Green (s)					54.3		15.5	15.5	68.8	15.5	15.5	
Actuated g/C Ratio					0.68		0.19	0.19	0.86	0.19	0.19	
v/c Ratio					0.98		0.23	0.05	0.20	0.06	0.41	
Control Delay					52.6		31.2	26.7	0.8	28.0	33.0	
Queue Delay					0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay					52.6		31.2	26.7	0.8	28.0	33.0	
LOS					D		C	C	A	C	C	
Approach Delay					52.6			5.4			32.4	
Approach LOS					D			A			C	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 79.8	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 31.3	Intersection LOS: C
Intersection Capacity Utilization 58.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Fairview Ave & Aloha St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	179	0	204	0	9	0	255	232	0	0	215	257
Satd. Flow (prot)	0	1703	1599	0	600	0	1660	1073	0	0	1170	0
Flt Permitted		0.950					0.950					
Satd. Flow (perm)	0	1703	1499	0	600	0	1660	1073	0	0	1170	0
Satd. Flow (RTOR)			221								279	
Confl. Peds. (#/hr)			42									99
Confl. Bikes (#/hr)			17									17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	2%	1%	100%	100%	100%	3%	3%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	194	221	0	10	0	276	252	0	0	512	0
Turn Type	Split	NA	Perm		NA		Prot	NA			NA	
Protected Phases	3	3			4		5	2			6	
Permitted Phases			3									
Total Split (s)	30.0	30.0	30.0		10.0		15.0	40.0			25.0	
Total Lost Time (s)		5.0	5.0		5.0		4.0	5.0			7.0	
Act Effct Green (s)		25.0	25.0		5.0		11.0	35.0			18.0	
Actuated g/C Ratio		0.31	0.31		0.06		0.14	0.44			0.22	
v/c Ratio		0.36	0.36		0.27		1.21	0.54			1.07	
Control Delay		23.8	5.0		54.0		161.8	21.8			77.7	
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	
Total Delay		23.8	5.0		54.0		161.8	21.8			77.7	
LOS		C	A		D		F	C			E	
Approach Delay		13.8			54.0			95.0			77.7	
Approach LOS		B			D			F			E	

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Control Type: Pretimed

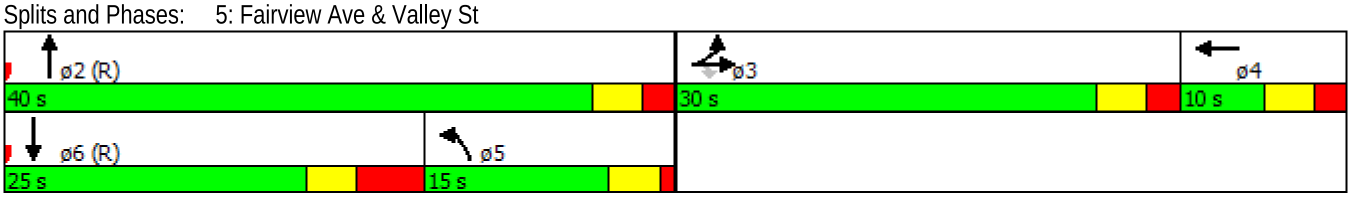
Maximum v/c Ratio: 1.21

Intersection Signal Delay: 65.7 Intersection LOS: E

Intersection Capacity Utilization 80.6% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 5: Fairview Ave & Valley St

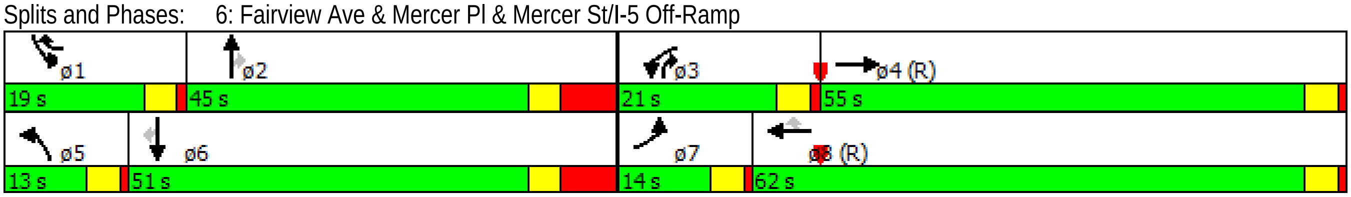


without added turn lanes, with all-walk phase

Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Volume (vph)	33	1858	79	36	280	1350	361	89	87	1122	61	245
Satd. Flow (prot)	1770	6239	0	0	3467	4964	1599	1770	841	1430	0	1956
Flt Permitted	0.950				0.950			0.950				0.950
Satd. Flow (perm)	1770	6239	0	0	3467	4964	1482	1770	841	1383	0	1956
Satd. Flow (RTOR)		3					286			82		
Confl. Peds. (#/hr)			3	179			19				3	
Confl. Bikes (#/hr)				4			4			3	3	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	2052	0	0	291	1405	376	93	91	1230	0	255
Turn Type	Prot	NA			Prot	NA	pm+ov	Prot	NA	pm+ov		Prot
Protected Phases	7	4			3	8	1	5	2	3		1
Permitted Phases							8			2		
Total Split (s)	14.0	55.0			21.0	62.0	19.0	13.0	45.0	21.0		19.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5	9.5	4.5		4.5
Act Effct Green (s)	9.5	50.5			16.5	57.5	72.0	8.5	35.5	57.0		14.5
Actuated g/C Ratio	0.07	0.36			0.12	0.41	0.51	0.06	0.25	0.41		0.10
v/c Ratio	0.28	0.91			0.71	0.69	0.41	0.87	0.43	1.99		1.26
Control Delay	68.5	49.7			70.0	36.1	5.7	121.3	51.2	476.3		200.5
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	68.5	49.7			70.0	36.1	5.7	121.3	51.2	476.3		200.5
LOS	E	D			E	D	A	F	D	F		F
Approach Delay		50.0				35.3			425.6			
Approach LOS		D				D			F			

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 96 (69%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.99	
Intersection Signal Delay: 138.5	Intersection LOS: F
Intersection Capacity Utilization 125.5%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 6: Fairview Ave & Mercer Pl & Mercer St/I-5 Off-Ramp



Lane Group	SBT	SBR
Lane Configurations		
Volume (vph)	107	92
Satd. Flow (prot)	1030	875
Flt Permitted		
Satd. Flow (perm)	1030	702
Satd. Flow (RTOR)		117
Confl. Peds. (#/hr)		139
Confl. Bikes (#/hr)		3
Peak Hour Factor	0.99	0.99
Growth Factor	103%	103%
Heavy Vehicles (%)	1%	1%
Shared Lane Traffic (%)		
Lane Group Flow (vph)	111	96
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Total Split (s)	51.0	51.0
Total Lost Time (s)	9.5	9.5
Act Effct Green (s)	41.5	41.5
Actuated g/C Ratio	0.30	0.30
v/c Ratio	0.36	0.33
Control Delay	43.1	6.8
Queue Delay	0.0	0.0
Total Delay	43.1	6.8
LOS	D	A
Approach Delay	122.4	
Approach LOS	F	

Intersection Summary

 without added turn lanes, with all-walk phase

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	61	28	26	86	399	3	859	1	125	251	68
Satd. Flow (prot)	0	1836	1599	0	1187	985	1711	1706	700	1719	2951	0
Flt Permitted		0.759			0.910		0.529			0.162		
Satd. Flow (perm)	0	1298	1276	0	1057	734	669	1706	608	293	2951	0
Satd. Flow (RTOR)			25			115			34		35	
Confl. Peds. (#/hr)	112		87	87		112	138		25	25		138
Confl. Bikes (#/hr)			9			8			4			4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	127	30	0	119	424	3	912	1	133	339	0
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+ov	D.P+P	NA	Perm	D.P+P	NA	
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6		2	2		
Total Split (s)	40.0	40.0	25.0	40.0	40.0	25.0	25.0	95.0	95.0	25.0	95.0	
Total Lost Time (s)		4.5	3.5		4.5	3.5	3.5	4.5	4.5	3.5	4.5	
Act Effct Green (s)		35.5	58.0		35.5	58.0	113.0	90.5	90.5	113.0	90.5	
Actuated g/C Ratio		0.22	0.36		0.22	0.36	0.71	0.57	0.57	0.71	0.57	
v/c Ratio		0.44	0.06		0.51	1.14	0.00	0.95	0.00	0.33	0.20	
Control Delay		59.4	12.8		63.4	122.7	6.0	49.6	0.0	8.8	15.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	44.2	0.0	0.0	0.0	
Total Delay		59.4	12.8		63.4	122.7	6.0	93.7	0.0	8.8	15.5	
LOS		E	B		E	F	A	F	A	A	B	
Approach Delay		50.5			109.7			93.3			13.6	
Approach LOS		D			F			F			B	

Intersection Summary	
Cycle Length: 160	
Actuated Cycle Length: 160	
Offset: 77 (48%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.14	
Intersection Signal Delay: 76.4	Intersection LOS: E
Intersection Capacity Utilization 111.4%	ICU Level of Service H
Analysis Period (min) 15	

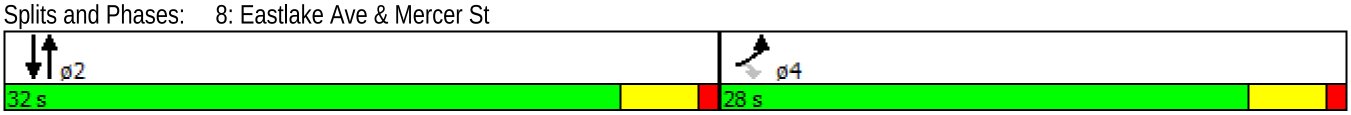
Splits and Phases: 7: Fairview Ave & Republican St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	316	58	0	281	1015	0
Satd. Flow (prot)	899	804	0	1294	3438	0
Flt Permitted	0.950					
Satd. Flow (perm)	899	767	0	1294	3438	0
Satd. Flow (RTOR)		48				
Confl. Peds. (#/hr)		39				
Confl. Bikes (#/hr)		7				
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	103%	103%	103%	103%	103%	103%
Heavy Vehicles (%)	6%	6%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	332	61	0	295	1067	0
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Total Split (s)	28.0	28.0		32.0	32.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	
Act Effct Green (s)	23.1	23.1		27.5	27.5	
Actuated g/C Ratio	0.39	0.39		0.46	0.46	
v/c Ratio	0.95	0.19		0.49	0.67	
Control Delay	60.6	7.0		14.9	15.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	60.6	7.0		14.9	15.3	
LOS	E	A		B	B	
Approach Delay	52.3			14.9	15.3	
Approach LOS	D			B	B	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 59.6
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 23.5 Intersection LOS: C
Intersection Capacity Utilization 64.9% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 8: Eastlake Ave & Mercer St



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	57	25	44	178	746	390
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	61	27	47	191	800	418
Pedestrians	98			2		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	8			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					406	
pX, platoon unblocked	0.76	0.76	0.76			
vC, conflicting volume	1298	709	1317			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	746	0	771			
tC, single (s)	6.8	6.9	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	73	96	91			
cM capacity (veh/h)	224	755	543			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	88	111	127	534	685
Volume Left	61	47	0	0	0
Volume Right	27	0	0	0	418
cSH	285	543	1700	1700	1700
Volume to Capacity	0.31	0.09	0.07	0.31	0.40
Queue Length 95th (ft)	32	7	0	0	0
Control Delay (s)	23.2	5.9	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	23.2	2.7		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

City of Seattle (SDOT)

Vegetation, Fish and Wildlife Technical Memorandum

Fairview Avenue North Bridge

August 2014

ESA

CONTENTS

LIST OF FIGURES

Introduction

The City of Seattle Department of Transportation (SDOT) proposes to replace two existing bridges (East and West Bridge) on Fairview Avenue North, with a single new bridge spanning a portion of the southeast shoreline of Lake Union, in Seattle, Washington (Figure 1). The project is located within the northwest quarter of Section 19, Township 25 North, Range 04 East.

This report has been prepared to provide additional technical information and analysis in support of the review of the project by SDOT pursuant to the State Environmental Policy Act (SEPA). This memorandum describes vegetation, fish, and wildlife resources located in the Fairview Avenue North Project area, and evaluates the potential of the project to impact these resources.

Project Description

This section provides an overview of the Fairview Avenue Bridge Replacement project. The existing bridges consist of two side-by-side structures (Figure 2). The West Bridge, built in 1948, carries one lane of southbound traffic and one mixed use (bicycle and pedestrian) lane. The East Bridge, built in 1963 carries two northbound lanes and a sidewalk. The East Bridge has a concrete deck and is supported on creosote treated timber piles, many of which are deteriorated and in poor condition or previously repaired. The West Bridge has a concrete deck supported on pre-cast concrete piles (HNTB and Perteet, 2013). The project is needed because the existing bridges are aging and do not meet current safety or design standards.

The proposed project will completely remove and replace the existing East and West Bridge structures with a new structure. Bridge removal includes removal of numerous creosote-treated wood piles supporting the existing West Bridge and cleanup of existing concrete rubble and waste under both existing bridges. Four new bridge spans will be supported on bents of four-foot-diameter reinforced concrete bridge columns, constructed on eight-foot-diameter shafts that will be installed to an approximate depth of 140 feet (Figure 3). Drilled shaft construction will also require construction of two temporary trestles, constructed on temporary drilled shafts. The project also includes reconstruction of the roadway approaches on the north and south side of the bridge.

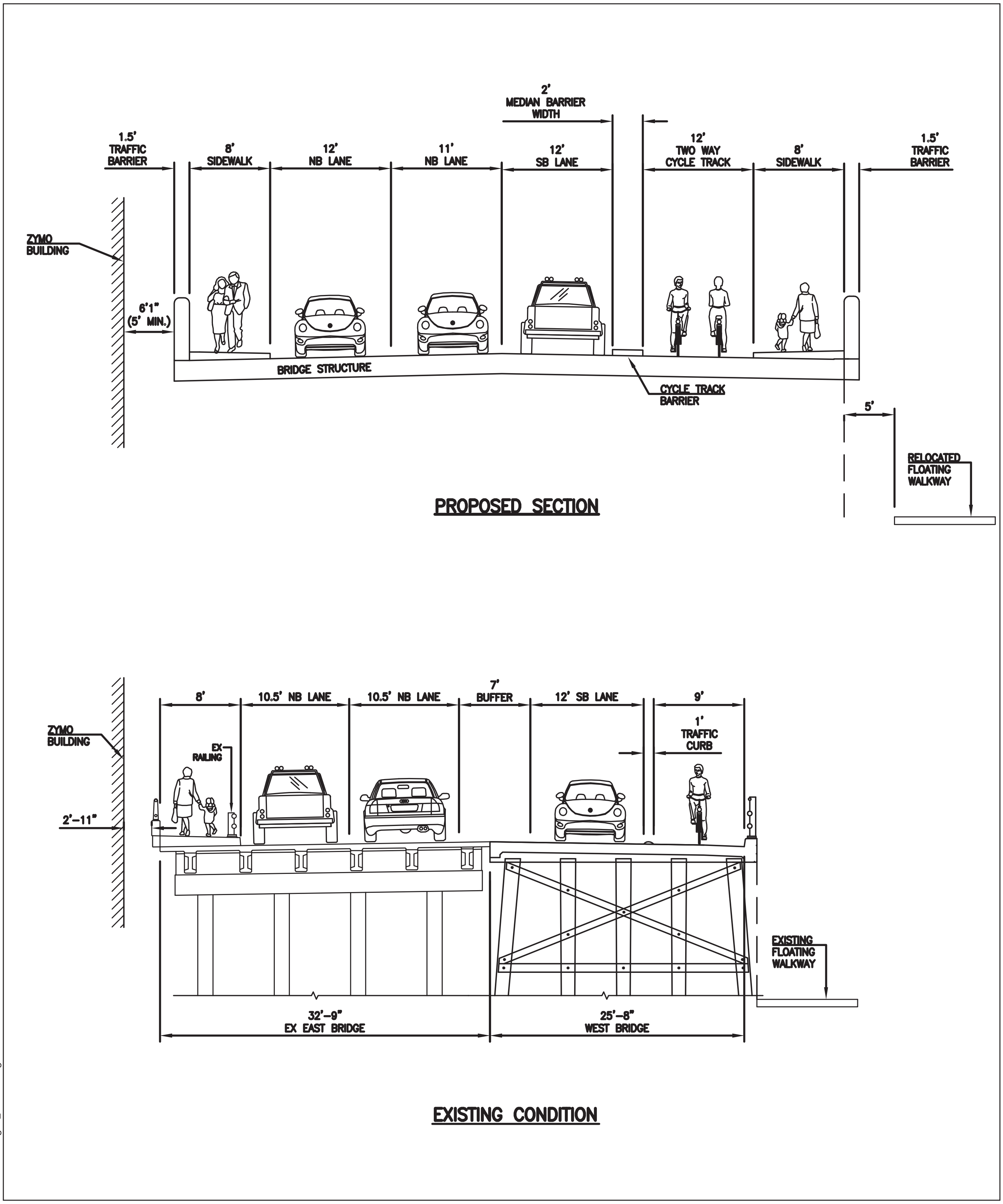
The project will include bridge and roadway reconstruction, relocation of underground and underwater utilities, and the installation of stormwater treatment and conveyance where none currently exists. The proposed new roadway will not add capacity and will include three travel lanes, a cycle track, a sidewalk and a mixed use trail/walkway (Figure 2). The project will temporarily relocate and slightly modify an existing floating walkway, presently connected to the existing West Bridge. The relocated floating walkway will be anchored to an estimated 16 steel pipe piles, up to 16 inches in diameter, which will be vibrated into place.

SOURCE: City of Seattle, 2009, 2010; WA Dept Ecology, 2009; WDFW, 2007; Microsoft Bing, 2010 (Aerial Photo).

Fairview Bridge. 210715

Figure 1

Project Vicinity Map



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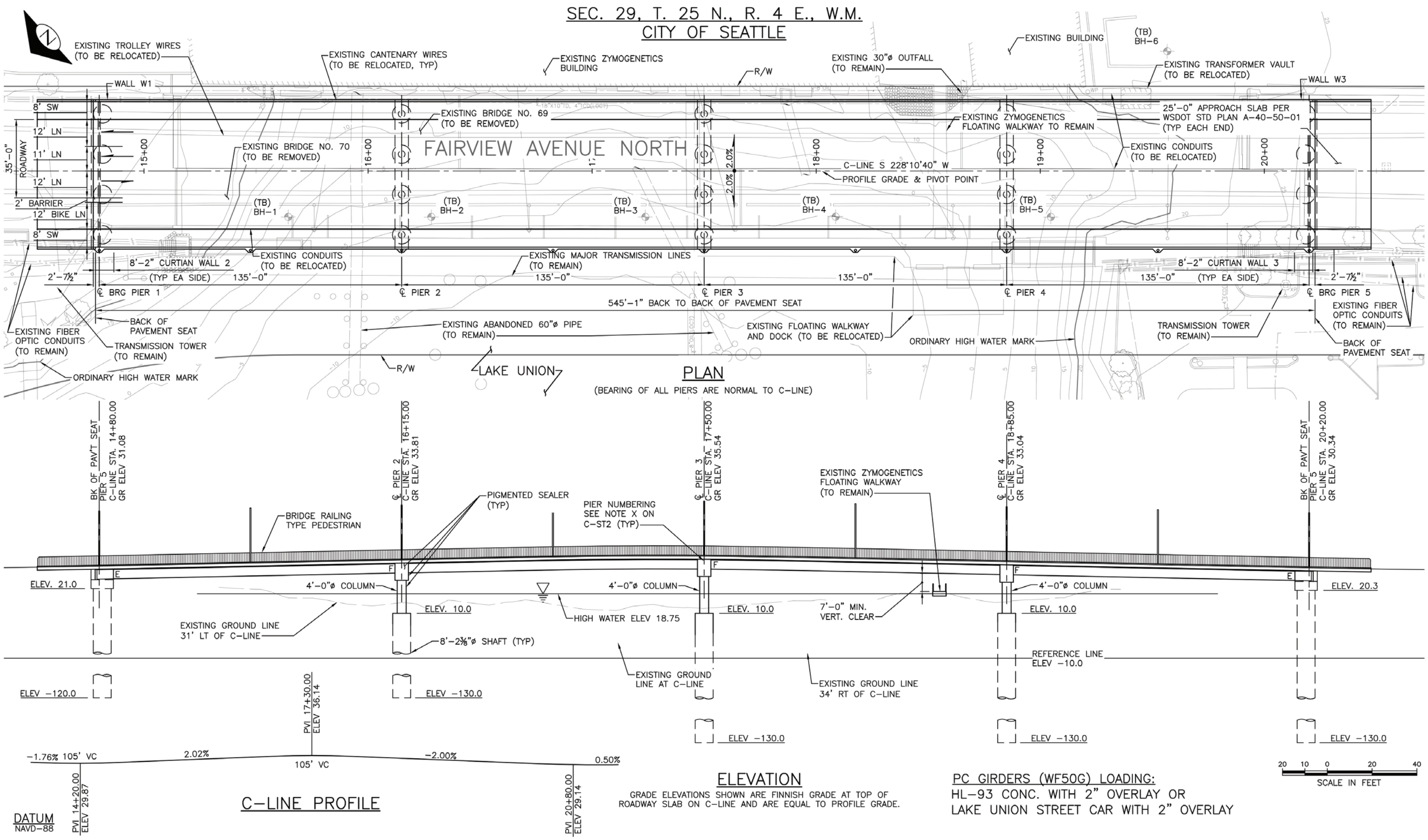
SOURCE: Perteet

Fairview Bridge . 210715

Figure 2
Lane Configuration for Existing and Proposed Bridges
Seattle, Washington



FILE NAME: Fig03_PlanAndProfileProposedBridge.ai / CREATED BY: JAC / DATE LAST UPDATED: 01/10/14

FAIRVIEW AVE NORTH
BRIDGE REPLACEMENT

SITE PLAN

ADDRESS OF PROPERTY: 1200 BLOCK OF FAIRVIEW AVE N

OWNER: SEATTLE DEPT. OF TRANSPORTATION

Figure 3
Plan and Profile of Proposed Fairview Avenue North Bridge
Seattle, Washington

Construction Equipment and Noise

Construction will require the use of heavy machinery including graders, excavators, dump trucks, auger rigs, rollers, pavers, dozers and cranes, and the potential use of a vibratory pile driver (for installation or removal of piles). The noise generated by these types of equipment is briefly discussed below to provide a context for discussion of disturbance impacts to terrestrial wildlife. No highly intensive noise activities such as blasting or impact pile driving are anticipated.

Construction Schedule and Timing Constraints

Construction of the project is anticipated to occur over a 24-month period between spring 2015 and spring 2017. Several factors constrain the timing of certain construction elements: (1) the need to maintain traffic flow over the bridge during construction, (2) conflicts with overhead high-voltage transmission power lines, and (3) the allowed in-water work window for the project area. The general in-water work window for fish protection for the Ship Canal and Lake Union is from October 1 to April 15.

Stormwater System Improvements

The project will result in an overall reduction (approximately 0.32 acre) of pollution-generating impervious surface (PGIS). Furthermore, stormwater facilities will treat stormwater runoff from all PGIS within the project area for water quality prior to stormwater discharge into Lake Union. Currently, runoff from impervious surfaces in the project receives no stormwater treatment or detention.

Secondary Construction Activities

Staging and Stockpile Areas

Staging and stockpile areas are necessary to store equipment and construction materials, to stockpile fill materials (e.g., clean sand and gravel), for assembly of the rebar cages required for drilled shaft installation, and to serve as decanting facilities for potentially contaminated and clean soils (separate facilities). Although the exact siting of these areas has not yet been finalized, several likely stockpile and staging areas have been identified immediately adjacent to the work area (Figure 4). Staging and stockpile areas will be established in currently developed areas, outside of the OHWM of Lake Union and other sensitive areas. These areas will be delineated with construction fencing and TESC measures installed to contain all materials and runoff from entering project waters.

SOURCE: King County, 2011; Microsoft Bing Maps, 2011 (Aerial)

210715 Fairview Bridge . 210715

Figure 4
Potential Staging and Stockpile Areas
Seattle, WA

Barge Activity

Barges may be used for construction of the project. Disturbances from near-shore barge operations are likely to be limited, and may result from anchoring, or barge travel in shallow water. The water depth in the vicinity of the work area is approximately 16 feet, although the water depth decreases towards shoreline. The typical draft (hull depth below waterline) of a heavy construction barge is 6 to 10 feet. Placement and movement of barges will be required to avoid grounding in shallow waters, in order to minimize sediment disturbance and associated turbidity. The use of barges, as with all other in-water work, will be required to comply with state water quality standards, and this activity would be included in the establishment of an approved water quality monitoring plan.

Methodology

The purpose of this study is to make a general assessment of vegetation types and potential fish and wildlife habitats; it does not include formal wildlife surveys. Environmental Science Associates reviewed existing information about natural resources in the project vicinity, including City of Seattle sensitive areas mapping; Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species mapping (2013); Washington Department of Natural Resources rare plant database (2013); and other documents cited in the references chapter. Environmental Science Associates biologists made a reconnaissance visit to the project area during January 2014.

Environmental Science Associates also evaluated the potential presence of species listed under the federal Endangered Species Act. Analysis methods are detailed in the *Fairview Avenue North Bridge Replacement Project Biological Assessment* (ESA, 2014).

Affected Environment

Fairview Avenue North is a major arterial street that runs along the eastern shoreline of Lake Union. To the north, Fairview Avenue connects with Eastlake Avenue East and to the south it intersects other major city arterials including Mercer Street and Denny Way (Figure 1). This roadway supports north-south traffic between downtown Seattle and the University District.

The land use in the project area is already developed as commercial/industrial, with industrial, office, and business zoning. Vegetation within the project corridor is limited to some shrubs and individual scattered small landscape-type coniferous and deciduous trees located along the west (waterward) side of the existing north and south bridge approaches. In addition, narrow strips of grass, street trees, and ornamental shrubs are located along the edges of Fairview Avenue North.

Within the project area, the proposed project is located within and above Lake Union. No other surface water features are present on-site and no wetlands were identified on or adjacent to the project site.

The topography of the site is flat at both ends of the bridge due to previous grading and filling of the area. The bridge straddles the east edge of Waterway 8 with water depths up to 26 feet near the center of the bridge and becoming shallower to the east. The mudline along the north end of the bridge inclines steeply to the north while the southern end has a more gentle increase in elevation to the south. The ordinary high water mark (OHWM) of the lake extends under the ZymoGenetics building, which is built on piles in this area.

This portion of the east Lake Union shoreline is considered one of the most heavily modified in Seattle, with more than 90 percent of the shoreline armored with bulkheads and riprap (City of Seattle, 2010). Concrete rubble, wood waste, and other debris cover the shoreline under almost all of the East Bridge and much of the West Bridge (refer to photos in Appendix A).

Riparian vegetation does not exist at the bridge crossing, and vegetation is sparse within the project area along the upland portion of the waterway edges. These plants are largely noxious species and landscape cultivars that have no physical connection with the waterway (refer to photos in Appendix A).

In addition to over 200 creosote-treated wooden piles and concrete piles that support the existing bridges, multiple wooden braces occur under the bridge (Photo 2, Appendix A), in addition to concrete rubble and refuse. A metal walkway located under the bridge (perpendicular to bridge) provides pedestrian passage from the ZymoGenetics building to a floating walkway and kayak launch dock. The proposed project includes the removal of the floating walkway during construction, the re-installation of the walkway on a new alignment approximately 10 feet west of its current location following construction. The change in alignment is necessitated by the slightly wider footprint of the new bridge.

<u>Aquatic Habitats (Lake Union)</u>

Basin Overview

Lake Union is a portion of the Lake Washington watershed, which in turn comprises 13 major drainage sub-basins and numerous smaller drainages, totaling about 656 linear miles of streams, two major lakes, and numerous smaller lakes. Lake Washington is located within the watersheds drained by Issaquah Creek, the Sammamish River, and the Cedar River, referred to as the Cedar-Sammamish Watershed Basin, or WRIA 8. The majority of the immediate watershed is heavily developed.

The Lake Union/Lake Washington Ship Canal system is comprised of the Montlake Cut, Portage Bay, Lake Union, the Fremont Cut, and the Salmon Bay Waterway. The Montlake Cut is an approximately 100-foot wide channel with concrete bulkheads extending along the length of the channel. Portage Bay is located west of the Montlake Cut and has a natural surface connection to Lake Union. Lake Union is linked to the Salmon Bay Waterway through the Fremont Cut, a steel, rip-rapped navigational channel.

Lake Union has glacial origins. The basin of the lake was created 12,000 years ago by the Vashon glacier, which also created Lake Washington. Lake Union covers an approximately 581-acre area with an average depth of 32 feet.

Shoreline Habitats

Current land uses along the shores of the Lake Union system consist primarily of water dependent commercial and industrial uses including marinas, commercial shipyards, and drydocks. Other commercial development and single and multi-family residences also border the shoreline. Habitat in the Ship Canal and Lake Union is much more modified than that in Lake Washington. The shoreline is heavily armored and the presence of bulkheads, docks, and over-water structures provides virtually no natural shoreline within the system (Weitkamp and Ruggerone, 2000). Lake Union and the Lake

Washington Ship Canal still support a large live-aboard and houseboat community. The south end of Lake Union is the only area of the lake that has retained any natural shoreline characteristics (Weitkamp and Ruggerone, 2000).

Control of Water Levels

The U.S. Army Corps of Engineers (USACE) is mandated by Congress (Public Law 74-409, August 30, 1935) to maintain the level of Lake Washington, Lake Union, and the Ship Canal between 20 and 22 feet (USACE datum) as measured at the Government Locks (Chittenden/Ballard Locks). The USACE operates this facility to systematically manage the water level in Lake Washington, over four distinct management periods, using various forecasts of water availability and use. The four management periods are as follows:

- Spring refill - lake level increases between February 15 and May 1 to 22 feet (USACE datum);
- Summer conservation - lake level maintained at about 22 feet for as long as possible, with involuntary drawdown typically beginning in late June or early July;
- Fall drawdown - lake level decreasing to about 20 feet from the onset of the fall rains until December 1; and
- Winter holding - lake level maintained at 20 feet between December 1 and February 15.

Operation of the Government Locks and other habitat changes throughout the Lake Washington Basin have substantially altered the frequency and magnitude of flood events in Lake Washington and its tributary rivers and streams.

Water and Sediment Quality

Lake Union is included on the Washington Department of Ecology's 2008 list of impaired and threatened water bodies, pursuant to Clean Water Act 303(d). Lake Union/Lake Washington Ship Canal is 303(d) listed for total phosphorus, fecal coliform bacteria, lead, and aldrin in the water column and for sediment bioassay (Ecology, 2013). Lake Union experiences periods of anaerobic conditions that typically begin in June and can last until October. Significant sediment contamination (heavy metals and organics) has been documented in Lake Union, primarily from historic industrial sources.

<u>Terrestrial Habitats</u>

The project is located in an urban setting on the eastern shore of Lake Union. Vegetation and wildlife habitats are heavily impacted by urban development and human activities, but they still support some native species, as discussed below. Representative photos are provided in Appendix A.

Information on threatened and endangered plant species and plant communities from the Washington State Department of Natural Resources (WDNR) Plant Natural Heritage Database (2013) indicated that no threatened or endangered plants are known to occur within the project vicinity.

Landscaped Areas

Landscaping in the project area includes planting strips along Fairview Avenue North and adjacent to buildings. Common landscaping species include nonnative shrubs such as cotoneaster, dwarf pine, box hedge, and rhododendron. A small area near the north end of the walkway on the west side of the Fairview Avenue Bridge has recently been planted with native shrubs such as snowberry.

Street trees are present along the roadway, planted approximately 20 feet apart within narrow grassy strips or interspersed with small shrub or groundcover species. Most street trees in the project area are small and appear to have been recently installed. A few larger red maples are located at the south end of the bridge (Photo 1).

Other trees in the project area include big-leaf maple, western red cedar, Douglas fir, and ornamental cherry. These are either used as street trees (ornamental cherry) or occur as single trees or in small landscaped areas.

Structures

Structures in the project area may provide limited habitat for wildlife. The bridge support structure could be used as a roosting area by pigeons, although the chain-link fencing along the bridge may deter birds (Photo 2). The kayak launch pad and floating walkway may be used as a resting spot by waterfowl such as mallards and Canada geese (Photo 3). There are several old piers and an abandoned dock west of the Fairview Avenue Bridge that provide perching spots for birds such as gulls, great blue herons, and cormorants (Photo 4). Building roofs along Lake Union also serve as resting areas for gulls and other bird species. None of these structures have been documented to provide habitat for any wildlife species.

Native Vegetation

No wetlands are located in the project area. The only native vegetation observed includes a few Douglas fir, big-leaf maple, and western red cedar trees in scattered areas. A landscaped area north of the ZymoGenetics building contains several large, multi-stemmed big-leaf maple trees along with native understory shrubs such as salal and tall Oregon grape.

Wetlands

No wetlands are located in the project area.

Nonnative Invasive Species

Vegetated areas that are actively maintained are dominated by nonnative invasive species, primarily Himalayan blackberry and English ivy (Photo 5). Other scattered invasives include butterfly bush, clematis, and Scot's broom.

Lake Union contains nonnative invasive aquatic vegetation, including Eurasian water milfoil and Brazilian elodea (Ecology, 2004).

Fish and Wildlife Use of Project Area

This section summarizes documented occurrences of fish and wildlife in the project area, including special-status species.

Fish

Most of the nearshore habitats of Lake Union are dominated by overwater structures. Most of the shoreline habitat in the project area has been armored with riprap (Photo 6). The most abundant fish species observed in the lake during recent surveys was the small forage species threespine stickleback. Low numbers of several other warmwater resident species were also present including smallmouth bass, yellow perch, prickly sculpin, and sunfish (Pentec, 2010). Species documented in the lake by WDFW include largemouth bass, black crappie, brown bullhead, and coastal cutthroat trout (WDFW, 2013). Other fish known to inhabit the lake include coho, resident cutthroat trout, longfin smelt, river lamprey, and northern pikeminnow. Federally listed fish species known to occur in the lake are discussed later in this section.

Terrestrial Wildlife

ESA observed several bird species in the project area during the January 2014 site visit. American robins were observed foraging for berries in trees along Fairview Avenue North. Evidence of breeding (a few old crow and bushtit nests) was also noted in trees along the roadway.

Lake Union attracts a variety of water-associated bird species year-round, such as gulls, ducks, geese, and cormorants. These species likely use the lake primarily for foraging since nesting materials and sites are scarce (City of Seattle, 2010). ESA observed cormorants perching on old pilings and building rooftops near the lakeshore. A great blue heron was perched on the abandoned dock west of the bridge. Gulls, hooded merganser, and cormorants were present on the lake surface. Canada geese use the kayak launch, as evidenced by scat.

Numerous other species of birds and small mammals likely use the project area. These include species that can tolerate or benefit from human disturbance, using landscape vegetation, structures, garbage cans, riprap, and other human features for foraging, movement, shelter, and potentially even breeding sites. Examples include common songbirds such as house sparrow; waterfowl such as mallard duck; and mammals such as Norway rat. A discussion of state designated Priority Habitats and Species known to occur in the project area occurs later in this section.

Federally Listed Species

Three federally listed fish species, discussed below, are thought to occur in the project area. No listed terrestrial wildlife or plant species or suitable habitats are present.

Table 1. Occurrence of Federally Listed Species and Critical Habitat within the Project Area.

Common Name	ESA Status	Jurisdiction	Critical Habitat
Coastal-Puget Sound DPS Bull Trout	Threatened	USFWS	Yes
Puget Sound Chinook Salmon Evolutionarily Significant Unit (ESU)	Threatened	NMFS	Yes
Puget Sound Steelhead Distinct Population Segment (DPS)	Threatened	NMFS	No

Bull Trout

Bull trout may occasionally occur within the project area but are not known to be regular inhabitants of the lake. The species likely uses the lake primarily as a migration route to marine waters for foraging and rearing. Adult and subadult bull trout could occur in the project area in the non-summer months, when Lake Washington water temperatures are below 15°C.

USFWS published the final rule designating critical habitat for Coastal-Puget Sound bull trout in September 2005 (70 FR 56212) and redesignated it in September 2010 (75 FR 63898). The final rule identifies Lake Washington as designated critical habitat for Coastal-Puget Sound bull trout. Any bull trout usage of Lake Union is extremely limited, and would be limited to use as a migration corridor. There are no physical impediments to bull trout migration in the Action Area. However, temperature-related impediments may also be present in Lake Union. Surface water temperatures of these water bodies typically exceed 20°C for substantial portions of the summer.

Bull trout may forage in the Lake Union, Lake Washington, and the Ship Canal as they migrate to and from the marine environment. Availability of food in Lake Union is generally good. The invertebrate food base in Lake Union is more abundant now than it was in the middle of the twentieth century but likely less productive than it was under historical conditions. Bull trout are expected to forage on juvenile salmonids, which are less abundant than they were historically.

The vast majority of the Lake Union shorelines are modified and lack habitat complexity. Despite the high summer water temperatures in surface waters, they continue to provide sufficient water quality and quantity to support normal growth and survival of bull trout. However, the substantial populations of nonnative predator species (e.g., smallmouth bass) are detrimental to healthy bull trout populations.

Chinook Salmon

Chinook salmon juveniles and adults occur in Lake Union (WDFW, 2011a, b). This potentially includes outmigrating fry that enter from the Sammamish and Cedar Rivers (Fresh, 2000; Tabor et al., 2004; Tabor et al., 2006). Adult Chinook salmon may also be present as they typically return to Lake Washington in August and September (City of Seattle and USACE, 2008).

Chinook salmon smolts appear to briefly reside (1-4 days) in Lake Union during their outmigration. Smolts use the entire lake, with 25% to 50% of tagged smolts using the southern portion of Lake Union. During this residence, Chinook move around the northern and southern parts of the Lake. Chinook smolts are active during the day, but exhibit variable behavior at night.

Juvenile salmonids appear to avoid overwater structures in Lake Union (Celedonia et al., 2008ab; Pentec, 2010). Acoustic tracking between 2005 and 2007 in the Ship Canal at Portage Bay and north Lake Union showed little evidence of shoreline affinity. Instead, juvenile Chinook salmon smolts were observed fanning out and mixing within Portage Bay and north Lake Union (Celedonia et al., 2008a). In north Lake Union most activity occurred at depths greater than 33 feet. Pentec (2010) noted that only 1 of 97 observations events conducted between late-April and early-July revealed the presence of juvenile Chinook salmon near floating homes. Juvenile salmonids largely avoided nearshore habitats in South Lake Union and Gas Works Park.

Returning adult Chinook salmon pass through the Ship Canal and Lake Union from the end of July through the beginning of September. Very little is known about adult salmon migration through the Ship Canal and Lake Union. In general, adult salmon do not appear to spend substantial time in the Ship Canal, including Lake Union. Typically, Chinook pass through the Ship Canal in 2 or fewer days (Fresh et al., 1999, 2000). Habitats used by adult salmon migrating through the Ship Canal are unknown. Only one report shows that Chinook salmon are generally found near depths of 20 feet in the Ship Canal (Fresh et al., 1999).

Adult salmon passage through the Ship Canal and Lake Union is thought to be influenced by warm water temperatures in the Ship Canal, among other things. Both sockeye and Chinook salmon may be impacted by these high temperatures. Sockeye tend to spend longer in the Ship Canal, but also keep to a tighter temperature range than Chinook. Chinook enter the Ship Canal later in the season when temperatures are higher, however.

High summer water temperatures in the Ship Canal and Lake Union are physiologically stressful to adult salmon. Low summer dissolved oxygen levels in Lake Union (June to October) may also be a problem for adult salmon. Low dissolved oxygen in the lake may prevent salmon from using the water column below a 33-foot depth, while warmer surface temperatures later in July may limit use of the upper water column (City of Seattle and USACE, 2008).

NMFS published the final rule designating critical habitat for Puget Sound Chinook salmon in September 2005 (70 FR 52630). Within the project area, Chinook salmon critical habitat is present within the nearshore habitats of Lake Union. The critical habitat throughout Lake Union has been substantially modified by long-term human activities. Freshwater rearing habitat along much of the shoreline of Lake Union supports introduced species (i.e., black crappie, carp, smallmouth and largemouth bass, goldfish, and yellow perch). Some of these species are also known to prey on juvenile Chinook salmon, further degrading the rearing conditions. Various forms of native and nonnative riparian vegetation grow along portions of the shoreline and substantial portions of the shoreline are hardened, producing relatively deeper habitat than that preferred by juvenile Chinook salmon. In general, the habitat conditions in much of the project area are unsuitable for Chinook salmon rearing.

Steelhead

Steelhead migrating through the Lake Washington watershed use the general area as a migratory corridor. Although limited information is available on steelhead passage through the Ship Canal, peak passage of steelhead smolts at the Ballard Locks is believed to occur in May (City of Seattle and USACE, 2008). The large steelhead smolts likely migrate relatively quickly through Lake Washington and the Ship Canal during late spring, utilizing a wide range of habitats. Their large size likely reduces predation risks during migration. There is no available information that identifies the project area as a location specifically used by juvenile steelhead for rearing.

Historically, adult steelhead entered Lake Washington through the Ballard Locks between December and early May, with peak numbers in February and March. Their subsequent movements in the Ship Canal and Lake Washington have not been described in available documents. It is likely the steelhead move directly into Lake Washington because the water temperatures are relatively cool during their migration period.

NMFS proposed critical habitat for Puget Sound steelhead January 14, 2013 (78 Federal Register 9). Critical habitat, as proposed, does not include Lake Union, the Lake Washington Ship Canal, or Lake Washington. The closest proposed freshwater critical habitat in WRIA 8 is the Cedar River, over 10 miles upstream of the project area.

<u>State Priority Habitats and Species</u>

The WDFW Priority Habitats and Species (PHS) online mapping shows only one state priority species, the Pacific pond turtle, as potentially occurring within 0.5 mile of the project site. The PHS mapping for this species occurrence is at a broad (quarter-township) scale. This turtle species is shy and easily disturbed. The project area does not provide shallow water, basking sites, or other habitat features needed to support this species (Larsen, 1997).

ESA observed one state monitor species, great blue heron, using the abandoned dock in the project area as a perching site. State monitor species are not considered Species of Concern, but they are monitored for status and distribution. They are managed by WDFW to prevent them from becoming endangered, threatened, or sensitive. While great blue herons use the project area for resting and likely foraging, no breeding habitat is present. Purple martins are listed as a candidate species by WDFW. There are no documented occurrences of purple martins or other species known to frequently perch or nest on piles or bridge structures.

<u>Applicable Regulations</u>

The City of Seattle regulates Fish and Wildlife Habitat Conservation Areas (FWHCA) through the City's critical areas code (Seattle Municipal Code [SMC] 25.09). FWHCAs include Type 1 shorelines such as Lake Union. SMC 25.09.200 provides development standards for parcels containing FWHCAs.

The City regulates the removal of street trees (SMC 25.11). The City standards for improvements in street rights-of-way include the preservation or planting of trees as part of the public infrastructure (City of Seattle, 2010b).

The WDFW provides management recommendations for activities affecting state-designated priority species and habitats. SDOT will obtain a Hydraulic Project Approval (HPA) for in-water work.

The U.S. Fish and Wildlife Service and National Marine Fisheries Service regulate activities that may affect species listed under the federal Endangered Species Act. The project is undergoing formal Section 7 consultation in compliance with the Act.

Impacts

The project requires in-water work, resulting in potential impacts to fish and other aquatic species in Lake Union that would be minimized through the use of BMPs. Because the project area is already developed and contains little native wildlife habitat, impacts to vegetation and wildlife resulting from the project would be minimal. This section discusses the construction-related and operational impacts of the project, and measures to avoid and minimize impacts.

<u>Construction Impacts</u>

A listing of the potential types of impacts that could occur during construction of the project are listed below, followed by further discussion of each type of impact:

Aquatic Habitat

- Degradation of shoreline habitat from project clearing and grading;
- Harm to fish during installation and operation of sediment curtains;
- Direct injury or mortality of fish from in-water equipment;
- Turbidity and sedimentation during construction;
- Resuspension of potentially contaminated sediments; and
- In-water noise and vibration during construction.

Terrestrial Habitat

- Temporary increase in noise and disturbance during construction;
- Effects on water-associated species; and

Aquatic Habitat

Substantive in-water work (below OHWM) will occur in wetted portions of Lake Union. These activities have the potential to impact fish and other aquatic life due to direct physical disturbance, noise, vibration, and habitat alteration. Potential impacts are as follows:

Installation and Operation of Sediment Curtains: The installation of a primary sediment curtain around the entire in-water work area in Lake Union, and the installation of smaller secondary curtains around individual in-water work areas, may result in harm or mortality to fish, if they are present in the work area. Fish removal from within the primary sediment curtain is not feasible due to water depths and numerous existing in-water piles and structures within the wetted portions of the project site under the existing bridge.

Bull trout are not anticipated to be present in the project area during construction. The anticipated densities of juvenile Chinook and steelhead within the area to be isolated are expected to be small, based upon the timing of curtain installation and the poor quality habitat within the area to be isolated (including shallow nearshore habitats with overwater structure, armored shorelines, and no natural shoreline vegetation).

Direct Injury or Mortality from In-water Equipment: During the installation process, drilled shafts will be lowered vertically onto the lake bed. This process could injure, kill, or entrain fish. However, the number of such fish is expected to be low, likely on the order of a few individuals.

Turbidity and Sedimentation: Construction of a new bridge and deconstruction of the existing bridge could potentially lead to the suspension or entrainment of sediment, some of it potentially contaminated, into the water column. In-water construction activities that could result in short-term water quality degradation include the application of a sand barrier layer prior to drilled shaft installation, installation and removal of temporary piles, installation of permanent piles, and removal of existing piles. These activities may resuspend existing sediments. Sedimentation is a concern since it can degrade spawning habitat, increase scour potential, degrade rearing habitat, and alter the structure of riparian vegetation. Suspended sediment has been shown to change salmon behavior and can cause mortality if turbidity concentrations are high. The sublethal effects of turbidity generally include salmon avoidance and redistribution, reduced feeding and growth, respiratory impairment, reduced tolerance to disease and toxicants, and physiological stress.

Small numbers of fish, including federally-listed fish (juvenile Chinook and steelhead), are anticipated to be present within the primary sediment curtain during construction. It is anticipated that increased turbidity will temporarily affect water quality extending from the site of each lake bed disturbing activity to a maximum distance of up to 150 feet from the activity. However, due to the use of primary and secondary turbidity curtains, increased turbidity will likely be confined to a much smaller area. There is no suitable spawning habitat for Chinook salmon, steelhead, or bull trout. The direct effects related to sedimentation and turbidity are considered insignificant due because they will be short-term and episodic. Other species such as stickleback and other non-game fish and game fish that may use these areas for spawning would be precluded from doing so by the silt curtain.

Soils disturbed during construction could provide a chronic source of erosion and sedimentation if not properly stabilized following construction. The project area is heavily developed, with little exposed soil in current conditions. Furthermore, the HPA for the proposed action is anticipated to require that within seven days of project completion, all disturbed areas must be protected from erosion using vegetation or other means and all revegetation must be completed within one year. These measures will reduce the effects from increased erosion and sedimentation to discountable levels for aquatic species.

Resuspension of Contaminated Sediments: In-water construction activities that could result in the short-term resuspension of potentially contaminated sediments include the installation of a sand barrier layer prior to in-water work activities, drilled shaft installation, installation and removal of temporary piles, installation of permanent piles, and removal of existing piles.

It is possible that the resuspension of sediments could lead to concentrations of chemicals that are toxic or harmful to fish. The area of chemical exposure will be small, limited to the area around a drilled shaft or pile being installed or removed. The sand layer application should reduce resuspension of sediments, but its effect cannot be quantified without field monitoring and verification. Overall, individual fish could be adversely affected by chemical desorption from sediments resuspended by construction activities in a very small section of the action area.

In-water Noise and Vibration: In-water construction activities will occur, but no impact pile driving will occur during the project. The in-water construction element that would likely produce the highest in-water noise levels is vibratory pile installation or removal. Studies in a California river and along the Oregon coast found that noise from vibratory pile installation was not measurable above background noise; the sound produced by vibratory pile driving is short in duration; and salmon show an avoidance response to only a short range of the total sound environment (Reyff, 2006; Carlson, 2001). Therefore, the use of vibratory hammers for pile installation is not likely to have a significant impact on migrating fish.

Other noise sources would include standard construction equipment such as dump trucks, cranes, backhoes, graders, and pavers. These sources will not cause in-water noise of a level capable of affecting aquatic species.

Terrestrial Habitat

Construction Noise and Disturbance: Construction of the project would occur over a period of 24 months. Use of heavy construction equipment would increase the level of noise and visual disturbance in the area over this timeframe. No blasting or impact pile driving would occur. Use of nighttime lighting, which is anticipated, could also increase disturbance of wildlife.

Noise from heavy construction equipment is anticipated to affect areas within approximately 1,800 feet of the project site. The increased noise and human activity may cause wildlife to avoid the area during construction. However, wildlife species that use the project area are already exposed to noise and human activity, and they are likely to resume using the area after construction is complete.

The project site is not located near any large areas of intact terrestrial habitat that would be disturbed by construction. Parks and greenspaces that provide significant wildlife habitat, such as St. Mark's Greenbelt and Volunteer Park, are located east of Interstate 5.

Impacts to Water-Associated Species: Species such as geese, ducks, cormorants, herons, martins, and swallows that may use the project area will likely avoid it during construction, as discussed above. The project area represents a small portion of the habitat available on Lake Union for these species.

Temporary water quality impacts discussed above for aquatic species could also affect diving birds such as cormorants if they are present in the project area during construction. However, birds are likely to avoid the area during construction due to noise and visual disturbance, and impacts are unlikely.

Permanent Changes in Habitat: The project would result in minor changes to vegetation in the project area. A few street trees and shrubs in planter strips near the existing bridge would be removed at both the north and south bridge approaches (see Photos 7 through 10), in addition to invasive species as a result of shifting the bridge and walkway waterward (Photos 3, 5 and 6). The affected vegetation consists mostly of nonnative or ornamental plant species, in addition to the street trees. These changes could have a minor effect on wildlife such as birds in the project area that may use the vegetation as part of larger foraging areas, and will result in a small net reduction in the areal coverage of shoreline vegetation. The affected riparian vegetation and street trees would be replaced as part of the project.

Removal of the bridge substructure and kayak dock would also have a minor effect on birds that may use these structures. For example, Canada geese use the launch pad as a resting area, and pigeons may roost under the bridge. These structures would be replaced and wildlife use could resume following project construction.

<u>Operational Impacts</u>

This section discusses the following types of impacts that could occur as a result of operation of the project:

Aquatic Habitat

- Changes to water quality and water quantity from stormwater runoff;
- Degradation of shoreline habitat from project clearing and grading;
- Overwater shading impacts from a slightly wider bridge footprint; and
- Potential alterations to predation patterns resulting from changes in the area and number of in-water vertical structures.

Terrestrial Habitat

- Slightly reduced shoreline vegetation habitat;
- Changes in habitat structure due to potential mitigation activities.

Aquatic Habitat

Stormwater Runoff and Water Quality: The new bridge will be seven feet wider than the existing bridge to accommodate a cycle track. However, the project will result in a 0.32-acre reduction in pollution-generating impervious surface (PGIS) within the project area. Stormwater from the existing bridges and road approaches is not currently treated. The project will provide basic stormwater treatment for runoff from all new and existing PGIS in the project area. Based on stormwater modeling, the pollutant loading in stormwater runoff from the completed project is expected to remain essentially unchanged, with only a minimal chance of increasing. Project-wide water quality impacts would likely be either positive or insignificant (ESA, 2014).

Removal of all of the existing wooden creosote-treated piles composing the pier protection system for the existing bridge will remove a source of contaminants from Lake Union and would therefore result in an improvement in the water quality of the lake.

Effects on Water Quantity and Flow Regime: Lake Union classified as a flow-exempt water body according to Ecology and the SDOT Stormwater Manual; therefore, no flow control is required. At the project site, the lake levels are controlled and maintained at the Ballard Locks. For these reasons, no effects to flow regime will result from discharge of stormwater to the lake.

Clearing and Grading of Shoreline Vegetation: Clearing of shoreline vegetation can indirectly affect aquatic species as a result of decreased habitat suitability and riparian complexity. However, the vegetation on the heavily developed project site is limited to some herbaceous and shrub vegetation, with a few scattered trees. These vegetation elements were planted for landscaping value, as opposed to being naturally recruited, and the value for aquatic habitat is limited to non-existent. However, the project will result in a small net reduction in the areal coverage of shoreline vegetation.

Shading and Habitat Complexity: Studies suggest that the juvenile salmonids respond to in-water and over-water structures by changing their migration rates or migration routes. This is particularly true for Chinook salmon (Celedonia et al., 2008a, 2008b, 2009). Changes in migratory behavior may (1) cause fish to occupy areas or migrate through areas that are more or less productive than the habitats they would otherwise occupy, (2) require different levels of energy expenditure, and (3) subject the fish to more or less viable survival conditions such as changes in predation potential or water quality.

The data suggest that migration behavior could be affected by two primary mechanisms related to changed habitat conditions: (1) alteration or disruption of physical structures (structural complexity) within the water column, and (2) increased or altered shading patterns of new over-water structures. Effects are likely to be most pronounced for juvenile salmon, which generally exhibit an affinity for shoreline areas during outmigration.

The fewer and more-widely-spaced in-water columns of the proposed permanent bridge structures are expected to reduce the habitat complexity in the immediate area of the bridge (Table 1). This change would diminish the quality of habitat for smallmouth bass (a predator of salmonids) and reduce both predator and prey habitat provided by the permanent bridge structures. Studies indicate that juvenile salmonids do not generally utilize shoreline habitat where overwater structures are present.

Table 2. Changes to In-water Habitat Complexity Under Bridge

Bridge Structure	Number of In-water Piers/Piles	Number of Creosote-Treated Piles	Approximate Total Area of In-water Piers (Square Feet)
Existing West Bridge	162	162	286
Existing East Bridge	58	0	102
Total Existing	*220*	*162*	*388*
Proposed New Bridge	12	0	629
Walkway Supports	15	0	21
Total New	27	*0*	*650*
Change from Existing to New	**-193**	**-162**	**262**

Factors that influence the extent of in-water shade include the width of the new bridge decks, the over-water height of the new bridge decks, light diffraction around the structure, light refraction in water, and the spatial alignment of the structures in relation to the path of the sun. The proposed project also includes the temporary removal of the floating walkway during construction and the reinstallation of the walkway along a new alignment approximately 10 feet west of its present location. Changes to in-water shading resulting from the new bridge or reconfigured walkway could alter the distribution and density of aquatic macrophytes, which in turn may affect fish migration behaviors.

Significant effects on the migration of juvenile salmonids are not expected to result from this project for several reasons. First, the amount of additional shading from the new bridge would be relatively small. The amount of existing overwater structure from the existing bridge structures is 23,200 square feet. The new bridge will provide 26,800 square feet of permanent overwater shading, an increase of 3,600 square foot (approximately 15 percent of existing overwater area). However, the new bridge will be slightly higher in the center and slightly lower on either end, allowing a similar amount of light penetration under the bridge. The reinstallation of the floating walkway will not increase the amount of overwater coverage or shading created by the existing walkway, but it will result in a change from the current condition. The light/dark boundary will be relocated approximately 10 feet waterward (west) of the existing shade line. In the event the City cannot reinstall the floating walkway as a result of federal, state or local permitting constraints, changes or impacts with this structure would not occur and the light/dark boundary line will remain effectively the same as the existing condition.

Habitat conditions under the existing bridge are poor, and studies have indicated that Chinook do not generally utilize shoreline overwater habitats of Lake Union. Concrete waste and riprap make up most of the substrate under the bridge, with several hundred vertical piles, no native aquatic macrophytic vegetation, and likely degraded water quality. These degraded habitat conditions do not provide the functions to support rearing or migrating Chinook salmon or steelhead. Although post-project conditions will be improved, with fewer piles, better quality substrate, and improved water quality, the conditions to support migrating or rearing salmonids will still not be present.

Terrestrial Habitat

Changes in Habitat Structure due to Mitigation Activities. It is possible that the abandoned pier adjacent to the project site may be removed as part of this project impacts. The pier is used by birds as a resting area, and its removal would slightly decrease the availability of this type of habitat in the area. However, the shoreline of Lake Union is heavily developed with docks, piers, and other structures that provide abundant resting habitat, and the loss of the dock would not pose a significant impact to birds using the lake. Removal of old creosote-treated pilings should actually improve habitat by reducing a source of water and sediment pollution.

Mitigation Measures

Numerous Best Management Practices (BMPs), described below, have been incorporated into the proposed project to avoid and minimize short-term and long-term impacts to fish and wildlife habitats in the project vicinity. With these measures in place, the project would have minimal impacts to vegetation, fish, and wildlife, and could improve water quality in the project area thus benefitting these resources.

Erosion and Sediment Control

- Implement construction phasing that minimizes the amount of earthwork that exposes the ground surface to erosion.
- Implement a Temporary Erosion and Sediment Control (TESC) plan including sediment-control BMPs such as silt fences, check dams, sediment traps, sedimentation basins, and flocculation methods.
- Use erosion-control practices (seeding, mulching, soil conditioning with polymers, use of geo-synthetics, sod stabilization, erosion-control blankets, vegetative buffer strips, and preservation of trees with construction fences).
- Use construction entrances, exits, parking areas, and wheel wash stations as appropriate to reduce tracking sediment onto public roads.
- Perform routine inspections of erosion-control and sediment-control BMPs and subsequent BMP maintenance.
- Implement construction BMPs to control dust and limit impacts to air quality.

Contaminated Materials Handling

- All contaminated or potentially contaminated project excavation spoils and waste material (e.g., removed creosote-treated piles) will be isolated from the lake once removed, tested in accordance with applicable guidelines, and disposed of in a licensed waste facility or other appropriate site pursuant to applicable regulations.

In-Water Work

- No in-water will occur until a primary containment curtain is installed around the entire project area.

- Prior to activities that involve physical disturbance of the lake bed, the work area will be further isolated with a smaller, secondary sediment curtain, installed as close to the work area as feasible.
- Prior to activities that involve physical disturbance of the lake bed, one to two feet of clean sand will be placed around the work area to minimize re-suspension of potentially contaminated materials.
- A debris containment system will be installed prior to demolition of the existing bridge structures, in order to minimize or eliminate debris falling into Lake Union.
- The project will not use impact pile driving, in order to minimize in-water noise and vibration.
- Work within Lake Union will require a Hydraulic Project Approval (HPA) from the Washington Department of Fish and Wildlife (WDFW). The project will comply with all permit conditions to minimize impacts on aquatic resources.

Clearing/Vegetation Removal

- High-visibility construction fencing will be installed to define the perimeter of the work area and protect sensitive areas from construction related impacts.
- Replace all trees removed at a minimum 1:1 ratio in accordance with City of Seattle street tree planting guidelines. All temporarily cleared vegetation will be replanted with native species following construction.
- Clearly mark the limits of construction and protect vegetation remaining outside of these limits. Protect street trees as required by City code.

Stormwater Pollution/Spill Prevention

- A Spill Prevention Control and Countermeasure (SPCC) plan will be implemented. Elements of this plan will satisfy all pertinent requirements set forth by federal, state, and local laws and regulations.
- All vehicles operated within the project area will be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected will be repaired before the vehicle resumes operation. When not in use, all vehicles will be stored in the staging areas or stored with spill containment pans or pads.
- All mechanical equipment will be fueled at least 50 feet from Lake Union. All equipment will be inspected daily for fluid leaks. Spill response equipment will be on-site for potential fluid leakage.

Staging Areas

- All staging and stockpile areas will be limited to paved or gravel right-of-way.
- Staging areas will be located in areas that will prevent the potential of contamination of Lake Union. Servicing and refueling of vehicles will not occur in areas that reduce potential spills

of petroleum and hydraulic fluids in sensitive areas. Additionally, drip pans will be fitted with absorbent pads and placed under all equipment being fueled.

Other Construction Activities

- Any use of wet concrete will include provisions for allowing adequate time and protection of material to allowing adequate curing before coming into contact with water. No wet or curing concrete will be allowed to come in contact with the waters of Lake Union.
- Nighttime lighting will be directed toward active work areas only during construction to minimize disturbance of wildlife in Lake Union

Significant Unavoidable Adverse Impacts

With implementation of the mitigation measures described in the previous section, the project would not have significant unavoidable adverse impacts on vegetation or terrestrial birds and wildlife. The project will result in a small net overall decrease of shoreline vegetation. In addition, if the abandoned pier and pilings are removed, fewer perching spots would be available in the immediate project area for birds.

A limited number of individual fish may be injured or killed from direct physical contact with construction equipment, entrainment within a drilled shaft casing, or sedimentation from construction activities including sand layer installation. These potential impacts are unavoidable because of the in-water work required to replace the bridge.

The temporary suspension of some sediment in Lake Union is an unavoidable adverse impact of the project, but is limited to periods of active in-water construction. Operation of the project would not result in an increase in sediment in the lake, and will result in improved stormwater quality entering the lake.

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APPENDIX A

Representative Site Photos

Photo 1. Street trees at south end of Fairview Bridge.

Photo 2. Support structure under Fairview Bridge.

Photo 3. Floating walkway and kayak launch along NW side of bridge.

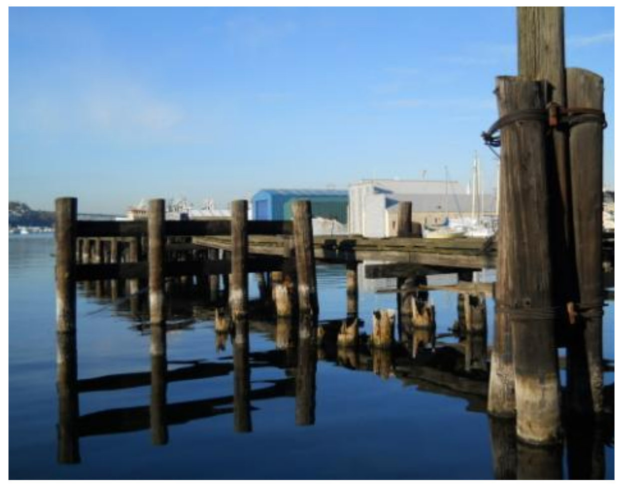

Photo 4. Abandoned dock in Lake Union adjacent to bridge site.

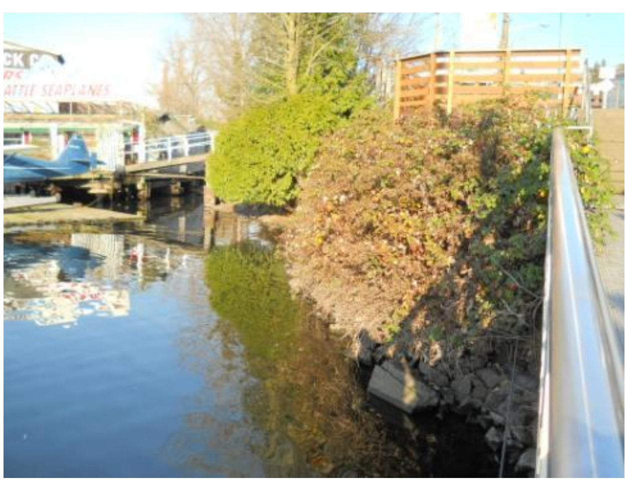

Photo 5. Invasive vegetation along Lake Union shoreline at NW end of bridge.

Photo 6. Shoreline armored with riprap at south end of floating walkway.

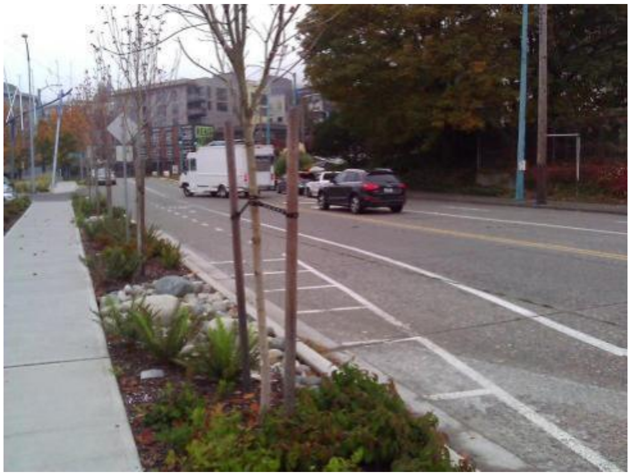

Photo 7. Streetside vegetation potentially affected by construction at north end of bridge approach.

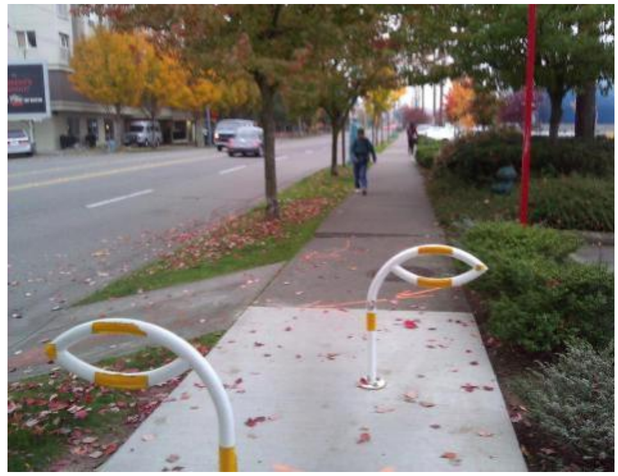

Photo 8. Planting areas potentially affected by construction at south end of bridge approach.

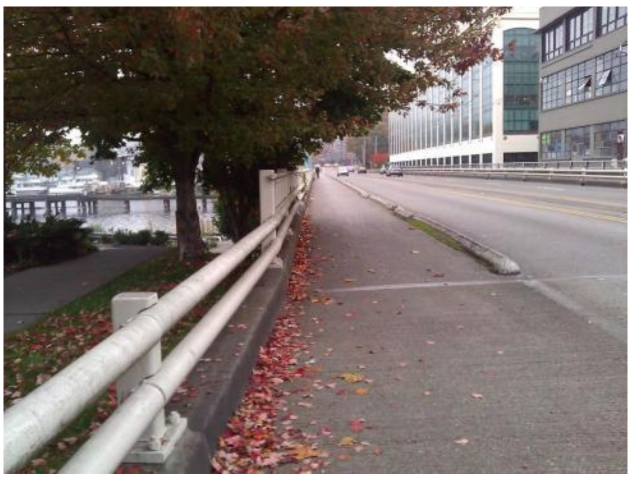

Photo 9. Street trees potentially affected by construction at south end of bridge approach.

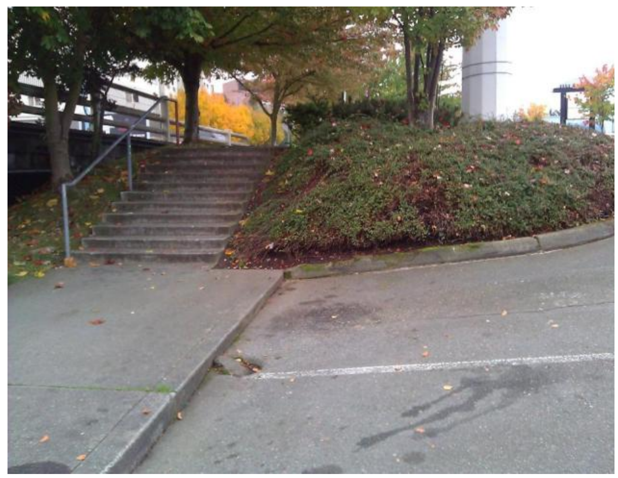

Photo 10. Planting area potentially affected by construction at south end of bridge approach.

Fairview Avenue Bridge
Vessel Allision Loads Analysis

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DOC:	REV: A	FILE: 15018.01	DATE: 29 January 2016

Revision History

Section	Rev	Description	Date	Approved
Allision Force Computation Methodology, Results	A	Reduced conservatism of including upper deck in Minorsky impact load calculation, included commentary about pile spacing	01/29/16	JMM
Introduction	A	Project description	01/29/16	JMM
All	–	Initial issue.	4/27/15	JMM

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2. American Association of State Highway and Transportation Officials, *Guide Specifications and Commentary for Vessel Collision Design of Highway Bridges*, Second Edition, 2009.
3. Glosten, *Fairview Avenue North Bridge Replacement Project: Navigation Evaluation*, File 15018.01, 13 April 2015.
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Introduction

The City of Seattle Department of Transportation (SDOT) proposes to replace the Fairview Avenue North Bridge, which is located on the southeast shoreline of Lake Union in Seattle, Washington. The existing bridge consists of two immediately adjacent bridges: an eastern, concrete pile-supported bridge built in 1964 and a western, timber pile-supported bridge built in 1948. Neither bridge meets current seismic standards.

A floating walkway, braced to the bridge, runs parallel to and west of the bridge. The walkway provides north-south pedestrian access through the project corridor as well as public shoreline and water access to Lake Union.

SDOT proposes to replace the existing bridge with a single, multi-span concrete bridge. The new bridge would be supported on three bents consisting of three, three and a half foot (3½-foot) diameter, reinforced concrete bridge columns that are constructed on a foundation of eight foot diameter drilled shafts that will be installed to an approximate depth of 140 feet below the water surface elevation.

SDOT also proposes to remove and, if allowed by federal, state, and local permits, to refurbish and reconstruct the floating walkway to a location approximately 10-feet west of its current location. The walkway would be anchored to steel pipe piles, which would be vibrated into place.

The body of Lake Union, to the west of the bridge, is an important maritime resource for the City of Seattle, used by wide range of vessels, ranging from light recreational craft to deep-sea fishing trawlers. To estimate the risks posed to the bridge from these vessels a vessel impact study has been carried out, following the methods prescribed by AASHTO in References 1 and 2, supplemented by other methods used in the maritime industry to estimate collision forces.

Allision Force Standards and Methodologies

Bridges over navigable waterways are required to withstand forces imposed by allisions of all probable vessels passing beneath the bridge. The methodology and loads are specified in the American Association of State Highway and Transportation Officials (AASHTO) bridge design guidance, References 1 and 2. These references provide both deterministic methodologies, for analyzing the loads imposed by specific vessels, and statistical methodologies, for determining the annual probability of collapse. The Fairview Avenue Bridge is unusual in that there is no vessel traffic under the bridge (see Reference 3), but there is a possibility of vessel allision, due to aberrant maneuvering or drifting vessels in wind.

Since there is zero vessel passage beneath the bridge, the annual probability of collapse, according to the AASHTO procedures, is zero. Therefore, the statistical methodology is not applicable. The AASHTO deterministic analysis is intended to estimate loads due to allisions with steel-hulled merchant ships of greater than 1,000 deadweight tons capacity and to typical US inland barges traveling at normal transit speeds and alliding head-on with the bridge structure. Neither of these scenarios fits the expected allision scenarios on Lake Union. Nevertheless, this standard is the most widely applied and generally accepted standard for bridge allision loads in the US, so, in the absence of a clearly defined alternative standard the AASHTO rules are applied in the analysis reported herein.

As an alternative to, and a check on the level of conservatism in the AASHTO guidelines, ship collision damage methodologies have also been applied. The ship collision calculations are based on a paper by Minorsky, Reference 4, in which he found a simple relationship between the volume of damaged steel and the kinetic energy of the colliding vessels.

The details of the AASHTO and Minorsky methods are explained in more detail in "Allision Force Computation Methodology" below.

Design Vessels

As discussed in Reference 3, the Fairview Avenue Bridge crosses the southeast end of an approximately 400-ft wide waterway (Waterway 8), extending approximately 850 ft to the northwest. The northeast and southwest sides of the waterway are lined with docks, used by recreational craft and commercial vessels associated with repair work at Lake Union Dry Dock. There is no navigation under the bridge.

The layout of the bridge and waterway is shown in Figure 1.

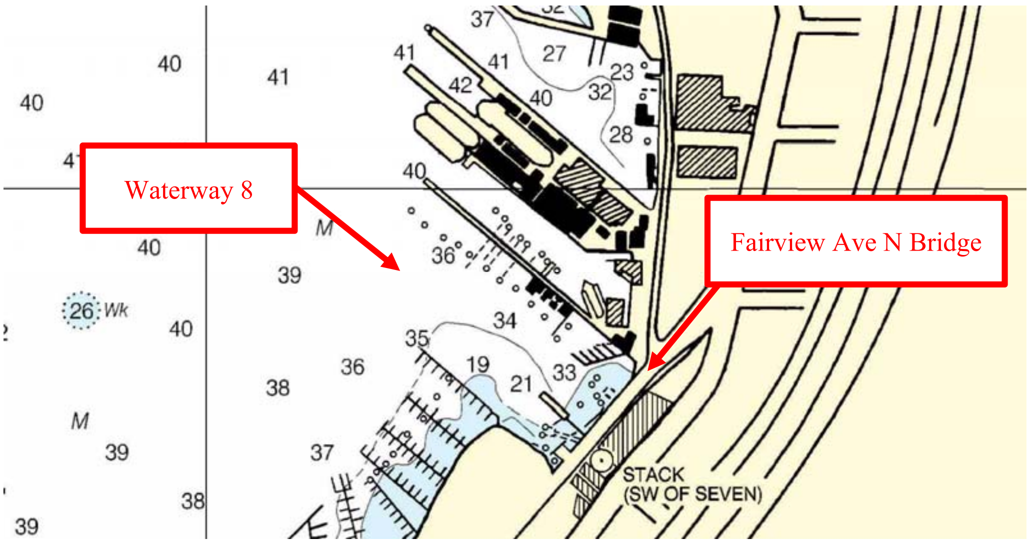

Figure 1 Waterway layout

Large vessels typically transit the lake at the northern end, through the Lake Washington Ship Canal, and rarely have reason to navigate to the south end of the lake. Furthermore, the narrow width of the waterway leading to the bridge provides little opportunity for large vessels to accidentally drift into the bridge, since they are likely to impact moored vessels or docks prior to impacting the bridge.

For these reasons, the design vessels are not taken from the largest vessels transiting the north end of Lake Union, but rather from vessels docked in or near the waterway itself.

On 05 March, 2015 a survey was conducted of the adjacent marina facility and Lake Union Dry Dock, to find the largest vessels likely to use the waterway. From this survey two vessels were selected as representative of the likely impacting vessels:

1. A 50-ft long motor yacht, displacing 75,000 lbs (34 tonnes), traveling at 4 knots.
2. The *Libresea*, a 149-ft long, 36 ft wide offshore vessel, displacing approximately 289 tonnes in its lightest condition, travelling at 2.9 knots.

The former vessel represents an aberrant recreational vessel, attempting to dock but suffering a maneuvering failure, due to piloting error or propulsion machinery malfunction.

The latter vessel represents a commercial vessel, docked in the waterway, breaking free from its moorings and drifting in the wind towards the bridge. The wind speed, 32.7 mph, is taken from the 50-year return period one-hour average wind speed documented in Reference 5.

The drift speed of *Libresea* is computed by finding the equilibrium speed at which the side force due to wind matches the broadside drag force of the hull. This speed is computed for *Libresea* at its lightest displacement, since this is the condition in which it is docked and also the condition that leads to the highest drift velocity. Wind force and hull drag coefficients are taken from guidance in Reference 6.

For the purposes of computing impact forces according to the AASHTO guidelines (see "Allision Force Computation Methodology," below) the deadweight tonnage of the yacht is conservatively estimated as its full displaced weight. The deadweight of the *Libresea* is estimated from the difference between its displacement at the time of the vessel survey (estimated 3.8-ft draft) and its weight at design draft, 10.7 ft. Reference 2 provides tables of deadweight, fully-laden displacement, and ballasted displacement for various ship types. Assuming typical small merchant ship hull characteristics, extrapolation from the AASHTO tables yields an estimate of 503 tonnes for the deadweight of *Libresea*.

Allision Force Computation Methodology

The AASHTO guidelines in References 1and 2 provide methodologies for estimating impact forces, vessel damage extent and annual probability of collapse due to allisions of ships and barges with bridge piers. The deterministic methodology is termed Type I methodology and the probabilistic assessment of the annual probability of collapse is termed Type II methodology. In the Type I methodology the design impact force on the bridge is calculated, based on impact force due to specific design vessels. In the Type II approach the statistics of vessel impact leading up to the annual probability of collapse are based upon the number of vessels passing beneath the bridge and vessel collision frequency. Since there are currently no vessels passing beneath the bridge, and no historical collision data, the Type II methodology is not applicable for this bridge.

Type I methods are employed to estimate impact forces from specific vessels. References 1and 2 give the impact force from a bow-on allision between a ship and bridge pier as

$$P_s = 8.15 \cdot V \cdot \sqrt{DWT} \tag{1}$$

where,

P_s = Impact force, in kip

DWT = Vessel deadweight, in metric tons

V = Vessel impact velocity in ft/s

The AASHTO impact force guideline is based upon the deadweight tonnage of the vessel, rather the actual mass of the vessel at the time of impact. Reference 2 addresses this shortcoming by noting that impact forces from fully-laden and ballasted vessels are approximately equal, due to the effective stiffening in the vessel bow due to ballast water. This argument is questionable for the types of vessels likely to impact the Fairview Avenue Bridge; however, in the absence of better guidance from AASHTO, the definition of vessel weight given in Equation 1 is applied.

It is noted that the AASHTO guidance for barge impact forces, unlike the ship impact forces, are based upon the actual vessel kinetic energy at time of impact. The impact forces are appropriate for typical inland barge bow structures, however, so this method is not applied in the analysis reported herein.

As noted previously, the AASHTO guidance is primarily concerned with relatively high-energy, head-on impacts. Low energy, broadside impacts will not generally constitute a governing design event for bridges over navigable waterways. The impact forces computed by Equation 1 are, therefore, likely to be quite conservative for Fairview Avenue, particularly in the case of drifting vessel in wind, since vessels typically drift broadside to the wind.

To compute ship collision energies, naval architects typically rely on methods similar to those first proposed by Minorsky in Reference 4. From an extensive database of ship collision events Minorsky deduced that:

1. Vessels in collision travel together as a single mass after contact, with a combined velocity given by conservation of momentum
2. The difference in kinetic energy between that of the two vessels after collision and the striking ship prior to collision is absorbed as structural damage in the two vessels.

For a vessel striking a rigid pier or wall, a similar method can be employed with the post-allision momentum equal to zero and all kinetic energy absorbed as structural damage in the vessel. Minorsky found a simple linear relationship between the vessel kinetic energy and absorbed plastic deformation energy, in the form:

$$E_T = 121{,}900 + 414.5R_T \qquad (2)$$

where,

E_T = Absorbed structural energy, in tons-knots^2
R_T = Resistance factor = volume of damaged steel, in ft^2-in

The resistance factor is the length of plate edge in contact (ft) times the depth of damage in the direction of travel (ft) times the thickness of the plate (in).

Minorsky's equation is illustrated graphically in Figure **2**, reproduced from Reference 4.

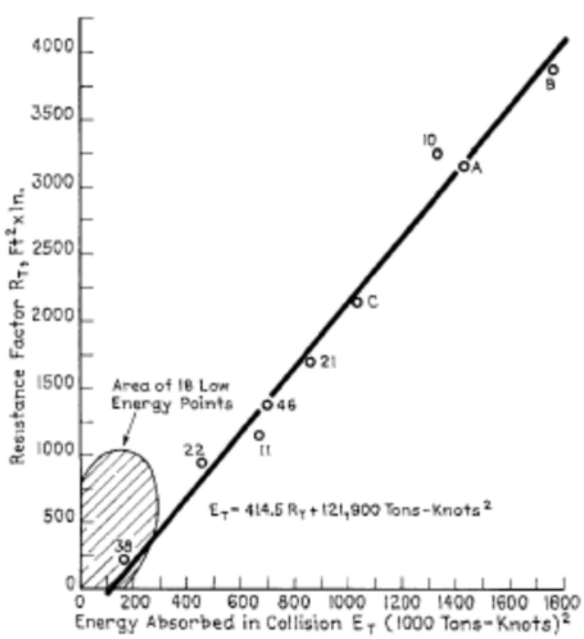

Figure 2 **Minorsky absorbed energy-resistance relationship (taken from Reference 4)**

Subsequent researchers, including Glosten (see Reference 7) have converted Minorsky's formulation to more consistent units, and noted that the damage process postulated by Minorsky is equivalent to a constant pressure acting on the contact area of load-carrying structural members. In Reference 7, Glosten gives this pressure as 13.7 ksi. By assuming a constant force acting during the collision this relationship provides a relationship between absorbed energy and impact force.

Minorsky's method, as originally formulated, provides a good fit to the collision data for high-energy collisions, leading to extensive crushing failure in the structural members oriented parallel to the vessel direction of travel at impact (decks, floors, and deck stiffeners oriented parallel to the direction of travel). He noted, however, that there was considerable scatter in the low energy collisions. The US Army Corps of Engineers (USACE), recognizing the conservatism of the Minorsky approach, have developed guidance for impact forces on lock walls (Reference 8). This methodology, however, is more appropriate for oblique impact than head-on or broadside allisions, so is not applied in the analysis reported herein.

A number of researchers, notably Jones (Reference 9), have extended Minorsky's approach to low energy collisions, by including bending and tearing failures in the stiffeners and plates oriented with their primary axes normal to the direction of travel (side shell plating, side shell stiffeners, etc.).

Jones evaluated the bending failure of a rectangular beam representing a section of side shell and stiffener, fixed at each end, giving the relationship:

$$F = \frac{E}{w} = \frac{2\sigma t B w}{L} \tag{3}$$

where,

F = Impact force (kip)

E = Absorbed plastic deformation energy (kip-ft)

σ = Strain-hardened yield stress of frame steel = $\frac{\sigma_{yield}+\sigma_{ultimate}}{2}$ (kip/ft^2)

B = Beam width (ft)

w = Deflection normal to beam centerline (ft)

L = Beam length (ft)

t = Beam thickness (ft)

Jones pointed out that Minorsky's original relationship corresponded to a *w/L* ratio of approximately 1/3. The low energy collisions, shown in the hatched area of Figure **2**, fit to an approximate *w/L* ratio of 1/4.

Impact forces due to the 75,000-lb motor yacht and the *Libresea* were computed according to AASHTO guidelines. Impact forces were also computed for *Libresea* using Minorsky's and Jones' methods, to provide comparative data.

Since the *Libresea* is intended to represent a class of vessels likely to be in the waterway, its structural scantlings are estimated from structures of similar-sized vessels in the Glosten database. Jones' and Minorsky's methods are applied to a section of side shell, near the midship. The structural particulars used in Minorsky's method are summarized in Table 1, and the structural particulars used in Jones' method are presented in Table 2. The computation according to Jones' method examines the deformation of a single side frame, between the tank top and main deck.

In the Minorsky method, the impact force is related to the length of the contact area. For this computation, the contact structure is assumed to be a 4-ft diameter pile in contact with the hull over a depth from the bottom shell to the main deck, which is approximately 4 ft above the design waterline. There is an upper deck in the forward part of the ship, but it is approximately 13 ft above the design waterline, i.e. more than 13 ft above the waterline in a lightly loaded condition. In a head-on allision, therefore, the upper deck and topsides are likely to impact the bridge superstructure prior to allision with the columns, reducing impact forces on the column. Depending on the vessel's draft and drift angle at time of impact the impact forces will be spread over a column height ranging from 6 ft to 14 feet. The 6 ft contact height can occur anywhere in a height range between the top of the column and 2 ft below the lowest water level. The 14 foot contact height can occur anywhere in a range between the top of the column an 10 ft below the lowest water level. It is recognized that the low end of this range includes some of the 8 ft shaft below the column, but in the absence of any data on the distribution of forces between the two diameters it is assumed that the force distribution is uniform. The height ranges are illustrated in Figure 3.

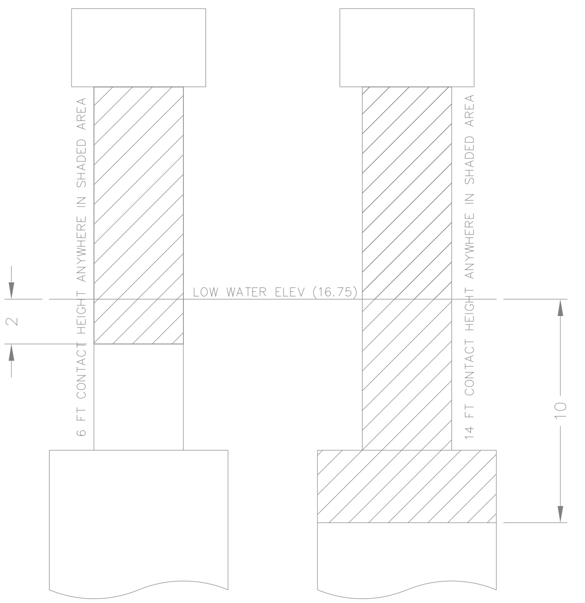

Figure 3 Height ranges for impact forces

The contact length is computed by an iterative process, in which the penetration depth of the pile into the side of the hull is computed from the vessel kinetic energy, the chord subtended by the vessel flat of side is computed from the penetration depth, and the process is repeated until the contact length and subtended chord length are equal.

The number of transverse stiffeners (floors, deck stiffeners) participating in the allision is (L/S+1), where L is the contact length and S is the frame spacing, assumed to be 2 ft.

Table 1 Estimated structural contact area for *Libresea*, for Minorsky's method

Item	Composition	Contact area, per inch of contact length (in^2)
Bottom shell	3/8" plate	0.38
Transverse floors	5/16" plate	0.46
Tank top	3/8" plate	0.38
Main deck	1/4" plate	0.25
Main deck stiffeners	3.5×2.5×1/4" L	0.11

Table 2 Estimated side frame structure for *Libresea*, for Jones' method

Item	Composition
Side frame	6×4×5/16" L
Side shell	3/8" plate
Height between decks	10 ft

When computing kinetic energy in head-on allisions, AASHTO recommends augmenting the vessel mass by 5% to account for hydrodynamic added mass. In broadside allisions standard practice is to augment the vessel mass by 50% (Reference 10). Added mass equivalent to 50% of the vessel mass is used in this analysis for computing impact forces using Minorsky's and Jones' method, since the *Libresea* is assumed to be drifting broadside to the wind.

Allision Force Results

The vessel impact energies and forces on the motor yacht and *Libresea* are summarized in Table 3 and Table 4, respectively. As noted previously, AASHTO methods are applied to the motor yacht, and AASHTO, Minorsky, and Jones methods are applied to *Libresea*.

Table 3 Motor yacht impact forces

Parameter	Value	Units
Deadweight	34.0	tonnes
Speed	6.8	ft/sec
Kinetic energy (head-on)	55.8	kip-ft
Kinetic energy (beam-on)	83.7	kip-ft
Impact force: AASHTO Equation 1	321	kip

Table 4 ***Libreasea* impact forces**

Parameter	Value	Units
Deadweight	503	tonnes
Speed	5.0	ft/sec
Kinetic energy (head-on)	258	kip-ft
Kinetic energy (beam-on)	369	kip-ft
Impact force: AASHTO Equation 1	912	kip
Impact force: Minorsky on 4-ft pile (ignoring upper deck)	692	kip
Impact force: Jones on single frame	249	kip

As seen in Table 3 and Table 4, the drifting *Libresea* contributes the governing design load, 912 kip according to AASHTO methods. The Minorsky method gives a lower load. The Minorsky method computes a deformation depth of 6.4 in. The Jones method computes a deformation depth of 17.8 in. This latter depth is too large for the assumption of single frame damage to be valid, and it is likely that the structural damage will be a combination of Jones' frame deformation and Minorsky's plate crushing mechanisms. In other words, the Minorsky result is a better conservative estimate.

The results in Table 3 and Table 4 assume that the floating walkway and its associated piles afford no protection for the bridge. This is likely to be an overly conservative assumption. The walkway pile spacing is 30 ft, so even with the walkway removed a vessel the size of the *Libresea* will not fit through a gap between piles without contacting at least one pile. In a broadside or quartering allision, the most likely scenario, the vessel will likely contact a minimum of two, and likely three, walkway piles prior to impact with the bridge.

FAIRVIEW AVENUE NORTH BRIDGE PROJECT

WATER RESOURCES TECHNICAL MEMORANDUM
(DRAFT)

February 2014

PREPARED FOR:

SDOT

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FAIRVIEW AVENUE NORTH BRIDGE

WATER RESOURCES TECHNICAL MEMORANDUM

DRAFT
February 2014

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the state of Washington.

Signed: ___________________________________ Lic. No.: 29988

Printed Name: _Richard Kittler___ Date: ___________

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1 Introduction

The Fairview Avenue North Bridge Project is part of the City of Seattle's Bridge Rehabilitation, Replacement and Seismic Retrofit Program funded by Bridging the Gap (BTG), a nine-year levy for transportation maintenance and improvement. The project is also federally funded by Highway Bridge Program funds.

The City of Seattle Department of Transportation (SDOT) proposes to replace two existing bridges on Fairview Avenue North with a single new bridge spanning a portion of the southeast shoreline of Lake Union, in Seattle Washington.

Fairview Avenue North is a three-lane roadway connecting the South Lake Union neighborhood to Eastlake Avenue East adjacent to the Lake Union Steam Plant. Fairview Avenue North receives about 8,700 vehicles per day. Fairview Avenue North is classified as a Principal Arterial, Regional Connector and a Minor Transit Street by the City of Seattle.

There are two parallel bridges at this location, the West Bridge and the East Bridge. The bridges are adjacent to the historic Lake Union Steam Plant building occupied by ZymoGenetics. The West Bridge was built in 1948 and has one southbound traffic lane and a bike lane separated by curb. The West Bridge has a concrete deck supported on timber piles and rated as being structurally deficient. The East Bridge was built in 1963 and has two northbound traffic lanes and one raised sidewalk. The East Bridge is a prestressed concrete girder structure supported on concrete piles and requires seismic upgrade.

In July 2013, a Type, Size, and Location (TS&L) report was prepared evaluating the following concepts: replacing both bridges with a roadway fill section supported by retaining walls, replacing both bridges with a single bridge, and replacing the West Bridge and rehabilitating the East Bridge. It was determined that replacement of both bridges with a new bridge is the preferred alternative.

2 Summary of Conclusions

The replacement of the Fairview Avenue Bridge is expected to improve the water quality in this area of Lake Union. The existing bridges provide no water quality treatment or flow control with stormwater running directly to the lake from the existing structures. The proposed improvements will provide water quality treatment meeting Washington State Department of Ecology (WSDOE) and City of Seattle requirements. Flow control is not required at this location as Lake Union is a flow control exempt water body. The water quality facility will provide treatment exceeding the requirements by 20% using treatment cartridges. The design proposes to utilize a General Use Level Designation (GULD) approved treatment vault such as KriStar's Perk Filter Media Filtration Device that consists of modular cartridge media filter utilizing zeolite-perlite-carbon (ZPC) filter media. The treatment facility has the capability to remove 80% of Total Suspended Solids (TSS) as well as 50% of Total Phosphorus (TP) from stormwater runoff.

Outlets from the treatment vaults will be submerged below the ordinary high water and designed to prevent fish entry as required by City of Seattle's Municipal Code (SMC

23.60.194). Temporary construction stormwater BMPs will be put into place to prevent sediment and other construction related pollutants from entering the lake. Stormwater during construction will be managed through a National Pollutant Discharge Elimination (NPDES) permit to be acquired for construction of the project. Contractors will be required to complete a Stormwater Pollution Prevention Plan (SWPPP) and monitor BMP performance throughout construction.

During design, alternate stormwater treatment options were considered for permanent BMP. Due to space constraints, high fines content in the soil, and the presence of contaminated materials, infiltration was not feasible. In addition, the groundwater levels in proximity to the project are at the elevation of the water surface of Lake Union; 16.75 to 18.75 feet (NAVD 88).

3 Purpose and Need for Action

3.1 Project Purpose

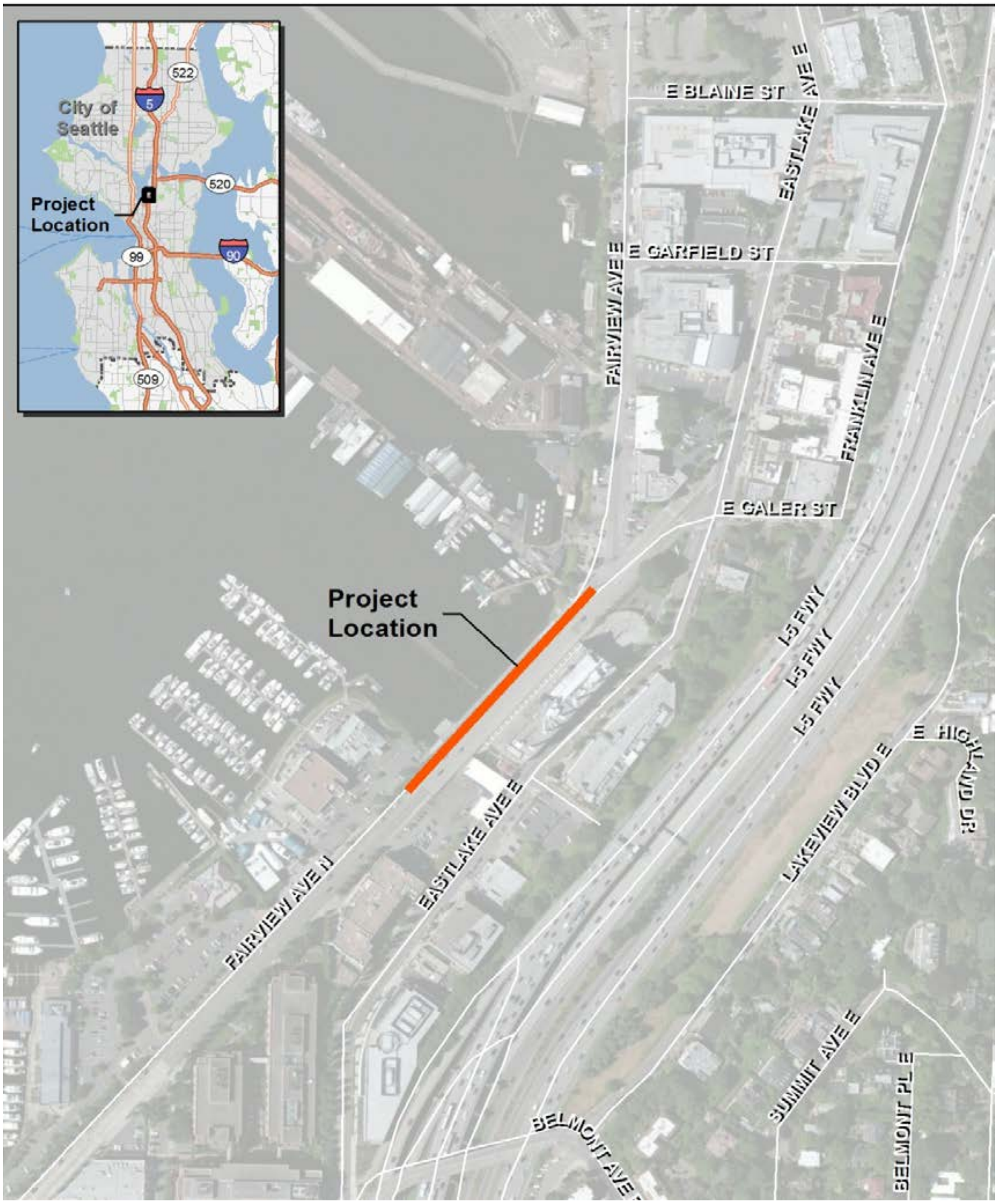
The Fairview Avenue North Bridge is located along the southeast shore of Lake Union near the 1200 block of Fairview Avenue North in Seattle. The bridge is composed of two parallel bridge structures, the West Bridge and the East Bridge. The bridges are adjacent to the historic Lake Union Steam Plant building, which is currently owned by Alexandria Real Estate Equities and occupied by ZymoGenetics.

The West Bridge, built in 1948, carries the single southbound lane of Fairview Avenue North. The bridge consists of one 12-foot-wide southbound traffic lane and a 9-foot-wide multi-use bicycle/pedestrian path. The bridge is 504 feet long and 25.25 feet wide. The bridge deck is comprised of a 10-inch-thick reinforced concrete slab that spans between pile-supported bents spaced at 16 feet. Each bent is constructed with a minimum five timber piles with the west-exterior piles battered outward. The piles are partially submerged, many are in poor condition, and a number of piles have been repaired in years past. The bridge is rated as structurally deficient (SD) with a sufficiency rating of 23.98 SD. The primary driver of the low rating is the condition of the piles. Since 1989, the bridge has been posted for a 40-ton weight limit.

The East Bridge, built in 1963, carries the two 10.5-foot-wide northbound traffic lanes of Fairview Avenue North. The bridge is 481 feet long and 32.75 feet wide. The East Bridge shares a 7-foot-wide median with the West Bridge and has an 8-foot-wide raised sidewalk. The superstructure consists of fifteen spans of 32-foot-long prestressed concrete girders at a 5.5-foot spacing. The concrete deck slab is 5.75 inches thick. The substructure consists of concrete bents spaced 32 feet apart, with four 18-inch-diameter prestressed concrete piles at most bents. Bent 2 is missing one pile and as a result governs the load rating for the East Bridge. The bridge has a sufficiency rating of 40.98. The bridge will not support the future extension of the streetcar and requires seismic upgrade.

The purpose of this project is to maintain the transportation function and capacity on Fairview Avenue North by replacing the existing deteriorating bridges with a new 540 feet long structure. Currently, stormwater runoff discharges directly into Lake Union at Waterway 8 without receiving treatment.

This Water Resources Technical Memorandum will focus on surface water issues (including stormwater runoff), water quality methods and ground water issues. The report will discuss the contract requirements for temporary and permanent Best Management Practices (BMPs).



Source: King County GIS, Bing Maps

Figure 1 – Vicinity Map

4 Description of Alternatives

4.1 Alternative 1 – No-Build Alternative

The main purpose for this project is not environmental in nature. The west bridge is structurally deficient. If the No-Build Alternative is taken, the West Bridge will continue to deteriorate resulting in life safety concerns. In the event that the West Bridge is obsolete, all lanes on Fairview Avenue North will need to be shifted on to the East Bridge resulting in an 11-foot wide lane in each direction with a 5-foot sidewalk on the east side. The Cheshiahud Trail will be disrupted and will require the use of a non-ADA route along the existing floating walkway. In addition, the floating walkway would require an alternate method of anchoring and could possibly require permanently removing or replacing the floating walkway.

Environmental concerns as a result of the No-Build Alternative include:

- The stormwater runoff will continue to discharge directly into Lake Union without receiving treatment. According to the City of Seattle drainage requirements, the current condition does not meet Basic water quality standards set by WSDOE. City of Seattle requirements from *Volume 3 – Stormwater Flow Control and Water Quality Treatment Technical Requirements Manual* state that all stormwater discharge into Lake Union must at a minimum have Basic Treatment. This means that at least 80% of total suspended solids (TSS) must be removed prior to discharging into the lake. TSS is a hazard for fish and plants. It disrupts the ecosystem by blocking sunlight from reaching deeper depths. This can prevent native aquatic plants from growing at deeper depths and reduce aquatic habitat. High TSS can lead to turbidity problems and sediment transport which can also disrupt fish habitat, respiration, and survival.

- Currently, the area under the bridge remains contaminated with metals and hydrocarbons. The area is also full of debris and broken creosote pile remnants of the original East Bridge and West Bridge timber creosote piles. The No-Build Alternative will perpetuate the current condition under the bridge.

4.2 Alternative 2 – Build Alternative

The roadway alignment will be raised at the mid-point of the bridge to allow surface water runoff to be conveyed to either ends of the bridge where it will be collected and treated prior to discharging to Lake Union. The proposed roadway section includes three 11-foot-wide lanes (two northbound and one southbound), an 8-foot-wide sidewalk on the both sides and a 12-foot-wide two–way cycle track on the west side. The project will detach the floating walkway during construction and re-attach the walkway to the west of the new bridge. The Build Alternative will widen the bridge by 7-feet and shift the west edge of the floating walkway 10 feet to the west.

Under the Build Alternative, the new bridge would be supported on concrete piers set in groups of four drilled shafts each at five locations or bents. Three of the shaft groups will be installed on land and two from temporary support platforms incorporated into the existing bridge deck. Fills and wing walls would be placed for bridge approaches.

During installation of the drilled shafts, wet soils (spoils) generated will require management, dewatering and disposal offsite, as appropriate. In addition, some degree of local lake water turbidity will be generated during over-water shaft installation. Methods for management of turbidity and disposal of spoils will be detailed in the projects dewatering and erosion control, NPDES permit and the project specifications.

Replacing the bridges would allow long-term traffic use on Fairview Avenue North and maintain the existing function of the Cheshiahud Trail. In addition, this project will mitigate water quality issues by providing Basic Treatment in accordance with the regulatory requirements. Stormwater would be diverted to water quality treatment facilities prior to discharge into Lake Union. The treatment facilities selected will be WSDOE approved for Basic Treatment.

The lake bottom contamination under the bridge will be improved by placing a one to two foot layer of clean sand at the lake bottom. This will improve fish habitat by providing a clean layer of sand separating contaminated soil from the lake. New runoff will be treated for total suspended solids.

5 Studies, Coordination, Methods, and Regulations

5.1 Baseline Documentation

The roadway within the project limits currently discharges directly to Lake Union, a freshwater lake, without water quality treatment. The following reports were used to analyze existing conditions in the project area and identify impacts on water resources:

- Draft Biological Assessment by ESA – dated January 2014
    - Provides a summary of project, stormwater, geology, soils, construction methods, construction impacts and timeline, and determination of impacts and effects on various species and natural environment.
- Draft Geology and Soils Discipline Report by HWA GeoSciences Inc. – dated February 2014
    - Provides information related impacts and mitigation associated with geologic impacts such as liquefaction and landslides.
- Draft Contaminated Materials Discipline Report – January 2014
    - Provides information related to affects and mitigation measures of contaminated soils.
- Construction Methods Technical Memorandum by Ott Construction Consultants – dated February 2014
    - Provides potential means and methods of construction to identify temporary and permanent BMPs considerations for the project.
- Draft Stormwater Design Technical Report by HNTB – to be submitted March 2014
    - Provides detailed and technical information related to conveyance and water quality treatment.
- Type, Size, and Location Report by HNTB – dated May 2013
    - Addresses the alternative analysis and documents decision of the preferred alternative.

5.2 Rules, Regulations and Requirements

Lake Union is the only surface water resource of concern for the Fairview Avenue North bridge replacement project. The bridge spans a shallow inlet of the eastern edge of Lake Union. Lake Union is part of the Lake Washington Drainage Basin, located in the Water Resource Inventory Area (WRIA) 8 – Lake Washington/Sammamish Watershed.

This project will conform to the 2009 Stormwater Municipal Code (SMC 22.800-22.808), the 2009 City of Seattle Stormwater Manual Volume 2, Construction Stormwater Control Technical Requirements Manual, and the 2009 City of Seattle Stormwater Manual Volume 3, Stormwater Flow Control and Water Quality Treatment Technical Requirements Manual.

The following agencies/regulations have jurisdiction over Lake Union for stormwater quality:

- National Environmental Policy Act (NEPA)
- Clean Water Act
- State Environmental Policy Act (SEPA)
- Shoreline Management Act (SMA)
- City of Seattle Municipal Code
- Washington State Department of Fish and Wildlife
- Army Corp of Engineers
- NPDES Municipal Phase II
- United States Coast Guard Permit for Navigable Waters
- USEPA
- Washington State Department of Ecology (WSDOE)
- City of Seattle including Seattle Public Utilities
- King County Industrial Waste Discharge Permit (if needed)

Lists of permits are identified in the State Environmental Policy Act (SEPA) Checklist for this project.

Below are descriptions regulations and how they apply to this project:

Lake Union – 303(d) Listing

Lake Union is also on the WSDOE 303(d) List for impaired waters. The Federal Environmental Protection Agency (EPA) requires that impaired waters of the United States be listed on the 303(d) list. Pollutants that are listed as category 5 are assigned a total maximum daily load (TMDL) for each pollutant.

Table 1- 303(d) List

Lake Union 303(d)	
Pollutant	**Category**
Endosulfan I	1
Temperature	2
pH	2
Dissolved Oxygen	2
4,4'-DDD	2
4,4'-DDE	2
Zinc	2
Lead	5
Aldrin	5
Bacteria	5
Total Phosphorus	5

WRIA - 8 Cedar Sammamish

Lead, Aldrin, Bacteria, and Total Phosphorus are each Category 5 pollutants in Lake Union. The project will not generate any of these pollutants.

Flood Prone Areas

Lake Union is not in a 100 year floodplain. Lake Union water levels are controlled by the Hiram M. Chittenden Locks. According to the US Army Corps of Engineers, the water level at Lake Union is at 20 to 22 feet above sea level, which translates to NAVD88 elevation of 16.75 to 18.75 feet. This is not a threat to the property along the shoreline. Tidal effects have been negated by controlling the water elevation through operation of the locks.

Wetlands

There are no wetlands within the project site.

Aquifer Recharge

According to King County GIS maps, the site is not located within a Critical Aquifer Recharge Area.

Shoreline Protection

SMC 23.60.194 Standards for intakes and outfalls require all outfalls be located so they will not be visible at mean lower low water and designed to prevent the entry of fish.

For the proposed condition, the two outfalls will be located at elevation 15.00 NAVD88. The lower low water elevation at Lake Union is 16.75. This should ensure that the outfall won't be visible from the lake surface. Each outfall location will have a rip rap pad to prevent erosion. The outfalls will be designed to prevent fish from entering the drainage system by either providing a down turn elbow or fish screen. The outfall will have an energy dissipater to prevent water from eroding the soil around it.

Flow Control

The City of Seattle Stormwater Code requires roadway projects discharging to the public combined sewer to comply with subsection 22.805.080.B.4 (Peak Control Standard) if the total new plus replaced impervious surface is 10,000 square feet or more. This project will not discharge to the combined sewer. Lake Union has been identified as a Designated Receiving Water by the City of Seattle and the Department of Ecology, and therefore, flow control is not required.

Water Quality

Basic Treatment

Roadway projects that do not discharge to the public combined sewer are required to provide basic water quality treatment if the total new plus replaced pollution-generating impervious surface is 5,000 square feet or more. Basic water quality treatment requirements are to provide a minimum of 80% total suspended solids (TSS) removal for influent concentrations between 100 mg/l and 200 mg/l.

Oil Control

Oil control applies to projects that contain "High-use Sites". High use is defined as a road intersection with a measured average daily traffic (ADT) of 25,000 vehicles or more on the main roadway and 15,000 vehicles or more on any intersecting roadway. There are no high use sites within the project limits, and therefore oil control is not required.

Phosphorus Control

Phosphorus control applies to projects discharging into nutrient-critical receiving waters. The WSDOE Section 303d listing indicates phosphorus as a listed impaired parameter for Lake Union. The City of Seattle does not currently require phosphorus treatment for water discharging into any receiving water body; therefore, the water quality treatment system will not be required to treat phosphorus. In addition, this is a roadway project that does not typically contain use of pesticides, fertilizers, etc. to necessitate phosphorus treatment. There are local ordinances in place that ban the use of phosphorus in fertilizers in the region around Lake Union. Washington State Department of Ecology sets the threshold for phosphorus treatment to be at 20ug/L. If the concentration of phosphorus in Lake Union is higher than 20ug/L, then some remediation is required to improve those conditions.

No phosphorus chemicals will be used in fertilizers or other landscaping products.

Enhanced Treatment

Enhanced treatment is required for basic treatment roadway projects with an AADT exceeding 7,500 that discharge to fish-bearing streams, lakes, or to waters or conveyance systems tributary to fish-bearing streams or lakes. Sites that discharge directly (or, indirectly through a municipal storm sewer system) to Basic Treatment Receiving Waters are not subject to Enhanced Treatment requirements. Lake Union is designated as a basic treatment receiving water, and therefore enhanced treatment is not required.

Turbidity Requirements:

Turbidity should be less than 25 NTU's or if the existing water is already over 25 NTU, the following testing standard will apply. If the existing turbidity level is between 25 NTU and 50 NTU, then during construction turbidity readings must be no more than 5 NTU above the existing. If the existing turbidity level is over 50 NTU, then turbidity readings must not exceed 10% over the baseline. According to DOE, for lakes, the point of compliance for turbidity shall be at a radius of one hundred fifty feet from the activity causing the turbidity exceedance.

Green Stormwater Infrastructure

Green Stormwater Infrastructure (GSI) includes stormwater best management practices designed to reduce runoff from development using infiltration, evapotranspiration, or stormwater reuse. SMC requires all projects with 7,000 square feet or more of land disturbing activity or 2,000 square feet or more of new plus replaced impervious surface to implement green stormwater infrastructure to the maximum extent feasible. Due to site constraints, the project will not be able to utilize GSI.

6 Project Area Then and Now

A Critical Areas Map (see Appendix C – Critical Areas Map) was generated to show the project area; possible construction staging areas; liquefaction zones; known and potential landslides areas; steep slopes; and confirmed and suspected contaminated sites.

6.1 Existing Drainage

The project site is located on the eastern edge of Lake Union located in WRIA 8. The bridge itself spans a shallow inlet of the lake. The adjacent ZymoGenetics building is built on concrete piles and the lake water expands under the building at high water periods. The entire project area is tributary to Lake Union, and consists of graded and flattened lake front area.

The project area can be divided into four separate sub-basins that drain to Lake Union - by different drainage paths. See Appendix A – Drainage Basin Figures – Existing Drainage Conditions.

Table 2 – Existing Basins shows a summary of the existing drainage basins.

Table 2 – Existing Basins

BASIN AREAS	TOTAL IMPERVIOUS AREA	PGIS AREA	NON-PGIS
BASIN A	0.88 AC.	0.75 AC.	0.13 AC.
BASIN B	0.42 AC.	0.28 AC.	0.14 AC.
BASIN C	0.90 AC.	0.38 AC.	0.52 AC.
BASIN D	0.12 AC.	0.10 AC.	0.02 AC.
TOTAL PROJECT AREA =	2.32 AC.	1.51 AC.	0.81 AC.

Note: basins are 100% impervious
PGIS – Pollution Generating Impervious Surface

The main basin area that will be impacted during the bridge replacement is Basin A. Basin A includes the area immediately surrounding the bridge, bridge deck, and a portion of Fairview Avenue north of the project area. The existing stormwater infrastructure in Basin A consists of scuppers on the West Bridge and on the East Bridge which drain directly into Lake Union. On the southern end of the bridge, there is also an inlet in the middle of Fairview Avenue which collects a small area of runoff and discharges directly into Lake Union from a pipe which runs under the bridge. This is part of Basin A.

Basin B begins north of the bridge, and there are no inlets to collect stormwater. Runoff travels onto the bridge from as far away as the intersection with Eastlake Avenue E. There is no conveyance or water quality treatment.

Basin B should be a portion of Basin A, but runoff ponds at a low point north of the Zymogenetics building before crossing onto the bridge. It does not seem to drain into Lake Union because there are no catch basins to collect stormwater at the low point. It is assumed that stormwater from Basin B ponds up near the northern end of the Zymogenetics building and evaporates.

Basin D begins with a series of catch basins located along the west side of the road south of the bridge. These catch basins connect to a 12-inch trunk line that runs underneath the existing sidewalk. Stormwater from this trunk line runs south to connect to a 72-inch outfall located at the intersection of Ward Street and Fairview Avenue North. This outfall discharges into Lake Union via “Waterway No.6” as classified from City of Seattle Sewer Cards. Treatment is not provided prior to discharge into Lake Union.

Basin C includes the remaining project area. This area drains to Lake Union either directly or through inlets and pipes, and does not include the bridge deck and areas that flow onto the bridge. Some of the areas that drain directly into Lake Union are the floating walkway, ground immediately next to the shoreline, and the marina parking lot south of the bridge. There is one inlet on the western side of Fairview Ave. N. north of the intersection with Fairview Avenue East, which collects some stormwater and is part of Basin C. This inlet is connected by a conveyance system of pipes to an existing oil/water separator before being discharged to Lake Union. This is outside of the project limits.

Erosion is not an issue due to direct discharges from numerous bridge drains. Pervious areas around the bridge are covered with thick vegetation.

6.2 Proposed Drainage

As part of the proposed design, the bridge profile is to be raised to allow for positive drainage; hence, collection and treatment systems will not be required on the bridge and will be located in the roadway section adjacent to each bridge approach. The stormwater runoff will be treated at each end of the bridge and discharged to Lake Union.

The proposed project site stretches from the intersection with Fairview Avenue East located approximately 100 feet north of the bridge. See Appendix A – Drainage Basin Figures - Proposed Drainage Conditions. In the build condition, the amount of PGIS is slightly increased by 0.05 acres.

The proposed project area is divided into three basins. Basin A begins at the high point in the middle of the new bridge and ends to the south along Fairview Avenue North. Basin B starts at the high point in the bridge and goes north up to the intersection of Fairview Avenue North and Eastlake Avenue East. These two basins will receive treatment by new water quality facilities discussed in the next section. Basin C includes all the area west of Basin A and Basin B that cannot be conveyed to a water quality vault. This area bypasses the stormwater improvements and flows into Lake Union. A portion of Basin C between Fairview Avenue East and Eastlake Blvd. flows to an existing oil-water separator in Fairview Avenue East prior to discharging into Lake Union. After going through the oil water separator, water is discharged to Lake Union. The rest of Basin C drains directly into Lake Union by overland flow. Some of this includes the relocated walkway west of the bridge. South of the bridge, a portion of Basin C goes into some inlets that are discharged into Lake Union.

Table 3 – Proposed Basins

BASIN AREAS	TOTAL IMPERVIOUS AREA	NEW PGIS AREA	EXISTING PGIS AREA	EXISTING NON-PGIS AREA	NEW NON-PGIS AREA	REQUIRED WQ FLOW TREATMENT (cfs)	WQ FLOW TREATED (cfs)
BASIN A	0.64 AC.	0.47 AC.	0.00 AC.	0.00 AC.	0.17 AC.	0.066	0.066
BASIN B	1.05 AC.	0.46 AC.	0.29 AC.	0.09 AC.	0.20 AC.	0.065	0.106
BASIN C	0.63 AC.	0.07 AC.	0.17 AC.	0.15 AC.	0.25 AC.	0.010	0.000
TOTAL =	2.32 AC.	1.00 AC.	0.46 AC.	0.24 AC.	0.62 AC.	0.141	0.172

Note: basins are 100% impervious

The project will fully treat stormwater using GULD approved treatment facilities to provide basic treatment of the total new and replaced PGIS. In addition, the project will treat above and beyond the needs of the project and provides treatment that exceeds the project requirements by approximately 20% (See the WQ Flow Rates in Appendix B – Water Quality Calculations). The total water quality flow that is being treated is 0.171 cfs, which exceeds the required water quality flow treatment amount of 0.141 cfs.

6.3 Water Quality Methodology

The following sections describe the methodology that will be used to provide water quality treatment for both the permanent and temporary condition:

Permanent Best Management Practices

- Determine the boundaries of the sub-basins contributing runoff within the project limits. Use available digital terrain model (DTM) surface information, topographic drawings, and on-site observations to define existing and proposed conditions.

- Determine pervious and impervious areas and select the runoff coefficients for each sub-basin.

- Compute required post-developed Water Quality (WQ) treatment flow from new and replaced Pollution Generating Impervious Surface (PGIS) areas using MSGFlood for each drainage system. Route this flow to a water quality treatment BMP. Because stormwater flows from existing areas or non-PGIS areas cannot be separated or bypassed, include those areas in determining treatment flow for designing BMPs. This provides compensatory and/or reserve capacity treatment for the project.

- Determine vault size and treatment cartridges required for the selected Kristar Flow Perk Filter BMPs in accordance with the manufacturer's specifications. Kristar Flow Perk Filters have a General Use Level Designation (GULD) approval rating by WSDOE for Basic and Phosphorus treatment. This will be sized to provide a minimum of Basic Treatment for the computed WQ treatment flow. Annual pollutant loads of oil and grease; dissolved metals such as copper, lead and zinc; and phosphorus are not required to be treated for this site but will be addressed during construction.

Temporary Best Management Practices

- Contract documents will require contractor to prepare Stormwater Pollution Prevention Plan (SWPPP), which includes the Temporary Erosion and Sediment Control (TESC) and the Spill Prevention, Control and Countermeasure (SPCC).

- Construct and maintain a silt curtain across the lake adjacent to the project from lakeshore to lakeshore.

- Monitor for plumes.

- Focus evaluation on in-water, over-water, and de-watering construction activities. A list of applicable temporary erosion and sediment control (TESC) BMPs will be developed. Monitor dewatered groundwater quality and implement treatment BMPs as necessary.

- Test lake water quality regularly from the project during construction for compliance with maximum levels of TSS, pH, oil, and turbidity and dissolved metals such as copper, lead, zinc and phosphorus in accordance with NPDES requirements.

6.4 Soil and Geology

Project area is fairly flat but will be slightly raised to accommodate stormwater runoff. The embankments on both sides of the bridge are steep but heavily planted with brush and ground cover.

The site is susceptible to geological hazard; the area has poor soils and is affected by seismically induced liquefaction and liquefaction induced flow sliding.

HWA has determined that Fairview Avenue Bridge spans over a portion of ancient landslide area. Based on the explorations conducted to date, the landslide area appears to extend from project Station 12+25 in the north to some southern terminus located an unknown distance north of the Fred Hutchison Cancer Care facility. In the east-west direction, the slide area extends beneath the ZymoGenetics building to approximately 330 feet west of the existing bridge structure.

Foundations and abutments designed to address seismic conditions and meet life safety will mitigate the liquefaction effects for the bridge project.

6.5 Hazardous Materials

HWA performed the Phase 1 Environmental Site Assessment and Contaminated Materials Discipline Report for the project. Boring logs indicated the presence of Polycyclic aromatic hydrocarbons (PAH) and Polychlorinated biphenyls (PCBs) as well as metals such as zinc and mercury within the project site. Any excavated material will be tested and transported to an approved disposal facility. Soil will not be re-used as part of the project.

6.6 Groundwater

No continuous impermeable layers were encountered during geotechnical investigations, suggesting that the ground water level on either side of the bridge is the same as Lake Union. Lake Union water surface level is controlled by the Hiram Chittenden Locks and therefore, groundwater level fluctuates between elevation 16.75 and 18.75 feet (NAVD 88). Any contaminated soils will be transported to an approved disposal facility. Associated contaminated groundwater will be collected and treated prior to discharge to Lake Union. A King County Wastewater Discharge permit would be required if the contractor elects to discharge to the sanitary sewer system.

7 Environmental Consequences

7.1 Comparison of Alternatives

Source pollutants on site are due to traffic for both build and no-build alternatives. Pollutants from traffic include but are not limited to oil, dissolved metals, and hydrocarbons.

The consequences of not replacing the bridge are worse than if the bridge were to be replaced. In the current condition, stormwater runoff from Fairview Avenue North is a source of pollution; stormwater runoff enters Lake Union without mitigation or treatment. Contamination in the lakebed has existed for nearly 100 years since the coal plant was operational. Replacing the bridge with a new bridge provides the opportunity to add water quality treatment facilities, remediate the contaminated lake bed, and remove debris that currently exists under the bridge. Flow control is not an issue since Lake Union is close enough to discharge without eroding a downstream river or creek. The final condition of the project would be an improved condition over existing. No changes in the watershed would occur. The overall impervious area is increases by 0.05 acres. The source pollutants are the same except water quality treatment will be provided. The Contractor will be required to follow the requirements of the NPDES permit to mitigate construction pollution.

pH testing results should be between 6.5 and 8.5. It is anticipated that concrete work from constructing the piles and abutments of the new bridge is a risk for altering the pH of the water below the bridge.

7.2 Conservation and Mitigation

Conservation

The Built condition will provide water quality treatment using water quality vaults. Basic treatment requires the removal of 80% total suspended solids (TSS) from stormwater prior to discharging to Lake Union. TSS consists of sediment from runoff from roads and exposed soil and other sources. Each facility will consist of a water quality vault with filter cartridges to provide removal of TSS. See Appendix A – Drainage Basin Figures for proposed basin areas and water quality flows.

To prevent sediment and other pollutants from contaminating Lake Union, temporary BMPs will be installed during construction.

The contractor will be required to submit a SWPPP which includes a TESC and SPCC Plan the will provide detailed measures for prevention, containment, and treatment of pollutants during construction. Monitoring of the discharge thresholds required for NPDES compliance. Samples will be taken at the point of compliance, which is within a radius of 150 feet.

Because Lake Union is classified by WSDOE under Section 303(d) of the Clean Water Act as a Category 5 pollutant for phosphorus, lead, aldrin, and fecal coliform bacteria, the contractor will provide additional BMPs to target these specific pollutants. However, these pollutants are not anticipated during construction of the project.

Numerous Best Management Practices (BMPs), described below, have been incorporated into the proposed project to avoid and minimize short-term and long-term impacts to water quality. With these measures in place, the project would have minimal impacts to vegetation, fish, ground water, and wildlife, and could improve water quality in the project area thus benefitting these resources.

Erosion and Sediment Control

- Implement a Temporary Erosion and Sediment Control (TESC) plan, including sediment-control BMPs such as silt fences, check dams, sediment traps, sedimentation basins, and flocculation methods.

- Use erosion-control practices (seeding, mulching, soil conditioning with polymers, use of geo-synthetics, sod stabilization, erosion-control blankets).

- Use construction entrances, exits, and parking areas that reduce tracking sediment onto public roads.

- Perform routine inspections of erosion-control and sediment-control BMPs and subsequent BMP maintenance.

- Implement construction BMPs to control dust and limit impacts to air quality.

Contaminated Materials Handling

- All contaminated or potentially contaminated project excavation spoils and waste material (e.g., removed creosote-treated piles) will be isolated from the lake once removed, tested in accordance with applicable guidelines, and disposed of in a licensed waste facility or other appropriate site pursuant to applicable regulations.

Dewatering

- Dewatering of the construction area around piles and abutments may be necessary to prevent pH increase during construction. Another idea is to isolate the water there and chemically treat it until the pH is within a normal range.

In-Water Work

- No in-water will occur until a primary containment curtain (silt curtain) is installed across the lake waters adjacent to the entire project area.

- Prior to activities that involve physical disturbance of the lakebed, the work area will be further isolated with a smaller, secondary sediment curtain or coffer dam, installed as close to the work area as feasible.

- Prior to activities that involve physical disturbance of the lakebed, one to two feet of clean sand will be placed around the work area to minimize re-suspension of potentially contaminated materials.

- A debris containment system will be installed prior to demolition of the existing bridge structures, in order to minimize or eliminate debris falling into Lake Union.

- The project will not use impact pile driving, in order to minimize in-water noise and vibration.

- Existing piles including creosote piles will be removed and capped two feet below the mudline.

Stormwater Pollution/Spill Prevention

- A Spill Prevention Control and Countermeasure (SPCC) plan will be implemented. Elements of this plan will satisfy all pertinent requirements set forth by federal, state, and local laws and regulations.

- All vehicles operated within the project area will be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected will be repaired before the vehicle resumes operation. When not in use, all vehicles will be stored in the staging areas or stored with spill containment pans or pads.

- All mechanical equipment will be fueled at least 50 feet from Lake Union. All equipment will be inspected daily for fluid leaks. Spill response equipment will be on-site for potential fluid leakage.

Staging Areas

- All staging and stockpile areas will be limited to paved or gravel right-of-way.

- Staging areas will be located in areas that will prevent the potential of contamination of Lake Union. Servicing and refueling of vehicles will not occur in areas that reduce potential spills of petroleum and hydraulic fluids in sensitive areas. Additionally, drip pans will be fitted with absorbent pads and placed under all equipment being fueled.

Turbidity and pH:

- Any use of wet concrete will include provisions for allowing adequate time and protection of material to allowing adequate curing before coming into contact with water. No wet or curing concrete will be allowed to come in contact with the waters of Lake Union. pH will be monitored throughout construction.

- The contractor will test discharged water during construction at least weekly. At each inspection the contractor will inspect the site conditions and BMPs to determine if additional BMPs are needed or if any are to be replaced. Water samples shall be taken and tested for turbidity, transparency, and pH by a Certified Erosion and Sediment Control Lead (CESCL). The CESCL shall maintain a log book to record erosion control methods and test results. Test results will be shared with WSDOE for review.

Mitigation Measures

The project is essentially self-mitigating by the removal of creosote piles and debris under the bridge and by providing water quality treatment.

- Existing creosote and concrete piles will be removed capped two feet below the mud line and disposed at an approved facility.

- Sand layer will be placed within the in-water work area to minimize re-suspension of potentially contaminated materials.

- A GULD approved Water Quality treatment vault is proposed to provide basic treatment by removing at least 80% of the TSS.

8 APPENDICES

Appendix A – Drainage Basin Figures

Figure A1 – Existing Drainage Basins

Figure A2 – Proposed Drainage Basins

Appendix B – Water Quality Calculations

Basin A WQ Calculations

Basin B WQ Calculations

Appendix C – Critical Areas Map

Appendix D – Preliminary Bridge Plan and Profile

FAIRVIEW AVENUE NORTH BRIDGE PROJECT

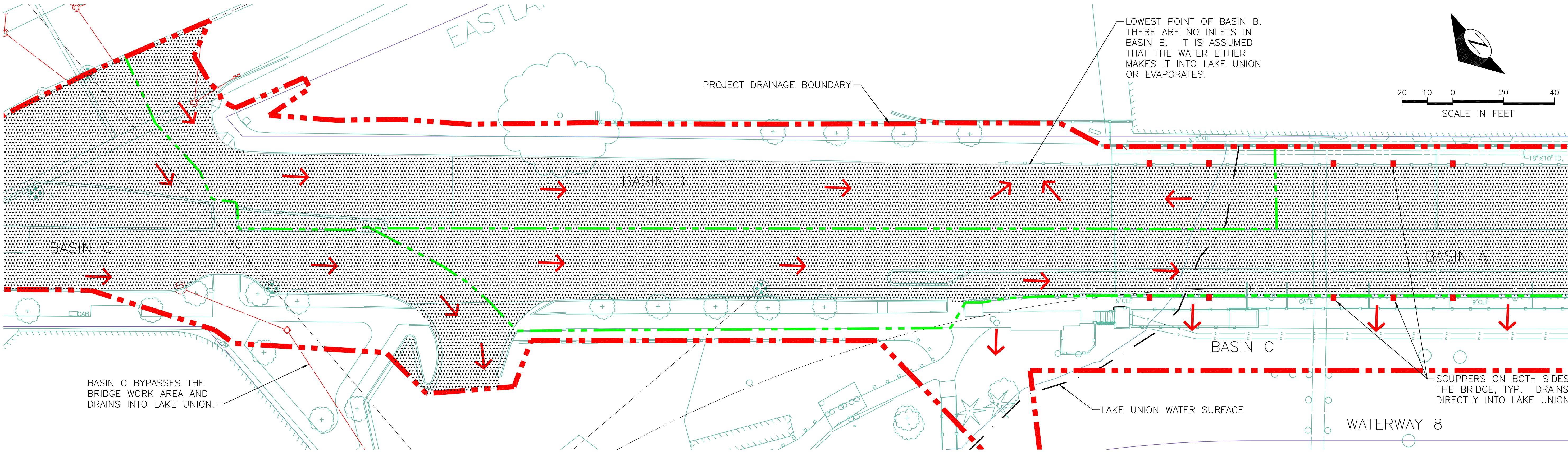
WATER RESOURCES DISCIPLINE REPORT

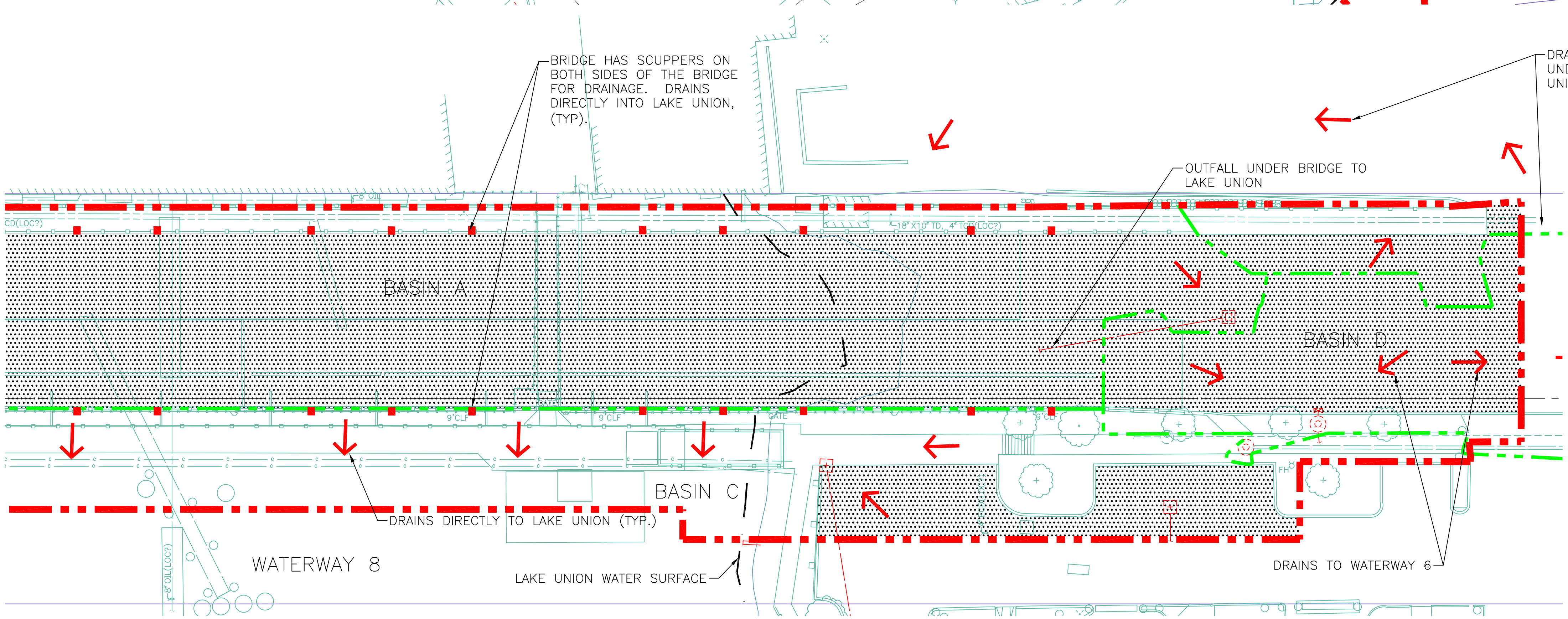
APPENDIX A

DRAINAGE BASIN FIGURES

FIGURE A1 – EXISTING DRAINAGE BASINS

FIGURE A2 – PROPOSED DRAINAGE BASINS





POLLUTION GENERATING IMPERVIOUS SURFACE (PGIS)

PROJECT DRAINAGE BOUNDARY

BASIN BOUNDARY

NOTE:

1. BASIN B SHOULD BE PART OF BASIN A, BUT THERE IS NO DRAINAGE INFRASTRUCTURE THAT COLLECTS STORMWATER. IT IS ASSUMED THAT WATER PONDS UNTIL IT IS EVAPORATED FROM BASIN B.

BASIN AREAS	TOTAL IMPERVIOUS AREA	PGIS AREA	NON–PGIS
BASIN A	0.88 AC.	0.75 AC.	0.13 AC.
BASIN B	0.42 AC.	0.28 AC.	0.14 AC.
BASIN C	0.90 AC.	0.38 AC.	0.52 AC.
BASIN D	0.12 AC.	0.10 AC.	0.02 AC.
TOTAL PROJECT AREA=	2.32 AC.	1.51 AC.	0.81 AC.

NOTE: BASINS ARE 100% IMPERVIOUS

30% SUBMITTAL

EXISTING DRAINAGE BASINS

TS4986A

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PURCHASING & CONTRACTING SERVICES DIRECTOR

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CHECKED
DRAWN DCF
CHECKED

INITIALS AND DATE
REVIEWED:
DES. CONST.
SDOT PROJ. MGR.
RECEIVED
REVISED AS BUILT

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0-02.3 OF THE PROJECT MANUAL.

Seattle Public Utilities
City of Seattle
Ray Hoffman, Director
ORDINANCE NO. APPROVED
FUND:
SCALE: 1" = 50' INSPECTOR'S BOOK

FAIRVIEW AVE NORTH BRIDGE REPLACEMENT

JOB NO. PC R/W CO
VAULT PLAN NO.
FIGURE A1
SHEET 1 OF 1

VAULT SERIAL NO. DATE MARK NATURE REVISIONS MADE CHK'D REV'D

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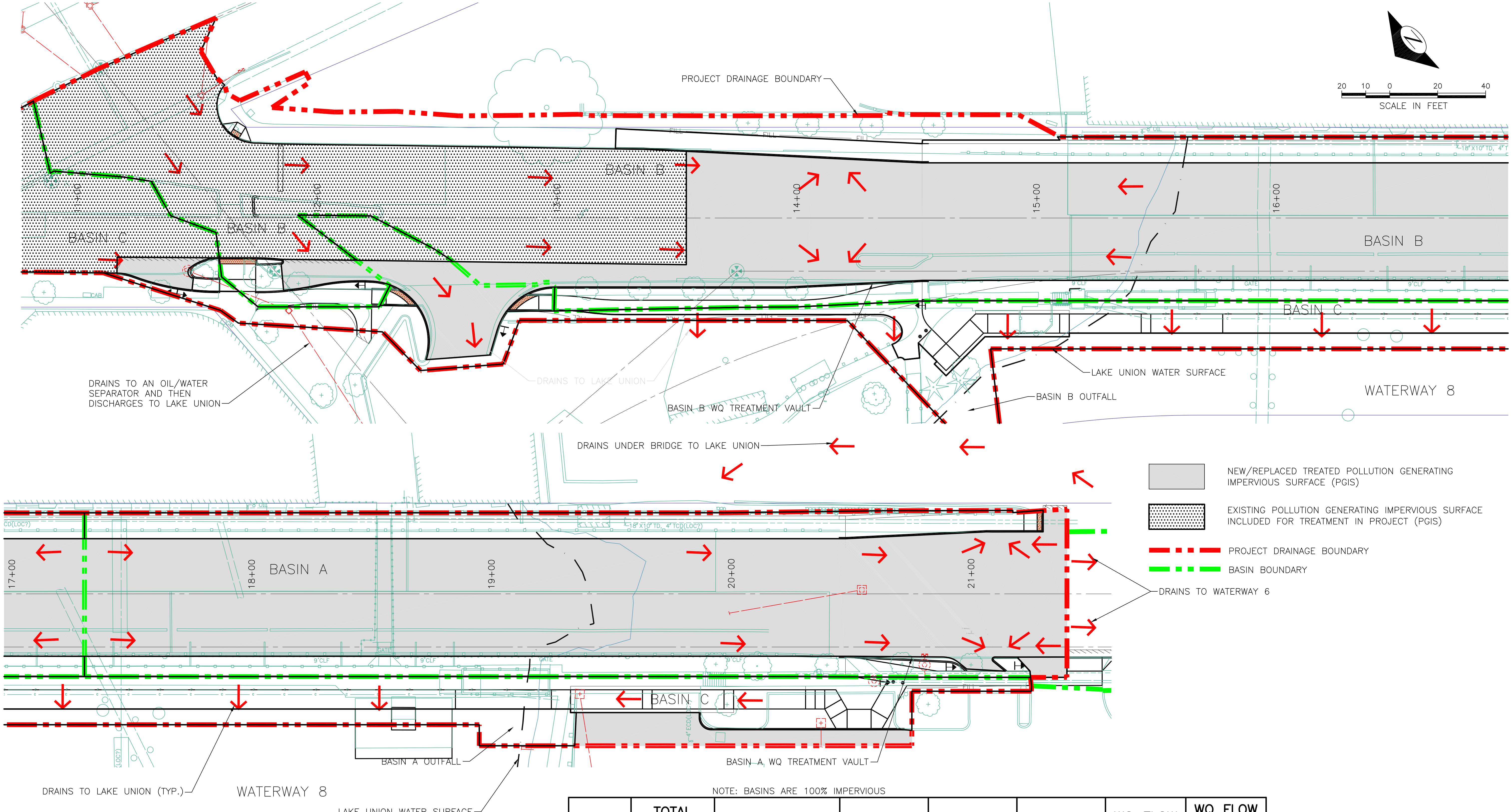

NOTE: BASINS ARE 100% IMPERVIOUS

BASIN AREAS	TOTAL IMPERVIOUS AREA	NEW/REPLACED PGIS AREA	EXISTING PGIS	EXISTING NON–PGIS	NEW/REPL. NON–PGIS	WQ FLOW REQ (CFS)	WQ FLOW TREATED (CFS)
BASIN A	0.64 AC.	0.47 AC.	0.00 AC.	0.00 AC.	0.17 AC.	0.066	0.066
BASIN B	1.05 AC.	0.46 AC.	0.29 AC.	0.09 AC.	0.20 AC.	0.065	0.106
BASIN C	0.63 AC.	0.07 AC.	0.17 AC.	0.15 AC.	0.25 AC.	0.010	0.000
TOTAL=	2.32 AC.	1.00 AC.	0.46 AC.	0.24 AC.	0.62 AC.	0.141	0.172

30% SUBMITTAL

PROPOSED DRAINAGE BASINS

TS4986A

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INITIALS AND DATE
REVIEWED:
DES. CONST.
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ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0-02.3 OF THE PROJECT MANUAL.

Seattle Public Utilities
City of Seattle
Ray Hoffman, Director
ORDINANCE NO.
FUND:
SCALE: 1" = 50'
APPROVED
INSPECTOR'S BOOK

FAIRVIEW AVE NORTH BRIDGE REPLACEMENT

JOB NO. PC R/W CO
VAULT PLAN NO. FIGURE A2
SHEET 1 OF 1

VAULT SERIAL NO. | DATE | MARK | NATURE REVISIONS | MADE | CHK'D | REV'D

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dfuller Feb-25-14 9:03am

FAIRVIEW AVENUE NORTH BRIDGE PROJECT

WATER RESOURCES DISCIPLINE REPORT

APPENDIX B

WATER QUALITY CALCULATIONS

BASIN A WQ CALCULATIONS

BASIN B WQ CALCULATIONS

MGS FLOOD
PROJECT REPORT

Program Version: MGSFlood 4.12
Program License Number: 200610003
Run Date: 01/06/2014 9:43 AM

Input File Name: Fairview Ave Bridge North Basin A.fld
Project Name: 55928 Fairview
Analysis Title: Water Quality Catch Basin
Comments: CB treatment for BASIN A (most contributing area)

PRECIPITATION INPUT

Computational Time Step (Minutes): 15

Extended Precipitation Timeseries Selected
Climatic Region Number: 42

Full Period of Record Available used for Routing
Precipitation Station : 99003805 Seattle 38 in_5min 10/01/1939-10/01/2097
Evaporation Station : 991038 Seattle 38 in MAP
Evaporation Scale Factor : 0.750

HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

********** Default HSPF Parameters Used (Not Modified by User) ***************

*********************** WATERSHED DEFINITION ***********************

----------------------SCENARIO: PREDEVELOPED
Number of Subbasins: 1

---------- Subbasin : Subbasin 1 ----------

-------Area(Acres) --------	
Till Forest	0.470
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000
Subbasin Total	0.470

----------------------SCENARIO: POSTDEVELOPED
Number of Subbasins: 1

---------- Subbasin : Subbasin 1 ----------

-------Area(Acres) --------	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.470
Subbasin Total	0.470

**************************** LINK DATA *******************************

----------------------SCENARIO: PREDEVELOPED
Number of Links: 0

**************************** LINK DATA *******************************

----------------------SCENARIO: POSTDEVELOPED
Number of Links: 1

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Link Name: New Copy Lnk1
Link Type: Copy
Downstream Link: None

**********************FLOOD FREQUENCY AND DURATION STATISTICS*******************

----------------------SCENARIO: PREDEVELOPED
Number of Subbasins: 1
Number of Links: 0

----------------------SCENARIO: POSTDEVELOPED
Number of Subbasins: 1
Number of Links: 1

***********Water Quality Facility Data *************

----------------------SCENARIO: PREDEVELOPED

Number of Links: 0

---------------------SCENARIO: POSTDEVELOPED

Number of Links: 1

********** Link: New Copy Lnk1 **********

15-Minute Timestep, Water Quality Treatment Design Discharge
On-line Design Discharge Rate (91% Exceedance): 0.07 cfs
Off-line Design Discharge Rate (91% Exceedance): 0.04 cfs

Infiltration/Filtration Statistics--------------------
Total Runoff Volume (ac-ft): 199.46
Total Runoff Infiltrated (ac-ft): 0.00, 0.00%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Percent Treated (Infiltrated+Filtered)/Total Volume: 0.00%

MGS FLOOD
PROJECT REPORT

Program Version: MGSFlood 4.12
Program License Number: 200610003
Run Date: 01/06/2014 9:30 AM

Input File Name: Fairview Ave Bridge North Basin B.fld
Project Name: 55928 Fairview
Analysis Title: Water Quality Catch Basin
Comments: CB treatment for BASIN B (most contributing area)

PRECIPITATION INPUT

Computational Time Step (Minutes): 15

Extended Precipitation Timeseries Selected
Climatic Region Number: 42

Full Period of Record Available used for Routing
Precipitation Station : 99003805 Seattle 38 in_5min 10/01/1939-10/01/2097
Evaporation Station : 991038 Seattle 38 in MAP
Evaporation Scale Factor : 0.750

HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

********** Default HSPF Parameters Used (Not Modified by User) ***************

********************** WATERSHED DEFINITION ***********************

----------------------SCENARIO: PREDEVELOPED
Number of Subbasins: 1

---------- Subbasin : Subbasin 1 ----------

-------Area(Acres) --------	
Till Forest	0.750
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000
Subbasin Total	0.750

----------------------SCENARIO: POSTDEVELOPED
Number of Subbasins: 1

---------- Subbasin : Subbasin 1 ----------

-------Area(Acres) --------

Till Forest	0.000
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.750
Subbasin Total	0.750

**************************** LINK DATA ***********************************

----------------------SCENARIO: PREDEVELOPED
Number of Links: 0

**************************** LINK DATA ***********************************

----------------------SCENARIO: POSTDEVELOPED
Number of Links: 1

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Link Name: New Copy Lnk1
Link Type: Copy
Downstream Link: None

************************FLOOD FREQUENCY AND DURATION STATISTICS*********************

----------------------SCENARIO: PREDEVELOPED
Number of Subbasins: 1
Number of Links: 0

----------------------SCENARIO: POSTDEVELOPED
Number of Subbasins: 1
Number of Links: 1

************Water Quality Facility Data **************

----------------------SCENARIO: PREDEVELOPED

Number of Links: 0

----------------------SCENARIO: POSTDEVELOPED

Number of Links: 1

********** Link: New Copy Lnk1 **********

15-Minute Timestep, Water Quality Treatment Design Discharge
On-line Design Discharge Rate (91% Exceedance): 0.11 cfs
Off-line Design Discharge Rate (91% Exceedance): 0.06 cfs

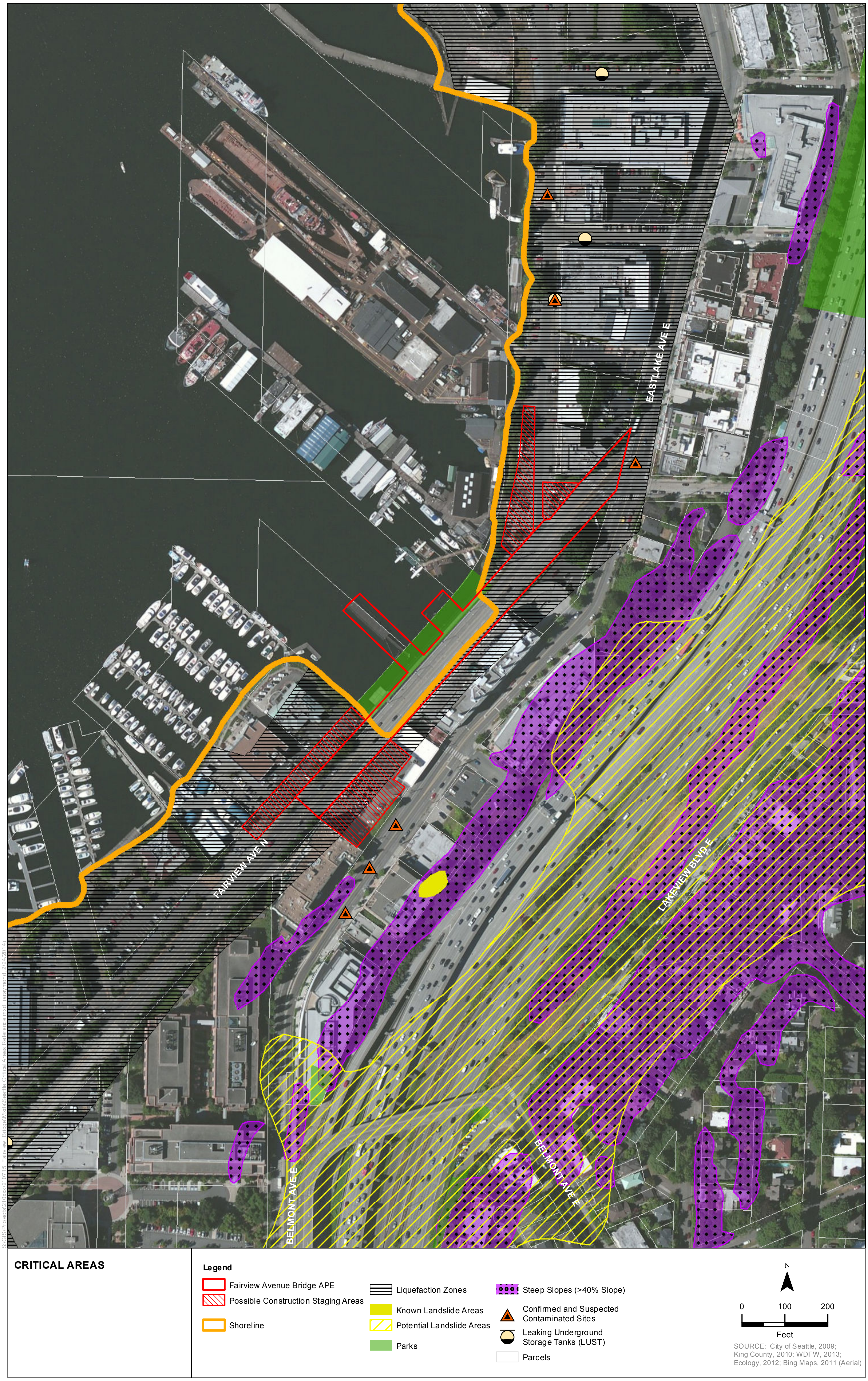
Infiltration/Filtration Statistics--------------------
Total Runoff Volume (ac-ft): 318.29
Total Runoff Infiltrated (ac-ft): 0.00, 0.00%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Percent Treated (Infiltrated+Filtered)/Total Volume: 0.00%

FAIRVIEW AVENUE NORTH BRIDGE PROJECT

WATER RESOURCES DISCIPLINE REPORT

APPENDIX C

CRITICAL AREAS MAP



CRITICAL AREAS

FAIRVIEW AVENUE NORTH BRIDGE PROJECT

WATER RESOURCES DISCIPLINE REPORT

APPENDIX D

PRELIMINARY BRIDGE PLAN AND PROFILE

PC GIRDERS (WF58G) LOADING:

HL-93 WITH 2" CONC. OVERLAY OR LAKE UNION STREET CAR (SEE SHEET ST02) WITH 2" CONC. OVERLAY

ST01

BRIDGE LAYOUT

60% SUBMITTAL - NOT FOR CONSTRUCTION

VAULT SERIAL NO.	DATE	MARK	NATURE	MADE	CHK'D	REV'D
			REVISIONS			

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INITIALS AND DATE
REVIEWED:
DES. CONST.
SDOT PROJ. MGR.
RECEIVED
REVISED AS BUILT

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER DOCUMENTS CALLED FOR IN SECTION 0-02.3 OF THE PROJECT MANUAL.

City of Seattle
Seattle Department of Transportation
ORDINANCE NO. . . . . APPROVED . . . .
FUND: . . . .
SCALE: 1"=20' INSPECTOR'S BOOK . . . .

FAIRVIEW AVE NORTH
BRIDGE REPLACEMENT

JOB NO. PC TS4986A
R/W
CO
VAULT PLAN NO.

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Feb-21-14 11:39am
* -22*

Fairview Avenue Bridge
Wave Loads Analysis

PREPARED FOR: HNTB Bellevue, Washington			BY: Matthew A. Lankowski, PE PROJECT ENGINEER
1201 WESTERN AVENUE, SUITE 200 SEATTLE, WASHINGTON 98101-2953 T 206.624.7850 GLOSTEN.COM			CHECKED: John Cross-Whiter, PE PRINCIPAL
			APPROVED: Justin M. Morgan, PE PRINCIPAL-IN-CHARGE
DOC:	REV: A	FILE: 15018.01	DATE: 29 January 2016

Revision History

Section	Rev	Description	Date	Approved
Introduction	A	Added Introduction	01/28/16	JMM
All	–	Initial issue.	4/1/15	JMM

References

1. NOAA National Climatic Data Center, Automated Surface Observing System (ASOS), *USAF 727930 WBAN 24233 SEA*, 1948-2015, ftp://ftp.ncdc.noaa.gov/pub/data/noaa/, Accessed 11 March 2015.
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8. *Coastal Engineering Manual*, U.S. Army Corps of Engineers, EM 1110-2-1100 (Change 2), 1 August 2008.

Introduction

The City of Seattle Department of Transportation (SDOT) proposes to replace the Fairview Avenue North Bridge, which is located on the southeast shoreline of Lake Union in Seattle, Washington. The existing bridge consists of two immediately adjacent bridges: an eastern, concrete pile-supported bridge built in 1964 and a western, timber pile-supported bridge built in 1948. Neither bridge meets current seismic standards.

A floating walkway, braced to the bridge, runs parallel to and west of the bridge. The walkway provides north-south pedestrian access through the project corridor as well as public shoreline and water access to Lake Union.

SDOT proposes to replace the existing bridge with a single, multi-span concrete bridge. The new bridge would be supported on three bents consisting of three, three and a half foot (3½-foot) diameter, reinforced concrete bridge columns that are constructed on a foundation of eight foot diameter drilled shafts that will be installed to an approximate depth of 140 feet below the water surface elevation.

SDOT also proposes to remove and, if allowed by federal, state, and local permits, to refurbish and reconstruct the floating walkway to a location approximately 10-feet west of its current location. The walkway would be anchored to steel pipe piles, which would be vibrated into place.

As part of the assessment of design loads for the piles and reconstructed walkway, an analysis of wave loads was carried out. This analysis included computations of the 50-year return period extreme wind-driven waves and estimates of the extreme wave wakes from passing vessels in the lake.

Site Climatology

Wind Speed

A long baseline historical wind record was available for Seattle-Tacoma International Airport (Reference 1). Wind speed and direction data from 1964 through 2014 were used as the basis for the wind statistics presented herein. Prior to 1964, wind directions were not recorded in ten-degree sectors as is the case for subsequent years, making it difficult to combine older information with the more contemporary data. Historical anemometer height data was not located for this station. In this report, wind speeds are assumed to represent the one-hour averages at 10 meters above local ground, since the anemometer is currently at 10 m and airport anemometers are typically close to that height, unless otherwise noted.

Due to the location of the Fairview Avenue Bridge walkway, waves at the site are possible from winds in the northwest quadrant only. Waves due to wind from other directions are not likely to produce waves at the site.

Annual maximum wind speeds from the northwest quadrant, defined as wind directions 270 to 360 degrees true, were taken from the historical record. These maxima form the basis of an extreme-value analysis to determine the 50-year return period wind speed as a function of wind direction.

The package 'extRemes' for R (References 2 and 3) was used to fit the data to extreme value distributions. Data were fit to both a generalized extreme value (GEV) distribution and a Gumbel distribution. The GEV cumulative distribution function is given by

$$G(z) = \exp\left[-\left\{ 1 + \xi\left(\frac{z-\mu}{\sigma} \right) \right\}_{+}^{-1/\xi} \right], \text{ where } y_{+} = \max\{y, 0\},\ \sigma > 0, \text{ and } -\infty < \mu, \xi < \infty.$$

The Gumbel cumulative distribution function is a form of the GEV that results by taking the limit as ξ goes to zero and is given by

$$G(z) = \exp\left[-\exp\left\{ -\left(\frac{z-\mu}{\sigma} \right) \right\} \right], \text{ where } -\infty < z < \infty.$$

The expected 50-year return period values predicted by both models were compared and the higher value was assumed. The expected value 50-year return period wind speed from the northwest quadrant is 32.7 mph, which represents the one-hour average wind speed at 10 meters above ground. Plots of the data and extreme value distribution fit are shown in Figure 1.

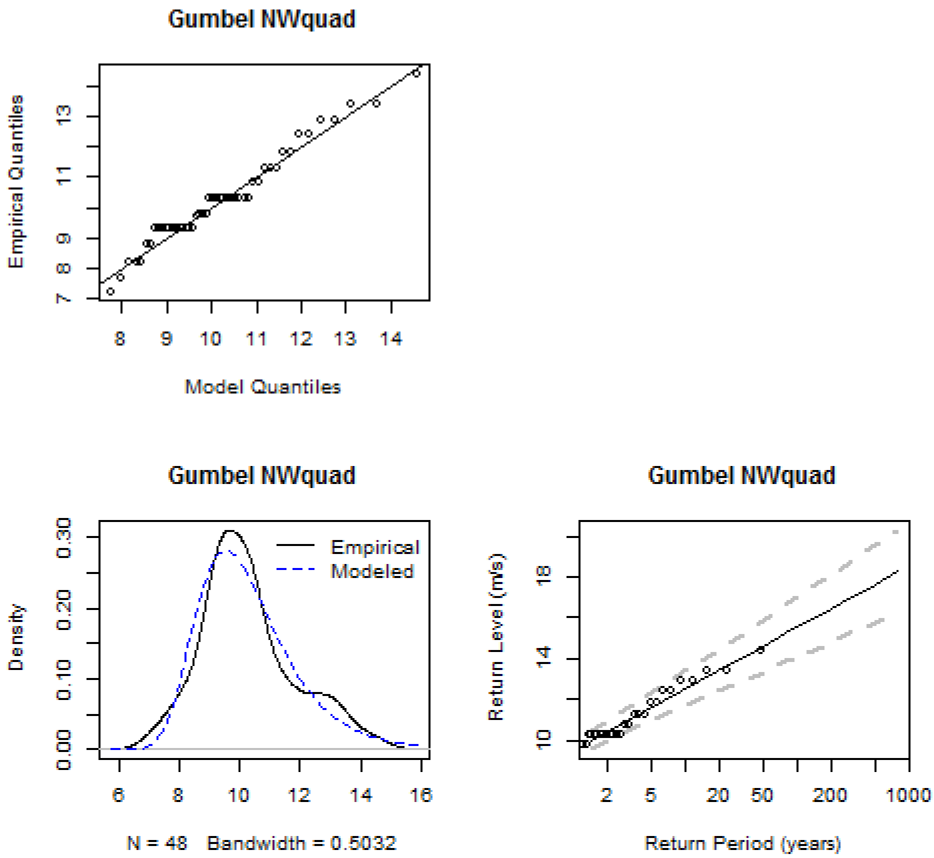

Figure 1 Gumbel fit of annual extremes from northwest quadrant

Wave Conditions

Wind-driven waves at the Fairview Avenue Bridge walkway site were estimated using the U.S. Army Corps of Engineers' ACES program (Reference 4) which estimates nearshore wind-driven wave growth.

The air-water temperature difference was assumed to be zero for the wave-growth formulation. The final duration of the input wind speed was adjusted until the maximum fetch-limited wave was achieved. The maximum significant wave height at the walkway is estimated to be 1.2 feet with a peak wave period of 2.1 seconds.

Wave Loads

Environmental Wave Loads

A JONSWAP spectrum was generated for the 50-year return period significant wave height and peak wave, as shown in Figure 2. The JONSWAP spectrum is commonly used to represent fetch-limited environments such as bays and lakes.

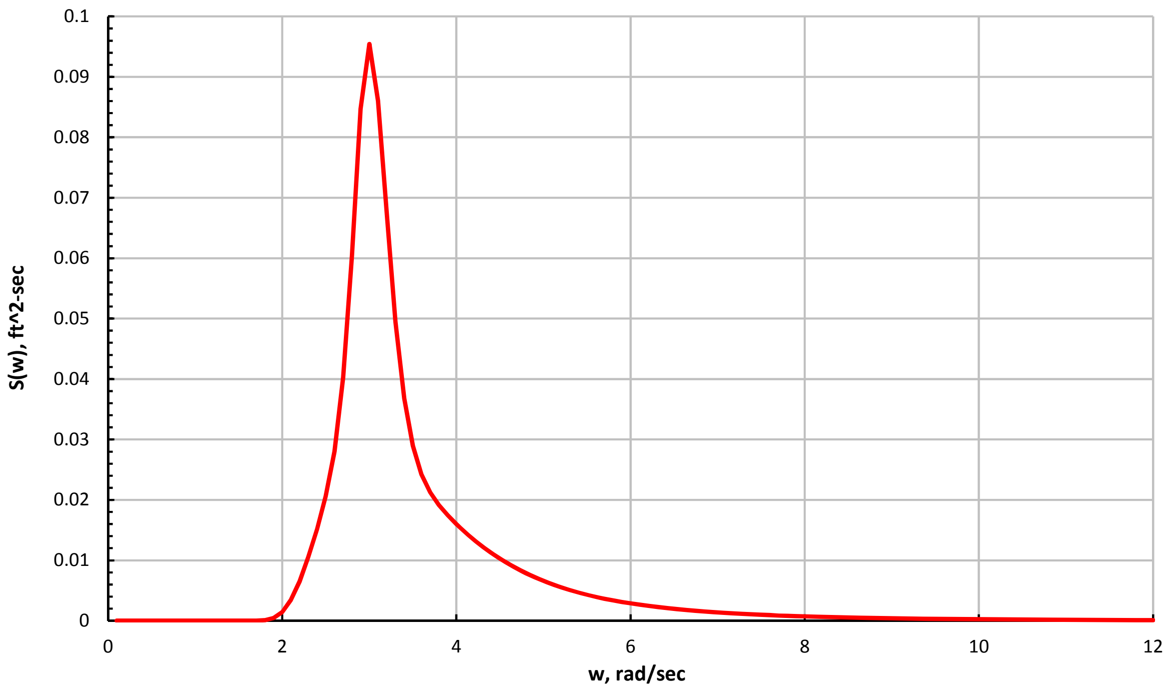

Figure 2 JONSWAP wave height spectrum for Hs = 1.2 ft, Tp = 2.1 s

First order oscillatory forces *F1(ω)* and reflection coefficients *R(ω)* were calculated for the walkway and launch float using McIver's method for calculating the wave forces on an isolated rectangular section in the vertical plane (Reference 6). A water depth of 20 feet was assumed at the walkway and launch float. The existing coal dock, dolphins, and submerged pilings that currently absorb some of the incident wave energy were not modeled, as it was assumed that they will be removed as part of this project.

First order oscillatory forces and reflection coefficients are presented in Figure 3. Note that the peak response frequencies closely coincide with the peak wave frequency.

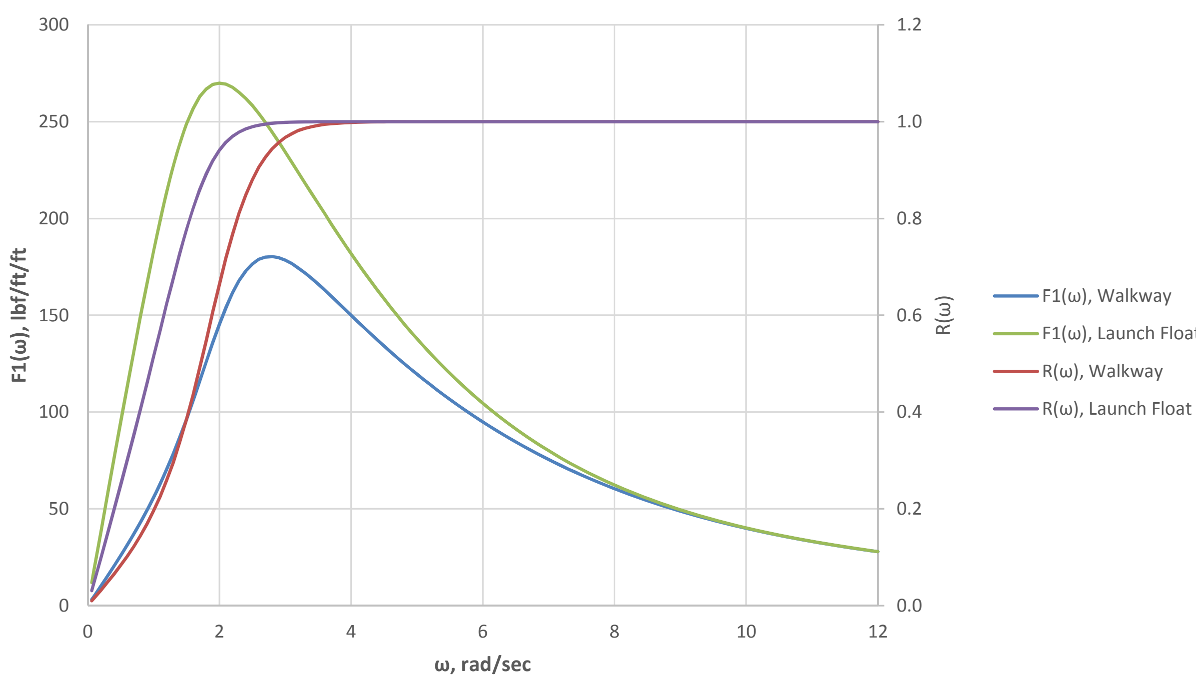

Figure 3 First order oscillatory forces and reflection coefficients

First order oscillatory significant wave force F_{sig} and extreme wave force $F_{extreme}$ were calculated by integrating the frequency-dependent wave forces over the wave height spectrum as follows:

$$F1_{sig} = 2 \times \sqrt{m_0}$$

$$F1_{extreme} = 4.29 \times \sqrt{m_0}$$

where

$$m_0 = \int_0^\infty S(\omega) \times F1(\omega)^2 d\omega$$

Significant wave force F_{sig} is defined as the average of the highest $^1/_3$ of wave forces. Extreme wave force $F_{extreme}$ is defined as the expected maximum value in 1,000 cycles with a 10% probability of exceedance. One thousand cycles translates to a duration of 35 minutes based on a peak wave period of 2.1 seconds.

Second order mean drift forces were calculated as follows:

$$F2 = 2\int_0^\infty S(\omega) \times F2(\omega) d\omega$$

where

$$F2(\omega) = \frac{1}{2}\rho g (R(\omega)A)^2$$

where ρ is the density of water, *g* is the acceleration of gravity, and *A* is the incident wave amplitude.

50-year return period environmental wave forces on the walkway and the launch float are presented in Table 1 and Figure 4. Extreme wave forces were estimated to be 218 lbf per linear foot of walkway and 285 lbf per linear foot of launch float.

Table 1 50-year return period wind-induced wave forces

Environmental Wave Forces (lbf/ft)	First Order Oscillatory		Second Order Mean Drift	Total	
	$F1_{sig}$	$F1_{extreme}$	F2	$F1_{sig}$ + F2	$F1_{extreme}$ + F2
Walkway	99.3	213.1	5.4	104.7	218.4
Launch Float	130.2	279.3	5.7	135.9	285.0

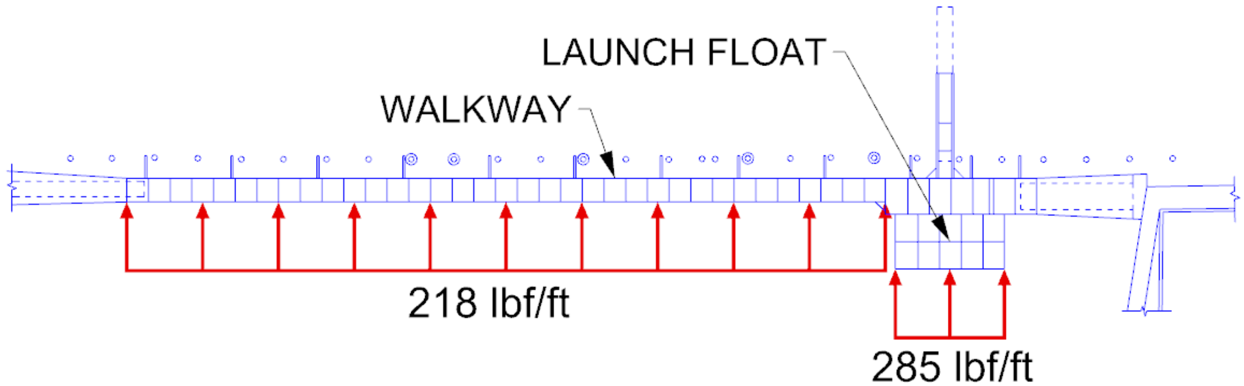

Figure 4 Extreme environmental wave loads

Vessel Wake Loads

Wave loads due to the passage of large vessels were estimated with Sorensen and Weggel's quasi-empirical model (Reference 7). Two "worst-case" scenarios were investigated, as illustrated in Figure 5:

A. Seattle's primary freshwater firefighting vessel, F/B *Chief Seattle*, passing by the bridge at 900 feet and 10 knots.
B. A large (75,000-pound) motor yacht entering the inlet and maneuvering within 400 feet of the bridge at 4 knots.

Assuming water depth is at least a half wavelength, vessel wake wave period T is dependent on vessel speed V and the direction of the waves relative to the vessels θ:

$$T = \frac{2\pi V_c}{g}$$

where

$$V_c = V \sin\theta$$

In scenario A, it was assumed that all of the wave energy was resolved in diverging waves ($\theta = 55°$). In scenario B, it was assumed that all of the wave energy was resolved in transverse waves ($\theta = 0°$).

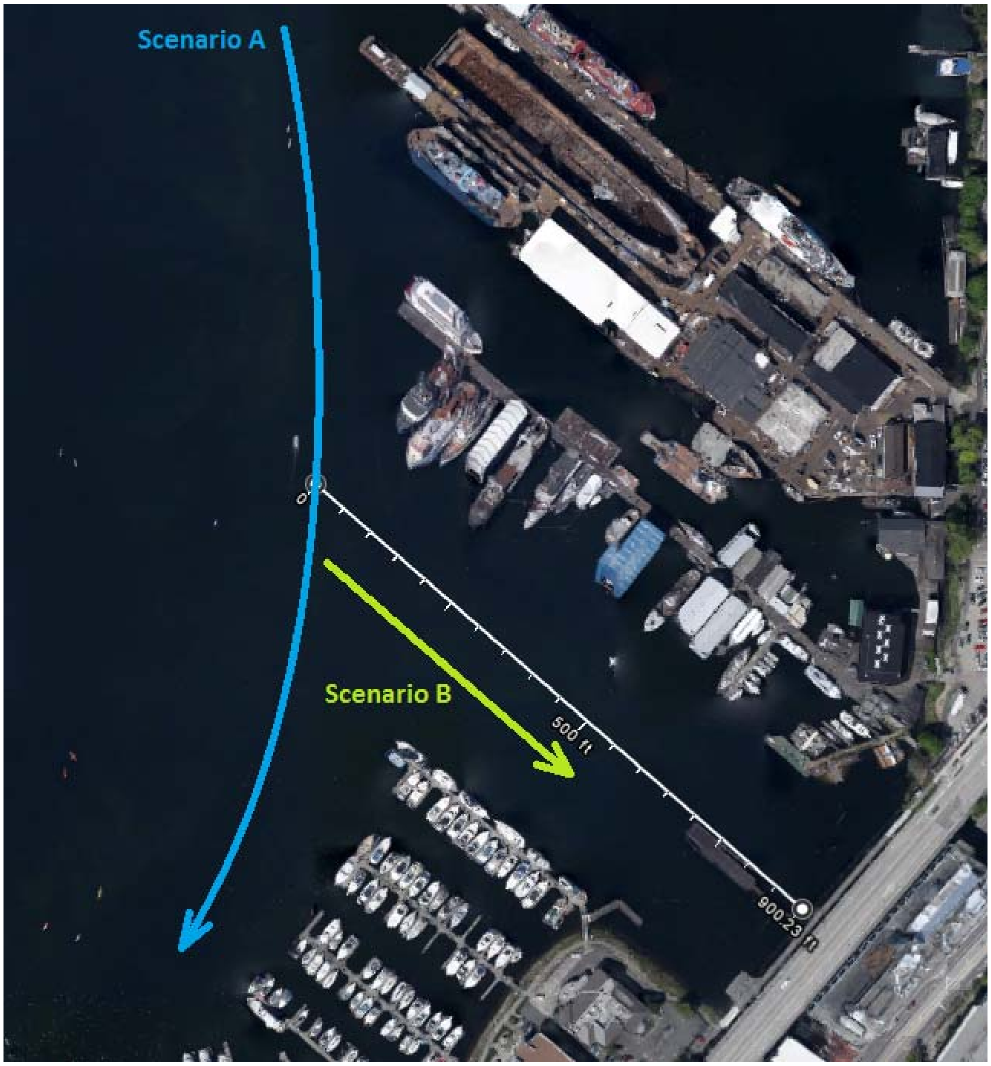

Figure 5 Assumed worst-case vessel wake scenarios

Results for maximum wave height were compared to Table II-7-5 of the USACE *Coastal Engineering Manual* (Reference 8) and found to be slightly conservative. First order oscillatory forces were calculated using McIver's method. Vessel wake load results are presented in Table 2 and Figure 6. Maximum vessel wake forces were estimated to be 80.4 lbf per linear foot of walkway and 102.1 lbf per linear foot of launch.

Table 2 Vessel wake loads

	Scenario A	Scenario B
Vessel Type	Fireboat *Chief Seattle*	Motor Yacht
Displacement (LT)	80.1	33.5
Speed (knots)	10	4
Proximity to Bridge (ft)	900	400
Wave Divergence Angle (deg)	55	0
Wave Period (s)	1.89	1.32
Maximum Wave Height (ft)	0.94	0.14
Force on Walkway (lbf/ft)	80.5	9.0
Force on Launch Float (lbf/ft)	102.1	10.5

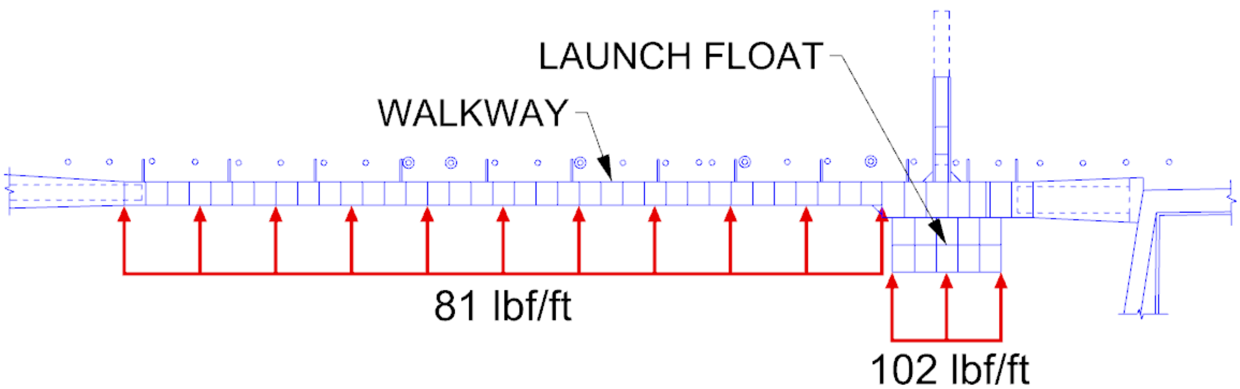

Figure 6 Maximum vessel wake loads