# Appendix F

## Transportation and Traffic

Transportation Impact Analysis

# RICHMOND BAY CAMPUS LONG RANGE DEVELOPMENT PLAN


Prepared for:

Tetra Tech
LBNL

*November 2013*

FEHR & PEERS

WC12-2953

# Richmond Bay Campus
# Long Range Development Plan
# Transportation Impact Analysis

**Prepared for:**
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# Table of Contents

# List of Figures

## List of Tables

## Appendices (Bound Separately)

# 0.0 EXECUTIVE SUMMARY

This report evaluates the impacts of the proposed Richmond Bay Campus (RBC) Long Range Development Plan (LRDP) Project on the transportation network. The analysis identifies impacts and mitigation measures of the Phase 1 Project (consisting of about 1,000 employees) and Campus Buildout (consisting of about 10,000 employees) on traffic operations at intersections and freeway segments in the vicinity of the Project site, as well as on the pedestrian, bicycle, and transit networks. This analysis also assesses the impacts of the Phase 1 Project at Alameda Point and the existing Lawrence Berkeley National Laboratory (LBNL) site and an Additional Employment Alternative (consisting of the 1,000 Phase 1 employees plus an additional 700 employees) at the three sites.

A brief description of each site followed by the impacts and mitigation for each site is provided below.

## 0.1 RICHMOND BAY CAMPUS

The RBC site is located in the South Shoreline area of Richmond. Phase 1 of the project would provide about 600,000 square feet of space and accommodate up to 1,000 employees. It would also provide about 600 parking spaces in surface parking lots.

At buildout, RBC would provide 5.4 million square feet of space and accommodate up to 10,000 employees. The buildout plan would also consist of a new internal street network providing automobile, bicycle, and pedestrian connections to adjacent streets and trails, emphasizing non-motorized travel within the RBC site. At buildout, RBC is estimated to provide about 6,000 parking spaces mostly in parking structures. The LRDP would also implement a robust Transportation Demand Management (TDM) program, including frequent shuttle service to BART and UC Berkeley/LBNL, to reduce the automobile trips generated by the RBC.

It is estimated that the Phase 1 project would generate about 2,080 daily, 210 AM peak hour, and 200 PM peak hour automobile trips. The buildout project is estimated to generate about 20,230 daily trips, 2,050 AM peak hour, and 1,940 PM peak hour automobile trips.

The Phase 1 project at the RBC site would not result in significant traffic impacts on traffic operations at intersections or freeway segments.

The Additional Employment Alternative would consist of an additional 200,000 square feet of space and accommodate an additional 700 employees at the RBC site. It is estimated that the Additional

Employment Alternative would generate about 3,500 daily, 360 AM peak hour, and 340 PM peak hour automobile trips. The Additional Employment Alternative at the RBC site would not result in significant traffic impacts on traffic operations at intersections or freeway segments.

The Buildout Project at the RBC site would result in the following impacts:

### IMPACT 2-1: EXISTING PLUS PROJECT BUILDOUT CONDITIONS INTERSECTION OPERATIONS

The buildout of the RBC would cause significant impacts at the following seven intersections under Existing Plus Buildout conditions:

A. The Project would cause a significant impact at the signalized **Meeker Avenue/23rd Street/Marina Bay Parkway** (Intersection 4) because it would increase v/c ratio by more than 0.01 during the PM peak hour at an intersection operating at LOS F regardless of the Project.

B. The Project would cause a significant impact at the signalized **Regatta Boulevard/ Marina Bay Parkway** (Intersection 5) because it would deteriorate intersection operations from LOS C to LOS F during the AM peak hour and from LOS D to LOS E during the PM peak hour.

C. The Project would cause a significant impact at the signalized **I-580 Eastbound Ramps/ Regatta Boulevard/Meade Street** (Intersection 7) because it would deteriorate intersection operations from LOS A to LOS F during the AM peak hour.

D. The Project would cause a significant impact at the side-street stop-controlled **Meade Street/Seaver Avenue** (Intersection 9) because it would deteriorate operations for the side-street stop-controlled approach from LOS A to LOS F during both AM and PM peak hours and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

E. The Project would cause a significant impact at the all-way stop-controlled **Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue** (Intersection 10) because it would deteriorate intersection operations from LOS D to LOS F during the AM peak hour and from LOS C to LOS E during the PM peak hour. In addition, the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

F. The Project would cause a significant impact at the signalized **I-580 Westbound Ramps/ Bayview Avenue** (Intersection 11) because it would deteriorate intersection operations from LOS A to LOS F during both AM and PM peak hours.

G. The Project would cause a significant impact at the signalized **Carlson Boulevard/I-80 Westbound Ramps** (Intersection 13) because it would deteriorate intersection operations from LOS B to LOS E during the AM peak hour.

**Mitigation Measure 2-1:** Implement the following:

A. **Meeker Avenue/23rd Street/Marina Bay Parkway** (Intersection 4): Implement the following which requires coordination with City of Richmond:

- Convert the eastbound approach to provide one left-turn lane and one through-right lane
- Convert signal operations for the eastbound and westbound approaches from split phasing to protected left-turn phasing.
- Optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would improve to LOS C during both AM and PM peak hours after implementation of these improvements. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

B. **Regatta Boulevard/Marina Bay Parkway** (Intersection 5): Implement the following which requires coordination with City of Richmond:

- Optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would improve to LOS D during the AM peak hour after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

C. **I-580 Eastbound Ramps/Regatta Boulevard/Meade Street** (Intersection 7): Implement the following which requires coordination with City of Richmond and Caltrans:

- Optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would improve to LOS D during the AM peak hour after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

D. **Meade Street/Seaver Avenue** (Intersection 9): Implement the following which requires coordination with City of Richmond:

- Install an actuated signal at the intersection with protected/permitted phasing for the westbound left-turn movement.
- Convert the northbound approach to provide one left-turn lane and one right-turn lane.

The intersection would improve to LOS C during the AM peak hour and LOS B during the PM peak hour after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

E. **Seaport Avenue/I-580 Eastbound Ramps/Bayview Avenue** (Intersection 10): Implement the following which requires coordination with City of Richmond and Caltrans:

- Install an actuated signal at the intersection with protected phasing for the northbound and southbound left-turn movements.

- Convert the southbound approach to provide two left-turn lanes and one shared right-turn/through lane.

The intersection would improve to LOS C during both AM and PM peak hours after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

F. **I-580 Westbound Ramps/Bayview Avenue** (Intersection 11): Implement the following which requires coordination with City of Richmond and Caltrans:

- Optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would improve to LOS C during the AM peak hour and LOS B during the PM peak hour after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

G. **Carlson Boulevard/I-80 Westbound Ramps** (Intersection 13): Implement the following which requires coordination with City of Richmond and Caltrans:

- Optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would improve to LOS D during the AM peak hour after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

### IMPACT 2-2: CUMULATIVE (2035) PLUS PROJECT BUILDOUT CONDITIONS INTERSECTION OPERATIONS

The buildout of the RBC would cause significant impacts at the following six intersections under Cumulative (2035) Plus Buildout conditions:

A. The Project would cause a significant impact at the signalized **Meeker Avenue/23rd Street/Marina Bay Parkway** (Intersection 4) because it would increase v/c ratio by more than 0.01 during the PM peak hour at an intersection operating at LOS F regardless of the Project.

B. The Project would cause a significant impact at the side-street stop-controlled **I-580 Westbound Ramps/Juliga Woods Street** (Intersection 6) because it would deteriorate operations for the side-street stop-controlled approach from LOS C to LOS F during the PM peak hour and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

C. The Project would cause a significant impact at the side-street stop-controlled **Meade Street/Regatta Boulevard** (Intersection 8) because it would deteriorate operations for the side-street stop-controlled approach from LOS B to LOS F during both AM and PM peak hours and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

D. The Project would cause a significant impact at the side-street stop-controlled **Meade Street/Seaver Avenue** (Intersection 9) because it would deteriorate operations for the side-street stop-controlled approach from LOS B to LOS F during both AM and PM peak hours and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

E. The Project would cause a significant impact at the all-way stop-controlled **Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue** (Intersection 10) because it would deteriorate intersection operations from LOS D during the AM peak hour and LOS E during the PM peak hour to LOS F during both AM and PM peak hours. In addition, the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

F. The Project would cause a significant impact at the signalized **Carlson Boulevard/I-80 Westbound Ramps** (Intersection 13) because it would deteriorate intersection operations from LOS D to LOS F during the AM peak hour and LOS E to LOS F during the PM peak hour.

**Mitigation Measure 2-2:** Implement the following:

A. **Meeker Avenue/23rd Street/Marina Bay Parkway** (Intersection 4): Implement the following which requires coordination with City of Richmond (Same as Mitigation Measure 2-1A):

- Convert the eastbound approach to provide one left-turn lane and one through-right lane
- Convert signal operations for the eastbound and westbound approaches from split phasing to protected left-turn phasing. Optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would improve to LOS C during the AM peak hour and LOS D during the PM peak hour after implementation of these improvements. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

B. **I-580 Westbound Ramps/Juliga Woods Street** (Intersection 6): Implement the following which requires coordination with City of Richmond and Caltrans:

- Install an actuated signal at the intersection.

The intersection would improve to LOS A during both AM and PM peak hours after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

C. **Meade Street/Regatta Boulevard** (Intersection 8): Implement the following which requires coordination with City of Richmond:

- Install an actuated signal at the intersection. The new signal shall be connected and coordinated with the existing controls at the at-grade railroad crossing on Meade Street and the existing signal at the I-580 Eastbound Ramps/Regatta

Boulevard/Meade Street (Intersection 7) just west of the intersection to minimize potential queues spilling onto the railroad tracks.

The intersection would improve to LOS B during both AM and PM peak hours after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

D. **Meade Street/Seaver Avenue** (Intersection 9): Implement the following which requires coordination with City of Richmond (Same as Mitigation Measure 2-1D):

- Install an actuated signal at the intersection with protected/permitted phasing for the westbound left-turn movement.
- Convert the northbound approach to provide one left-turn lane and one right-turn lane.

The intersection would improve to LOS D during the AM peak hour and LOS B during the PM peak hour after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

E. **Seaport Avenue/I-580 Eastbound Ramps/Bayview Avenue** (Intersection 10): Implement the following which requires coordination with City of Richmond and Caltrans (Same as Mitigation Measure 2-1E):

- Install an actuated signal at the intersection with protected phasing for the northbound and southbound left-turn movements.
- Convert the southbound approach to provide two left-turn lanes and one shared right-turn/through lane.

The intersection would improve to LOS C during both AM and PM peak hours after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

F. **Carlson Boulevard/I-80 Westbound Ramps** (Intersection 13): Implement the following which requires coordination with City of Richmond and Caltrans:

- Convert the southbound approach to provide one left-turn lane and one right-turn lane.

The intersection would improve to LOS C during both AM and PM peak hours after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

## IMPACT 2-3: CUMULATIVE (2035) PLUS PROJECT BUILDOUT CONDITIONS FREEWAY OPERATIONS

The buildout of the RBC would cause a significant impact under Cumulative (2035) Plus Buildout conditions on **I-580 between Central Avenue and I-80** in westbound direction during the AM peak hour and in the eastbound direction during the PM peak hour because the Project would cause the westbound segment to deteriorate from LOS E to LOS F during the AM peak hour and it increase the PM peak hour volume on the eastbound freeway segment by more than five percent on a freeway segment that would operate at LOS F regardless of the Project.

**Mitigation Measure 2-3:** This impact can be mitigated by increasing the freeway capacity through adding one more travel lane in each direction of I-580 in this section. No freeway capacity projects are currently planned by Caltrans for this section of I-580. In addition, the feasibility of implementing this mitigation measure is not known at this time. Therefore, this impact is conservatively considered to be *significant and unavoidable*.

### IMPACT 2-4: TRANSIT DEMAND

The Project would generate demand for bus transit service that may not be adequately served by the proposed RBC shuttles serving UC Berkeley, LBNL, and El Cerrito Plaza BART station. Although this is not considered a significant impact, the following improvement is recommended.

**Environmental Protection Measure 2-4:** The University of California shall implement the following:

- Regularly monitor the use of the proposed shuttle services and if necessary, adjust service frequency, stop location, and routes to better serve the RBC population.
- Coordinate with AC Transit and the City of Richmond to modify and/or extend current bus routes to serve demand generated by the RBC, as employment grows at the campus.

### IMPACT 2-5: CONSTRUCTION TRAFFIC IMPACTS

The Project construction would temporarily and intermittently impact traffic operations due to truck movements and construction worker commute trips. This is a *significant* impact.

**Mitigation Measure 2-5**: Prepare a Construction Traffic Management Plan (CTMP) for each construction project at the RBC site to reduce the impacts of construction on traffic and parking. The University of California shall work with City of Richmond in preparing the CTMP which may consist of the following:

- Proposed truck routes
- Hours of construction and limits on number of truck trips during peak commute periods (7:00 to 9:00 AM and 4:00 to 6:00 PM) if traffic conditions demonstrate the need reduce construction traffic to avoid causing significant delays.
- Parking management plan for construction workers.
- Identification of alternative routes for temporary closure of streets and/or paths during construction in order to provide safe access and circulation for automobiles, bicycles, pedestrians, and emergency access vehicles.

Implementation of this mitigation measure will reduce the impact to a *less than significant* level.

## 0.2 ALAMEDA POINT ALTERNATIVE

The Alameda Point site is located in northwest part of City of Alameda. Phase 1 of the project would provide about 600,000 square feet of space and accommodate up to 1,000 employees at the site. It is estimated that the Phase 1 project at the Alameda Point site would generate about 2,080 daily, 210 AM peak hour, and 200 PM peak hour automobile trips.

The Phase 1 project at the Alameda Point site would result in the following impacts:

**IMPACT 3-1: NEAR-TERM (2018) PLUS PROJECT CONDITIONS INTERSECTION OPERATIONS**

The proposed Project at Alameda Point would cause a significant impact at the following intersection under Near-Term (2018) Plus Project conditions:

A. The Project would cause a significant impact at the signalized **Harrison Street/7th Street** (Intersection 12) because it would increase the overall intersection v/c ratio by 0.01 or more and increase critical movement v/c ratio by 0.02 or more during both AM and PM peak hours at an intersection in downtown Oakland operating at LOS F regardless of the Project.

**Mitigation Measure 3-1:** Implement the following:

A. **Harrison Street/7th Street** (Intersection 12): Implement the following which requires coordination with City of Oakland:

- Increase traffic signal cycle length to 75 seconds and optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would continue to operate at LOS F during both AM and PM peak hours after the implementation of this mitigation measure. However, this mitigation measure would reduce the overall intersection v/c ratio and the critical movement v/c ratio to the same level or less than under Near-Term (2018) No Project conditions. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

**IMPACT 3-2: CUMULATIVE (2035) PLUS PROJECT CONDITIONS INTERSECTION OPERATIONS**

The proposed Project at Alameda Point would cause a significant impact at the following intersections under Cumulative (2035) Plus Project conditions:

A. The Project would cause a significant impact at the signalized **Harrison Street/7th Street** (Intersection 12) because it would increase the overall intersection v/c ratio by .0.01 or more and increase critical movement v/c ratio by 0.02 or more during the PM peak hour at an intersection in downtown Oakland operating at LOS F regardless of the Project.

B. The Project would cause a significant impact at the signalized **Jackson Street/7th Street** (Intersection 13) because it would increase the overall intersection v/c ratio by .0.01 or more and increase critical movement v/c ratio by 0.02 or more during the PM peak hour at an intersection in downtown Oakland operating at LOS F regardless of the Project.

**Mitigation Measure 3-2:** Implement the following:

A. **Harrison Street/7th Street** (Intersection 12): Implement the following which requires coordination with City of Oakland (Same as Mitigation Measure 3-1A):

- Increase traffic signal cycle length to 80 seconds and optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would continue to operate at LOS F during the PM peak hour. However, this mitigation measure would reduce the overall intersection v/c ratio and the critical movement v/c ratio to the same level or less than under Cumulative (2035) No Project conditions. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

B. **Jackson Street/7th Street** (Intersection 13): Implement the following which requires coordination with City of Oakland:

- Increase traffic signal cycle length to 80 seconds and optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would continue to operate at LOS F during the PM peak hour. However, this mitigation measure would reduce the overall intersection v/c ratio and the critical movement v/c ratio to the same level or less than under Cumulative (2035) No Project conditions. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

The Additional Employment Alternative would consist of an additional 200,000 square feet of space and accommodate an additional 700 employees at the Alameda Point site. It is estimated that the Additional Employment Alternative would generate about 3,500 daily, 360 AM peak hour, and 340 PM peak hour automobile trips. The Additional Employment Alternative at the Alameda Point site would result in the following significant traffic impact, which is the same as the Project Impact 3-1.

**IMPACT 3-3: NEAR-TERM (2018) PLUS ADDITIONAL EMPLOYMENT ALTERNATIVE CONDITIONS INTERSECTION OPERATIONS**

The Additional Employment Alternative at Alameda Point would cause a significant impact at the following intersection under Near-Term (2018) Plus Additional Employment Alternative conditions:

A. The Additional Employment Alternative would cause a significant impact at the signalized **Harrison Street/7th Street** (Intersection 12) because it would increase the overall intersection v/c ratio by 0.01 or more and increase critical movement v/c ratio by 0.02 or more during both AM and PM peak hours at an intersection in downtown Oakland operating at LOS F regardless of the Alternative.

**Mitigation Measure 3-3:** Implement the following:

A. **Harrison Street/7th Street** (Intersection 12): Implement the following which requires coordination with City of Oakland (same as Mitigation Measure 3-1A):

- Increase traffic signal cycle length to 75 seconds and optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would continue to operate at LOS F during both AM and PM peak hours after the implementation of this mitigation measure. However, this mitigation measure would reduce the overall intersection v/c ratio and the critical movement v/c ratio to the same level or less than under Near-Term (2018) No Project conditions. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

## 0.3 LBNL SITE ALTERNATIVE

The LBNL site is located in the hills of Berkeley and Oakland just east of the UC Berkeley campus. Phase 1 of the project would provide about 600,000 square feet of space and accommodate up to 1,000 employees within the existing LBNL campus. It is estimated that the Phase 1 project at the existing LBNL site would generate about 1,590 daily, 160 AM peak hour, and 150 PM peak hour automobile trips.

The Phase 1 project at the existing LBNL site would result in the following impacts:

**IMPACT 4-1: NEAR-TERM (2018) PLUS PROJECT CONDITIONS INTERSECTION OPERATIONS**

The proposed Project at LBNL site would cause a significant impact at the following intersection under Near-Term (2035) Plus Project conditions:

A. The Project would cause a significant impact at the all-way stop-controlled **Stadium Rim Way/Gayley Road** (Intersection 4) because the Project would contribute to LOS F operations for a critical movement during the PM peak hour and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

**Mitigation Measure 4-1:** Implement the following:

A. **Stadium Rim Way/Gayley Road** (Intersection 4): Implement the following which requires coordination with City of Berkeley and UC Berkeley:

- Install a traffic signal at the intersection.

The intersection would improve to LOS C or better during both AM and PM peak hours after implementation of this improvement. If found to be feasible and implemented, this mitigation measure would reduce the impact to less than significant.

## IMPACT 4-2: CUMULATIVE (2035) PLUS PROJECT CONDITIONS INTERSECTION OPERATIONS

The proposed Project at LBNL site would cause a significant impact at the following intersections under Cumulative (2035) Plus Project conditions:

A. The Project would cause a significant impact at the all-way stop-controlled **Stadium Rim Way/Gayley Road** (Intersection 4) because the Project would contribute to LOS F operations during both AM and PM peak hours and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

B. The Project would cause a significant impact at the all-way stop-controlled **Durant Avenue/Piedmont Avenue** (Intersection 9) because the Project would contribute to LOS F operations during both AM and PM peak hours and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

**Mitigation Measure 4-2:** Implement the following:

A. **Stadium Rim Way/Gayley Road** (Intersection 4): Implement the following which requires coordination with City of Berkeley and UC Berkeley (Same as Mitigation Measure 4-1A):

- Install a traffic signal at the intersection.

The intersection would improve to LOS C or better during both AM and PM peak hours after implementation of this improvement. If found to be feasible and implemented, this mitigation measure would reduce the impact to less than significant.

B. **Durant Avenue/Piedmont Avenue** (Intersection 9): Implement the following which requires coordination with City of Berkeley:

- Install a traffic signal at the intersection.

The intersection would improve to LOS B or better during both AM and PM peak hours after implementation of this improvement. If found to be feasible and implemented, this mitigation measure would reduce the impact to less than significant.

The Additional Employment Alternative would consist of an additional 200,000 square feet of space and accommodate an additional 700 employees at the existing LBNL site. It is estimated that the Additional Employment Alternative would generate about 2,700 daily, 270 AM peak hour, and 260 PM peak hour automobile trips. The Additional Employment Alternative at the existing LBNL site would result in the following significant traffic impact, which is the same as the Project Impact 4-1:

### IMPACT 4-3: NEAR-TERM (2018) PLUS ADDITIONAL EMPLOYMENT ALTERNATIVE CONDITIONS INTERSECTION OPERATIONS

The Additional Employment Alternative at LBNL site would cause a significant impact at the following intersection under Near-Term (2035) Plus Additional Employment Alternative conditions:

A. The Additional Employment Alternative would cause a significant impact at the all-way stop-controlled **Stadium Rim Way/Gayley Road** (Intersection 4) because it would contribute to LOS F operations for a critical movement during the PM peak hour and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

**Mitigation Measure 4-3:** Implement the following:

A. **Stadium Rim Way/Gayley Road** (Intersection 4): Implement the following which requires coordination with City of Berkeley and UC Berkeley (Same as Mitigation Measure 4-1A):

- Install a traffic signal at the intersection.

The intersection would improve to LOS C or better during both AM and PM peak hours after implementation of this improvement. If found to be feasible and implemented, this mitigation measure would reduce the impact to less than significant.

# 1.0 INTRODUCTION

This report presents an analysis of the impacts of the proposed Richmond Bay Campus (RBC) Long Range Development Plan (LRDP) Project on the transportation network. The University of California (University) is preparing the LRDP to guide campus development across a projected 40-year planning horizon. This analysis assesses impacts of the Phase 1 Project (consisting of about 1,000 employees) and Campus Buildout (consisting of about 10,000 employees) on traffic operations at intersections and freeway segments in the vicinity of the Project site, as well as on the pedestrian, bicycle, and transit networks. This analysis also assesses the impacts of implementing the Phase 1 Project at Alameda Point and at the Lawrence Berkeley National Laboratory (LBNL) site, and an Additional Employment Alternative (consisting of the 1,000 Phase 1 employees plus an additional 700 employees) at the three sites. Details on the proposed Project and the alternatives are provided in Chapters 2, 3, and 4. **Figure 1-1** shows the location of the RBC, Alameda Point, and LBNL sites.

## 1.1 REPORT ORGANIZATION

This report is divided into the following four chapters:

- ***Chapter 1 – Introduction*** describes the analysis methods used for the transportation impact assessment for all three project alternatives (RBC, Alameda Point, and LBNL Sites). This chapter also includes the significance criteria for each alternative. The criteria vary to reflect the standards and practices for each jurisdiction

- ***Chapter 2 – Richmond Bay Campus Project*** describes the existing conditions in the vicinity of the RBC site and assesses the impacts of the Phase 1 Project and Project Buildout at this site.

- ***Chapter 3 – Alameda Point Alternative*** describes the existing conditions in the vicinity of the Alameda Point site and assesses the impacts of the Phase 1 development at this site.

- ***Chapter 4 – LBNL Site Alternative*** describes the existing conditions in the vicinity of the existing LBNL site and assesses the impacts of the Phase 1 development at this site.

- ***Chapter 5 – References*** lists reference material used in preparing this report.

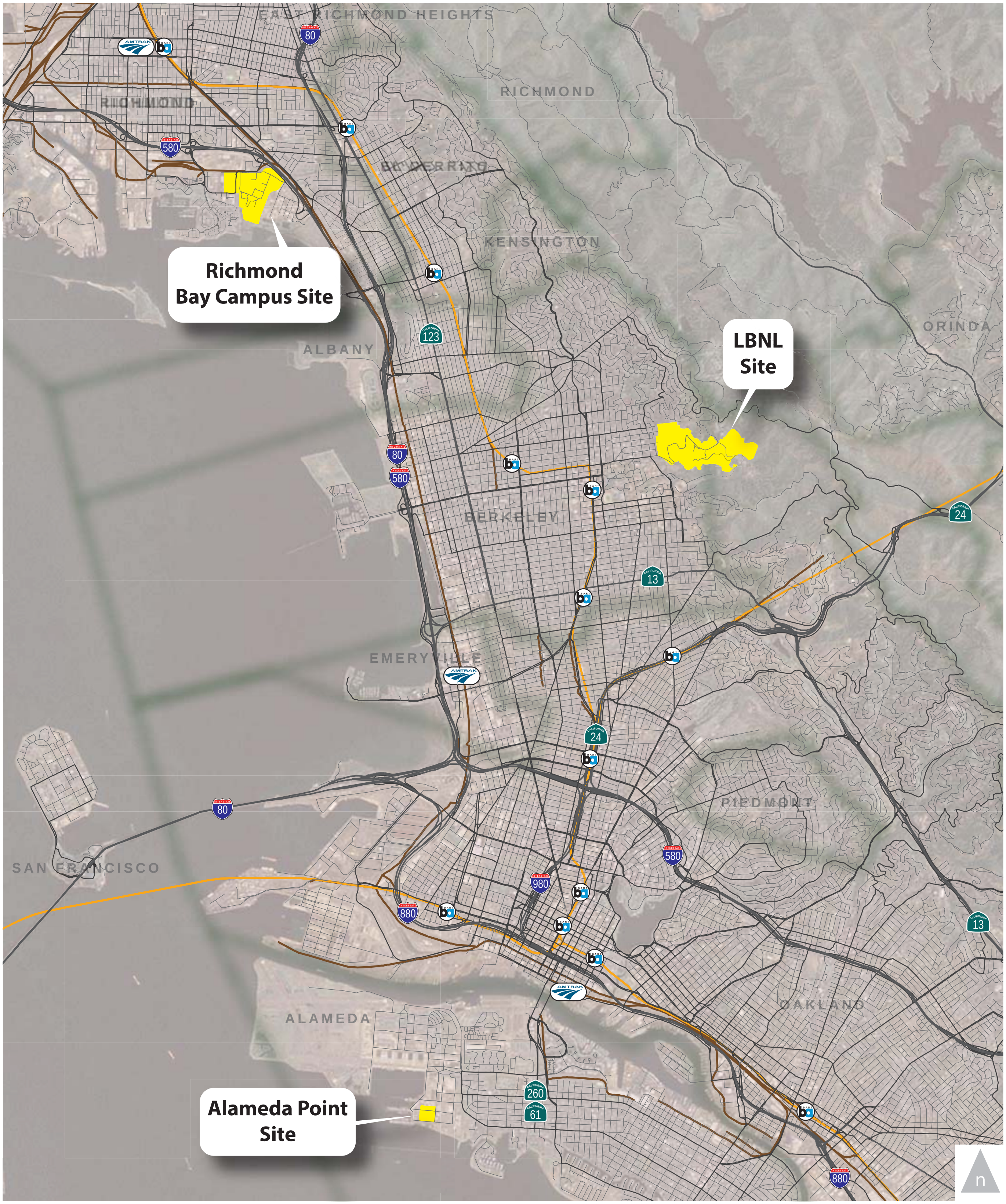


Figure 1-1.

Site Locations

WC12-2953_1-1_SiteLocs

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# 1.2 INTERSECTION OPERATION ANALYSIS METHOD

Intersection operations are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic operations from the vehicle driver perspective and consists of the delay experienced by the driver at the intersection. It ranges from LOS A, with no congestion and little delay, to LOS F, with excessive congestion and delays. Different methods are used to assess signalized and unsignalized (stop-controlled) intersections.

## 1.2.1 SIGNALIZED INTERSECTIONS

Signalized intersection operations are evaluated using methods provided in the 2000 Highway Capacity Manual (HCM). This method uses intersection characteristics to estimate average control delay and then assign an LOS. Control delay is defined as the delay associated with deceleration, stopping, moving up in the queue, and acceleration experienced by drivers at an intersection. **Table 1-1** provides descriptions of various LOS and the corresponding ranges of delays for signalized intersections.

## 1.2.2 UNSIGNALIZED INTERSECTIONS

Unsignalized intersection (four-way stop-controlled, side-street stop-controlled, and roundabouts) LOS are also analyzed using the 2000 HCM. Delay is calculated for movements that are controlled by a stop sign or that must yield the right-of-way. This method defines operations by average control delay per vehicle (measured in seconds) for each stop-controlled movement. This incorporates delay associated with deceleration, acceleration stopping, and moving up in the queue. For side-street stop-controlled intersections, the movement or approach with the highest delay is reported. **Table 1-1** summarizes the LOS ranges for unsignalized intersections. They are lower than the delay ranges for signalized intersections because drivers will generally tolerate more delay at signals.

## 1.2.3 ANALYSIS TOOLS

The Synchro Software was used to estimate delay and LOS for all signalized and most of the unsignalized study intersections. Synchro uses the equations provided in 2000 HCM to calculate control delay. These equations use intersection characteristics, such as vehicle and pedestrian volumes, lane geometry, and signal phasings, as inputs in estimating control delay.

**TABLE 1-1**
**INTERSECTION LEVEL OF SERVICE DEFINITIONS**

| **Unsignalized Intersections** | | | **Signalized Intersections** | |
|---|---|---|---|---|
| **Description** | **Average Total Vehicle Delay (Seconds)** | **Level of Service Grade** | **Average Control Vehicle Delay (Seconds)** | **Description** |
| No delay for stop-controlled approaches. | ≤10.0 | A | ≤10.0 | Free Flow or Insignificant Delays: Operations with very low delay, when signal progression is extremely favorable and most vehicles arrive during the green light phase. Most vehicles do not stop at all. |
| Operations with minor delay. | >10.0 and ≤15.0 | B | >10.0 and ≤20.0 | Stable Operation or Minimal Delays: Generally occurs with good signal progression and/or short cycle lengths. More vehicles stop than with LOS A, causing higher levels of average delay. An occasional approach phase is fully utilized. |
| Operations with moderate delays. | >15.0 and ≤25.0 | C | >20.0 and ≤35.0 | Stable Operation or Acceptable Delays: Higher delays resulting from fair signal progression and/or longer cycle lengths. Drivers begin having to wait through more than one red light. Most drivers feel somewhat restricted. |
| Operations with increasingly unacceptable delays. | >25.0 and ≤35.0 | D | >35.0 and ≤55.0 | Approaching Unstable or Tolerable Delays: Influence of congestion becomes more noticeable. Longer delays result from unfavorable signal progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop. Drivers may have to wait through more than one red light. Queues may develop, but dissipate rapidly, without excessive delays. |
| Operations with high delays, and long queues. | >35.0 and ≤50.0 | E | >55.0 and ≤80.0 | Unstable Operation or Significant Delays: Considered to be the limit of acceptable delay. High delays indicate poor signal progression, long cycle lengths and high volume to capacity ratios. Individual cycle failures are frequent occurrences. Vehicles may wait through several signal cycles. Long queues form upstream from intersection. |
| Operations with extreme congestion, and with very high delays and long queues unacceptable to most drivers. | >50.0 | F | >80.0 | Forced Flow or Excessive Delays: Occurs with oversaturation when flows exceed the intersection capacity. Represents jammed conditions. Many cycle failures. Queues may block upstream intersections. |

Source: Highway Capacity Manual, Transportation Research Board, 2000.

Delay at some unsignalized intersections (Bancroft Way/Piedmont Avenue and Durant Avenue/Piedmont Avenue intersections in Berkeley) was calculated using SimTraffic because of the unique conditions at these intersections. The heavy pedestrian crossing volumes and the close distance of the intersections to each other cannot be accurately measured by Synchro. SimTraffic is used for modeling and simulating traffic operations based on the behavior of individual drivers in a network. The software accounts for the physical features of the transportation system, traffic flow conditions, and driver behavior characteristics to estimate travel delays and other performance measures that describe traffic operations.

Microsimulation programs, such as SimTraffic, incorporate the element of randomness inherent in traffic flow. Therefore, in order to average out the random fluctuations and obtain a statistically more significant result, a microsimulation model should be run a number of times and the average of the runs should be reported. For this study, the SimTraffic files were each run ten times.

## 1.3 FREEWAY OPERATIONS ANALYSIS METHOD

### 1.3.1 FREEWAY MAINLINE SECTIONS

The LOS for a freeway section is based on measures of density (passenger cars/ lane/ mile). Freeway LOS is a qualitative description of traffic flow based on speed, travel time, delay, and freedom to maneuver. There are six levels, ranging from LOS A (i.e., the best operating conditions) to LOS F (i.e., the worst). LOS E represents “at-capacity” operation. When volumes exceed capacity, stop-and-go conditions result and operations are designated as LOS F. **Table 1-2** presents a summary of the relationship between LOS and density for freeway mainline sections.

### 1.3.2 FREEWAY WEAVE SECTION

The freeway weave sections were analyzed using the Leisch methodology as described in *Highway Design Manual* (California Department of Transportation, 2009). A weave section is defined as a length of freeway where vehicles are crossing paths, changing lanes, or merging/weaving with through traffic as they enter or exit the freeway. This methodology assigns the LOS for the weave section based on volumes, traffic service flow, and capacity using nomographs.

**TABLE 1-2**
**FREEWAY SEGMENT LEVEL OF SERVICE CRITERIA**

| Level of Service | Freeway Maximum Density (Passenger cars / mile / lane) |
|---|---|
| A | 11 |
| B | 18 |
| C | 26 |
| D | 35 |
| E | 45 |
| F | > 45 |

Notes:
Freeway mainline LOS based on a 65 miles per hour free-flow speed.
Source: Transportation Research Board, 2000.

# 1.4 SIGNIFICANCE CRITERIA

This section describes the thresholds of significance used to determine if a project would cause a significant impact.

## 1.4.1 GENERAL

The following thresholds of significance are based on the CEQA Guidelines Appendix G Checklist:

A. Would the Project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

B. Would the Project conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads and highways?

C. Would the Project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks;

D. Would the Project substantially increase traffic hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?

E. Would the project result in inadequate emergency access?

F. Would the Project conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

The local jurisdictions and congestion management programs have established specific thresholds of significance for intersections and freeways which are discussed in the next two subsections and used in this analysis. The local jurisdictions do not have specific thresholds for assessing impacts on other aspects of the transportation network; therefore, the thresholds from the CEQA Guidelines Appendix G Checklist, as listed above, are used to determine significant impacts.

### 1.4.2 INTERSECTION OPERATIONS

For the purposes of this analysis, the following intersection LOS thresholds of significance are used based on the local jurisdictions' standards and practices.

***City of Richmond:***

An impact is significant if the Project would cause:

- A signalized intersection to deteriorate from LOS D or better to LOS E or LOS F.
- A signalized intersection where the level of service is LOS E, the project would cause the average control delay to increase by more than five seconds or deteriorate to LOS F.
- A signalized intersection where the level of service is LOS F, the project would cause the overall volume-to-capacity ("V/C") ratio to increase 0.01 or more.
- At an unsignalized intersection the project would cause the intersection to operate at LOS F and after project completion satisfy the Caltrans peak hour traffic volume signal warrant.

***City of Alameda:***

An impact is significant if the Project would cause:

- An intersection to fall from the minimum acceptable LOS (LOS D) to LOS E or F.
- An intersection is already operating at LOS E or F, the impact is significant if the project causes a three percent increase in peak hour traffic volumes.

***City of Oakland:***

An impact is significant if:

- At a signalized intersection which is located within the Downtown area, the Project would cause the LOS to degrade to worse than LOS E (i.e., LOS F)

- At a signalized intersection for all areas where the level of service is LOS E, the Project would cause an increase in the average delay for any of the critical movements of six (6) seconds or more or degrade to worse than LOS E (i.e., LOS F)
- At a signalized intersection for all areas where the level of service is LOS F, the Project would cause (a) the overall volume-to-capacity ("V/C") ratio to increase 0.01 or more or (b) the critical movement V/C ratio to increase 0.02 or more

***City of Berkeley***:

An impact is significant if the Project would cause:

- At a signalized intersection operations degrade from LOS D to LOS E or worse and more than a two-second increase in delay; or
- At a signalized intersection, more than a three-second increase in delay at intersections operating at LOS E without and with the project; or
- At a signalized intersection, operations degrade from LOS E to LOS F and more than a three-second increase in delay; or
- At a signalized intersection operating at LOS F without the project, a change in the volume-to-capacity (v/c) ratio of more than 0.01.
- At an unsignalized intersection, the addition of Project-related traffic causes:
    - the critical approach to operate at LOS F; and
    - the intersection meets peak hour traffic volume signal warrants; and
    - no alternative routes are available.

***All Jurisdictions:***

A project's contribution to cumulative impacts is considered "considerable" (i.e., significant) when the project exceeds at least one of the thresholds listed above under a future year scenario.

### 1.4.3 FREEWAY SEGMENTS

The 2011 *Contra Costa Congestion Management Program* is the applicable CMP document for the RBC. Based on the CMP requirements, the following standards are used to determine if the Project impacts on a freeway segment are considered significant:

- I-580: Cause a segment to degrade from LOS E or better to LOS F or increase peak hour volume by five percent or more for a segment already operating at LOS F.
- I-80: Increase peak hour volume by five percent or more for a segment already operating at LOS F.

The 2009 Alameda County Congestion Management Program is the applicable CMP document for the Alameda Point Alternative. Based on the CMP requirements, the following standards are used to determine if the Project impacts on a freeway segment are considered significant:

- All freeway segments in Alameda County: Increase peak hour volume by five percent or more for a segment already operating at LOS F.

# 2.0 RICHMOND BAY CAMPUS PROJECT

This chapter describes existing transportation conditions for the RBC site and identifies impacts and mitigation measures of developing both the Phase 1 and buildout of the proposed LRDP at RBC site.

## 2.1 EXISTING CONDITIONS

Existing transportation conditions at the RBC site and vicinity are described below.

### 2.1.1 EXISTING ROADWAY NETWORK

**Figure 2-1** shows the existing RBC site, the surrounding roadway system, and study intersections and freeway segments analyzed as part of this assessment. The regional and local roadways serving the project site are described below.

#### 2.1.1.1 Regional Roadways

*Interstate 580* (I-580) is a generally east-west six-lane freeway connecting I-80 and points east to US 101 in Marin County, via the Richmond-San Rafael Bridge. Auxiliary lanes (lanes connecting adjacent on-ramps and off-ramps) provide a fourth travel lane in each direction, in the project vicinity. Access between the RBC site and I-580 is provided via interchanges at Bayview Avenue/51st Street, Regatta Boulevard/Juliga Woods Street, and Marina Bay Parkway/South 23rd Street. I-580 has an average annual daily traffic volume (AADT) of 91,000 vehicles (Caltrans, 2011) between the Regatta Boulevard/Juliga Woods Street and Marina Bay Parkway/South 23rd Street interchanges.

*Interstate 80* (I-80) freeway connects the San Francisco Bay Area with the Sacramento region and continues east. Near the RBC site, I-80 is oriented in a north-south direction about one mile east, and provides four lanes of travel in each direction. Access between I-80 and the RBC site is provided via I-580 to and from the south and via the Carlson Boulevard interchange to and from the north. I-80 has an AADT of 171,000 vehicles (Caltrans, 2011) north of I-580.


Figure 2-1.

## Richmond Bay Campus Study Locations

WC12-2953_2-1_BayCampusStudy

*Regatta Boulevard* is an east-west arterial that connects Marina Way South to Meade Street, forming the primary east-west connection in the South Shoreline area of Richmond. Regatta Boulevard provides two travel lanes in each direction with a median, turn lanes at intersections, and a continuous sidewalk/path along the north and an intermittent sidewalk/path along the south side of the roadway between Marina Way South and Marina Bay Parkway. East of Marina Bay Parkway, the roadway narrows to three lanes with one travel lane in each direction, a center two-way left-turn lane and a continuous sidewalk along the north side and intermittent sidewalk along the south side of the roadway; further east, the roadway narrows further to a two-lane cross section with shoulders on both sides of the roadway, terminating at Meade Street. The recently completed extension of Regatta Boulevard provides a direct connection to Meade Street, allowing for another access/egress route for the South Shoreline area when trains at the at-grade railroad crossing block the Marina Bay Parkway just north of Regatta Boulevard. The posted speed limit on Regatta Boulevard is 25 miles per hour (mph).

*Marina Bay Parkway/South 23rd Street* is a north-south arterial connecting downtown Richmond to the South Shoreline area. South of I-580, the roadway is called Marina Bay Parkway and north of I-580, the roadway is called South 23rd Street. In the study area the roadway generally provides two travel lanes in each direction, with turn lanes at intersections. The roadway provides sidewalks on both sides of the roadway north of Meeker Avenue and only on the west side of the street south of Meeker Avenue. The posted speed limit is 30 mph. Marina Bay Parkway/South 23rd Street is currently designated as a Class 3 Bicycle Route.

*Cutting Boulevard* is an east-west arterial roadway connecting San Pablo Avenue and I-580 in the east with South Garrard Boulevard in the west. In the study area, Cutting Boulevard generally provides two travel lanes in each direction, with turn lanes at intersections and sidewalks on both sides of the street. The posted speed limit is 35 mph.

*Carlson Boulevard* is a generally four-lane northwest-southeast arterial through the study area, connecting 23rd Street to I-80 via an interchange, and terminating at San Pablo Avenue in El Cerrito. The roadway generally provides two travel lanes in each direction with turn lanes at major intersections and sidewalks on both sides of the street south of Bay View Avenue. Carlson Boulevard does not provide a continuous sidewalk on the west side of the street north of Bay View Avenue. The posted speed limit is 35 mph. Carlson Boulevard between Potrero Drive and Cutting Boulevard is currently designated as a Class 3 bicycle route.

#### 2.1.1.2 Local Roadways

*Meade Street* is a two-lane roadway that runs northwest from the I-580/Bayview Avenue interchange to the I-580/Regatta Boulevard interchange and would continue to provide access to the RBC site during both the Phase 1 and buildout scenarios. Meade Street provides a continuous sidewalk along the north side and intermittent sidewalk along the south side of the roadway. The posted speed limit is 30 mph.

### 2.1.2 INTERSECTION OPERATIONS ANALYSIS

This study analyzes existing traffic operations during typical weekday AM and PM peak hours at the following 14 intersections in the City of Richmond:

1. Cutting Boulevard/23rd Street
2. I-580 Westbound Ramps/23rd Street
3. I-580 Eastbound Ramps/23rd Street
4. Meeker Avenue/23rd Street/Marina Bay Pkwy
5. Regatta Boulevard/Marina Bay Parkway
6. I-580 Westbound Ramps/Juliga Woods Street
7. I-580 Eastbound Ramps/Regatta Boulevard/ Meade Street
8. Meade Street/Regatta Boulevard
9. Meade Street/Seaver Avenue
10. Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue
11. I-580 Westbound Ramps/Bayview Avenue
12. Carlson Boulevard/Bayview Avenue
13. Carlson Boulevard/I-80 Eastbound Ramps
14. Carlson Boulevard/I-80 Westbound Ramps

These intersections were selected for analysis because they are most likely to be affected by the proposed Project. **Figure 2-1** shows the location of the study intersections.

#### 2.1.2.1 Existing Intersection Volumes

The intersection operations analysis presented in this study are based on AM and PM peak period (7:00 to 9:00 AM and 4:00 to 6:00 PM) intersection turning movement, pedestrian, and bicycle volumes collected on December 12 and 13, 2012. These time periods were selected because trips generated by the proposed Project, in combination with background traffic, are expected to represent typical worst traffic conditions. Within the peak periods, the peak hours (i.e., the hour with the highest traffic volumes observed in the study area) are from 7:30 AM to 8:30 AM (AM peak hour) and 5:00 PM to 6:00 PM (PM peak hour).

Because the traffic counts were collected in December when traffic patterns may be atypical due to irregular school schedules, holidays, and more frequent shopping trips[1], "check counts" were collected during the week of January 28, 2013, at three locations (Meeker Avenue/23rd Street/Marina Bay Parkway, Meade Street/Regatta Boulevard, and Carlson Boulevard/Bayview Avenue). These check counts were compared to the December 2012 counts, in terms of total intersection volumes and also critical

[1] Since the RBC site is not located near schools or major shopping destinations, it is not expected to have different traffic patterns in December, which was confirmed with the counts collected in February.

movements. In comparison, some movements were higher in December 2012 while others were higher in January/February 2013. Overall, the January/February 2013 intersections volumes were between 12 percent lower and 15 percent higher than the December 2012 volumes, which is within the typical daily fluctuation expected in traffic volumes. Thus, the December 2012 traffic volumes represent typical conditions in the vicinity of the RBC site.

Although the December 2012 traffic volumes represent typical conditions in the study area, they were adjusted to reflect the higher traffic volumes observed in January/February 2013 in order to present a more conservative analysis, resulting in a slight overestimation of the anticipated traffic impacts. The adjustments included increasing the northbound through movement at Marina Bay Parkway/Meeker Street intersection and corresponding upstream movements, and increasing the truck percentages at all the intersections based on observed higher truck volumes in the January/February 2013 counts.

**Figures 2-2A and 2-2B** present the existing AM and PM peak hour intersection vehicle turn movement volumes at the study intersections. **Figures 2-3A and 2-3B** present the existing AM and PM peak hour pedestrian and bicycle volumes at the study intersections. **Appendix A** presents the detailed count sheets at the study intersections.

#### 2.1.2.2 Existing Intersection Operations

**Table 2-1** summarizes existing weekday peak hour intersection LOS analysis results. **Appendix B** provides the detailed calculation work sheets. As shown in the table, all study intersections during the AM peak hour, and all but one intersection during the PM peak hour operate at LOS D or better. The one sub-standard intersection is Meeker Avenue/23rd Street/Marina Bay Parkway, which operates at LOS F during the PM peak hour.

### 2.1.3 FREEWAY OPERATIONS

This study analyzes existing traffic operations during typical weekday AM and PM peak hours at the following seven freeway segments:

1. I-580 between Harbor Way and Marina Bay Parkway
2. I-580 between Marina Bay Parkway and Regatta Boulevard
3. I-580 between Regatta Boulevard and Bayview Avenue
4. I-580 between Bayview Avenue and Central Avenue
5. I-580 between Central Avenue and I-80
6. I-80 between Carlson Boulevard and Potrero Avenue
7. I-80 at the Gilman Street Overpass

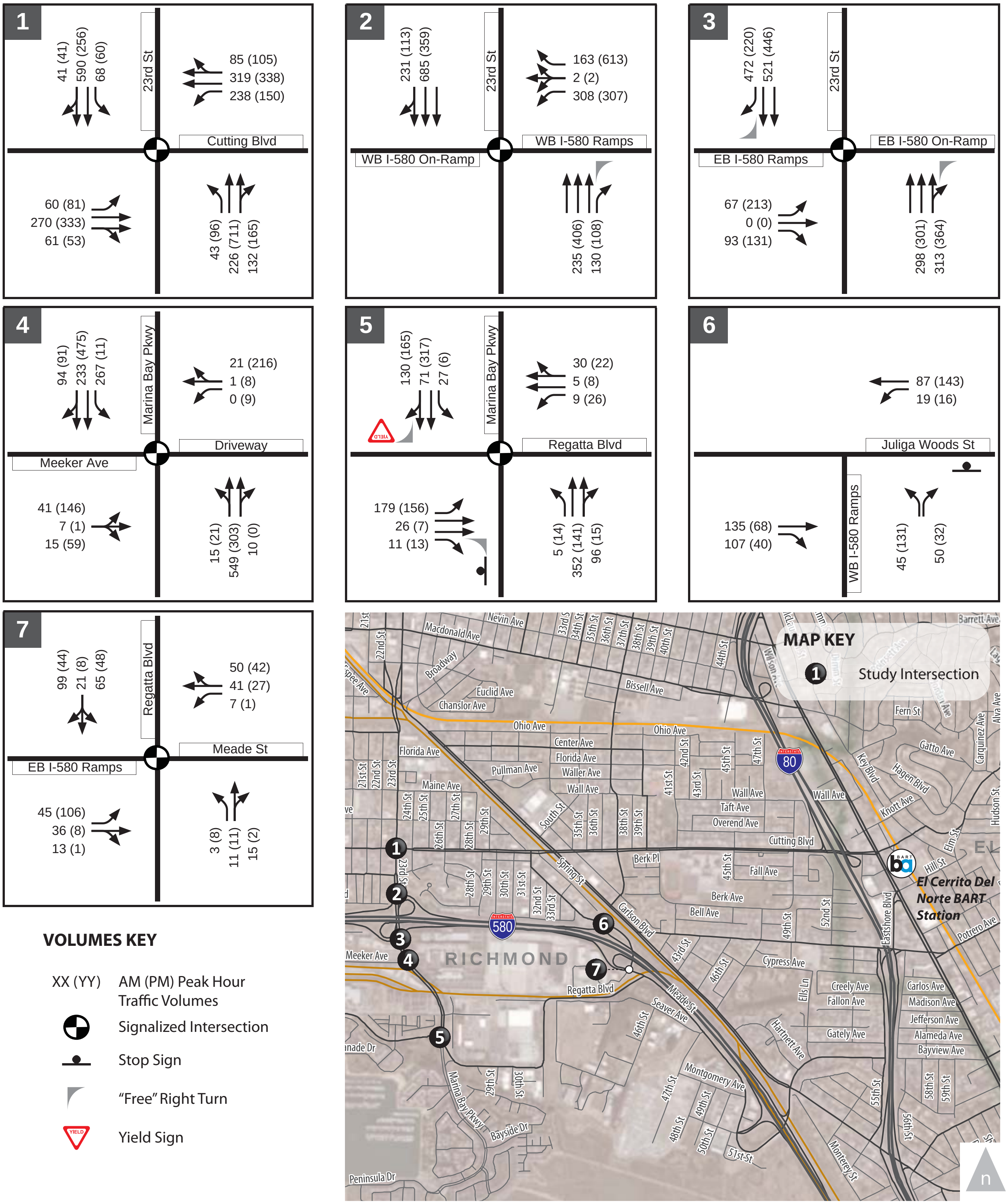


Figure 2-2A.

## Richmond Bay Campus Existing
## Peak Hour Traffic Volumes, Lane Configurations and Traffic Control

FEHR & PEERS

WC12-2953_2-2A_ExVol

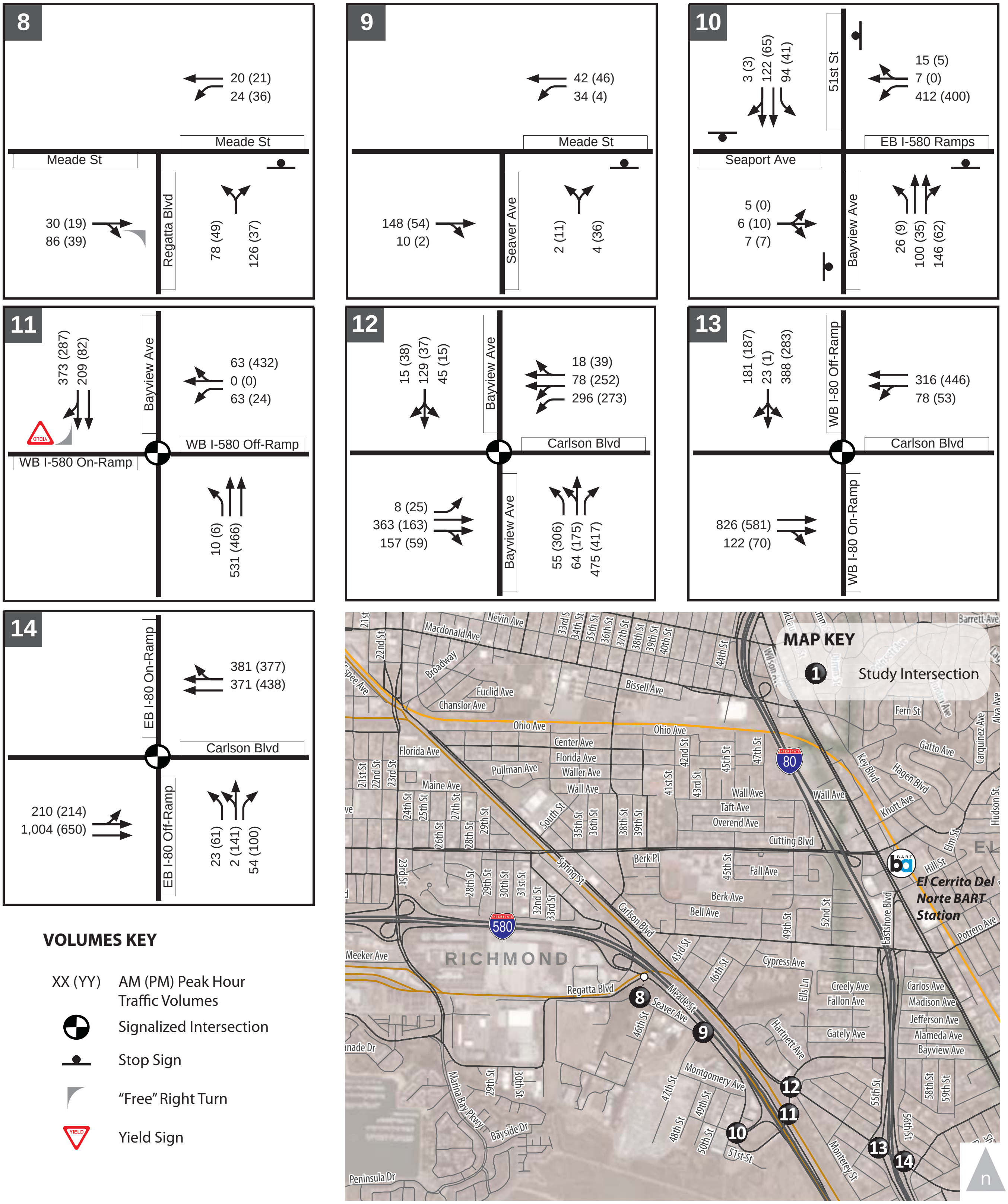


Figure 2-2B.

Richmond Bay Campus Existing
Peak Hour Traffic Volumes, Lane Configurations and Traffic Control

WC12-2953_2-2B_ExVol

FEHR & PEERS

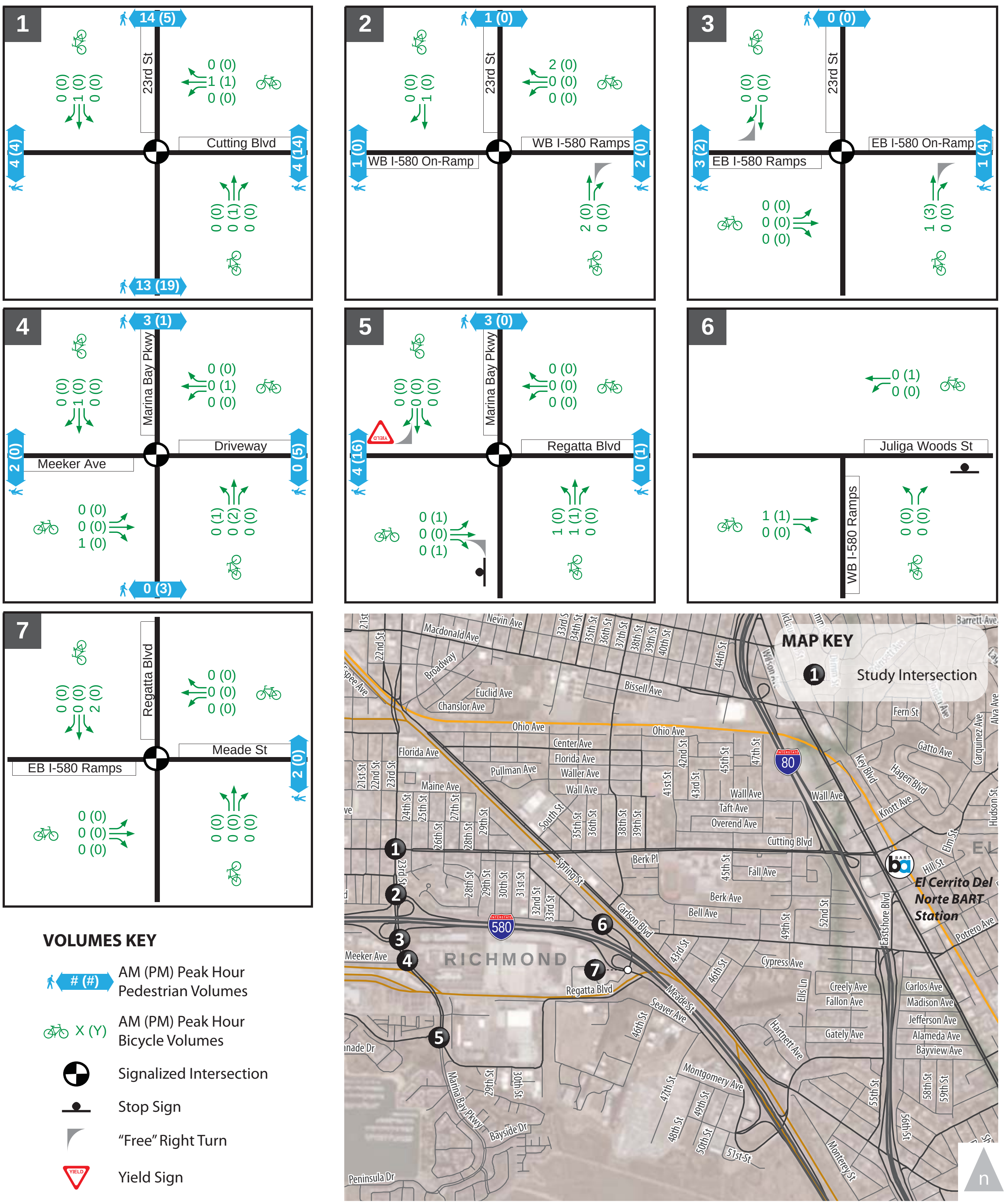


Figure 2-3A.

## Richmond Bay Campus Existing Pedestrian and Bicycle Volumes

WC12-2953_2-3A_ExPedBikeVol

FEHR & PEERS

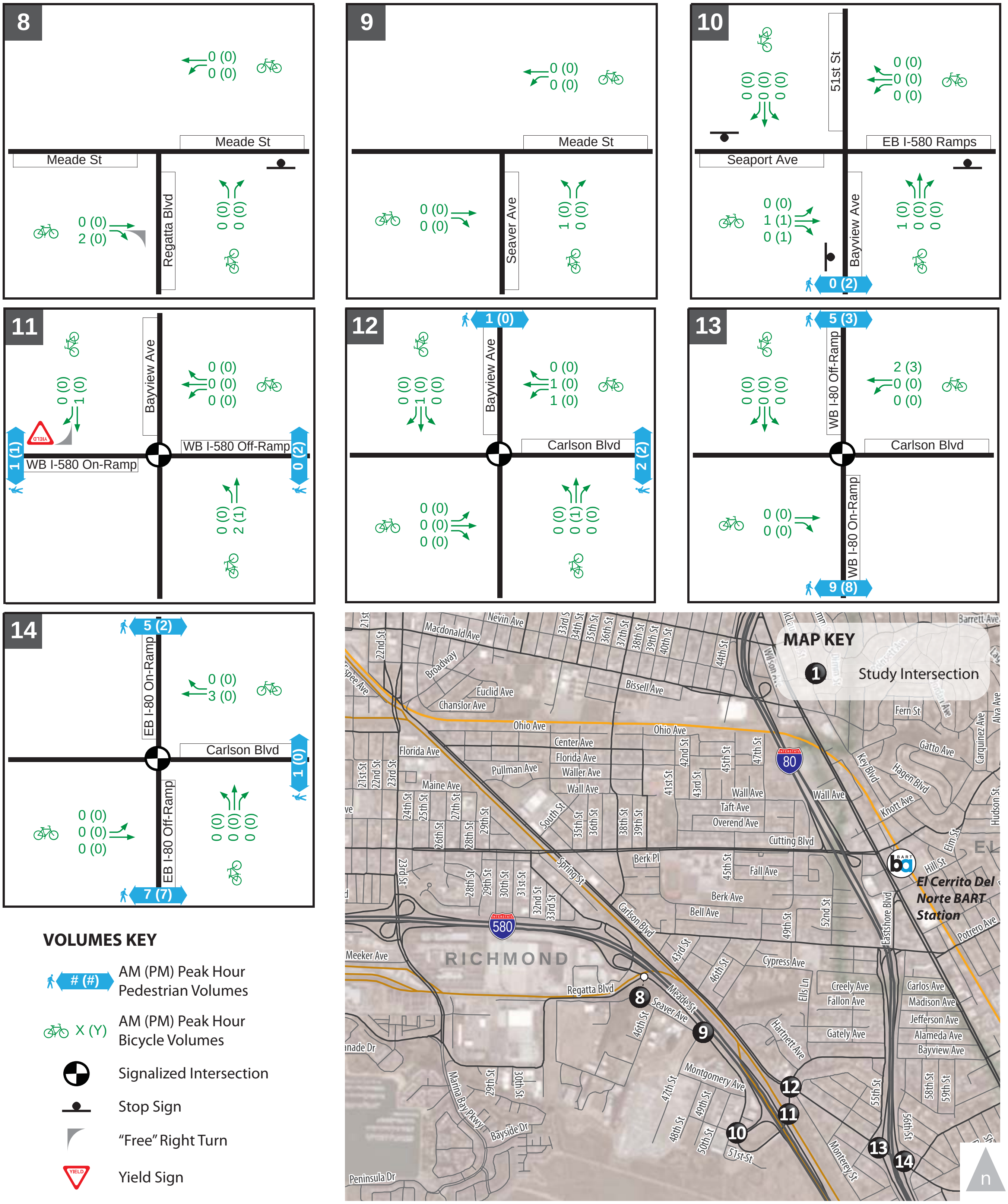


Figure 2-3B.

## Richmond Bay Campus Existing Pedestrian and Bicycle Volumes

WC12-2953_2-3B_ExPedBikeVol

FEHR & PEERS

**TABLE 2-1**
**RICHMOND BAY CAMPUS**
**EXISTING CONDITIONS – STUDY INTERSECTION LOS SUMMARY**

| Intersection | Control | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|
| | | Delay (Seconds)[1] | LOS [1] | Delay (Seconds) [1] | LOS [1] |
| 1. Cutting Boulevard/ 23rd Street | Signal | 22.9 | C | 23.0 | C |
| 2. I-580 Westbound Ramps/ 23rd Street | Signal | 6.9 | A | 6.8 | A |
| 3. I-580 Eastbound Ramps/ 23rd Street | Signal | 3.6 | A | 6.3 | A |
| 4. Meeker Avenue/23rd Street/ Marina Bay Pkwy | Signal | 37.1 | D | **115.8** | **F** |
| 5. Regatta Boulevard/ Marina Bay Parkway | Signal | 30.0 | C | 43.6 | D |
| 6. I-580 Westbound Ramps/ Juliga Woods Street | Side Street Stop | 2.5 (10.0) | A (B) | 4.4 (10.9) | A (B) |
| 7. I-580 Eastbound Ramps/ Regatta Boulevard/ Meade Street | Signal | 9.7 | A | 9.1 | A |
| 8. Meade Street/ Regatta Boulevard | Side Street Stop | 6.4 (10.6) | A (B) | 5.6 (10.0) | A (B) |
| 9. Meade Street/ Seaver Avenue | Side Street Stop | 1.3 (9.7) | A (A) | 3.0 (9.0) | A (A) |
| 10. Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue | All-way Stop | 27.6 | D | 20.0 | C |
| 11. I-580 Westbound Ramps/ Bayview Avenue | Signal | 5.4 | A | 6.7 | A |
| 12. Carlson Boulevard/ Bayview Avenue | Signal | 27.0 | C | 21.6 | C |
| 13. Carlson Boulevard/ I-80 Westbound Ramps | Signal | 19.3 | B | 20.0 | B |
| 14. Carlson Boulevard/ I-80 Eastbound Ramps | Signal | 10.7 | B | 9.8 | A |

Notes: **Bold** indicates an intersection operating at unacceptable LOS E or LOS F.
1. Signalized and all-way stop-controlled intersection delay and LOS based on average control delay per vehicle, according to the Highway Capacity Manual, Special Report 209, Transportation Research Board, 2000.

Source: Fehr & Peers.

These freeway segments were selected for analysis because they are most likely to be affected by the proposed Project.

#### 2.1.3.1 Existing Freeway Volumes

Existing freeway volumes are primarily derived from two sources of data: (1) October 2012 freeway volumes published by Caltrans through the California Freeway Performance Measurement System (PeMS), and (2) ramp terminal intersection turning movement counts collected in December 2012, and described in Section 2.1.2.1.

#### 2.1.3.2 Existing Freeway Operations

**Table 2-2** summarizes existing weekday AM and PM peak hour freeway segment LOS analysis results for both mainline and weave sections. **Appendix C** provides the detailed calculation work sheets. As shown in the table, all freeway segments currently operate at LOS D or better during both AM and PM peak hour.

**TABLE 2-2**
**RICHMOND BAY CAMPUS**
**EXISTING CONDITIONS – FREEWAY SEGMENT LOS SUMMARY**

| Freeway Segment | Type[1] | Dir[2] | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|---|
| | | | Density[2] | LOS | Density[2] | LOS |
| 1. I-580 between Harbor Way and Marina Bay Pkwy | Weave | EB | N/A | A | N/A | A |
| | Weave | WB | N/A | A | N/A | A |
| 2. I-580 between Marina Bay Pkwy and Regatta Blvd | Weave | EB | N/A | A | N/A | A |
| | Weave | WB | N/A | A | N/A | A |
| 3. I-580 between Regatta Blvd and Bayview Ave | Weave | EB | N/A | A | N/A | A |
| | Weave | WB | N/A | A | N/A | A |
| 4. I-580 between Bayview Ave and Central Ave | Basic | EB | 15.4 | B | 14.0 | B |
| | Basic | WB | 14.3 | B | 16.9 | B |
| 5. I-580 between Central Ave and I-80 | Basic | EB | 23.5 | C | 28.7 | D |
| | Basic | WB | 25.0 | C | 22.6 | C |
| 6. I-80 between Carlson Blvd and Potrero Ave | Basic | EB | 21.3 | C | 27.3 | D |
| | Basic | WB | 29.5 | D | 24.0 | C |
| 7. I-80 at Gilman St Overpass | Basic | EB | 21.7 | C | 27.3 | D |
| | Basic | WB | 30.9 | D | 25.6 | C |

1. Segments with auxiliary lanes are classified as weave segments, and were analyzed based on the Leisch Method. Basic segments are analyzed as basic segments using the 2000 HCM methodologies.
2. EB = Eastbound; WB = Westbound
3. Density is presented in passenger cars per lane per mile (pc/ln/mi).

Source: Fehr & Peers.

### 2.1.4 EXISTING TRANSIT AND SHUTTLE SERVICES

The RBC site is served indirectly by Bay Area Rapid Transit (BART), Alameda-Contra Costa Transit (AC Transit), Amtrak, and directly by the Richmond Field Station (RFS) shuttle. **Figure 2-4** shows the transit routes in the vicinity of the site. Each transit service is described below.

#### 2.1.4.1 BART

BART provides regional commuter rail transit in Alameda, Contra Costa, San Francisco, and San Mateo counties. Currently, BART trains operate on weekdays from 4:00 AM to midnight, on Saturdays from 6:00 AM to midnight, and on Sundays from 8:00 AM to midnight. The nearest BART stations to the RBC site are the Richmond Station (about two miles northwest of the RBC site and at the end of the Richmond-Fremont line), the El Cerrito del Norte Stations (about two miles northeast of the RBC site), and the El Cerrito Plaza Station (about three miles east of the RBC site). These three stations are served by the Richmond-Fremont and Richmond-Daly City/Millbrae lines. Other destinations in the BART system can be reached by transferring at stations in Oakland. Typically, these three stations are served by a train every seven (peak weekday commute periods) to 20 minutes (Sundays). The average weekday daily ridership for the Richmond, El Cerrito del Norte, and El Cerrito Plaza Stations were about 7,500, 15,800 and 9,000 riders in January 2013, respectively.

#### 2.1.4.2 AC Transit

Local bus service in Richmond is provided by AC Transit. **Figure 2-4** illustrates the existing AC Transit routes in the vicinity of the RBC site. **Table 2-3** describes the service provided on these routes and the nearest stops to the RBC site.

#### 2.1.4.3 Amtrak

The Richmond Transit Station, located adjacent to the Richmond BART station, provides Amtrak service on three routes – the Capital Corridor (15 trains per day in each direction between San Jose and Sacramento); the San Joaquin Intercity (four trains per day in each direction to Bakersfield via Modesto and Fresno) and the California Zephyr (one train per day in each direction between Chicago and Emeryville).

#### 2.1.4.4 Richmond Field Station Shuttle

UC Berkeley currently operates a shuttle connecting the main University campus with El Cerrito Plaza BART Station and the Richmond Field Station (RFS) with other stops on Buchanan Street at Jackson Street, Martin Luther King Jr. Way at Hopkins Street, and Downtown Berkeley BART Station. The shuttle operates approximately hourly between 7:00 AM and 6:00 PM on weekdays. Current LBNL staff can use the LBNL (See Section 4.1.1.4 for details for LBNL shuttles) and RFS shuttles to travel between LBNL and RFS.


Figure 2-4.

## Richmond Bay Campus Existing Transit Service

WC12-2953_2-4_ExTransit

FEHR & PEERS

**TABLE 2-3**
**RICHMOND BAY CAMPUS**
**AC TRANSIT SERVICE SUMMARY**

| Line | Route | Nearest Stop[1] | Weekday | | Weekend | |
|---|---|---|---|---|---|---|
| | | | Hours | Frequency | Hours | Frequency |
| ***Local Routes*** | | | | | | |
| 71 | Richmond Parkway Transit Center – El Cerrito BART | Carlson Blvd./ Cutting Blvd. (About 1.0 miles) | 5:00 AM – 8:00 PM | 30 minutes | 6:30 AM – 9:30 PM | 60 minutes |
| 74 | Castro Ranch – Richmond BART – Harbor Way South/Ford Point | Marina Bay Pkwy/Regatta Blvd. (About 1.3 miles) | 7:00 AM – 10:00 PM | 30-40 minutes | 7:00 AM – 8:00 PM | 30-40 minutes |
| 76 | El Cerrito Del Norte BART – Hilltop Mall | Carlson Blvd./ Cutting Blvd. (About 1.0 miles) | 6:00 AM – 7:40 PM | 30-40 minutes | 6:30 AM – 8:20 PM | 30 minutes |
| 376 | El Cerrito Del Norte BART – Pinole Vista Center | Carlson Blvd./ Cutting Blvd. (About 1.0 miles) | 8:00 PM – 3:45 AM | 30 minutes | 8:00 PM – 3:45 AM | 30 minutes |

1. Distance shown is current walking distance between bus stop and south 46th Street at Seaver Avenue.
Source: AC Transit, 2013

## 2.1.5 EXISTING PEDESTRIAN AND BICYCLE CIRCULATION

### 2.1.5.1 Pedestrian and Bicycle Facilities

Pedestrian facilities in the study area include sidewalks, crosswalks, and multi-use trails. Most roadways in the study area provide sidewalks on both sides of the street; except Regatta Boulevard east of Marina Bay Parkway, where sidewalks are generally only provided where there are fronting uses; Meade Street, which has sidewalks only on the north side of the street; and Marina Bay Parkway south of Meeker Avenue, which has sidewalks only on the west side of the street. The Richmond Bay Trail is located along the bay shoreline to the south of the RBC site, connecting via Marina Bay Parkway to Regatta Boulevard and continuing west.

Based on the *City of Richmond Bicycle Master Plan* (October 2011), bicycle facilities in the study area can be classified into three types, including:

- ***Bicycle Paths (Class 1)*** – These facilities are located off-street and can serve both bicyclists and pedestrians.

- ***Bicycle Lanes (Class 2)*** – These facilities provide a dedicated area for bicyclists within the paved street width through the use of striping and appropriate signage.

- ***Bicycle Routes (Class 3)*** – These facilities are found along streets that do not provide sufficient width for dedicated bicycle lanes. The street is designated as a bicycle route through the use of signage informing drivers to expect bicyclists.

**Figure 2-5** identifies existing and proposed bicycle facilities in the study area. Existing bicycle facilities near the project site include the Class 1 Bay Trail along the bay shoreline, and Class 3 routes on Marina Bay Parkway and on Regatta Boulevard west of Marina Bay Parkway.

As previously shown on Figures 2-3A and 2-3B, study intersections in the vicinity of the RBC site have minimal pedestrian and bicycle activity.

#### 2.1.5.2 Proposed Pedestrian and Bicycle Improvements

The *Richmond Bicycle Master Plan* and *City of Richmond Pedestrian Plan* propose the following bicycle and pedestrian improvements in the study area:

- Class 1 path connecting Regatta Boulevard west of Marina Bay Parkway and Bayview Avenue just south of the I-580 Interchange.

- Class 1 path adjacent to the east-west railroad tracks connecting Meade Street at Seaver Street to Regatta Boulevard.

- Class 1 path along south 46th connecting the Bay Trail and Meade Street.

- Class 2 lanes on Regatta Boulevard between Marina Way and Meade Street.

- Class 2 lanes on South 23rd Street/Marina Bay Parkway including potential improvements at the I-580 Overpass such as widening sidewalks, and realigning the freeway ramps to square the intersection and shorten pedestrian crossings.

- Class 2 lanes on Meade Street/South 51st Street between Regatta Boulevard and Seaport Avenue.

- Class 2 lanes on Bay View Avenue between Seaport Avenue and Carlson Boulevard.

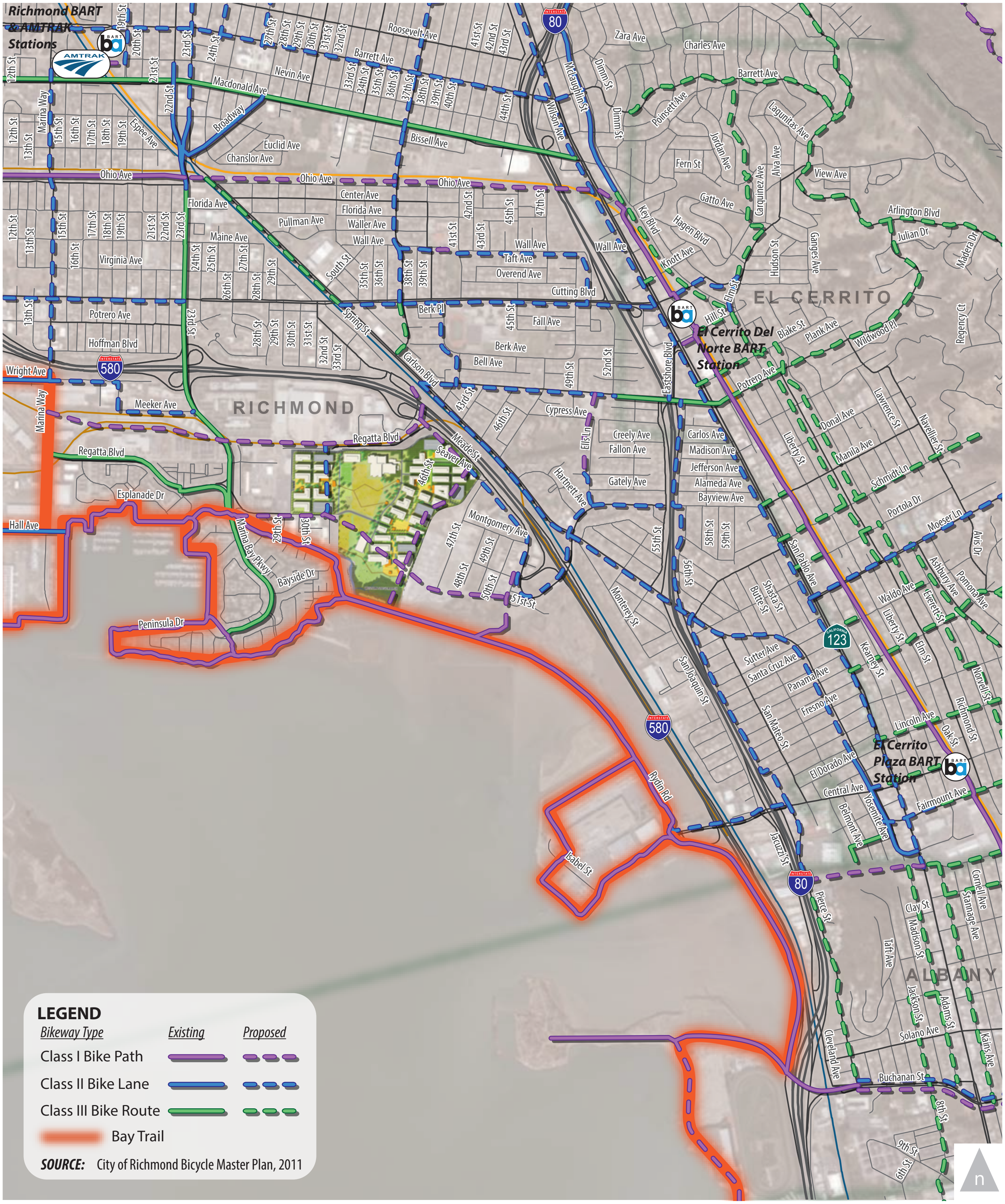


Figure 2-5.

## Richmond Bay Campus Existing and Future Bicycle Network

WC12-2953_2-5_ExBikeNet

- Class 2 lanes on Carlson Boulevard between El Cerrito City Limit and Broadway.

The potential improvements listed above are not fully funded, designed, or approved. It is not known if and when they would be implemented. Therefore, this assessment does not assume them in the analysis of future conditions.

### 2.1.6 EXISTING AT-GRADE RAILROAD CROSSINGS

There are two at-grade railroad crossings in the study area, on Marina Bay Parkway between Meeker Avenue and Regatta Boulevard, and on Meade Street between Regatta Boulevard and the recently completed Regatta Boulevard extension as shown on Figure 2-1. The at-grade crossings are operated by Richmond Pacific and Union Pacific Railroad Corporations.

Based on data provided by Federal Railroad Administration (FRA), about nine trains use the at-grade crossing on Marina Bay Parkway on a typical day with speeds from about one to ten mph, and about four trains use the at-grade crossing on Meade Street with speeds from five to ten mph. The vehicular approaches at both crossings provide gate controls with bells, pavement markings, and advanced warning signs. The crossing on Marina Bay Parkway also includes a sidewalk on the west side of the roadway and the crossing on Meade Street provides a sidewalk on the north side of the roadway.

Based on six years (2007-2012) of collision data summarized by the FRA, one collision was reported at the at-grade crossing on Marina Bay Parkway in 2007 and no collisions were reports at the crossing on Meade Street. The reported collision involved an automobile that drove around or through the safety gates and struck rail equipment. No injuries were reported.

The Marina Bay Parkway at-grade crossing is currently scheduled to be replaced with a grade-separated crossing. The undercrossing will also include separated pedestrian/bicycle path on both sides of the roadway. This project is fully funded and construction is expected to start in 2013.[2]

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[2] Source: City of Richmond, www.ci.richmond.ca.us/index.aspx?NID=951

# 2.2 REGULATORY CONSIDERATIONS

## 2.2.1 RICHMOND GENERAL PLAN 2030

The Richmond General Plan 2030 Circulation Element contains the following goals, policies and actions that are relevant to the Project. The General Plan document contains more detailed descriptions of these goals, policies and actions; brief statements are provided below.

**Goal CR1 An Expanded Multimodal Circulation System.** Make conditions safer and more attractive for all modes of transportation including travel by foot and bicycle, public transit and automobiles. Evaluate streets and potential enhancements based on surrounding land use, street function and desired character and by relying on the place-based approach to circulation planning articulated in the General Plan. Take potential improvement measures ranging from physical design treatment of the street environment to social and programmatic responses appropriate to the particular street context.

*Policy CR1.1 Balanced Modes of Travel and Equitable Access.* Encourage multiple circulation options in the City and work with transit operators to ensure equitable access for all members of the community.

*Policy CR1.2 An Interconnected Street System.* Promote an interconnected system of streets that adequately serves current and future travel needs.

*Policy CR1.3 Local and Regional Transportation Linkages.* Enhance circulation linkages within the City and region.

*Policy CR1.4 Expanded and Affordable Public Transit.* Coordinate with regional transportation agencies and support enhanced and expanded public transit to improve mobility options for residents and visitors.

*Policy CR1.5 Safe and Convenient Walking and Bicycling.* Promote walking and bicycling as a safe and convenient mode of transportation.

*Policy CR1.6 Comprehensive Network of Multi-Use Trails.* Develop a comprehensive network of multi-use trails including to enhance bicycle and pedestrian connectivity throughout the City and the region.

*Policy CR1.8 Place-Based Circulation Approach.* Promote the place-based planning approach and classification system.

*Policy CR1.9 Place-Based Circulation Classification System and Multi-Modal Level of Service Standards.* Classify all streets in the City to conform to the Place-Based Circulation Classification System discussed in the Circulation Element of the General Plan and adopt multi-modal level of service (MMLOS) standards that are consistent with each street type's intended function and character.

*Policy CR1.10 Vehicular Level of Service Standards for West County Routes of Regional Significance.* Maintain vehicular level of service (LOS) standards for signalized intersections consistent with the Contra Costa Transportation Authority's (CCTA) West County Action Plan for Routes of Regional Significance.

Relevant Actions under Goal CR1: Actions CR1.A, B, C, D, E, J, L, and M.

**Goal CR2 Walkable Neighborhoods and Complete Streets.** Activate the public right-of-way and improve the experience of moving people between key destinations at the pedestrian level. In order to make walking and bicycling a more attractive options, enhance connectivity between neighborhoods, schools, the workplace, and daily goods and services so that reaching key destinations is safer and more convenient. Contribute to walkability and livability by promoting mixed-use and complete streets, high-quality pedestrian environments, context-based street design, and efficient public transit.

*Policy CR2.2 Complete Streets.* Promote mixed-use urban streets that balance public transit, walking and bicycling with other modes of travel.

*Policy CR2.3 Integrated Bicycle and Pedestrian System.* Plan, construct and maintain a safe, comprehensive and integrated bicycle and pedestrian system.

Relevant Actions under Goal CR2: Actions CR2.A, D, E and G.

**Goal CR3 A safe and well-maintained Circulation System.** In order to create a safe and efficient circulation system, emphasize on-going street maintenance and safety improvements that consider all modes of transportation including walking, bicycling, and public transit. Require new facilities and infrastructure as development occurs in order to meet the needs of all users while enhancing mobility and connectivity.

*Policy CR3.1 Safety and Accessibility.* Enhance safety and accessibility for pedestrians, bicyclists and transit riders.

*Policy CR3.3 Concurrent Infrastructure Development.* Require concurrent infrastructure development for new and redevelopment projects that may have a significant impact on the existing circulation system including streets, trails, sidewalks, bicycle paths and public transit.

Relevant Actions Under Goal CR3: Actions CR3.A, B, and C.

**Goal CR5 Sustainable and Green Practices.** In order to create sustainable and clean circulation options, encourage the use of low-impact alternative fuels and new technologies and implement transportation demand management programs. Encourage measures to treat and retain storm water in the design of pedestrian and parking amenities.

*Policy CR5.1 Transportation Demand Management.* Promote transportation demand management (TDM) strategies among residents and businesses to reduce reliance on automobiles.

*Policy CR5.2 Renewable Energy and Clean Technology.* Promote the use of renewable energy, including non-fossil fuels, and clean technology for transportation including public transit and goods movement.

*Policy CR5.3 Green Streets.* Promote the development of street design elements that incorporate natural storm water drainage and landscaping in new and retrofitted streets.

Relevant Actions Under Goal CR5: Actions CR5.A, B, C, E, and F.

### 2.2.2 RICHMOND BICYCLE MASTER PLAN

Consistent with the vision presented in the General Plan, the City of Richmond *Bicycle Master Plan* provides detailed action items to complete a bikeway system and supporting facilities in the City of Richmond. The Richmond *Bicycle Master Plan* contains the following four goals and objectives:

**Goal 1:** Expand the city’s bicycle routes and parking facilities into an extensive, well-connected and well-designed network, and improve and maintain these facilities over time.

> **Objective:** Increase the number of bikeway miles by 75 percent, complete all gaps in the Bay Trail and double the number of bicycle parking spaces.

**Goal 2:** Increase the number of people of all ages and backgrounds who bicycle for transportation, recreation and health.

> **Objective:** Double the number of trips made by bicycle.

**Goal 3**: Make the streets safer for bicyclists, not only during the day but also at night.

> **Objective:** Reduce the number of bicycle fatalities and injuries by 25 percent (even as the number of bicyclists increases).

**Goal 4:** Incorporate the needs and concerns of cyclists in all transportation and development projects.

**Objective**: Adopt, institutionalize and have relevant City departments implement a "Complete Streets" policy and bicycle-friendly design standards and guidelines for streets and developments.

### 2.2.3 RICHMOND PEDESTRIAN PLAN

Consistent with the vision presented in the General Plan, the City of Richmond *Pedestrian Plan* aims to improve the safety, convenience, and appeal of waking throughout the City of Richmond. The Richmond Pedestrian Plan contains the following goals:

**Increased Safety.** Streets will be developed and retrofitted to accommodate all types of users. Designs and devices will produce speed moderation, visibility, awareness and communication for motorists and non-motorists alike.

**Improved Security.** Streets, trails and other public spaces will be designed and improved to create active places that are watched over, maintained and that project a sense of control and community ownership.

**Improved Connectivity.** A range of strategies and solutions will address physical barriers to walking, such as dead-end streets, railroad right of ways, wide roadways, and wide, complex intersections.

**Increased Equity**. Walking, the cheapest form of transportation, will be a safe, viable and convenient choice for those who cannot afford, are unable, or choose not to drive a car.

**Improved Health.** Walking and bicycling, the healthiest forms of transportation, will become desirable alternatives for trips to daily destinations.

**Increased Sustainability**. Walking and bicycling in the city will reduce the number of vehicle miles Richmond residents and visitors travel, and will reduce associated climate change, air and water quality impacts from vehicle emissions. Opportunities will be identified to convert excess paved rights of way to lower impact spaces with trees and landscaping.

**Neighborhood and Downtown Revitalization.** Improvements to the streets and pedestrian realm will beautify the public realm and set the stage for new investment in private property that can help fund improvements and attract development that supports walking, bicycling and the use of transit.

## 2.3 PROJECT TRANSPORTATION CHARACTERISTICS

Phase 1 of the project, expected to be completed by 2018, would include up to six new buildings providing 600,000 total square feet of space. The Phase 1 buildings are expected to accommodate 1,000 new employees at the RBC. Phase 1 of the project would provide about 600 parking spaces in surface parking lots. Access to the site would continue to be provided at the current location on Meade Street at Seaver Avenue.

Campus buildout would include a total of 5.4 million square feet of space accommodating up to 10,000 employees. The buildout plan would also reroute Regatta Boulevard to the west and provide multiple access points on Meade Street, Regatta Boulevard, and South 46th Street. At buildout, the RBC is estimated to provide about 6,000 parking spaces mostly in parking structures.

Based on information provided in the Preliminary Project Description, various aspects of site and circulation are described in more detail below.

### 2.3.1 VEHICLE ACCESS AND CIRCULATION

Regional access to and from the RBC would continue to be provided through the existing interchanges on I-580. In the near-term, direct access to and from the RBC site would continue to be provided through the existing entry on Meade Street at Seaver Street. As the RBC is developed, additional entries on Meade Street to the north, Regatta Boulevard to the west, and South 46th Street to the east would also be provided. Currently, the LRDP envisions up to seven access points from Regatta Boulevard and Meade Street at buildout. These access points would either provide direct access to parking facilities for employees and visitors or provide service access for buildings throughout the campus.

The RBC site would also provide new internal roadways to provide direct access to each facility. Internal streets in the RBC would be generally designed to accommodate multiple travel modes with priority for pedestrians and bicycles with the intent that the majority of internal trips would be walk or bike trips. Internal streets accommodating automobiles would be designed for vehicles with low traveling speeds. The proposed RBC street network is further described below:

- Regatta Boulevard - As part of RBC buildout, Regatta Boulevard would be rerouted to the north and west to continue to provide east-west access through the South Shoreline area of Richmond, and internally connect eastern and western portions of the site and reduce automobile traffic within the RBC.

- Lark Drive – Lark Drive would form the main east-west roadway through the RBC and would connect Regatta Boulevard in the west to South 46th Street in the east. Although it would traverse the RBC site and provides through access, it would be designed to reduce automobile speeds and discourage through traffic. Lark Drive is expected to provide one automobile lane and a bicycle lane in each direction, with sidewalks on both sides of the street, and parking and/or automobile drop-off area at select locations.

- Peripheral Streets – Streets, such as 46th Street, connecting to Regatta Boulevard and Meade Street, would provide access to parking structures and other facilities throughout the RBC. These streets would provide bicycle lanes and sidewalks and may accommodate transit vehicles.
- Service Access Streets – These streets would allow service vehicles to access each individual building; however, they would restrict general automobile access. These streets would be designed to encourage pedestrian and bicycle use.

### 2.3.2 AUTOMOBILE PARKING

It is expected over time that the proposed Project would eliminate about 690 of the existing 760 automobile parking spaces in the RBC site's current surface parking lots. In the short term (including Phase 1), automobile parking would continue to be provided in surface parking lots. It is expected that about 600 parking spaces would be provided as part of Phase 1 development. As the RBC site develops, parking structures would be constructed to provide most of the 6,000 vehicle parking spaces estimated for the buildout of the RBC. The LRDP proposes to locate most of parking spaces in parking structures located on the periphery of the site, in order to provide a pedestrian-friendly vehicle-free central campus. Although parking is expected to be free in the early phases of development, a parking charge may be established as parking structures are developed.

### 2.3.3 BICYCLE CIRCULATION AND PARKING

The RBC site would accommodate bicycles internal to the site by providing on-site paths and on-street facilities that connect to existing and proposed bicycle network in City of Richmond and beyond, including the Bay Trail, located just south of the site. As previously discussed in section 2.1.5.1 and shown on Figure 2-5, the Richmond Bicycle Plan proposes bicycle facilities through the RBC site; the proposed LRDP is consistent with the Richmond Bicycle Plan by providing various facilities internal to the site that connect to existing and proposed bicycle facilities external to the site.

In addition, the RBC may provide a bike sharing system to allow for internal site circulation and travel to and from other nearby destinations.

RBC proposes to provide bicycle parking at a rate of at least one space per every five daily occupants, which corresponds to about 200 bicycle parking spaces at completion of Phase 1 and 2,000 spaces at buildout. New buildings would provide indoor secure bicycle parking, and amenities such as showers and lockers, in addition to outdoor bicycle racks.

### 2.3.4 PEDESTRIAN ACCESS AND CIRCULATION

The RBC would be designed so that walking is the primary travel mode for trips within the campus. All internal roadways would provide sidewalks; paths and walkways would connect buildings to parking structures, other roadways providing access to and from the site, and the Bay Trail. A central pedestrian "main street" corridor would provide pedestrian connection to most buildings in the eastern portion of the campus.

### 2.3.5 TRANSIT

The following two shuttle lines are proposed for the RBC:

- The LBNL-UC Berkeley-RBC Shuttle would provide a no-transfer 20-minute ride between LBNL and the RBC with a single stop at the main UC Berkeley campus.
- The BART-RBC Shuttle would operate continuously between the El Cerrito Plaza BART Station and the RBC, providing a nonstop nine-minute ride between BART and the RBC. This shuttle can also be used to access AC Transit buses at the El Cerrito Plaza BART Station.

As the RBC develops, these routes may be modified or additional routes may be added to serve other destinations. The RBC would provide shuttle stops throughout the campus to ensure minimal walking distance to and from each building. Shuttle stops would provide amenities such as shelters and benches.

### 2.3.6 TRANSPORTATION DEMAND MANAGEMENT

In addition to providing shuttle services and a potential bike sharing system, the University would also implement a Transportation Demand Management (TDM) program to encourage RBC employees to use transit, bicycling, walking, and carpooling for traveling to and from the site and reduce the number of automobile trips. Although the specific components of the TDM program are not known at this time, it would be similar to the program currently implemented at the LBNL site in Berkeley, and may include strategies such as subsidized or discounted transit passes, Guaranteed Ride Home, carpool matching, and flexible car share programs.

### 2.3.7 TRIP GENERATION

**Table 2-4** shows the estimated vehicle trip generation for RBC at Phase 1 and buildout. The trip generation estimates are derived from trip generation rates per average daily population observed at the existing LBNL site in Berkeley. The LBNL rates were developed based on vehicle counts at the LBNL gates in 2011 and the corresponding on-site population. For the RBC site, these trip rates were adjusted to reflect the differences between the two sites, most notably differences in transit availability, pedestrian and bicycle facilities, and proximity to residential and non-residential uses. The Contra Costa Transportation Authority (CCTA) and Alameda County Transportation Commission (ACTC) Travel Demand Models were used to estimate these effects, by comparing employment zone trip generation for the LBNL zone with employment trip generation in the RBC zone.

**TABLE 2-4**
**RICHMOND BAY CAMPUS**
**PROJECT VEHICLE TRIP GENERATION SUMMARY**

| | Average Daily Population | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total |
| Project Phase 1 [1] | 1,000 | 2,079 | 182 | 29 | 211 | 27 | 172 | 199 |
| Project Buildout [2] | 10,000 | 20,226 | 1,770 | 283 | 2,053 | 259 | 1,678 | 1,937 |

1. Based on following trip generation rates:
   Daily = 2.08 trips per Average Daily Population (ADP); AM Peak Hour = 0.21 trips per ADP (86% in, 14% out); PM Peak Hour = 0.20 trips per ADP (13% in, 87% out)
2. Based on following trip generation rates:
   Daily = 2.02 trips per ADP; AM Peak Hour = 0.20 trips per ADP (86% in, 14% out); PM Peak Hour = 0.19 trips per ADP (13% in, 87% out)

Source: Fehr & Peers, based on trip generation rate per average daily population at the existing LBNL site in Berkeley adjusted to reflect the different characteristics of the RBC.

The RBC LRDP Project would include a robust TDM program intended to reduce the vehicular trips generated by the Project. Since the specific components of the TDM program are not known and their effectiveness cannot be accurately measured, the trip generation used for this analysis assumes that the TDM program would be similar to the existing LBNL site. In addition, the trip generation estimate conservatively assumes that parking for both employees and site visitors would be free, similar to the existing LBNL site in Berkeley. If parking at RBC is not free, then fewer employees and visitors would drive to and from the site and reduce the project vehicle trip generation.

The buildout trip generation is estimated at a slightly lower rate than Phase 1, based on a projected economy of scale and more amenities provided on-site. It is estimated that the Project Buildout would generate about 20,230 daily automobile trips, 2,050 AM peak hour trips, and 1,940 PM peak hour trips.

## 2.3.8 TRIP DISTRIBUTION AND ASSIGNMENT

Trip distribution is defined as the directions of approach and departure that vehicles would use to arrive at and depart from the Project site. This assessment estimated the distribution of project trips based on existing travel patterns, location of complementary land uses, and results from the CCTA Travel Demand Model. **Figure 2-6** shows the resulting trip distribution. **Figures 2-7A and 2-7B** show the Project Phase 1 trip assignment at the study intersections, based on the distribution, and **Figures 2-8A and 2-8B** show the Project Buildout trip assignment.

## 2.3.9 EXISTING PLUS PHASE 1 PROJECT CONDITIONS

**Figures 2-9A and 2-9B** show the Existing Plus Phase 1 traffic volumes, which consist of traffic volumes under Existing conditions (Figures 2-2A and 2-2B) plus Phase 1 traffic assignment (Figures 2-7A and 2-7B). This analysis assumes no roadway modifications under this scenario.

### 2.3.9.1 Intersection Operations

**Table 2-5** summarizes intersection operations at the study intersections under the Existing Plus Phase 1 Project conditions. **Appendix B** provides the detailed calculation work sheets.

The addition of the Phase 1 Project traffic would not cause any of the intersections that currently operate at an acceptable LOS to degrade to an unacceptable LOS. At the one intersection currently operating below the LOS standard, Meeker Avenue/23rd Street/Marina Bay Parkway, the addition of project generated traffic would not change the overall v/c ratio. This is because the Project would add traffic to the north-south through movements at the intersection, which are not critical movements for purposes of overall intersection control delay calculation. Therefore, the Phase 1 Project would not cause a significant impact at this or other study intersections under Existing Plus Phase 1 Project conditions.

### 2.3.9.2 Freeway Operations

**Table 2-6** shows the freeway segment LOS results for the Existing Plus Phase 1 Project conditions. **Appendix C** provides the detailed calculation work sheets.


Figure 2-6.

## Richmond Bay Campus Project Trip Distribution

WC12-2953_2-6_TripDistro

FEHR & PEERS

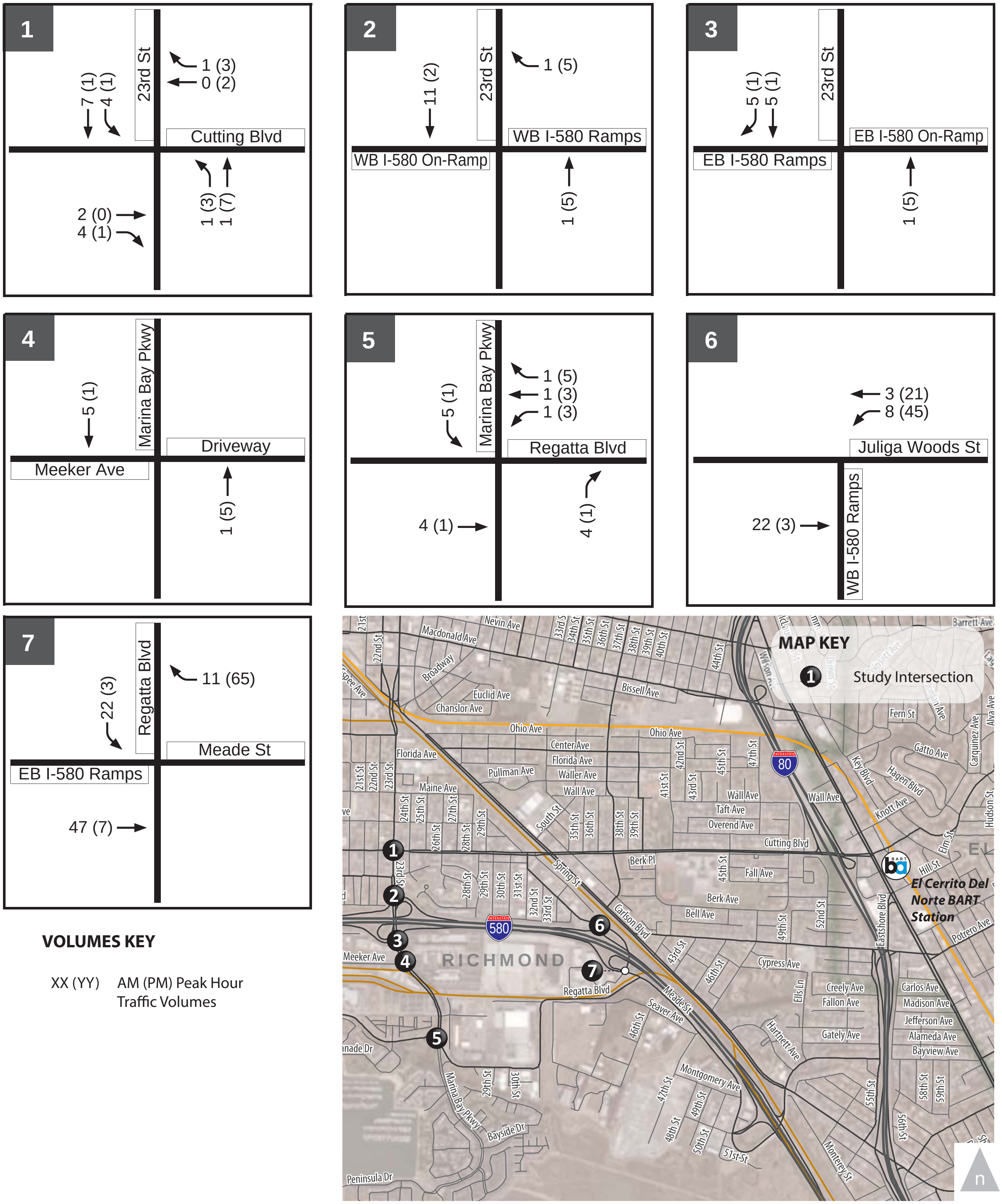



Figure 2-7A.

Richmond Bay Campus
Project Trip Assignment (Phase 1)

WC12-2953_2-7A_PTAPhase1

FEHR PEERS

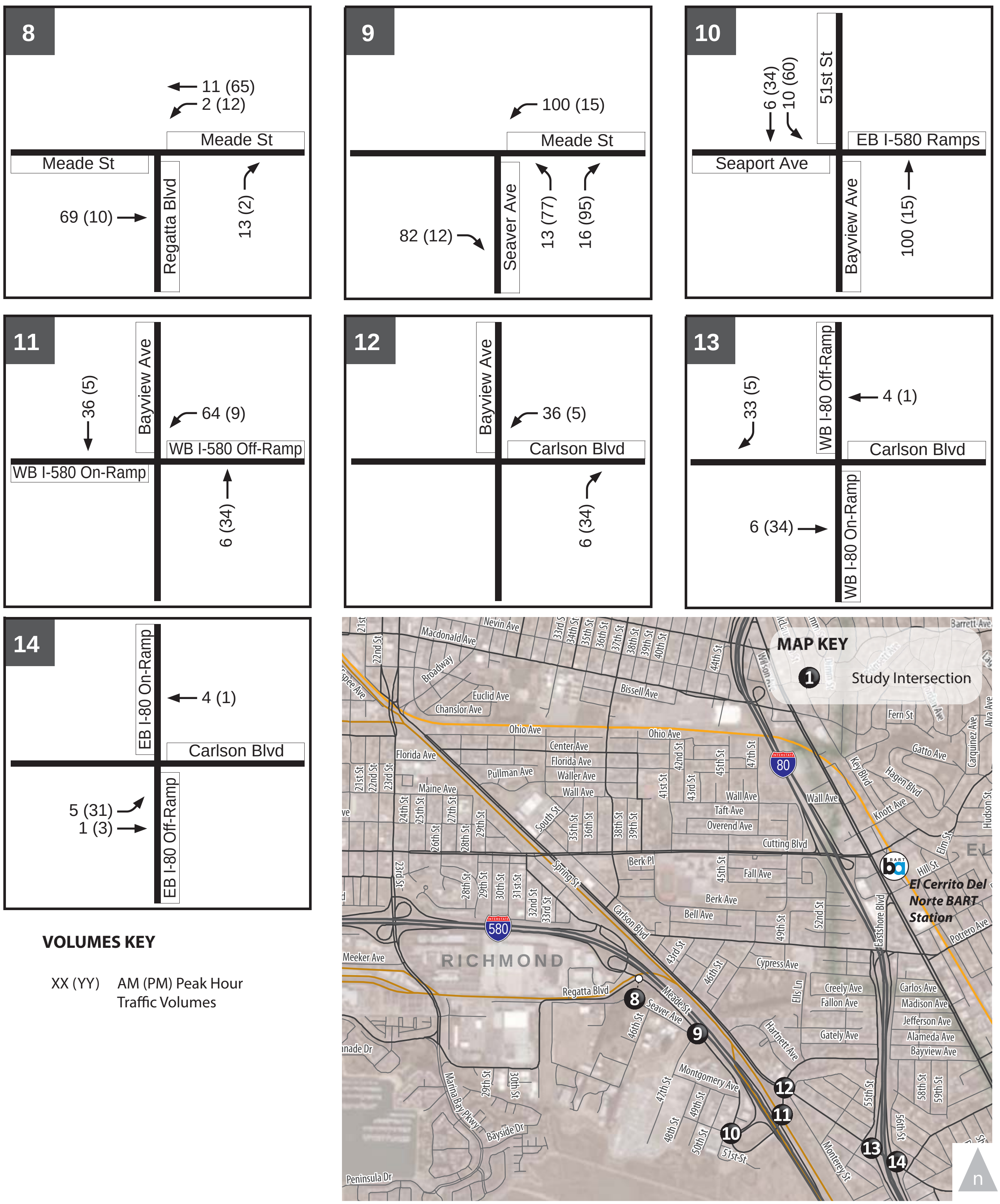



Figure 2-7B.

## Richmond Bay Campus
## Project Trip Assignment (Phase 1)

WC12-2953_2-7B_PTAPhase1

FEHR & PEERS

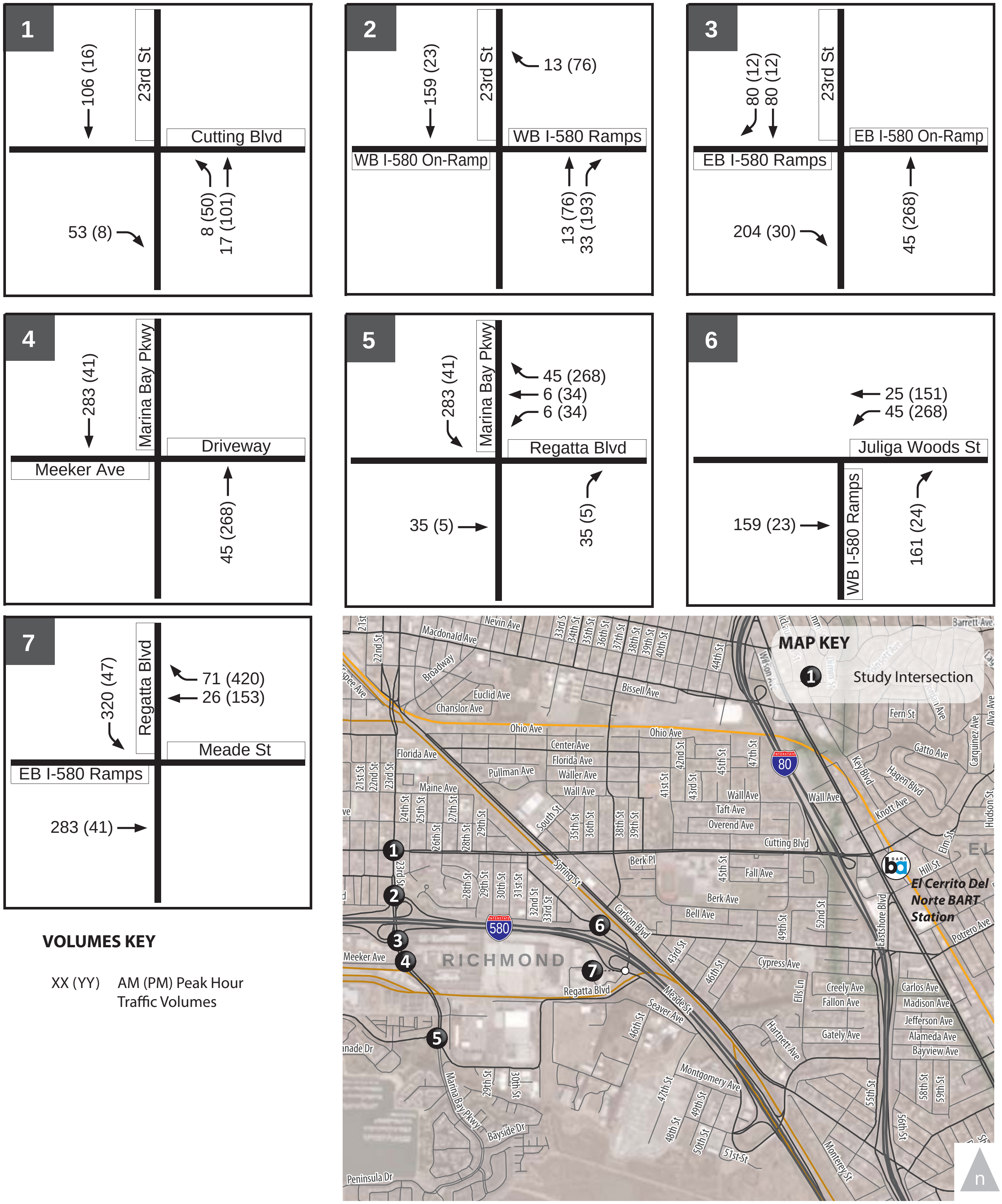



Figure 2-8A.

**Richmond Bay Campus**
**Project Trip Assignment (Buildout)**

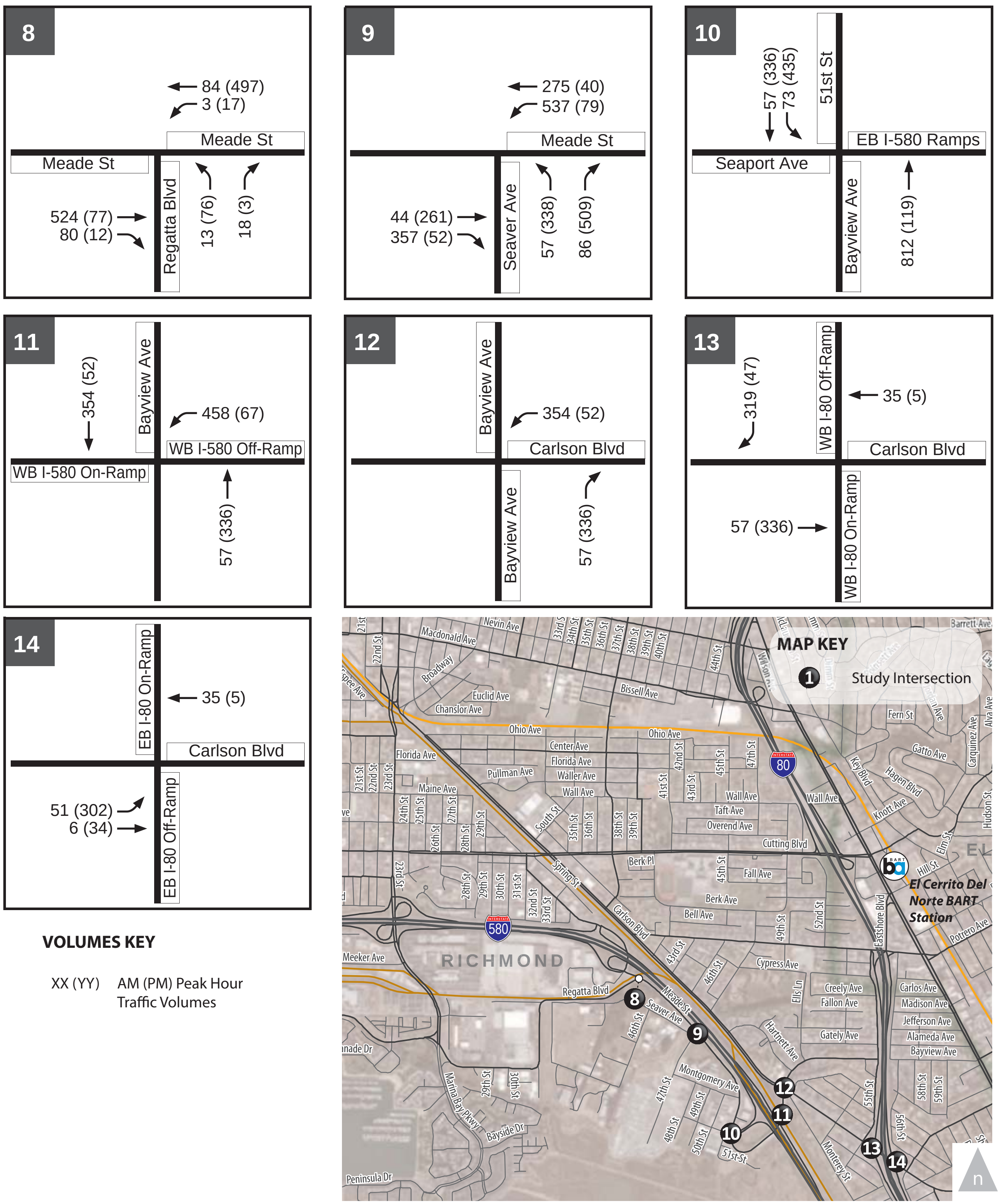



Figure 2-8B.

**Richmond Bay Campus**
**Project Trip Assignment (Buildout)**

WC12-2953_2-8B_PTABuildout

FEHR & PEERS

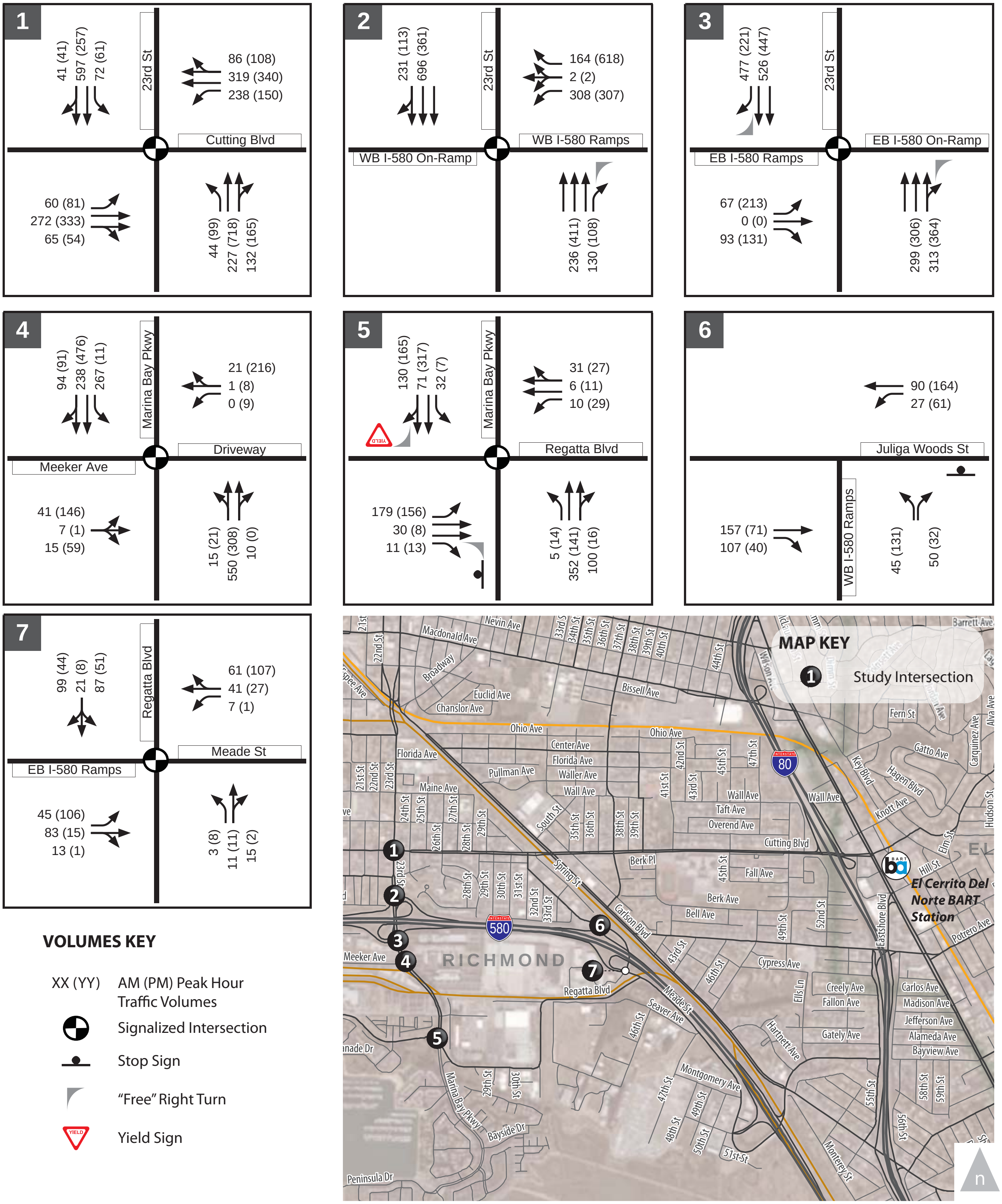



Figure 2-9A.

Richmond Bay Campus
Existing Plus Phase 1 Peak Hour Traffic Volumes

WC12-2953_2-9A_Ex+Ph1Vols

FEHR & PEERS

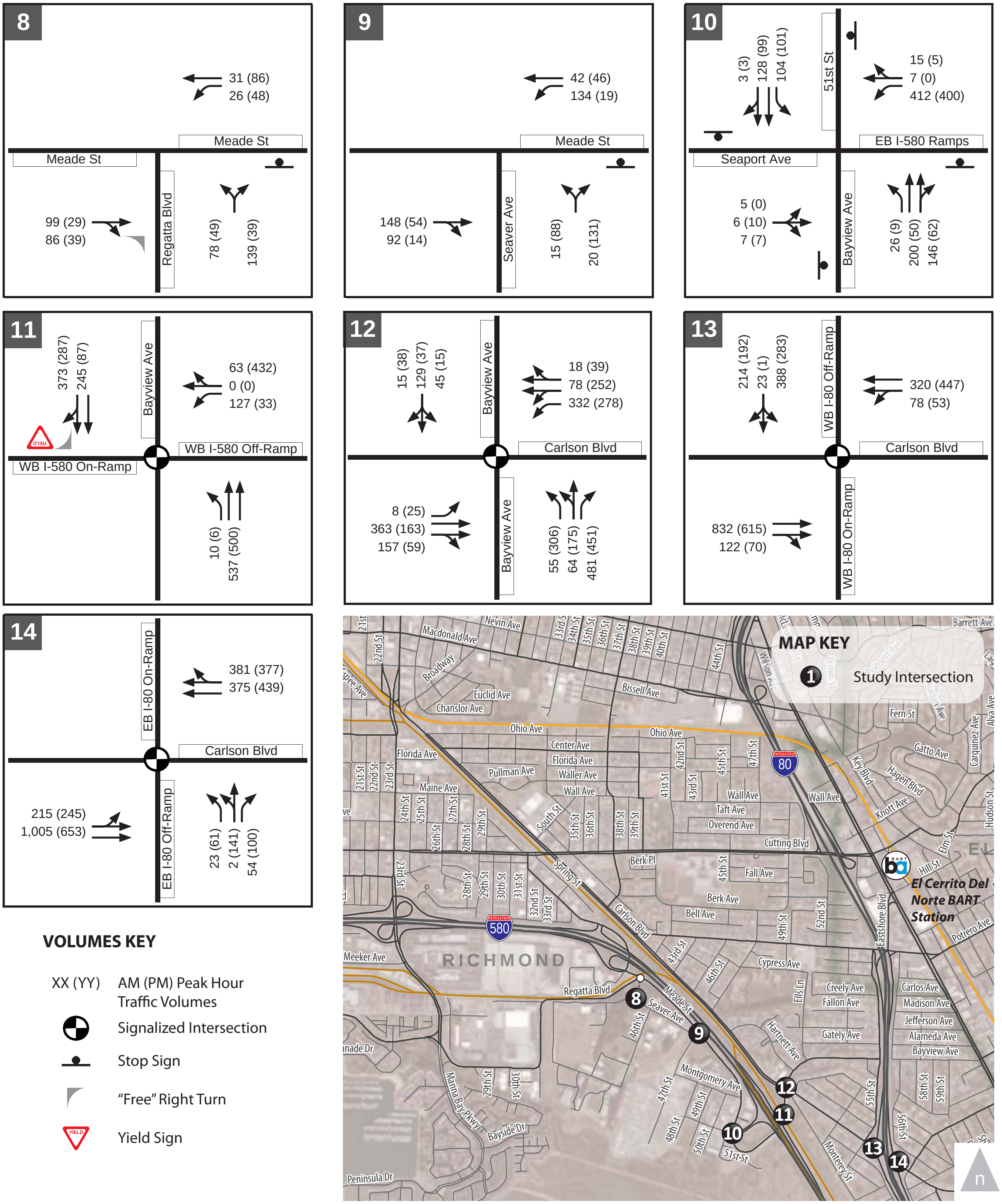



Figure 2-9B.

## Richmond Bay Campus
## Existing Plus Phase 1 Peak Hour Traffic Volumes

**TABLE 2-5**
**RICHMOND BAY CAMPUS**
**EXISTING PLUS PHASE 1 CONDITIONS – STUDY INTERSECTION LOS SUMMARY**

| Intersection | Traffic Control | Peak Hour | Existing | | Existing Plus Phase 1 Project | | Significant Impact? |
|---|---|---|---|---|---|---|---|
| | | | Delay[1] (seconds) | LOS[1] | Delay[1] (seconds) | LOS[1] | |
| 1. Cutting Boulevard/ 23rd Street | Signal | AM | 22.9 | C | 23.0 | C | No |
| | | PM | 23.0 | C | 23.1 | C | No |
| 2. I-580 Westbound Ramps/ 23rd Street | Signal | AM | 6.9 | A | 6.9 | A | No |
| | | PM | 6.8 | A | 6.9 | A | No |
| 3. I-580 Eastbound Ramps/ 23rd Street | Signal | AM | 3.6 | A | 3.6 | A | No |
| | | PM | 6.3 | A | 6.4 | A | No |
| 4. Meeker Avenue/23rd Street/ Marina Bay Pkwy | Signal | AM | 37.1 | D | 37.1 | D | No |
| | | PM | **115.8 (v/c=0.50)** | **F** | **115.8 (v/c=0.50)** | **F** | No |
| 5. Regatta Boulevard/ Marina Bay Parkway | Signal | AM | 30.0 | C | 39.8 | D | No |
| | | PM | 43.6 | D | 51.2 | D | No |
| 6. I-580 Westbound Ramps/ Juliga Woods Street | Side Street Stop | AM | 2.5 (10.0) | A (B) | 2.5 (10.3) | A (B) | No |
| | | PM | 4.4 (10.9) | A (B) | 5.0 (12.4) | A (B) | No |
| 7. I-580 Eastbound Ramps/ Regatta Blvd/Meade Street | Signal | AM | 9.7 | A | 10.8 | B | No |
| | | PM | 9.1 | A | 10.4 | B | No |
| 8. Meade Street/ Regatta Boulevard | Side Street Stop | AM | 6.4 (10.6) | A (B) | 6.4 (12.3) | A (B) | No |
| | | PM | 5.6 (10.0) | A (B) | 5.6 (10.0) | A (B) | No |
| 9. Meade Street/ Seaver Avenue | Side Street Stop | AM | 1.3 (9.7) | A (A) | 3.4 (11.9) | A (B) | No |
| | | PM | 3.0 (9.0) | A (A) | 7.2 (10.8) | A (B) | No |
| 10. Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue | All-way Stop | AM | 27.6 | D | 33.3 | D | No |
| | | PM | 20.0 | C | 22.9 | C | No |
| 11. I-580 Westbound Ramps/ Bayview Avenue | Signal | AM | 5.4 | A | 11.3 | B | No |
| | | PM | 6.7 | A | 7.0 | A | No |
| 12. Carlson Boulevard/ Bayview Avenue | Signal | AM | 27.0 | C | 27.5 | C | No |
| | | PM | 21.6 | C | 21.6 | C | No |
| 13. Carlson Boulevard/ I-80 Westbound Ramps | Signal | AM | 19.3 | B | 20.5 | C | No |
| | | PM | 20.0 | B | 19.4 | B | No |
| 14. Carlson Boulevard/ I-80 Eastbound Ramps | Signal | AM | 10.7 | B | 11.0 | B | No |
| | | PM | 9.8 | A | 9.8 | A | No |

Notes: **Bold** indicates an intersection operating at unacceptable LOS E or LOS F.
1. For signalized and all-way stop-controlled intersections, average intersection delay and LOS based on the 2000 HCM method is shown. For side-street stop-controlled intersections, delays for worst movement and average intersection delay are shown: intersection average (worst movement).

Source: Fehr & Peers.

**TABLE 2-6**
**RICHMOND BAY CAMPUS**
**EXISTING PLUS PHASE 1 CONDITIONS**
**FREEWAY SEGMENT LOS SUMMARY**

| Freeway Segment | Type[1] | Dir[2] | Existing No Project | | | | Existing Plus Phase 1 Project | | | | Significant Impact? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | | |
| | | | Density[3] | LOS | Density[3] | LOS | Density[3] | LOS | Density[3] | LOS | |
| 1. I-580 between Harbor Way and Marina Bay Pkwy | Weave | EB | N/A | A | N/A | A | N/A | A | N/A | A | No |
| | Weave | WB | N/A | A | N/A | A | N/A | A | N/A | A | No |
| 2. I-580 between Marina Bay Pkwy and Regatta Blvd | Weave | EB | N/A | A | N/A | A | N/A | A | N/A | A | No |
| | Weave | WB | N/A | A | N/A | A | N/A | A | N/A | A | No |
| 3. I-580 between Regatta Blvd and Bayview Ave | Weave | EB | N/A | A | N/A | A | N/A | A | N/A | A | No |
| | Weave | WB | N/A | A | N/A | A | N/A | A | N/A | A | No |
| 4. I-580 between Bayview Ave and Central Ave | Basic | EB | 15.4 | B | 14.0 | B | 15.4 | B | 14.4 | B | No |
| | Basic | WB | 14.3 | B | 16.9 | B | 14.7 | B | 16.9 | B | No |
| 5. I-580 between Central Ave and I-80 | Basic | EB | 23.5 | C | 28.7 | D | 23.6 | C | 29.3 | D | No |
| | Basic | WB | 25.0 | C | 22.6 | C | 25.5 | C | 22.6 | C | No |
| 6. I-80 between Carlson Blvd and Potrero Ave | Basic | EB | 21.3 | C | 27.3 | D | 21.3 | C | 27.5 | D | No |
| | Basic | WB | 29.5 | D | 24.0 | C | 29.7 | D | 24.0 | C | No |
| 7. I-80 at Gilman St Overpass | Basic | EB | 21.7 | C | 27.3 | D | 22.0 | C | 27.3 | D | No |
| | Basic | WB | 30.9 | D | 25.6 | C | 31.0 | D | 25.9 | C | No |

1. Segments with auxiliary lanes are classified as weave segments, and were analyzed based on the Leisch Method. Basic segments are analyzed as basic segments using the 2000 HCM methodologies.
2. EB = Eastbound; WB = Westbound
3. Density is presented in passenger cars per lane per mile (pc/ln/mi).

Source: Fehr & Peers.

The addition of the Phase 1 Project traffic would not cause any of the study freeway segments to operate at an unacceptable LOS. Therefore, the Phase 1 Project would not cause a significant impact at the study freeway segments under Existing Plus Phase 1 Project conditions.

## 2.3.10 EXISTING PLUS PROJECT BUILDOUT CONDITIONS

**Figures 2-10A and 2-10B** show the Existing Plus Project Buildout traffic volumes, which consist of traffic volumes under Existing conditions (Figures 2-2A and 2-2B) plus Project Buildout traffic assignment (Figures 2-8A and 2-8B). This analysis assumes no roadway modifications under this scenario.

### 2.3.10.1 Intersection Operations

**Table 2-7** summarizes intersection operations at the study intersections under the Existing Plus Project Buildout conditions. **Appendix B** provides the detailed calculation work sheets.

The addition of Project Buildout traffic would cause eight intersections to deteriorate from acceptable (LOS D or better) to unacceptable (LOS E or LOS F) conditions during one or both peak hours and would contribute to one intersection that currently operates at LOS F.

The addition of Project Buildout traffic would cause the side-street stop-controlled approach at the I-580 Westbound Ramps/Juliga Woods Street (Intersection 6) to degrade from LOS B to LOS F during the PM peak hour, and the side-street stop-controlled approach at the Meade Street/Regatta Boulevard (intersection 8) to degrade from LOS C to LOS F during the AM peak hour. However, these are not considered significant impacts because neither intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

The Project would cause a significant impact at seven intersections which are summarized under Impact 2-1 discussion.

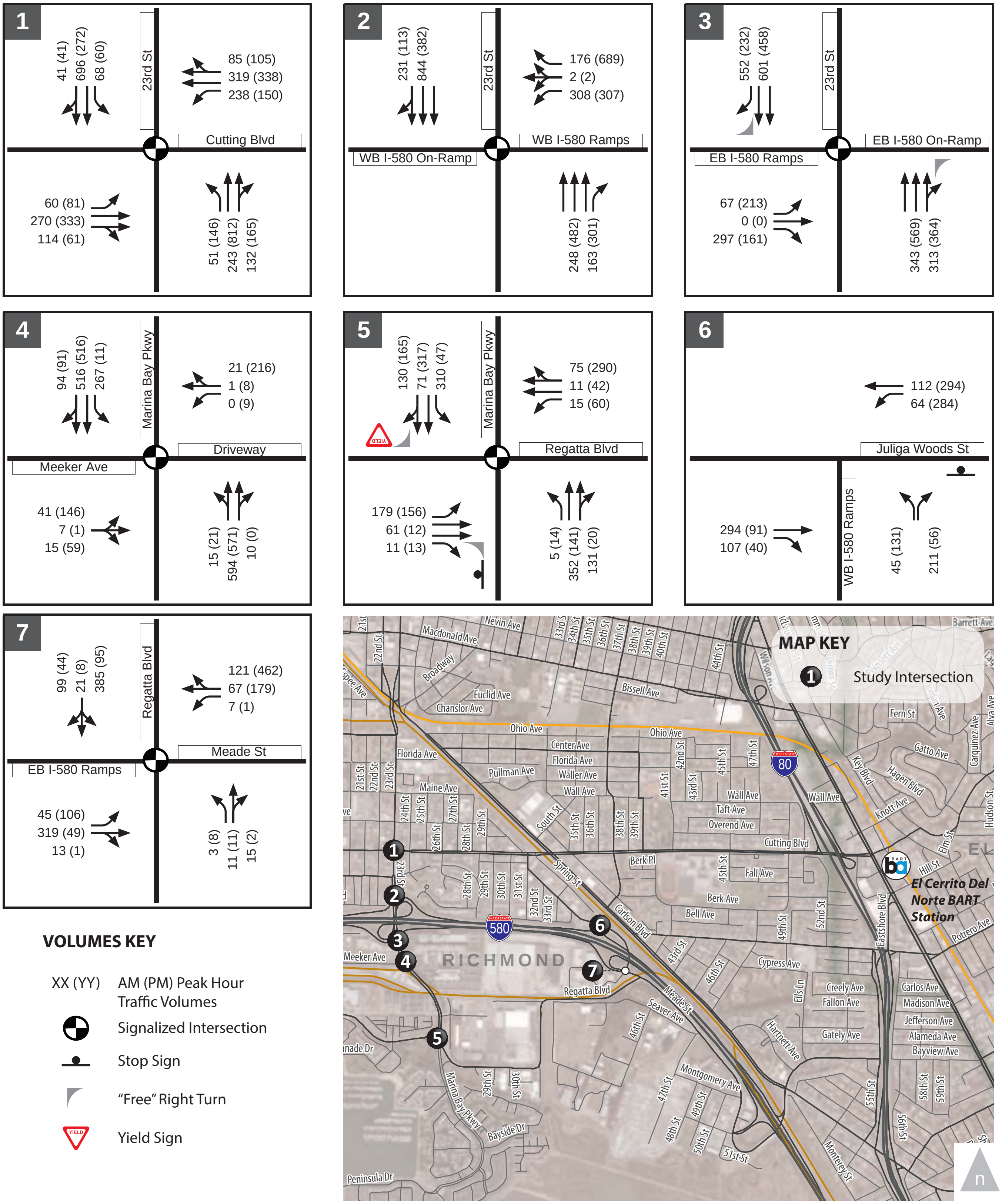



Figure 2-10A.

Richmond Bay Campus
Existing Plus Buildout Peak Hour Traffic Volumes

WC12-2953_2-10A_Ex+BuildoutVols

FEHR & PEERS

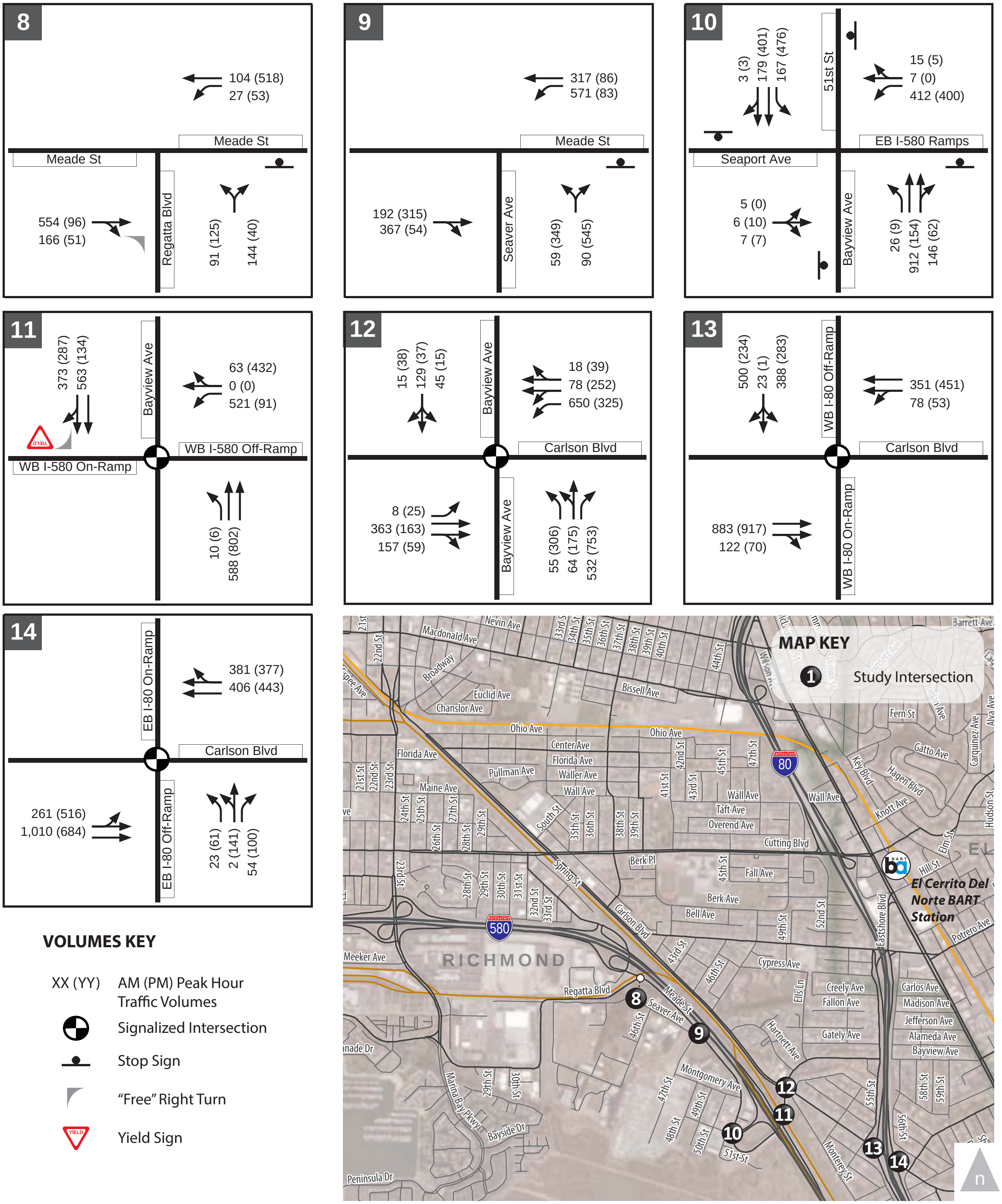



Figure 2-10B.

## Richmond Bay Campus
## Existing Plus Buildout Peak Hour Traffic Volumes

WC12-2953_2-10B_Ex+BuildoutVols

**TABLE 2-7**
**RICHMOND BAY CAMPUS**
**EXISTING PLUS BUILDOUT PROJECT CONDITIONS – STUDY INTERSECTION LOS SUMMARY**

| Intersection | Traffic Control | Peak Hour | Existing | | Existing Plus Buildout Project | | Significant Impact? |
|---|---|---|---|---|---|---|---|
| | | | Delay[1] (seconds) | LOS[1] | Delay[1] (seconds) | LOS[1] | |
| 1. Cutting Boulevard/ 23rd Street | Signal | AM | 22.9 | C | 25.3 | C | No |
| | | PM | 23.0 | C | 24.4 | C | No |
| 2. I-580 Westbound Ramps/ 23rd Street | Signal | AM | 6.9 | A | 7.1 | A | No |
| | | PM | 6.8 | A | 6.8 | A | No |
| 3. I-580 Eastbound Ramps/ 23rd Street | Signal | AM | 3.6 | A | 5.6 | A | No |
| | | PM | 6.3 | A | 6.7 | A | No |
| 4. Meeker Avenue/23rd Street/ Marina Bay Pkwy | Signal | AM | 37.1 | D | 37.1 | D | No |
| | | PM | **115.8 (v/c=0.50)** | **F** | **>120 (v/c=0.59)** | **F** | **Yes** |
| 5. Regatta Boulevard/ Marina Bay Parkway | Signal | AM | 30.0 | C | **>120 (v/c=0.64)** | **F** | **Yes** |
| | | PM | 43.6 | D | **69.3** | **E** | **Yes** |
| 6. I-580 Westbound Ramps/ Juliga Woods Street | Side Street Stop | AM | 2.5 (10.0) | A (A) | 4.7 (13.1) | A (B) | No |
| | | PM | 4.4 (10.9) | A (B) | 12.3 (**46.2**) | B (**E**) | No |
| 7. I-580 Eastbound Ramps/ Regatta Boulevard/ Meade Street | Signal | AM | 9.7 | A | **>120 (v/c=1.03)** | **F** | **Yes** |
| | | PM | 9.1 | A | 19.5 | B | No |
| 8. Meade Street/ Regatta Boulevard | Side Street Stop | AM | 6.4 (10.6) | A (B) | 18.2 (82.9) | C (**F**) | No |
| | | PM | 5.6 (10.0) | A (B) | 4.4 (21.4) | A (C) | No |
| 9. Meade Street/ Seaver Avenue | Side Street Stop | AM | 1.3 (9.7) | A (A) | **>120 (>120)** | **F (F)** | **Yes** |
| | | PM | 3.0 (9.0) | A (A) | **>120 (>120)** | **F (F)** | **Yes** |
| 10. Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue | All-way Stop | AM | 27.6 | D | **60.2** | **F** | **Yes** |
| | | PM | 20.0 | C | **49.4** | **E** | **Yes** |
| 11. I-580 Westbound Ramps/ Bayview Avenue | Signal | AM | 5.4 | A | **>120 (v/c=1.02)** | **F** | **Yes** |
| | | PM | 6.7 | A | **109.1 (v/c=0.52)** | **F** | **Yes** |
| 12. Carlson Boulevard/ Bayview Avenue | Signal | AM | 27.0 | C | 34.7 | C | No |
| | | PM | 21.6 | C | 22.5 | C | No |

**TABLE 2-7**
**RICHMOND BAY CAMPUS**
**EXISTING PLUS BUILDOUT PROJECT CONDITIONS – STUDY INTERSECTION LOS SUMMARY**

| Intersection | Traffic Control | Peak Hour | Existing | | Existing Plus Buildout Project | | Significant Impact? |
|---|---|---|---|---|---|---|---|
| | | | Delay[1] (seconds) | LOS[1] | Delay[1] (seconds) | LOS[1] | |
| 13. Carlson Boulevard/ I-80 Westbound Ramps | Signal | AM | 19.3 | B | **77.7** | **E** | **Yes** |
| | | PM | 20.0 | B | 20.0 | B | No |
| 14. Carlson Boulevard/ I-80 Eastbound Ramps | Signal | AM | 10.7 | B | 14.6 | B | No |
| | | PM | 9.8 | A | 14.1 | B | No |

Notes: **Bold** indicates an intersection operating at unacceptable LOS E or LOS F.
1. For signalized and all-way stop-controlled intersections, average intersection delay and LOS based on the 2000 HCM method is shown. For side-street stop-controlled intersections, delays for worst movement and average intersection delay are shown: intersection average (worst movement).

Source: Fehr & Peers.

## IMPACT 2-1: EXISTING PLUS PROJECT BUILDOUT CONDITIONS INTERSECTION OPERATIONS

The buildout of the RBC would cause significant impacts at the following seven intersections under Existing Plus Buildout conditions:

A. The Project would cause a significant impact at the signalized **Meeker Avenue/23rd Street/Marina Bay Parkway** (Intersection 4) because it would increase v/c ratio by more than 0.01 during the PM peak hour at an intersection operating at LOS F regardless of the Project.

B. The Project would cause a significant impact at the signalized **Regatta Boulevard/ Marina Bay Parkway** (Intersection 5) because it would deteriorate intersection operations from LOS C to LOS F during the AM peak hour and from LOS D to LOS E during the PM peak hour.

C. The Project would cause a significant impact at the signalized **I-580 Eastbound Ramps/ Regatta Boulevard/Meade Street** (Intersection 7) because it would deteriorate intersection operations from LOS A to LOS F during the AM peak hour.

D. The Project would cause a significant impact at the side-street stop-controlled **Meade Street/Seaver Avenue** (Intersection 9) because it would deteriorate operations for the side-street stop-controlled approach from LOS A to LOS F during both AM and PM peak hours and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

E. The Project would cause a significant impact at the all-way stop-controlled **Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue** (Intersection 10) because it would deteriorate intersection operations from LOS D to LOS F during the AM peak hour and from LOS C to LOS E during the PM peak hour. In addition, the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

F. The Project would cause a significant impact at the signalized **I-580 Westbound Ramps/ Bayview Avenue** (Intersection 11) because it would deteriorate intersection operations from LOS A to LOS F during both AM and PM peak hours.

G. The Project would cause a significant impact at the signalized **Carlson Boulevard/I-80 Westbound Ramps** (Intersection 13) because it would deteriorate intersection operations from LOS B to LOS E during the AM peak hour.

**Mitigation Measure 2-1:** Implement the following:

A. **Meeker Avenue/23rd Street/Marina Bay Parkway** (Intersection 4): Implement the following which requires coordination with City of Richmond:

- Convert the eastbound approach to provide one left-turn lane and one through-right lane
- Convert signal operations for the eastbound and westbound approaches from split phasing to protected left-turn phasing.
- Optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would improve to LOS C during both AM and PM peak hours after implementation of these improvements. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

B. **Regatta Boulevard/Marina Bay Parkway** (Intersection 5): Implement the following which requires coordination with City of Richmond:

- Optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would improve to LOS D during the AM peak hour after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

C. **I-580 Eastbound Ramps/Regatta Boulevard/Meade Street** (Intersection 7): Implement the following which requires coordination with City of Richmond and Caltrans:

- Optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would improve to LOS D during the AM peak hour after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

D. **Meade Street/Seaver Avenue** (Intersection 9): Implement the following which requires coordination with City of Richmond:

- Install an actuated signal at the intersection with protected/permitted phasing for the westbound left-turn movement.
- Convert the northbound approach to provide one left-turn lane and one right-turn lane.

The intersection would improve to LOS C during the AM peak hour and LOS B during the PM peak hour after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

E. **Seaport Avenue/I-580 Eastbound Ramps/Bayview Avenue** (Intersection 10): Implement the following which requires coordination with City of Richmond and Caltrans:

- Install an actuated signal at the intersection with protected phasing for the northbound and southbound left-turn movements.
- Convert the southbound approach to provide two left-turn lanes and one shared right-turn/through lane.

The intersection would improve to LOS C during both AM and PM peak hours after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

F. **I-580 Westbound Ramps/Bayview Avenue** (Intersection 11): Implement the following which requires coordination with City of Richmond and Caltrans:

- Optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would improve to LOS C during the AM peak hour and LOS B during the PM peak hour after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

G. **Carlson Boulevard/I-80 Westbound Ramps** (Intersection 13): Implement the following which requires coordination with City of Richmond and Caltrans:

- Optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would improve to LOS D during the AM peak hour after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

#### 2.3.10.2 Freeway Operations

**Table 2-8** shows the freeway segment LOS results for the Existing Plus Project Buildout conditions. **Appendix C** provides the detailed calculation work sheets.

**TABLE 2-8**
**RICHMOND BAY CAMPUS**
**EXISTING PLUS BUILDOUT PROJECT CONDITIONS**
**FREEWAY SEGMENT LOS SUMMARY**

| Freeway Segment | Type[1] | Dir[2] | Existing No Project | | | | Existing Plus Buildout Project | | | | Significant Impact? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | | |
| | | | Density[3] | LOS | Density[3] | LOS | Density[3] | LOS | Density[3] | LOS | |
| 1. I-580 between Harbor Way and Marina Bay Pkwy | Weave | EB | N/A | A | N/A | A | N/A | A | N/A | A | No |
| | Weave | WB | N/A | A | N/A | A | N/A | A | N/A | A | No |
| 2. I-580 between Marina Bay Pkwy and Regatta Blvd | Weave | EB | N/A | A | N/A | A | N/A | B | N/A | A | No |
| | Weave | WB | N/A | A | N/A | A | N/A | A | N/A | B | No |
| 3. I-580 between Regatta Blvd and Bayview Ave | Weave | EB | N/A | A | N/A | A | N/A | A | N/A | A | No |
| | Weave | WB | N/A | A | N/A | A | N/A | A | N/A | A | No |
| 4. I-580 between Bayview Ave and Central Ave | Basic | EB | 15.4 | B | 14.0 | B | 16.0 | B | 17.4 | B | No |
| | Basic | WB | 14.3 | B | 16.9 | B | 17.9 | B | 17.4 | B | No |
| 5. I-580 between Central Ave and I-80 | Basic | EB | 23.5 | C | 28.7 | D | 24.4 | C | 37.0 | E | No |
| | Basic | WB | 25.0 | C | 22.6 | C | 31.7 | D | 23.4 | C | No |
| 6. I-80 between Carlson Blvd and Potrero Ave | Basic | EB | 21.3 | C | 27.3 | D | 21.6 | C | 29.4 | D | No |
| | Basic | WB | 29.5 | D | 24.0 | C | 32.2 | D | 24.3 | C | No |
| 7. I-80 at Gilman St Overpass | Basic | EB | 21.7 | C | 27.3 | D | 24.4 | C | 27.7 | D | No |
| | Basic | WB | 30.9 | D | 25.6 | C | 31.6 | D | 28.6 | D | No |

1. Segments with auxiliary lanes are classified as weave segments, and were analyzed based on the Leisch Method. Basic segments are analyzed as basic segments using the 2000 HCM methodologies.
2. EB = Eastbound; WB = Westbound
3. Density is presented in passenger cars per lane per mile (pc/ln/mi).

Source: Fehr & Peers.

The addition of Project Buildout traffic would not cause any study freeway segment to operate at an unacceptable LOS F. Therefore, Project Buildout would not cause a significant impact at the study freeway segments under Existing Plus Project Buildout conditions.

# 2.4 NEAR-TERM (2018) ANALYSIS

This section summarizes traffic operations under Near-Term (2018) No Project and Near-Term (2018) Plus Phase 1 Project conditions. Project Buildout conditions were not analyzed because no RBC development beyond Phase 1 would occur in 2018.

## 2.4.1 NEAR-TERM (2018) NO PROJECT CONDITIONS

The Near-Term (2018) No Project traffic volumes were developed by interpolating between the existing volumes (Figure 2-2) and the projected 2035 volumes (Figure 2-13), which were prepared using the CCTA Countywide Travel Demand Model and described in Section 2.5. **Figures 2-11A and 2-11B** show the Near-Term (2018) No Project traffic volumes.

The Near-Term (2018) No Project scenario assumes that signal timing parameters at the signalized study intersections would be optimized to reflect typical signal timing updates due to changing traffic flow over time. No other roadway modifications are assumed in the study area under the Near-Term (2018) No Project scenario.

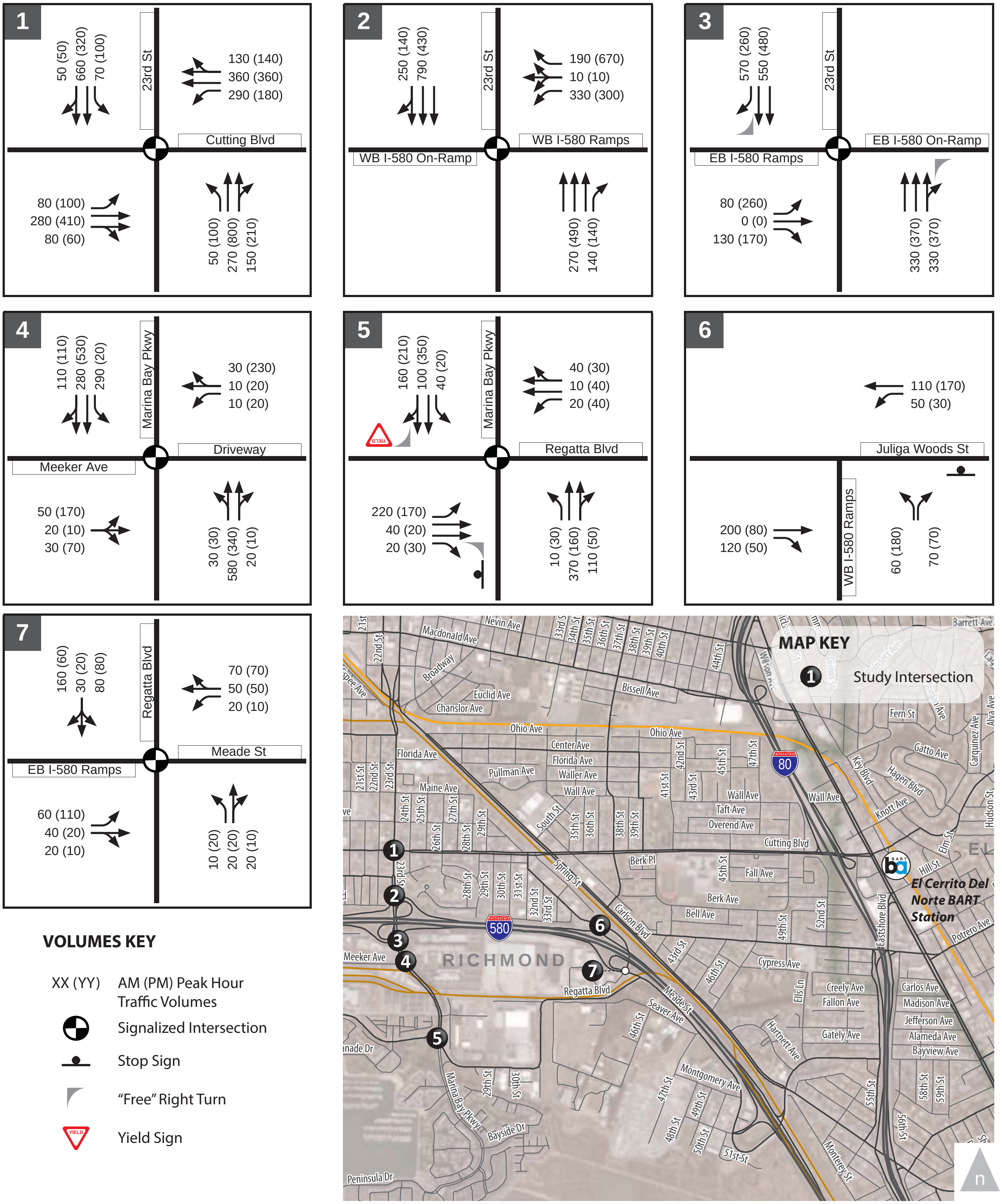
### 2.4.1.1 Intersection Operations

**Table 2-9** summarizes the Near-Term (2018) No Project intersection LOS analysis results. **Appendix B** provides the detailed calculation work sheets.

All study intersections would continue to operate at LOS D or better, except Meeker Avenue/23rd Street/Marina Bay Parkway intersection, which would continue to operate at LOS F with additional delay during the PM peak hour.

### 2.4.1.2 Freeway Operations

**Table 2-10** summarizes the AM and PM peak hour freeway LOS analysis results under Near-Term (2018) No Project conditions. **Appendix C** provides the detailed calculation work sheets. All freeway segments are projected to continue to operate at LOS D or better during both AM and PM peak hours.




## Figure 2-11A.

**Richmond Bay Campus**
**Near-Term (2018) No Project Peak Hour Traffic Volumes**

WC12-2953_2-11A_NT2018NPVols

FEHR & PEERS

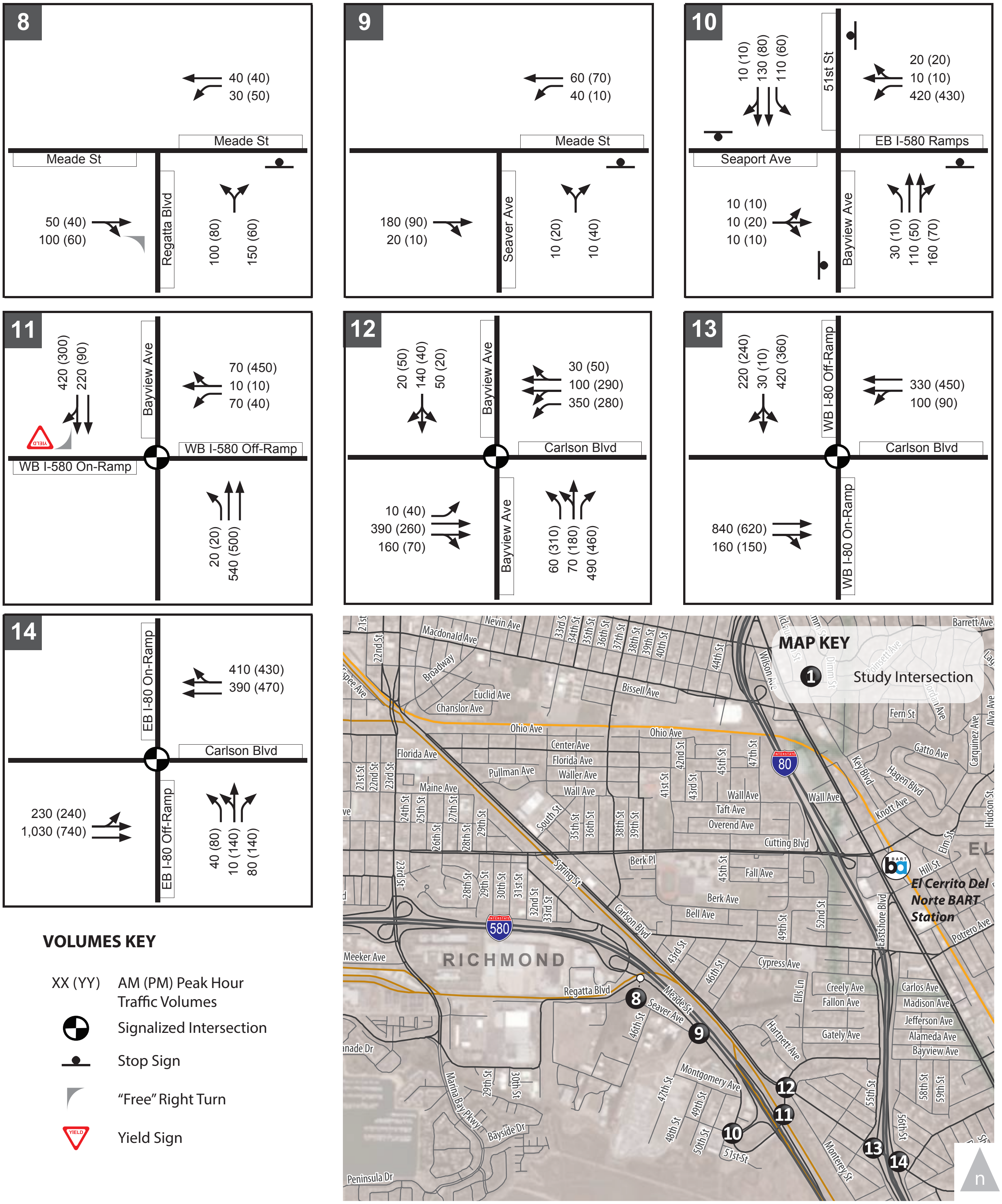



Figure 2-11B.

Richmond Bay Campus
Near-Term (2018) No Project Peak Hour Traffic Volumes

WC12-2953_2-11B_NT2018NPVols

FEHR PEERS

**TABLE 2-9**
**RICHMOND BAY CAMPUS**
**NEAR-TERM (2018) CONDITIONS – STUDY INTERSECTION LOS SUMMARY**

| Intersection | Traffic Control | Peak Hour | Near-Term (2018) No Project Delay[1] (seconds) | Near-Term (2018) No Project LOS[1] | Near-Term (2018) Plus Phase 1 Project Delay[1] (seconds) | Near-Term (2018) Plus Phase 1 Project LOS[1] | Significant Impact? |
|---|---|---|---|---|---|---|---|
| 1. Cutting Boulevard/ 23rd Street | Signal | AM | 24.4 | C | 24.9 | C | No |
| | | PM | 24.5 | C | 24.6 | C | No |
| 2. I-580 Westbound Ramps/ 23rd Street | Signal | AM | 7.3 | A | 7.3 | A | No |
| | | PM | 7.5 | A | 7.5 | A | No |
| 3. I-580 Eastbound Ramps/ 23rd Street | Signal | AM | 4.2 | A | 4.2 | A | No |
| | | PM | 6.5 | A | 6.5 | A | No |
| 4. Meeker Avenue/23rd Street/ Marina Bay Pkwy | Signal | AM | 40.0 | D | 40.0 | D | No |
| | | PM | **148.5 (v/c=0.54)** | **F** | **148.5 (v/c=0.54)** | **F** | No |
| 5. Regatta Boulevard/ Marina Bay Parkway | Signal | AM | 22.0 | C | 22.0 | C | No |
| | | PM | 15.1 | B | 15.5 | B | No |
| 6. I-580 Westbound Ramps/ Juliga Woods Street | Side Street Stop | AM | 3.1 (11.2) | A (B) | 3.1 (11.6) | A (B) | No |
| | | PM | 5.5 (12.0) | A (B) | 6.3 (14.0) | A (B) | No |
| 7. I-580 Eastbound Ramps/ Regatta Blvd/Meade Street | Signal | AM | 11.1 | B | 12.1 | B | No |
| | | PM | 11.1 | B | 11.1 | B | No |
| 8. Meade Street/ Regatta Boulevard | Side Street Stop | AM | 6.6 (11.5) | A (B) | 6.6 (12.9) | A (B) | No |
| | | PM | 5.5 (10.4) | A (B) | 5.5 (11.1) | A (B) | No |
| 9. Meade Street/ Seaver Avenue | Side Street Stop | AM | 1.6 (10.3) | A (B) | 3.3 (12.5) | A (B) | No |
| | | PM | 2.7 (9.4) | A (A) | 6.3 (11.1) | A (B) | No |
| 10. Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue | All-way Stop | AM | 27.2 | D | 32.6 | D | No |
| | | PM | 20.8 | C | 23.8 | C | No |
| 11. I-580 Westbound Ramps/ Bayview Avenue | Signal | AM | 5.6 | A | 7.0 | A | No |
| | | PM | 8.6 | A | 8.9 | A | No |
| 12. Carlson Boulevard/ Bayview Avenue | Signal | AM | 28.6 | C | 29.2 | C | No |
| | | PM | 24.5 | C | 24.6 | C | No |
| 13. Carlson Boulevard/ I-80 Westbound Ramps | Signal | AM | 20.4 | C | 21.9 | C | No |
| | | PM | 15.9 | B | 16.0 | B | No |
| 14. Carlson Boulevard/ I-80 Eastbound Ramps | Signal | AM | 12.9 | B | 13.3 | B | No |
| | | PM | 12.2 | B | 12.2 | B | No |

Notes: **Bold** indicates an intersection operating at unacceptable LOS E or LOS F.
1. For signalized and all-way stop-controlled intersections, average intersection delay and LOS based on the 2000 HCM method is shown. For side-street stop-controlled intersections, delays for worst movement and average intersection delay are shown: intersection average (worst movement).

Source: Fehr & Peers.

| **TABLE 2-10**<br>**RICHMOND BAY CAMPUS**<br>**NEAR-TERM (2018) CONDITIONS – FREEWAY SEGMENT LOS SUMMARY** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Freeway Segment** | **Type[1]** | **Dir[2]** | **Near-Term (2018) No Project** | | | | **Near-Term (2018) Plus Phase 1 Project** | | | | **Significant Impact?** |
| | | | **AM Peak Hour** | | **PM Peak Hour** | | **AM Peak Hour** | | **PM Peak Hour** | | |
| | | | **Density[3]** | **LOS** | **Density[3]** | **LOS** | **Density[3]** | **LOS** | **Density[3]** | **LOS** | |
| 1. I-580 between Harbor Way and Marina Bay Pkwy | Weave | EB | N/A | A | N/A | B | N/A | A | N/A | B | No |
| | Weave | WB | N/A | A | N/A | A | N/A | A | N/A | A | No |
| 2. I-580 between Marina Bay Pkwy and Regatta Blvd | Weave | EB | N/A | A | N/A | B | N/A | B | N/A | B | No |
| | Weave | WB | N/A | B | N/A | A | N/A | B | N/A | A | No |
| 3. I-580 between Regatta Blvd and Bayview Ave | Weave | EB | N/A | B | N/A | B | N/A | B | N/A | B | No |
| | Weave | WB | N/A | B | N/A | A | N/A | B | N/A | A | No |
| 4. I-580 between Bayview Ave and Central Ave | Basic | EB | 17.8 | B | 17.1 | B | 17.9 | B | 17.4 | B | No |
| | Basic | WB | 17.3 | B | 18.6 | C | 17.6 | B | 18.7 | C | No |
| 5. I-580 between Central Ave and I-80 | Basic | EB | 26.1 | D | 32.8 | D | 26.2 | D | 33.7 | D | No |
| | Basic | WB | 29.1 | D | 24.0 | C | 29.8 | D | 24.1 | C | No |
| 6. I-80 between Carlson Blvd and Potrero Ave | Basic | EB | 22.9 | C | 28.2 | D | 22.9 | C | 28.5 | D | No |
| | Basic | WB | 31.4 | D | 25.3 | C | 31.7 | D | 25.4 | C | No |
| 7. I-80 at Gilman St Overpass | Basic | EB | 23.0 | C | 28.4 | D | 23.2 | C | 28.4 | D | No |
| | Basic | WB | 32.1 | D | 26.3 | D | 32.2 | D | 26.6 | D | No |

1. Segments with auxiliary lanes are classified as weave segments, and were analyzed based on the Leisch Method. Basic segments are analyzed as basic segments using the 2000 HCM methodologies.
2. EB = Eastbound; WB = Westbound
3. Density is presented in passenger cars per lane per mile (pc/ln/mi).

Source: Fehr & Peers.

## 2.4.2 NEAR-TERM (2018) PLUS PHASE 1 PROJECT CONDITIONS

**Figures 2-12A and 2-12B** show the Near-Term (2018) Plus Phase 1 Project traffic volumes which consist of traffic volumes under Near-Term (2018) No Project conditions (Figures 2-11A and 2-11B) plus Phase 1 traffic assignment (Figures 2-7A and 2-7B).

### 2.4.2.1 Intersection Operations

**Table 2-9** summarizes intersection operations at the study intersections under the Near-Term (2018) Plus Phase 1 Project conditions. **Appendix B** provides the detailed calculation work sheets.

The addition of the Phase 1 Project traffic would not cause any of the study intersections that currently operate at an acceptable LOS to degrade to an unacceptable LOS under Near-Term (2018) conditions. At the one intersection that would operate below the LOS standard regardless of the Project, Meeker Avenue/23rd Street/Marina Bay Parkway, the addition of project generated traffic would not change the overall v/c ratio. Therefore, the Phase 1 Project would not cause a significant impact at this or other study intersections under Near-Term (2018) Plus Phase 1 Project conditions.

### 2.4.2.2 Freeway Operations

**Table 2-10** shows the freeway segment LOS results for the Near-Term (2018) Plus Phase 1 Project conditions. **Appendix C** provides the detailed calculation work sheets.

The addition of the Phase 1 Project traffic would not cause any of the study freeway segments to operate at an unacceptable LOS. Therefore, the Phase 1 Project would not cause a significant impact at the study freeway segments under Near-Term (2018) Plus Phase 1 Project conditions.

# 2.5 CUMULATIVE (2035) ANALYSIS

This section summarizes traffic operations under Cumulative (2035) No Project and Cumulative (2035) Plus Project Buildout conditions.

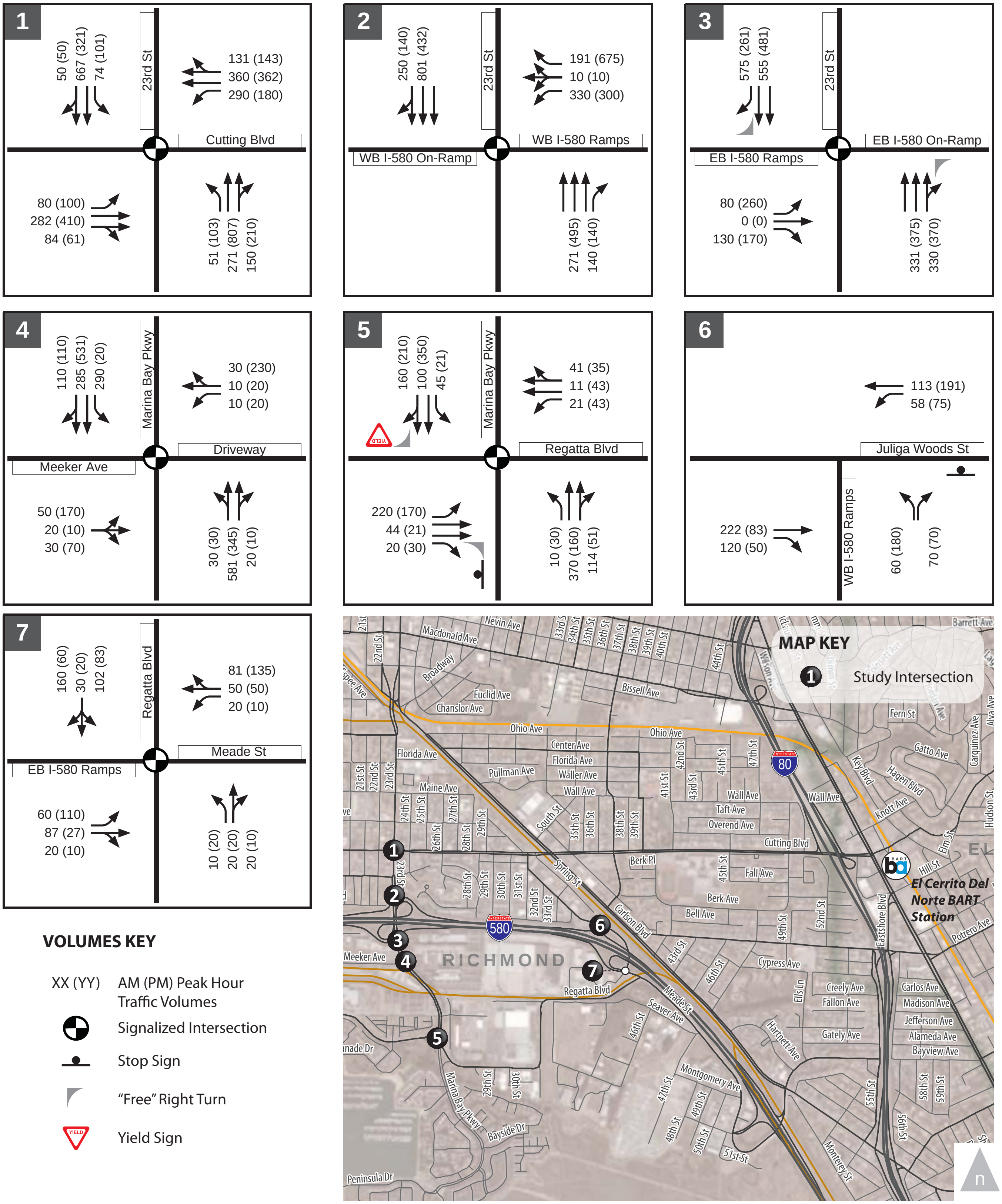



Figure 2-12A.

## Richmond Bay Campus
## Near-Term (2018) Plus Phase 1 Peak Hour Traffic Volumes

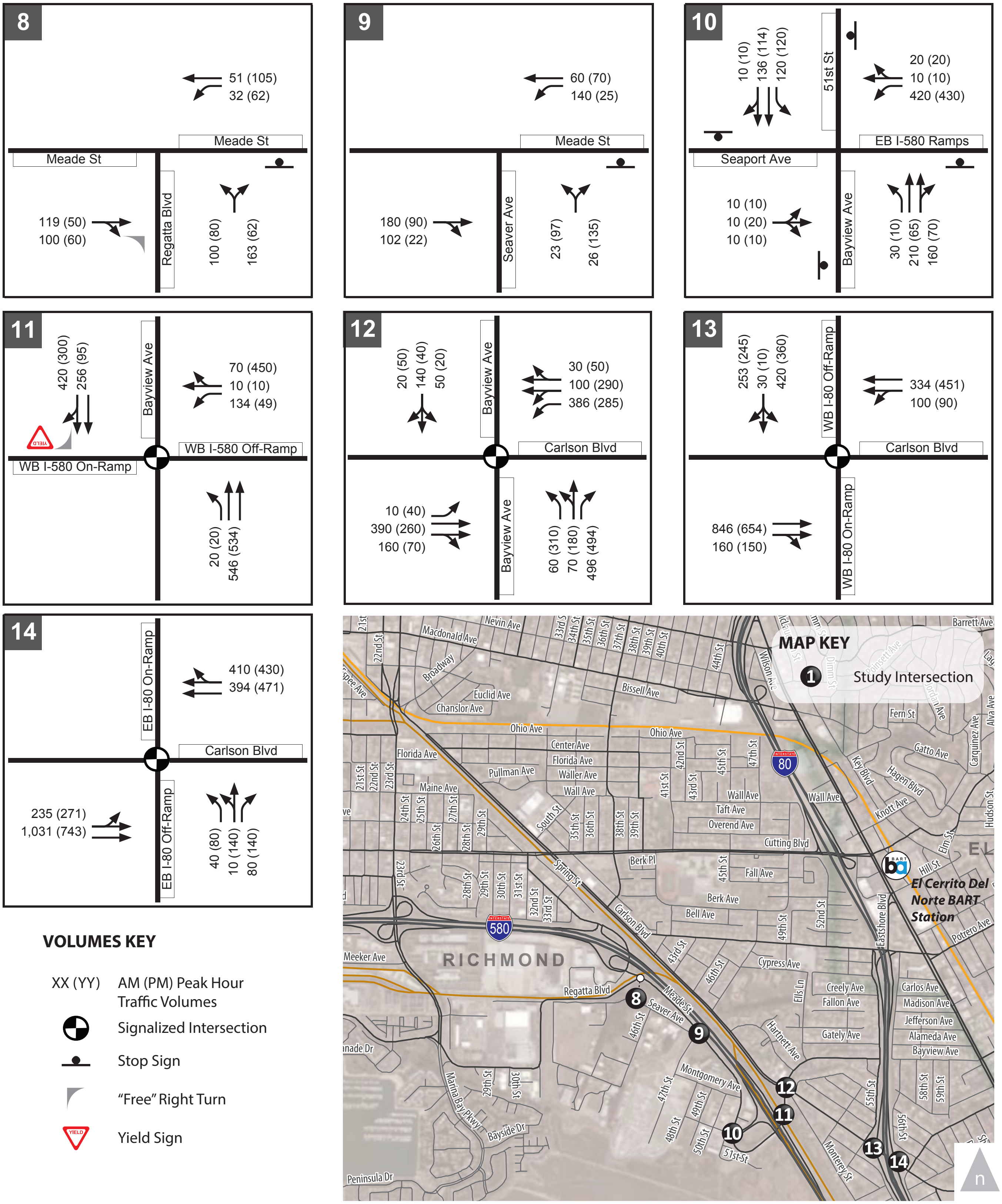



Figure 2-12B.

## Richmond Bay Campus
## Near-Term (2018) Plus Phase 1 Peak Hour Traffic Volumes

WC12-2953_2-12B_NT2018+Ph1Vols

FEHR & PEERS

### 2.5.1 CUMULATIVE (2035) NO PROJECT CONDITIONS

Traffic forecasts to the year 2035 were developed based on the results of the CCTA Countywide Travel Demand Model. The most recent version of the CCTA Model, which reflects assumptions in residential and non-residential land use growth consistent with the Association of Bay Area Governments (ABAG) *Projections 2007,* served as the basis for developing AM and PM peak hour intersection turning movement forecasts for the year 2035. The Model land use database was checked to ensure the land use growth in Richmond is consistent with the recently adopted *General Plan 2030*. Consistent with CCTA's *Technical Procedures* (2006), the forecasting process involved running the 2010 and 2035 models and using the model produced volumes and existing turning movement count data, to estimate year 2035 intersection turn movements using the Furness[3] method. The 2035 model run did not assume any growth at the RBC site. **Figures 2-13A and 2-13B** shows the Cumulative (2035) No Project traffic volumes.

The Cumulative (2035) No Project scenario assumes that signal timing parameters at the signalized study intersections would be optimized to reflect typical signal timing updates due to changing traffic flow over several years. No other roadway modifications are assumed in the study area under the Cumulative (2035) No Project scenario.

#### 2.5.1.1 Intersection Operations

**Table 2-11** summarizes the Cumulative (2035) No Project intersection LOS analysis results. **Appendix B** provides the detailed calculation work sheets.

The delay at all study intersections would increase in comparison to Existing and Near-Term (2018) conditions. All study intersections would continue to operate at LOS D or better, except Meeker Avenue/ 23rd Street/Marina Bay Parkway intersection, which would continue to operate at LOS F during the PM peak hour.

#### 2.5.1.2 Freeway Operations

**Table 2-12** summarizes the AM and PM peak hour freeway LOS analysis results under Cumulative (2035) No Project conditions. **Appendix C** provides the detailed calculation work sheets.

All freeway segments are projected to continue to operate at LOS E or better during both AM and PM peak hours, except I-580 between Central Avenue and I-80 which would operate at LOS F in the eastbound direction during the PM peak hour.

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[3] Furnessing is an iterative process that develops future turning movements by applying the difference between the base model volumes and the existing counts to future model approach and departure volumes.

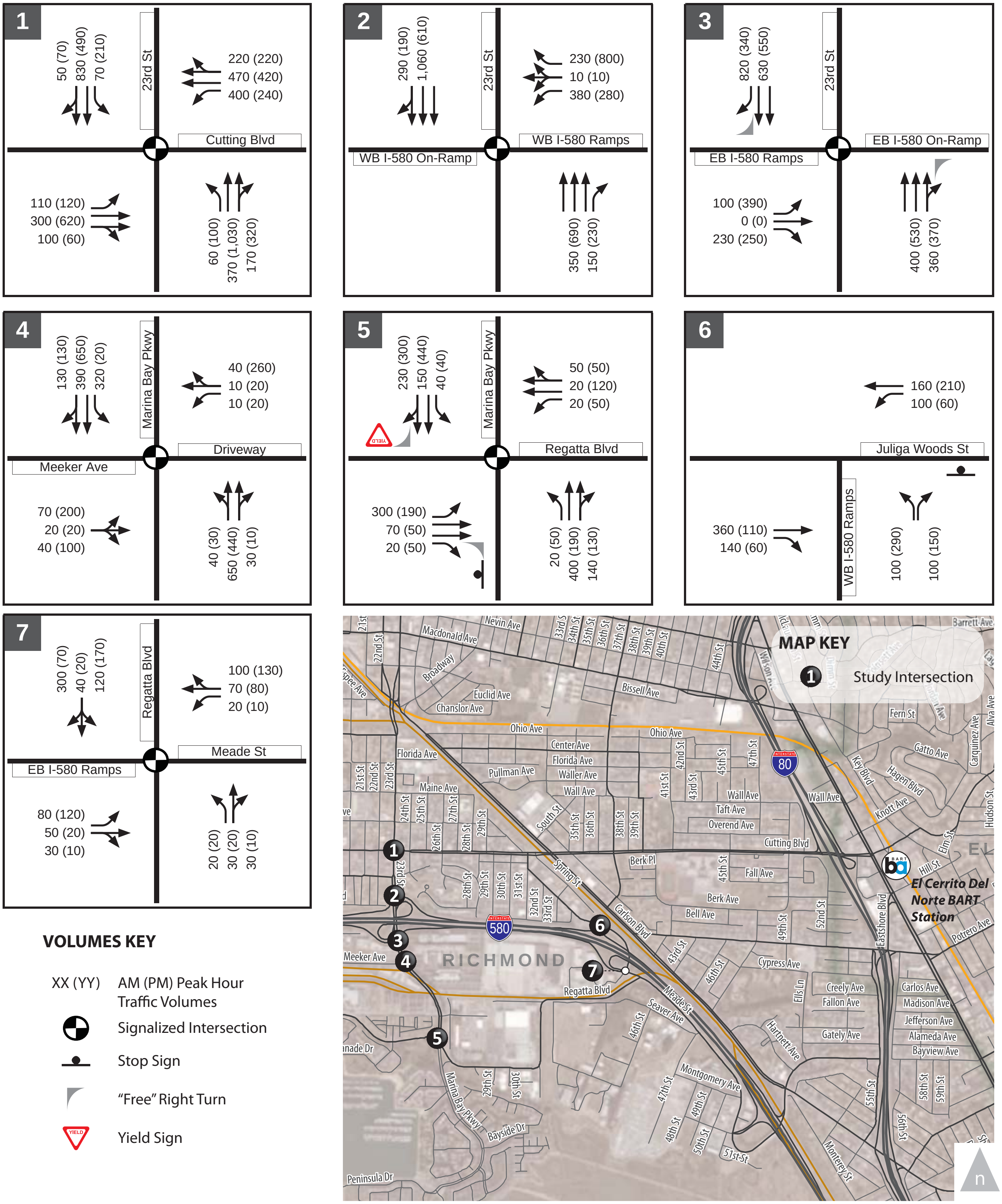


Figure 2-13A.

Richmond Bay Campus
Cumulative (2035) No Project Peak Hour Traffic Volumes

WC12-2953_2-13A_Cumu2035NPVols

FEHR & PEERS

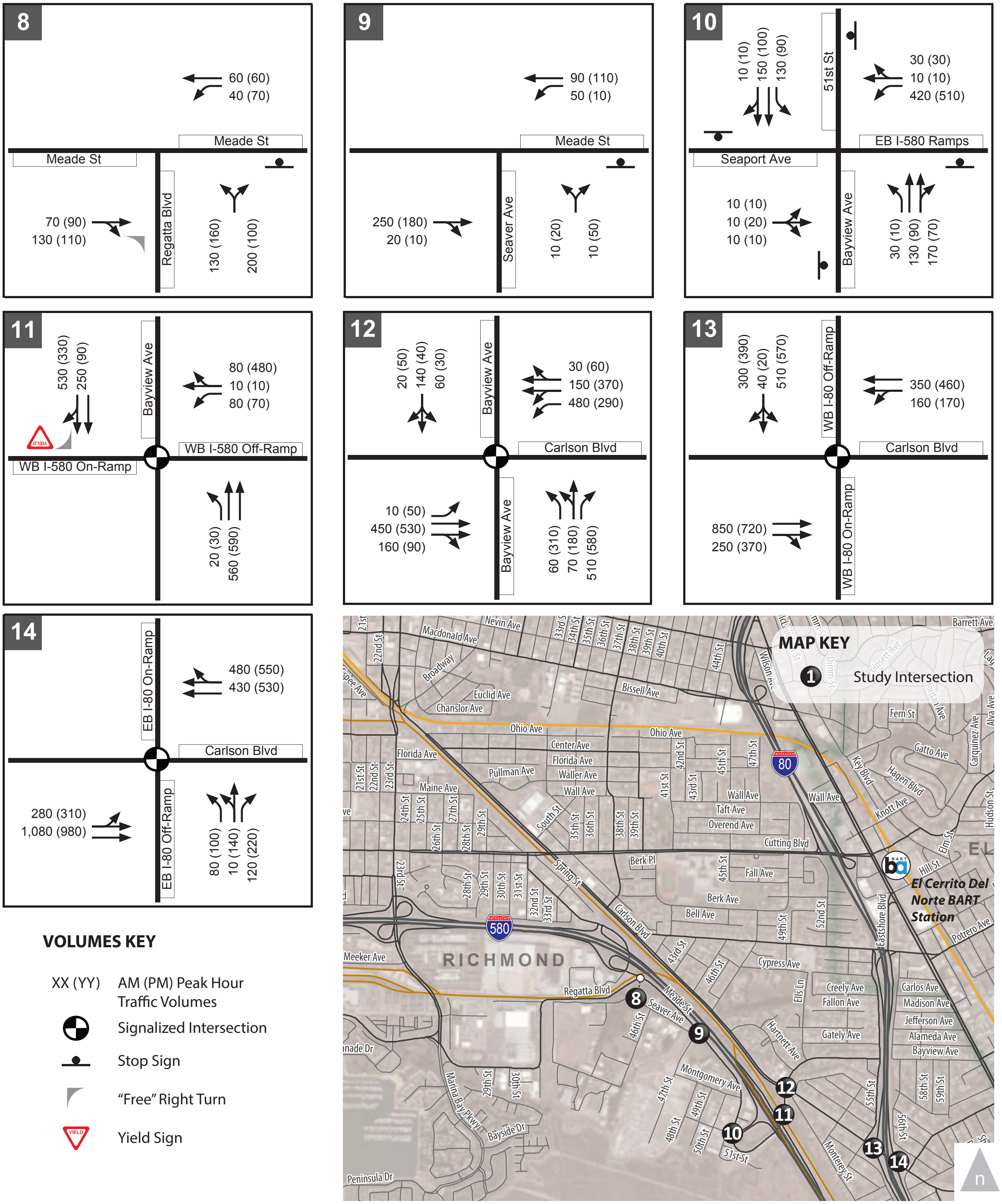


Figure 2-13B.

Richmond Bay Campus
Cumulative (2035) No Project Peak Hour Traffic Volumes

WC12-2953_2-13B_Cumu2035NPVols

**TABLE 2-11**
**RICHMOND BAY CAMPUS**
**CUMULATIVE (2035) CONDITIONS – STUDY INTERSECTION LOS SUMMARY**

| Intersection | Traffic Control | Peak Hour | Cumulative (2035) No Project | | Cumulative (2035) Plus Buildout Project | | Significant Impact? |
|---|---|---|---|---|---|---|---|
| | | | Delay[1] (seconds) | LOS[1] | Delay[1] (seconds) | LOS[1] | |
| 1. Cutting Boulevard/ 23rd Street | Signal | AM | 32.8 | C | 36.6 | D | No |
| | | PM | 43.3 | D | 46.1 | D | No |
| 2. I-580 Westbound Ramps/ 23rd Street | Signal | AM | 8.4 | A | 8.6 | A | No |
| | | PM | 9.4 | A | 9.8 | A | No |
| 3. I-580 Eastbound Ramps/ 23rd Street | Signal | AM | 4.8 | A | 7.7 | A | No |
| | | PM | 7.8 | A | 8.8 | A | No |
| 4. Meeker Avenue/23rd Street/ Marina Bay Pkwy | Signal | AM | **61.4** | **E** | **61.4** | **E** | No |
| | | PM | **>120 (v/c=0.65)** | **F** | **>120 (v/c=0.75)** | **F** | **Yes** |
| 5. Regatta Boulevard/ Marina Bay Parkway | Signal | AM | 28.2 | C | 35.0 | C | No |
| | | PM | 17.4 | B | 20.9 | C | No |
| 6. I-580 Westbound Ramps/ Juliga Woods Street | Side Street Stop | AM | 4.5 (17.0) | A (C) | 8.3 (27.1) | A (D) | No |
| | | PM | 9.5 (18.0) | A (C) | **>120 (>120)** | **F (F)** | **Yes** |
| 7. I-580 Eastbound Ramps/ Regatta Boulevard/ Meade Street | Signal | AM | 17.8 | B | 54.9 | D | No |
| | | PM | 13.8 | B | 41.9 | D | No |
| 8. Meade Street/ Regatta Boulevard | Side Street Stop | AM | 7.5 (13.5) | A (B) | **46.3 (>120)** | **E (F)** | **Yes** |
| | | PM | 7.2 (14.3) | A (B) | 47.6 **(>120)** | E **(F)** | **Yes** |
| 9. Meade Street/ Seaver Avenue | Side Street Stop | AM | 1.5 (11.2) | A (B) | **>120 (>120)** | **F (F)** | **Yes** |
| | | PM | 2.1 (10.2) | A (B) | **>120 (>120)** | **F (F)** | **Yes** |
| 10. Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue | All-way Stop | AM | 30.9 | D | **59.8** | **F** | **Yes** |
| | | PM | **39.3** | **E** | **50.2** | **F** | **Yes** |
| 11. I-580 Westbound Ramps/ Bayview Avenue | Signal | AM | 6.6 | A | 25.7 | C | No |
| | | PM | 10.7 | B | 13.6 | B | No |
| 12. Carlson Boulevard/ Bayview Avenue | Signal | AM | 33.6 | C | 43.2 | D | No |
| | | PM | 30.6 | C | 49.1 | D | No |
| 13. Carlson Boulevard/ I-80 Westbound Ramps | Signal | AM | 43.6 | D | **97.9 (v/c=1.21)** | **F** | **Yes** |
| | | PM | **58.1** | **E** | **79.4** | **E** | **Yes** |

**TABLE 2-11**
**RICHMOND BAY CAMPUS**
**CUMULATIVE (2035) CONDITIONS – STUDY INTERSECTION LOS SUMMARY**

| Intersection | Traffic Control | Peak Hour | Cumulative (2035) No Project | | Cumulative (2035) Plus Buildout Project | | Significant Impact? |
|---|---|---|---|---|---|---|---|
| | | | Delay[1] (seconds) | LOS[1] | Delay[1] (seconds) | LOS[1] | |
| 14. Carlson Boulevard/ I-80 Eastbound Ramps | Signal | AM | 13.3 | B | 23.7 | C | No |
| | | PM | 14.6 | B | 49.0 | D | No |

Notes: **Bold** indicates an intersection operating at unacceptable LOS E or LOS F.
1. For signalized and all-way stop-controlled intersections, average intersection delay and LOS based on the 2000 HCM method is shown. For side-street stop-controlled intersections, delays for worst movement and average intersection delay are shown: intersection average (worst movement).

Source: Fehr & Peers.

## 2.5.2 CUMULATIVE (2035) PLUS PROJECT BUILDOUT CONDITIONS

**Figures 2-14A and 2-14B** shows the Cumulative (2035) Plus Project Buildout volumes, which consist of traffic volumes under Cumulative (2035) No Project conditions (Figures 2-13A and 2-13B) plus Project Buildout traffic assignment (Figures 2-8A and 2-8B). This analysis assumes no roadway modifications under this scenario compared to the Cumulative (2035) No Project conditions.

### 2.5.2.1 Intersection Operations

**Table 2-11** summarizes intersection operations at the study intersections under the Cumulative (2035) Plus Project Buildout conditions. **Appendix B** provides the detailed calculation work sheets.

The addition of Project Buildout traffic would cause six intersections to either deteriorate from acceptable (LOS D or better) to unacceptable (LOS E or LOS F) conditions or contribute to already unacceptable conditions during one or both peak hours.

The Project would cause a significant impact at six intersections which are summarized under Impact 2-2 discussion.

**TABLE 2-12**
**RICHMOND BAY CAMPUS**
**CUMULATIVE (2035) CONDITIONS – FREEWAY SEGMENT LOS SUMMARY**

| Freeway Segment | Type[1] | Dir[2] | Cumulative (2035) No Project | | | | Cumulative (2035) Plus Project Buildout | | | | Significant Impact? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | | |
| | | | Density[3] | LOS | Density[3] | LOS | Density[3] | LOS | Density[3] | LOS | |
| 1. I-580 between Harbor Way and Marina Bay Pkwy | Weave | EB | N/A | A | N/A | C | N/A | B | N/A | C | No |
| | Weave | WB | N/A | C | N/A | A | N/A | C | N/A | A | No |
| 2. I-580 between Marina Bay Pkwy and Regatta Blvd | Weave | EB | N/A | B | N/A | C | N/A | B | N/A | C | No |
| | Weave | WB | N/A | C | N/A | B | N/A | C | N/A | C | No |
| 3. I-580 between Regatta Blvd and Bayview Ave | Weave | EB | N/A | C | N/A | C | N/A | C | N/A | C | No |
| | Weave | WB | N/A | C | N/A | B | N/A | C | N/A | B | No |
| 4. I-580 between Bayview Ave and Central Ave | Basic | EB | 24.5 | C | 25.8 | C | 25.1 | C | 29.9 | D | No |
| | Basic | WB | 25.9 | C | 23.5 | C | 30.3 | D | 24.0 | C | No |
| 5. I-580 between Central Ave and I-80 | Basic | EB | 36.1 | E | -- | **F** | 37.9 | E | -- | **F** | Yes |
| | Basic | WB | 40.5 | E | 26.5 | D | -- | **F** | 27.4 | D | Yes |
| 6. I-80 between Carlson Blvd and Potrero Ave | Basic | EB | 27.2 | D | 31.5 | D | 27.5 | D | 34.3 | D | No |
| | Basic | WB | 37.6 | E | 28.8 | D | 42.2 | E | 29.2 | D | No |
| 7. I-80 at Gilman St Overpass | Basic | EB | 26.2 | D | 32.2 | D | 29.5 | D | 32.8 | D | No |
| | Basic | WB | 35.1 | E | 28.3 | D | 36.0 | E | 31.8 | D | No |

**Bold** indicates freeway segment operating at unacceptable LOS.
1. Segments with auxiliary lanes are classified as weave segments, and were analyzed based on the Leisch Method. Basic segments are analyzed as basic segments using the 2000 HCM methodologies.
2. EB = Eastbound; WB = Westbound
3. Density is presented in passenger cars per lane per mile (pc/ln/mi).

Source: Fehr & Peers.

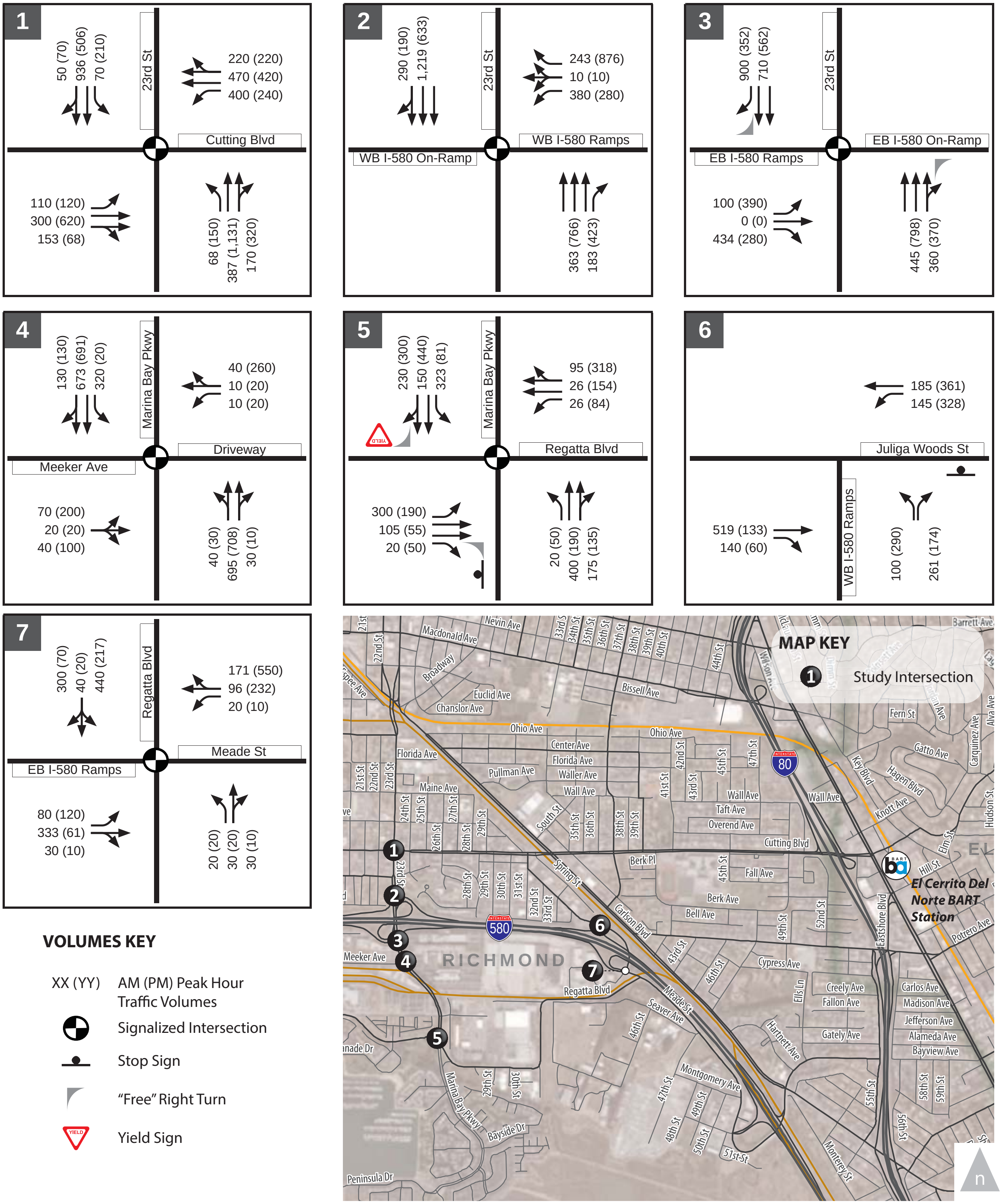


Figure 2-14A.

Richmond Bay Campus
Cumulative (2035) Plus Buildout Peak Hour Traffic Volumes

WC12-2953_2-14A_Cumu2035+BuildoutVols

FEHR & PEERS

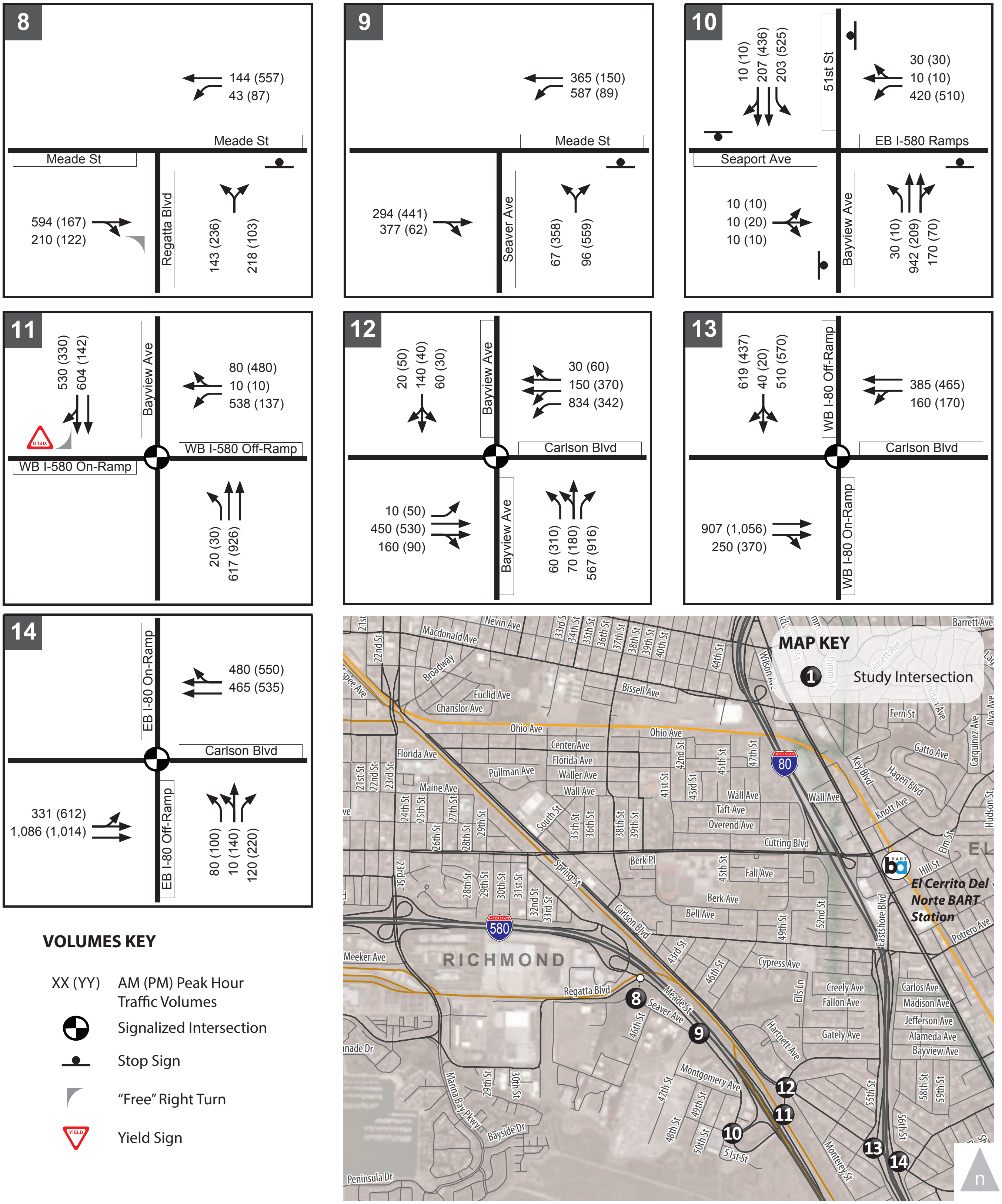


Figure 2-14B.

## Richmond Bay Campus
## Cumulative (2035) Plus Buildout Peak Hour Traffic Volumes

WC12-2953_2-14B_Cumu2035+BuildoutVols

FEHR & PEERS

## IMPACT 2-2: CUMULATIVE (2035) PLUS PROJECT BUILDOUT CONDITIONS INTERSECTION OPERATIONS

The buildout of the RBC would cause significant impacts at the following six intersections under Cumulative (2035) Plus Buildout conditions:

A. The Project would cause a significant impact at the signalized **Meeker Avenue/23rd Street/Marina Bay Parkway** (Intersection 4) because it would increase v/c ratio by more than 0.01 during the PM peak hour at an intersection operating at LOS F regardless of the Project.

B. The Project would cause a significant impact at the side-street stop-controlled **I-580 Westbound Ramps/Juliga Woods Street** (Intersection 6) because it would deteriorate operations for the side-street stop-controlled approach from LOS C to LOS F during the PM peak hour and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

C. The Project would cause a significant impact at the side-street stop-controlled **Meade Street/Regatta Boulevard** (Intersection 8) because it would deteriorate operations for the side-street stop-controlled approach from LOS B to LOS F during both AM and PM peak hours and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

D. The Project would cause a significant impact at the side-street stop-controlled **Meade Street/Seaver Avenue** (Intersection 9) because it would deteriorate operations for the side-street stop-controlled approach from LOS B to LOS F during both AM and PM peak hours and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

E. The Project would cause a significant impact at the all-way stop-controlled **Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue** (Intersection 10) because it would deteriorate intersection operations from LOS D during the AM peak hour and LOS E during the PM peak hour to LOS F during both AM and PM peak hours. In addition, the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

F. The Project would cause a significant impact at the signalized **Carlson Boulevard/I-80 Westbound Ramps** (Intersection 13) because it would deteriorate intersection operations from LOS D to LOS F during the AM peak hour and LOS E to LOS F during the PM peak hour.

**Mitigation Measure 2-2:** Implement the following:

A. **Meeker Avenue/23rd Street/Marina Bay Parkway** (Intersection 4): Implement the following which requires coordination with City of Richmond (Same as Mitigation Measure 2-1A):

- Convert the eastbound approach to provide one left-turn lane and one through-right lane

- Convert signal operations for the eastbound and westbound approaches from split phasing to protected left-turn phasing. Optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would improve to LOS C during the AM peak hour and LOS D during the PM peak hour after implementation of these improvements. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

B. **I-580 Westbound Ramps/Juliga Woods Street** (Intersection 6): Implement the following which requires coordination with City of Richmond and Caltrans:

- Install an actuated signal at the intersection.

The intersection would improve to LOS A during both AM and PM peak hours after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

C. **Meade Street/Regatta Boulevard** (Intersection 8): Implement the following which requires coordination with City of Richmond:

- Install an actuated signal at the intersection. The new signal shall be connected and coordinated with the existing controls at the at-grade railroad crossing on Meade Street and the existing signal at the I-580 Eastbound Ramps/Regatta Boulevard/Meade Street (Intersection 7) just west of the intersection to minimize potential queues spilling onto the railroad tracks.

The intersection would improve to LOS B during both AM and PM peak hours after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

D. **Meade Street/Seaver Avenue** (Intersection 9): Implement the following which requires coordination with City of Richmond (Same as Mitigation Measure 2-1D):

- Install an actuated signal at the intersection with protected/permitted phasing for the westbound left-turn movement.
- Convert the northbound approach to provide one left-turn lane and one right-turn lane.

The intersection would improve to LOS D during the AM peak hour and LOS B during the PM peak hour after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

E. **Seaport Avenue/I-580 Eastbound Ramps/Bayview Avenue** (Intersection 10): Implement the following which requires coordination with City of Richmond and Caltrans (Same as Mitigation Measure 2-1E):

- Install an actuated signal at the intersection with protected phasing for the northbound and southbound left-turn movements.

- Convert the southbound approach to provide two left-turn lanes and one shared right-turn/through lane.

The intersection would improve to LOS C during both AM and PM peak hours after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

F. **Carlson Boulevard/I-80 Westbound Ramps** (Intersection 13): Implement the following which requires coordination with City of Richmond and Caltrans:

- Convert the southbound approach to provide one left-turn lane and one right-turn lane.

The intersection would improve to LOS C during both AM and PM peak hours after implementation of this improvement. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

#### 2.5.2.2 Freeway Operations

**Table 2-12** shows the freeway segment LOS results for the Cumulative (2035) Plus Project Buildout conditions. **Appendix C** provides the detailed calculation work sheets. The addition of Project Buildout traffic would cause one study freeway segment to operate at LOS F and contribute to one study freeway segment that would operate at LOS F regardless of the Project.

The Project would cause a significant impact at one freeway segment which is summarized under Impact 2-3 discussion.

#### IMPACT 2-3: CUMULATIVE (2035) PLUS PROJECT BUILDOUT CONDITIONS FREEWAY OPERATIONS

The buildout of the RBC would cause a significant impact under Cumulative (2035) Plus Buildout conditions on **I-580 between Central Avenue and I-80** in westbound direction during the AM peak hour and in the eastbound direction during the PM peak hour because the Project would cause the westbound segment to deteriorate from LOS E to LOS F during the AM peak hour and it increase the PM peak hour volume on the eastbound freeway segment by more than five percent on a freeway segment that would operate at LOS F regardless of the Project.

**Mitigation Measure 2-3:** This impact can be mitigated by increasing the freeway capacity through adding one more travel lane in each direction of I-580 in this section. No freeway capacity projects are currently planned by Caltrans for this section of I-580. In addition, the feasibility of implementing this mitigation measure is not known at this time. Therefore, this impact is conservatively considered to be *significant and unavoidable*.

# 2.6 ADDITIONAL EMPLOYMENT ALTERNATIVE ANALYSIS

This section presents trip generation for the Additional Employment Alternative scenario and summarizes traffic operations under the Near-Term (2018) Plus Additional Employment Alternative conditions. The Additional Employment Alternative would consist of an additional 200,000 square feet of space and accommodate an additional 700 employees at the RBC site.

## 2.6.1 TRIP GENERATION

**Table 2-13** shows the estimated vehicle trip generation for the Additional Employment Alternative at the RBC site. The trip generation estimates is based on the same methodology used to estimate trip generation for the Phase 1 project as documented in section 2.3.7. The 700 additional employees under the Additional Employment Alternative at the RBC site are expected to increase trip generation to about 3,500 daily, 360 AM peak hour, and 340 PM peak hour automobile trips.

**TABLE 2-13**
**RICHMOND BAY CAMPUS**
**ADDITIONAL EMPLOYMENT ALTERNATIVE VEHICLE TRIP GENERATION SUMMARY**

| | Average Daily Population | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total |
| Project Phase 1 [1] | 1,000 | 2,079 | 182 | 29 | 211 | 27 | 172 | 199 |
| Additional Employees [1] | 700 | 1,455 | 127 | 20 | 147 | 18 | 121 | 139 |
| Additional Employment Alternative Total | 1,700 | 3,534 | 309 | 49 | 358 | 45 | 293 | 338 |

1. Based on following trip generation rates:
Daily = 2.08 trips per Average Daily Population (ADP); AM Peak Hour = 0.21 trips per ADP (86% in, 14% out); PM Peak Hour = 0.20 trips per ADP (13% in, 87% out)

Source: Fehr & Peers, based on trip generation rate per average daily population at the existing LBNL site in Berkeley adjusted to reflect the different characteristics of the RBC.

## 2.6.2 NEAR-TERM (2018) PLUS ADDITIONAL EMPLOYMENT ALTERNATIVE CONDITIONS

**Figures 2-15A and 2-15B** show the traffic volumes under the Near-Term (2018) Plus Additional Employment Alternative conditions, which consists of traffic volumes under Near-Term (2018) No Project conditions plus traffic generated by the 1,000 Phase 1 employees and the 700 additional employees under the Additional Employment Alternative.

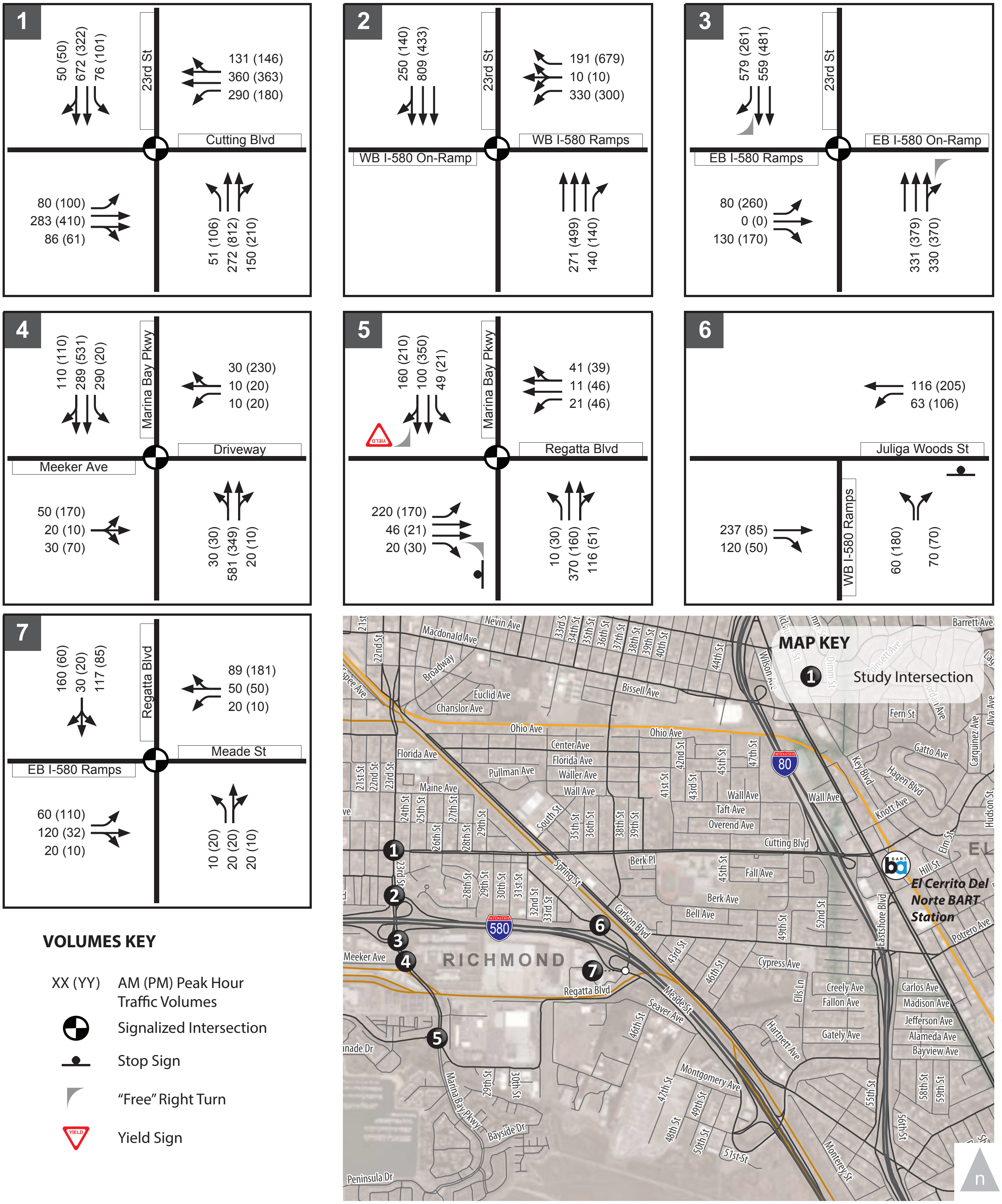


Figure 2-15A.

Richmond Bay Campus Near-Term (2018)
Plus Additional Employment Alternative Peak Hour Traffic Volumes

WC12-2953_2-15A_NT2018+AEAVols

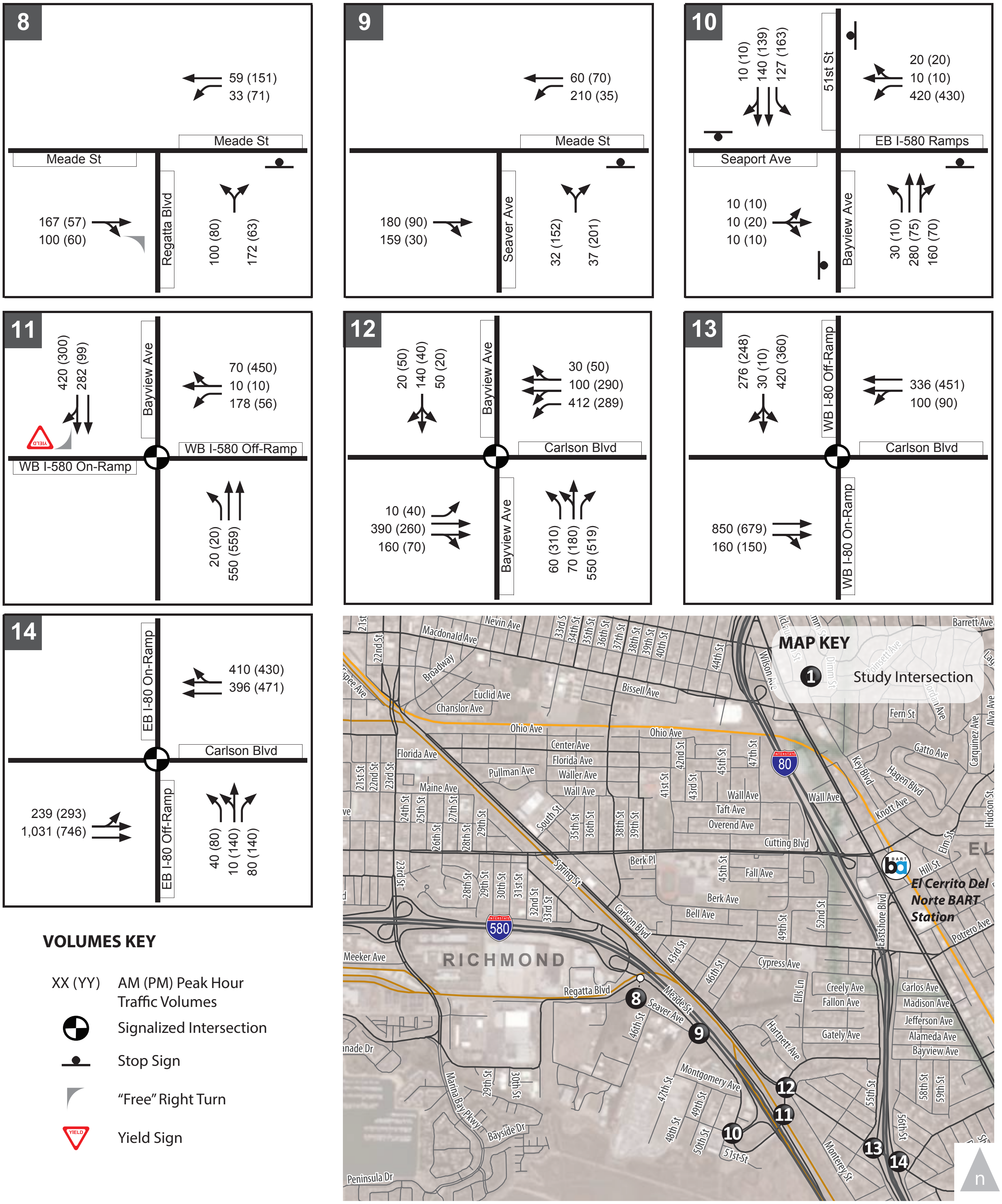


Figure 2-15B.

**Richmond Bay Campus Near-Term (2018)**
**Plus Additional Employment Alternative Peak Hour Traffic Volumes**

WC12-2953_2-12B_NT2018+AEAVols

FEHR & PEERS

#### 2.6.2.1 Intersection Operations

**Table 2-14** summarizes intersection operations at the study intersections under the Near-Term (2018) Plus Additional Employment Alternative conditions. **Appendix B** provides the detailed calculation work sheets.

The traffic generated by the Additional Employment Alternative would not cause any of the study intersections that currently operate at an acceptable LOS to degrade to an unacceptable LOS under Near-Term (2018) conditions. At the one intersection that would operate below the LOS standard regardless of the Alternative, Meeker Avenue/23rd Street/Marina Bay Parkway, the addition of traffic generated by the Additional Employment Alternative would not change the overall v/c ratio. Therefore, the Alternative, combined with the Phase 1 Project would not cause a significant impact at this or other study intersections under Near-Term (2018) Plus Cumulative Alternative conditions.

#### 2.6.2.2 Freeway Operations

**Table 2-15** shows the freeway segment LOS results for the Near-Term (2018) Plus Additional Employment Alternative conditions. **Appendix C** provides the detailed calculation work sheets.

The addition of the Alternative traffic would not cause any of the study freeway segments to operate at an unacceptable LOS. Therefore, it would not cause a significant impact at the study freeway segments under Near-Term (2018) Plus Additional Employment Alternative conditions.

## 2.7 SITE ACCESS AND CIRCULATION IMPACTS

Various aspects of site access and circulation are discussed below.

### 2.7.1 VEHICULAR ACCESS AND CIRCULATION

Under Phase 1, the RBC site will have vehicle access only at the current location on Meade Street/Seaver Avenue intersection. The Conceptual Layout shows that at buildout, vehicle access to parking lots and structures would be provided at several locations along Regatta Boulevard, Meade Street, and South 46th Street. In addition, cross-campus vehicle circulation will be served via Lark Drive, extending east from Regatta Boulevard, and connecting to a north-south axis roadway that connects to Regatta Boulevard between South 34th Street and Meade Street. Cross-campus access via Lark Drive to South 46th Street may also be provided. These connections would allow campus employees and visitors to travel to/from the site without excessive circulation around the site periphery. The multiple access points from the

**TABLE 2-14**
**RICHMOND BAY CAMPUS**
**ADDITIONAL EMPLOYMENT ALTERNATIVE (2018) CONDITIONS –**
**STUDY INTERSECTION LOS SUMMARY**

| Intersection | Traffic Control | Peak Hour | Near-Term (2018) No Project | | Near-Term (2018) Plus Additional Employment Alternative | | Significant Impact? |
|---|---|---|---|---|---|---|---|
| | | | Delay[1] (seconds) | LOS[1] | Delay[1] (seconds) | LOS[1] | |
| 1. Cutting Boulevard/ 23rd Street | Signal | AM | 24.4 | C | 25.1 | C | No |
| | | PM | 24.5 | C | 24.8 | C | No |
| 2. I-580 Westbound Ramps/ 23rd Street | Signal | AM | 7.3 | A | 7.3 | A | No |
| | | PM | 7.5 | A | 7.5 | A | No |
| 3. I-580 Eastbound Ramps/ 23rd Street | Signal | AM | 4.2 | A | 4.2 | A | No |
| | | PM | 6.5 | A | 6.5 | A | No |
| 4. Meeker Avenue/23rd Street/ Marina Bay Pkwy | Signal | AM | 40.0 | D | 40.0 | D | No |
| | | PM | **148.5 (v/c=0.54)** | **F** | **148.5 (v/c=0.54)** | **F** | No |
| 5. Regatta Boulevard/ Marina Bay Parkway | Signal | AM | 22.0 | C | 22.1 | C | No |
| | | PM | 15.1 | B | 15.9 | B | No |
| 6. I-580 Westbound Ramps/ Juliga Woods Street | Side Street Stop | AM | 3.1 (11.2) | A (B) | 3.1 (11.9) | A (B) | No |
| | | PM | 5.5 (12.0) | A (B) | 6.9 (16.0) | A (C) | No |
| 7. I-580 Eastbound Ramps/ Regatta Blvd/Meade Street | Signal | AM | 11.1 | B | 13.2 | B | No |
| | | PM | 11.1 | B | 11.2 | B | No |
| 8. Meade Street/ Regatta Boulevard | Side Street Stop | AM | 6.6 (11.5) | A (B) | 6.5 (14.1) | A (B) | No |
| | | PM | 5.5 (10.4) | A (B) | 4.6 (11.7) | A (B) | No |
| 9. Meade Street/ Seaver Avenue | Side Street Stop | AM | 1.6 (10.3) | A (B) | 4.3 (15.4) | A (C) | No |
| | | PM | 2.7 (9.4) | A (A) | 8.5 (13.2) | A (B) | No |
| 10. Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue | All-way Stop | AM | 27.2 | D | 34.6 | D | No |
| | | PM | 20.8 | C | 26.5 | D | No |
| 11. I-580 Westbound Ramps/ Bayview Avenue | Signal | AM | 5.6 | A | 7.6 | A | No |
| | | PM | 8.6 | A | 9.2 | A | No |
| 12. Carlson Boulevard/ Bayview Avenue | Signal | AM | 28.6 | C | 29.7 | C | No |
| | | PM | 24.5 | C | 24.6 | C | No |
| 13. Carlson Boulevard/ I-80 Westbound Ramps | Signal | AM | 20.4 | C | 23.3 | C | No |
| | | PM | 15.9 | B | 16.1 | B | No |
| 14. Carlson Boulevard/ I-80 Eastbound Ramps | Signal | AM | 12.9 | B | 13.6 | B | No |
| | | PM | 12.2 | B | 12.8 | B | No |

Notes: **Bold** indicates an intersection operating at unacceptable LOS E or LOS F.
1. For signalized and all-way stop-controlled intersections, average intersection delay and LOS based on the 2000

**TABLE 2-14**
**RICHMOND BAY CAMPUS**
**ADDITIONAL EMPLOYMENT ALTERNATIVE (2018) CONDITIONS –**
**STUDY INTERSECTION LOS SUMMARY**

HCM method is shown. For side-street stop-controlled intersections, delays for worst movement and average intersection delay are shown: intersection average (worst movement).
Source: Fehr & Peers.

1

**TABLE 2-15**
**RICHMOND BAY CAMPUS**
**ADDITIONAL EMPLOYMENT ALTERNATIVE (2018) CONDITIONS –**
**FREEWAY SEGMENT LOS SUMMARY**

| Freeway Segment | Type[1] | Dir[2] | Near-Term (2018) No Project | | | | Near-Term (2018) Plus Additional Employment Alternative | | | | Significant Impact? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | | |
| | | | Density[3] | LOS | Density[3] | LOS | Density[3] | LOS | Density[3] | LOS | |
| 1. I-580 between Harbor Way and Marina Bay Pkwy | Weave | EB | N/A | A | N/A | B | N/A | A | N/A | B | No |
| | Weave | WB | N/A | A | N/A | A | N/A | A | N/A | A | No |
| 2. I-580 between Marina Bay Pkwy and Regatta Blvd | Weave | EB | N/A | A | N/A | B | N/A | B | N/A | B | No |
| | Weave | WB | N/A | B | N/A | A | N/A | B | N/A | B | No |
| 3. I-580 between Regatta Blvd and Bayview Ave | Weave | EB | N/A | B | N/A | B | N/A | B | N/A | B | No |
| | Weave | WB | N/A | B | N/A | A | N/A | B | N/A | A | No |
| 4. I-580 between Bayview Ave and Central Ave | Basic | EB | 17.8 | B | 17.1 | B | 17.9 | B | 17.6 | B | No |
| | Basic | WB | 17.3 | B | 18.6 | C | 17.9 | B | 18.7 | C | No |
| 5. I-580 between Central Ave and I-80 | Basic | EB | 26.1 | D | 32.8 | D | 26.2 | D | 34.3 | D | No |
| | Basic | WB | 29.1 | D | 24.0 | C | 30.4 | D | 24.2 | C | No |
| 6. I-80 between Carlson Blvd and Potrero Ave | Basic | EB | 22.9 | C | 28.2 | D | 23.0 | C | 28.6 | D | No |
| | Basic | WB | 31.4 | D | 25.3 | C | 31.9 | D | 25.4 | C | No |
| 7. I-80 at Gilman St Overpass | Basic | EB | 23.0 | C | 28.4 | D | 23.4 | C | 28.5 | D | No |
| | Basic | WB | 32.1 | D | 26.3 | D | 32.2 | D | 26.8 | D | No |

1. Segments with auxiliary lanes are classified as weave segments, and were analyzed based on the Leisch Method. Basic segments are analyzed as basic segments using the 2000 HCM methodologies.
2. EB = Eastbound; WB = Westbound
3. Density is presented in passenger cars per lane per mile (pc/ln/mi).

Source: Fehr & Peers.

campus periphery, combined with the internal circulation roadways, would distribute peak hour traffic volumes and reduce the project traffic volume at any one driveway or intersection.

Regatta Boulevard would be relocated to west and north of its current alignment so that through traffic using Regatta Boulevard would not travel through the RBC site and provide more connectivity between the eastern and western portions of the RBC. Although other internal RBC roadways may allow through traffic to traverse the RBC site, these streets would be designed to minimize automobile speeds to discourage through automobile traffic and prioritize pedestrian and bicycle travel in the RBC.

Traffic generated by the RBC would travel to and from the parking facilities in the RBC. Currently, the exact size, location, and access points of the parking facilities are not known. It is expected that as the size, location, and access points of each future parking facility is established, a more detailed analysis will be conducted to determine the infrastructure (i.e., number of lanes, signal, etc.) needed to serve each parking facility. Therefore, the impacts on vehicular access and circulation are expected to be less than significant.

### 2.7.2 PEDESTRIAN AND BICYCLE CIRCULATION

The City of Richmond's *Bicycle Master Plan* and *Pedestrian Plan* outline goals and policy objectives to guide and promote the development of bicycle and pedestrian facilities throughout the city and link these facilities, where possible, to other local and regional bicycle and pedestrian networks. Several of these goals and polices are applicable to development of the RBC. Goal 1 of the *Bicycle Master Plan* expands the city's bicycle routes and parking facilities into an extensive, well-connected and well-designed network, and would improve and maintain these facilities over time. Goal 4 incorporates the needs and concerns of cyclists in all transportation and development projects. Similarly, the Increased Connectivity and Increased Sustainability goals of the *Pedestrian Plan* seek to reduce physical barriers to walking and promote walking as a long-term transportation alternative to reduce vehicle miles travelled and climate change and air quality impacts.

The proposed bicycle and pedestrian networks of both plans show pathways through the area encompassing the RBC site connecting to the Bay Trail and to other existing and proposed facilities in the vicinity of the site. The primary pathway outlined in these plans would consist of a bicycle and pedestrian spine through the site connecting Seaver Avenue with the Bay Trail. While minimal detail is provided on the design of internal roadways or paths, the Conceptual Layout for the LRDP shows a pedestrian-friendly workplace, with buildings clustered together connected by tree-lined paths, and internal roadways that minimize walking distance between the two building clusters. Consistent with the goals in the bicycle and pedestrian plans, pathways would provide pedestrian and bicycle connections between the RBC, Meeker

Tidal Slough and the San Francisco Bay Trail. These pathways would also promote walking as an alternative to vehicular transportation within the site, consistent with the Increased Sustainability goal.

### 2.7.3 TRANSIT DEMAND

As previously described, two shuttle lines, serving UC Berkeley and LBNL campuses and El Cerrito Plaza BART Station, are proposed for the RBC. It is expected that hours of operations and frequency of service will be increased as the RBC expands and the number of employees increases.

As previously described, currently, AC Transit does not serve the RBC directly. However, it is expected that AC Transit would initiate direct service to the RBC as the number of employees and associated transit demand increases. This service may involve modifications of existing routes or a new route.

**IMPACT 2-4: TRANSIT DEMAND**

The Project would generate demand for bus transit service that may not be adequately served by the proposed RBC shuttles serving UC Berkeley, LBNL, and El Cerrito Plaza BART station. Although this is not considered a significant impact, the following improvement is recommended.

**Environmental Protection Measure 2-4:** The University of California shall implement the following:

- Regularly monitor the use of the proposed shuttle services and if necessary, adjust service frequency, stop location, and routes to better serve the RBC population.
- Coordinate with AC Transit and the City of Richmond to modify and/or extend current bus routes to serve demand generated by the RBC, as employment grows at the campus.

### 2.7.4 TRAFFIC HAZARDS

The proposed RBC LRDP would result in increased vehicular traffic and pedestrian and bicycle activity in and around the Project site. The LRDP proposes gateway elements to orient the visitor that they are arriving at the RBC, and vehicular access would be limited primarily to the perimeter of the campus to promote pedestrian and bicycle activity and safety. The exception is Lark Drive, which would provide an important link to adjoining research and industrial districts to the east as they are developed with the LRDP. Lark Drive would also provide public access into the campus, including access to public amenities, including the San Francisco Bay Trail. The LRDP proposes to design this street to discourage cut-through traffic or speeding, and proposes design elements, such as narrow roadway width, stop signs or other traffic controls, street alignment (e.g., curve radii), and special paving to denote pedestrian crossing zones. This design, combined with the design of other internal and access streets, would minimize potential conflicts between different modes of travel and provide safe and efficient pedestrian, bicycle, and vehicular access and circulation throughout the RBC. Although, detailed design for various buildings, parking facilities, and internal roadways and pathways has not been completed, the final design for each project element will be reviewed to ensure consistency with applicable design standards. In addition, the proposed uses at the RBC are similar to and consistent with the existing uses at the site. Thus, the proposed Project would not cause a significant impact by substantially increasing traffic hazards to motor vehicles, bicycles, or pedestrians due to a design feature or incompatible uses.

### 2.7.5 RAILROAD CROSSINGS

The existing at-grade railroad crossing on Marina Bay Parkway is expected to be replaced by a grade separated crossing, which will also provide grade separated facilities for bicycles and pedestrians. Construction is scheduled to begin in 2013. Thus, neither the Phase 1 Project, nor the buildout project would cause an impact at this location.

The other at-grade railroad crossing is on Meade Street between the RBC and I-580 Interchange at Regatta Boulevard/Juliga Woods Street. The recently completed Meade Street bypass allows traffic on Regatta Boulevard to access I-580 further east via Meade Street and the Bayview Avenue Interchange without crossing the at-grade railroad tracks. At both Phase 1 and buildout of the RBC, drivers who may typically use the Regatta Boulevard/Juliga Woods Street to travel to and from the site have a choice of using different streets to access the site. Thus, if trains are using the at-grade crossing and blocking through vehicular traffic, drivers can divert to other streets. Mitigation Measure 2-2C would also signalize the recently constructed Meade Street/Regatta Boulevard (Intersection 8) and interconnect the signal operations with the controls at the at-grade railroad crossing and the existing signal at the I-580 Eastbound Ramps/Regatta Boulevard/Meade Street (intersection 7). This improvement would minimize the potential for vehicular queues at either intersection to spill back onto the railroad tracks.

The at-grade railroad crossing on Meade Street provides a center median and directional safety gates that prevent automobiles and bicycles from crossing the tracks when trains are passing. The crossing currently provides a sidewalk on the north side of the roadway which also provides a safety gate to prevent pedestrians from crossing the tracks when trains are passing. The crossing currently provides a sidewalk on the north side of the roadway which provides a safety gate. In addition, considering the infrequent use of the at-grade crossing by trains, and that the at-grade crossing currently provides safety features such as gates and bells, the Project would not cause a significant impact at this at-grade railroad crossing.

### 2.7.6 CONSISTENCY WITH ADOPTED POLICIES, PLANS OR PROGRAMS SUPPORTING ALTERNATIVE TRANSPORTATION

The proposed RBC LRDP is consistent with adopted policies, plans, and programs that support alternative transportation and would not cause a significant impact by conflicting with adopted policies, plans, or programs supporting public transit, bicycle, or pedestrian through the following:

- The Conceptual Layout locates parking facilities in the parameter of the RBC site and provides paths connecting the various buildings. Thus, walking would be the primary mode of transportation for internal trips within the RBC. This is consistent with the Increased Connectivity, Improved Health, and Increased Sustainability goals of the *Pedestrian Plan*.
- The LRDP would provide connections to Bay Trail and other planned bicycle facilities in City of Richmond, consistent with Goals 1 and 4 of the Bicycle Master Plan.
- The Project would provide adequate bicycle parking and amenities such as showers and lockers. The Project may also provide bike sharing. This is consistent with the objective of doubling the number of bicycle parking spaces per Goal 1 of the *Bicycle Master Plan*.
- The LRDP would not prevent the installation of planned and proposed pedestrian and bicycle facilities in the City of Richmond as previously described in Section 2.1.5, consistent with Goal 1 of the *Bicycle Master Plan* and the Increased Connectivity goal of the *Pedestrian Plan*.
- The Project would include a robust Transportation Demand Management Program (TDM) program that provides incentives that encourage the use of transit, walking, biking, and carpooling. This is consistent with Policy CR5.1 of the Circulation Element of the City of Richmond General Plan 2030.
- The Project would provide on-site amenities, such as food service and temporary housing, that would reduce the need for off-site travel. This would be consistent with the Increased Sustainability goal of the *Pedestrian Plan*.
- The Project would provide frequent shuttle service to BART, UC Berkeley, and LBNL, consistent with Goal 4 of the Bicycle Master Plan and Goal CR3 of the Circulation Element.
- The high number of employees expected at buildout of the RBC would make extending transit service in the project area more viable, consistent with Goal CR3 of the Circulation Element.

Thus, the proposed RBC Project would not cause a significant impact on consistency with adopted policies, plans, and programs that support alternative transportation.

### 2.7.7 EMERGENCY ACCESS

The nearest fire station to the RBC site is Richmond Fire Department Station 64, which is located at 4801 Bayview Avenue, about one-half mile to the east of the site. It is expected that Richmond Fire Department would continue to provide emergency services at the RBC through Phase 1 of the Project. However, the LRDP anticipates construction of an on-site fire station when sufficient development is provided within the RBC.

The overall RBC site would continue to provide multiple access points and each facility would also be designed to provide multiple access points. Thus, if one site access were blocked, the other access point(s) could be used by emergency vehicles to reach any part of the campus or specific building. In addition, all RBC buildings and internal streets would be designed to accommodate access by fire apparatus and other emergency response vehicles.

Thus, there would be adequate emergency service and access after Phase 1 and at buildout, and the Project would not cause a significant impact on emergency access.

## 2.7.8 CONSTRUCTION PERIOD IMPACTS

Construction of Phase 1 Project is expected to start in 2014. Construction activity at the RBC site is estimated to continue until 2050 when the proposed LRDP would be completed. During the demolition of existing buildings or construction of new buildings, roadways, and other infrastructure in the RBC site, temporary and intermittent transportation impacts may result from truck movements as well as construction worker vehicle commute trips. The construction-related traffic may temporary reduce capacities of roadways in the vicinity because of the slower movements and larger turning radii of construction trucks compared to passenger vehicles.

Construction worker and truck trips during peak commute periods (7:00 to 9:00 AM and 4:00 to 6:00 PM on weekdays) may result in short-term adverse effects during the construction period.

In addition, temporary closure of streets and paths for construction staging may also affect automobile, pedestrian, and bicycle access and circulation and may cause a significant temporary impact by increasing traffic hazards or impeding emergency access.

### IMPACT 2-5: CONSTRUCTION TRAFFIC IMPACTS

The Project construction would temporarily and intermittently impact traffic operations due to truck movements and construction worker commute trips. This is a *significant* impact.

**Mitigation Measure 2-5**: Prepare a Construction Traffic Management Plan (CTMP) for each construction project at the RBC site to reduce the impacts of construction on traffic and parking. The University of California shall work with City of Richmond in preparing the CTMP which may consist of the following:

- Proposed truck routes
- Hours of construction and limits on number of truck trips during peak commute periods (7:00 to 9:00 AM and 4:00 to 6:00 PM) if traffic conditions demonstrate the need to reduce construction traffic to avoid causing significant delays.

- Parking management plan for construction workers.
- Tools to provide safe access for pedestrians, bicyclists, automobiles, and emergency access vehicles.
- Identification of alternative routes for temporary closure of streets and/or paths during construction.

Implementation of this mitigation measure will reduce the impact to a *less than significant* level.

### 2.7.9 CHANGES IN AIR TRAFFIC PATTERNS

The nearest airport to the RBC is the Oakland International Airport, which is about 15 miles to the south. The proposed LRDP would increase density and increase building heights at the RBC. However, building heights would not interfere with current flight patterns of Oakland International Airport or other nearby airports. Therefore, the proposed RBC Project would not cause a significant impact on air traffic patterns.

# 3.0 ALAMEDA POINT ALTERNATIVE

This chapter describes existing transportation conditions for the Alameda Point site and identifies impacts and mitigation measures of Phase 1 development of the proposed LRDP at Alameda Point under Near-Term (2018) and Cumulative (2035) conditions.

## 3.1 EXISTING CONDITIONS

Existing transportation conditions at Alameda Point and vicinity are described below.

### 3.1.1 EXISTING ROADWAY NETWORK

**Figure 3-1** shows the existing Alameda Point site, the surrounding roadway system, and study intersections and freeway segments analyzed as part of this assessment. The regional and local roadways serving the project site are described below.

#### 3.1.1.1 Regional Roadways

*Interstate 880* (I-880) is a north-south eight -lane freeway, between Oakland and San Jose. Near the Alameda Point site, I-880 provides a direct connection to I-980/SR-24. Alameda Point connects to I-880 via an interchange at Broadway and Jackson Street in Oakland, the Webster/Posey Tubes and other streets in Alameda. I-880 has an AADT of 199,000 vehicles south of I-980 (Caltrans, 2011).

*Webster/Posey Tubes* (SR260) are each two-lane, one-way tunnels under the Oakland Estuary that connect City of Alameda to Oakland. Posey Tube provides access to Oakland from Alameda, whereas Webster Tube provides access from Oakland to Alameda. Alameda Point connects to the Webster/Posey tubes via Atlantic Avenue, Pacific Avenue, Main Street/Central Avenue, and Webster Street or Constitution Way. Each tube provides two travel lanes. Posey Tube also provides a separated pedestrian and bicycle path. The speed limit is 45 mph in the tubes. The Webster and Posey Tubes have an AADT of about 22,300 vehicles (Caltrans, 2011).

*Webster Street* (SR260) is a north-south major arterial that connects Central Avenue in the south to the Webster/Posey Tubes in the north. Webster Street provides two travel lanes in each direction and on-street parking and sidewalks south of Atlantic Avenue on both sides of the street. The speed limit is 25 mph.


Figure 3-1.

## Alameda Point Campus Study Locations

WC12-2953_3-1_AlamedaPtCampusStudy

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*Constitution Way* is a north-south major arterial in Alameda that provides one of the two connections to the Webster/Posey Tubes. Constitution Way connects to Webster Tube directly and to Posey Tube via Webster Street. Constitution Way provides two travel lanes in each direction, a median, and left turn lanes at most signalized intersections and sidewalks on both sides of the roadway. South of Lincoln Avenue, Constitution Way becomes 8th Street. The speed limit is 25 mph.

*Willie Stargell Avenue* is an east-west arterial that connects Webster Street and Alameda Point. Between Main and 5th streets, Willie Stargell Avenue provides one travel lane in each direction. East of 5th Street, Willie Stargell Avenue widens to two travel lanes in each direction and a center median. The speed limit is 25 mph. Willie Stargell Avenue provides intermittent sidewalks on both sides of the roadway. It also provides Class 2 bicycle lanes east of 5th Street, and is a designated Class 3 bicycle route west of 5th Street.

*Atlantic Avenue (Ralph Appezzato Memorial Parkway)* is an east-west arterial that connects Alameda Point in the west to Webster Street, Constitution Way and points east. West of Constitution Way, Atlantic Avenue provides two travel lanes in each direction, intermittent sidewalks, a raised median, and left turn pockets at signalized intersections. East of Constitution Way, Atlantic Avenue narrows to one travel lane with class 2 bike lanes in each direction and sidewalks on both sides of the roadway. The speed limit is 35 mph between Main and Webster streets and is 25 mph east of Webster Street.

*Pacific Avenue* is an east-west arterial that connects Main Street in the west to Park Street in the east. Near the Project site, Pacific Avenue generally provides two travel lanes in each direction with on-street parking and sidewalks on both sides of the street. The speed limit is 25 mph.

*Lincoln Avenue* is generally an east-west arterial that connects Central Avenue in the west to High Street in the east. Near the Project site, Lincoln Avenue generally provides two travel lanes in each direction with on-street parking and sidewalks on both sides of the street. The speed limit is 25 mph.

*Main Street* is a north-south arterial that connects Central Avenue to the Alameda Main Street Ferry Terminal. Main Street provides two travel lanes in each direction and left-turn pockets at signalized intersections with intermittent sidewalks and a parallel Class 1 path. The speed limit is 35 mph. South of Pacific Avenue, Main Street becomes Central Avenue and extends through the City of Alameda.

#### 3.1.1.2 Local Roadways

*Ferry Point* is a north-south collector to the west of the Alameda Point site, connecting the Project site to Atlantic Avenue and points north. In the vicinity of the Project site, Ferry Point provides one travel lane in each direction with striped shoulders, and minimal pedestrian facilities. The speed limit is 25 mph.

*Viking Street* is a north-south local street on the east side of the Alameda Point site connecting the Project site to Atlantic Avenue and points north. In the vicinity of the Project site, Viking Street provides one travel lane in each direction with striped shoulders, and minimal pedestrian facilities. The speed limit is 25 mph.

*Hornet Avenue* is an east-west local street on the south side of the Alameda Point site. In the vicinity of the Project site, Hornet Avenue provides one travel lane in each direction with striped shoulders, and minimal pedestrian facilities. A parallel Class 1 path is provided just south of Hornet Avenue. The speed limit is 25 mph.

## 3.1.2 INTERSECTION OPERATIONS ANALYSIS

This study analyzes existing traffic operations during typical weekday AM and PM peak hours at the following 13 intersections:

City of Alameda:
1. Willie Stargell Avenue/Webster Street
2. Main Street/Atlantic Avenue
3. Third Street/Atlantic Avenue
4. Webster Street/Atlantic Avenue
5. Constitution Way/Atlantic Street
6. Main Street/Pacific Avenue
7. Webster Street/Lincoln Avenue
8. Constitution Way/Lincoln Avenue
9. 8th Street/Central Avenue

City of Oakland:

10. Broadway/5th Street
11. Webster Street/8th Street
12. Harrison Street/7th Street
13. Jackson Street/7th Street

These intersections were selected for analysis because they are most likely to be affected by the proposed Project. **Figure 3-1** shows the location of the study.

### 3.1.2.1 Existing Intersection Volumes

For all study intersections, the operations analysis presented in this study is based on AM and PM peak period (7:00 to 9:00 AM and 4:00 to 6:00 PM) intersection turning movement, pedestrian, and bicycle volumes. These time periods were selected because trips generated by the proposed Project, in combination with background traffic, are expected to represent typical worst traffic conditions. Traffic counts were collected in October 2010[4] for intersections in Oakland and on December 12, 2012 for intersections in Alameda. Within the peak periods, the peak hours (i.e., the hour with the highest traffic volumes observed in the study area) are from 7:45 AM to 8:45 AM (AM peak hour) and 5:00 PM to 6:00 PM (PM peak hour).

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[4] In general, traffic volume counts that are three years old or newer are considered to be valid. Considering that minimal new development or roadway modifications have occurred in the vicinity of these intersections in the last three years, the counts continue to be valid and present typical current conditions.

Because the traffic counts in Alameda were collected in December when traffic patterns maybe atypical due to irregular school schedules, holidays, and more frequent shopping trips, "check" counts were collected during the week of January 28, 2013 at two study intersections, while local schools and College of Alameda were in regular session. These "check" counts were compared to the December 2012 counts, in terms of total intersection volumes and also critical movements. In comparison, some movements were higher in December 2012 while others were higher in January 2013. The January 2013 intersections volumes were about two to ten percent higher than the December 2012 volumes, which is within the typical daily fluctuation expected in traffic volumes. Thus, the December 2012 traffic volumes represent typical conditions in the Alameda study intersections. Although the December 2012 traffic volumes represent typical conditions in the study area, they were adjusted to reflect the higher traffic volumes observed in January 2013 in order to present a more conservative analysis.

**Figures 3-2A and 3-2B** present the existing AM and PM peak hour intersection vehicle turn movement volumes at the study intersections. **Figures 3-3A and 3-3B** present the existing AM and PM peak hour pedestrian and bicycle volumes at the study intersections. **Appendix D** presents the detailed count sheets at the study intersections.

#### 3.1.2.2 Existing Intersection Operations

**Table 3-1** summarizes existing weekday peak hour intersection LOS analysis results. **Appendix E** provides the detailed calculation work sheets. As shown in the table, all study intersections in Alameda currently operate at LOS D or better during both AM and PM peak hours. All but one study intersection in Oakland currently operate at LOS E or better during both AM and PM peak hours. The one sub-standard intersection in Oakland is the 7th Street/Harrison Street intersection which operates at LOS F during the PM peak hour.

### 3.1.3 FREEWAY OPERATIONS

This study analyzes existing traffic operations during typical weekday AM and PM peak hours at the following four freeway segments:

1. I-880 west of I-980
2. I-880 between I-980 and Oak Street
3. I-880 south of Oak Street
4. Webster/Posey Tubes

These freeway segments were selected for analysis because they are most likely to be affected by the proposed Project.

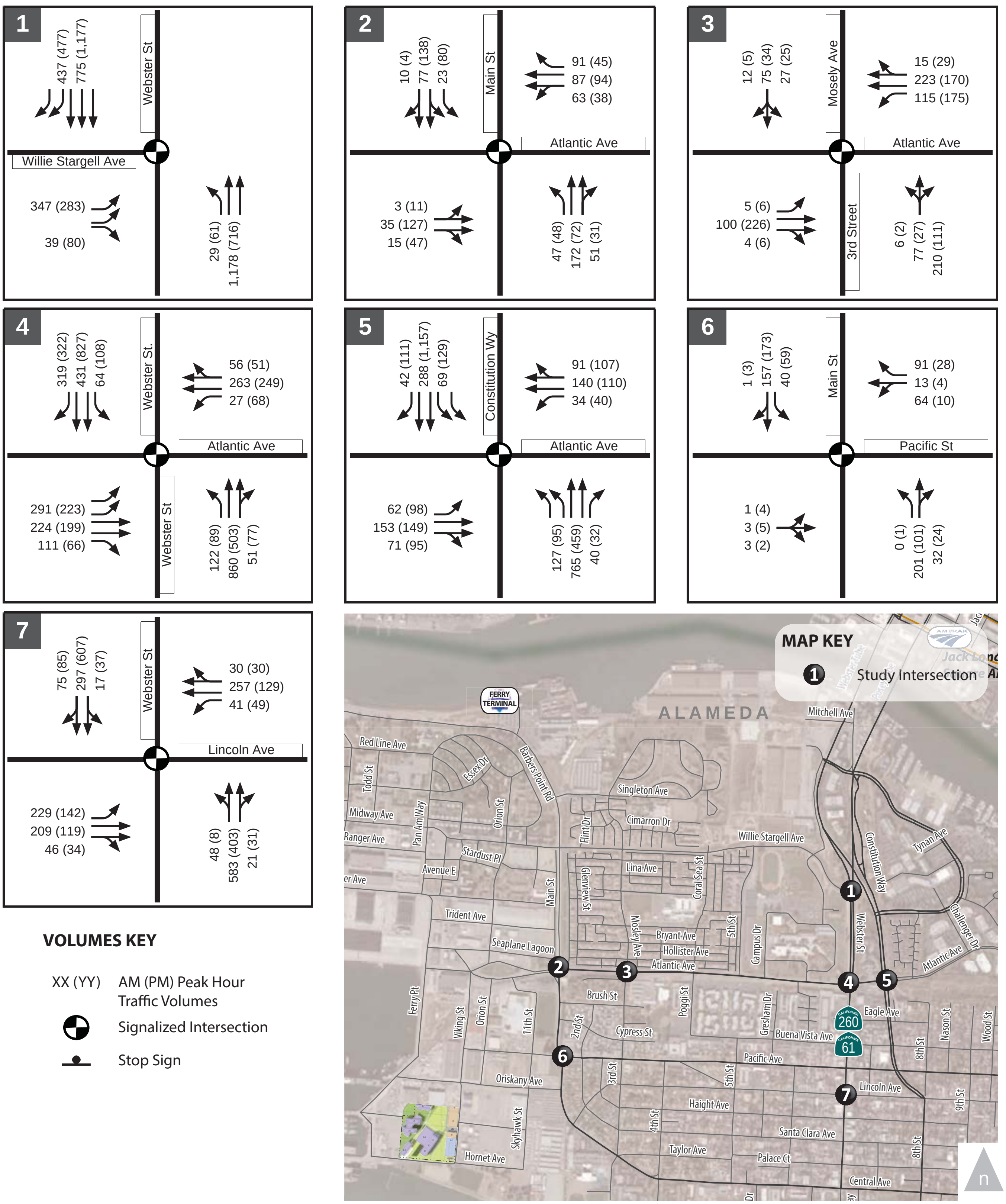


Figure 3-2A.

## Alameda Point Campus
## Existing Peak Hour Traffic Volumes, Lane Configurations and Traffic Control

WC12-2953_3-2A_ExVol

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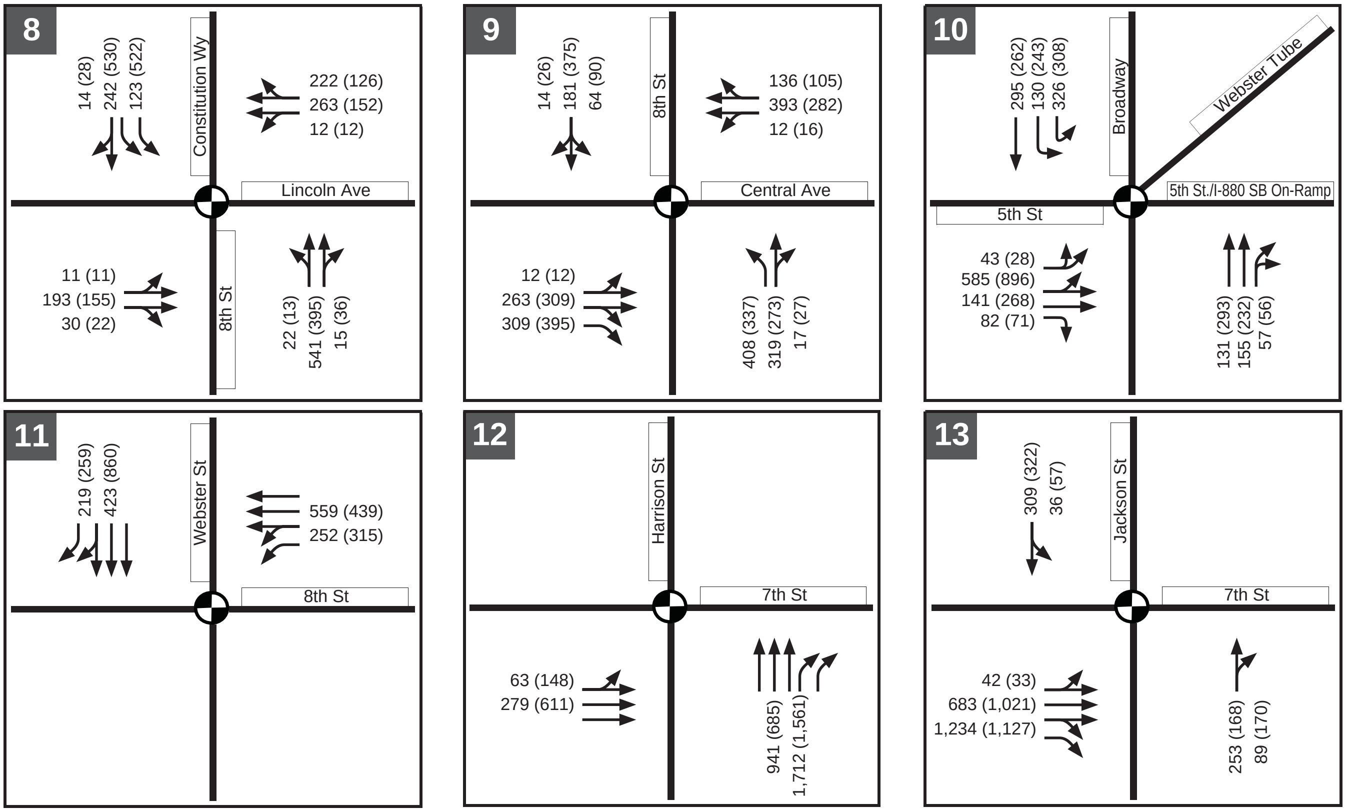


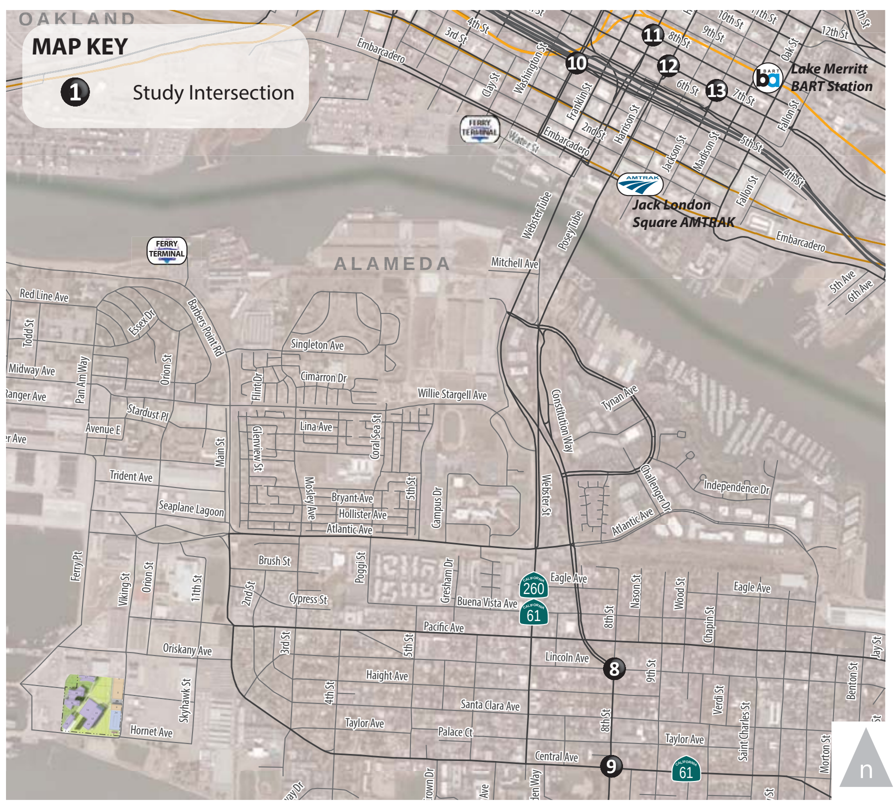


**VOLUMES KEY**

XX (YY) AM (PM) Peak Hour Traffic Volumes

Signalized Intersection

Stop Sign

Figure 3-2B.

Alameda Point Campus
Existing Peak Hour Traffic Volumes, Lane Configurations and Traffic Control

WC12-2953_3-2B_ExVol

FEHR & PEERS

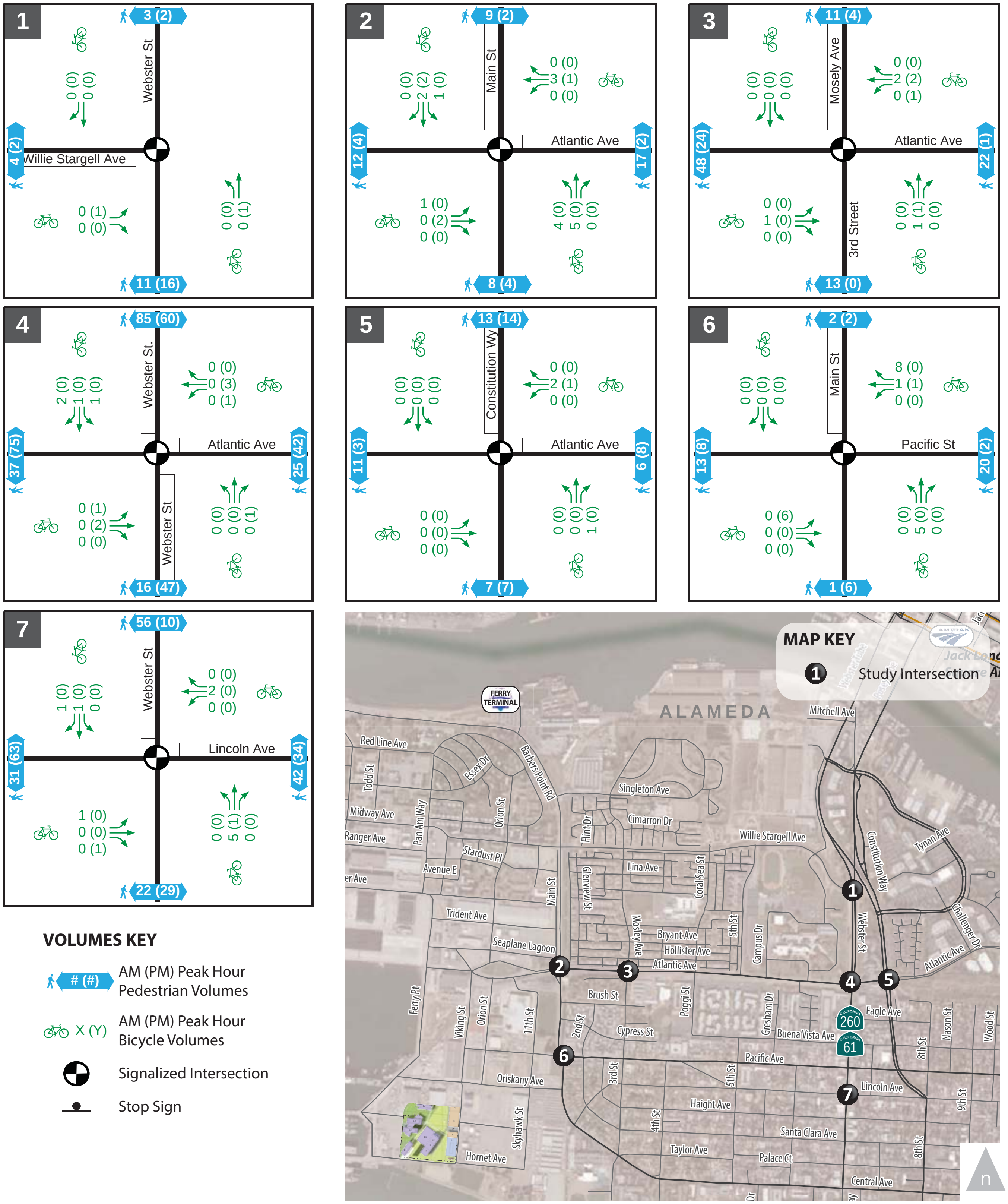


Figure 3-3A.

Alameda Point Campus
Existing Pedestrian and Bicycle Volumes

WC12-2953_3-3A_BikePedVol

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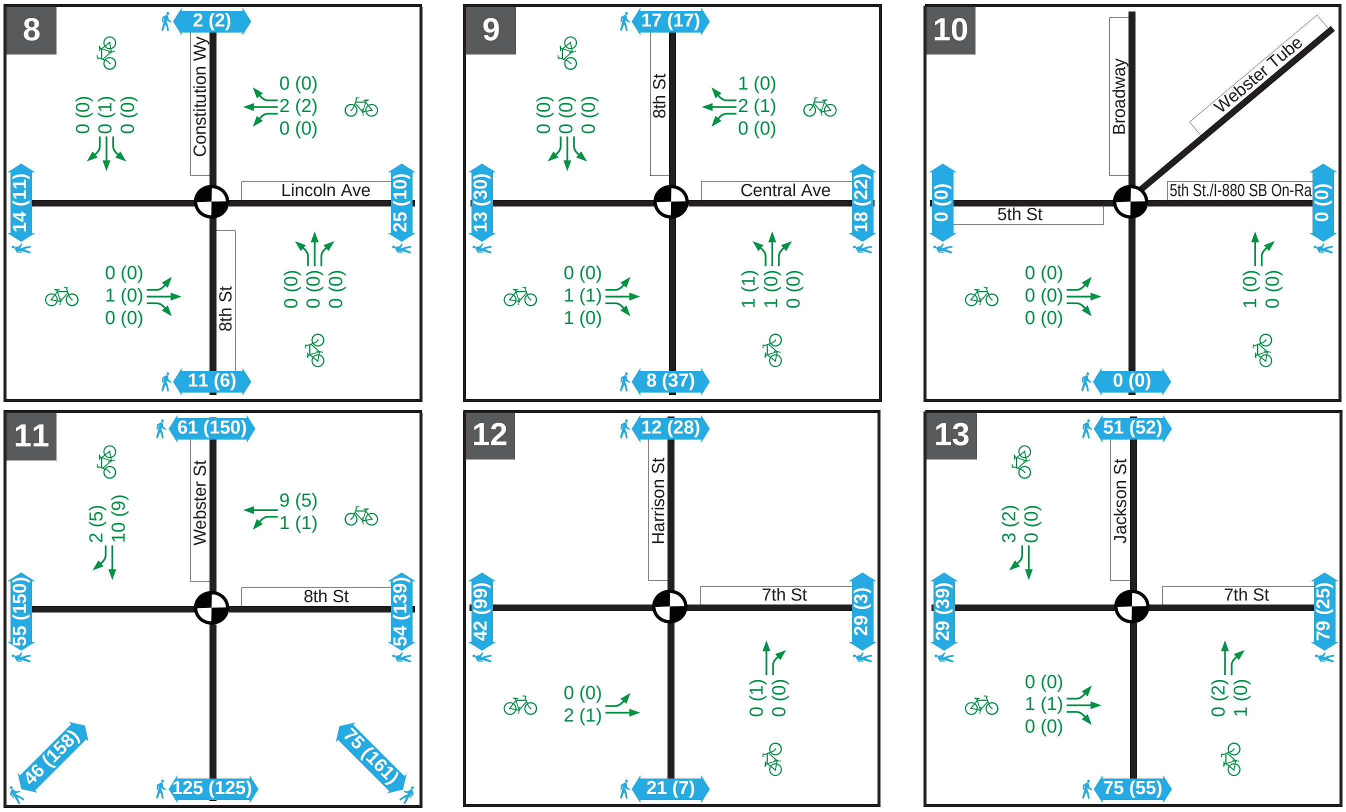




**VOLUMES KEY**

# (#) AM (PM) Peak Hour Pedestrian Volumes

X (Y) AM (PM) Peak Hour Bicycle Volumes

Signalized Intersection

Stop Sign

Figure 3-3B.

Alameda Point Campus
Existing Pedestrian and Bicycle Volumes

WC12-2953_3-3B_BikePedVol

FEHR PEERS

**TABLE 3-1**
**ALAMEDA POINT**
**EXISTING CONDITIONS – STUDY INTERSECTION LOS SUMMARY**

| Intersection | Control | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|
| | | Delay (Seconds)[1] | LOS[1] | Delay (Seconds)[1] | LOS[1] |
| ***City of Alameda:*** | | | | | |
| 1. Webster Street/ Willie Stargell Avenue | Signal | 20.7 | C | 18.9 | B |
| 2. Main Street/ Atlantic Avenue | Signal | 11.2 | B | 11.5 | B |
| 3. Third Street/ Atlantic Avenue | Signal | 19.8 | B | 43.3 | D |
| 4. Webster Street/ Atlantic Avenue | Signal | 36.1 | D | 28.3 | C |
| 5. Constitution Way/ Atlantic Street | Signal | 20.5 | C | 23.1 | C |
| 6. Main Street/ Pacific Avenue | Signal | 22.6 | C | 13.5 | B |
| 7. Webster Street/ Lincoln Avenue | Signal | 16.9 | B | 13.9 | B |
| 8. Constitution Way/ Lincoln Avenue | Signal | 20.3 | C | 21.1 | C |
| 9. 8th Street/ Central Avenue | Signal | 39.3 | D | 39.9 | D |
| ***City of Oakland:*** | | | | | |
| 10. Broadway/ 5th Street | Signal | 23.5 | C | 31.9 | C |
| 11. Webster Street/ 8th Street | Signal | 15.3 | B | 16.7 | B |
| 12. Harrison Street/ 7th Street | Signal | 77.4 | E | **>120 (v/c=0.73)** | **F** |
| 13. Jackson Street/ 7th Street | Signal | 12.0 | B | 12.2 | B |

Notes: **Bold** indicates intersection operating at unacceptable LOS E/F in Alameda or unacceptable LOS F in Oakland.
1. Signalized and all-way stop-controlled intersection delay and LOS based on average control delay per vehicle, according to the Highway Capacity Manual, Special Report 209, Transportation Research Board, 2000.

Source: Fehr & Peers.

#### 3.1.3.1 Existing Freeway Volumes

Existing freeway volumes are primarily derived from two sources of data: (1) October 2012 freeway volumes published by Caltrans through the California Freeway Performance Measurement System (PeMS), and (2) intersection turning movement counts at the tube termini collected in December 2012, and described in Section 3.1.2.1.

#### 3.1.3.2 Existing Freeway Operations

**Table 3-2** summarizes existing weekday AM and PM peak hour freeway LOS analysis results. **Appendix F** provides the detailed calculation work sheets. As shown in the table, both directions of I-880 west of I-980 and southbound I-880 between I-980 and Oak Street currently operate at LOS F during both peak hours. The Webster/Posey Tubes operate at LOS C or better during both peak hours.

**TABLE 3-2**
**ALAMEDA POINT**
**EXISTING CONDITIONS – FREEWAY SEGMENT LOS SUMMARY**

| Freeway Segment | Type[1] | Dir[2] | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|---|
| | | | Density[3] | LOS | Density[3] | LOS |
| 1. I-880, west of I-980 | Basic | NB | -- | F | -- | F |
| | Basic | SB | -- | F | -- | F |
| 2. I-880, between I-980 and Oak Street | Basic | NB | 34.7 | D | 36.1 | E |
| | Basic | SB | -- | F | -- | F |
| 3. I-880, south of Oak Street | Basic | NB | 33.1 | D | 33.0 | D |
| | Basic | SB | 32.5 | D | 36.6 | E |
| 4. Webster/Posey Tubes | Basic | NB | 22.4 | C | 19.0 | C |
| | Basic | SB | 14.8 | B | 22.0 | C |

1. Basic segments are analyzed as basic segments using the 2000 HCM methodologies.
2. NB = Northbound; SB = Southbound
3. Density is presented in passenger cars per lane per mile (pc/ln/mi).

Source: Fehr & Peers.

### 3.1.4 EXISTING TRANSIT SERVICES

The Alameda Point site is served indirectly by BART, AC Transit, ferries, and Amtrak. **Figure 3-4** shows the transit routes in the vicinity of the site. Each transit service is described below.


Figure 3-4.

## Alameda Point Campus Existing Transit Service

WC12-2953_3-4_APCtransit

FEHR PEERS

#### 3.1.4.1 BART

BART provides regional commuter rail transit in Alameda, Contra Costa, San Francisco, and San Mateo counties. Currently, BART trains operate on weekdays from 4:00 AM to midnight, on Saturdays from 6:00 AM to midnight, and on Sundays from 8:00 AM to midnight. The nearest BART station to Alameda Point is the Lake Merritt BART Station (about 2.5 miles northeast of Alameda Point) in Oakland, which is served by the Fremont-Richmond, Fremont-Daily City, and Dublin/Pleasanton-Daly City lines. Typically, the Lake Merritt BART Station is served by a train every five (peak weekday commute periods) to ten minutes (Sundays). The average weekday daily ridership for the Lake Merritt BART Station is about 11,800, riders in January 2013.

#### 3.1.4.2 AC Transit

Local bus service in Alameda is provided by AC Transit. **Figure 3-4** illustrates the existing AC Transit routes in the vicinity of Alameda Point. **Table 3-3** describes the major bus routes serving the Project area. Most bus routes operate along Webster Street, which is about one mile east of the Alameda Point site.

#### 3.1.4.3 Ferry Service

The Alameda Main Street Ferry Terminal is located about one mile north of the Project site. The Water Emergency Transportation Authority (WETA) provides weekday commute ferry service between the Alameda Main Street Ferry Terminal and San Francisco, South San Francisco, and Oakland Jack London Square. The Alameda Ferry Terminal is typically in operation on weekdays from 6:00 AM to 8:45 PM with seasonal service provided on weekends.

#### 3.1.4.4 Amtrak

The Oakland Jack London Square Station, located about 3.5 miles northeast of the Alameda Point site, provides Amtrak service on three routes – the Capital Corridor (15 trains per day in each direction between San Jose and Sacramento); the San Joaquin Intercity (four trains per day in each direction to Bakersfield via Modesto and Fresno) and the Coast Starlight (one train per day in each direction between Seattle and Los Angeles).

**TABLE 3-3**
**ALAMEDA POINT**
**AC TRANSIT SERVICE SUMMARY**

| Line | Route | Nearest Stop [1] | Weekday | | Weekend | |
|---|---|---|---|---|---|---|
| | | | Hours | Frequency | Hours | Frequency |
| ***Local Routes*** | | | | | | |
| 20 | Dimond District – Downtown Oakland | Webster St./ Central Ave. (About 1.6 miles) | 5:00 AM – 10:00 PM | 30 minutes | 5:00 AM – 10:00 PM | 30 minutes |
| 31 | Alameda Point – Macarthur BART | Main St./ Pacific Ave. (About 0.8 miles) | 6:00 AM – 10:00 PM | 30 minutes | 6:00 AM – 10:00 PM | 30 minutes |
| 51A | Rockridge BART – Fruitvale BART | Webster St./ Santa Clara Ave. (About 1.6 miles) | 5:15 AM – 12:00 AM | 10-20 minutes | 5:40 AM – 12:00 AM | 15-20 minutes |
| ***Night Routes*** | | | | | | |
| 851 | Downtown Berkeley – Fruitvale BART | Webster St./ Santa Clara Ave. (About 1.6 miles) | 12:30 AM – 4:30 AM | 60 minutes | 12:30 AM – 4:30 AM | 60 minutes |
| ***Transbay Routes*** | | | | | | |
| O | Fruitvale BART – San Francisco | Webster St./ Santa Clara Ave. (About 1.6 miles) | 5:20 AM – 9:20 PM | 30 – 60 minutes | 5:20 AM – 9:20 AM | 60 minutes |
| W | Broadway & Blanding – San Francisco | Webster St./ Santa Clara Ave. (About 1.6 miles) | 6:00 AM – 9:00 AM | 20 – 30 minutes | N/A | N/A |

1. Distance shown is current walking distance between bus stop and Ferry Point at West Hornet Avenue.
Source: AC Transit, 2013.

## 3.1.5 EXISTING PEDESTRIAN AND BICYCLE CIRCULATION

As the area in the vicinity of Alameda Point site is mostly industrial, few of the streets currently provide sidewalks. Most pedestrian activity occurs in the extended shoulder of the streets and along industrial driveways. Roadways in the study area that do provide pedestrian facilities include: Hornet Avenue on the south side of the street; Ferry Point north of Avenue L; and Atlantic Avenue. Although there are no sidewalks along the remaining roadways, some of the intersections include marked crosswalks. In addition to sidewalks and crosswalks, there is a multi-use trail just south of the Alameda Point site, along Alameda Park.

Based on the *City of Alameda Bicycle Master Plan Update* (November 2010), bicycle facilities in the study area can be classified into three types, including:

- ***Bicycle Paths (Class 1)*** – These facilities are located off-street and can serve both bicyclists and pedestrians.
- ***Bicycle Lanes (Class 2)*** – These facilities provide a dedicated area for bicyclists within the paved street width through the use of striping and appropriate signage.
- ***Bicycle Routes (Class 3)*** – These facilities are found along streets that do not provide sufficient width for dedicated bicycle lanes. The street is then designated as a bicycle route through the use of signage informing drivers to expect bicyclists.

**Figure 3-5** identifies existing and proposed bicycle facilities in the study area. Currently, bicyclists are allowed on all roadways in the study area. Existing bicycle facilities near the project site include Class 1 bicycle paths along the shoreline in Alameda Park and adjacent to Main Street and Class 3 bicycle routes on Hancock Street between Central Avenue and the shoreline. The *2010 Alameda Bicycle Master Plan Update* proposes to extend the existing Class 1 paths adjacent to Atlantic Avenue and the shoreline further into Alameda Point. The Bicycle Master Plan Update also identifies Central and Pacific Avenues as future Class 3 bicycle routes.

As previously shown on Figures 3-3A and 3-3B, study intersections nearest to the Alameda Point site have minimal pedestrian and bicycle activity, while study intersections along Webster Street and Constitution Way have moderate pedestrian and bicycle activity, and study intersections in Oakland have high pedestrian activity as they are located in a high-density urban commercial area.

## 3.2 REGULATORY CONSIDERATIONS

### 3.2.1 ALAMEDA GENERAL PLAN

The Alameda General Plan Transportation Element contains the following objectives and supporting policies that are relevant to the Project:

<u>Objective 4.1.2:</u> Protect and enhance the service level of the transportation system.

Policy 4.1.2.a Develop multimodal level of service (LOS) standards that development will be required to maintain by encouraging the use of non-automotive modes.

<u>Objective 4.1.6</u>: Increase the efficiency of the existing transportation system by emphasizing Transportation System Management (TSM) strategies and Transportation Demand Management (TDM) techniques.


Figure 3-5.

## Alameda Point Campus Existing and Future Bicycle Network

WC12-2953_3-5_APCbike

FEHR & PEERS

Policy 4.1.6.a Identify, develop, and implement travel demand management strategies to reduce demand on the existing transportation system.

1. Establish peak hour trip reduction goals for all new developments as follows:
    - 10 percent peak hour trip reduction for new residential developments
    - 30 percent peak hour trip reduction for new commercial developments

Policy 4.1.6.e Support and maintain an up-to-date Transportation System Management (TSM) and Transportation Demand Management (TDM) plan consistent with state law to provide adequate traffic flow to maintain established LOS.

1. Develop a TDM plan which would include specific requirements for new developments to implement measures to mitigate their traffic impacts based on an applicable nexus.

2. Develop one or more sub-area TDM plans to help address the unique conditions of different areas within Alameda.

Policy 4.1.6.f Require monitoring programs to ensure that TSM and TDM measures mitigate impacts.

1. Develop thresholds of significance for ongoing monitoring and evaluation of TSM/ TDM measures

<u>Objective 4.2.3</u>: Plan, develop and implement a transportation system that protects and enhances air and water quality, protects and enhances views and access to the water, and minimizes noise impacts on residential areas.

Policy 4.2.3.c Identify and pursue opportunities to enhance shoreline access for pedestrians.

Policy 4.2.3.d Support and prioritize trip reduction strategies that maximize air quality benefits and reduce greenhouse gas emissions.

1. Support the use of alternative fuel vehicles for all transportation modes.

2. Encourage shift of trips to alternative transportation modes. This includes short trips, as these will have a disproportionate impact on air quality.

<u>Objective 4.2.4:</u> Develop a Transportation plan based on existing and projected land uses and plans. Encourage land use decisions that facilitate implementation of this transportation system.

Policy 4.2.4.a Encourage development patterns and land uses that promote the use of alternate modes and reduce the rate of growth in region-wide vehicle miles traveled.

Policy 4.2.4.b Integrate planning for Environmentally Friendly Modes, including transit, bicycling and walking, into the City's development review process.

<u>Objective 4.3.1:</u> Develop programs and infrastructure to encourage the use of high occupancy vehicles (HOVs), such as buses, ferries, vans and carpools.

Policy 4.3.1.c Actively encourage increases in public transit, including frequency and geographic coverage.

Policy 4.3.1.d Encourage and support efforts to provide information to use environmentally-friendly transportation modes.

Policy 4.3.1.e Provide amenities or support programs to make using alternative modes a more attractive option.

Policy 4.3.1.f Reduce vehicle trips through telecommuting or other options.

Policy 4.3.1.i Develop parking management strategies for both new development projects and, as appropriate, for existing development.

<u>Objective 4.4.1</u>: Require developers to reserve and construct (if nexus exists) rights of way, transportation corridors and dedicated transportation facilities through the development process and other means.

1. Develop design guidelines for pedestrian access in new development and redevelopment areas, including shopping centers, residential developments, and business parks.
2. In any new development or re-development, safe and convenient pedestrian connections between major origins and destinations, including connections within the development and between the development and adjacent areas, should be a high priority in evaluating the site plan.
3. Develop shoreline access design guidelines.

<u>Objective 4.4.2</u>: Ensure that new development implement approved transportation plans, including the goals, objectives, and policies of the Transportation Element of the General Plan and provides the transportation improvements needed to accommodate that development and cumulative development.

Policy 4.4.2.a Roadways will not be widened to create additional automobile travel lanes to accommodate additional automobile traffic volume with the exception of increasing transit exclusive lanes or non-motorized vehicle lanes.

Policy 4.4.2.b Intersections will not be widened beyond the width of the approaching roadway with the exception of a single exclusive left turn lane when necessary with the exception of increasing transit exclusive lanes or non-motorized vehicle lanes.

Policy 4.4.2.d All EIRs must include analysis of the effects of the project on the city's transit, pedestrian and bicycling environment, including adjacent neighborhoods and the overall City network.

Policy 4.4.2.e EIRs will not propose mitigations that significantly degrade the bicycle and pedestrian environment which are bellwethers for quality of life issues and staff should identify "Levels of Service" or other such measurements to ensure that the pedestrian and bicycling environment will not be significantly degraded as development takes place.

Policy 4.4.2.f Transportation related mitigations for future development should first implement TDM measures with appropriate regular monitoring; transit, bicycle and pedestrian capital projects; and more efficient use of existing infrastructure such as traffic signal re-timing in order to reduce the negative environmental effects of development, rather than attempting to accommodate them. Should appropriate regular monitoring indicate that these mitigations are unable to provide the predicted peak-hour vehicle trip reductions, additional TDM measures, development specific traffic caps, or mitigations through physical improvements of streets and intersections, consistent with policy 4.4.2.a and policy 4.4.2.b, may be implemented.

Policy 4.4.2.g After the implementation of quantifiable/verifiable TDM measures (verified through appropriate regular monitoring), and mitigation measures consistent with 4.4.2.f and identification of how multimodal infrastructure relates to congestion concerns, some congestion may be identified in an EIR process as not possible to mitigate. This unmitigated congestion should be evaluated and disclosed (including intersection delay length of time) during the EIR process, and acknowledged as a by-product of the development and accepted with the on-going funding of TDM measures.

## 3.3 PROJECT TRANSPORTATION CHARACTERISTICS

Similar to the Phase 1 development at the RBC site (described in Section 2.3), the proposed development at Alameda Point would include up to six new buildings providing 600,000 square feet of space and would accommodate up to 1,000 employees by 2018. The project would develop generally vacant land in the area bound by Ferry Point, Avenue L, Orion Street and West Hornet Avenue. Vehicular access to and from the site would be provided from West Hornet Avenue.

It is expected that the development would provide adequate parking in surface parking lots to meet demand at the site. This analysis also assumes that the development at Alameda Point, similar to the RBC project, would provide regular shuttle service to and from the Lake Merritt BART Station and LBNL/UC Berkeley.

### 3.3.1 TRIP GENERATION

**Table 3-4** shows the estimated vehicle trip generation for the proposed Project at Alameda Point. This assessment uses the same trip generation used for the Phase 1 Project at the RBC site (See Section 2.3.6 for a detailed description) because the Alameda Point and RBC sites have similar characteristics such as transit availability, pedestrian and bicycle facilities, and proximity to residential and non-residential uses.

For example, both sites are more than two miles from BART and Amtrak stations, both sites have less than 5,000 residents and less than 500 retail employees within one mile of their locations.

**TABLE 3-4**
**ALAMEDA POINT**
**PROJECT VEHICLE TRIP GENERATION SUMMARY**

| | Average Daily Population | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total |
| Alameda Point Alternative [1] | 1,000 | 2,079 | 182 | 29 | 211 | 27 | 172 | 199 |

1. Based on following trip generation rates:
Daily = 2.08 trips per Average Daily Population (ADP); AM Peak Hour = 0.21 trips per ADP (86% in, 14% out);
PM Peak Hour = 0.20 trips per ADP (13% in, 87% out)

Source: Fehr & Peers, based on trip generation rate per average daily population at the existing LBNL site in Berkeley adjusted to reflect the different characteristics of the Alameda Point site.

It is estimated that the proposed development at Alameda Point would generate about 2,080 daily automobile trips, 210 AM peak hour trips, and 200 PM peak hour trips.

### 3.3.2 TRIP DISTRIBUTION AND ASSIGNMENT

Trip distribution is defined as the directions of approach and departure that vehicles would use to arrive at and depart from the Project site. The assessment of the Alameda Point site estimated the distribution of project trips based on existing travel patterns, location of complementary land uses, and results from the ACTC Travel Demand Model. **Figure 3-6** shows the resulting trip distribution. **Figures 3-7A and 3-7B** show the Project Phase 1 trip assignment at the study intersections, based on the distribution.

## 3.4 NEAR-TERM (2018) ANALYSIS

This section summarizes traffic operations under Near-Term (2018) No Project and Near-Term (2018) Plus Project conditions.

### 3.4.1 NEAR-TERM (2018) NO PROJECT CONDITIONS

The Near-Term (2018) No Project traffic volumes were developed by interpolating between the existing volumes (Figure 3-2) and the projected 2035 volumes (Figure 3-10), which were prepared using the ACTC Countywide Travel Demand Model and described in Section 3.5. **Figures 3-8A and 3-8B** show the Near-Term (2018) No Project traffic volumes.

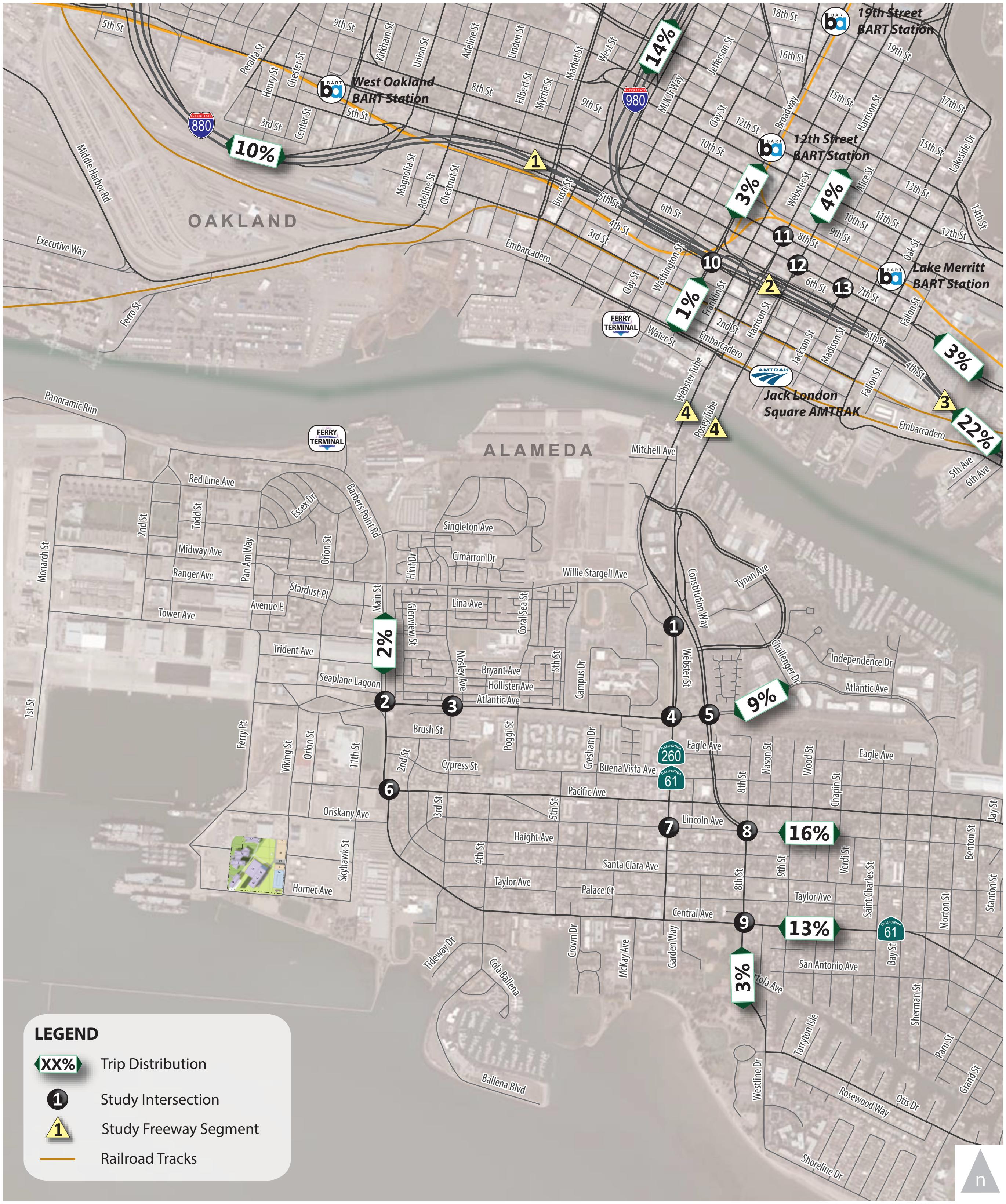



Figure 3-6.

## Alameda Point Campus Project Trip Distribution

WC12-2953_3-6_APCtripdistro

FEHR & PEERS

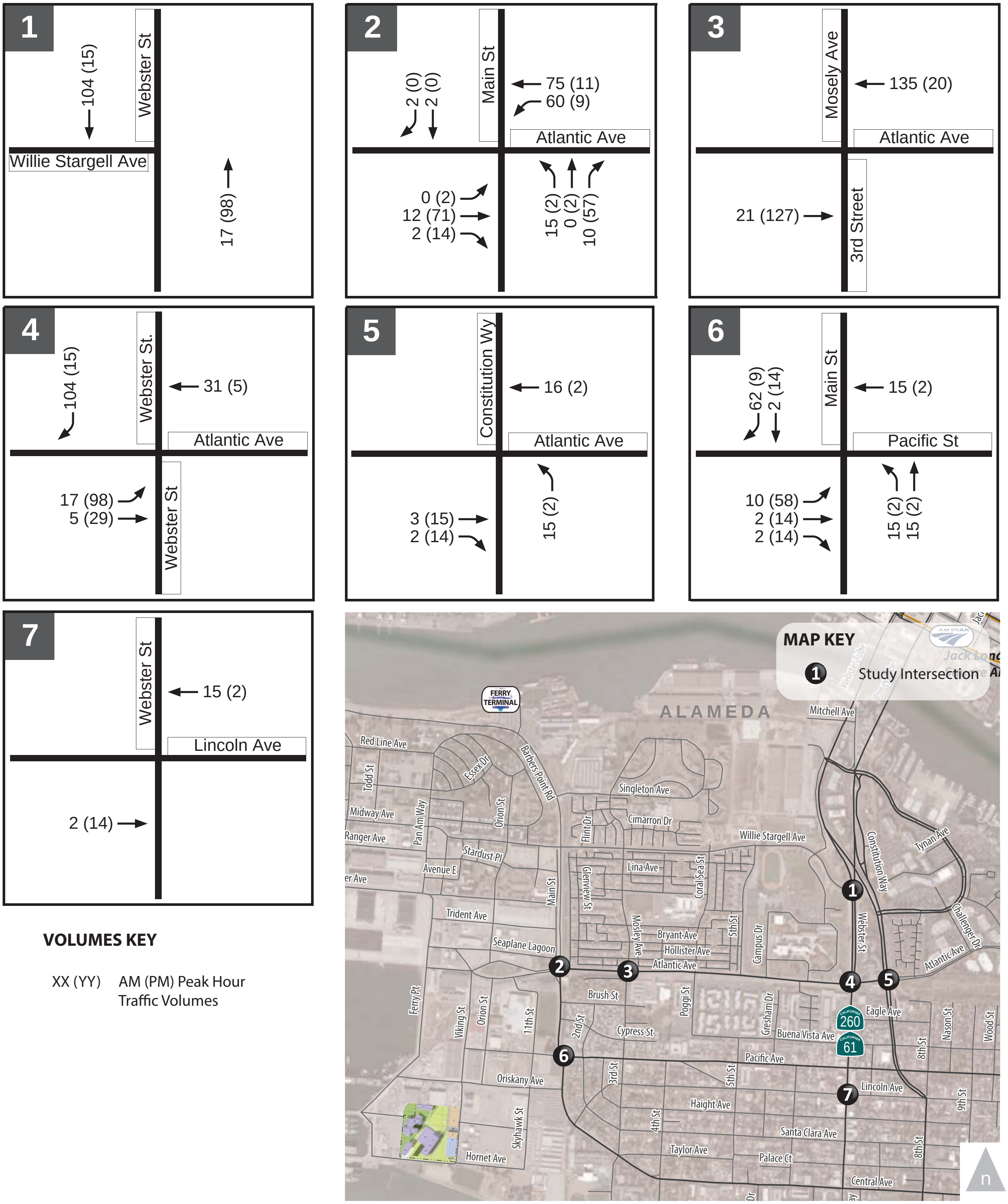
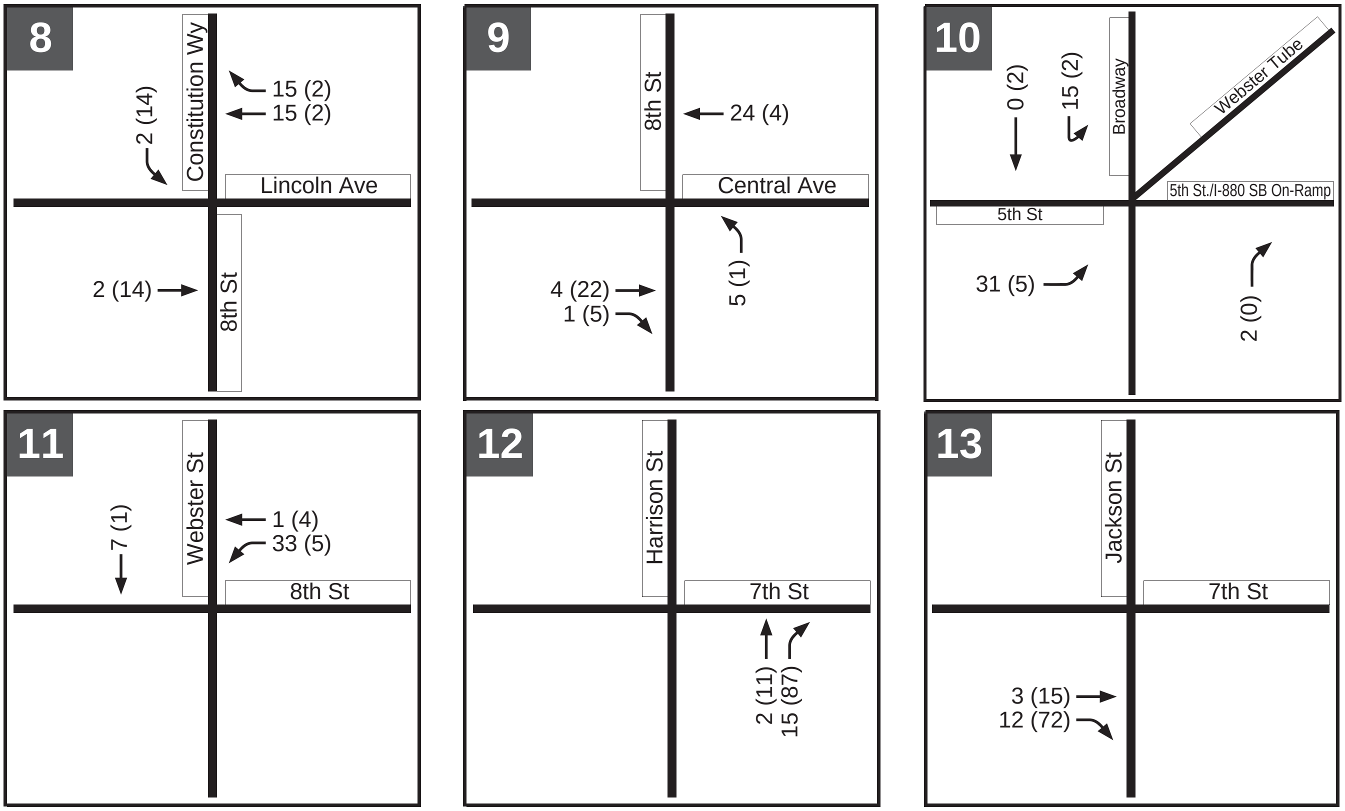



Figure 3-7A.

Alameda Point Campus
Project Trip Assignment (Phase 1)

WC12-2953_3-7A_Ph1PTA

FEHR & PEERS




**VOLUMES KEY**

XX (YY) AM (PM) Peak Hour Traffic Volumes

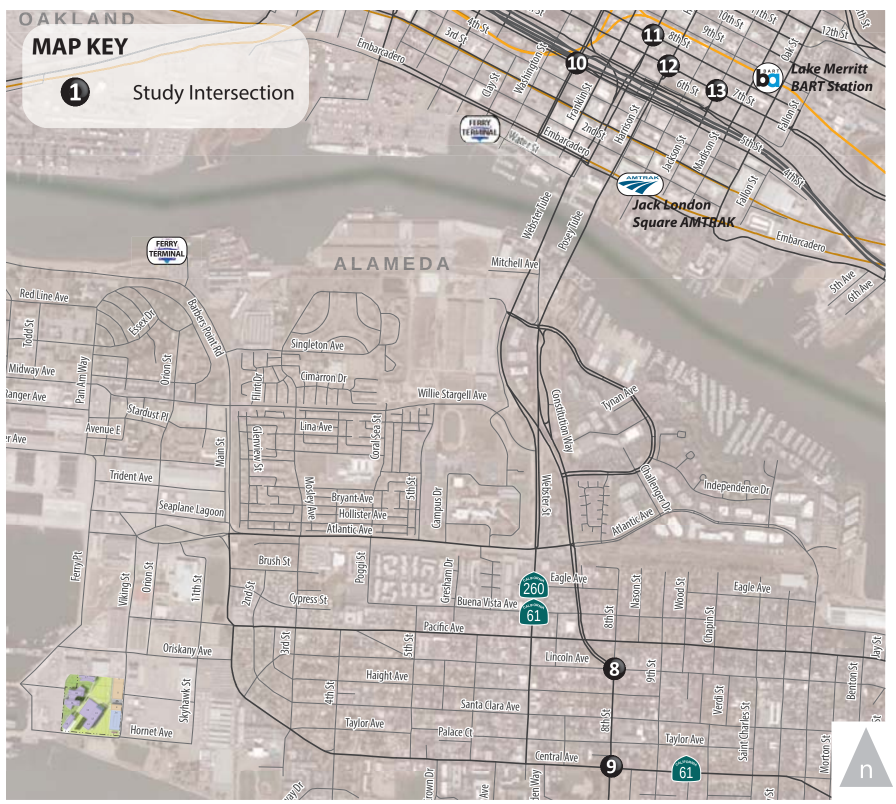



Figure 3-7B.

## Alameda Point Campus
## Project Trip Assignment (Phase 1)

WC12-2953_3-7B_Ph1PTA

FEHR PEERS

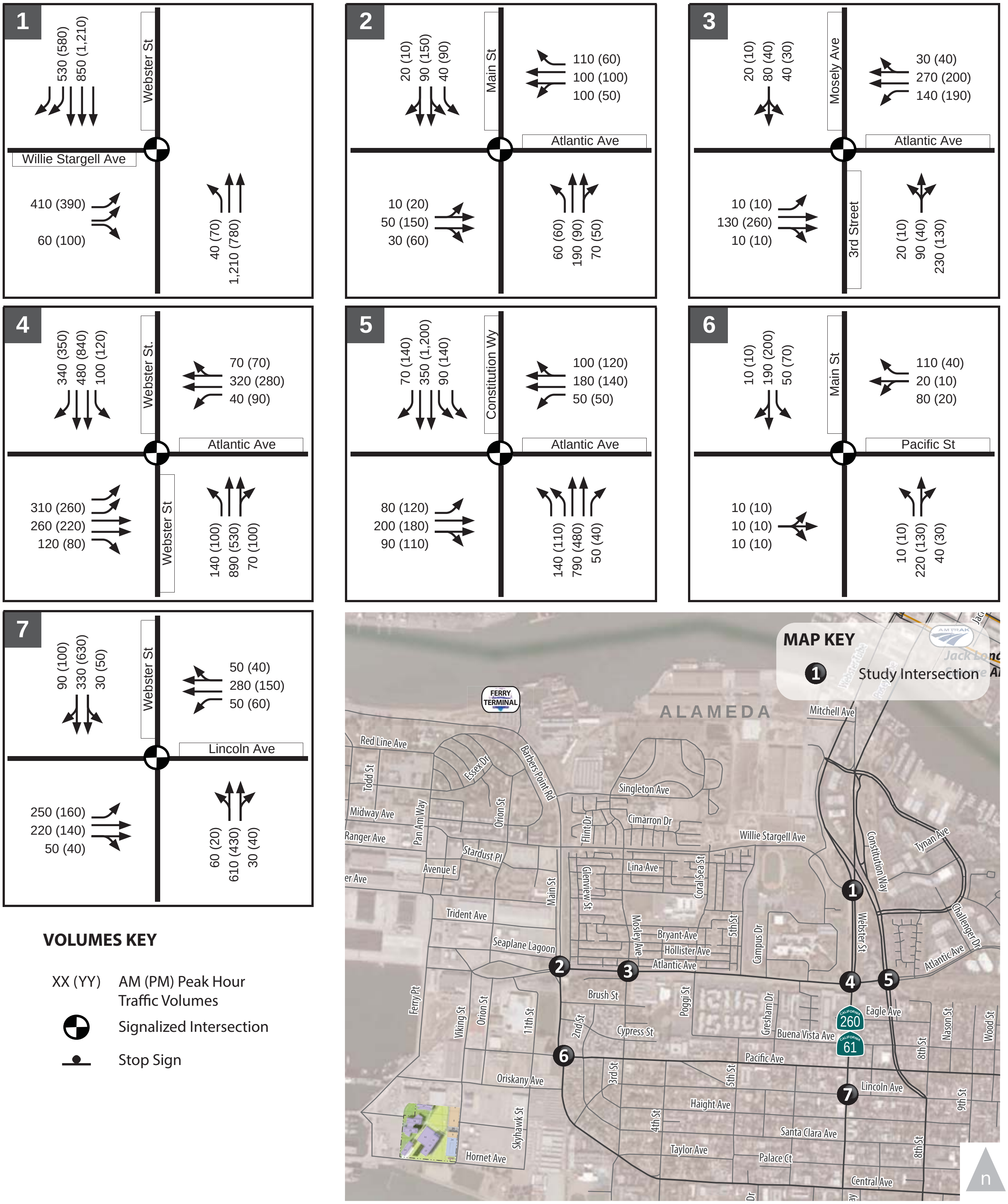
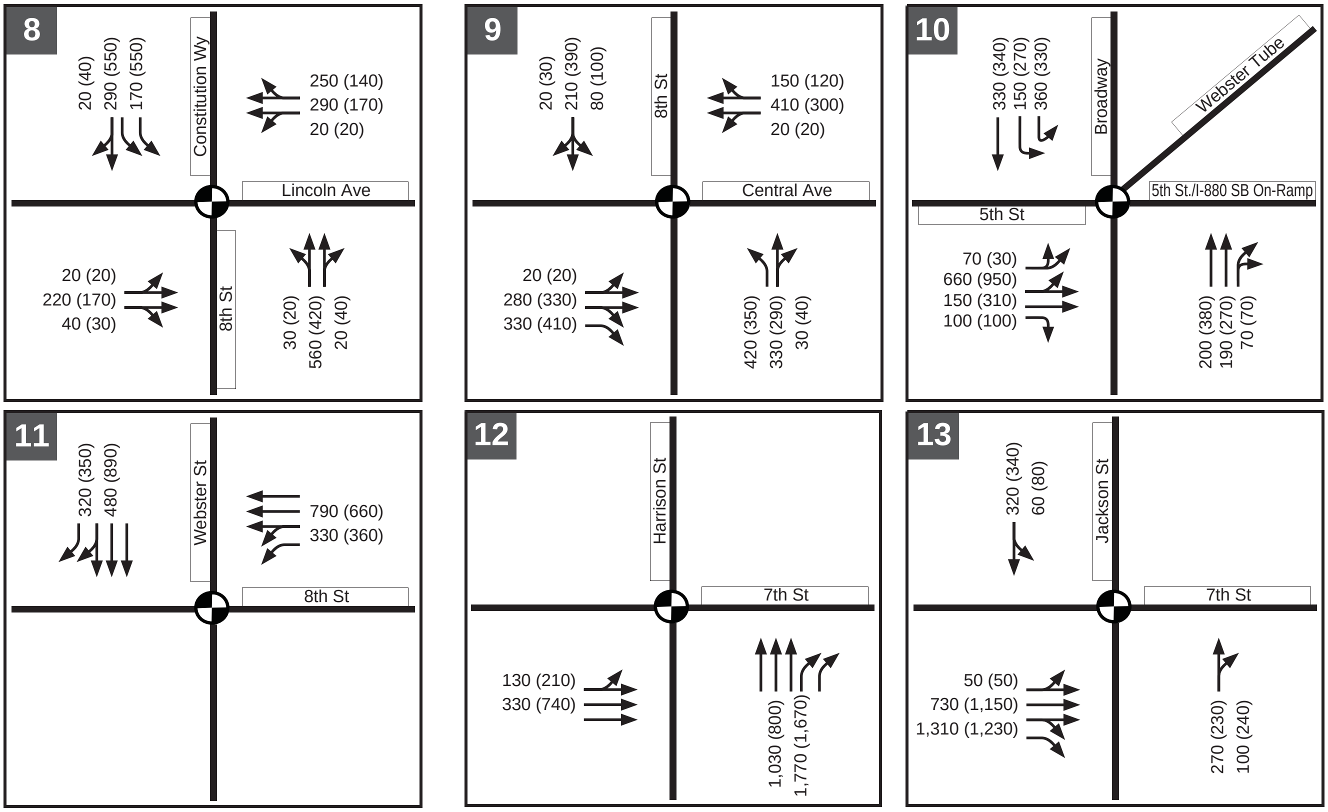


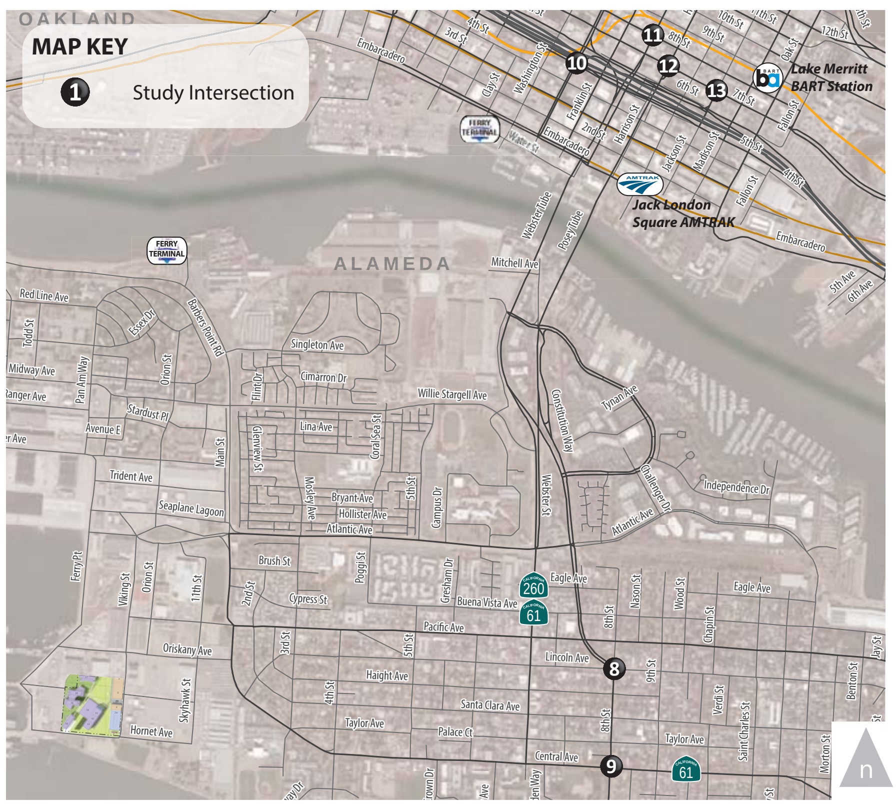

Figure 3-8A.

## Alameda Point Campus
## Near-Term (2018) No Project Peak Hour Traffic Volumes

WC12-2953_3-8A_NT2018NPvols

FEHR & PEERS




## VOLUMES KEY

XX (YY) AM (PM) Peak Hour Traffic Volumes

Signalized Intersection

Stop Sign

**Figure 3-8B.**

## Alameda Point Campus
## Near-Term (2018) No Project Peak Hour Traffic Volumes

WC12-2953_3-8B_NT2018NPvols

FEHR & PEERS

The Near-Term (2018) No Project scenario assumes that signal timing parameters at the signalized study intersections in Alameda would be optimized to reflect typical signal timing updates due to changing traffic flow over time. Consistent with City of Oakland practice, this analysis assumes that signal timing parameters would not change at the study intersections in Oakland. No other roadway modifications are assumed at any of the study intersections under the Near-Term (2018) No Project scenario.

#### 3.4.1.1 Intersection Operations

**Table 3-5** summarizes the Near-Term (2018) No Project intersection LOS analysis results. **Appendix E** provides the detailed calculation work sheets.

All study intersections in Alameda would continue to operate at LOS D or better during both AM and PM peak hours under Near-Term (2018) No Project conditions. All but one study intersection in Oakland would continue to operate at LOS E or better during both AM and PM peak hours. The one sub-standard intersection in Oakland is the 7th Street/Harrison Street intersection which would deteriorate from LOS E under Existing conditions to LOS F under Near-Term (2018) No Project conditions during the AM peak hour and would continue to operate at LOS F during the PM peak hour.

#### 3.4.1.2 Freeway Operations

**Table 3-6** summarizes the AM and PM peak hour freeway LOS analysis results under Near-Term (2018) No Project conditions. **Appendix F** provides the detailed calculation work sheets. Similar to Existing Conditions, both directions of I-880 west of I-980 and southbound I-880 between I-980 and Oak Street would continue to operate at LOS F during both peak hours; Webster/Posey Tubes would continue to operate at LOS C or better during both peak hours.

### 3.4.2 NEAR-TERM (2018) PLUS PROJECT CONDITIONS

**Figures 3-9A and 3-9B** show the Near-Term (2018) Plus Project traffic volumes, which consist of traffic volumes under Near-Term (2018) No Project conditions (Figures 3-8A and 3-8B) plus Project traffic assignment (Figures 3-7A and 3-7B). This analysis assumes no roadway modifications under this scenario.

#### 3.4.2.1 Intersection Operations

**Table 3-5** summarizes intersection operations at the study intersections under the Near-Term (2018) Plus Project conditions. **Appendix E** provides the detailed calculation work sheets.

All study intersections in Alameda would continue to operate at LOS D or better during both AM and PM peak hours under the Near-Term (2018) Plus Project conditions. The Project would not cause a significant impact at the study intersections in Alameda.

**TABLE 3-5**
**ALAMEDA POINT**
**NEAR-TERM (2018) CONDITIONS – STUDY INTERSECTION LOS SUMMARY**

| Intersection | Traffic Control | Peak Hour | Near-Term (2018) No Project | | Near-Term (2018) Plus Project | | Significant Impact? |
|---|---|---|---|---|---|---|---|
| | | | Delay[1] (seconds) | LOS[1] | Delay[1] (seconds) | LOS[1] | |
| **City of Alameda** | | | | | | | |
| 1. Webster Street/ Willie Stargell Avenue | Signal | AM | 19.1 | B | 19.8 | B | No |
| | | PM | 19.3 | B | 19.6 | B | No |
| 2. Main Street/ Atlantic Avenue | Signal | AM | 11.2 | B | 11.9 | B | No |
| | | PM | 11.6 | B | 11.9 | B | No |
| 3. Third Street/ Atlantic Avenue | Signal | AM | 22.2 | C | 22.4 | C | No |
| | | PM | 40.7 | D | 38.3 | D | No |
| 4. Webster Street/ Atlantic Avenue | Signal | AM | 42.9 | D | 45.3 | D | No |
| | | PM | 31.6 | C | 34.6 | C | No |
| 5. Constitution Way/ Atlantic Street | Signal | AM | 22.7 | C | 23.0 | C | No |
| | | PM | 25.8 | C | 26.0 | C | No |
| 6. Main Street/ Pacific Avenue | Signal | AM | 20.4 | C | 23.1 | C | No |
| | | PM | 16.0 | B | 19.5 | B | No |
| 7. Webster Street/ Lincoln Avenue | Signal | AM | 16.0 | B | 16.2 | B | No |
| | | PM | 14.5 | B | 14.5 | B | No |
| 8. Constitution Way/ Lincoln Avenue | Signal | AM | 22.0 | C | 22.4 | C | No |
| | | PM | 23.0 | C | 23.1 | C | No |
| 9. 8th Street/ Central Avenue | Signal | AM | 38.0 | D | 39.3 | D | No |
| | | PM | 44.8 | D | 45.0 | D | No |
| **City of Oakland** | | | | | | | |
| 10. Broadway/ 5th Street | Signal | AM | 26.4 | C | 27.4 | C | No |
| | | PM | 35.2 | D | 35.3 | D | No |
| 11. Webster Street/ 8th Street | Signal | AM | 15.9 | B | 16.0 | B | No |
| | | PM | 17.3 | B | 17.3 | B | No |
| 12. Harrison Street/ 7th Street | Signal | AM | **100.5 (v/c=0.74)** | **F** | **104.2 (v/c=0.75)** | **F** | Yes |
| | | PM | **>120 (v/c=0.86)** | **F** | **>120 (v/c=0.90)** | **F** | Yes |
| 13. Jackson Street/ 7th Street | Signal | AM | 16.8 | B | 16.7 | B | No |
| | | PM | 70.9 | E | 69.4 | E | No |

Notes: **Bold** indicates intersection operating at unacceptable LOS E/ F in Alameda or unacceptable LOS F in Oakland.
1. For signalized intersections, average intersection delay and LOS based on the 2000 HCM method is shown.
Source: Fehr & Peers.

**TABLE 3-6**
**ALAMEDA POINT**
**NEAR-TERM (2018) CONDITIONS – FREEWAY SEGMENT LOS SUMMARY**

| Freeway Segment | Type[1] | Dir[2] | Near-Term (2018) No Project | | | | Near-Term (2018) Plus Project | | | | Significant Impact? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | | |
| | | | Density[3] | LOS | Density[3] | LOS | Density[3] | LOS | Density[3] | LOS | |
| 1. I-880, west of I-980 | Basic | NB | -- | F | -- | F | -- | F | -- | F | No |
| | Basic | SB | -- | F | -- | F | -- | F | -- | F | No |
| 2. I-880, between I-980 and Oak Street | Basic | NB | 35.7 | E | 38.8 | E | 35.7 | E | 39.3 | E | No |
| | Basic | SB | -- | F | -- | F | -- | F | -- | F | No |
| 3. I-880, south of Oak Street | Basic | NB | 34.2 | D | 35.8 | E | 34.5 | D | 35.8 | E | No |
| | Basic | SB | 34.0 | D | 38.7 | E | 34.1 | D | 39.1 | E | No |
| 4. Webster/Posey Tubes | Basic | NB | 23.4 | C | 20.7 | C | 23.5 | C | 21.5 | C | No |
| | Basic | SB | 17.0 | B | 23.7 | C | 17.9 | B | 23.9 | C | No |

1. Segments with auxiliary lanes are classified as weave segments, and were analyzed based on the Leisch Method. Basic segments are analyzed as basic segments using the 2000 HCM methodologies.
2. NB = Northbound; SB = Southbound
3. Density is presented in passenger cars per lane per mile (pc/ln/mi).

Source: Fehr & Peers.

In Oakland, Project generated traffic would contribute to LOS F conditions at the Harrison Street/7th Street intersection during both AM and PM peak hours.

Project generated traffic would also contribute to LOS E conditions at the Jackson Street/7th Street intersection in Oakland during the PM peak hour; however, the Project would not cause an increase in the average delay for any of the critical movements by six seconds or more. Based on City of Oakland's significance criteria, the Project would not cause an impact at the Jackson Street/7th Street intersection under Near-Term (2018) No Project conditions.

The Project would cause a significant impact at one intersection in Oakland which is summarized under Impact 3-1 discussion.

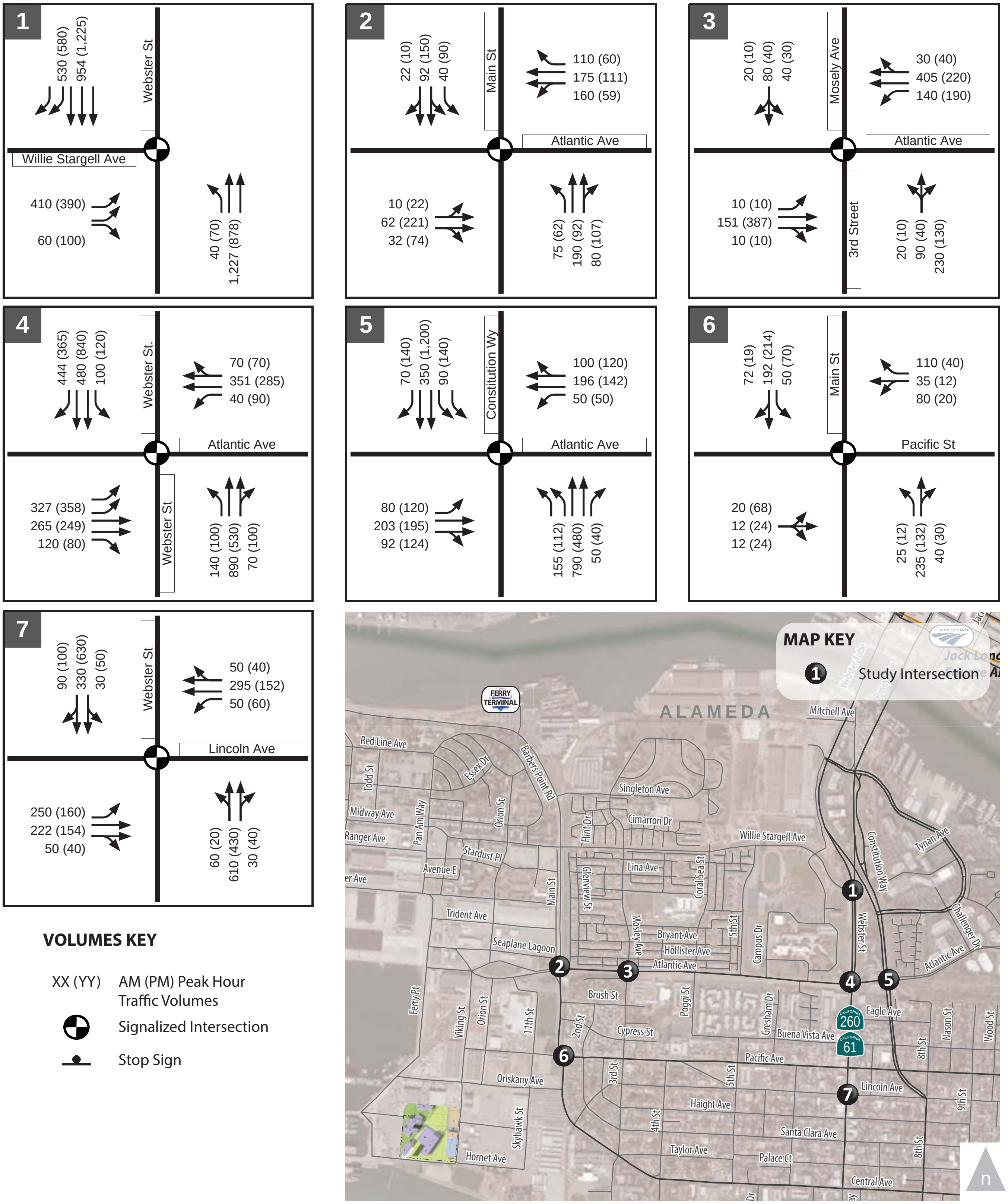
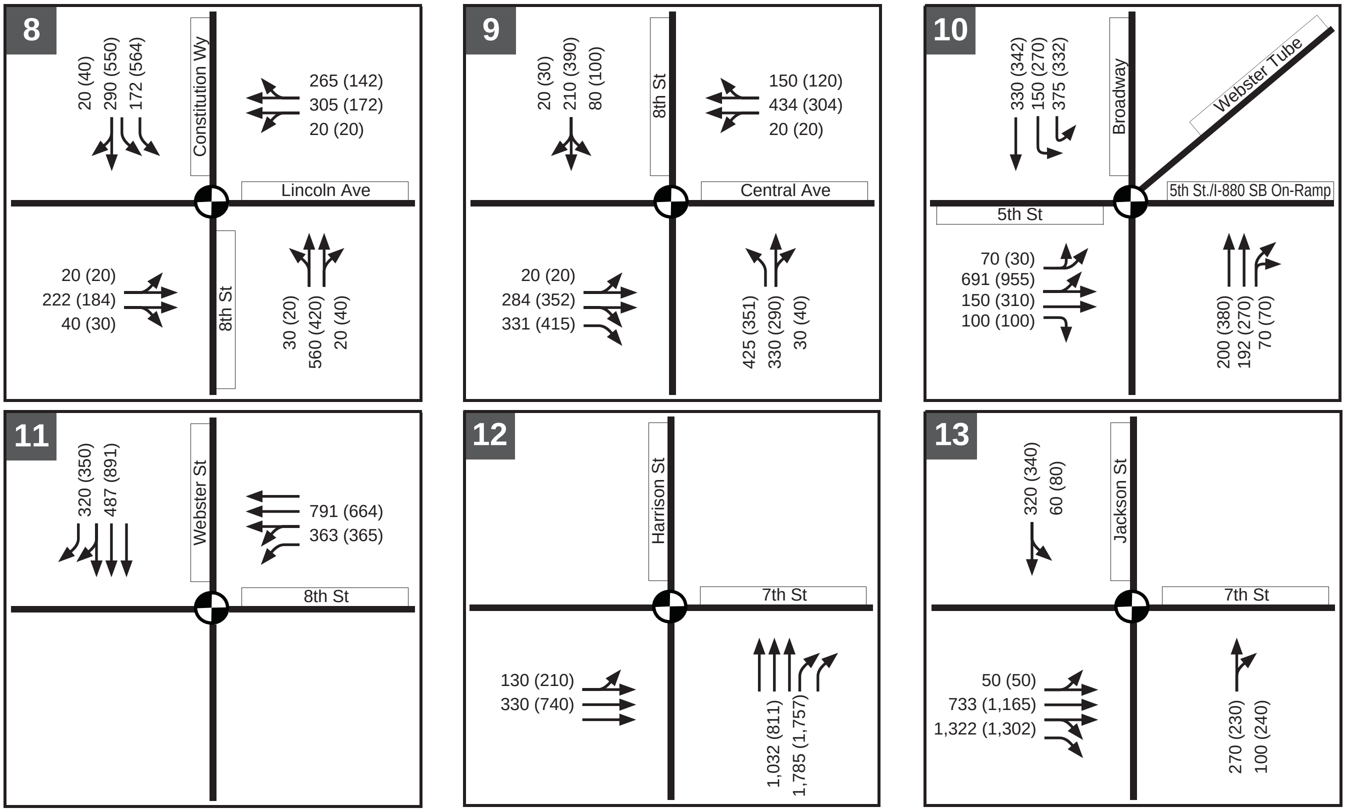
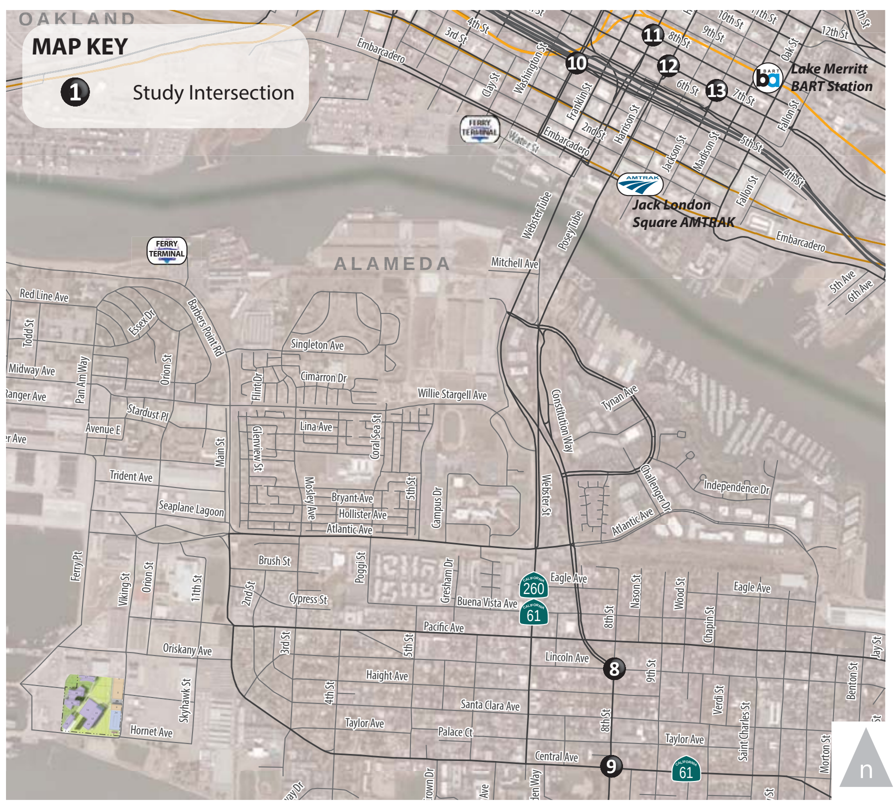



Figure 3-9A.

Alameda Point Campus
Near-Term (2018) Plus Phase 1 Peak Hour Traffic Volumes

WC12-2953_3-9A_NT2018+Ph1vols




**VOLUMES KEY**

XX (YY) AM (PM) Peak Hour Traffic Volumes

Signalized Intersection

Stop Sign

Figure 3-9B.

Alameda Point Campus
Near-Term (2018) Plus Phase 1 Peak Hour Traffic Volumes

WC12-2953_3-9B_NT2018+Ph1vols

FEHR & PEERS

**IMPACT 3-1: NEAR-TERM (2018) PLUS PROJECT CONDITIONS INTERSECTION OPERATIONS**

The proposed Project at Alameda Point would cause a significant impact at the following intersection under Near-Term (2018) Plus Project conditions:

A. The Project would cause a significant impact at the signalized **Harrison Street/7th Street** (Intersection 12) because it would increase the overall intersection v/c ratio by 0.01 or more and increase critical movement v/c ratio by 0.02 or more during both AM and PM peak hours at an intersection in downtown Oakland operating at LOS F regardless of the Project.

**Mitigation Measure 3-1:** Implement the following:

A. **Harrison Street/7th Street** (Intersection 12): Implement the following which requires coordination with City of Oakland:

- Increase traffic signal cycle length to 75 seconds and optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would continue to operate at LOS F during both AM and PM peak hours after the implementation of this mitigation measure. However, this mitigation measure would reduce the overall intersection v/c ratio and the critical movement v/c ratio to the same level or less than under Near-Term (2018) No Project conditions. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

### 3.4.2.2 Freeway Operations

**Table 3-6** summarizes the AM and PM peak hour freeway LOS analysis results under Near-Term (2018) Plus Project conditions. **Appendix F** provides the detailed calculation work sheets.

All freeway segments are projected to continue to operate at the same LOS as under Near-Term (2018) No Project conditions during both AM and PM peak hours. The proposed Project would not increase the peak hour volume by five percent or more at the study freeway segments that are projected to operate at LOS F. Therefore, the proposed Project would not cause a significant impact at the study freeway segments under Near-Term (2018) Plus Project conditions.

## 3.5 CUMULATIVE (2035) ANALYSIS

This section summarizes traffic operations under Cumulative (2035) No Project and Cumulative (2035) Plus Project conditions.

## 3.5.1 CUMULATIVE (2035) NO PROJECT CONDITIONS

Traffic forecasts to the year 2035 were developed based on the results of the ACTC Countywide Travel Demand Model. The most recent version of the ACTC Model, released in June 2011, which reflects assumptions in residential and non-residential land use growth consistent with ABAG *Projections 2009,* served as the basis for developing AM and PM peak hour intersection turning movement forecasts for the year 2035. The Model land use database and roadway network were checked for accuracy in the vicinity of the Project. The forecasting process involved running the 2010 and 2035 models and using the model produced volumes and existing turning movement count data, to estimate year 2035 intersection turn movements using the Furness[5] method. The 2035 model run did not assume any growth at the proposed Project site. **Figures 3-10A and 3-10B** show the Cumulative (2035) No Project traffic volumes.

Similar to the Near-Term (2018) No Project conditions, the Cumulative (2035) No Project analysis assumes that signal timing parameters at the signalized study intersections in Alameda would be optimized, while signal timing parameters at the study intersection in Oakland would remain the same. No other roadway modifications are assumed in the study area under the Cumulative (2035) No Project scenario.

### 3.5.1.1 Intersection Operations

**Table 3-7** summarizes the Cumulative (2035) No Project intersection LOS analysis results. **Appendix E** provides the detailed calculation work sheets.

All but one study intersection in Alameda would continue to operate at LOS D or better during both AM and PM peak hours under Cumulative (2035) No Project conditions.

In Oakland, the Harrison Street/7th Street intersection during both AM and PM peak hours and the Jackson Street/7th Street intersection during the PM peak hour would operate at LOS F. The other study intersections in Oakland would continue to operate at LOS E or better during both AM and PM peak hours.

### 3.5.1.2 Freeway Operations

**Table 3-8** summarizes the AM and PM peak hour freeway LOS analysis results under Cumulative (2035) No Project conditions. **Appendix F** provides the detailed calculation work sheets. All freeway segments are projected to continue to operate at LOS D or better during both AM and PM peak hours.

[5] Furnessing is an iterative process that develops future turning movements by applying the difference between the base model volumes and the existing counts to future model approach and departure volumes.

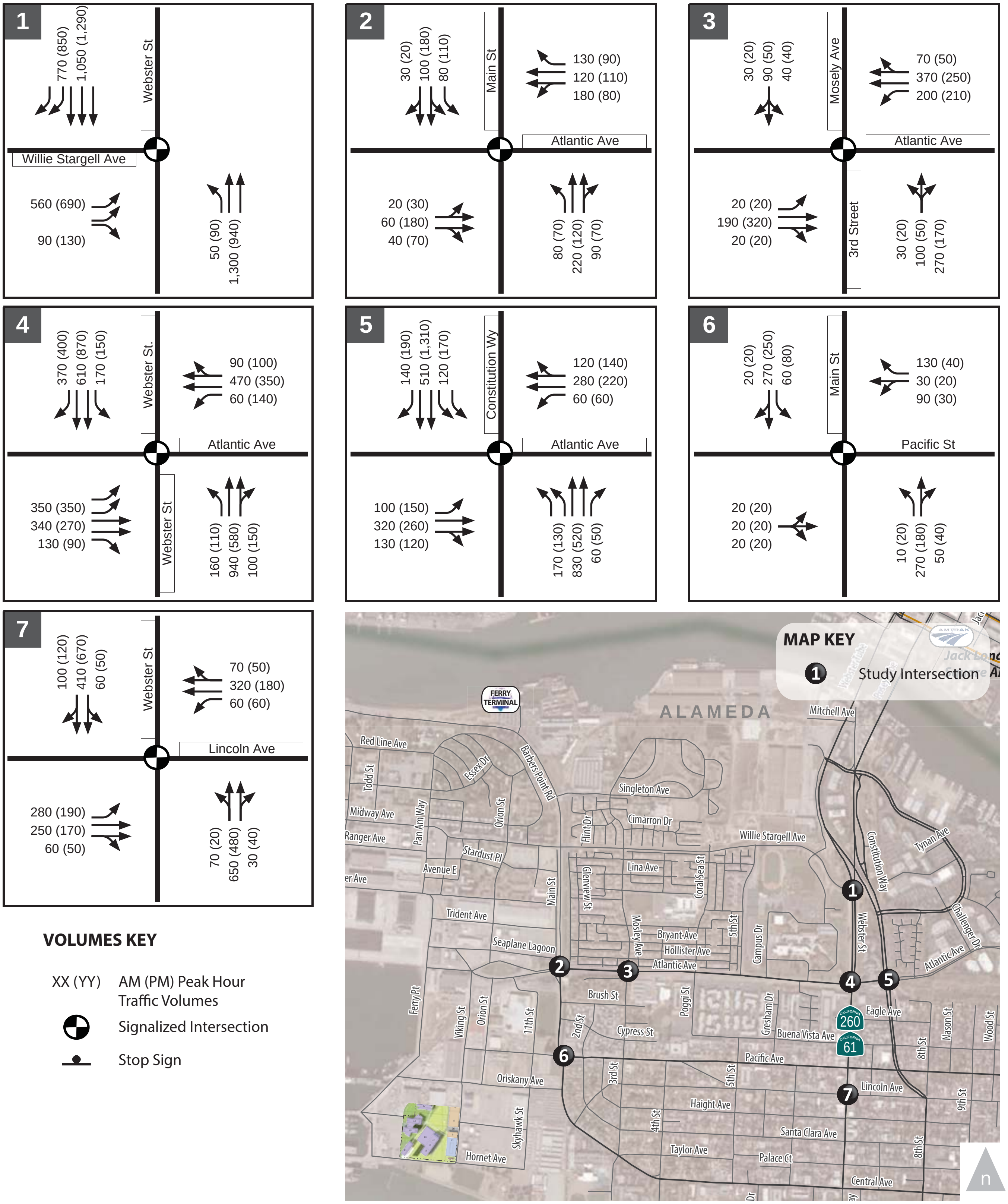
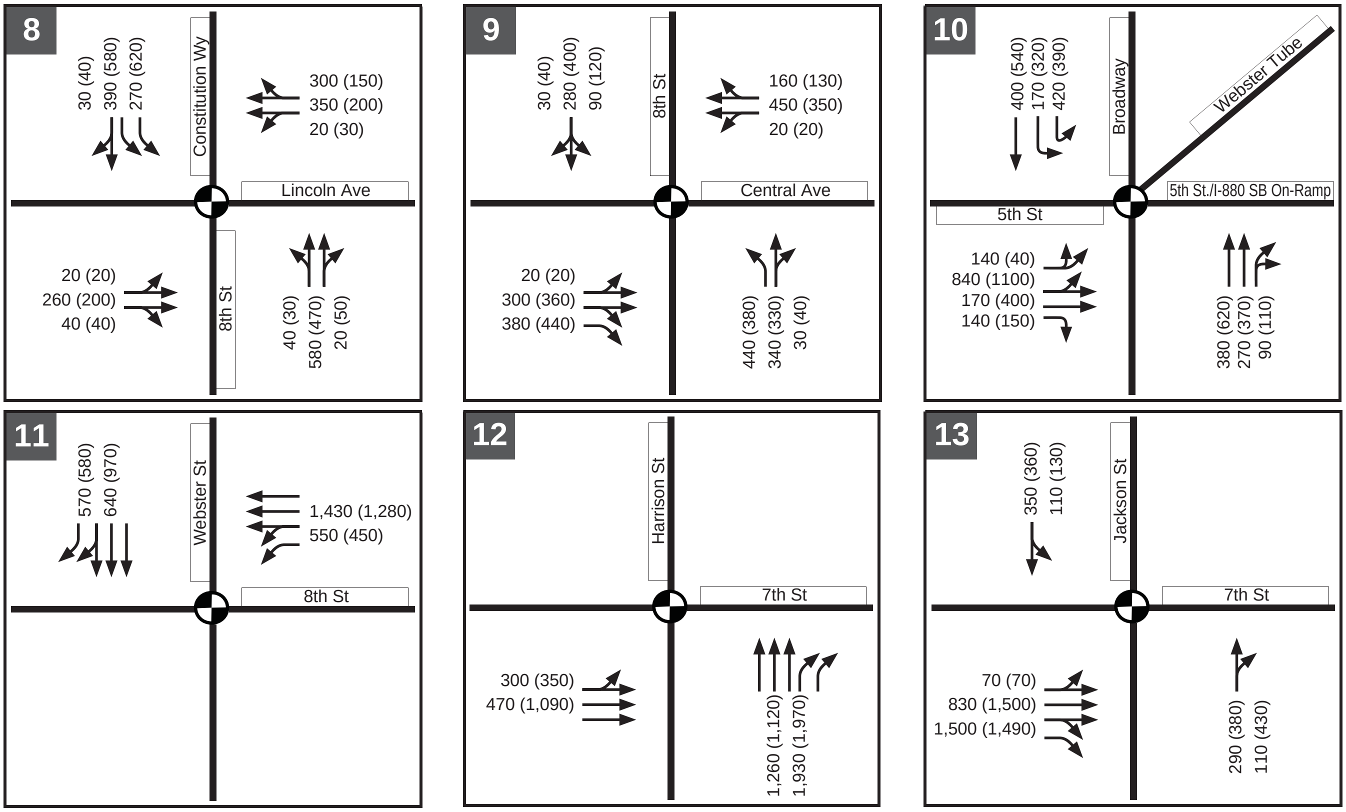
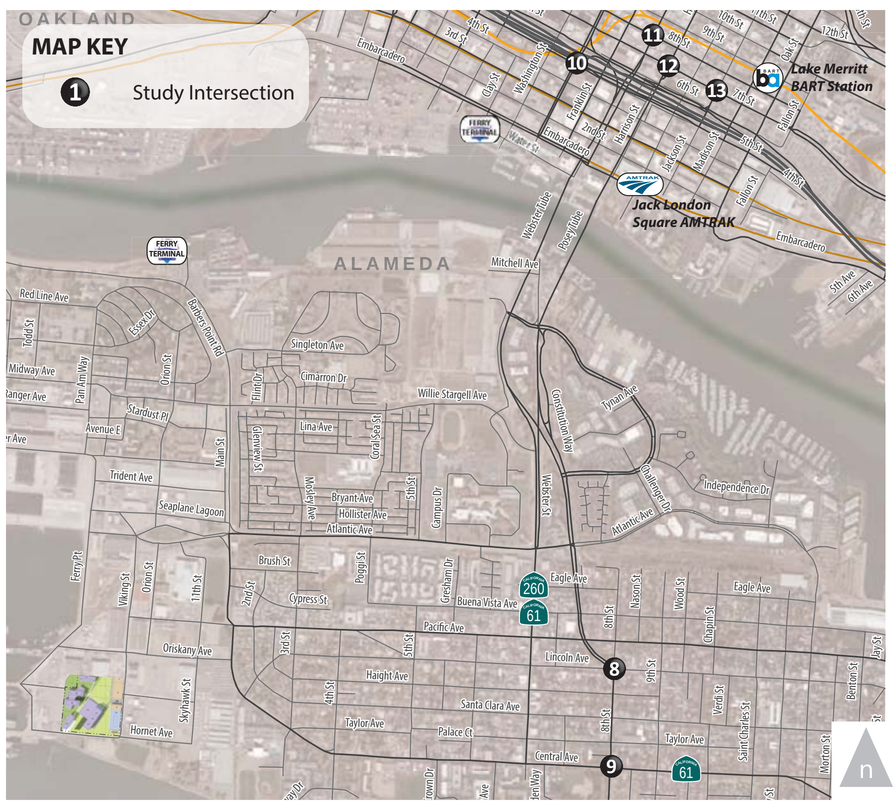



Figure 3-10A.

Alameda Point Campus
Cumulative (2035) No Project Peak Hour Traffic Volumes

WC12-2953_3-10A_Cumu2035NPvols




**VOLUMES KEY**

XX (YY) AM (PM) Peak Hour Traffic Volumes

Signalized Intersection

Stop Sign

Figure 3-10B.

## Alameda Point Campus
## Cumulative (2035) No Project Peak Hour Traffic Volumes

WC12-2953_3-10B_Cumu2035NPvols

FEHR & PEERS

**TABLE 3-7**
**ALAMEDA POINT**
**CUMULATIVE (2035) CONDITIONS – STUDY INTERSECTION LOS SUMMARY**

| Intersection | Traffic Control | Peak Hour | Cumulative (2035) No Project Delay[1] (seconds) | Cumulative (2035) No Project LOS[1] | Cumulative (2035) Plus Project Delay[1] (seconds) | Cumulative (2035) Plus Project LOS[1] | Significant Impact? |
|---|---|---|---|---|---|---|---|
| **City of Alameda** | | | | | | | |
| 1. Webster Street/ Willie Stargell Avenue | Signal | AM | 21.7 | C | 23.0 | C | No |
| | | PM | 21.0 | C | 21.5 | C | No |
| 2. Main Street/ Atlantic Avenue | Signal | AM | 12.1 | B | 13.1 | B | No |
| | | PM | 11.9 | B | 12.6 | B | No |
| 3. Third Street/ Atlantic Avenue | Signal | AM | 39.3 | D | 38.6 | D | No |
| | | PM | 45.6 | D | 45.6 | D | No |
| 4. Webster Street/ Atlantic Avenue | Signal | AM | 53.6 | D | 54.7 | D | No |
| | | PM | 40.8 | D | 46.3 | D | No |
| 5. Constitution Way/ Atlantic Street | Signal | AM | 28.0 | C | 28.6 | C | No |
| | | PM | 47.0 | D | 49.2 | D | No |
| 6. Main Street/ Pacific Avenue | Signal | AM | 26.6 | C | 30.2 | C | No |
| | | PM | 19.9 | B | 23.8 | C | No |
| 7. Webster Street/ Lincoln Avenue | Signal | AM | 19.5 | B | 20.0 | B | No |
| | | PM | 15.2 | B | 15.2 | B | No |
| 8. Constitution Way/ Lincoln Avenue | Signal | AM | 27.6 | C | 28.1 | C | No |
| | | PM | 27.1 | C | 27.4 | C | No |
| 9. 8th Street/ Central Avenue | Signal | AM | 44.3 | D | 46.5 | D | No |
| | | PM | 53.4 | D | 53.8 | D | No |
| **City of Oakland** | | | | | | | |
| 10. Broadway/ 5th Street | Signal | AM | 44.6 | D | 47.8 | D | No |
| | | PM | 60.4 | E | 60.6 | E | No |
| 11. Webster Street/ 8th Street | Signal | AM | 19.3 | B | 19.5 | B | No |
| | | PM | 19.9 | B | 19.9 | B | No |
| 12. Harrison Street/ 7th Street | Signal | AM | **>120 (v/c=0.95)** | **F** | **>120 (v/c=0.95)** | **F** | No |
| | | PM | **>120 (v/c=1.17)** | **F** | **>120 (v/c=1.21)** | **F** | **Yes** |
| 13. Jackson Street/ 7th Street | Signal | AM | 70.9 | E | 70.6 | E | No |
| | | PM | **>120 (v/c=2.89)** | **F** | **>120 (v/c=2.90)** | **F** | Yes |

Notes: **Bold** indicates intersection operating at unacceptable LOS E/F in Alameda or unacceptable LOS F in Oakland.
1. For signalized intersections, average intersection delay and LOS based on the 2000 HCM method is shown.
Source: Fehr & Peers.

**TABLE 3-8**
**ALAMEDA POINT**
**CUMULATIVE (2035) CONDITIONS – FREEWAY SEGMENT LOS SUMMARY**

| Freeway Segment | Type[1] | Dir[2] | Cumulative (2035) No Project | | | | Cumulative (2035) Plus Project | | | | Significant Impact? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | | |
| | | | Density[3] | LOS | Density[3] | LOS | Density[3] | LOS | Density[3] | LOS | |
| 1. I-880, west of I-980 | Basic | NB | -- | F | -- | F | -- | F | -- | F | No |
| | Basic | SB | -- | F | -- | F | -- | F | -- | F | No |
| 2. I-880, between I-980 and Oak Street | Basic | NB | 38.8 | E | -- | F | 38.9 | E | -- | F | No |
| | Basic | SB | -- | F | -- | F | -- | F | -- | F | No |
| 3. I-880, south of Oak Street | Basic | NB | 37.8 | E | -- | F | 38.2 | E | -- | F | No |
| | Basic | SB | 39.3 | E | -- | F | 39.3 | E | -- | F | No |
| 4. Webster/Posey Tubes | Basic | NB | 26.6 | D | 25.7 | C | 26.7 | D | 26.6 | D | No |
| | Basic | SB | 23.1 | C | 29.2 | D | 24.0 | C | 29.3 | D | No |

1. Segments with auxiliary lanes are classified as weave segments, and were analyzed based on the Leisch Method. Basic segments are analyzed as basic segments using the 2000 HCM methodologies.
2. NB = Northbound; SB = Southbound
3. Density is presented in passenger cars per lane per mile (pc/ln/mi).

Source: Fehr & Peers.

All three study freeway segments on I-880 would operate at LOS F during one or both peak hours. The Webster/Posey Tubes would operate at LOS D or better during both peak hours.

## 3.5.2 CUMULATIVE (2035) PLUS PROJECT CONDITIONS

**Figures 3-11A and 3-11B** show the Cumulative (2035) Plus Project traffic volumes, which consist of traffic volumes under Cumulative (2035) No Project conditions (Figures 3-10 and 3-10B) plus Project traffic assignment (Figures 3-7A and 3-7B). This analysis assumes no roadway modifications under this scenario.

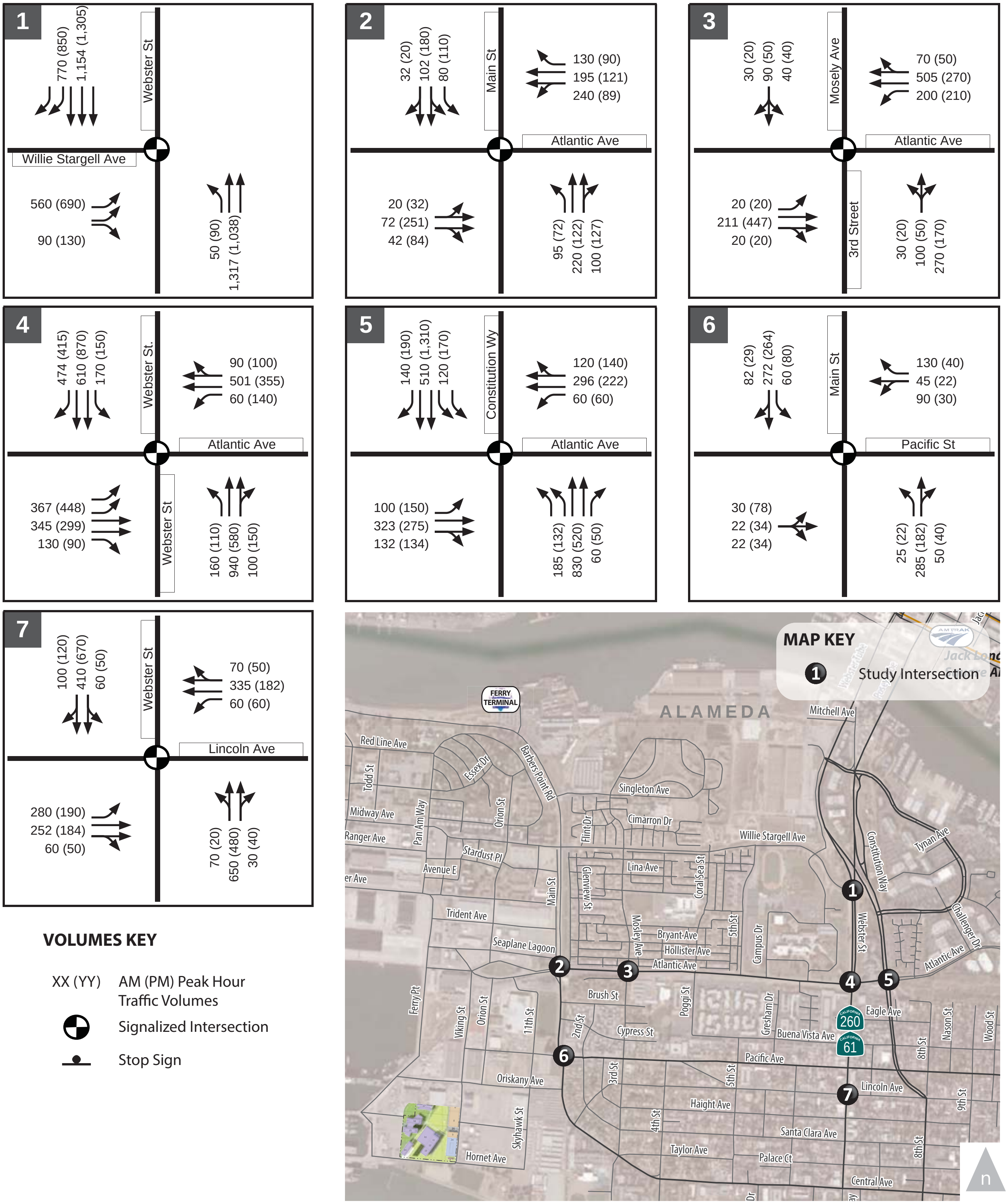



Figure 3-11A.

## Alameda Point Campus
## Cumulative (2035) Plus Phase 1 Peak Hour Traffic Volumes

WC12-2953_3-11A_Cumu2035+Ph1vols

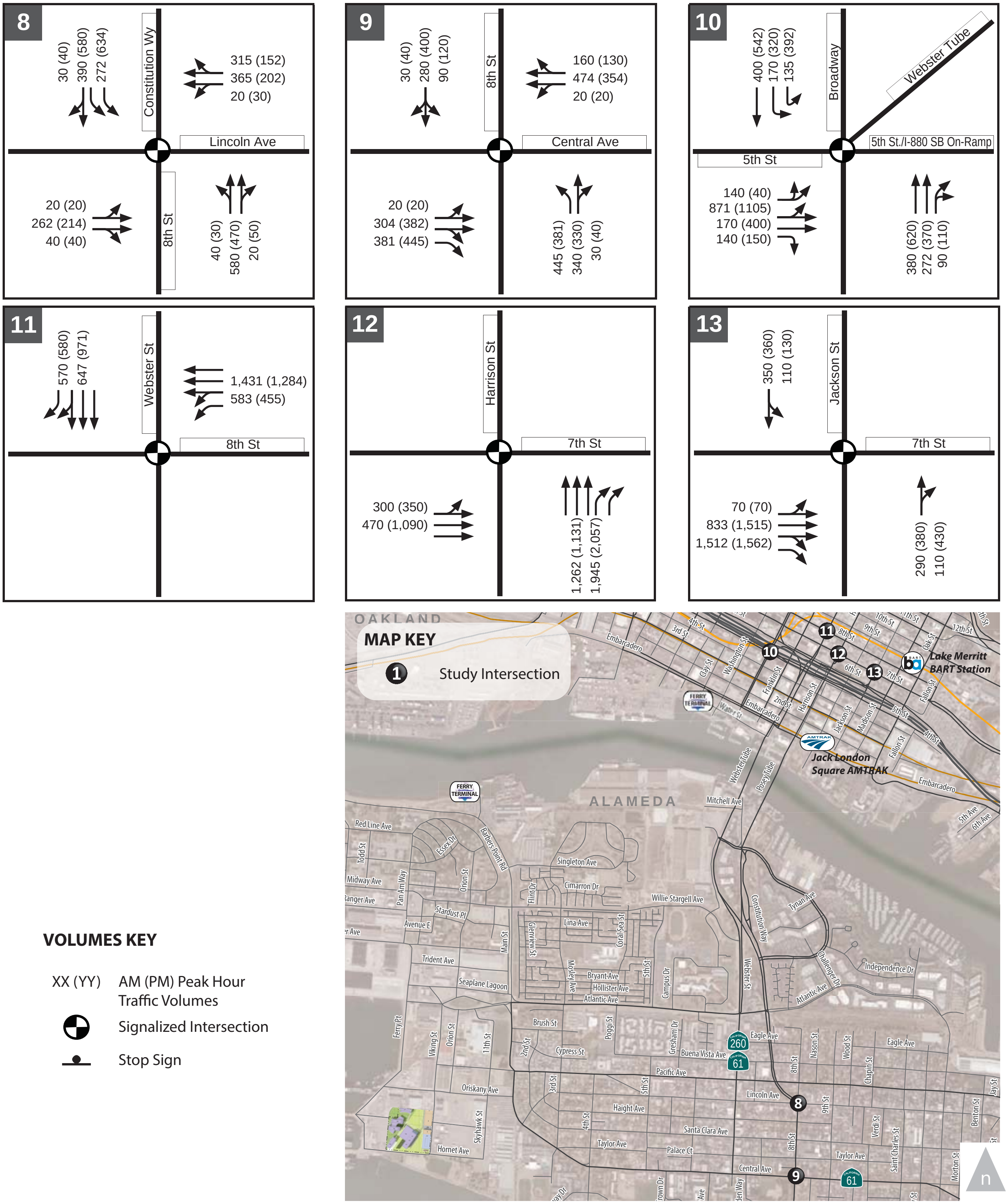



Figure 3-11B.

## Alameda Point Campus
## Cumulative (2035) No Project Peak Hour Traffic Volumes

WC12-2953_3-11B_Cumu2035+PH1vols

FEHR & PEERS

#### 3.5.2.1 Intersection Operations

**Table 3-7** summarizes intersection operations at the study intersections under the Cumulative (2035) Plus Project conditions. **Appendix E** provides the detailed calculation work sheets.

All study intersections in Alameda would continue to operate at LOS D or better during both AM and PM peak hours under the Cumulative (2035) Plus Project conditions. The Project would not cause a significant impact at the study intersections in Alameda.

In Oakland, Project generated traffic would contribute to LOS F conditions at the Harrison Street/7th Street intersection during both AM and PM peak hours and Jackson Street/7th Street intersection during the PM peak hour. The proposed project would not increase the overall intersection v/c ratio by 0.01 or more or increase critical movement v/c ratio by 0.02 or more at the Harrison Street/7th Street intersection during the AM peak hour. Therefore, the Project would not cause a significant impact at this intersection during the AM peak hour.

Project generated traffic would also contribute to LOS E conditions at the Jackson Street/7th Street intersection during the AM peak hour and at Broadway/5th Street during the PM peak hour; however, the Project would not cause an increase in the average delay for any of the critical movements by six seconds or more at either intersection. Based on City of Oakland's significance criteria, the Project would not cause a significant impact at the Jackson Street/7th Street or Broadway/5th Street intersections under Cumulative (2035) Plus Project conditions.

The Project would cause a significant impact at two intersections which are summarized under Impact 3-2 discussion.

#### IMPACT 3-2: CUMULATIVE (2035) PLUS PROJECT CONDITIONS INTERSECTION OPERATIONS

The proposed Project at Alameda Point would cause a significant impact at the following intersections under Cumulative (2035) Plus Project conditions:

A. The Project would cause a significant impact at the signalized **Harrison Street/7th Street** (Intersection 12) because it would increase the overall intersection v/c ratio by 0.01 or more and increase critical movement v/c ratio by 0.02 or more during the PM peak hour at an intersection in downtown Oakland operating at LOS F regardless of the Project.

B. The Project would cause a significant impact at the signalized **Jackson Street/7th Street** (Intersection 13) because it would increase the overall intersection v/c ratio by 0.01 or more and increase critical movement v/c ratio by 0.02 or more during the PM peak hour at an intersection in downtown Oakland operating at LOS F regardless of the Project.

**Mitigation Measure 3-2:** Implement the following:

A. **Harrison Street/7th Street** (Intersection 12): Implement the following which requires coordination with City of Oakland (Same as Mitigation Measure 3-1A):

- Increase traffic signal cycle length to 80 seconds and optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would continue to operate at LOS F during the PM peak hour. However, this mitigation measure would reduce the overall intersection v/c ratio and the critical movement v/c ratio to the same level or less than under Cumulative (2035) No Project conditions. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

B. **Jackson Street/7th Street** (Intersection 13): Implement the following which requires coordination with City of Oakland:

- Increase traffic signal cycle length to 80 seconds and optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would continue to operate at LOS F during the PM peak hour. However, this mitigation measure would reduce the overall intersection v/c ratio and the critical movement v/c ratio to the same level or less than under Cumulative (2035) No Project conditions. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

#### 3.5.2.2 Freeway Operations

**Table 3-8** summarizes the AM and PM peak hour freeway LOS analysis results under Cumulative (2035) Plus Project conditions. **Appendix F** provides the detailed calculation work sheets.

All freeway segments are projected to continue to operate at the same LOS as under Cumulative (2035) No Project conditions during both AM and PM peak hours. The proposed Project would not increase the peak hour volume by five percent or more at the study freeway segments that are projected to operate at LOS F. Therefore, the proposed Project would not cause a significant impact at the study freeway segments under Cumulative (2035) Plus Project conditions.

# 3.6 ADDITIONAL EMPLOYMENT ALTERNATIVE ANALYSIS

This section presents trip generation for the Additional Employment Alternative scenario and summarizes traffic operations under the Near-Term (2018) Plus Additional Employment Alternative conditions. The Additional Employment Alternative would consist of an additional 200,000 square feet of space and accommodate an additional 700 employees at the Alameda Point site.

## 3.6.1 TRIP GENERATION

**Table 3-9** shows the estimated vehicle trip generation for the Additional Employment Alternative at the Alameda Point site. The trip generation estimates is based on the same methodology used to estimate trip generation for the Alameda Point Project as documented in section 3.3.1. The 700 additional employees under this Alternative at the Alameda Point site are expected to increase trip generation to about 3,500 daily, 360 AM peak hour, and 340 PM peak hour automobile trips.

**TABLE 3-9**
**ALAMEDA POINT**
**ADDITIONAL EMPLOYMENT ALTERNATIVE VEHICLE TRIP GENERATION SUMMARY**

| | Average Daily Population | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total |
| Alameda Point Project [1] | 1,000 | 2,079 | 182 | 29 | 211 | 27 | 172 | 199 |
| Additional Employees [1] | 700 | 1,455 | 127 | 20 | 147 | 18 | 121 | 139 |
| Additional Employment Alternative Total | 1,700 | 3,534 | 309 | 49 | 358 | 45 | 293 | 338 |

1. Based on following trip generation rates:
Daily = 2.08 trips per Average Daily Population (ADP); AM Peak Hour = 0.21 trips per ADP (86% in, 14% out); PM Peak Hour = 0.20 trips per ADP (13% in, 87% out)
Source: Fehr & Peers, based on trip generation rate per average daily population at the existing LBNL site in Berkeley adjusted to reflect the different characteristics of the RBC.

## 3.6.2 NEAR-TERM (2018) PLUS ADDITIONAL EMPLOYMENT ALTERNATIVE CONDITIONS

**Figures 3-12A and 3-12B** show the traffic volumes under the Near-Term (2018) Plus Additional Employment Alternative conditions, which consist of traffic volumes under Near-Term (2018) No Project conditions plus traffic generated by the 1,000 Project employees and the 700 additional employees under the Additional Employment Alternative.

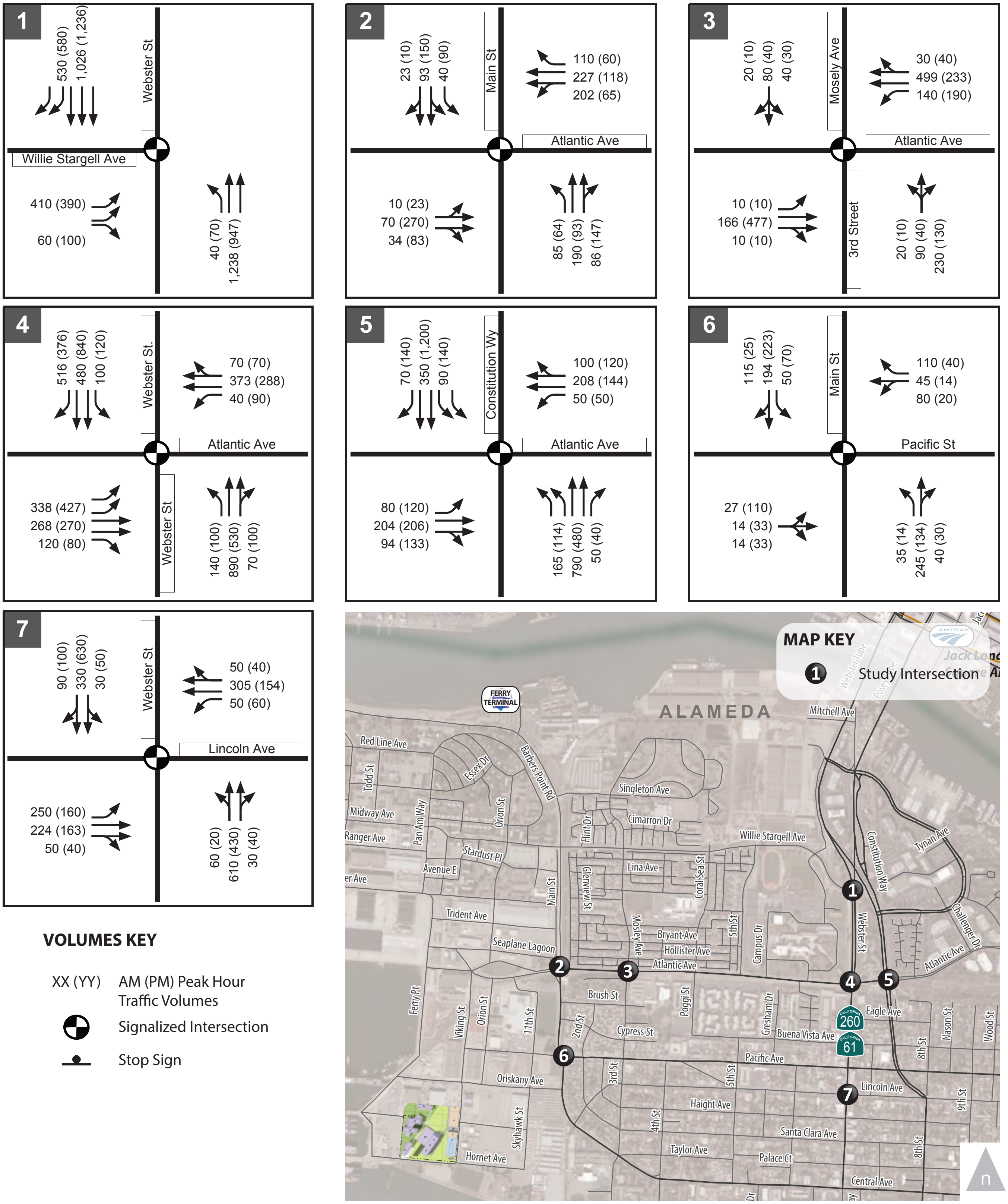
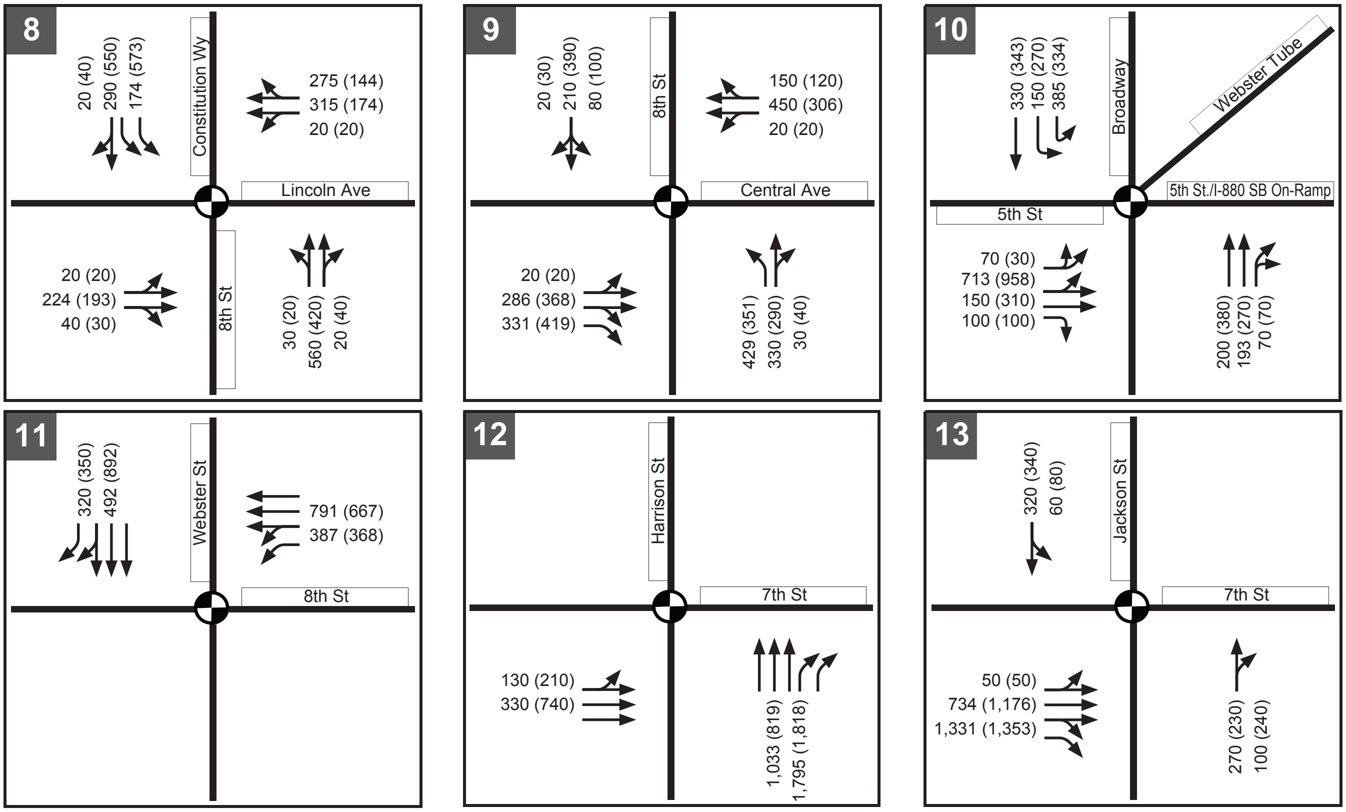



Figure 3-12A.

## Alameda Point Campus Near-Term (2018) Plus Additional Employment Alternative Peak Hour Traffic Volumes

WC12-2953_3-12A_NT2018+AEAvols

FEHR & PEERS





**VOLUMES KEY**

XX (YY) AM (PM) Peak Hour Traffic Volumes

Signalized Intersection

Stop Sign

Figure 3-12B.

## Alameda Point Campus Near-Term (2018) Plus Additional Employment Alternative Peak Hour Traffic Volumes

WC12-2953_3-12B_NT2018+AEAvols

FEHR & PEERS

### 3.6.2.1 Intersection Operations

**Table 3-10** summarizes intersection operations at the study intersections under the Near-Term (2018) Plus Additional Employment Alternative conditions. **Appendix E** provides the detailed calculation work sheets.

Similar to the Near-Term (2018) Plus Project conditions, all study intersections in Alameda would continue to operate at LOS D or better during both AM and PM peak hours under the Near-Term (2018) Plus Additional Employment Alternative conditions. The Additional Employment Alternative would not cause a significant impact at the study intersections in Alameda.

In Oakland, traffic generated by the Additional Employment Alternative would contribute to LOS F conditions at the Harrison Street/7th Street intersection during both AM and PM peak hours.

Traffic generated by the Additional Employment Alternative would also contribute to LOS E conditions at the Jackson Street/7th Street intersection in Oakland during the PM peak hour; however, the Cumulative Alternative would not cause an increase in the average delay for any of the critical movements by six seconds or more. Based on City of Oakland's significance criteria, the Cumulative Alternative would not cause an impact at the Jackson Street/7th Street intersection under Near-Term (2018) conditions.

The Cumulative Alternative would cause a significant impact at one intersection in Oakland which is summarized under Impact 3-3 discussion.

#### IMPACT 3-3: NEAR-TERM (2018) PLUS ADDITIONAL EMPLOYMENT ALTERNATIVE CONDITIONS INTERSECTION OPERATIONS

The Additional Employment Alternative at Alameda Point would cause a significant impact at the following intersection under Near-Term (2018) Plus Additional Employment Alternative conditions:

A. The Additional Employment Alternative would cause a significant impact at the signalized **Harrison Street/7th Street** (Intersection 12) because it would increase the overall intersection v/c ratio by 0.01 or more and increase critical movement v/c ratio by 0.02 or more during both AM and PM peak hours at an intersection in downtown Oakland operating at LOS F regardless of the Alternative.

**Mitigation Measure 3-3:** Implement the following:

**TABLE 3-10**
**ALAMEDA POINT**
**ADDITIONAL EMPLOYMENT ALTERNATIVE (2018) CONDITIONS –**
**STUDY INTERSECTION LOS SUMMARY**

| Intersection | Traffic Control | Peak Hour | Near-Term (2018) No Project Delay[1] (seconds) | Near-Term (2018) No Project LOS[1] | Near-Term (2018) Plus Additional Employment Alternative Delay[1] (seconds) | Near-Term (2018) Plus Additional Employment Alternative LOS[1] | Significant Impact? |
|---|---|---|---|---|---|---|---|
| **City of Alameda** | | | | | | | |
| 1. Webster Street/ Willie Stargell Avenue | Signal | AM | 19.1 | B | 20.4 | C | No |
| | | PM | 19.3 | B | 19.9 | B | No |
| 2. Main Street/ Atlantic Avenue | Signal | AM | 11.2 | B | 12.4 | B | No |
| | | PM | 11.6 | B | 12.1 | B | No |
| 3. Third Street/ Atlantic Avenue | Signal | AM | 22.2 | C | 23.0 | C | No |
| | | PM | 40.7 | D | 37.4 | D | No |
| 4. Webster Street/ Atlantic Avenue | Signal | AM | 42.9 | D | 47.4 | D | No |
| | | PM | 31.6 | C | 37.1 | D | No |
| 5. Constitution Way/ Atlantic Street | Signal | AM | 22.7 | C | 23.3 | C | No |
| | | PM | 25.8 | C | 26.1 | C | No |
| 6. Main Street/ Pacific Avenue | Signal | AM | 20.4 | C | 25.1 | C | No |
| | | PM | 16.0 | B | 21.8 | C | No |
| 7. Webster Street/ Lincoln Avenue | Signal | AM | 16.0 | B | 16.4 | B | No |
| | | PM | 14.5 | B | 14.5 | B | No |
| 8. Constitution Way/ Lincoln Avenue | Signal | AM | 22.0 | C | 22.6 | C | No |
| | | PM | 23.0 | C | 23.4 | C | No |
| 9. 8th Street/ Central Avenue | Signal | AM | 38.0 | D | 40.3 | D | No |
| | | PM | 44.8 | D | 45.3 | D | No |
| **City of Oakland** | | | | | | | |
| 10. Broadway/ 5th Street | Signal | AM | 26.4 | C | 28.7 | C | No |
| | | PM | 35.2 | D | 38.4 | D | No |
| 11. Webster Street/ 8th Street | Signal | AM | 15.9 | B | 16.0 | B | No |
| | | PM | 17.3 | B | 17.3 | B | No |
| 12. Harrison Street/ 7th Street | Signal | AM | **100.5 (v/c=0.74)** | **F** | **106.5 (v/c=0.75)** | **F** | Yes |
| | | PM | **>120 (v/c=0.86)** | **F** | **>120 (v/c=0.93)** | **F** | Yes |
| 13. Jackson Street/ 7th Street | Signal | AM | 16.8 | B | 16.7 | B | No |
| | | PM | 70.9 | E | 68.4 | E | No |

Notes: **Bold** indicates intersection operating at unacceptable LOS E/ F in Alameda or unacceptable LOS F in Oakland.
1. For signalized intersections, average intersection delay and LOS based on the 2000 HCM method is shown.
Source: Fehr & Peers.

A. **Harrison Street/7th Street** (Intersection 12): Implement the following which requires coordination with City of Oakland (same as Mitigation Measure 3-1A):

- Increase traffic signal cycle length to 75 seconds and optimize traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would continue to operate at LOS F during both AM and PM peak hours after the implementation of this mitigation measure. However, this mitigation measure would reduce the overall intersection v/c ratio and the critical movement v/c ratio to the same level or less than under Near-Term (2018) No Project conditions. Therefore, the mitigation measure would reduce the impact to less than significant if implemented.

#### 3.6.2.2 Freeway Operations

**Table 3-6** summarizes the AM and PM peak hour freeway LOS analysis results under Near-Term (2018) Plus Additional Employment Alternative conditions. **Appendix F** provides the detailed calculation work sheets.

All freeway segments operating at acceptable LOS E or better under Near-Term (2018) No Project conditions are projected to continue to operate at an acceptable LOS under Near-Term (2018) Plus Additional Employment Alternative conditions. The Additional Employment Alternative would not increase the peak hour volume by five percent or more at the study freeway segments that are projected to operate at LOS F. Therefore, the Additional Employment Alternative would not cause a significant impact at the study freeway segments under Near-Term (2018) Plus Additional Employment Alternative conditions.

**TABLE 3-11**
**ALAMEDA POINT**
**ADDITIONAL EMPLOYMENT ALTERNATIVE (2018) CONDITIONS –**
**FREEWAY SEGMENT LOS SUMMARY**

| Freeway Segment | Type[1] | Dir[2] | Near-Term (2018) No Project | | | | Near-Term (2018) Plus Additional Employment Alternative | | | | Significant Impact? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | | |
| | | | Density[3] | LOS | Density[3] | LOS | Density[3] | LOS | Density[3] | LOS | |
| 1. I-880, west of I-980 | Basic | NB | -- | F | -- | F | -- | F | -- | F | No |
| | Basic | SB | -- | F | -- | F | -- | F | -- | F | No |
| 2. I-880, between I-980 and Oak Street | Basic | NB | 35.7 | E | 38.8 | E | 35.8 | E | 39.6 | E | No |
| | Basic | SB | -- | F | -- | F | -- | F | -- | F | No |
| 3. I-880, south of Oak Street | Basic | NB | 34.2 | D | 35.8 | E | 34.7 | D | 35.8 | E | No |
| | Basic | SB | 34.0 | D | 38.7 | E | 34.1 | D | 39.4 | E | No |
| 4. Webster/Posey Tubes | Basic | NB | 23.4 | C | 20.7 | C | 23.6 | C | 22.1 | C | No |
| | Basic | SB | 17.0 | B | 23.7 | C | 18.5 | C | 24.0 | C | No |

1. Segments with auxiliary lanes are classified as weave segments, and were analyzed based on the Leisch Method. Basic segments are analyzed as basic segments using the 2000 HCM methodologies.
2. NB = Northbound; SB = Southbound
3. Density is presented in passenger cars per lane per mile (pc/ln/mi).

Source: Fehr & Peers.

# 4.0 LBNL SITE ALTERNATIVE

This chapter describes existing transportation conditions for the existing LBNL site and identifies impacts and mitigation measures of Phase 1 development of the proposed LRDP at LBNL under Near-Term (2018) and Cumulative (2035) conditions.

## 4.1 EXISTING CONDITIONS

Existing transportation conditions at LBNL and vicinity are described below.

### 4.1.1 EXISTING ROADWAY NETWORK

**Figure 4-1** shows the existing LBNL site, the surrounding roadway system, and intersections analyzed as part of this analysis. The regional and local roadways serving the project site, as well as the internal circulation within the site are described below.

#### 4.1.1.1 Regional Roadways

*Interstate 80* (I-80) connects the San Francisco Bay Area with the Sacramento region and continues east. Within Berkeley, I-80 is oriented in a north-south direction along the western edge of the city and provides five lanes of travel in each direction. Access from I-80 to the city of Berkeley is provided through interchanges at Ashby Avenue, University Avenue, and Gilman Street. I-80 and the nearby I-80/I-580 interchange operate at capacity during the peak commute hours. I-80 between Emeryville and Albany is also I-580. I-80 has an AADT of 256,000 vehicles (Caltrans, 2011) between the University Avenue and Gilman Street interchanges.

*State Route 24* (SR 24) links I-680 in Contra Costa County to I-80/I-580 and I-980. SR 24 provides four travel lanes in each direction near Berkeley. This is the primary route used by Berkeley-bound travelers from Contra Costa County. The primary access routes from SR 24 to the LBNL area are SR 13 (Ashby Avenue) to the Belrose-Derby-Warring-Piedmont corridor, and Telegraph Avenue. SR 24 has an AADT of 148,000 vehicles (Caltrans, 2011) east of SR 13.

*State Route 13/Ashby Avenue* (SR 13) connects I-580 in east Oakland to I-80, with a partial access interchange at SR 24. In Berkeley, SR 13 is Tunnel Road/Ashby Avenue, a generally east-west two to four-lane arterial through the city. Ashby Avenue intersects the major north-south roadways in Berkeley, providing several routes toward LBNL and UC Berkeley campus. It is about 1.25 miles south of the LBNL.


Figure 4-1.

**LBNL Site Study Locations**

WC12-2953_4-1_LBNLStudy

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During the peak commute hours, on-street parking restrictions on the north side of Ashby Avenue in the morning and the south side in the evening provide an additional travel lane for commuters. Ashby Avenue provides sidewalks on both sides of the roadway. SR 13 has an AADT of 28,500 vehicles (Caltrans, 2011) north of SR 24.

*University Avenue* provides one of Berkeley's three connections to I-80 to the west (along with Gilman Street and Ashby Avenue). It is an east-west major arterial that extends from the Berkeley Marina and I-80 in the west to the UC Berkeley campus in the east. The divided roadway provides a center median and left-turn pockets at major intersections. Left turns from University Avenue onto cross-streets generally are not served by a separate left-turn signal phase. University Avenue is a four-lane arterial, with parallel parking and sidewalks on both sides of the roadway.

*Belrose-Derby-Warring-Piedmont Corridor.* This is a heavily used route connecting SR 24 with Berkeley's Southside area (i.e., the area just south of the UC Berkeley campus), UC Berkeley, and LBNL. With a single travel lane in each direction, the route is at or near capacity for several hours during the morning and evening commute periods. The roadways in this corridor provide sidewalks on both sides of the street. Using roadway signs and notices in official mailings, the City of Berkeley and UC Berkeley have been encouraging travelers to use other routes, like Telegraph Avenue.

*Hearst Avenue* is a two- to four-lane, east-west street that extends between west Berkeley and LBNL's main entrance at Cyclotron Road, which diverges from Hearst Avenue just east of Gayley Road along the northern boundary of the UC Berkeley campus. Between Gayley Road/La Loma Avenue and LeRoy Avenue, Hearst Avenue provides one travel lane in each direction, with parallel parking on both sides. During the peak commute hours, on-street parking restrictions on the south side of the street in the morning and the north side in the evening provide an additional travel lane. Hearst Avenue generally provides sidewalks on both sides of the street, except between Arch Street and Euclid Avenue, where sidewalk is only provided on the north side of the roadway. Hearst Avenue is designated as a bicycle lane (Class 2 west of Shattuck Avenue and a bicycle route (Class 3) east of Shattuck Avenue.

#### 4.1.1.2 Local Roadways

*Bancroft Way* is an east-west roadway extending from downtown Berkeley through the Southside area, along the southern boundary of the UC Berkeley campus. The roadway is one-way westbound, with two travel lanes from Piedmont Avenue to Telegraph Avenue and three travel lanes from Telegraph Avenue to the Bancroft Way/Oxford Street intersection. Bancroft Way provides sidewalks on both sides of the roadway.

*Durant Avenue* is a major east-west roadway extending from downtown Berkeley through the Southside area. East of Shattuck Avenue, the roadway is one-way eastbound with three travel lanes. Durant Avenue serves as a "one-way couplet" with Bancroft Way for east-west travel on the south side of the UC Berkeley campus. Durant Avenue provides sidewalks on both sides of the roadway.

*La Loma Avenue/Gayley Road* is a two-lane, north-south street that extends from Hearst Avenue through north Berkeley. South of Hearst Avenue, La Loma Avenue becomes Gayley Road and borders the east side of the UC Berkeley campus. Parking is allowed on both sides of the street north of Hearst Avenue, but is not allowed south of Hearst Avenue until the vicinity of Memorial Stadium, where Gayley Road becomes Piedmont Avenue. Both streets provide sidewalks on both sides of the roadway. Gayley Road, just north of Banroft Way, provides Class 2 bicycle lanes.

*Stadium Rim Way* wraps around the east and north sides of Memorial Stadium and connects the west end of Panoramic Way to Gayley Road near the Greek Theater. It provides access from Gayley Road and Prospect Street to the east side of Memorial Stadium and surrounding parking facilities. Stadium Rim Way also intersects with Centennial Drive, indirectly providing access to the Lawrence Hall of Science (LHS), the Botanical Garden, the Strawberry Canyon Recreational Area, and the LBNL gates on Centennial Drive. Stadium Rim Way generally provides pedestrian facilities on the south side of the roadway consisting of sidewalks or an at-grade path separated from the roadway with bollards.

*Centennial Drive* borders the east and south perimeters of LBNL. It connects Grizzly Peak Boulevard and Stadium Rim Way and provides access to LBNL through the Strawberry Canyon and Grizzly Peak gates. Centennial Drive also provides access to LHS, the Botanical Garden, Strawberry Canyon Recreational Area, and Tilden Regional Park. In the vicinity of LBNL, the speed limit is 25 miles per hour. Several sections of the roadway have steep grades and sharp curves, where the speed limit is reduced to 15 miles per hour. Centennial Drive provides intermittent sidewalks or parallel unpaved path along specific segments.

*Grizzly Peak Boulevard* is a two-lane, two-way roadway located in the hills of Berkeley, connecting Skyline Boulevard in the Sibley Volcanic Regional Preserve in the south, to Spruce Street near the Summit Reservoir in north Berkeley. The narrow and curvy roadway does not provide any pedestrian or bicyclist amenities south of Centennial Drive; however, it is signed as a Class 3 bicycle route. The roadway provides access to parking facilities and trails in Tilden Regional Park, and to SR 24.

#### 4.1.1.3 Internal Circulation

The LBNL campus is served by an east-west traffic circulation system that generally conforms to the contours of the site's topography. Employees and visitors access the site through three gates. The

Blackberry Canyon Gate, on the west of the site, is accessed via Cyclotron Road and connects to Hearst Avenue. The Strawberry Canyon and Grizzly Peak Gates, on the east of the site, are accessed via Centennial Road. The three gates are attended by security personnel during business hours; the Blackberry Canyon Gate is the only one accessible by a card access system at other times. The site's main vehicle routes are two-way, except for three sections where roadside parking reduces the width, permitting only one-way travel.

## 4.1.2 TRAFFIC OPERATIONS ANALYSIS

This study analyzes existing traffic operations during typical weekday AM and PM peak hours at the following 14 intersections in the City of Berkeley:

1. Grizzly Peak Boulevard/Centennial Drive
2. Hearst Avenue/Shattuck Avenue
3. Hearst Avenue/Oxford Street
4. Hearst Avenue/Euclid Avenue
5. Hearst Avenue/Gayley Road/La Loma Avenue
6. University Avenue/Shattuck Avenue
7. University Avenue/Oxford Street
8. Gayley Road/Stadium Rim Way
9. Centennial Drive/Stadium Rim Way
10. Panoramic Way/Canyon Road/ Stadium Rim Way
11. Bancroft Way/Gayley Road/Piedmont Avenue
12. Durant Avenue/Piedmont Avenue
13. Channing Way/Piedmont Avenue
14. Dwight Way/Piedmont Avenue

These intersections were selected for analysis because they are most likely to be affected by the proposed Alternative. **Figure 4-1** shows the location of the study intersections and their configuration and control.

### 4.1.2.1 Existing Intersection Volumes

The intersection operations analysis presented in this study are based on AM and PM peak period (7:00 to 10:00 AM and 4:00 to 7:00 PM) intersection turning movement, pedestrian, and bicycle volumes collected on Wednesday, September 12, 2012, and Thursday, January 31, 2013, while UC Berkeley was in regular session. These time periods were selected because trips generated by the proposed Project, in combination with background traffic, are expected to represent typical worst traffic conditions. Within the peak periods, the peak hours (i.e., the hour with the highest traffic volumes observed in the study area) are from 8:00 AM to 9:00 AM (AM peak hour) and 5:00 PM to 6:00 PM (PM peak hour).

**Figures 4-2A and 4-2B** present the existing AM and PM peak hour intersection vehicle turn movement volumes at the study intersections. **Figures 4-3A and 4-3B** present the existing AM and PM peak hour pedestrian and bicycle volumes at the study intersections. **Appendix G** presents the detailed count sheets at the study intersections.

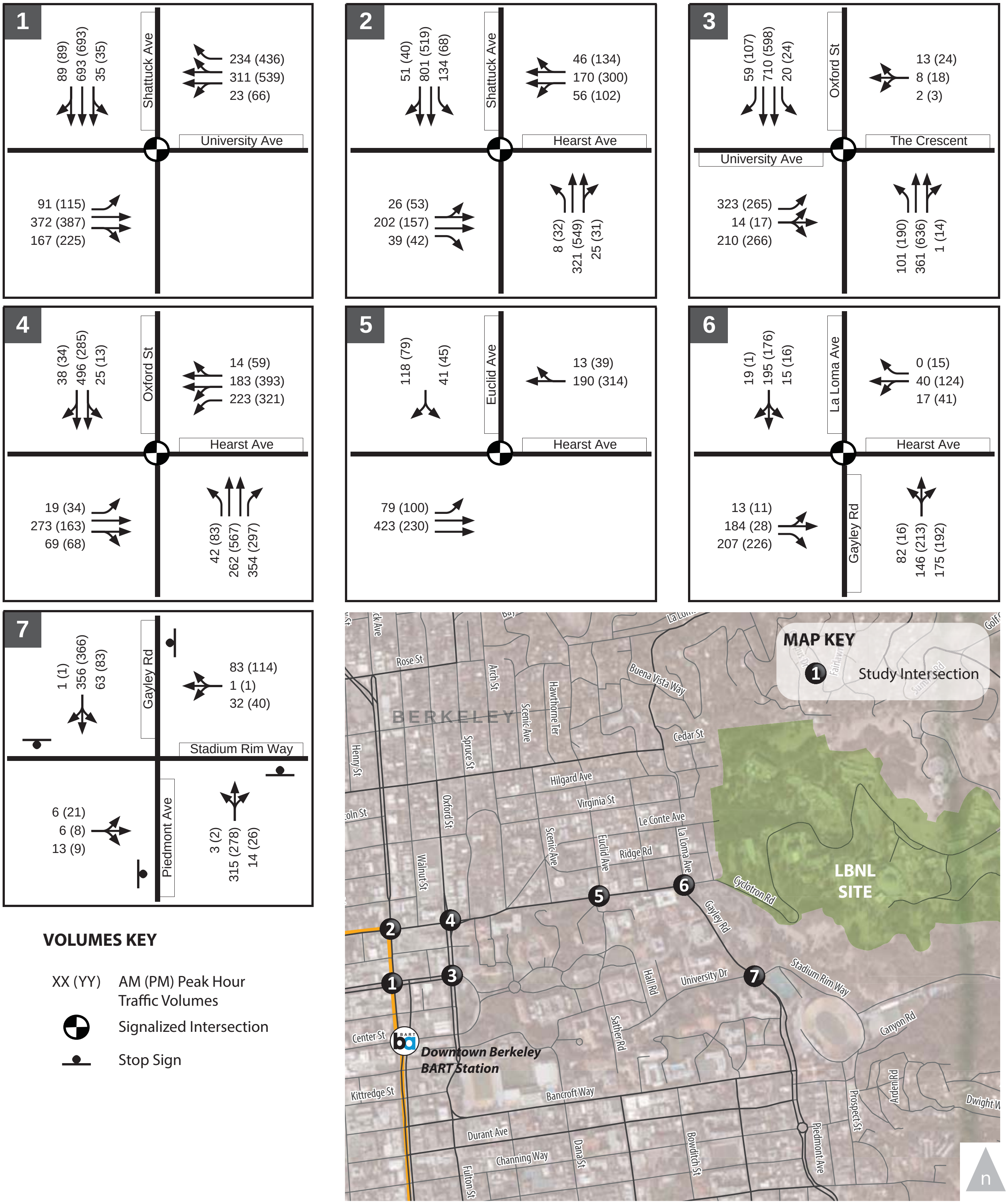



Figure 4-2A.

LBNL Site Existing
Peak Hour Traffic Volumes, Lane Configurations and Traffic Control

WC12-2953_4-2A_ExVol

FEHR & PEERS

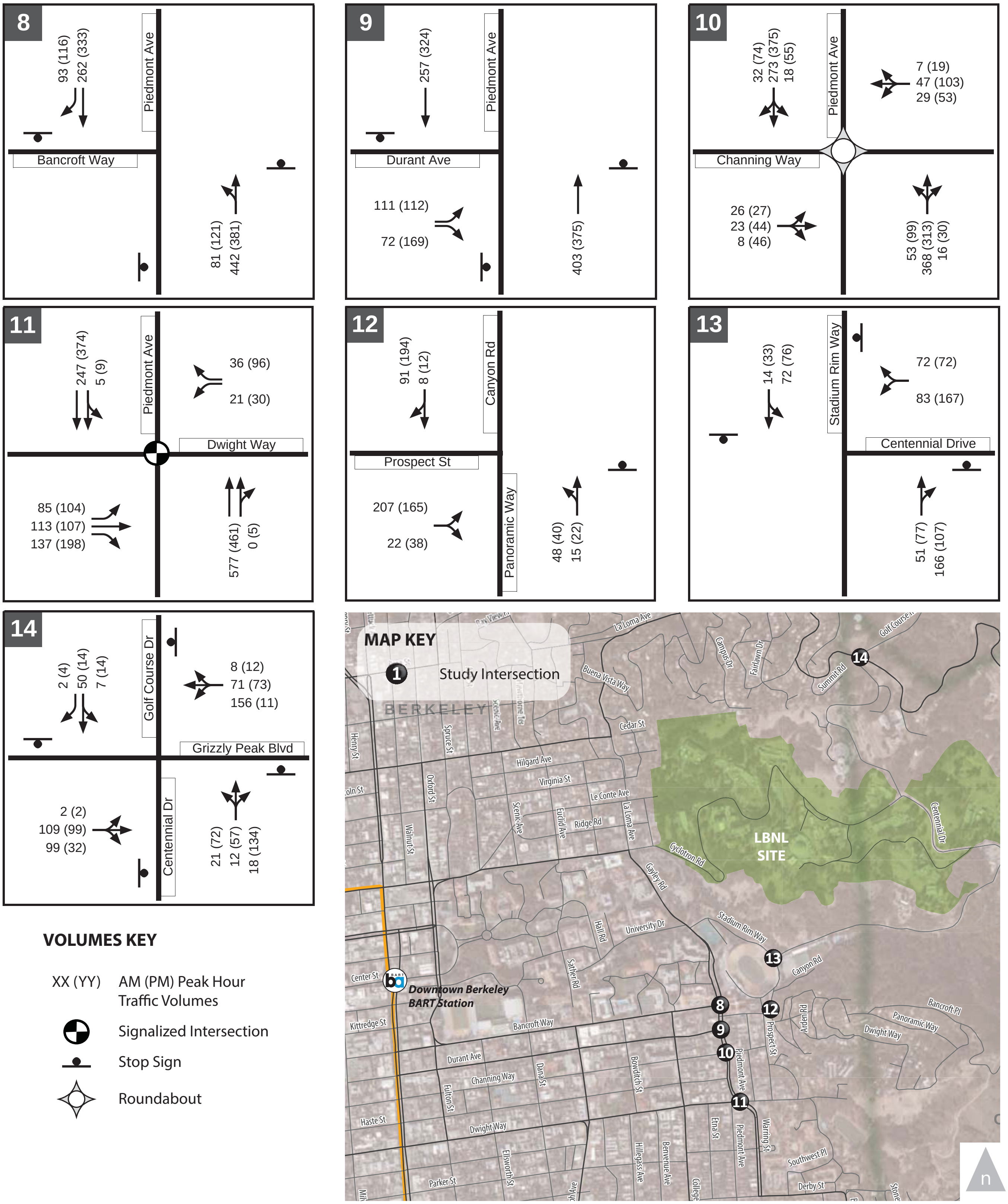



Figure 4-2B.

LBNL Site Existing
Peak Hour Traffic Volumes, Lane Configurations and Traffic Control

WC12-2953_4-2B_ExVol

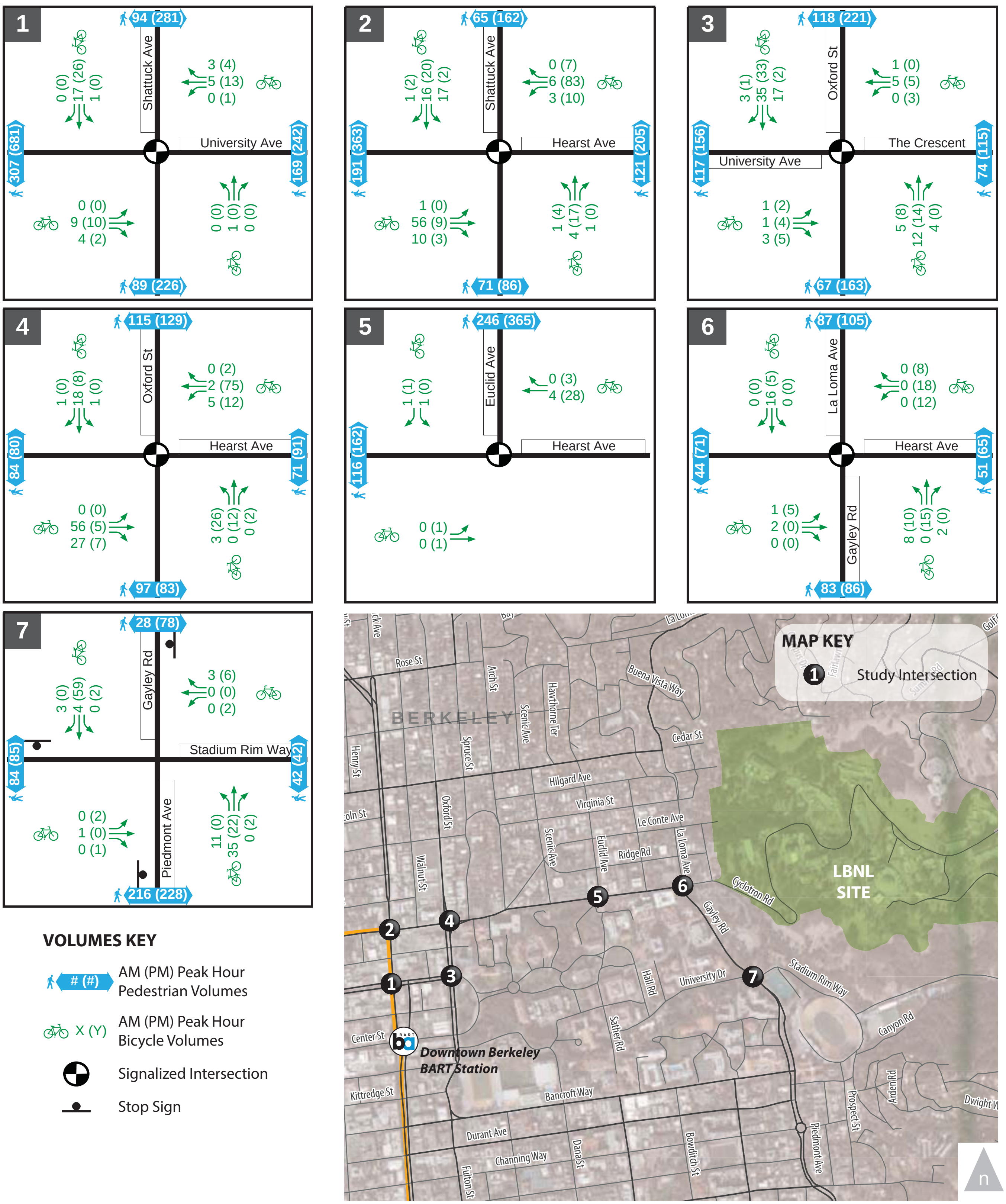
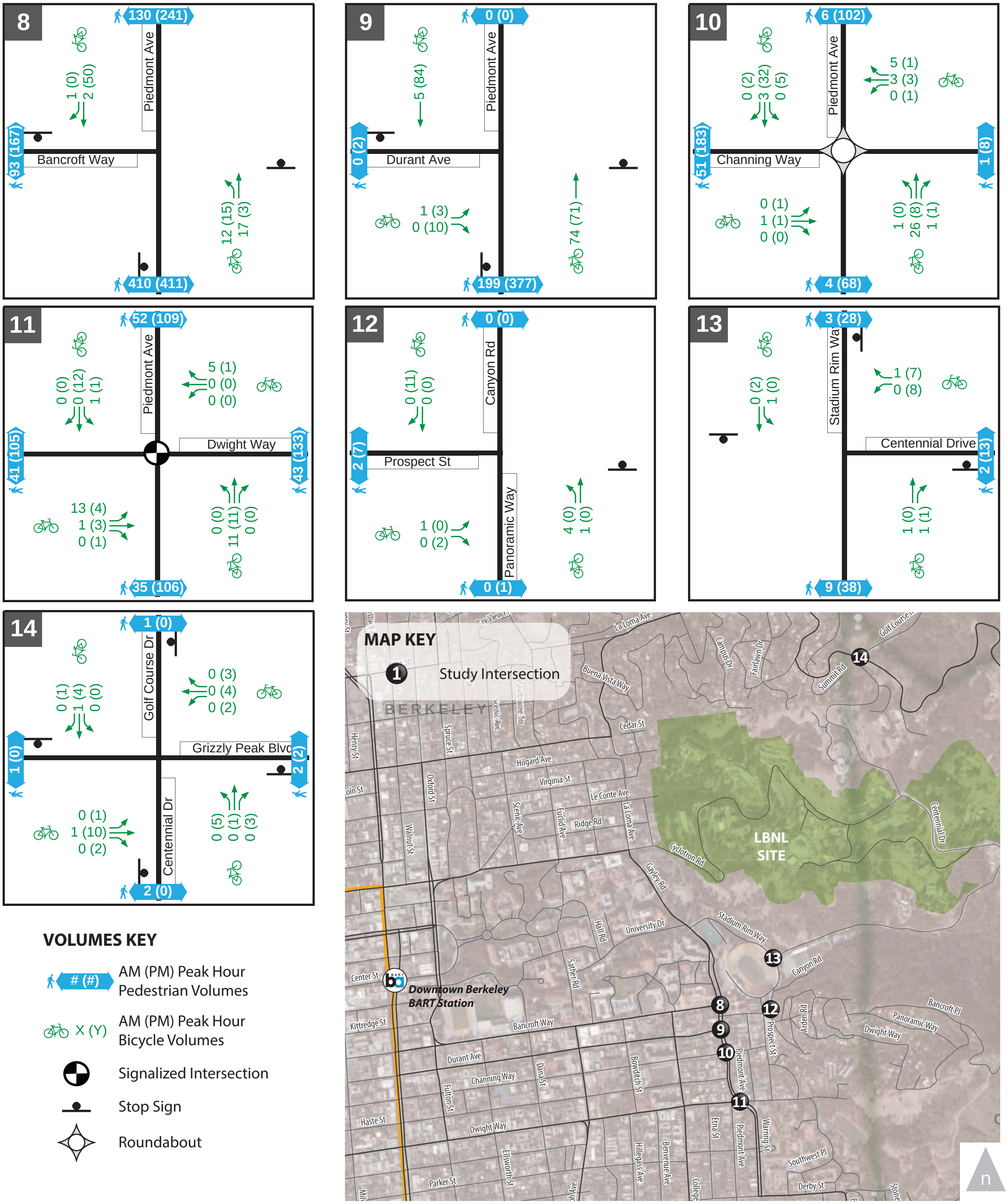



Figure 4-3A.

## LBNL Site Existing Pedestrian and Bicycle Peak Hour Volumes




# Figure 4-3B.

## LBNL Site Existing Pedestrian and Bicycle Peak Hour Volumes

WC12-2953_4-3B_ExVol

FEHR & PEERS

#### 4.1.2.2 Existing Intersection Operations

**Table 4-1** summarizes existing weekday peak hour intersection LOS analysis results. **Appendix H** provides the detailed calculation work sheets. As shown in the table, all study intersections currently operate at LOS D or better during the AM peak hour; and 12 of the 14 study intersections currently operate at LOS C or better during the PM peak hour.

Based on the analysis and verified by observations, the all-way stop-controlled Bancroft Way/Piedmont Avenue and Durant Avenue/Piedmont Avenue intersections operate at LOS F during the PM peak hour. Northbound and southbound vehicle flows at these intersections are impeded by the high pedestrian volumes crossing Piedmont Avenue.

### 4.1.3 EXISTING TRANSIT AND SHUTTLE SERVICES

The LBNL site is served indirectly by BART, AC Transit, and UC Berkeley Shuttle Service (BEAR Transit) and directly by the LBNL shuttle service. **Figure 4-4** shows the transit routes in the vicinity of the project site. Each transit service is described below.

#### 4.1.3.1 BART

BART provides regional commuter rail transit in Alameda, Contra Costa, San Francisco, and San Mateo counties. Currently, BART trains operate on weekdays from 4:00 AM to midnight, on Saturdays from 6:00 AM to midnight, and on Sundays from 8:00 AM to midnight. The nearest BART station to the LBNL site is the Downtown Berkeley station located one block west of the UC Berkeley campus at the Center Street/ Shattuck Avenue intersection (approximately 1.25 miles east of the project site). The LBNL shuttle service provides access between the LBNL site and the Downtown Berkeley BART Station.

The Downtown Berkeley BART Station is served by the Richmond-Fremont and Richmond-Daly City/ Millbrae lines. Other destinations in the BART system can be reached by transferring at stations in Oakland. Typically, Downtown Berkeley BART Station is served by a train every seven (peak weekday commute periods) to 20 minutes (Sundays). The Downtown Berkeley BART station is one of the most highly used stations within the BART system with average weekday exits and entries of approximately 23,000 passengers in January 2013.

#### 4.1.3.2 AC Transit

Local bus service in Berkeley is provided by AC Transit. Within the City of Berkeley, at least one AC Transit route provides service within walking distance (0.25 mile) of nearly every resident in the city. **Figure 4-4** illustrates the existing AC Transit routes in the vicinity of LBNL. Although these routes do not directly serve LBNL, the LBNL shuttle service provides access to them.

**TABLE 4-1**
**LBNL SITE**
**EXISTING CONDITIONS – STUDY INTERSECTION LOS SUMMARY**

| Intersection | Control | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|
| | | Delay (Seconds)[1] | LOS [1] | Delay (Seconds) [1] | LOS [1] |
| 1. University Avenue/ Shattuck Avenue | Signal | 16.6 | B | 21.6 | C |
| 2. Hearst Avenue/ Shattuck Avenue | Signal | 16.0 | B | 21.1 | C |
| 3. University Avenue/ Oxford Street | Signal | 19.8 | B | 20.2 | C |
| 4. Hearst Avenue/ Oxford Street | Signal | 28.7 | C | 33.7 | C |
| 5. Hearst Avenue/ Euclid Avenue | Signal | 14.9 | B | 19.8 | B |
| 6. Hearst Avenue/Gayley Road/La Loma Avenue | Signal | 13.1 | B | 13.8 | B |
| 7. Stadium Rim Way/ Gayley Road | All-Way Stop | 13.7 | B | 13.8 | B |
| 8. Bancroft Way/ Piedmont Avenue [2] | All-Way Stop | 34.3 | D | **76.4** | **F** |
| 9. Durant Avenue/ Piedmont Avenue [2] | All-Way Stop | 16.2 | C | **53.2** | **F** |
| 10. Channing Way/ Piedmont Avenue | Roundabout | 8.0 | A | 11.4 | B |
| 11. Dwight Way/ Piedmont Avenue | Signal | 13.8 | B | 13.0 | B |
| 12. Panoramic Way/Canyon Road/ Stadium Rim Way | Side-Street Stop | 2.0 (11.4) | A (B) | 1.7 (11.4) | A (B) |
| 13. Centennial Drive/ Stadium Rim Way | All-Way Stop | 8.5 | A | 9.7 | A |
| 14. Centennial Drive/Grizzly Peak Boulevard | All-Way Stop | 9.3 | A | 9.0 | A |

Notes: **Bold** indicates an intersection operating at unacceptable LOS E or LOS F.

1. For signalized, all-way stop-controlled, and roundabout intersections, average intersection delay and LOS based on the 2000 HCM method is shown. For side-street stop-controlled intersections, delays for worst movement and average intersection delay are shown: intersection average (worst movement).
2. Intersection analyzed using SimTraffic software because of unique conditions including heavy pedestrian volumes. Field observations validate the results shown in the table.

Source: Fehr & Peers.

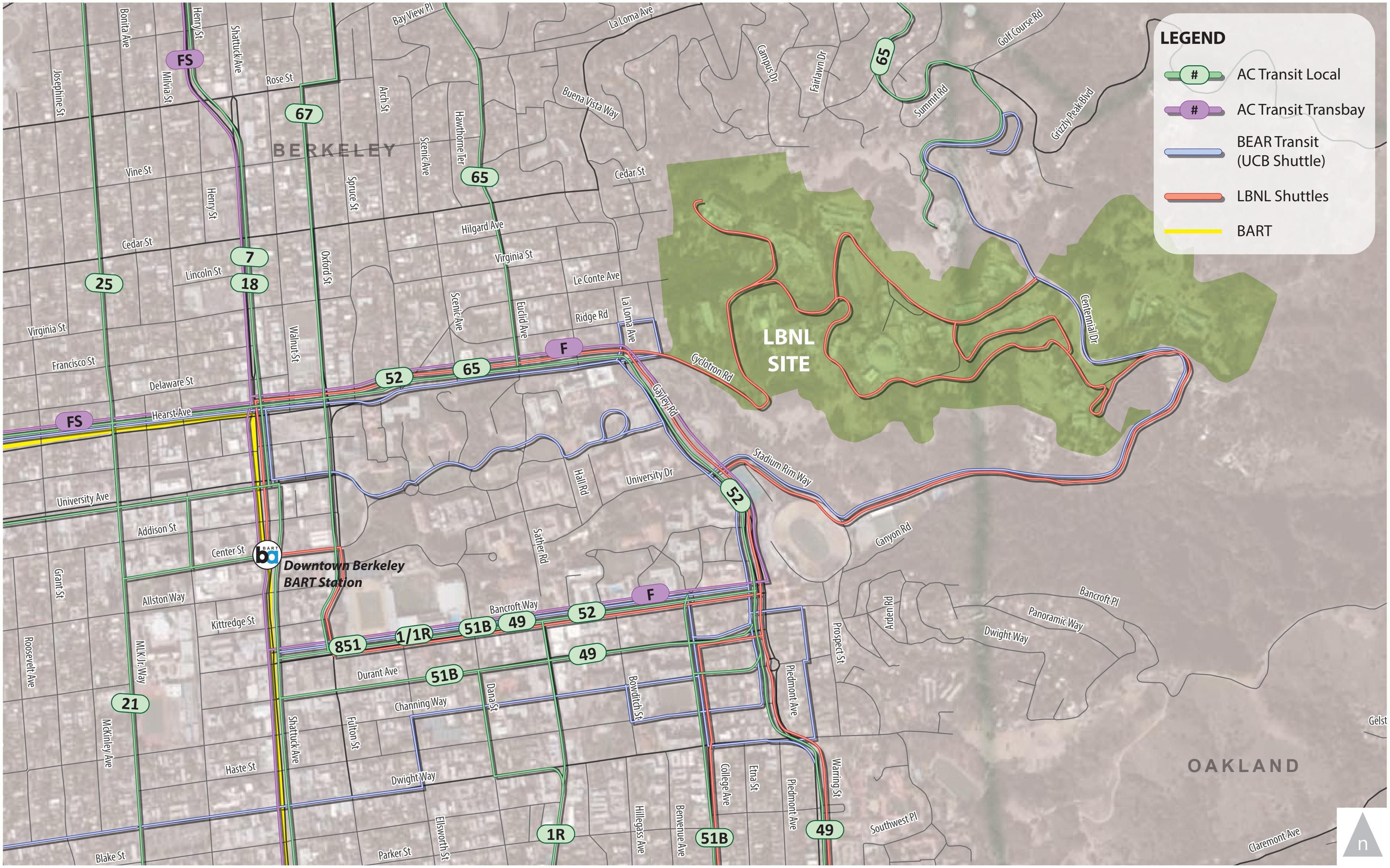



Figure 4-4.

## LBNL Site Existing Transit Service

WC12-2953_4-4_LBNLTransit

FEHR & PEERS

**Table 4-2** describes the major bus routes serving the project area. Additional AC Transit routes can be accessed in downtown Berkeley and Southside area through the LBNL shuttles.

#### 4.1.3.3 LBNL Shuttles

LBNL provides a free on-site and off-site shuttle service connecting LBNL to UC Berkeley, BART, AC Transit, and local neighborhoods. These shuttles are described below.

- The Orange Route operates in a clockwise loop between the LBNL Strawberry Gate, the UC Berkeley campus and the Downtown Berkeley BART Station through Hearst Avenue, Gayley Road Centennial Drive, and Bancroft Way on weekdays with 10 to 15-minute headways from 6:30 AM to 7:00 PM.
- The Blue Route operates in a clockwise loop between the Downtown Berkeley BART Station, north side of the UC Berkeley campus, and LBNL through Hearst Avenue, and Cyclotron Road on weekdays with 10-minute headways from 6:20 AM to 7:30 PM.
- The Rockridge Shuttle operates between and the Rockridge BART Station on one-hour headways from 6:40 AM to 8:40 AM and from 3:35 PM to 6:35 PM.
- The Potter Street/JBEI Route operates between LBNL, UC Berkeley Campus, Downtown Berkeley BART Station, and LBNL's remote sites in Emeryville and West Berkeley on 30-minute headways from 8:00 AM to 8:00 PM.

Although the LBNL shuttles are free, they are restricted to LBNL employees and visitors and shuttle riders are required to provide a valid identification to the driver. Shuttle stops are coordinated with AC Transit bus lines serving downtown Berkeley. The LBNL shuttles are equipped with bicycle racks for the ride up the hill. The shuttles listed above serve the project vicinity via stops on Alvarez Road near Building 56A.

#### 4.1.3.4 BEAR Transit

BEAR Transit, operated by UC Berkeley, primarily serves the UC Berkeley community, providing service between the UC Berkeley campus, surrounding neighborhoods, and select destinations, including the Richmond Field Station (RFS) (See Section 2.1.4.4 for more detail on the RFS shuttle). In general, the daytime shuttles operate on a fixed route and schedule between 6:45 AM and 7:30 PM. The night shuttles operate on a fixed schedule between 7:30 PM and 2:00 AM, and provide door-to-door service throughout the service area between 2:00 AM and 6:00 AM.

All BEAR Transit shuttle buses, except the RFS shuttle line, are free to UC Berkeley students, faculty, staff, post-docs, and visiting scholars, who have valid university identification. Others must pay a fair of $1.00. The Bear Transit Line H serves destinations along Centennial Drive including the UC Berkeley Botanical Garden and LHS.

**TABLE 4-2**
**LBNL SITE**
**AC TRANSIT SERVICE SUMMARY**

| Line | Route | Nearest Stop [1] | Weekday | | Weekend | |
|---|---|---|---|---|---|---|
| | | | Hours | Frequency | Hours | Frequency |
| ***Local Routes*** | | | | | | |
| 1/1R | Between Berkeley and Bay Fair BART Stations via Telegraph Ave., International Blvd., and East 14th St. | Telegraph Avenue/ Bancroft Way (About 1.0 miles) | 5:00 AM to 1:00 AM | 15 minutes | 5:00 AM to 1:00 AM | 20 minutes |
| 49 | Loop starting at Rockridge BART via Ashby Ave., Dwight Way, Bancroft Way, Durant Ave. and Claremont Ave. | Piedmont Avenue/ Bancroft Way (About 0.9 miles) | 6:00 AM to 8:15 PM | 30 minutes | 7:00 AM to 8:00 PM | 40 minutes |
| 51B | Between Rockridge BART and Berkeley Amtrak Station via College Ave., Bancroft Way/Durant Ave. and University Ave. | College Avenue/ Bancroft Way (About 0.9 miles) | 5:00 AM to 12:30 AM | 10 to 20 minutes | 5:00 AM to 12:30 AM | 15 to 20 minutes |
| 52 | Between UC Berkeley and Albany University Village via Bancroft Way, University Ave., San Pablo Ave., and Hearst Ave. | Leroy Avenue/ Hearst Avenue (About 0.4 miles) | 6:00 AM to 12:00 AM | 15 to 30 minutes | 8:00 AM to 8:15 PM | 30 to 40 minutes |
| 65 | Between Berkeley BART and Lawrence Hall of Science via Euclid Ave. and Grizzly Peak Blvd. | Euclid Avenue/ Hearst Avenue (About 0.5 miles) | 5:30 AM to 9:00 PM | 30 to 60 minutes | 7:30 AM to 7:30 PM | 60 minutes |
| ***Night Routes*** | | | | | | |
| 851 | Between Fruitvale and Berkeley BART Stations via, Fruitvale Ave., Santa Clara Ave., Webster St., Broadway, College Ave., and Bancroft Way/ Durant Ave. | College Avenue/ Bancroft Way (About 0.9 miles) | 12:00 AM to 5:00 AM | 60 minutes | 12:00 AM to 5:00 AM | 60 minutes |
| ***Transbay Routes*** | | | | | | |
| F | Between UC Berkeley and San Francisco Transbay Terminal | Leroy Avenue/ Hearst Avenue (About 0.4 miles) | 5:00 AM to 1:00 AM | 30 minutes | 5:00 AM to 1:00 AM | 30 minutes |

1. Distance shown is current walking distance between bus stop and Blackberry Gate.
Source: AC Transit, 2013.

### 4.1.4 EXISTING PEDESTRIAN AND BICYCLE CIRCULATION

Most LBNL employees and visitors either drive or use transit to access the site. The hilly terrain and steep grades make walking or biking to the site rather difficult. Most walking and biking trips to the LBNL site are through the Blackberry Canyon Gate which connects to the City's sidewalks and bicycle facilities through Cyclotron Road and Hearst Avenue. The Strawberry Canyon and Grizzly Peak Gates can also be accessed by bicyclists using Centennial Drive and pedestrians using the intermittent paved sidewalks and unpaved paths along Centennial Drive. Many bicyclists also use the LBNL shuttles that are equipped with bike racks for their uphill inbound trip to the site and use their bicycles for the outbound downhill trip.

Within the site, pedestrian and bicycle paths meander and have many discontinuities. Pedestrian pathways primarily connect parking facilities and buildings. Although these paths are used for shorter trips within the site, the on-site shuttle service is typically used for longer trips.

Within the City of Berkeley, all non-residential and most residential streets provide sidewalks and crosswalks for pedestrians.

Based on the *City of Berkeley Bicycle Master Plan* (February 2005), bicycle facilities can be classified into several types, including:

- ***Bicycle Paths (Class 1)*** – These facilities are located off-street and can serve both bicyclists and pedestrians.

- ***Bicycle Lanes (Class 2)*** – These facilities provide a dedicated area for bicyclists within the paved street width through the use of striping and appropriate signage.

- ***Bicycle Routes (Class 3)*** – These facilities are found along streets that do not provide sufficient width for dedicated bicycle lanes. The street is then designated as a bicycle route through the use of signage informing drivers to expect bicyclists.

- ***Shared Bikeways (Class 2.5)*** – These facilities are found along streets with high bicycle volumes where bicycle lanes are not feasible. Typically, shared lane bicycle stencils, wide curb lanes, signage, and low speed limits are used to encourage shared use.

- ***Bicycle Boulevards*** – These facilities are installed along residential streets with low traffic volumes and prioritize bicycle travel. Assignment of right-of-way to the route, traffic calming measures and bicycle traffic signal actuation are used to prioritize through-trips for bicycles.

**Figure 4-5** identifies existing and proposed bicycle facilities in the study area. Currently, bicyclists are allowed on all roadways within the study area. Existing bicycle facilities near the project site include Class 2 bicycle lanes on Gayley Road adjacent to the California Memorial Stadium and Class 3 bicycle routes on Grizzly Peak Boulevard south of Centennial Drive. The 2005 Berkeley Bicycle Plan Update identifies Gayley Road, Piedmont Avenue, and Bancroft Way as future Class 2.5 facilities (shared roadways where full bicycle lanes cannot be implemented but other improvements and amenities can be provided). Stadium Rim Way and Centennial Drive are identified as future Class 3 facilities (signed bike routes). In addition, the 2006 UC Berkeley Campus Bicycle Plan recommends Gayley Road and Stadium Rim Way as future Class 2.5 facilities. The 2005 Berkeley Bicycle Plan Update proposes Hearst Avenue as a combination of Class 2.5 and Class 3 facilities. City of Berkeley and UC Berkeley completed the *Hearst Avenue Complete Street Study* (Fehr & Peers 2012) to identify improvements along the Hearst Avenue corridor between Shattuck Avenue and Gayley Road/LaLoma Avenue that primarily benefit bicyclists and pedestrians.

As previously shown on Figures 4-3A and 4-3B, intersections in the vicinity of LBNL generally experience moderate to high pedestrian and bicycle activity.

## 4.2 REGULATORY CONSIDERATIONS

The LBNL campus is located within Berkeley and Oakland City boundaries. This section summarizes relevant principles, polices and guidelines contained in the Cities of Berkeley and Oakland General Plans.

### 4.2.1 CITY OF BERKELEY GENERAL PLAN

About 95 acres, or almost half of the LBNL site, is within the City of Berkeley. The Land Use Element of the Berkeley General Plan contains comprehensive objectives and policies that guide physical development in the city. One objective of the Land Use Element is to "minimize the negative impacts and maximize the benefits of University of California on the citizens of Berkeley."

The Transportation Element of the Berkeley General Plan contains the following policies relevant to the proposed alternative:

Transportation Objective 1: Maintain and improve public transportation services throughout the city.

Transportation Objective 2: Reduce automobile use and vehicle miles traveled in Berkeley, and the related impacts, by providing and advocating for transportation alternatives and subsidies that facilitate voluntary decisions to drive less.

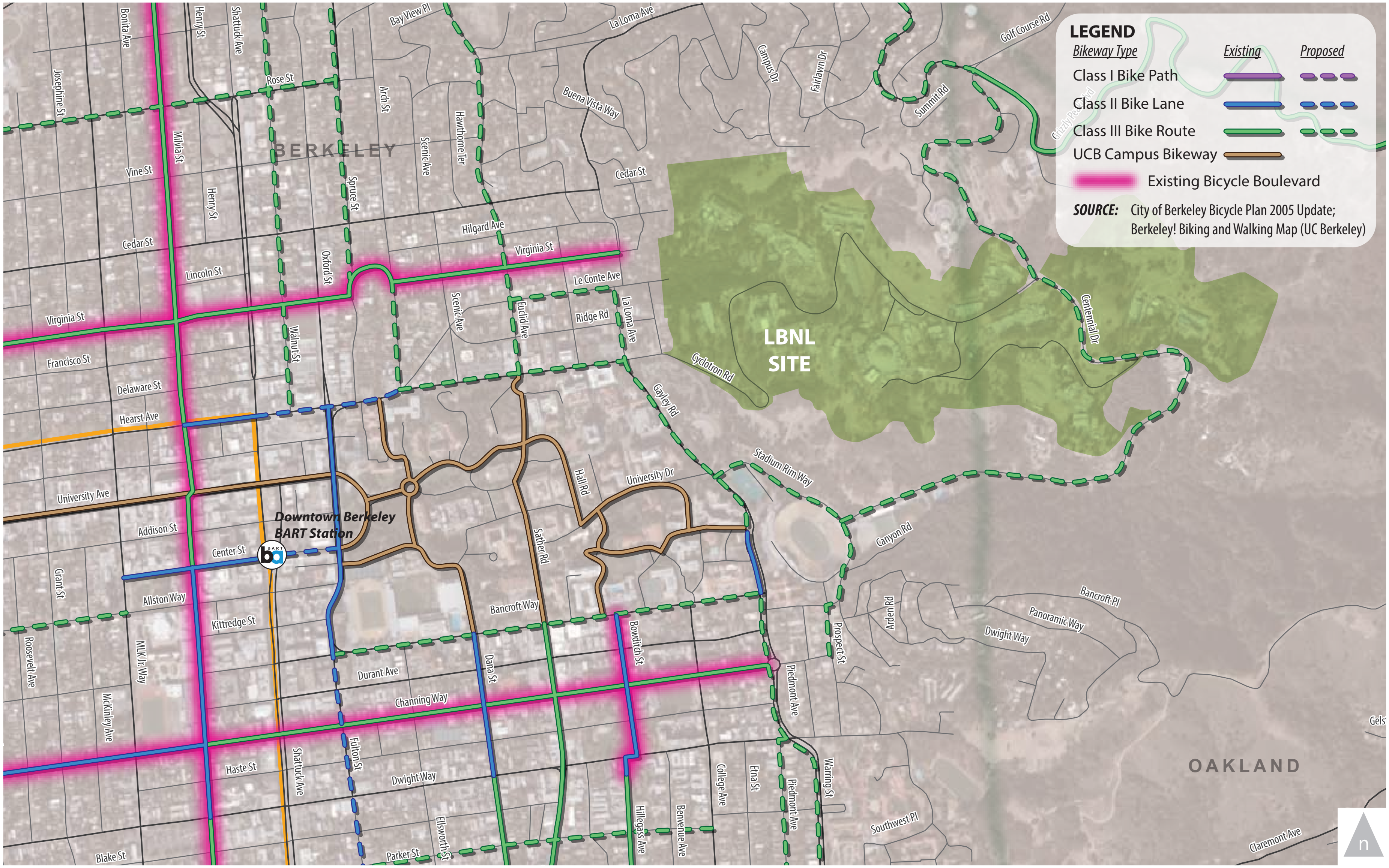



Figure 4-5.

## LBNL Site Existing and Future Bicycle Network

WC12-2953_4-5_LBNLBikeNet

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<u>Transportation Objective 6</u>: Create a model bicycle- and pedestrian-friendly city where bicycling and walking are safe, attractive, easy, and convenient forms of transportation and recreation for people of all ages and abilities.

<u>Policy T-2 Public Transportation Improvements</u>: Encourage regional and local efforts to maintain and enhance public transportation services and seek additional regional funding for public and alternative transportation improvements.

*Action T-2 D*: Improve shuttle and transit services by:

1. Increasing shuttle and transit services from Rockridge and the Rockridge BART station to downtown BART and the UCB campus.
3. Promoting express shuttle services to complement local transit service and ensure that Berkeley residents and commuters have information about shuttle services readily available.
5. Encouraging transportation providers to coordinate and consolidate the installation of new jointly used shelters.

<u>Policy T-10 Trip Reduction</u>: To reduce automobile traffic and congestion and increase transit use and alternative modes in Berkeley, support, and when appropriate require, programs to encourage Berkeley citizens and commuters to reduce automobile trips, such as:

2. Participation in the Commuter Check Program.
3. Carpooling and provision of carpool parking and other necessary facilities.
4. Telecommuting programs.
8. Programs to encourage neighborhood-level initiatives to reduce traffic by encouraging residents to combine trips, carpool, telecommute, reduce the number of cars owned, shop locally, and use alternative modes.
9. Programs to reward Berkeley citizens and neighborhoods that can document reduced car use.
10. Limitations on the supply of long-term commuter parking and elimination of subsidies for commuter parking.

<u>Policy T-13 Major Public Institutions</u>: Work with other agencies and institutions, such as the University of California, the Berkeley Unified School District, Lawrence Berkeley Laboratory, Vista Community College, the Alameda County Court, and neighboring cities to promote Eco-Pass and to pursue other efforts to reduce automobile trips.

*Action T-13A*: Encourage other agencies and institutions to match or exceed the City of Berkeley's trip reduction and emission reduction programs for their employees.

*Action T-13C*: Encourage the University of California:

1. To maintain and improve its facilities and programs that support and encourage pedestrians, bicyclists, and transit riders.
2. To provide bicycle facilities, "all hour" bicycle paths, and timely pavement maintenance.

*Action T-13H*: Encourage the University of California, the Berkeley Unified School District, and other major institutions to cap parking at current levels while seeking to reduce automobile use.

*Action T-13I*: Encourage institutions to create incentives for their employees and students to live locally.

*Action T-13J*: Encourage all public and private institutions, including schools, health clubs, recreation centers, and other community destinations to organize carpools and shuttles.

<u>Policy T-18 Level of Service</u>: When considering transportation impacts under the California Environmental Quality Act, the City shall consider how a plan or project affects all modes of transportation, including transit riders, bicyclists, pedestrians, and motorists, to determine the transportation impacts of a plan or project. Significant beneficial pedestrian, bicycle, or transit impacts, or significant beneficial impacts on air quality, noise, visual quality, or safety in residential areas may offset or mitigate a significant adverse impact on vehicle Level of Service (LOS) to a level of insignificance. The number of transit riders, pedestrians, and bicyclists potentially affected will be considered when evaluating a degradation of LOS for motorists.

<u>Policy T-28 Emergency Access:</u> Provide for emergency access to all parts of the city and safe evacuation routes.

<u>Policy T-37 University of California and Large Employer Parking</u>: Encourage large employers, such as the University of California and Berkeley Unified School District, to allocate existing employee parking on the basis of a) need for a vehicle on the job, b) number of passengers carried, c) disability, and d) lack of alternative public transportation.

*Action T-37A*: Encourage the University of California to cap its parking supply at current levels, to postpone any plans to expand its existing (year 2000) parking supply and instead encourage transit use and alternative modes of transportation, and better manage and utilize existing parking.

Policy T-38 Inter-Jurisdictional Coordination: Establish partnerships with adjacent jurisdictions and agencies, such as the University of California and the Berkeley Unified School District, to reduce parking demand and encourage alternative modes of transportation.

Policy T-41 Structured Parking: Encourage consolidation of surface parking lots into structured parking facilities and redevelopment of surface lots with residential or commercial development where allowed by zoning.

Policy T-42 Bicycle Planning: Integrate the consideration of bicycle travel into City planning activities and capital improvement projects, and coordinate with other agencies to improve bicycle facilities and access within and connecting to Berkeley.

Policy T-54 Pathways: Develop and improve the public pedestrian pathway system.

### 4.2.2 CITY OF OAKLAND GENERAL PLAN

About half of the LBNL site is within the City of Oakland. The following transportation-related policies in the Oakland General Plan Land Use and Transportation Element are applicable to the proposed Project:

Policy T2.5 Linking Transportation and Activities: Link transportation facilities and infrastructure improvements to recreational uses, job centers, commercial nodes, and social services (i.e., hospitals, parks, or community centers).

Policy T3.2 Promoting Strategies to Address Congestion: The City should promote and participate in both local and regional strategies to manage traffic supply and demand where unacceptable levels of service exist or are forecast to exist.

Policy T3.6 Including Bikeways and Pedestrian Walks: The City should include bikeways and pedestrian walks in the planning of new, reconstructed, or realigned streets, wherever possible.

Policy T4.2 Creating Transportation Incentives: Through cooperation with other agencies, the City should create incentives to encourage travelers to use alternative transportation options.

Policy D3.2 Incorporating Parking Facilities: New parking facilities for cars and bicycles should be incorporated into the design of any project in a manner that encourages and promotes safe pedestrian activity.

Policies in the Open Space, Conservation, and Recreation (OSCAR) Element of the Oakland General Plan pertaining to transportation relevant to the proposed Project include the following:

Policy CO-12.1: Promote land use patterns and densities which help improve regional air quality conditions by: (a) minimizing dependence on single passenger autos; (b) promoting projects which minimize quick auto starts and stops, such as live-work development, and office development with ground-floor retail space; (c) separating land uses which are sensitive to pollution from the sources of air pollution; and (d) supporting telecommuting, flexible work hours, and behavioral changes which reduce the percentage of people in Oakland who must drive to work on a daily basis.

Policy CO-12.3: Expand existing transportation systems management and transportation demand management strategies which reduce congestion, vehicle idling, and travel in single-passenger autos.

## 4.3 PROJECT TRANSPORTATION CHARACTERISTICS

Similar to the Phase 1 development at the RBC site (described in Section 2.3), the proposed development at the existing LBNL site would provide up to 600,000 square feet of space and accommodate up to 1,000 new employees in four new buildings by 2018. Vehicular access to and from LBNL would continue be provided through the existing three gates. The proposed Project is not expected to modify the internal roadway system in LBNL.

It is expected that as buildings are constructed and the number of employees is increased, LBNL would increase the current parking supply and shuttle service proportionally to meet the increase demand.

### 4.3.1 TRIP GENERATION

**Table 4-3** shows the estimated vehicle trip generation for the proposed Project at the existing LBNL site. This analysis assumes that the Project employees at the LBNL site would have the same trip making characteristics as the employees at the current LBNL site. Thus, the trip generation for the Project is based on current observed trip generation at LBNL based on data collected in 2011. It is estimated that the proposed development at LBNL would generate about 1,590 daily automobile trips, 160 AM peak hour trips, and 150 PM peak hour trips.

**TABLE 4-3**
**EXISTING LBNL SITE**
**PROJECT VEHICLE TRIP GENERATION SUMMARY**

| | Average Daily Population | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total |
| Existing LBNL [1] | 4,200 | 6,640 | 581 | 93 | 674 | 85 | 551 | 636 |
| LBNL Alternative [2] | 1,000 | 1,585 | 139 | 22 | 161 | 20 | 132 | 152 |

1. Based on counts at existing LBNL gates conducted in April 2011.
2. Based on the following current trip generation rate per at the existing LBNL site:
   Daily = 1.58 trips per Average Daily Population (ADP); AM Peak Hour = 0.14 trips per ADP (86% in, 14% out); PM Peak Hour = 0.15 trips per ADP (13% in, 87% out)

Source: Fehr & Peers.

### 4.3.2 TRIP DISTRIBUTION AND ASSIGNMENT

Trip distribution is defined as the directions of approach and departure that vehicles would use to arrive at and depart from the Project site. As previously stated, this analysis assumes that the Project employees at the LBNL site would have the same trip making characteristics as the employees at the current LBNL site. Thus, the trip distribution for the proposed Project is based on the current trip distribution of current LBNL employees. **Figure 4-6** shows the resulting trip distribution. **Figures 4-7A and 4-7B** show the Project Phase 1 trip assignment at the study intersections, based on the distribution.

## 4.4 NEAR-TERM (2018) ANALYSIS

This section summarizes traffic operations under Near-Term (2018) No Project and Near-Term (2018) Plus Project conditions.

### 4.4.1 NEAR-TERM (2018) NO PROJECT TRAFFIC CONDITIONS

The Near-Term (2018) No Project traffic volumes were developed by interpolating between the existing volumes (Figure 4-2) and the projected 2035 volumes (Figure 4-10), which were prepared using the ACTC Countywide Travel Demand Model and described in Section 4.5. Since the ACTC Model did not include any growth at the LBNL site or UC Berkeley, the traffic volume forecasts were adjusted to account for the expected traffic generated by projects currently under construction or planned at both sites, which include Solar Energy Research Center (SERC), Computational Research and Theory (CRT) Facility, and Seismic Phase 1 and 2 General Purpose Lab (GPL) at LBNL, and the Maxwell Family Field Garage at UV Berkeley. **Figures 4-8A and 4-8B** show the Near-Term (2018) No Project traffic volumes.

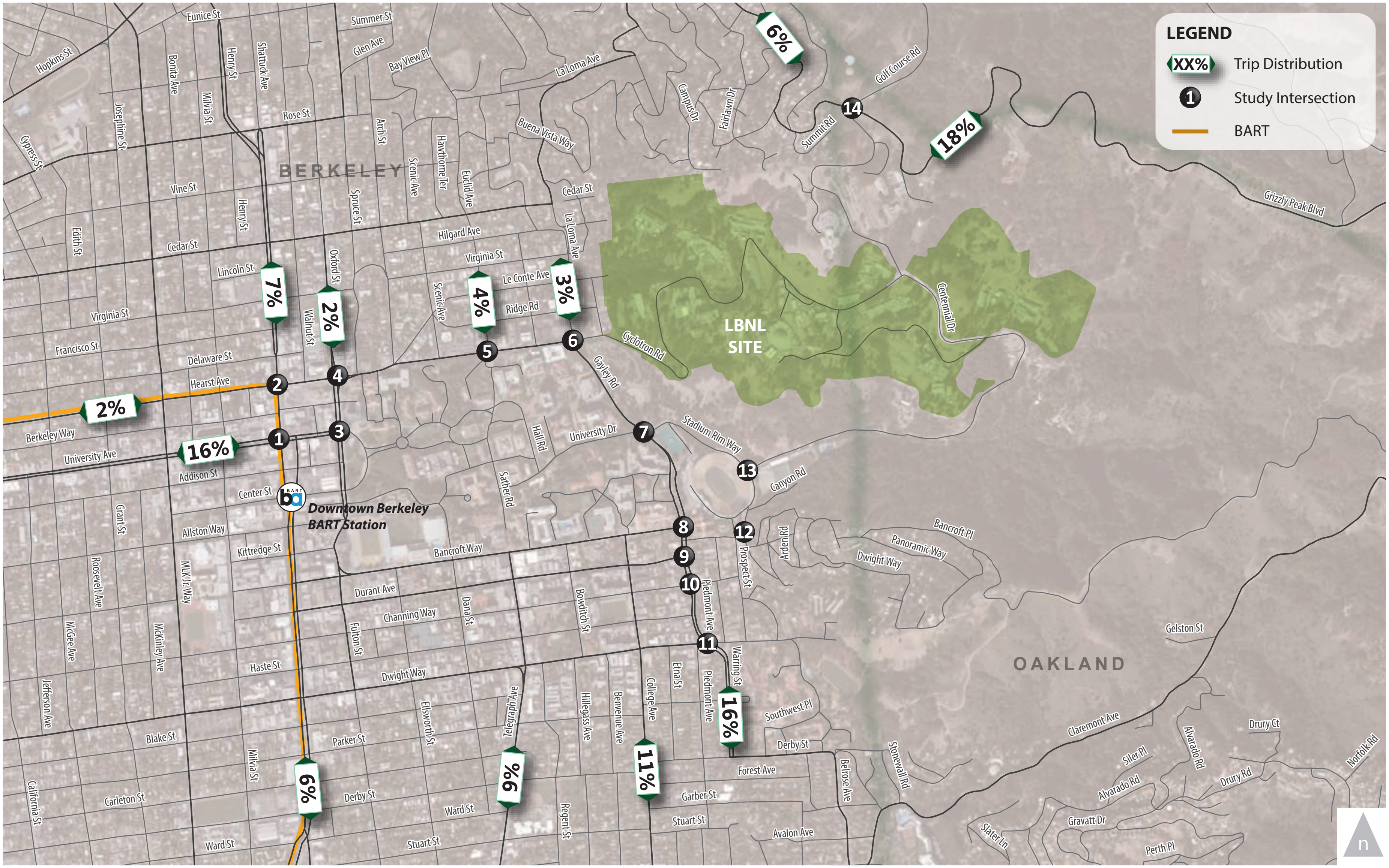



Figure 4-6.

## LBNL Site Project Trip Distribution

WC12-2953_4-6_LBNLTripDistro

FEHR & PEERS


Figure 4-7A.

## LBNL Site
## Project Trip Assignment (Phase 1)

WC12-2953_4-7A_PTA

FEHR & PEERS


Figure 4-7B.

**LBNL Site**
**Project Trip Assignment (Phase 1)**

WC12-2953_4-7B_PTA

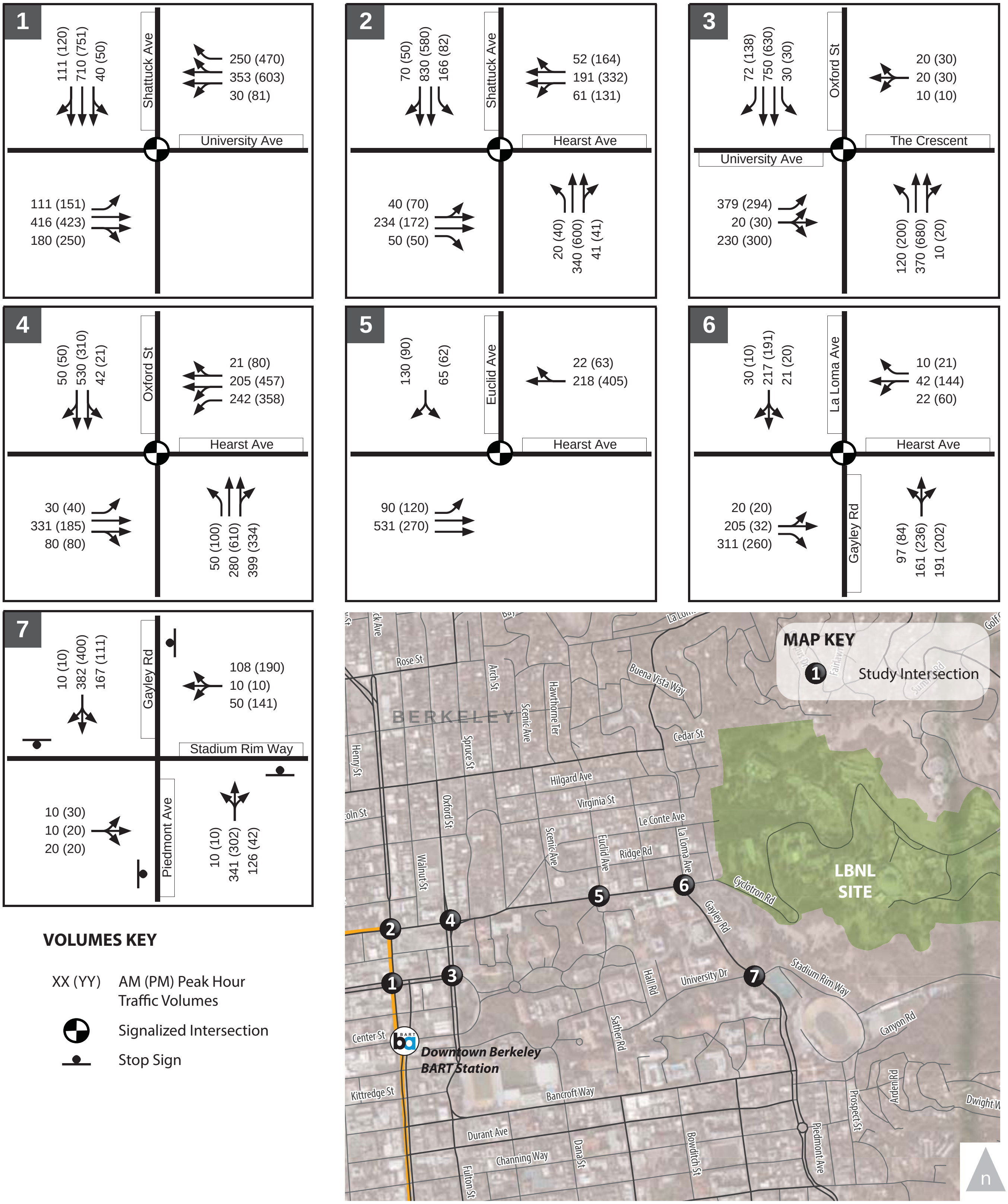



Figure 4-8A.

## LBNL Site Near-Term (2018) No Project Peak Hour Traffic Volumes

WC12-2953_4-8A_NT2018NPvol

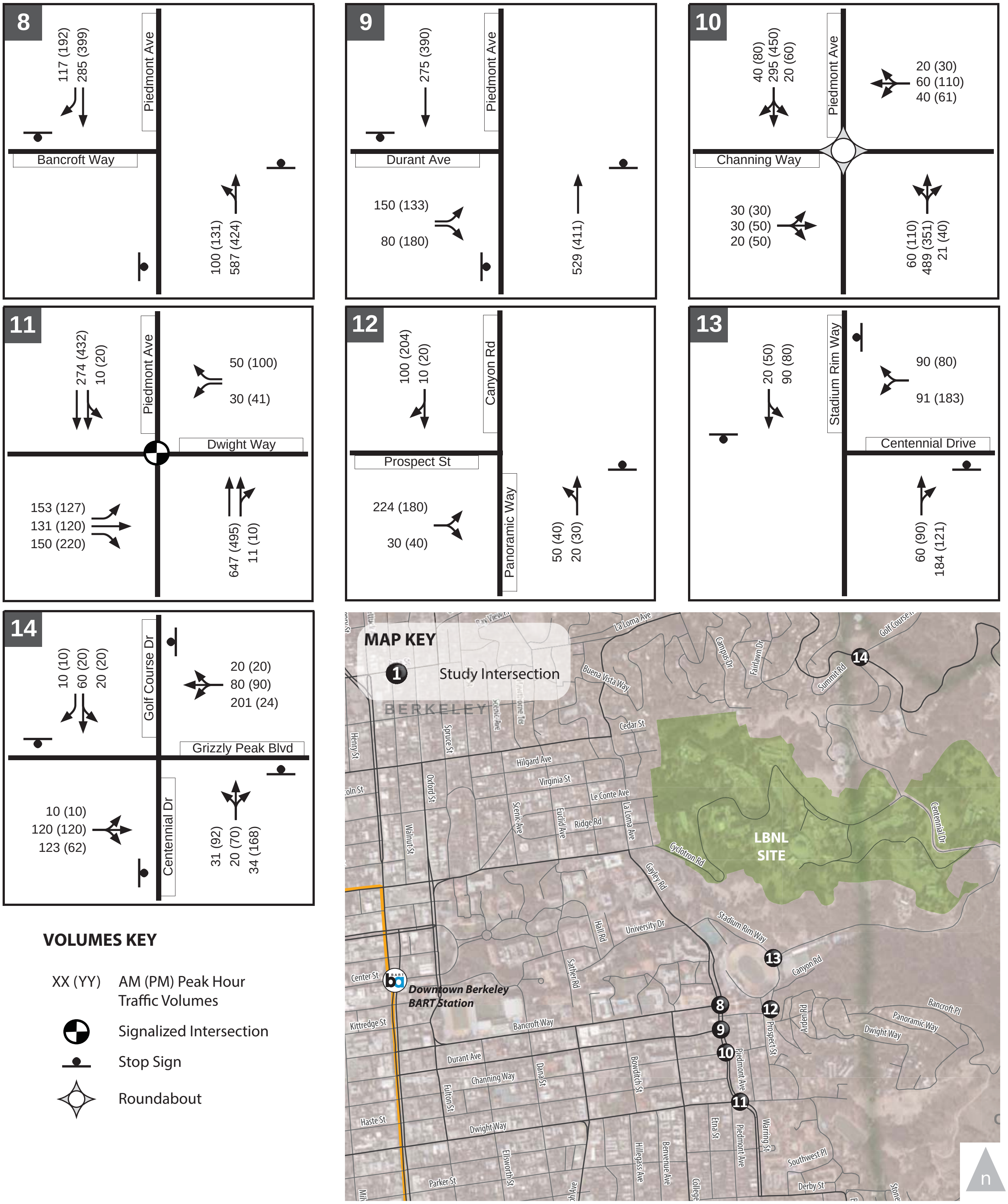



Figure 4-8B.

**LBNL Site Near-Term (2018) No Project Peak Hour Traffic Volumes**

WC12-2953_4-8A_NT2018NPvol

FEHR & PEERS

The Near-Term (2018) No Project scenario assumes that signal timing parameters at the signalized study intersections would be optimized to reflect typical signal timing updates due to changing traffic flow over time. No other roadway modifications are assumed at any of the study intersections in Berkeley under the Near-Term (2018) No Project scenario.

**Table 4-4** summarizes the Near-Term (2018) No Project intersection LOS analysis results. **Appendix H** provides the detailed calculation work sheets. In comparison to Existing Conditions, both all-way stop-controlled Bancroft Way/Piedmont Avenue and Durant Avenue/Piedmont Avenue intersections would continue to operate at LOS F during the PM peak hour. In addition, the Durant Avenue/Piedmont Avenue intersection would deteriorate to LOS F during the AM peak hour. All other study intersections would continue to operate at LOS D or better during both AM and PM peak hours.

### 4.4.2 NEAR-TERM (2018) PLUS PROJECT CONDITIONS

**Figures 4-9A and 4-9B** show the Near-Term (2018) Plus Project traffic volumes, which consist of traffic volumes under Near-Term (2018) No Project conditions (Figures 4-8A and 4-8B) plus Project traffic assignment (Figures 4-7A and 4-7B). This analysis assumes no roadway modifications under this scenario.

**Table 4-4** summarizes intersection operations at the study intersections under the Near-Term (2018) Plus Project conditions. **Appendix H** provides the detailed calculation work sheets.

All signalized intersections would continue to operate at LOS D or better during both AM and PM peak hours under the Near-Term (2018) Plus Project conditions. All but two of the unsignalized study intersections would operate at LOS F during one or both peak hours.

The all-way stop-controlled Bancroft Avenue/Piedmont Avenue intersection during the PM peak hour and the all-way stop-controlled Durant Avenue/Piedmont Avenue intersection during both AM and PM peak hours would operate at LOS F under the Near-Term (2018) Plus Project conditions. However, the Project would not cause an impact at these intersections because neither intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

The Project would cause a significant impact at one intersection which is summarized under Impact 4-1 discussion.

**TABLE 4-4**
**LBNL SITE**
**NEAR-TERM (2018) CONDITIONS – STUDY INTERSECTION LOS SUMMARY**

| Intersection | Traffic Control | Peak Hour | Near-Term (2018) No Project | | Near-Term (2018) Plus Project | | Significant Impact? |
|---|---|---|---|---|---|---|---|
| | | | Delay[1] (seconds) | LOS[1] | Delay[1] (seconds) | LOS[1] | |
| 1. University Avenue/ Shattuck Avenue | Signal | AM | 17.3 | B | 17.4 | B | No |
| | | PM | 23.2 | C | 23.6 | C | No |
| 2. Hearst Avenue/ Shattuck Avenue | Signal | AM | 16.7 | B | 16.8 | B | No |
| | | PM | 22.6 | C | 23.1 | C | No |
| 3. University Avenue/ Oxford Street | Signal | AM | 26.1 | C | 27.0 | C | No |
| | | PM | 22.1 | C | 22.0 | C | No |
| 4. Hearst Avenue/ Oxford Street | Signal | AM | 31.4 | C | 32.0 | C | No |
| | | PM | 41.0 | D | 41.5 | D | No |
| 5. Hearst Avenue/ Euclid Avenue | Signal | AM | 15.6 | B | 15.7 | B | No |
| | | PM | 25.8 | C | 29.4 | C | No |
| 6. Hearst Avenue/Gayley Road/La Loma Avenue | Signal | AM | 14.3 | B | 15.3 | B | No |
| | | PM | 16.3 | B | 17.3 | B | No |
| 7. Stadium Rim Way/ Gayley Road | All-Way Stop | AM | 33.1 | C | 38.7 | E | No |
| | | PM | 31.4 | C | 38.7 | E | **Yes** |
| 8. Bancroft Way/ Piedmont Avenue [2] | All-Way Stop | AM | 39.7 | E | 41.2 | E | No |
| | | PM | **>120** | **F** | **>120** | **F** | No |
| 9. Durant Avenue/ Piedmont Avenue [2] | All-Way Stop | AM | **>120** | **F** | **>120** | **F** | No |
| | | PM | **>120** | **F** | **>120** | **F** | No |
| 10. Channing Way/ Piedmont Avenue | Round-about | AM | 10.1 | B | 10.8 | B | No |
| | | PM | 15.1 | C | 16.6 | C | No |
| 11. Dwight Way/ Piedmont Avenue | Signal | AM | 14.8 | B | 15.1 | B | No |
| | | PM | 13.8 | B | 14.0 | B | No |
| 12. Panoramic Way/ Canyon Road/Stadium Rim Way | Side-Street Stop | AM | 2.1 (11.9) | A (B) | 2.1 (12.0) | A (B) | No |
| | | PM | 2.0 (11.8) | A (B) | 2.1 (11.9) | A (B) | No |
| 13. Centennial Drive/ Stadium Rim Way | All-way Stop | AM | 8.9 | A | 9.0 | A | No |
| | | PM | 10.4 | B | 10.6 | B | No |
| 14. Centennial Drive/ Grizzly Peak Boulevard | All-way Stop | AM | 10.8 | B | 11.4 | B | No |
| | | PM | 10.4 | B | 11.0 | B | No |

Notes: **Bold** indicates an intersection operating at unacceptable LOS E or LOS F.
1. For signalized, all-way stop-controlled, and roundabout intersections, average intersection delay and LOS based on the 2000 HCM method is shown. For side-street stop-controlled intersections, delays for worst movement and average intersection delay are shown: intersection average (worst movement).
2. Intersection analyzed using SimTraffic software because of unique conditions including heavy pedestrian volumes.

Source: Fehr & Peers.

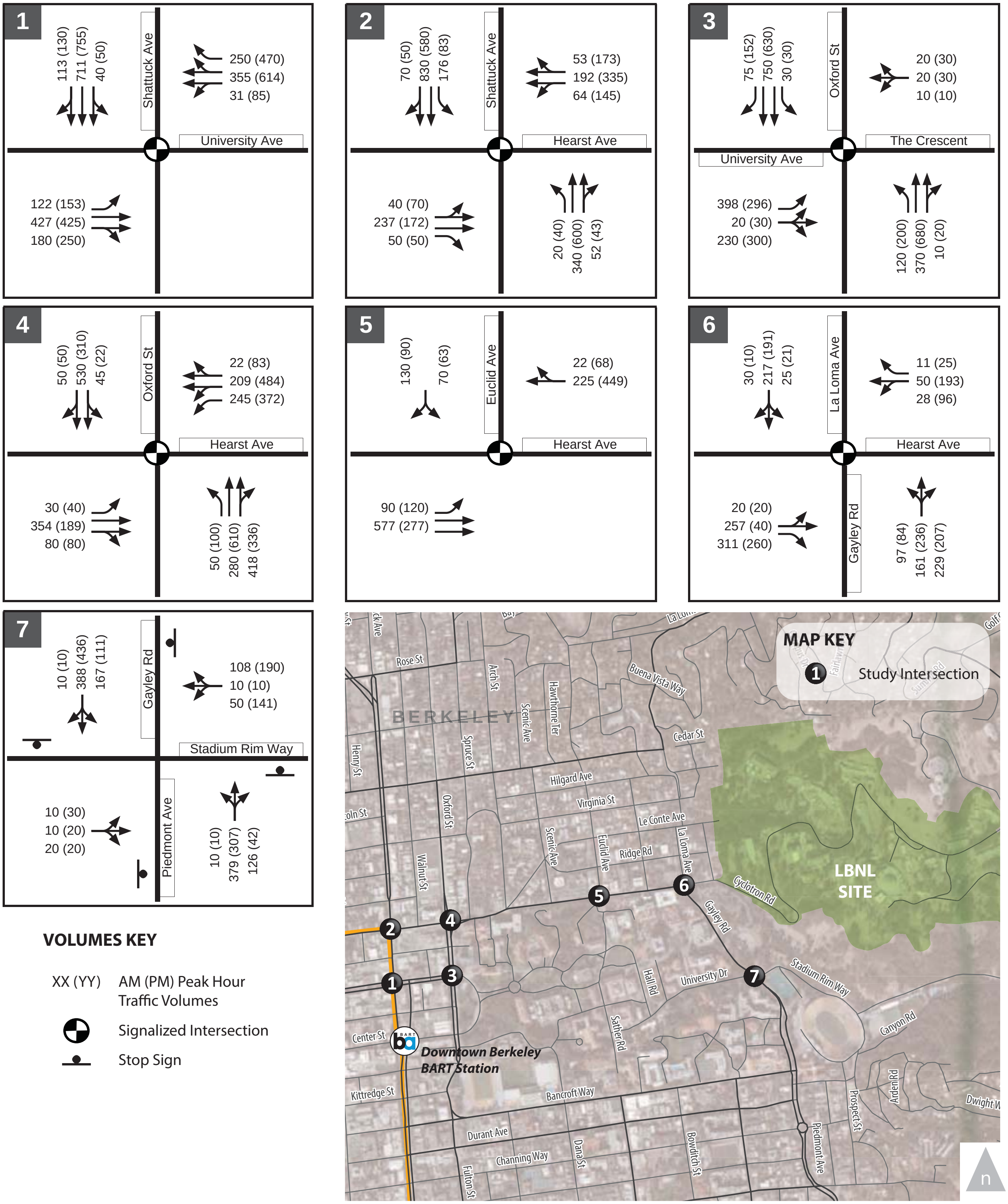



Figure 4-9A.

## LBNL Site Near-Term (2018) Plus Phase 1 Project Peak Hour Traffic Volumes

WC12-2953_4-9A_NT2018+PH1vol

FEHR & PEERS

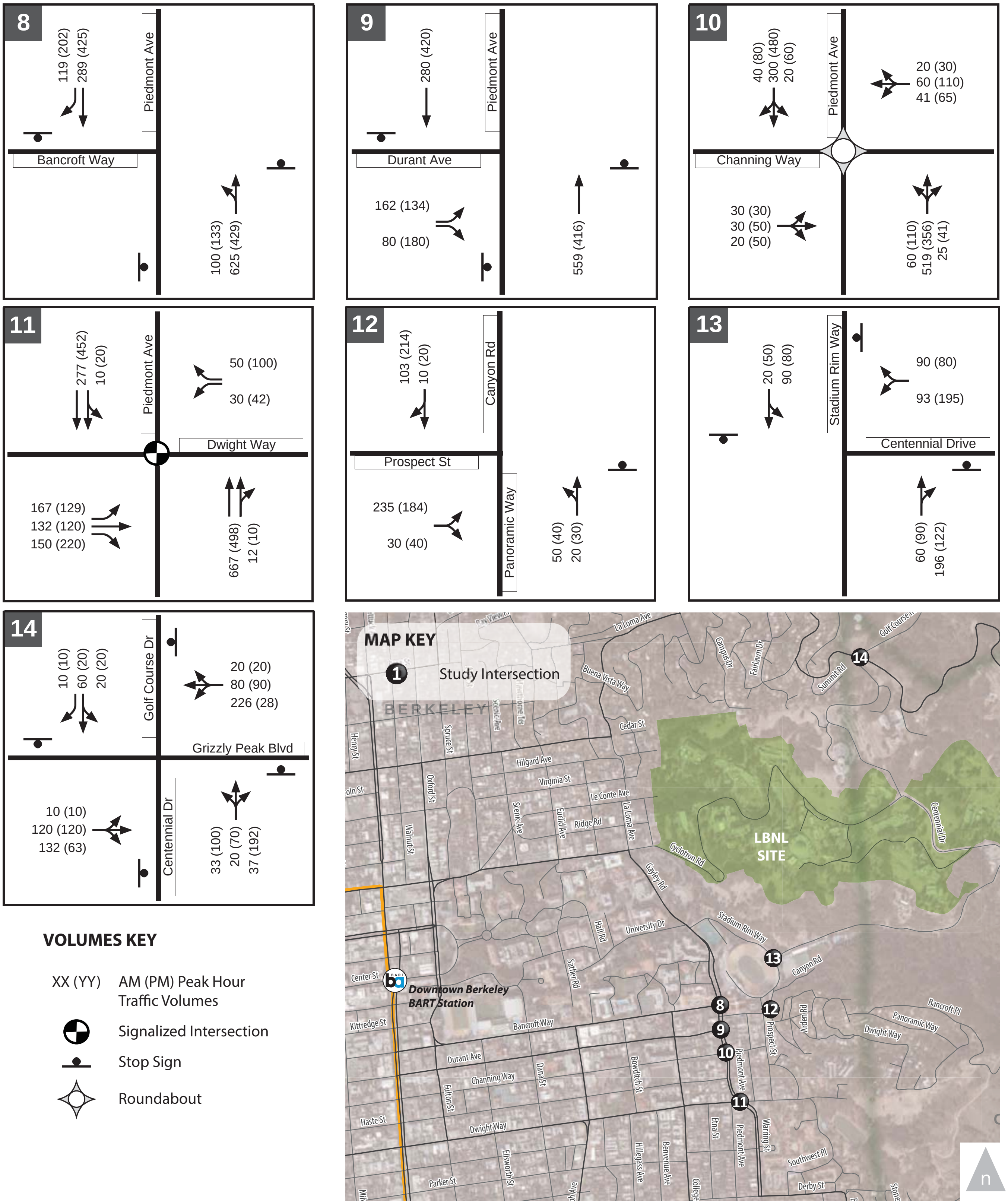



**Figure 4-9B.**

## LBNL Site Near-Term (2018) Plus Phase 1 Project Peak Hour Traffic Volumes

WC12-2953_4-9B_NT2018+PH1vol

**IMPACT 4-1: NEAR-TERM (2018) PLUS PROJECT CONDITIONS INTERSECTION OPERATIONS**

The proposed Project at LBNL site would cause a significant impact at the following intersection under Near-Term (2035) Plus Project conditions:

A. The Project would cause a significant impact at the all-way stop-controlled **Stadium Rim Way/Gayley Road** (Intersection 4) because the Project would contribute to LOS F operations for a critical movement during the PM peak hour and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

**Mitigation Measure 4-1:** Implement the following:

A. **Stadium Rim Way/Gayley Road** (Intersection 4): Implement the following which requires coordination with City of Berkeley and UC Berkeley:

- Install a traffic signal at the intersection.

The intersection would improve to LOS C or better during both AM and PM peak hours after implementation of this improvement. If found to be feasible and implemented, this mitigation measure would reduce the impact to less than significant.

## 4.5 CUMULATIVE (2035) ANALYSIS

This section summarizes traffic operations under Cumulative (2035) No Project and Cumulative (2035) Plus Project conditions.

### 4.5.1 CUMULATIVE (2035) NO PROJECT CONDITIONS

Traffic forecasts to the year 2035 were developed based on the results of the ACTC Countywide Travel Demand Model. The most recent version of the ACTC Model, released in June 2011, which reflects assumptions in residential and non-residential land use growth consistent with ABAG *Projections 2009,* served as the basis for developing AM and PM peak hour intersection turning movement forecasts for the year 2035. The Model land use database and roadway network were checked for accuracy in the vicinity of the LBNL. The forecasting process involved running the 2010 and 2035 models and using the model produced volumes and existing turning movement count data, to estimate year 2035 intersection turn movements using the Furness[6] method. Since the ACTC Model did not include any growth at the LBNL site, similar to the Near-Term (2018) No Project conditions, the traffic volume forecasts were adjusted to

[6] Furnessing is an iterative process that develops future turning movements by applying the difference between the base model volumes and the existing counts to future model approach and departure volumes.

account for the expected traffic generated by projects currently under construction or planned at LBNL and UC Berkeley. **Figures 4-10A and 4-10B** shows the Cumulative (2035) No Project traffic volumes.

Similar to the Near-Term (2018) No Project conditions, the Cumulative (2035) No Project analysis assumes that signal timing parameters at the signalized study intersections would be optimized. No other roadway modifications are assumed in the study area under the Cumulative (2035) No Project scenario.

**Table 4-5** summarizes the Cumulative (2035) No Project intersection LOS analysis results. **Appendix H** provides the detailed calculation work sheets.

All but one signalized study intersection would continue to operate at LOS D or better during both AM and PM peak hours under Cumulative (2035) No Project conditions. The Hearst Avenue/Oxford Street intersection would operate at LOS E during the PM peak hour.

All but three of the unsignalized intersections would continue to operate at LOS E or better during both AM and PM peak hours under Cumulative (2035) No Project conditions. The all-way stop-controlled Stadium Rim Way/Gayley Road intersection during both AM and PM peak hours, the all-way stop-controlled Bancroft Avenue/Piedmont Avenue intersection during the PM peak hour, and the all-way stop-controlled Durant Avenue/Piedmont Avenue intersection during both AM and PM peak hours would operate at LOS F.

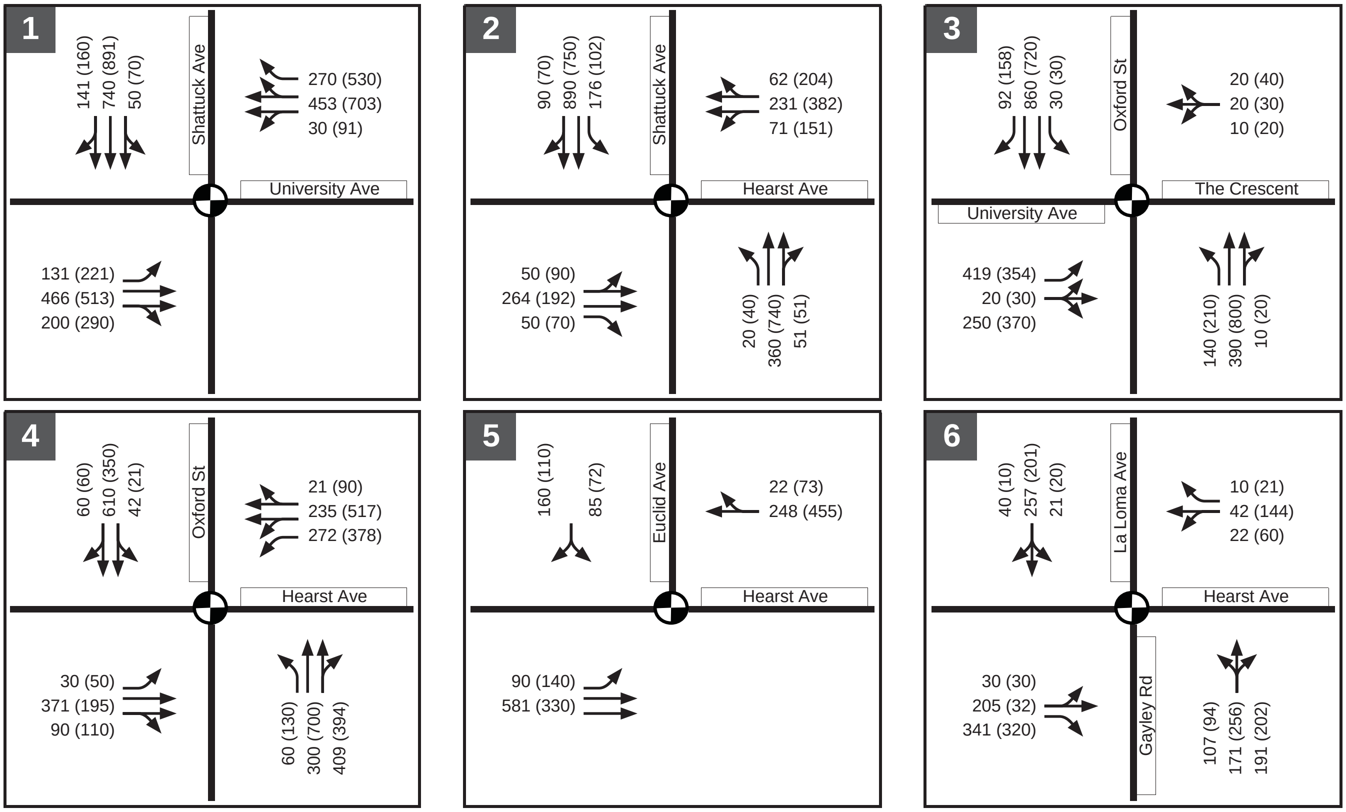
### 4.5.2 CUMULATIVE (2035) PLUS PROJECT CONDITIONS

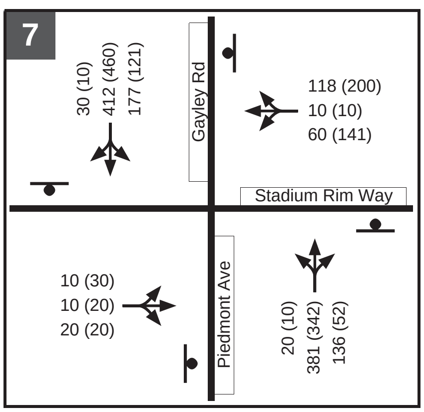
**Figures 4-11A and 4-11B** show the Cumulative (2035) Plus Project traffic volumes, which consist of traffic volumes under Cumulative (2035) No Project conditions (Figures 4-10A and 4-10B) plus Project traffic assignment (Figures 4-7A and 4-7B). This analysis assumes no roadway modifications under this scenario.

**Table 4-5** summarizes intersection operations at the study intersections under the Cumulative (2035) Plus Project conditions. **Appendix H** provides the detailed calculation work sheets.

All but one signalized study intersection would continue to operate at LOS D or better and all but three unsignalized study intersections would continue to operate at LOS E or better during both AM and PM peak hours under Cumulative (2035) Plus Project conditions.

The signalized Hearst Avenue/Oxford Street intersection would operate at LOS E during the PM peak hour under the Cumulative (2035) Plus Project conditions. However, the Project would not cause an impact at this intersection because it would not increase intersection average delay by more than three seconds.



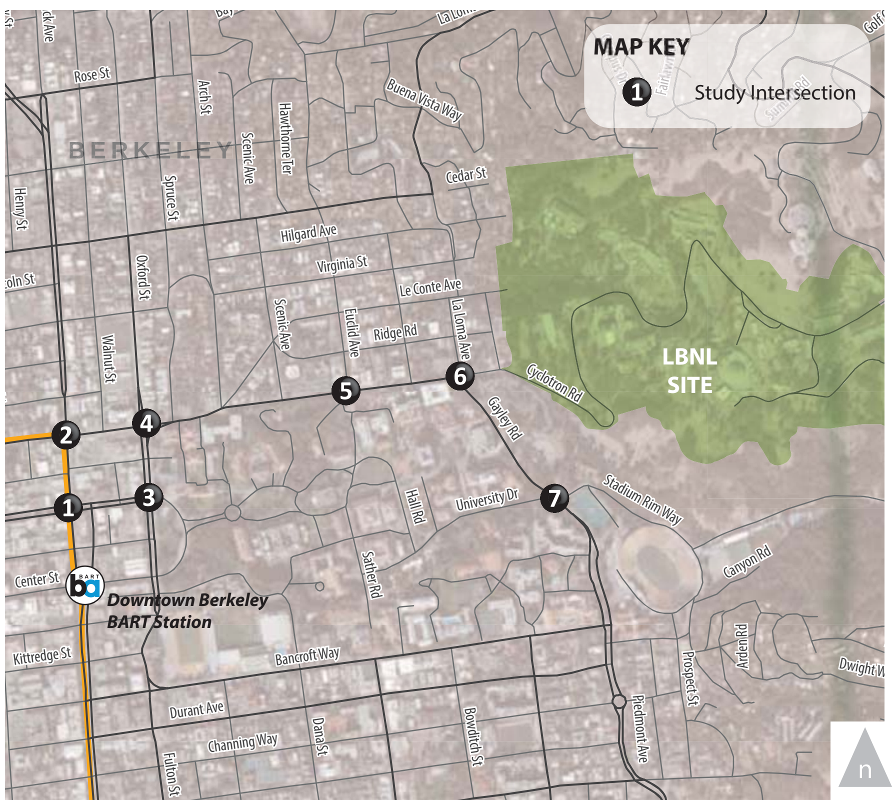




**VOLUMES KEY**

XX (YY) AM (PM) Peak Hour Traffic Volumes

Signalized Intersection

Stop Sign




## Figure 4-10A.

## LBNL Site Cumulative (2035) No Project Peak Hour Traffic Volumes

WC12-2953_4-10A_Cumu2035NPvol

FEHR & PEERS

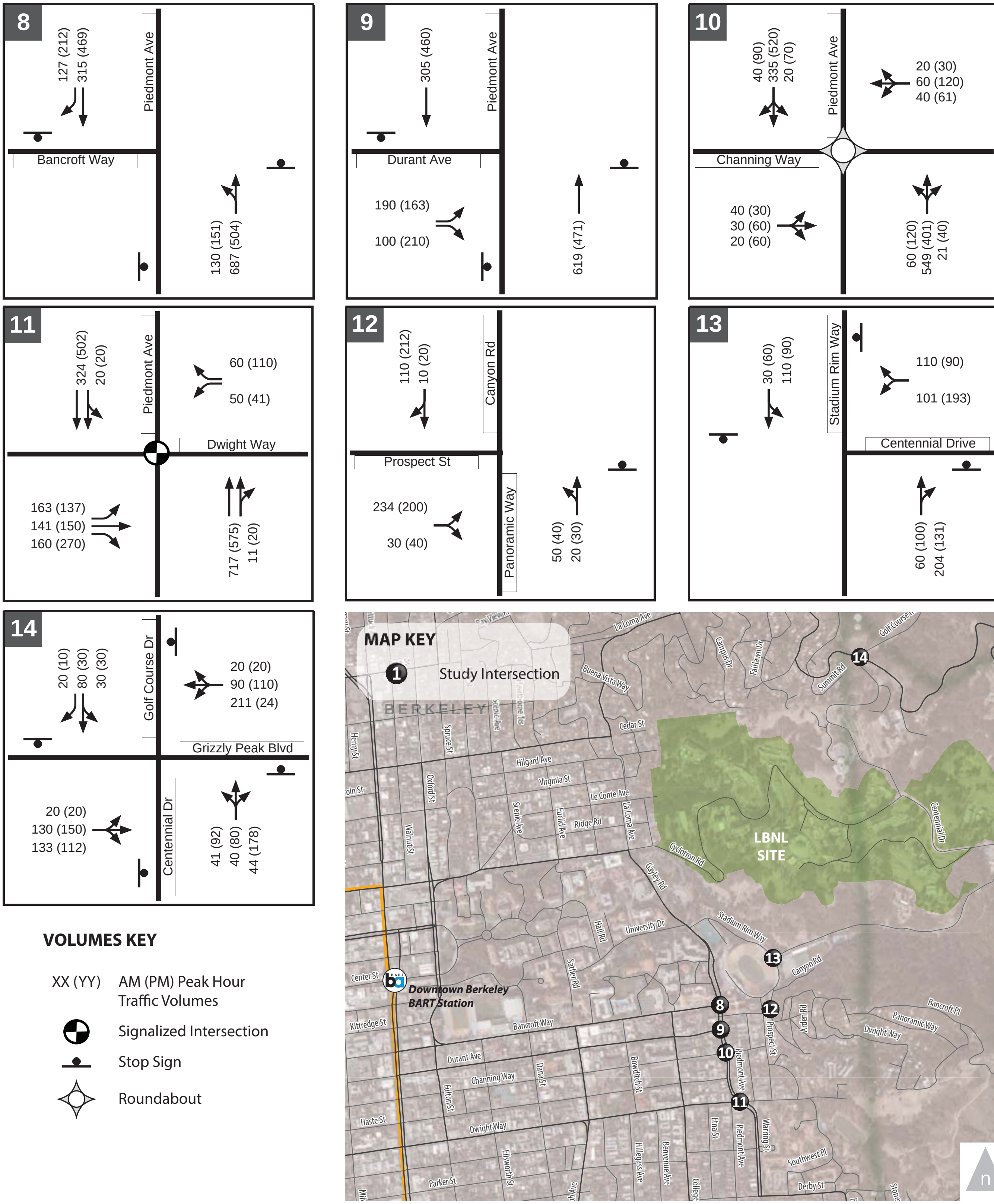



**Figure 4-10B.**

**LBNL Site Cumulative (2035) No Project Peak Hour Traffic Volumes**

WC12-2953_4-10B_Cumu2035NPvol

FEHR & PEERS

**TABLE 4-5**
**LBNL SITE**
**CUMULATIVE (2035) CONDITIONS – STUDY INTERSECTION LOS SUMMARY**

| Intersection | Traffic Control | Peak Hour | Cumulative (2035) No Project | | Cumulative (2035) Plus Project | | Significant Impact? |
|---|---|---|---|---|---|---|---|
| | | | Delay[1] (seconds) | LOS[1] | Delay[1] (seconds) | LOS[1] | |
| 1. University Avenue/ Shattuck Avenue | Signal | AM | 18.5 | B | 18.6 | B | No |
| | | PM | 33.0 | C | 34.2 | C | No |
| 2. Hearst Avenue/ Shattuck Avenue | Signal | AM | 17.4 | B | 17.6 | B | No |
| | | PM | 24.1 | C | 24.8 | C | No |
| 3. University Avenue/ Oxford Street | Signal | AM | 34.8 | C | 35.9 | D | No |
| | | PM | 27.7 | C | 27.8 | C | No |
| 4. Hearst Avenue/ Oxford Street | Signal | AM | 34.3 | C | 34.8 | C | No |
| | | PM | **65.4** | **E** | **65.9** | **E** | No |
| 5. Hearst Avenue/ Euclid Avenue | Signal | AM | 16.0 | B | 16.1 | B | No |
| | | PM | 36.0 | D | 48.5 | D | No |
| 6. Hearst Avenue/Gayley Road/La Loma Avenue | Signal | AM | 15.0 | B | 16.2 | B | No |
| | | PM | 17.5 | B | 18.5 | B | No |
| 7. Stadium Rim Way/ Gayley Road | All-Way Stop | AM | **56.0** | **F** | **65.5** | **F** | **Yes** |
| | | PM | **52.7** | **F** | **64.1** | **F** | **Yes** |
| 8. Bancroft Way/ Piedmont Avenue [2] | All-Way Stop | AM | 41.7 | E | 44.6 | E | No |
| | | PM | **>120** | **F** | **>120** | **F** | No |
| 9. Durant Avenue/ Piedmont Avenue [2] | All-Way Stop | AM | **>120** | **F** | **>120** | **F** | **Yes** |
| | | PM | **>120** | **F** | **>120** | **F** | **Yes** |
| 10. Channing Way/ Piedmont Avenue | Round-about | AM | 11.7 | B | 12.5 | B | No |
| | | PM | 22.6 | C | 26.3 | D | No |
| 11. Dwight Way/ Piedmont Avenue | Signal | AM | 16.1 | B | 16.6 | B | No |
| | | PM | 15.2 | B | 15.4 | B | No |
| 12. Panoramic Way/ Canyon Road/Stadium Rim Way | Side-Street Stop | AM | 2.1 (12.1) | A (B) | 2.1 (12.3) | A (B) | No |
| | | PM | 1.9 (12.1) | A (B) | 1.9 (12.3) | A (B) | No |
| 13. Centennial Drive/ Stadium Rim Way | All-way Stop | AM | 9.4 | A | 9.5 | A | No |
| | | PM | 11.1 | B | 11.3 | B | No |
| 14. Centennial Drive/ Grizzly Peak Boulevard | All-way Stop | AM | 12.4 | B | 13.2 | B | No |
| | | PM | 12.2 | B | 12.9 | B | No |

Notes: **Bold** indicates an intersection operating at unacceptable LOS E or LOS F.

1. For signalized, all-way stop-controlled, and roundabout intersections, average intersection delay and LOS based on the 2000 HCM method is shown. For side-street stop-controlled intersections, delays for worst movement and average intersection delay are shown: intersection average (worst movement).
2. Intersection analyzed using SimTraffic software because of unique conditions including heavy pedestrian volumes.

Source: Fehr & Peers.

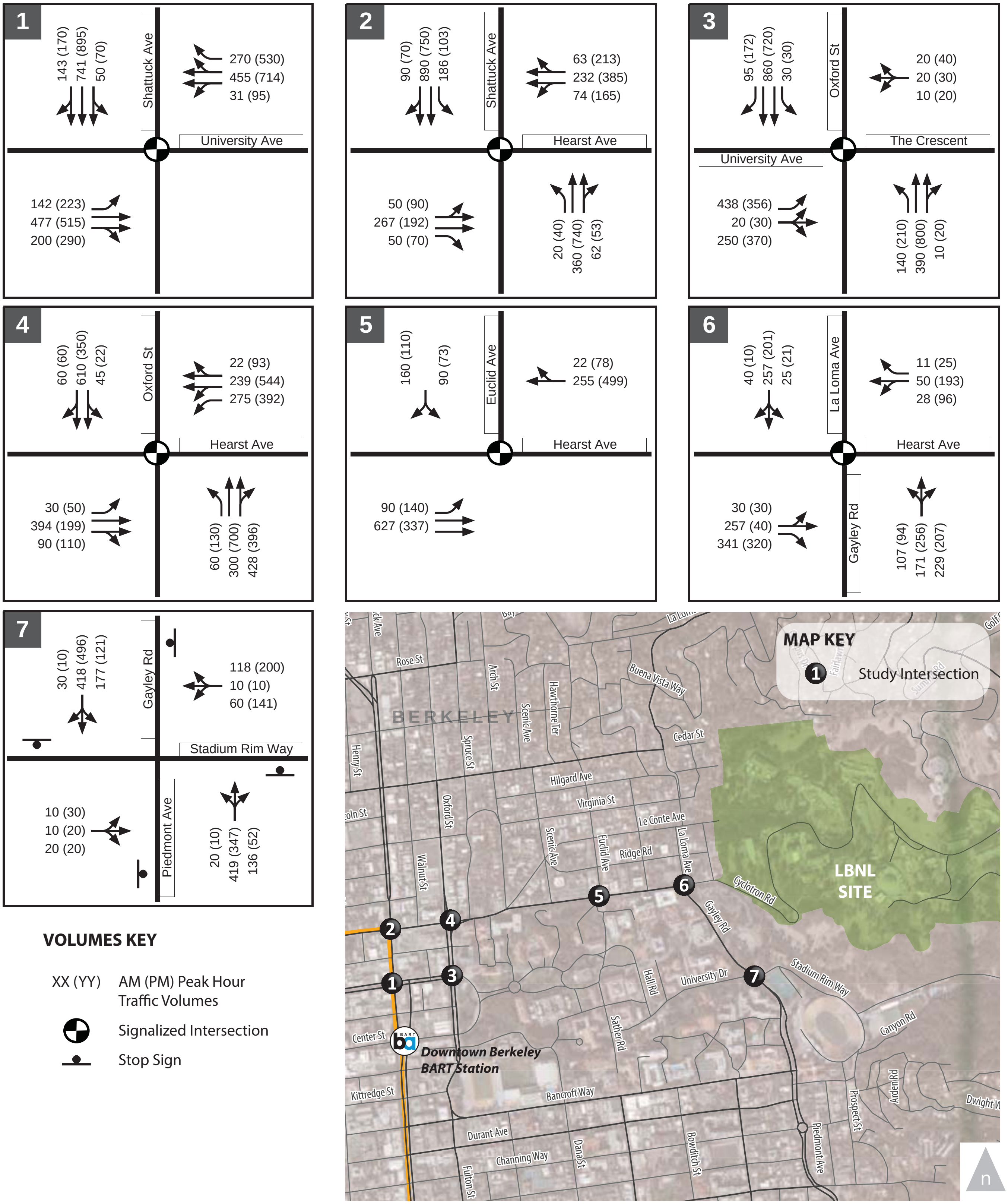



Figure 4-11A.

## LBNL Site Cumulative (2035) Plus Phase 1 Project Peak Hour Traffic Volumes

WC12-2953_4-11A_Cumu2035+PH1vol

FEHR & PEERS

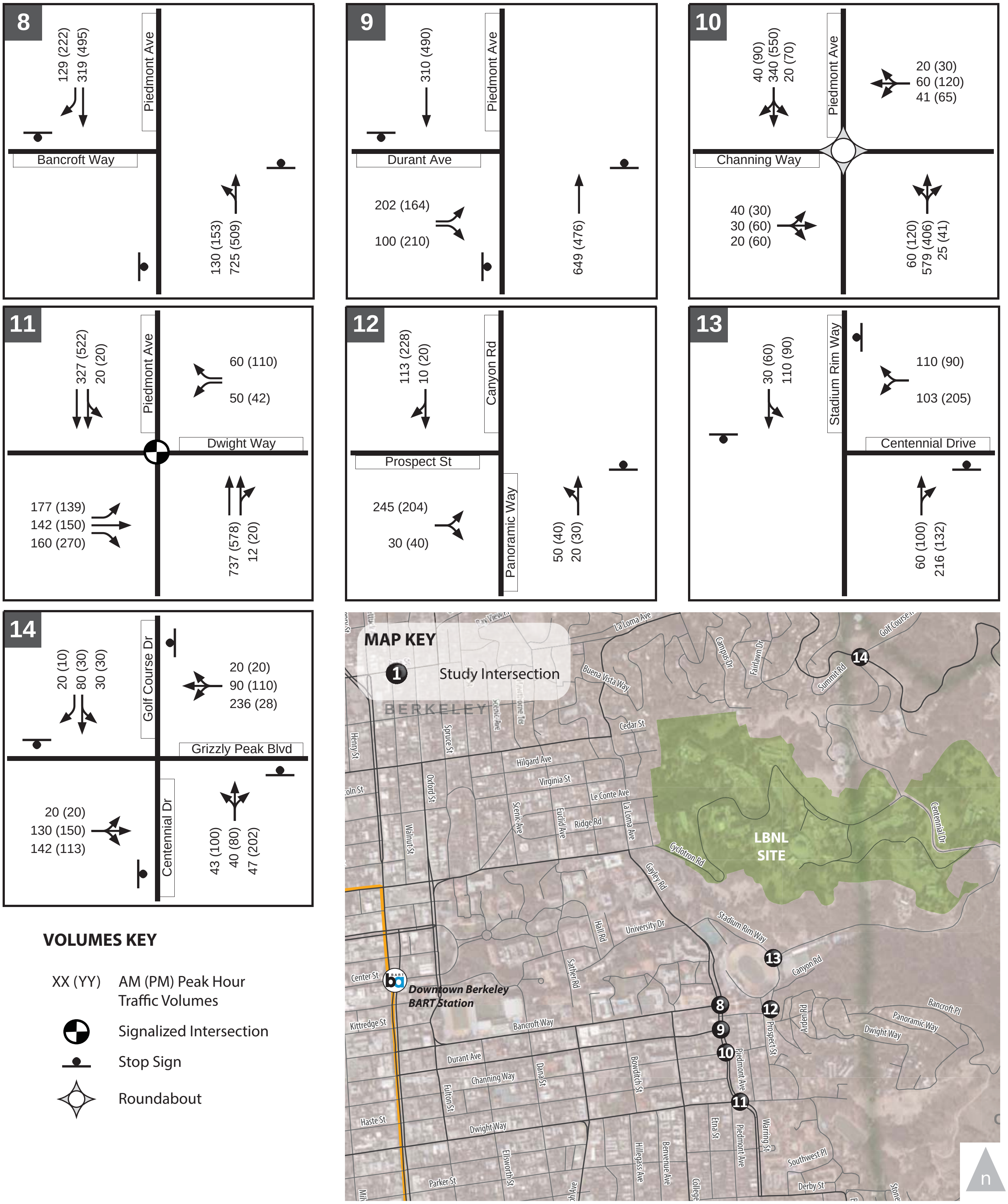



Figure 4-11B.

## LBNL Site Cumulative (2035) Plus Phase 1 Project Peak Hour Traffic Volumes

WC12-2953_4-11B_Cumu2035+PH1vol

FEHR & PEERS

The all-way stop-controlled Bancroft Avenue/Piedmont Avenue intersection would operate at LOS F during the PM peak hour under the Cumulative (2035) Plus Project conditions. However, the Project would not cause an impact at this intersection because the intersection would not satisfy the Caltrans peak hour traffic volume signal warrant.

The Project would cause a significant impact at two intersections which are summarized under Impact 4-2 discussion.

**IMPACT 4-2: CUMULATIVE (2035) PLUS PROJECT CONDITIONS INTERSECTION OPERATIONS**

The proposed Project at LBNL site would cause a significant impact at the following intersections under Cumulative (2035) Plus Project conditions:

A. The Project would cause a significant impact at the all-way stop-controlled **Stadium Rim Way/Gayley Road** (Intersection 4) because the Project would contribute to LOS F operations during both AM and PM peak hours and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

B. The Project would cause a significant impact at the all-way stop-controlled **Durant Avenue/Piedmont Avenue** (Intersection 9) because the Project would contribute to LOS F operations during both AM and PM peak hours and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

**Mitigation Measure 4-2:** Implement the following:

A. **Stadium Rim Way/Gayley Road** (Intersection 4): Implement the following which requires coordination with City of Berkeley and UC Berkeley (Same as Mitigation Measure 4-1A):

- Install a traffic signal at the intersection.

The intersection would improve to LOS C or better during both AM and PM peak hours after implementation of this improvement. If found to be feasible and implemented, this mitigation measure would reduce the impact to less than significant.

B. **Durant Avenue/Piedmont Avenue** (Intersection 9): Implement the following which requires coordination with City of Berkeley:

- Install a traffic signal at the intersection.

The intersection would improve to LOS B or better during both AM and PM peak hours after implementation of this improvement. If found to be feasible and implemented, this mitigation measure would reduce the impact to less than significant.

# 4.6 ADDITIONAL EMPLOYMENT ALTERNATIVE ANALYSIS

This section presents trip generation for the Additional Employment Alternative scenario and summarizes traffic operations under the Near-Term (2018) Plus Additional Employment Alternative conditions. The Additional Employment Alternative would consist of an additional 200,000 square feet of space and accommodate an additional 700 employees at the existing LBNL site.

## 4.6.1 TRIP GENERATION

**Table 4-6** shows the estimated vehicle trip generation for the Additional Employment Alternative at the existing LBNL site. The trip generation estimates is based on the same methodology used to estimate trip generation for the Project at the LBNL site as documented in section 4.3.1. The 700 additional employees under the Alternative at the existing LBNL site are expected to increase trip generation to about 2,700 daily, 270 AM peak hour, and 260 PM peak hour automobile trips.

**TABLE 4-6**
**EXISTING LBNL SITE**
**ADDITIONAL EMPLOYMENT ALTERNATIVE**
**VEHICLE TRIP GENERATION SUMMARY**

| | Average Daily Population | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total |
| LBNL Project [1] | 1,000 | 1,585 | 139 | 22 | 161 | 20 | 132 | 152 |
| Additional Employees [1] | 700 | 1,109 | 97 | 16 | 123 | 14 | 92 | 106 |
| Additional Employment Alternative Total | 1,700 | 2,694 | 236 | 38 | 274 | 34 | 224 | 258 |

1. Based on the following current trip generation rate per at the existing LBNL site:
   Daily = 1.58 trips per Average Daily Population (ADP); AM Peak Hour = 0.14 trips per ADP (86% in, 14% out); PM Peak Hour = 0.15 trips per ADP (13% in, 87% out)

Source: Fehr & Peers.

## 4.6.2 NEAR-TERM (2018) PLUS CUMULATIVE ALTERNATIVE CONDITIONS

**Figures 4-12A and 4-12B** show the traffic volumes under the Near-Term (2018) Plus Additional Employment Alternative conditions, which consist of traffic volumes under Near-Term (2018) No Project conditions plus traffic generated by the 1,000 Project employees and the 700 additional employees under the Additional Employment Alternative.

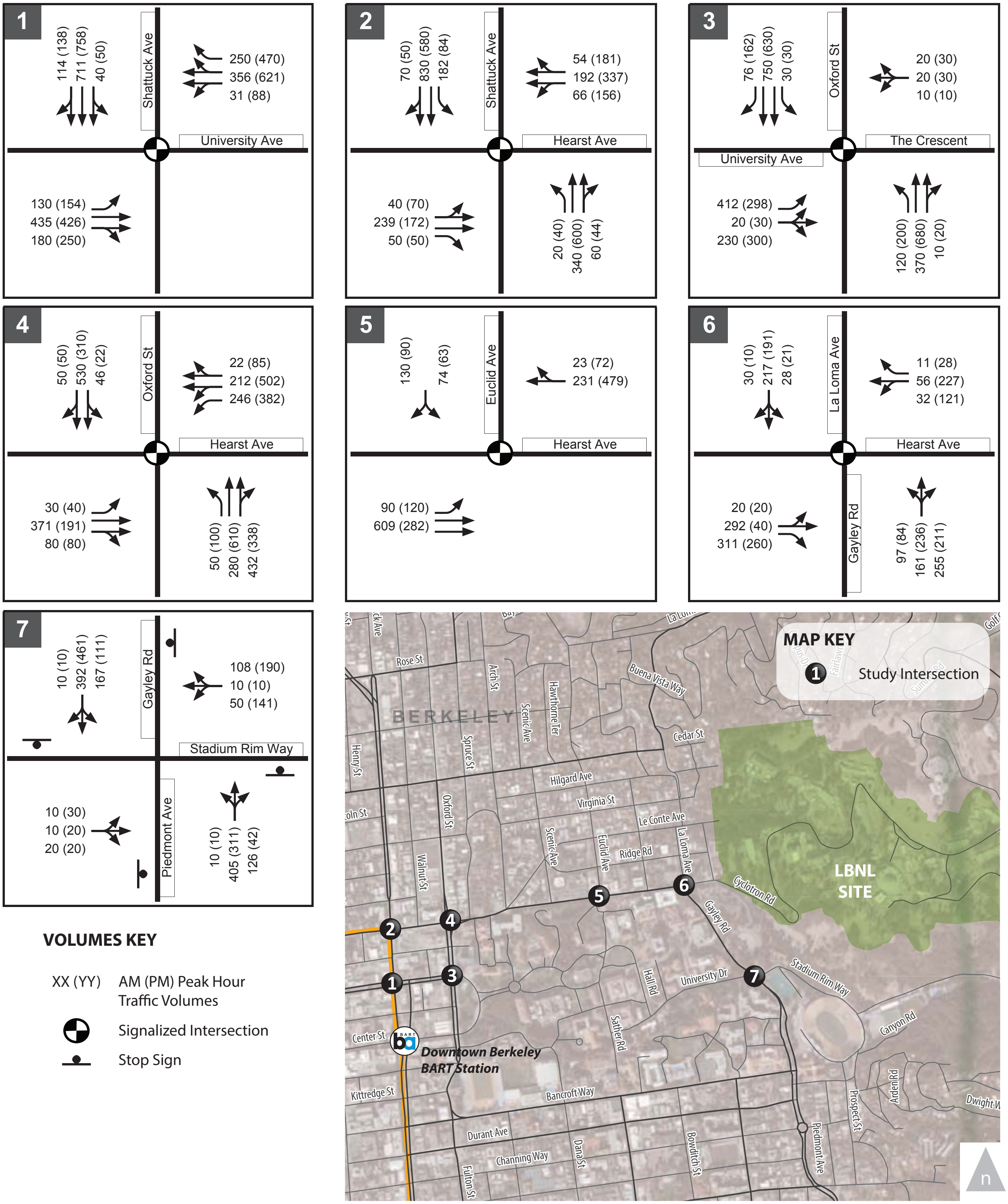



Figure 4-12A.

## LBNL Site Near-Term (2018)
## Plus Additional Employment Alternative Peak Hour Traffic Volumes

WC12-2953_4-12A_NT2018+AEAvol

FEHR & PEERS

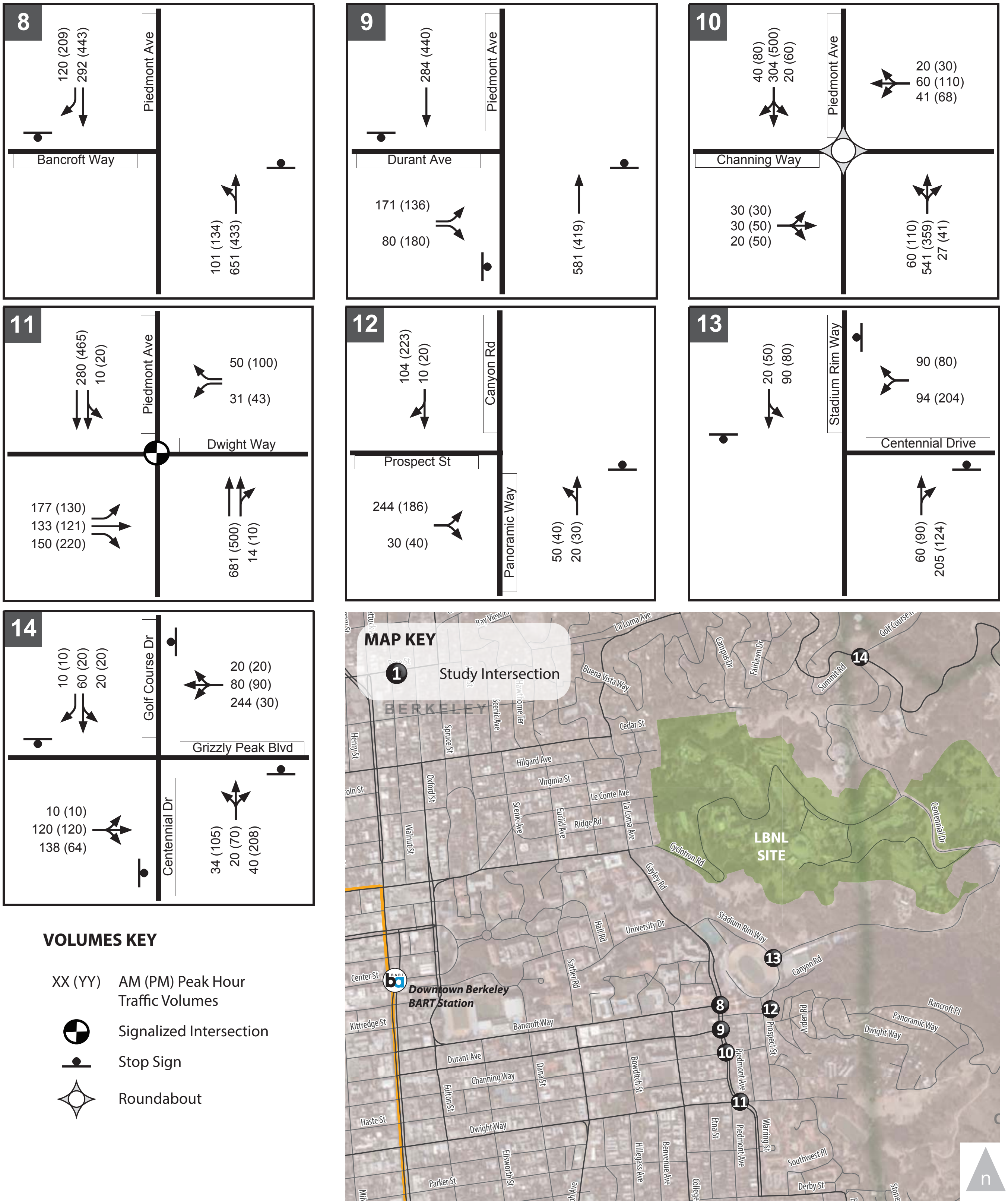



**Figure 4-12B.**

**LBNL Site Near-Term (2018)**
**Plus Additional Employment Alternative Peak Hour Traffic Volumes**

WC12-2953_4-12B_NT2018+AEAvol

FEHR & PEERS

**Table 4-7** summarizes intersection operations at the study intersections under the Near-Term (2018) Plus Additional Employment Alternative conditions. **Appendix H** provides the detailed calculation work sheets.

All signalized intersections would continue to operate at LOS D or better during both AM and PM peak hours under the Near-Term (2018) Plus Additional Employment Alternative conditions. All but two of the unsignalized study intersections would operate at LOS F during one or both peak hours.

The all-way stop-controlled Bancroft Avenue/Piedmont Avenue and Durant Avenue/Piedmont Avenue intersections during both AM and PM peak hours would operate at LOS F under the Near-Term (2018) Plus Additional Employment Alternative conditions. However, the Additional Employment Alternative would not cause an impact at these intersections because neither intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

The Additional Employment Alternative would cause a significant impact at one intersection which is summarized under Impact 4-3 discussion.

### IMPACT 4-3: NEAR-TERM (2018) PLUS ADDITIONAL EMPLOYMENT ALTERNATIVE CONDITIONS INTERSECTION OPERATIONS

The Additional Employment Alternative at LBNL site would cause a significant impact at the following intersection under Near-Term (2035) Plus Additional Employment Alternative conditions:

A. The Additional Employment Alternative would cause a significant impact at the all-way stop-controlled **Stadium Rim Way/Gayley Road** (Intersection 4) because the Alternative would contribute to LOS F operations for a critical movement during the PM peak hour and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant.

**Mitigation Measure 4-3:** Implement the following:

A. **Stadium Rim Way/Gayley Road** (Intersection 4): Implement the following which requires coordination with City of Berkeley and UC Berkeley (Same as Mitigation Measure 4-1A):

- Install a traffic signal at the intersection.

The intersection would improve to LOS C or better during both AM and PM peak hours after implementation of this improvement. If found to be feasible and implemented, this mitigation measure would reduce the impact to less than significant.

**TABLE 4-7**
**LBNL SITE**
**ADDITIONAL EMPLOYMENT ALTERNATIVE (2018) CONDITIONS –**
**STUDY INTERSECTION LOS SUMMARY**

| Intersection | Traffic Control | Peak Hour | Near-Term (2018) No Project | | Near-Term (2018) Plus Additional Employment Alternative | | Significant Impact? |
|---|---|---|---|---|---|---|---|
| | | | Delay[1] (seconds) | LOS[1] | Delay[1] (seconds) | LOS[1] | |
| 1. University Avenue/ Shattuck Avenue | Signal | AM | 17.3 | B | 17.4 | B | No |
| | | PM | 23.2 | C | 23.8 | C | No |
| 2. Hearst Avenue/ Shattuck Avenue | Signal | AM | 16.7 | B | 16.9 | B | No |
| | | PM | 22.6 | C | 23.5 | C | No |
| 3. University Avenue/ Oxford Street | Signal | AM | 26.1 | C | 28.0 | C | No |
| | | PM | 22.1 | C | 22.0 | C | No |
| 4. Hearst Avenue/ Oxford Street | Signal | AM | 31.4 | C | 32.5 | C | No |
| | | PM | 41.0 | D | 42.2 | D | No |
| 5. Hearst Avenue/ Euclid Avenue | Signal | AM | 15.6 | B | 15.7 | B | No |
| | | PM | 25.8 | C | 33.7 | C | No |
| 6. Hearst Avenue/Gayley Road/La Loma Avenue | Signal | AM | 14.3 | B | 16.1 | B | No |
| | | PM | 16.3 | B | 18.7 | B | No |
| 7. Stadium Rim Way/ Gayley Road | All-Way Stop | AM | 33.1 | C | 43.7 | E | No |
| | | PM | 31.4 | C | 44.3 | E | **Yes** |
| 8. Bancroft Way/ Piedmont Avenue [2] | All-Way Stop | AM | 39.7 | E | **75.0** | **F** | No |
| | | PM | **>120** | **F** | **>120** | **F** | No |
| 9. Durant Avenue/ Piedmont Avenue [2] | All-Way Stop | AM | **>120** | **F** | **>120** | **F** | No |
| | | PM | **>120** | **F** | **>120** | **F** | No |
| 10. Channing Way/ Piedmont Avenue | Round-about | AM | 10.1 | B | 11.3 | B | No |
| | | PM | 15.1 | C | 18.0 | C | No |
| 11. Dwight Way/ Piedmont Avenue | Signal | AM | 14.8 | B | 15.4 | B | No |
| | | PM | 13.8 | B | 14.1 | B | No |
| 12. Panoramic Way/ Canyon Road/Stadium Rim Way | Side-Street Stop | AM | 2.1 (11.9) | A (B) | 2.4 (12.0) | A (B) | No |
| | | PM | 2.0 (11.8) | A (B) | 2.2 (12.0) | A (B) | No |
| 13. Centennial Drive/ Stadium Rim Way | All-way Stop | AM | 8.9 | A | 9.1 | A | No |
| | | PM | 10.4 | B | 10.8 | B | No |
| 14. Centennial Drive/ Grizzly Peak Boulevard | All-way Stop | AM | 10.8 | B | 11.9 | B | No |
| | | PM | 10.4 | B | 11.4 | B | No |

Notes: **Bold** indicates an intersection operating at unacceptable LOS E or LOS F.

1. For signalized, all-way stop-controlled, and roundabout intersections, average intersection delay and LOS based on the 2000 HCM method is shown. For side-street stop-controlled intersections, delays for worst movement and average intersection delay are shown: intersection average (worst movement).

| TABLE 4-7<br>LBNL SITE<br>ADDITIONAL EMPLOYMENT ALTERNATIVE (2018) CONDITIONS –<br>STUDY INTERSECTION LOS SUMMARY |
|---|
| 2. Intersection analyzed using SimTraffic software because of unique conditions including heavy pedestrian volumes.<br>Source: Fehr & Peers. |

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