**ADDENDUM TO SUBSEQUENT ENVIRONMENTAL IMPACT REPORT**

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| **Date of Publication of Addendum:** | September 10, 2008 |
| **Date of Certification of Final Subsequent EIR:** | September 17, 1998 |
| **Lead Agency:** | San Francisco Redevelopment Agency<br>1 South Van Ness Avenue, San Francisco, CA 94103 |
| **Agency Contact:** | Stanley Muraoka **Telephone:** (415) 749-2577 |
| **Project Title:** | Redevelopment Agency Case No. ER 919-97 Addendum #6<br>Review of University of California San Francisco Medical Center at Mission Bay ("UCSF Medical Center") and Draft Environmental Impact Report for UCSF Medical Center at Mission Bay ("UCSF DEIR") (State Clearinghouse No. 2008012075) |
| **Project Sponsor/Contact:** | Stanley Muraoka, SF Redevelopment Agency **Telephone:** (415) 749-2577 |
| **Project Address:** | Approximately 303 acres located generally south of Townsend Street, east of Seventh Street and I-280 freeway, north of Mariposa Street, and west of Terry A. Francois Boulevard and Third Street; Mission Bay North and South are north and south of China Basin Channel respectively. |
| **City and County:** | San Francisco |

**Determination:**

The UCSF DEIR analyzes development of the UCSF Medical Center in the Mission Bay South Redevelopment Project Area. In September, 2008, The Regents of the University of California ("The Regents") will be acting on the approval of the UCSF Medical Center, which calls for establishment of up to a 289-bed hospital in Phase I and an additional 261-beds in Phase II on Blocks 36-39 and X-3 in Mission Bay South. Based upon the review and analysis described in this Addendum, the UCSF Medical Center project does not entail any substantial changes that would require major revisions to the existing *1998 Mission Bay Subsequent Environmental Impact Report (*"Mission Bay SEIR"*)*, nor would new significant environmental effects or a substantial increase in the severity of previously identified significant effects occur. Since certification, no changes have occurred in the circumstances under which the *Mission Bay North Redevelopment Plan* and the *Mission Bay South Redevelopment Plan* would be undertaken, and no new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR. Therefore, no additional environmental review is necessary beyond this Addendum.

*(The basis for this determination is provided on the following pages)*

I do hereby certify that the above determination has been made pursuant to State and Local requirements.

Stanley Muraoka
San Francisco Redevelopment Agency

September 10, 2008
Date of Determination

**Background**

Previous Mission Bay Redevelopment Project Area Environmental Review

On August 23, 1990, the San Francisco Board of Supervisors certified the *Mission Bay Final Environmental Impact Report* (the "1990 FEIR").[1] The 1990 FEIR assessed the development program that was ultimately adopted as the *Mission Bay Plan, an Area Plan of the San Francisco General Plan*, with implementing zoning. In 1996-97 the San Francisco Redevelopment Agency, with Catellus Development Corporation as project sponsor, proposed a new project for the Mission Bay area, consisting of two separate redevelopment plans (*Mission Bay North Redevelopment Plan* and *Mission Bay South Redevelopment Plan*) ("North Plan" and "South Plan" or collectively, the "Plans") in two redevelopment project areas separated by China Basin Channel.

On September 17, 1998, the San Francisco Planning Commission and the San Francisco Redevelopment Agency Commission certified the the Mission Bay SEIR.[2] The Mission Bay SEIR analyzed reasonably foreseeable development under the Plans. It incorporated by reference information from the original 1990 FEIR that continued to be accurate and relevant with respect to the new project. Thus, the 1990 FEIR and the Mission Bay SEIR together constitute the environmental documentation for the Plans.

The San Francisco Redevelopment Agency Commission adopted the Plans on September 17, 1998, along with the *Mission Bay South Owner Participation Agreement* and the *Mission Bay North Owner Participation Agreement* between the Redevelopment Agency and Catellus Development Corporation ("South OPA" and "North OPA").[3] As authorized by the Plans, the Commission simultaneously adopted design guidelines and standards governing development, contained in companion documents, the *Design for Development for the Mission Bay South Project Area* and the *Design for Development for the Mission Bay North Project Area* ("South Design for Development" and "North Design for Development" respectively).[4] The Board of Supervisors adopted the North Plan October 26, 1998 and the South Plan on November 2, 1998.[5]

The San Francisco Redevelopment Agency has prepared five prior Addenda to the Mission Bay SEIR. The first, dated March 21, 2000, analyzed the ballpark parking lots. The second, dated June 20, 2001, addressed Infrastructure Plan revisions related to 7th Street bike lanes and relocation of a storm drain outfall.

The San Francisco Redevelopment Agency revised the South Design for Development with respect to the maximum allowable number of towers, tower separation and required step-backs. These changes and related actions were analyzed in a third Addendum dated February 10, 2004.

The San Francisco Redevelopment Agency also revised the South Design for Development with respect to the permitted maximum number of parking spaces for bio-technical and similar research facilities, and to make certain changes to the North OPA to reflect a reduction in permitted commercial development and associated parking, all as described in a fourth Addendum dated March 9, 2004.

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[1] Planning Department Case No. 86.505E.

[2] Planning Department Case No. 96.771E, Redevelopment Agency Case No. ER 919-97.

[3] Resolution No. 188-98 and Resolution No. 193-98, respectively.

[4] Resolution No. 186-98 and Resolution No. 191-98, respectively.

[5] Ordinance No. 327098 and Ordinance No. 335-98, respectively.

Addendum #5, dated October 4, 2005, considered the information contained in the certified the Final Environmental Impact Report for UCSF Long Range Development Plan Amendment #2 ("LRDP FEIR"). This Addendum was prepared to address The Regents' proposal to amend the UCSF Long Range Development Plan ("LRDP") to allow the establishment of a 400-bed hospital on Blocks 36 to 39 and X-3 in the Mission Bay South Redevelopment Project Area. That project is discussed in more detail in the following section.

Previous UCSF Environmental Review and Hospital Planning

On March 17, 2005, The Regents certified the LRDP FEIR, which analyzed various scenarios for accommodating up to 650 new hospital beds and related facilities through construction at a combination of Parnassus Heights and Mission Bay campus sites, considering both 2012 and 2030 timeframes. The Mission Bay sites considered in the LRDP FEIR include one site located in Mission Bay South at the northern edge of the 43 acre UCSF Mission Bay campus site and one site located adjacent to the southern edge of the UCSF Mission Bay site on Blocks 36-39 and X-3. The first site is within the existing UCSF campus, the second is not. The facility scenarios studied in the LRDP FEIR include: a 250-bed hospital in Mission Bay and a 400-bed hospital in Parnassus Heights; a 400-bed hospital in Mission Bay and a 250-bed hospital in Parnassus Heights; and a 650-bed hospital in Mission Bay.

On March 17, 2005, The Regents approved amendments to the Long Range Development Plan Amendment and 2004 LRDP Update ("LRDP Amendment #2"), in which The Regents decided that in the initial LRDP Phase (through 2012), the Regents would: (a) develop three integrated specialty hospitals with about 210 beds at Mission Bay; (b) maintain tertiary and quaternary care with about 600 beds at Parnassus Heights for a total of about 810 beds during the LRDP Phase; (c) provide ambulatory care facilities at both Parnassus Heights and Mission Bay; and (d) populate both sites with basic and translational disease oriented research programs. The amendments also provide that ultimately, in future approvals beyond the LRDP time horizon, the concept is to have two major integrated campus sites in Parnassus and Mission Bay with clinical care, basic and translation research will be developed. The amendments additionally call for acquisition of additional property Mission Bay South by The Regents.[6]

The LRDP FEIR identified various potentially significant unavoidable impacts of the various facility scenarios, as summarized in Table 2-1 on pages 2-9 through 2-37 of the LRDP FEIR, in the areas of air quality, land use and planning, noise (helipad and construction-related) and transportation. All but three of these impacts were either previously identified in the Mission Bay SEIR or relate to impacts that occur only at the Parnassus Heights campus.

The LRDP FEIR identified three significant, unavoidable impacts that were not previously identified in the Mission Bay SEIR and that relate to Mission Bay. These include impacts 4.8-6 (helipad operations noise), 4.11-2a (increase traffic delays at 16th/Owens Street intersection) and 4.11-2b (increased traffic delays at Mariposa/3rd Street intersection).

As explained in Addendum #5 prepared for the Mission Bay North and South Redevelopment Project Areas, dated October 4, 2005, the helipad noise would not create any significant noise impacts to noise sensitive development allowed under the Mission Bay North and South Redevelopment Plans. Nor would development allowed under the Redevelopment Plans contribute to a cumulative noise impact when taken into consideration with noise generated by the proposed medical center. In addition, the significant and unavoidable traffic related impacts identified only occur in the scenario calling for a 650-bed hospital in

[6] Long Range Development Plan, LRDP Amendment #2 & 2004 LRDP Update, The Regents of the University of California, March 17, 2005, at page 3.

Mission Bay, not a 400-bed hospital. It was found at that time that the larger hospital was not reasonably foreseeable and therefore there would be no new significant and unavoidable traffic related impacts.

**Current UCSF Medical Center Project**

Since the LRDP FEIR was adopted in 2005, UCSF has modified the medical center design so that it would be smaller and the first phase would be mainly located on the eastern side of the site, i.e. Blocks 36, 37 and X-3. To analyze the revised project, in April 2008, The Regents released the Draft Environmental Impact Report for UCSF Medical Center at Mission Bay ("UCSF DEIR') to analyze at a project level the first phase of the revised UCSF Medical Center, as well as analyze a second phase of the medical center at a programmatic level. The UCSF DEIR was "tiered"[7] off of the program-level environmental analysis presented in the 2005 LRDP FEIR and focuses on environmental effects that were not fully considered in the program level analysis of the LRDP FEIR.

The medical center analyzed in the UCSF DEIR is smaller in scale than the hospital analyzed in the LRDP FEIR. As described in the UCSF DEIR project description, Phase I of the UCSF Medical Center would consist of a 289-bed integrated specialty hospital with distinct facilities for children, women and cancer patients, which is smaller than the 400-bed hospital analyzed in the LRDP FEIR. Other uses include a central utilities plant (referred to as the Energy Center), public plazas and green space (including a meditation garden and children's play area), as well as approximately 1,000 parking spaces in a structured parking lot and on a temporary surface parking lot. A helipad to allow for hospital-to-hospital transfer of urgent patients, including infants and young children, would be located at the corner of 16th and 4th Streets. The second phase would include an additional hospital building with 261 beds, bringing the total to 550 beds (still 100 fewer than was analyzed in the LRDP FEIR), and include an expanded parking structure. The additional Phase II development would occur on the surface parking lot currently proposed in Phase I.

**Analysis of Potential Environmental Effects**

CEQA Guidelines Section 15164 provides for the use of an addendum to document the basis for a lead agency's decision not to require a Subsequent or Supplemental EIR for a project that is already adequately covered in an existing certified EIR. The lead agency's decision to use an addendum must be supported by substantial evidence that the conditions that would trigger the preparation of a Subsequent EIR, as provided in Section 15162, are not present. Since the DEIR for the UCSF Medical Center has not been certified, the San Francisco Redevelopment Agency has prepared an Initial Study, attached to this Addendum, for the purposes of providing the substantial evidence necessary to make the findings required in CEQA Guidelines Section 15164.

**Conclusion**

Based on the attached Initial Study, implementation of the proposed UCSF Medical Center project described in the UCSF DEIR would not entail any substantial changes that would require major revisions to the Mission Bay SEIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects. Additionally, since certification of the Mission Bay SEIR, no changes have occurred in the circumstances under which the Plans would be undertaken, and no new information has emerged that would materially change any of the analyses or conclusions of the Mission Bay SEIR. Therefore, no additional environmental review is necessary.

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[7] Tiering from program level analysis is authorized by CEQA Guidelines Sections 15152(d) and 15168(c) and (d).

# SAN FRANCISCO REDEVELOPMENT AGENCY

## MISSION BAY ADDENDUM #6 INITIAL STUDY
## September 10, 2008

**FILE NUMBER:** ER 919-97 Addendum 9/10/08

**1. Project title:** Redevelopment Agency Case No. ER 919-97 Addendum #6
Review of University of California San Francisco Medical Center at Mission Bay ("UCSF Medical Center") and Draft Environmental Impact Report for UCSF Medical Center at Mission Bay ("UCSF DEIR")

**2. Lead Agency name and address:**

San Francisco Redevelopment Agency
1 South Van Ness Avenue, 5th Floor
San Francisco, CA 94103

**3. Contact person and phone number:**

Stanley Muraoka, Environmental Review Officer
(415) 749-2577
e-mail: Stanley.Muraoka@sfgov.org

**4. Project location:**

Approximately 303 acres located in San Francisco generally south of Townsend Street, east of Seventh Street and I-280 freeway, north of Mariposa Street, and west of Terry A. Francois Boulevard and Third Street; Mission Bay North and South are north and south of China Basin Channel respectively. See Figure 1.

**5. Project sponsor's name and address:**

San Francisco Redevelopment Agency
1 South Van Ness Avenue, 5th Floor
San Francisco, CA 94103

**6. General Plan designation:**

Mission Bay Redevelopment Area

**7. Zoning:**

Mission Bay Redevelopment Area

**FIGURE 1 – PROJECT AREA**

**8. Description of project:**

This Initial Study analyzes the potential impact to the conclusions of the Mission Bay 1998 Supplemental Environmental Impact Report ("Mission Bay SEIR") and the fifth Addendum, dated October 4, 2005, prepared for the Mission Bay SEIR ("Addendum #5) as a result of the new information available regarding the proposed University of California San Francisco Medical Center at Mission Bay project and the Draft Environmental Impact Report for UCSF Medical Center at Mission Bay (State Clearinghouse No. 2008012075).

On August 23, 1990, the San Francisco Board of Supervisors certified the Mission Bay Final Environmental Impact Report (the "1990 FEIR"). The 1990 FEIR assessed the development program that was ultimately adopted as the Mission Bay Plan, an Area Plan of the San Francisco General Plan, with implementing zoning. In 1996-97 the San Francisco Redevelopment Agency, with Catellus Development Corporation as project sponsor, proposed a new project for the Mission Bay area, consisting of two separate redevelopment plans (Mission Bay North Redevelopment Plan and Mission Bay South Redevelopment Plan) ("North Plan" and "South Plan" or collectively, the "Plans") in two redevelopment project areas separated by China Basin Channel.

On September 17, 1998, the San Francisco Planning Commission and the San Francisco Redevelopment Agency Commission certified the Mission Bay SEIR. The Mission Bay SEIR analyzed reasonably foreseeable development under the Plans. It incorporated by reference information from the original 1990 FEIR that continued to be accurate and relevant with respect to the new project. Thus, the 1990 FEIR and the Mission Bay SEIR together constitute the environmental documentation for the Plans.

To date, the San Francisco Redevelopment Agency has prepared five addenda to the Mission Bay SEIR. The first, dated March 21, 2000, analyzed the ballpark parking lots. The second, dated June 20, 2001, addressed Infrastructure Plan revisions related to 7th Street bike lanes and relocation of a storm drain outfall.

The San Francisco Redevelopment Agency revised the South Design for Development with respect to the maximum allowable number of towers, tower separation and required step-backs. These changes and related actions were analyzed in a third addendum dated February 10, 2004.

The San Francisco Redevelopment Agency also revised the South Design for Development with respect to the permitted maximum number of parking spaces for bio-technical and similar research facilities, and to make certain changes to the North OPA to reflect a reduction in permitted commercial development and associated parking, all as described in a fourth addendum dated March 9, 2004.

Finally, Addendum #5, dated October 4, 2005, considered information contained in the certified UCSF Long Range Development Plan ("LRDP") FEIR, as described below.

<u>Past Planning and Environmental Review for UCSF Medical Center</u>

On March 17, 2005, The Regents of the University of California ("The Regents") certified the LRDP FEIR, which analyzed various scenarios for accommodating up to 650 new hospital beds and related facilities through construction at a combination of UCSF's Parnassus Heights and Mission Bay campus sites, considering both 2012 and 2030 timeframes. One of the alternative medical center locations was located adjacent on Blocks 36-39 and X-3 ("2005 Medical Center"). The 2005 Medical Center studied in the LRDP FEIR includes up to a 650-bed hospital at Mission Bay (Phase I with 400 beds and Phase II resulting in a total of 650 beds).

The LRDP FEIR identified various potentially significant unavoidable impacts of the 2005 Medical Center, as summarized in Table 2-1 on pages 2-9 through 2-37 of the LRDP FEIR, in the areas of air quality, noise (helipad and construction-related) and transportation. All but three of these impacts were either previously identified in the Mission Bay SEIR.[1]

The LRDP FEIR identified three significant, unavoidable impacts that were not previously identified in the Mission Bay SEIR and that relate to Mission Bay. These include impact 4.8-6 (helipad operations noise), 4.11-2a (increased traffic delays at 16th/Owens Street intersection) and 4.11-2b (increased traffic delays at Mariposa/3rd Street intersection).

As explained in Addendum #5, the significant helipad noise impacts would occur outside of Mission Bay residential areas and would not create any significant noise impacts to development that would occur under the Plans, as analyzed in the Mission Bay SEIR. In addition, the significant and unavoidable traffic related impacts would only occur in the scenario calling for a 650-bed hospital in Mission Bay, not a 400-bed hospital. It was found at that time that the larger hospital was not reasonably foreseeable and therefore there would be no new significant and unavoidable traffic related impacts. As a result, the San Francisco Redevelopment Agency found that the conclusions of the Mission Bay SEIR were still adequate.

Current UCSF Medical Center Proposal

In April 2008, The Regents released the Draft Environmental Impact Report for UCSF Medical Center at Mission Bay ("UCSF DEIR") to analyze (1) at a project level for the first phase of the Mission Bay Medical Center, and (2) at a programmatic level the a second phase of the medical center ("Proposed Medical Center"). The UCSF DEIR was "tiered"[2] from the program-level environmental analysis presented in the LRDP FEIR and focuses on environmental effects that were not fully considered in the program level analysis of the LRDP FEIR.

The Proposed Medical Center analyzed in the UCSF DEIR would be smaller in scale than the 2005 Medical Center included in the LRDP FEIR. As described in the UCSF DEIR project description, Phase I of the Proposed Medical Center would consist of a 289-bed integrated specialty hospital with distinct facilities for children, women and cancer patients ("Phase I"), which is smaller than the 400-bed 2005 Medical Center analyzed in the LRDP FEIR. The second phase of the Proposed Medical Center would include an additional hospital building with 261 beds, bringing the total to 550 beds (still 100 fewer than was analyzed in the LRDP FEIR), and include an expanded parking structure ("Phase II"). The following provides an overview of the Proposed Medical Center.

*Program of Uses*

Phase I of the Proposed Medical Center would contain approximately 995,000 gross square feet of development on Blocks 36 to 39 and X3 in Mission Bay South, bounded by 16th Street to the north, 3rd Street to the east, Mariposa to the south and the future Owens to the west. The total site is approximately 14.5 acres. Phase I would consist of a 289-bed integrated specialty hospital with distinct facilities for children, women and cancer patients. A 183-bed children's hospital would include urgent/emergency care and pediatric primary care and specialty ambulatory facilities for children. The 70-bed adult hospital

[1] In the case of construction-related noise, The Regents and the City applied different significance criteria, but The Regents conclusion was consistent with that reached in the original LRDP analysis for the UCSF campus in Mission Bay. The City identified the same impacts as temporary and therefore insignificant in the Mission Bay SEIR. In addition, the construction would not be proximate to any sensitive receptors in Mission Bay and The Regents has agreed to comply with the City's noise ordinance, which would ensure that construction-related noise impacts remain insignificant.

[2] See CEQA Guidelines sections 15152(d) and 15168 (c) and (d).

for cancer patients would also include an outpatient facility for cancer treatment. The women's care hospital would include specialty surgery and select outpatient services, plus a 36-bed birthing center.

Other uses include a central utilities plant (referred to as the Energy Center), public plazas and green space (including a meditation garden and children's play area), as well as approximately 1,000 parking spaces in a structured parking lot and on a temporary surface parking lot. A helipad to allow for hospital-to-hospital transfer of urgent patients, including infants and young children, would be located at the corner of 16th and 4th Streets.

*Building Massing*

A goal of the design is to create an integrated campus with a unifying design, as well as create distinct facilities for each of its three program areas: the children's, women's and cancer hospitals. The site plan for the Proposed Medical Center would take the form of an irregular "E"-shape. The horizontal lines of the "E" are formed by three east/west oriented towers, each containing a distinct use. The children's hospital would be closest to Mariposa Street. The Women's and Cancer hospitals would be in the middle of the site, between 4th and 3rd Streets. The Cancer outpatient facilities would be closest to 16th Street. Connecting the three towers on the west side is a "spine" which contains outpatient facilities and provides internal circulation along the north-south axis. The Energy Center would be located between the middle and northern east-west towers, fronting 3rd Street.

The taller and more intense development on the site would occur closest to 16th Street. Most structures would be 105 feet in height, with an additional 20 feet of screening on top of each building. The helipad would be atop the outpatient buildings along 16th Street, bringing a portion of the building height up to 140 feet, not including an elevator penthouse. The buildings along 16th Street would hold the street edge and include a pedestrian plaza at the intersection of 4th Street and 16th Street to encourage pedestrian activity between the Proposed Medical Center and the existing UCSF campus.

The intensity of development would step down towards Mariposa Street to respect the residential neighborhood south of the site. The height along Mariposa Street would be 40 feet (before stepping up to 105 feet). The Mariposa Street frontage also would include a terrace garden. The Proposed Medical Center would be set back from Mariposa Street, accommodating a 10-foot pedestrian sidewalk and a 20-foot landscaped area along the street. In addition, the 3rd Street frontage would include a varied building setback to break-up the building mass. The Energy Center would be 40 feet tall.

*Access and Circulation*

Each specialty program within the Proposed Medical Center would have its own distinct entrance along 4th Street. A large pedestrian entrance and plaza would be located on 3rd Street. The 3rd Street entrance plaza would also provide access to the Proposed Medical Center for employees, visitors and patients using the transit lines on Third Street, specifically the existing T-3rd Muni line that stops at 3rd and Mariposa Streets and the future extension of the 22 bus line. Both the parking structure and the surface parking lots would be located on the western portion of the site for easy vehicular access from the I-280 and from the future Owens Street.

*Sustainable Design Features*

Phase I would be designed and constructed to Leadership in Energy and Environmental Design (LEED) standards, which are a set of nationally recognized criteria for constructing sustainable and green buildings. The sustainable design features include green roofs and healing gardens, on-site collection and reuse of stormwater, and a roof screening structure capable of accommodating a large network of photovoltaic cells.

*Project Phasing*

- **Phase I and Interim Phase I Condition.** Phase I of the Proposed Medical Center is expected to be open by 2015. The eventual build-out of the Mission Bay area calls for the continuation of 4th Street through the proposed medical center site, connecting 16th and Mariposa Streets. However, it is likely that Phase I of the Proposed Medical Center would be constructed before the roadway is built by the master developer. Therefore, UCSF is proposing an interim condition design for its Phase I building that includes a public plaza on what is eventually proposed to become the new 4th Street pursuant to the Plans.
- **Phase II.** A second phase of the Proposed Medical Center is being contemplated by UCSF, but no designs have been prepared. The second phase would include an additional hospital building with 261 beds, bringing the total to 550 beds, and include an expanded parking structure. The additional development would occur on the surface parking lot currently proposed in Phase I. The completion date for Phase II is unknown.

**9. Site description and surrounding land uses:**

Mission Bay is generally a flat area that prior to 1998 was characterized by low intensity industrial development and vacant land. Since 1998, the Mission Bay area has been redeveloped into a mixture of residential and retail uses to the north of the Mission Creek channel and biotechnical, office and UCSF research facilities to the south of the channel. The neighborhoods surrounding Mission Bay consist of residential, retail and light industrial uses.

## ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

| | | |
|---|---|---|
| ☐ Aesthetics | ☐ Agricultural Resources | ☐ Air Quality |
| ☐ Biological Resources | ☐ Cultural Resources | ☐ Geology/Soils |
| ☐ Hazards & Haz. Materials | ☐ Hydrology/Water Quality | ☐ Land Use/Planning |
| ☐ Mineral Resources | ☐ Noise | ☐ Population/Housing |
| ☐ Public Services | ☐ Recreation | ☐ Transportation/Traffic |
| ☐ Utilities/Service Systems | ☐ Wind/Shadows | ☐ Mandatory Findings |

**DETERMINATION:** On the basis of this initial evaluation:

☒ I find that the proposed project DOES NOT RESULT in substantial changes or new information that affect the conclusions of the 1998 Mission Bay SEIR, and an ADDENDUM will be prepared.

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

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

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

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

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

| | |
|---|---|
| Signature | September 10, 2008<br>Date |
| Stanley Muraoka<br>Printed name | Environmental Review Officer<br>Title |

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
|---|---|---|---|---|
| | ☐ | ☐ | ☐ | ☐ |

## EVALUATION OF ENVIRONMENTAL IMPACTS:

The following environmental factors were assessed for potential adverse environmental impacts based on the project description, field observations, experience and expertise of the Initial Study preparers on similar projects, and review of prior environmental review of development projects in the project vicinity. Additional sources for this Initial Study are cited in the relevant sections of the analysis.

## I. AESTHETICS

*Would the project:*

| | | | | |
|---|---|---|---|---|
| *a) Have a substantial adverse effect on a scenic vista?* | | | | X |
| *b) Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?* | | | | X |
| *c) Substantially degrade the existing visual character or quality of the site and its surroundings?* | | | | X |
| *d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?* | | | | X |

Explanation: The Proposed Medical Center would be smaller and of substantially similar design as the 2005 Medical Center that was analyzed in the LRDP FEIR and Addendum #5. As a result, no new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to aesthetics.

## II. AGRICULTURAL RESOURCES

*In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland.*

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
|---|---|---|---|---|
| *Would the project:* | | | | |
| *a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?* | | | | X |
| *b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?* | | | | X |
| *c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use?* | | | | X |

Explanation: There are no agricultural resources within the Mission Bay area, so no impact to agricultural resources could occur. No new information related to agricultural resources has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR.

## III. AIR QUALITY

*Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.*

| | | | | |
|---|---|---|---|---|
| *Would the project:* | | | | |
| *a) Conflict with or obstruct implementation of the applicable air quality plan?* | | | | X |
| *b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?* | | | | X |
| *c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?* | | | | X |
| | | | | X |

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
|---|---|---|---|---|
| *d) Expose sensitive receptors to substantial pollutant concentrations?* | | | | |
| *e) Create objectionable odors affecting a substantial number of people?* | | | | X |

Explanation: The 2005 LRDP FEIR found that there would be a significant and unavoidable project-level and cumulative air quality impact related to the operation and vehicular emissions generated by the 2005 Medical Center (Impact 4.2-1 and 4.2-5 of the LRDP FEIR). As discussed in Addendum #5, these air quality impacts were already addressed in the 1998 Mission Bay SEIR in Section V.F. Air Quality with regards to the cumulative impact of development in Mission Bay. In addition, the Proposed Medical Center would be smaller than 2005 Medical Center that was analyzed in the LRDP FEIR and Addendum #5, so air contaminants generated by the medical center as currently proposed would be less than have already been analyzed. As a result, no new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to air quality.

## IV. WIND/SHADOWS

*Would the project:*

| | | | | |
|---|---|---|---|---|
| *a) Alter wind, moisture or temperature (including sun shading effects) so as to substantially affect public areas, or change the climate either in the community or region?* | | | | X |

Explanation:

**Shadows**
The Proposed Medical Center would be smaller than the 2005 Medical Center, and would be within the height and bulk limitations assumed in the LRDP FEIR and Addendum #5. Therefore, the Proposed Medical Center would not result in greater shadowing than was what analyzed in the LRDP FEIR and Addendum #5. As a result, no new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to shadows.

**Wind**
A wind study has been prepared for the Proposed Medical Center, as required by Mitigation Measure D.7 of the Mission Bay SEIR and Mitigation Measure 4.1-7 of the 2005 LRDP FEIR. A copy of this technical report is included as Attachment 1 to this Initial Study.

The wind study consisted of a wind-tunnel test for both Phase I and Phase II of the Proposed Medical Center using data for 24 sample points, shown in Figure 1 of Attachment 1. Buildings in the surrounding vicinity that are existing or approved, under construction, or for which bulk concepts have been identified in

| Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
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redevelopment and UCSF plan documents, were considered a part of the project setting. These buildings included the planned, approved and existing developments on Blocks 24, 25, 29-34, X-4, and 40-43.

The wind study used the thresholds of significance from Mitigation Measure D.7 of the Mission Bay SEIR and Mitigation Measure 4.1-7 of the LRDP FEIR, which were based on Section 138 of the San Francisco Planning Code. Specifically, a significant impact would occur if the medical center would create a wind that:

- Reaches or exceeds 26-miles-per-hour ("mph") for a single full hour of the year (Hazard Criterion)
- Exceeds more than 10% of the time 11 mph for areas of substantial pedestrian use (Pedestrian Comfort Criterion)
- Exceeds more than 10% of the time 7 mph for seating areas (Pedestrian Comfort Criterion)

As discussed in detail in Attachment 1, existing pedestrian wind conditions in the Mission Bay South area can be characterized as windy to very windy. Half to three-quarters of the sample points already experience wind speed in excess of the significant thresholds listed above. The range of the durations for any exceedance is typically not very large, usually less than 10 hours per year each. However, in locations near to or in the wake of buildings such as those that lie to the north of the medical center site, wind accelerations and turbulence created by the buildings can result in specific hazard criterion exceedances for which the duration can be much greater - up to hundreds of hours per year.

**Wind Test Results for Phase I**

Upon the completion of Phase I of the Proposed Medical Center, wind conditions would be characterized as moderate to windy in the area adjacent to the Proposed Medical Center. With the Phase I buildings placed in the context of other anticipated future development in the vicinity, winds would exceed the wind hazard thresholds of significance at two locations: the south side of 16th Street, at the intersection with Owens, and at the southeast corner of Mariposa and 3rd Streets, with durations of those hazard exceedances being 15 hours per year and 20 hours per year, for a total duration of 35 hours per year. While construction of Phase I would result in wind speeds at or in excess of the thresholds of significant, the total duration of these exceedances are considered to be similar to but less than the duration of the existing wind hazards on the site, so the Proposed Medical Center would represent an overall improvement in wind conditions on-site and in the vicinity.

Pedestrian wind conditions in the general vicinity of the medical center site would be characterized as moderate to windy; the average wind speeds for the 24 points tested would be 12 mph. Wind speeds in pedestrian areas range from 5 to 18 mph, with speeds of 14 mph or more occurring at 10 of the 24 locations. The highest wind speed in the vicinity (18 mph) would occur at the southeast corner of Mariposa and 3rd Streets. Wind speeds along 3rd Street would range from 8 to 16 mph, while winds along the western face of the building would range from 9 mph to 15 mph.

With respect to the thresholds of significance, construction of Phase I of the Proposed Medical Center would generally improve wind conditions from those now existing by reducing the number of exceedances from many to two and by reducing the overall duration of exceedances. Continued application of the current mitigation measures identified in the Mission Bay SEIR and LRDP FEIR, requiring that the Medical Center incorporate design modifications to mitigate these impacts, would eliminate the wind hazards in Phase I.

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**Wind Test Results for Phase II**
At the completion of Phase II of the Proposed Medical Center, the two wind hazard exceedences that were identified for Phase I would be eliminated. However, while those two Phase I exceedances would be eliminated under Phase II, a new exceedance would be created at another location. This new wind hazard exceedance under Phase II would occur at the intersection of 3rd and 16th Streets for a duration of 2 hours per year. The net effect would be a reduction, by 35 hours per year, in the duration of the wind hazard condition that would exist, compared to Phase I. Phase II would also be required to implement the LRDP FEIR Mitigation Measure 4.1-7 and Mission Bay SEIR Mitigation Measure D.7, which would reduce hazards in Phase II to less than significant.

As a result, the Proposed Medical Center, in both Phase I and Phase II, would not increase wind speeds over what has already been analyzed in the LRDP FEIR and Addendum #5. No new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to wind. In fact, the overall wind speeds with the project would be reduced.

## V. BIOLOGICAL RESOURCES

*Would the project:*

| | | | | | |
|---|---|---|---|---|---|
| *a)* | *Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?* | ☐ | ☐ | ☐ | X |
| *b)* | *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?* | ☐ | ☐ | ☐ | X |
| *c)* | *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?* | ☐ | ☐ | ☐ | X |
| *d)* | *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with any* | ☐ | ☐ | ☐ | X |

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
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| *established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?* | | | | |
| *e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?* | | | | X |
| *f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?* | | | | X |

Explanation: The Proposed Medical Center would be smaller than the Medical Center analyzed in the 2005 LRDP FEIR and Addendum #5, and it would be developed in the same location as the 2005 Medical Center. As a result, the Proposed Medical Center would not impact any new sensitive biological resources that have not already been analyzed. No new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to biological resources.

## VI. CULTURAL RESOURCES

*Would the project:*

| | | | | |
|---|---|---|---|---|
| *a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?* | | | | X |
| *b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5* | | | | X |
| *c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?* | | | | X |
| *d) Disturb any human remains, including those interred outside of formal cemeteries?* | | | | X |

Explanation: The Mission Bay SEIR and 2005 LRDP FEIR previously concluded that the development of Block X-3 would not have a significant impact on historical, architectural, or archaeological resources. However, as part of the 2008 Central Waterfront Cultural Resources Survey ("2008 Cultural Survey"), additional information became available for the building at 1830 3rd Street on Block X-3, which warrant additional discussion of the building and its historical significance.

| Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
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The property at 1830 3rd Street (APN 3943/003) is located near the southwest corner of 3rd and 16th Streets. The vacant structure is a one-story, wood frame former restaurant building (originally the Viaduct Café and most recently the Sno-Drift Restaurant & Bar) with a rectangular plan, a flat roof with a terra cotta-clad parapet roof along the front (3rd Street) façade, and minimal Spanish Revival details. The building has a variety of cladding materials, including painted cement stucco on the front (3rd Street) façade, with horizontal wood ship-lap siding on the south-facing facade, and vertical wood tongue-and-groove siding on the north and west-facing façades. The building was originally constructed in 1934, with visible alterations to the front façade completed within the last 30 years.

1830 3rd Street (APN 3943/003) was surveyed in 2001 by the City of San Francisco as part of the Central Waterfront Cultural Resources Survey and was assigned a National Register Status Code of "4D2." In 2003, the State of California converted all National Register Status Codes (NRSC) into California Historical Resource Status Codes (CHRSC). All properties listed with a NRSC of "4D2" were converted into CHRSC of "7N1," thus identifying these properties as "Needs to Be Re-evaluated (Formerly NR SC4) – may become eligible for NR w/restoration or when meets other specific conditions." Consistent with this listing, the property was surveyed by ESA in January 2008 (Attachment 2) as part of the Proposed Medical Center project.

The ESA survey concludes that the 1830 Third Street property is an example of a Spanish Revival-styled restaurant in San Francisco's Central Waterfront area, an industrial and residential district which contained a number of smaller, wood frame buildings and large waterfront warehouses. The former café primarily served the needs of the workers who labored along the waterfront warehouses, as well as the residents in the immediate neighborhood. Although the building is historically associated with these past uses, it does not appear to have been individually significant for its contribution to the history of San Francisco's Central Waterfront or to labor history in general. While the building would provide some level of contextual relationship to the area, the area has undergone such change in the last decade that the context has largely been removed or substantially altered to the extent that the property no longer retains integrity of setting or feeling, especially since the removal of the Third Street Viaduct, for which the building was named, as well as the adjacent new construction in the area. Historical research did not reveal any associations with individuals important to the history of San Francisco, or to any master architects or builders. Finally, while the building does retain some Spanish Revival-style details, it reflects a more typical and commercial application of this style, rather than a "high-style" example of Spanish Revival style architecture as evidenced in other parts of San Francisco. Physical changes to the front façade of this building have also somewhat altered the integrity of design and materials of the property's architectural characteristics. As such, ESA concluded that, the conditions described in the CHRSC 7N1 designation related to eligibility are not present, and the building does not appear to qualify for listing in the National, State, or local register of historical resources.

In 2008, 1830 3rd Street was assigned a new California Historical Resource Status Code of "5B" by the firm of Page and Turnbull, thus identifying the property as a "Contributor and individually eligible or listed as coded (1/2/3)." The Planning Department does not concur with this status code assignment. This is based on the fact that the property does not possess the architectural or historical significance to be individually significant. Additionally the building does not possess the necessary geographic linkage to the greater concentration of the Central Waterfront's contributing structures to be considered a district contributor. In sum the Planning Department does not consider 1830 3rd Street to be an historic resource. This conclusion is consistent with the conclusions of the ESA survey.

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
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As a result, based on the conclusions of the Planning Department review and the ESA Survey that did not find that the building as an individual structure would be considered significant, the fact that the structure is not located within an identified historic district that it can contribute to, and the lack of evidence supporting a redesignation to 5B, the building at 1830 3rd Street is not considered a significant cultural resource.

As the Proposed Medical Center would not impact any new sensitive cultural resources that have not already been analyzed, no new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to cultural resources.

## VII.GEOLOGY AND SOILS

*Would the project:*

| | | | | |
|---|---|---|---|---|
| *a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:* | | | | |
| *i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.* | ☐ | ☐ | ☐ | X |
| *ii) Strong seismic ground shaking?* | ☐ | ☐ | ☐ | X |
| *iii) Seismic-related ground failure, including liquefaction?* | ☐ | ☐ | ☐ | X |
| *iv) Landslides?* | ☐ | ☐ | ☐ | X |
| *b) Result in substantial soil erosion or the loss of topsoil?* | ☐ | ☐ | ☐ | X |
| *c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral* | ☐ | ☐ | ☐ | X |

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
|---|---|---|---|---|
| *spreading, subsidence, liquefaction, or collapse?* | | | | |
| *d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?* | | | | X |
| *e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?* | | | | X |

Explanation: The Proposed Medical Center would be smaller than the Medical Center analyzed in the 2005 LRDP FEIR and Addendum #5, and it would be developed in the same location as the 2005 Medical Center. As a result, the Proposed Medical Center would be subject to the same geological hazards as have already been analyzed. No new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to geology and soils.

## VIII. HAZARDS AND HAZARDOUS MATERIALS

*Would the project:*

| | | | | |
|---|---|---|---|---|
| *a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?* | | | | X |
| *b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?* | | | | X |
| *c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?* | | | | X |
| *d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?* | | | | X |
| | | | | |

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
|---|---|---|---|---|
| *e) For a project within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?* | | | | X |
| *f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?* | | | | X |
| *g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?* | | | | X |
| *h) Expose people or structures to significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?* | | | | X |

Explanation: The Proposed Medical Center would be smaller than, would be developed on the same site as, and would have a similar operational plan as the Medical Center analyzed in the 2005 LRDP FEIR and Addendum #5. As a result, the Proposed Medical Center would be subject to or result in the same or less hazardous conditions as have already analyzed. While the Proposed Medical Center would not result in new impacts, an additional hazard study was prepared to study the potential risk of having a helipad at the Proposed Medical Center in response to concerns from the public. The study supports the conclusion that the helipad does not pose a threat to local safety. This study is included as Attachment 3. Based on the study, the threat of helicopter crashing as a result of the operation of the helipad is extremely low. Specifically, based on historical flight data from 1997 to 2006, the anticipated rate of fatal accidents occurring for medical helicopter operations is one fatal accident per 180,000 hours of flight time. The study finds that the rate of actual crashes of medical flights at hospital helipads, the rate drops even lower to one fatality for every 2.5 million hours of flight. Based on an assumption that there would be 1,000 hours of flight time each year at the UCSF Medical Center, there would be 1 fatality every 2,500 years. Attachment 3 contains more details on the assumptions and conclusions of the study. No new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to hazards and hazardous materials.

## IX. HYDROLOGY AND WATER QUALITY

*Would the project:*

| | | | | |
|---|---|---|---|---|
| *a) Violate any water quality standards or waste discharge requirements?* | | | | X |

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
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| *b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?* | | | | X |
| *c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?* | | | | X |
| *d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?* | | | | X |
| *e) Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?* | | | | X |
| *f) Otherwise substantially degrade water quality?* | | | | X |
| *g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?* | | | | X |
| *h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?* | | | | X |
| *i) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?* | | | | X |
| *j) Inundation by seiche, tsunami, or mudflow?* | | | | X |

Explanation: The Proposed Medical Center would be smaller than the Medical Center analyzed in the 2005 LRDP FEIR and Addendum #5, and it would be developed in the same location as the 2005 Medical Center.

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
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In addition, the development of the Proposed Medical Center would result in substantially the same amount, or less, of impervious surfaces and similar drainage patterns than the previously proposed hospital. As a result, the Proposed Medical Center would affect and be affected by local hydrological patterns in a similar manner as has already analyzed. No new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to hydrology and water quality.

## X. LAND USE AND PLANNING

*Would the project:*

| | | | | |
|---|---|---|---|---|
| *a) Physically divide an established community?* | ☐ | ☐ | ☐ | X |
| *b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purposed of avoiding or mitigating an environmental effect?* | ☐ | ☐ | ☐ | X |
| *c) Conflict with any applicable habitat conservation plan or natural community conservation plan?* | ☐ | ☐ | ☐ | X |

Explanation: The Proposed Medical Center would be smaller than the Medical Center analyzed in the 2005 LRDP FEIR and Addendum #5, and it would be developed on the same area as the previously 2005 Medical Center. The Proposed Medical Center consists of the same type of land use as was already analyzed in the 2005 LDRP FEIR and Addendum #5. As a result, the Proposed Medical Center would result in a similar land use and land use pattern as the 2005 Medical Center. No new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to land use and planning.

## XI. MINERAL RESOURCES

*Would the project:*

| | | | | |
|---|---|---|---|---|
| *a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?* | ☐ | ☐ | ☐ | X |

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
|---|---|---|---|---|
| | ☐ | ☐ | ☐ | ☐ |
| *b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?* | | | | X |

Explanation: The Proposed Medical Center would be smaller than the Medical Center analyzed in the 2005 LRDP FEIR and Addendum #5, and it would be developed on the same area as the 2005 Medical Center. As a result, the Proposed Medical Center would not impact any new mineral resources that have not already been analyzed. No new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to mineral resources.

## XII.NOISE

*Would the project result in:*

| | | | | |
|---|---|---|---|---|
| *a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?* | | | | X |
| *b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?* | | | | X |
| *c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?* | | | | X |
| *d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?* | | | | X |
| *e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?* | | | | X |
| *f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?* | | | | X |

| Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ |

Explanation: The Proposed Medical Center would be smaller than the hospital analyzed in the 2005 LRDP FEIR, but would be located in the same location. Since the Proposed Medical Center would be smaller than the 2005 Medical Center, the Proposed Medical Center would result in fewer vehicle trips, which would result in less traffic-related noise. The only change in the project description for the Proposed Medical Center that could change the conclusions of the LRDP FEIR is that the Proposed Medical Center would locate the helipad on the northern side of the medical center site rather than at the southern portion of the medical center site, as previously proposed.

The LRDP FEIR did analyze a helipad facility, which was not considered in the Mission Bay SEIR. The noise methodology and impacts associated with that facility are discussed on pages 4.8-16-4.8-31 of the LRDP FEIR. The analysis considers a helipad location at the southern side of the medical center site, and establishes operational assumptions and flight procedures associated with the 2005 Medical Center proposal.

On page 4.8-26, the LRDP FEIR concludes that a helipad could result in significant noise impacts in that nighttime helicopter operations could cause increased awakening of residents in the immediate vicinity. Figures 4.8-5 and 4.8-6 of the LRDP FEIR show the noise contours associated with both the primary and secondary flight paths. The contours establish that certain residences outside of Mission Bay, primarily to the east, would be located within the area of significant impact. The impacted areas within Mission Bay contain University and commercial industrial/retail uses, which are not considered sensitive receptors. None of the areas zoned residential within Mission Bay are within the area of significant impact. Accordingly, as discussed in Addendum #5, the helipad would not result in any significant noise impacts to sensitive land uses that would occur under the Plans.

However, as the location of the helipad of the Proposed Medical Center has changed to be located to the north of the medical center site, an additional noise study was completed to study a helipad at the intersection of 16th and 4th Streets. Harris Miller Miller & Hanson Inc. (HMMH) evaluated potential effects on the surrounding community due to predicted helicopter operations. This study is included as Attachment 4. The study describes in detail the methodology and results of an environmental noise assessment program to determine the effects of placing the helipad on the northern portion of the medical center site. The analyses of potential effects are based on federal, state, and local laws and guidelines. Below is a summary of the key findings of the HMMH study.

**Noise Measurements**

The helipad noise study had two objectives: (1) determine overall sound levels at representative community locations within the Proposed Medical Center environs without the UCSF helicopter and (2) obtain single-event sound levels for UCSF helicopter and other events in the surrounding community.

The study consisted of placing noise monitors at eight community locations with two of those locations set up only during the helicopter flight demonstration flights. The monitors measured existing community sound levels along with sound levels generated by the demonstration flights of helicopter operations flown to represent future use of the proposed rooftop helipad on Sunday morning, October 21, 2007.

| Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
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The sound levels measured in the surrounding communities to the medical center site were in the typical range for an urban area with generally louder sound levels during the day and quieter sound levels at night (shown in Appendix A, Figure A7 of Attachment 4).

**Noise Modeling Methodology**
The noise modeling effort (described in more detail in Section 3 of Attachment 4) determined cumulative noise effects of the helicopter operations based on forecast uses, helicopter types, and flight paths to and from the helipad in accordance with FAA and California Division of Aeronautics directives [using Community Noise Equivalence Level ("CNEL")]. CNEL noise levels take into consideration the average noise levels in a community over a 24-hour period, giving more weight to noise in the evening when people are more sensitive to ambient noise levels. As a result, CNEL is the tool that is used to calculate cumulative noise levels.

The assessment of cumulative helicopter operations included two daily helicopter operation levels:
1. Average day of 1.4 transports (1.4 helicopter arrivals and 1.4 departures), and
2. Busy day of 3 transports (3 helicopter arrivals and 3 departures).

Based on the provided forecasts, six helicopter types were identified and modeled with their predicted relative use at the Proposed Medical Center by time of day and expected flight path used to arrive and depart the helipad based on prevailing winds and pilot input. Depictions of the modeled flight paths are provided in Section 3, Figure 5 through Figure 7 of Attachment 4.

While there are no Federal or state or local guidelines for determining or mitigating impact based on speech interference or sleep disturbance, the study does also analyze the potential for this. The study uses Single Event Noise Exposure Level ("SENEL") and A-weighted Maximum Sound Level ("Lmax") calculations to analyze the noise levels associated with individual helicopter flights, versus cumulative noise levels.

**Compatibility Results (CNEL)**
Federal and state regulations have established that residential land uses are compatible with cumulative noise exposure of aircraft noise less than 65 dB CNEL, which is based on percent of the population highly annoyed. Studies have shown that 13% of the population is highly annoyed with noise events in a CNEL environment of 65 dB. The modeling effort determined that the 65 dB CNEL contour from expected UCSF helicopter operations at the proposed helipad site will be mostly contained on the medical center site and UCSF campus; see Figure 8 and Figure 9 in Section 3 of Attachment 4. Given the projected helicopter types, time of day of the transports, and flight paths to and from the three potential helicopter landing sites, no residential property outside of the UCSF campus will be exposed to 65 dB or greater noise exposure in terms of the CNEL metric. Therefore, noise from the expected helicopter operations at the proposed helipad is compatible with the existing land use in the surrounding communities.

Table ES-4 of Attachment 4 shows the cumulative helicopter noise modeling results, in terms of CNEL, at six community noise measurement sites along with the existing and planned community sound levels obtained from the measurement program. The table also shows the addition of the modeled helicopter CNEL and the measured community CNEL at the six community measurement sites, which indicates that the expected helicopter operations have no effect on the noise environment in terms of CNEL at those six community sites. Using the average noise exposure obtained for each site during the noise measurements and adding the modeled noise exposure from each site increases the total noise exposure at the community sites by less than

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
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0.5 dB CNEL. As a result, as the helipad operations would not significantly increase the cumulative noise levels in the Mission Bay area, and a significant cumulative noise impact would not occur.

**Activity Interference Results (SENEL)**
In addition to land use compatibility based on cumulative noise levels, activity interference such as speech interference and sleep disturbance is often a community concern.

Outdoor speech interference may occur under the flight paths for up to 20 seconds during a typical helicopter flyover at 1,000 feet altitude, while indoor interference would normally be less than 10 seconds with windows closed. Closer to the helipad, these times would increase due to helicopters descending to land and ascending to depart the helipad. Comparing the noise levels from all sources from the noise measurement program with the projected helicopter operation noise levels shows that some existing non-helicopter noise sources are equivalent to or louder than the projected helicopters during the day. At night when the community noise levels are generally lower, the helicopter noise would be more prominent. The community will hear the helicopter operations just as they currently hear buses and trucks on the local roads and since helicopters have a unique sound, the community will know the sound source is a helicopter.

95-dB SENEL appropriately reflects a "highly annoyed" standard for the public as it expects up to 10% of the population to be awakened from these outdoor noise exposure levels. Therefore, the study uses this standard of the 95-dB SENEL for the assessment of sleep disturbance. Figure 14 in Attachment 4 depicts the anticipated noise contours for the 95-dB SENEL and 10% awakenings. Based on this analysis the only residential units that would experience significant sleep disturbance are located to the south of Mariposa Street, outside of the Mission Bay area. No sensitive land uses developed within the Mission Bay area would be located within the 95-dB SENEL contours. As a result, the helipad would not significantly impact any noise sensitive land uses allowed under the Mission Bay Plans.

**Conclusion**
The helipad would not create a significant cumulative impact, therefore development allowed under the Mission Bay Redevelopment Plans would not contribute to a cumulative noise impact. In addition, the 95-dB SENEL noise contours generated by the helipad operations would not significantly impact any development allowed by the Mission Bay Plans since no sensitive land uses would occur within the impacted areas. As a result, no new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to noise.

## XIII. POPULATION AND HOUSING

*Would the project:*

| | | | | |
|---|---|---|---|---|
| *a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?* | ☐ | ☐ | ☐ | **X** |

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
|---|---|---|---|---|
| *b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?* | | | | X |
| *c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?* | | | | X |

Explanation: The Proposed Medical Center would be smaller than the Medical Center analyzed in the 2005 LRDP FEIR and Addendum #5, and it would be developed in the same location as the 2005 Medical Center. The area of Mission Bay where the Medical Center will be located contains no housing, nor will it contain housing. As a result, the Proposed Medical Center would result in less new growth generating development than the 2005 Medical Center. No new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to population and housing.

## XIV. PUBLIC SERVICES

| *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:* | | | | |
|---|---|---|---|---|
| *a) Fire protection?* | | | | X |
| *b) Police protection?* | | | | X |
| *c) Schools?* | | | | X |
| *d) Parks?* | | | | X |
| *e) Other public facilities?* | | | | X |

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
|---|---|---|---|---|
| | ☐ | ☐ | ☐ | ☐ |

Explanation: The Proposed Medical Center would be smaller than the Medical Center analyzed in the 2005 LRDP FEIR and Addendum #5, and it would be developed in the same location as the 2005 Medical Center. As a result, the Proposed Medical Center would result in less development than the previously proposed and require the same or less public services. No new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to public services.

## XV. RECREATION

| | | | | |
|---|---|---|---|---|
| a) *Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?* | | | | X |
| b) *Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?* | | | | X |

Explanation: The Proposed Medical Center would be smaller than the Medical Center analyzed in the 2005 LRDP FEIR and Addendum #5. As a result, the Proposed Medical Center would result in less development than previously proposed, with less of a demand for recreational space. No new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to recreation.

## XVI. TRANSPORTATION/TRAFFIC

*Would the project:*

| | | | | |
|---|---|---|---|---|
| a) *Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections)?* | | | | X |
| b) *Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?* | | | | X |
| c) *Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that* | | | | X |

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
|---|---|---|---|---|
| *results in substantial safety risks?* | | | | |
| *d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?* | | | | X |
| *e) Result in inadequate emergency access?* | | | | X |
| *f) Result in inadequate parking capacity?* | | | | X |
| *g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?* | | | | X |

Explanation:
**Subsections a) and b):** The Proposed Medical Center would be smaller than the 2005 Medical Center analyzed in the LRDP FEIR. Phase I of the Proposed Medical Center would result in 289 beds and Phase II would result in 261 beds, for a total of 550beds. As discussed in the LRDP FEIR and Addendum #5, no traffic-related significant and unavoidable impacts resulted from the 400-bed 2005 Medical Center proposal. Since Phase I of the Proposed Medical Center would be smaller than the first phase of the 2005 Medical Center, the Proposed Medical Center would result in fewer vehicle trips. Since it would result in fewer vehicle trips, the Proposed Medical Center would result in less of an impact to the surrounding streets. As a result, no new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to traffic impacts of Phase I of the Proposed Medical Center.

The finding about Phase I is supported by a traffic study, dated March 31, 3008 and prepared by Adavant Consulting (Attachment 5). Since the LRDP FEIR did not study the potential impacts of a 550-bed medical center, the attached traffic study was completed to determine whether any significant impacts would occur in Phase II of the Proposed Medical Center. The conclusions of the traffic study are described in the following sections.

**Mission Bay SEIR Methodology and Analysis**
The Mission Bay SEIR transportation analysis is contained on Mission Bay SEIR pages V.E.1-V.E-127. The transportation analysis assumes specific amounts and types of land uses in the Mission Bay Redevelopment North and South Areas, based on the land use designations in the Plans. It calculates numbers of "person trips" on various transit systems and numbers of vehicle trips that could result from build-out of Mission Bay. It generally assumes the more intense uses permitted in the Plans for each land use designation in order to provide a conservative analysis. For areas designated Commercial Industrial under the South Plan, the analysis considers that 50% will be developed as office space and the other 50% research and development.

| Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ |

The project analysis methodology is discussed on Mission Bay SEIR pages V.E.57-V.E.60. The transportation effects of the Mission Bay project were determined by calculating the daily person trips generated by each type of land use in Mission Bay, and determining the portion of those daily trips that would occur during the peak hour of the p.m. commute period, both under Project and cumulative 2015 conditions. The "mode split" analysis then assesses the portion of these trips anticipated by automobile, transit or any other mode of transportation, based upon the origin/destination of the trips, the purpose of the trips, and the availability of various modes. Finally, automobile occupancy rates were determined, to yield the average number of individuals in a vehicle and, thus, provide the number of vehicles that would be traveling to and from Mission Bay. The specific trip generation rates, p.m. peak hour proportions, trip distribution, mode split and vehicle occupancy rates are presented in the "Methodology" section of Appendix D to the Mission Bay SEIR.

Based upon this methodology, the Mission Bay SEIR identifies potentially significant impacts of the project on local streets and intersections, and provides mitigation measures to address these impacts (see Mission Bay SEIR pages VI.6-VI.30a). The final list of mitigation measures is contained in Resolution No. 854-98, adopted by the Board of Supervisors on October 19, 1998. It includes both physical improvements and programs designed to encourage transit use. The physical improvements are to be constructed during project development either based on an "adjacency" principle or on development thresholds establishing need for the feature. Some key intersections may begin to reach congested conditions due to traffic from other parts of Mission Bay before development has occurred on sites adjacent to the intersections. Therefore, thresholds are established for the physical improvements, based on the number of p.m. peak hour vehicle trips that are likely to cause one or more intersections in and near Mission Bay to deteriorate to unacceptable levels of service. As part of the review process for each development phase, the number of p.m. peak hour vehicle trips generated by the new phase is estimated using the trip rates developed in the Mission Bay SEIR, and added to the total calculated number of p.m. peak hour vehicle trips already generated by developed portions of Mission Bay, using the same trip rates. The threshold triggers are contained in Exhibit D (Infrastructure Plan) to the North and South Owner Participation Agreements, and are based on estimated total trips associated with all development in Mission Bay rather than the specific development location.

**LRDP FEIR Analysis and Intersection Impacts**

The transportation analysis in the Mission Bay SEIR was prepared by Wilbur Smith Associates ("WSA"). In connection with preparation of the LRDP FEIR, WSA was asked to conduct an updated analysis assuming the 2005 Medical Center proposal under both 2012 and 2025 conditions. The pertinent analyses and conclusions are summarized below.

The impact methodology for transportation is described on LRDP FEIR pages 4.11-29-4.11-42. First, WSA identified an average annual traffic growth rate using the countywide travel demand model developed and maintained by the San Francisco County Transportation Authority and applied that rate to individual turning movement counts. Second, WSA applied an overlay to account for full buildout of the Plans (excluding those trips being generated in the blocks where the hospital would be located), using trip generation and traffic assignment information obtained from the transportation analysis conducted for the Mission Bay SEIR. Finally, WSA added an overlay of medical center-related traffic to account for the proposed traffic at Blocks 36 to 39 and X-3 for a 400-bed and 650-bed hospital.

| Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ |

Transportation impacts on the 2005 Medical Center project are summarized on LRDP FEIR pages 4.11-45-4.11-59. The conclusions are generally consistent with the Mission Bay SEIR, and assuming implementation of the Infrastructure Plan, all study intersections are forecast to operate at LOS D or better under 2012 peak hour conditions with the addition of traffic from a 400-bed hospital. In the year 2025, assuming buildout under the Mission Bay SEIR and the 400-bed hospital, most study intersections are forecast to operate at LOS D or better, except 3rd and King and 4th and King Streets which would operate at LOS F. These intersection impacts were previously identified as significant and unavoidable in the Mission Bay SEIR. In 2025, assuming a 650-bed hospital, intersection operations would degrade from LOS D to E at 16th Street/Owens Street and from LOS D to LOS E at Mariposa Street and 3rd Street. The LRDP FEIR identifies mitigation measures that could eliminate these significant impacts, but concludes that the impacts are significant and unavoidable because the Regents does not control the implementation of these measures by the City. However as discussed in Addendum #5, the 650-bed scenario was not considered reasonably foreseeable, and the impacts associated with that scenario were considered speculative.

**Proposed Medical Center Traffic Analysis**

Phase II is now considered to be a reasonably foreseeable project. Since the LFRP FEIR did not analyze a 550-bed hospital, a traffic study was prepared by Adavant Consulting (Attachment 5) to determine whether the significant and unavoidable impacts identified for the 650-bed hospital would still occur with the currently proposed second phase of the 550-bed Medical Center project.

The Adavant transportation analysis is based on factors developed from extensive surveys conducted at existing UCSF facilities over the past ten years, data gathered by the San Francisco Planning Department, and information obtained from the LRDP FEIR and the Mission Bay SEIR. The traffic report included in Attachment 5 describes the specific trip generation rates assumed for the medical uses at the site and their p.m. peak hour proportions, as well as their trip distribution characteristics, travel mode splits and typical vehicle occupancy rates. The time period chosen for analysis of potential transportation impacts was the peak hour of the 4:00 p.m. to 6:00 p.m. afternoon commute period. This time of day traditionally comprises a larger more concentrated portion of the total daily trips in San Francisco, and consequently was chosen to reflect the worst case scenario within a typical weekday. The study also assumes that the improvements already identified in the Mission Bay South and North Infrastructure Plans will be implemented.

As described in detail in Attachment 5, the conclusions of the traffic study show that the signalized intersection of 16th Street and Owens Street as well as the unsignalized intersection at Owens Street and the Medical Center Garage entrance would operate at an unacceptable level of service (LOS E or F) under Year 2025 during the PM peak hour with the implementation of Phase II of the Medical Center project. The study identified the following recommended mitigation measures which would improve the operations of the intersections to an acceptable level of service and eliminate new significant and unavoidable impacts.

- **16th Street and Owens Street Intersection - Southbound Approach**: Conversion of the exclusive left turn lane to a shared through-left turn lane and conversion of the shared through-right turn lane to an exclusive right turn lane, resulting in a lane configuration of one shared through-left turn lane, one through lane and one exclusive right turn lane at this approach. This measure could be accomplished by restriping the travel lanes within the existing right-of-way and no roadway widening would be required.

| Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ |

- **Owens Street and Center Garage Access Intersection**: Signalization of this intersection and also coordination of the signal phasing at this intersection with the intersections of 16th and Owens Streets, and of Mariposa and I-280 SB on-ramp Intersections.

The implementation of the mitigation measure at the intersection of 16th and Owens Streets would improve the LOS from E to D and would reduce the average vehicle delay from 70.4 sec/veh to 50.3 sec/veh. The installation of a new traffic signal at the intersection of Owens Street and Center Garage Access would improve the LOS from F to B.

The UCSF DEIR includes both these mitigation measures, the first of which (restriping the southbound 16th/Owens Street intersection) was already adopted in the LRDP FEIR. The San Francisco Municipal Transportation Agency (MTA) has submitted a comment letter on the UCSF DEIR, dated July 3, 2008 (Attachment 6), that states that the City will work with UCSF to implement the two mitigation measures, so both mitigation measures are considered feasible. As a result, both mitigation measures are now identified as being feasible and would reduce a significant impact to less than significant. UCSF has indicated that these measures will be included in the list of mitigation measures to be adopted by The Regents as part of the certification of the UCSF DEIR as proposed, as required by CEQA. So, it is foreseeable that The Regents will adopt the two mitigation measures.

Based on the conclusions of the Adavant traffic study and the fact that the traffic mitigations identified in the UCSF DEIR will be included in the measures adopted by The Regents, no new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to traffic impacts of Phase II of the Proposed Medical Center.

**Subsections c) to g):** The Proposed Medical Center would be located on the same site as the 2005 Medical Center analyzed in the LRDP FEIR and Addendum #5. In addition, the design of the Proposed Medical Center contains similar roadway system, parking capacity and alternative transportation design features, such as bike lanes, as the 2005 Medical Center. As a result, the potential impact of the Proposed Medical Center regarding air patterns, emergency access, hazardous roadway design, parking capacity, and alternative modes of transportation is the same as the 2005 Medical Center proposal, and no new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to these topics.

## XVII. UTILITIES AND SERVICE SYSTEMS

*Would the project:*

| | | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
|---|---|---|---|---|---|
| *a)* | *Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?* | ☐ | ☐ | ☐ | **X** |
| *b)* | *Require or result in the construction of new water or wastewater treatment facilities or expansion of existing* | ☐ | ☐ | ☐ | **X** |

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
|---|---|---|---|---|
| *facilities, the construction of which could cause significant environmental effects?* | | | | |
| *c) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?* | | | | X |
| *d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?* | | | | X |
| *e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?* | | | | X |
| *f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?* | | | | X |
| *g) Comply with federal, state, and local statutes and regulations related to solid waste?* | | | | X |

Explanation: The Proposed Medical Center would be smaller than the 2005 Medical Center analyzed in the LRDP FEIR and Addendum #5. As a result, the Proposed Medical Center would result in less development than the 2005 Medical Center proposal and would require the same or fewer utility services. No new information has emerged that would materially change any of the analyses or conclusions of the existing Mission Bay SEIR related to utilities.

## XVIII. MANDATORY FINDINGS OF SIGNIFICANCE

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

Explanation: As described above, the Proposed Medical Center would not be expected to create any significant impacts on biological or cultural resources.

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporated | Less Than Significant Impact | No Impact/ No Change in Conclusions |
|---|---|---|---|---|
| | ☐ | ☐ | ☐ | ☐ |
| *b) Does the project have impacts that are individually limited but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)* | ☐ | ☐ | ☐ | **X** |

Explanation: As discussed above, the Proposed Medical Center would not result in any impacts that are individually limited but cumulatively considerable and which have not already been identified in the Mission Bay SEIR.

| | | | | |
|---|---|---|---|---|
| *c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?* | ☐ | ☐ | ☐ | **X** |

Explanation: As discussed above, the Proposed Medical Center would not result in any environmental effects that cause substantial adverse effects on human beings, either directly or indirectly, that have not already been identified in the Mission Bay SEIR.

## XIX. INITIAL STUDY PREPARATION

This Initial Study was prepared by:

**Lead Agency**
San Francisco Redevelopment Agency

**Author**
San Francisco Redevelopment Agency
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**Technical Studies**

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Charles Bennett, Project Manager
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Eugene Reindel, Vice President and Principal Consultant
Robert Behr, Senior Consultant

***Adavant Consulting (Transportation Study)***
Jose Faran, P.E., Principal Transportation Engineer
Purushotham Basavaraju, Wilber Smith Associates

***Massachusetts Institute of Technology, Cambridge, Massachusetts (Helicopter Safety Study)***
Arnold Barnett, Ph.D., George Eastman Professor of Management Science

## XX. REFERENCES

San Francisco Redevelopment Agency. Addendum #5 to Mission Bay Subsequent Environmental Impact Report. Date of publication October 04, 2005.

City and County of San Francisco Planning Department and San Francisco Redevelopment Agency. Final Mission May Subsequent Environmental Impact Report. State Clearinghouse No. 97092068. Certified September 17, 1998.

University of California, San Francisco. Final Environmental Impact Report, Long Range Development Plan LRDP Amendment #2 – Hospital Replacement. State Clearinghouse No. 2004072067. Certified March 17, 2005.

University of California, San Francisco. Draft Environmental Impact Report, UCSF Medical Center at Mission Bay. State Clearinghouse No. 2008012075. Released April 2008.

**SAN FRANCISCO REDEVELOPMENT AGENCY**

**MISSION BAY ADDENDUM #6 INITIAL STUDY**
**(ER 919-97 Addendum 9/10/08)**
**September 10, 2008**

# ATTACHMENTS

**ATTACHMENT 1 - WIND STUDY**

**ATTACHMENT 2 – HISTORICAL RESOURCES STUDY**

**ATTACHMENT 3 – HELICOPTER SAFETY STUDY**

**ATTACHMENT 4 – HELICOPTER NOISE STUDY**

**ATTACHMENT 5 – TRANSPORTATION STUDY**

**ATTACHMENT 6 – SFMTA DEIR COMMENT LETTER**

# Attachment 1
# Wind Study

# Technical Memorandum

**Date:** April 2, 2008

**To:** Lori Yamauchi
Assistant Vice Chancellor
University of California, San Francisco
Campus Planning
3333 California Street, Ste 11
San Francisco, CA

**From:** Charles Bennett and Josh Schnabel
Environmental Science Associates
225 Bush Street, Suite 1700
San Francisco, CA 94104

**Subject:** Potential Wind Conditions - UCSF Medical Center at Mission Bay
San Francisco, California
ESA 207192

## *I. INTRODUCTION AND OVERVIEW*

A wind-tunnel test was performed for the proposed design of the UCSF Medical Center at Mission Bay buildings on Mission Bay South Blocks 36, 37, 38, 39 and X3 to define the wind environment that would exist in pedestrian areas within and around the proposed project. The project occupies all of Blocks 36, 37, 38, 39 and X3, generally bounded by Third Street to the east, Mariposa Street to the south, future Owens Street to the west and 16th Street to the north, in the Mission Bay South Redevelopment Area of San Francisco. Pedestrian-level wind speeds were measured at selected points to quantify resulting pedestrian-level winds in public spaces near the proposed project.

The wind study was conducted in response to the Mission Bay South Redevelopment Area requirement to identify and mitigate significant impacts of pedestrian-level winds, as explicitly stated in the Mission Bay SEIR[1] Mitigation Measure D.7 (adopted through UCSF's LRDP EIR Mitigation Measure 4.1-7), an excerpt of which follows:

> "D.7 The Redevelopment Agency would conduct wind review of high-rise structures above 100 ft. Wind tunnel testing would also be required unless... it is determined that ... impacts, based on a 26-mile-per-

[1] City and County of San Francisco, *Final Mission Bay Subsequent Environmental Impact Report*, Sept. 17, 1998, and University of California San Francisco LRDP Amendment #2 – Hospital Replacement EIR, March 2005.

hour hazard for a single hour of the year criterion, will not occur. The purpose of the wind tunnel studies is to determine design-specific impacts based on the above Hazard Criterion and to provide a basis for design modifications to mitigate these impacts. Projects within Mission Bay, including UCSF, would be required to meet this standard or to mitigate exceedances through building design."

Thus, the primary objective of the study is to determine design-specific impacts based only on the San Francisco Planning Code's Hazard Criterion[2] and to provide a basis for design modifications to mitigate these impacts. The wind study also examines the potential future wind conditions on and around the project site in order to provide information that the site architects can use in the design of the project to benefit the comfort and enjoyment of site occupants and visitors.

Twenty-four test locations for each scenario were studied for each of the four prevailing wind directions: northwest, west-northwest, west, and southwest. These four wind directions are the most common in San Francisco, and represent the majority of the winds that exceed 13 mph, so are therefore the most representative for evaluation of the potential for the proposed project to cause wind hazards. The project site is within the overall Mission Bay South Redevelopment Area, which ultimately will be developed according to the approved Redevelopment Plan. At present, the project site consists of undeveloped vacant land containing a one-story warehouse, a two-story office building, and two one-story, wood frame buildings. No testing was performed for the existing site conditions, for the reasons discussed later in this Technical Memorandum.

Details of the background and test methods are presented in Section II, Background. Test results and discussion are presented in Section III, Study Results, and Section IV summarizes the findings and conclusions. An overview of the test results and conclusions follows.

## Existing Wind Conditions

The existing pedestrian wind conditions in the general vicinity of the project site can be characterized as windy to very windy. In open areas in the South Plan Area, typically as many as half to three-quarters of sampled locations in open areas have wind speeds that exceed the wind hazard criterion of Section 148 of the Planning Code. The range of the durations for any exceedance is typically not large – usually less than 10 hours per year each. However, in locations near to or in the wakes of buildings such as those that lie north of the project site, wind accelerations and turbulence created by the buildings can result in specific hazard criterion exceedances for which the duration can be much greater – up to hundreds of hours per year.

## Test 1: LRDP Phase Wind Conditions

Buildings in the surrounding vicinity that are existing or approved, under construction, or for which bulk concepts are contained in the Mission Bay South Plan or the UCSF LRDP, were

[2] The Mitigation Measure D.7 and LRDP EIR Mitigation Measure 4.1-7 hazard criterion, a wind that is 26-miles-per-hour for a single full hour of the year, is based on the hazard standard in City Planning Code Section 148. See Section II.

considered a part of the project setting. These buildings included the planned, approved and existing developments on south blocks 24, 25, 29-34, X4, and 40-43.

Upon the completion of the LRDP Phase, wind conditions would be characterized as moderate to windy. With the proposed LRDP Phase buildings placed in the context of other anticipated future development in the vicinity, winds would exceed the wind hazard criterion of Planning Code Section 148 at two locations – at the south side of 16th Street, at the intersection with Owens, and at the southeast corner of Mariposa and 3rd Streets, with durations of those hazard exceedances being 15 hours per year and 20 hours per year, for a total duration of 35 hours per year. The total duration of these exceedances should be considered to be similar to but less than the duration of the existing wind hazards on the site, so the proposed project would represent an overall improvement in these conditions on-site and in the vicinity.

General pedestrian wind conditions in the general vicinity of the project site would be characterized as moderate to windy; the average of the wind speeds for the 24 points tested would be 12 mph. Wind speeds in pedestrian areas range from 5 to 18 mph, with speeds of 14 mph or more occurring at 10 of the 24 locations. The highest wind speed in the vicinity (18 mph) would occur at the southeast corner of Mariposa and 3rd Streets. Wind speeds along 3rd Street would range from 8 to 16 mph, while winds along the western face of the building would range from 9 mph to 15 mph.

With respect to the Wind Hazard Criterion, the project would generally improve wind conditions from those now existing by reducing the number of exceedances from many to two and by reducing the overall duration of exceedances. Continued application of the current mitigation measures should eliminate the hazards in the LRDP Phase.

## Test 2: Future Phase Wind Conditions

The Future Phase setting consists of the LRDP Phase of the project with the new development of additional medical center buildings on the western portion of the project site.

At the completion of the Future Phase of the proposed project, the two wind hazard exceedences that were identified for the LRDP Phase would be eliminated. However, while those two LRDP Phase exceedances would be eliminated under the Future Phase, a new exceedance would be created at another location. This new wind hazard exceedance under the Future Phase would occur at the intersection of 3rd and 16th Streets for a duration of 2 hours per year. The net effect would be a reduction, by 35 hours per year, in the duration of the wind hazard condition that would exist, compared to the LRDP Phase.

Compared to the LRDP Phase scenario, the average of the wind speeds at the 24 locations would be reduced by 2 mph at the end of the Future Phase development. Wind speeds along 3rd Street would range from 9 to 14 mph, while winds along the western face of the building would range from 7 mph to 12 mph.

## Project Mitigation Measures

Both the LRDP Phase and the Future Phase of the project would substantially improve wind conditions by reducing the number and duration of previously occurring wind hazard exceedances. The Future Phase scenario would, however, still result in a single remaining wind hazard exceedance at one of the 24 pedestrian test point locations. As a result, continued actions under UCSF Mitigation Measure 4.1-7 and City Mitigation Measure D.7 would be required to eliminate this hazard during the further design process for the project. No further mitigation measures are considered necessary.

Landscaping that includes street trees and street furniture are planned for the project area. Since the landscaping for the project area is currently under development, it is not now possible to assess its effects on winds in the project vicinity. However, it is certain that the presence of large street trees and street furniture would further reduce general wind speeds and would improve wind conditions in the project area. These landscaping features would be expected to reduce the single remaining Hazard Criterion exceedance to less-than-significant levels.

## Added Recommendation

Note that the specific designs for buildings upwind (to the north and to the west) of the site will strongly affect wind conditions along 16th, Owens and 3rd Streets, and could increase or reduce the number of wind hazard exceedances that occur in the vicinity of the project site. Consideration must be given in their design as to the wind effects in the vicinity and on the project site. Since buildings on Block 25 will be part of the LRDP development of the Mission Bay campus site, it is recommended that the designs of those buildings, regardless whether the building heights reach the 100 ft. criterion of the Mission Bay SEIR Mitigation Measure D.7, be wind tested to determine that they do not adversely affect winds on the project site.

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## II. BACKGROUND

Tall buildings and structures can strongly affect the wind environment for pedestrians. In cities, groups of structures tend to slow the winds near ground level, due to the friction and drag of the structures themselves. Buildings that are much taller than the surrounding buildings intercept and redirect winds that might otherwise flow overhead, and bring them down the vertical faces of the buildings to ground level, where they create ground-level wind and turbulence. These redirected winds can be relatively strong and relatively turbulent, and can be incompatible with the intended uses of nearby ground-level spaces.

In the project area as it exists today, the general openness, lack of buildings and alignment of the street grid allow strong winds to reach the site from the west and southwest with little attenuation. The increasing densification of the Mission Bay Redevelopment Area will eventually alter the wind speed profile structure in the project area.

### Existing Climate and Wind Conditions in San Francisco

Average winds speeds in San Francisco are the highest in the summer and lowest in winter. However, the strongest peak winds occur in winter. The highest average wind speeds occur in mid-afternoon and the lowest in the early morning. Westerly to northwesterly winds are the most frequent and strongest winds during all seasons. Of the 16 primary wind directions, the northwest, west-northwest, west and west-southwest winds have both the greatest frequency of occurrence as well as the majority of the strong winds.

Data describing the speed, direction, and frequency of occurrence of winds were gathered at the old San Francisco Federal Building at 50 United Nations Plaza (at a height of 132 ft.) during the six-year period, 1945 to 1950. Measurements taken hourly and averaged over one-minute periods have been tabulated for each month (averaged over the six years) in three-hour periods using seven classes of wind speed and 16 compass directions. Analysis of these data shows that during the hours from 6:00 a.m. to 8:00 p.m., about 70% of all winds blow from five of the 16 directions, as follows: Northwest (NW), 10%; West Northwest (WNW), 14%; West (W), 35%; West Southwest (WSW), 2%; Southwest (SW), 9%; and all other winds, 28%. Calm conditions occur 2%of the time. More than 90% of measured winds over 13 miles per hour (mph) blow from the NW, WNW, W, WSW, or SW.

### Wind Speed and Pedestrian Comfort[3]

The comfort of pedestrians varies under different conditions of sun exposure, temperature, clothing, and wind speed. Winds up to 4 mph have no noticeable effect on pedestrian comfort. With winds from 4 to 8 mph, wind is felt on the face. Winds from 8 to 13 mph will disturb hair, cause clothing to flap, and extend a light flag mounted on a pole. Winds from 13 to 19 mph will

[3] Lawson, T.V. and A.D. Penwarden, *The Effects of Wind on People in the Vicinity of Buildings*, Proceedings of the Fourth International Conference on Wind Effects on Buildings and Structures, London, 1975, Cambridge University Press, Cambridge, U.K., 605-622 1976.

raise loose paper, dust and dry soil, and will disarrange hair. For winds from 19 to 26 mph, the force of the wind will be felt on the body. With 26 to 34 mph winds, umbrellas are used with difficulty, hair is blown straight, there is difficulty in walking steadily, and wind noise is unpleasant. Winds over 34 mph increase difficulty with balance and gusts can blow people over.

## Redevelopment Agency Requirements

The City Planning Code specifically outlines wind criteria for the Downtown Commercial District, the Rincon Hill, Van Ness Avenue, and South of Market areas in Code sections 148, 249.1(a)(3), 243(c)(8), 263.11(c), respectively. The Mission Bay Redevelopment Area is not subject to any of these City Planning Code sections. However, under the authority of the Redevelopment Agency, the development is subject to Mitigation Measure D.7, as follows:

> "D.7 Require a qualified wind consultant to review specific designs for buildings 100 feet or more in height for potential wind effects. The Redevelopment Agency would conduct wind review of high-rise structures above 100 ft. Wind tunnel testing would also be required unless, upon review by a qualified wind consultant, and with concurrence by the Agency, it is determined that the exposure, massing, and orientation of buildings are such that impacts, based on a 26-mile-per-hour hazard for a single hour of the year criterion, will not occur. The purpose of the wind tunnel studies is to determine design-specific impacts based on the above Hazard Criterion and to provide a basis for design modifications to mitigate these impacts. Projects within Mission Bay, including UCSF, would be required to meet this standard or to mitigate exceedances through building design."

The origin of the Hazard Criterion cited by Measure D.7 is City Planning Code Section 148, Reduction of Ground-Level Wind Currents in C-3 (Downtown Commercial) Districts. In addition to establishing a Hazard Criterion, Section 148 establishes the methodology for wind tunnel testing, analysis and evaluation of wind conditions, and this methodology is used to prepare all environmental impact reports in San Francisco. In environmental impact analyses in San Francisco, the exceedance of a Hazard Criterion would be a significant environmental impact that requires mitigation, while the exceedance of either comfort criteria would be a less-than¬significant environmental impact, which does not require mitigation.

To assure that this technical study meets the technical requirements of Mitigation Measure D.7 (as adopted by UCSF Mitigation Measure 4.1-7), it was performed using the same wind testing, analysis and evaluation methods that would be used to determine conformity with Section 148.

City Planning Code Section 148 requires that buildings not cause equivalent wind speeds to reach or exceed the hazard level of 26 mph as averaged for a single full hour of the year, or 0.011416% of the time. The Code defines the wind ordinance in terms of equivalent wind speed.[4] This term denotes an average wind speed (mean velocity), adjusted to include the level of gustiness and turbulence. Similarly, the Code also establishes comfort criteria, requiring that buildings be

[4] Equivalent mean wind speed is defined as the mean wind, multiplied by the quantity (one plus three times the turbulence intensity) divided by 1.45.

shaped so as not to cause ground-level wind currents to exceed, more than 10% of the time, 11 mph in substantial pedestrian use areas, and 7 mph in public seating areas. The Hazard Criterion is based on winds that are measured for one hour and averaged. In contrast, the comfort criteria are based on wind speeds that are measured for one minute and averaged; when stated on the same basis as the comfort criteria winds, the Hazard Criterion speed is a one-minute average of 36 mph.[5]

## Model and Wind Testing Protocols

Based on project design information provided by Anshen + Allen Architects, Inc., ESA constructed a 1 inch to 50 foot scale model of the project site and vicinity to simulate the project and its existing and future contexts. The scale models were then tested in a boundary layer wind-tunnel facility at the University of California, Davis, under the direction of Dr. Bruce White. These tests, however, were performed independent of the University.

Wind-tunnel tests were conducted for two test scenarios: 1) the LRDP Phase development, and 2) the combined LRDP and Future Phase development. Both scenarios included full future development of the surrounding vicinity in accordance with the Redevelopment Area *Design for Development Guidelines* and included future development of the UCSF Mission Bay campus site in accordance with the LRDP. In accordance with the protocol for wind-tunnel testing in Section 148 of the Planning Code, each configuration was wind-tunnel tested for each of four primary wind directions: northwest (NW), west-northwest (WNW), west (W) and west-southwest (WSW).

The test procedure consisted of orienting the selected configuration of the model in the boundary layer wind-tunnel and measuring the wind speed at each of the test locations. The model was tested in a wind tunnel that allows testing of natural atmospheric boundary layer flow past surface objects such as buildings and other structures. The tunnel has an overall length of 22 meters (m) (72 feet), a test section of 1.22 m (4 feet) wide by 1.83 m (6 feet) high, and an adjustable false ceiling. The adjustable ceiling and turbulence generators allow speeds within the tunnel to vary from 1 meter per second (m/s) to 8 m/s, or 2.2 mph to 17.9 mph.

Wind-speed measurements at each test location were made with a hot-wire anemometer, an instrument that directly relates rates of heat transfer to wind speeds by electronic signals. The hot-wire signals are proportional to the magnitude and steadiness of the wind. The hot-wire probe is calibrated to an accuracy of within 2% before the test procedure is begun. The hot-wire probe measures the analog voltage for approximately 30 seconds at each test location. When converted to digital signals, this measurement provides approximately 30,000 individual voltage samples that are averaged and the root mean square calculated for each test location. These data, when

[5] Arens, E., *Designing for Acceptable Wind Environment*, Transactions Engineering Journal, ASCE 107, No. TE 2, p. 127-141, 1981.

converted to velocity using the calibration curves, provide the mean velocity and turbulence values used in the calculation of the equivalent wind speed.

By measuring both the mean wind speeds and corresponding turbulence intensities, high wind speeds and gustiness (changes in wind speeds over short periods of time) could be determined. The ratio of near-surface speed to reference wind speed was calculated from the hot-wire measurements. The inherent uncertainty of measurements made with the hot-wire anemometer close to the surface of the model is ±5% of the true values. These values are compared with the free stream wind as measured in the wind-tunnel. As a result, each wind-tunnel measurement results in a ratio that relates the speed of ground-level wind to the speed at the reference elevation, in this case the height of the Old San Francisco Federal Building. These ratios are the output data from the wind-tunnel tests.

These output data are reduced using a computer program that evaluates the contribution from each tested wind direction to the total wind speed measured at each location for each wind direction. The program first adjusts the wind-tunnel output ratios to account for the differences between the boundary layer profile in the wind-tunnel and the profile as measured at the Old Federal Building located at 50 United Nations Plaza. The program then computes the equivalent wind speed that conforms to the selected criterion; either the wind speed exceeded 10% of the time or the wind speed exceeded one hour or more per year. The program also computes the percentage of time that the wind would exceed the speed criterion selected and further computes the percentage contribution of each wind direction to the equivalent wind speed and to the excess of the criterion. In addition to the computations for each tested wind direction, the program computes an average ratio and uses this to compute statistics for "Other" winds, which accounts for all remaining wind directions.

The output of the computer program is presented in the Wind-Tunnel Test Results tables for normal winds and for hazardous winds. These tables, appended to this Memorandum, provide the detail of the data and of the intermediate results that are described above. The wind tunnel ratios were included in the program input, and the results evaluated in the discussions.

## Wind Speed Profile Adjustments

The standard wind test methodology implicitly assumes that the relationship between height above the ground and wind speed (referred to hereafter as the “wind speed profile”) is the same in the test area as at the Civic Center weather station. However, wind speed profiles vary from place to place across San Francisco, and the wind speed profiles for the Mission Bay Redevelopment Area, both North and South, are known to differ from those at the Civic Center weather station where data were gathered.

Previously, wind-tunnel measurements of the wind speed profiles for NW, WNW, W and WSW winds were made for the Mission Bay Boulevard North area. Wind profile adjustment factors were estimated for those wind directions, based on those profile measurements and upon the

methodology presented in the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Handbook, Chapter 14. Based on data from the site's wind speed profiles and previously measured profiles for the Civic Center, the ASHRAE methodology was expanded to create two new categories intermediate to the four presented in Chapter 14. Those categories were assigned for each of the four wind directions at the Old Federal Building meteorological station and for each of the four wind directions at the project site. The assignment provided the values used for alpha and delta, the power-law exponent and the boundary-layer thickness, respectively, and ultimately the factors for normalizing the Civic Center meteorological data to the wind speed at the project site. For Mission Bay Redevelopment Area North and South sites, WSW wind speeds are reduced by about 27% and W wind speeds by 13%, while NW and WNW wind speeds are reduced by about 3% compared to winds in the Civic Center. The wind speeds are reported below, in Section III. Test Cases and Study Results, reflect the use of these adjusted values.

Note that, ultimately, the on-going extensive cumulative development that is a part of the Mission Bay South Redevelopment Area ultimately will substantially alter the wind speed profile structure in the vicinity of the project site, bringing it back closer to the conditions at the Civic Center site.

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# III. EXISTING WINDS, TEST CASES AND STUDY RESULTS

## Introduction

Wind-tunnel tests were conducted for the two test scenarios. Twenty-four test locations for both the LRDP Phase and the Future Phase scenarios were studied for the four prevailing wind directions: northwest, west-northwest, west, and southwest. These winds are the most common in San Francisco, and represent the majority of the winds over 13 mph, so are therefore the most representative for evaluation of the proposed project.

## Test Point Locations

In general, the test locations were stationed within the project complex and immediate vicinity including blocks 24, 25, and 31 to the north and northeast of the project site, 33 and 34 to the east of the project site, and 40 to the west of the project site. Test locations focused on sidewalk locations on Mariposa, Third, 16th and Owens Streets along the south, west north and east side of the project site, respectively. Additional test point locations were included within the project site along 4th Street and at the entrances to the proposed hospital building.

Test points were positioned to capture pedestrian areas along streets in the project vicinity and in open areas on the project site itself (see Figure 1). In the north/south direction, two test points were located along Owens Street from 16th Street to Mariposa Street (#3 and 4), eight test points were located along 3rd Street (#7-10 and 15-18), and ten test points were located along 4th Street and within the project site (#1, 2, 5, 6, and 19-24). In the east/west direction, nine test points were located along Mariposa Street (#4-12) and nine test points were located along 16th Street (#1-3 and 13-18).

For the purpose of identifying the applicable wind Comfort Criterion, all of the test locations are considered to be pedestrian areas, subject to the 11 mph Pedestrian Comfort Criterion.

## Wind Evaluation and Criteria

Just as the wind-tunnel testing was performed in accordance with the test protocols of City Planning Code Section 148, the hazard and comfort criteria of Code Section 148 were used to evaluate the results of the tests. The mean wind speeds are compared to the pedestrian comfort criteria of 11 mph for areas of substantial pedestrian use and 7 mph for seating areas, each not to be exceeded more than 10% of the time. Separate calculations evaluate compliance with the Hazard Criterion. As previously noted, the wind data observed at the Old San Francisco Federal Building are not full hour average speeds as specified by the Hazard Criterion, so it is necessary to adjust the wind criterion speed to obtain a valid comparison with the available data and the equivalent wind speeds based on those data. When normalized to the equivalent wind speeds used here, the Hazard Criterion speed is equal to 36 mph, the value used in the tables. Throughout the following discussion the wind speeds reported refer to the equivalent wind speeds that would be

exceeded 10% of the time when referring to the Comfort Criteria, and about 0.011416% of the time when referring to the Hazard Criterion.

### *Test Output*

The basic wind-tunnel test data and the detailed outputs of the computer program are presented in tables that evaluate comfort criteria and hazard criteria for each scenario. These output tables, appended to this Memorandum, provide the detail of the data and the intermediate results described above. The wind-tunnel ratios and the wind profile adjustment factors for each wind direction are included. The results evaluated and presented in the discussions that follow.

Figure 1 identifies the measurement point locations. Summary information about the wind-tunnel test results and evaluations of compliance with the comfort and hazard criteria are presented for the Existing Setting and Project scenarios in summary Tables 1 and 2. Table 1 presents the Comfort Analyses results, namely the measured 10%-exceeded wind speed and the percentage of time that the Comfort Criterion is exceeded for each test location and test scenario. Table 2 presents the Wind Hazard Analyses results, the equivalent wind speed and the number of hours per year of exceedance, if any, of the Hazard Criterion for each test location and test scenario.

Throughout the following discussion, references are made to values from Tables 1 and 2. Note that the times in hours and wind speeds in mph presented in those tables are rounded to the nearest integer value. The sums, differences and averages presented also were rounded after calculations that were made using the actual (unrounded) values. As a result, what may appear to be discrepancies in the tabular results, such as sums for each of the columns or differences between values for project and existing conditions, are simply due to the rounding of results. However, the rounded values of the differences in wind speeds and in hours exceedances in the Tables best represent the measured changes in those quantities.

### *Discussion*

Throughout the following discussion the wind speeds reported refer to the equivalent wind speeds that would be exceeded 10% of the time when referring to the Pedestrian Comfort Criterion and the Seating Comfort Criterion, and to the winds exceeded 1 hour per year when referring to the Hazard Criterion.

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## Existing Wind Conditions at the Project Site

The existing pedestrian wind conditions in the general vicinity of the project site can be characterized as windy to very windy. Prior wind testing clearly demonstrates that "equivalent" wind speeds[6] in open areas within the Mission Bay Redevelopment Area typically reach wind speeds of 16 to 22 mph. The presence of groups of large buildings such as those at the UCSF site or similar structures built according to the Redevelopment Area *Design for Development Guidelines* substantially slows these winds, while adding turbulence. Winds in the downwind reach of such buildings, although slowed, tend to be much more variable in speed. Typically, the range of wind speeds expected in locations on the project site would be as much as 2 to 3 mph lower, namely in the range of 14 to 19 mph. Wind speeds along 16th Street are shaped by the buildings north of 16th and would be generally lower, although more variable and turbulent, with locations where strong accelerations of the winds occur.

In vacant open areas in the South Plan Area, typically many individual locations have wind speeds that exceed the wind hazard criterion of Section 148 of the Planning Code. Thus, it is typical to find that as many as half to three-quarters of locations in open areas would have wind conditions that exceed the wind hazard criterion. The range of the durations of an exceedance is typically not large – usually less than 10 hours per year each, but in a few cases near to or in the wakes of buildings, where wind turbulence is increased, the duration of a specific hazard criterion exceedance can be much greater – up to hundreds of hours per year.

Experience also shows clearly that adding large new structures in accordance with *Design for Development Guidelines* into large open sites usually results in marked general reductions in wind speed and decreases the number and durations of exceedances of the wind hazard in that vicinity. While these speed reductions occur in general, in specific cases the wind interacts with the buildings to cause new wind hazards or to aggravate existing hazards. However, such wind hazards generally have straightforward remedies that can be proven effective through additional design-level wind testing.

In summary, wind hazards are expected to occur on-site and in the immediate vicinity under existing conditions. Based on prior wind testing, the total duration of wind hazard exceedances on-site at the present is estimated to fall in the range of one to two hundred hours per year.

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[6] Throughout the discussion that follows, "wind speed" refers to equivalent wind speed (a metric defined in the Section 148 protocol that includes the effects of turbulence) that is exceeded 10% of the time.

SOURCE: ESA

UCSF Medical Center at Mission Bay . 207192

**Figure 1**
Wind Test Point Locations

## TEST 1 – LRDP Phase Wind Conditions

The LRDP Phase consists of development covered under the current plan at the project site (four interconnected buildings on Mission Bay parcels 36, 37, and X3) added to the planned and existing development in the project site vicinity. See Figure 1.

### *LRDP Phase Comfort Criterion Conditions*

Upon the completion of the LRDP Phase, which includes other anticipated future development in the vicinity, general pedestrian wind conditions in the vicinity of the project site would be characterized as moderate to windy; the average of the wind speeds for the 24 points tested would be 12 mph. Wind speeds in pedestrian areas range from 5 to 18 mph, with speeds of 14 mph or more occurring at 10 of the 24 test locations (see Table 1). The highest wind speed in the vicinity (18 mph) would occur at the southeast corner of Mariposa and 3rd Streets. Wind speeds along 3rd Street would range from 8 to 16 mph, while winds along the western face of the building would range from 9 mph to 15 mph.

### *LRDP Phase Hazard Conditions*

With the project in the proposed LRDP Phase, winds would exceed the wind hazard criterion of Planning Code Section 148 at two locations—at the south side of 16th Street, at the intersection with future Owens Street, and at the southeast corner of Mariposa and 3rd Streets—with durations of those hazard exceedances being 15 hours per year and 20 hours per year, for a total duration of 35 hours per year (see Table 2). The total duration of these exceedances should be considered to be similar to but less than the duration of the existing wind hazards on the site. Thus, the proposed project would represent an overall improvement in these conditions on-site and in the vicinity.

### *Wind Mitigation Measures*

Mitigation measures would be the same under the LRDP Phase and Future Phase development. See the discussion of these measures under TEST 2.

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**TABLE 1**
**WIND COMFORT ANALYSIS**

| References | | LRDP Phase Project | | | Future Phase Project (A) | | | | Future Phase Alternative (B) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Location Number* | *Comfort Criterion Speed (mph)* | *Measured Equivalent Wind Speed (mph)* | *Percent of Time Wind Speed Exceeds Criterion* | e x c e e d s | *Measured Equivalent Wind Speed (mph)* | *Percent of Time Wind Speed Exceeds Criterion* | *Speed Change Relative to Existing (mph)* | e x c e e d s | *Measured Equivalent Wind Speed (mph)* | *Percent of Time Wind Speed Exceeds Criterion* | *Speed Change Relative to Future Phase Project (A) (mph)* | e x c e e d s |
| 1 | 11 | 12 | *11* | **e** | 12 | *12* | | **e** | 12 | *11* | | **e** |
| 2 | 11 | 10 | *9* | | 13 | *14* | 2 | **s** | 12 | *13* | | **p** |
| 3 | 11 | 18 | *32* | **e** | 16 | *29* | -2 | **e** | 15 | *26* | -1 | **e** |
| 4 | 11 | 14 | *20* | **e** | 15 | *23* | 1 | **e** | 15 | *23* | | **e** |
| 5 | 11 | 15 | *19* | **e** | 15 | *20* | | **e** | 15 | *20* | | **e** |
| 6 | 11 | 14 | *16* | **e** | 14 | *16* | | **e** | 14 | *17* | | **e** |
| 7 | 11 | 16 | *30* | **e** | 15 | *23* | -2 | **e** | 15 | *22* | | **e** |
| 8 | 11 | 15 | *24* | **e** | 14 | *23* | | **e** | 15 | *24* | | **e** |
| 9 | 11 | 17 | *22* | **e** | 14 | *19* | -3 | **e** | 14 | *19* | | **e** |
| 10 | 11 | 13 | *19* | **e** | 11 | *9* | -3 | **-** | 12 | *13* | 1 | **s** |
| 11 | 11 | 14 | *20* | **e** | 12 | *12* | -2 | **e** | 12 | *15* | 1 | **e** |
| 12 | 11 | 13 | *16* | **e** | 13 | *16* | | **e** | 12 | *14* | -1 | **e** |
| 13 | 11 | 11 | *9* | | 10 | *9* | | | 11 | *10* | | |
| 14 | 11 | 9 | *5* | | 10 | *6* | 1 | | 10 | *6* | | |
| 15 | 11 | 15 | *18* | **e** | 16 | *18* | 1 | **e** | 16 | *18* | | **e** |
| 16 | 11 | 9 | *3* | | 8 | *3* | -1 | | 9 | *7* | 1 | |
| 17 | 11 | 8 | *6* | | 10 | *8* | 2 | | 9 | *5* | -1 | |
| 18 | 11 | 11 | *9* | | 12 | *14* | 1 | **s** | 10 | *7* | -2 | **-** |
| 19 | 11 | 11 | *9* | | 11 | *10* | | | 10 | *6* | -1 | |
| 20 | 11 | 10 | *5* | | 7 | *0* | -3 | | 10 | *4* | 3 | |
| 21 | 11 | 10 | *5* | | 11 | *9* | 1 | | 11 | *10* | | |
| 22 | 11 | 8 | *5* | | 9 | *6* | | | 8 | *4* | | |
| 23 | 11 | 10 | *7* | | 12 | *13* | 2 | **s** | 13 | *19* | 1 | **p** |
| 24 | 11 | 15 | *23* | **e** | 10 | *5* | -6 | **-** | 9 | *2* | -1 | |
| Average mph and % | | 12.4 mph | *14%* | | 10.6 mph | *13%* | -0.7 mph | | 10.6 mph | *13%* | 0 mph | |
| **Exceedances** | | ***Total*** | **13** | | | ***Total*** | **14** | | | ***Total*** | **15** | |
| | *Counts* | *Existing* | 13 | **e** | | *Existing* | 11 | **e** | | *Existing or Project* | 13 | |
| | | | | | | *New, due to scenario* | 3 | **s** | | *New, due to scenario* | 2 | **s** |
| | | | | | | *New, at new location* | 0 | **n** | | *New, at new location* | 0 | **n** |
| | | | | | | *Eliminated* | 2 | **-** | | *Eliminated* | 1 | **-** |

## TEST 2 – Future Phase Wind Impacts

The Future Phase consists of the anticipated development under the LRDP Phase scenario with the addition of further development of additional buildings located west of future 4th and east of future Owens Streets, on the project site. Two options were analyzed for the Future Phase scenario: the western building connected to the UCSF medical center via two pedestrian bridges over 4th Street, the project (A); and the western building connected to the UCSF medical center via a connecting building, the alternative (B).

**TABLE 2**
**WIND HAZARD ANALYSIS**

| References | | LRDP Phase Project | | | Future Phase Project (A) | | | | Future Phase Alternative (B) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Location Number* | *Hazard Criterion Speed (mph)* | *Measured Equivalent Wind Speed (mph)* | *Hours per year Wind Speed Exceeds Hazard Criterion* | exceeds | *Measured Equivalent Wind Speed (mph)* | *Hours per year Wind Speed Exceeds Hazard Criterion* | *Hours Change Relative to Existing Setting* | exceeds | *Measured Equivalent Wind Speed (mph)* | *Hours per year Wind Speed Exceeds Hazard Criterion* | *Hours Change Relative to Future Phase Project (A)* | exceeds |
| 1 | 36 | 29 | | | 30 | | | | 29 | | | |
| 2 | 36 | 31 | | | 28 | | | | 27 | | | |
| 3 | 36 | 41 | *15* | e | 33 | | *-15* | | 33 | | | |
| 4 | 36 | 24 | | | 26 | | | | 26 | | | |
| 5 | 36 | 33 | | | 33 | | | | 33 | | | |
| 6 | 36 | 30 | | | 30 | | | | 30 | | | |
| 7 | 36 | 29 | | | 26 | | | | 28 | | | |
| 8 | 36 | 25 | | | 26 | | | | 26 | | | |
| 9 | 36 | 42 | *20* | e | 35 | | *-20* | | 35 | | | |
| 10 | 36 | 32 | | | 24 | | | | 25 | | | |
| 11 | 36 | 27 | | | 26 | | | | 26 | | | |
| 12 | 36 | 23 | | | 24 | | | | 23 | | | |
| 13 | 36 | 23 | | | 23 | | | | 24 | | | |
| 14 | 36 | 21 | | | 24 | | | | 22 | | | |
| 15 | 36 | 35 | | | 37 | *2* | *2* | s | 37 | *2* | | p |
| 16 | 36 | 19 | | | 18 | | | | 21 | | | |
| 17 | 36 | 22 | | | 22 | | | | 19 | | | |
| 18 | 36 | 20 | | | 26 | | | | 25 | | | |
| 19 | 36 | 20 | | | 19 | | | | 26 | | | |
| 20 | 36 | 18 | | | 13 | | | | 19 | | | |
| 21 | 36 | 18 | | | 28 | | | | 27 | | | |
| 22 | 36 | 20 | | | 20 | | | | 20 | | | |
| 23 | 36 | 22 | | | 21 | | | | 23 | | | |
| 24 | 36 | 32 | | | 17 | | | | 15 | | | |
| Average mph and % | | 27 mph | *35 hr* | | 23 mph | *2 hr* | *-33 hr* | | 23 mph | *2 hr* | *0 hr* | |
| **Exceedances** | | ***Total*** | **2** | | | ***Total*** | **1** | | | ***Total*** | **1** | |
| | *Counts* | *Existing* | 2 | e | | *Existing* | 0 | e | | *Existing or Project* | 1 | |
| | | | | | | *New, due to scenario* | 1 | s | | *New, due to scenario* | 0 | s |
| | | | | | | *New, at new location* | 0 | n | | *New, at new location* | 0 | n |
| | | | | | | *Eliminated* | 0 | - | | *Eliminated* | 0 | - |

## *Future Phase Comfort Criterion Conditions*

With either the Future Phase scenario project (A) or alternative (B), the average of the wind speeds at the 24 locations would be 10.6 mph, a reduction of 1 mph at the end of the Future Phase development, compared to the LRDP Phase scenario. Wind speeds along 3rd Street would range from 9 to 14 mph, while winds along the western face of the building would range from 7 mph to 12 mph.

Although the average wind speed would be reduced by 1 mph to 10.6 mph, wind conditions still would be considered windy. Compared to the LRDP Phase scenario, the Future Phase would reduce wind speeds at 10 locations and eliminate Comfort Criterion exceedances at 2 of those locations (#10 and 24).

### *Future Phase Hazard Conditions*

At the completion of the Future Phase of the proposed project, the two wind hazard exceedences that were identified for the LRDP Phase would be eliminated. However, while those two LRDP Phase exceedances would be eliminated under the Future Phase, a new exceedance would be created at another location. This new wind hazard exceedance under the Future Phase would occur at the intersection of 3rd and 16th Streets for a duration of 2 hours per year. The net effect would be a reduction, by 35 hours per year, in the duration of the wind hazard condition that would exist, compared to the LRDP Phase.

### *Wind Mitigation Measures*

Overall, the project site and vicinity can be considered windy in both the LRDP and Future Phase scenarios. With respect to the Hazard Criterion, the Future Phase project would greatly improve wind conditions over the LRDP setting by reducing the number and duration of exceedances. However, wind hazard criterion exceedances would remain. The mitigating measures that have the potential to reduce wind speeds and eliminate such relatively small exceedances are the proposed landscape trees and street furniture which would block some of the wind from reaching the pedestrian areas. The testing did not consider the effects of landscaping vegetation since the landscaping design is still under development. Though future landscaping may not immediately eliminate Hazard Criterion exceedances, it can be expected that the presence of large street trees and street furniture would further reduce the wind speeds and further improve wind conditions.

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## IV. SUMMARY

The project site is within the overall Mission Bay South Redevelopment Area, which ultimately will be developed according to the approved Redevelopment Plan. At present, the project area consists primarily of vacant land containing a one-story warehouse, a two-story office building, and two one-story, wood frame buildings.

The LRDP Scenario consists of the Medical Center buildings added to the existing setting, primarily along the eastern portion of the site. Buildings in the surrounding vicinity that are existing or approved, under construction, or for which bulk concepts are contained in the Mission Bay South Plan or the UCSF LRDP, were considered a part of the project setting. These buildings do now, or would in the future, occupy South Plan blocks 24, 25, 29-34, X4, and 40-43.

The Future Phase Scenario includes additional buildings on the western side of 4th Street. This scenario includes two options for the Future Phase scenario: the western building connected to the UCSF medical center via two pedestrian bridges over 4th Street, project (A); and the western building connected to the UCSF medical center via a connecting building, alternative (B). In terms of the resulting wind test conditions, these options are similar to each other.

The wind-tunnel testing was performed to determine the wind conditions of the site and vicinity under the LRDP Phase and to establish and compare the performance of the Future Phase of the project with respect to pedestrian-level wind effects in public areas.

### Comfort Criteria Winds

Although no testing was performed for the existing site conditions, the existing pedestrian wind conditions in the general vicinity of the project site can be reliably characterized as windy to very windy, with winds in almost all locations exceeding the Comfort Criterion of Section 148.

With LRDP Phase development, general pedestrian wind conditions in the general vicinity of the project site would be characterized as moderate to windy; the average of the wind speeds for the 24 points tested would be 12 mph. Wind speeds in pedestrian areas would range from 5 to 18 mph, with speeds of 14 mph or more occurring at 10 of the 24 locations. The highest wind speed in the vicinity (18 mph) would occur at the southeast corner of Mariposa and 3rd Streets. Wind speeds along 3rd Street would range from 8 to 16 mph, while winds along the western face of the building would range from 9 mph to 15 mph.

Compared to the LRDP Phase scenario, the average of the wind speeds at the 24 locations would be reduced by 2 mph at the end of the Future Phase development. Wind speeds along 3rd Street would range from 9 to 14 mph, while winds along the western face of the building would range from 7 mph to 12 mph.

### *Hazard Criterion Winds*

In open, vacant, areas in the South Plan Area, typically as many as half to three-quarters of sampled locations in open areas have wind speeds that exceed the wind hazard criterion of Section 148 of the Planning Code. The range of the durations for any exceedance is typically not large – usually less than 10 hours per year each. However, in locations near to or in the wakes of buildings such as those that lie north of the project site, wind accelerations and turbulence created by the buildings can result in specific hazard criterion exceedances for which the duration can be much greater – up to hundreds of hours per year.

Upon the completion of the LRDP Phase, winds would exceed the wind hazard criterion of Planning Code Section 148 at two locations – at the south side of 16th Street, at the intersection with Owens, and at the southeast corner of Mariposa and 3rd Streets, with durations of those hazard exceedances being 15 hours per year and 20 hours per year, for a total duration of 35 hours per year. The total duration of these exceedances should be considered to be similar to but less than the duration of the existing wind hazards on the site, so the proposed project would represent an overall improvement in these conditions on-site and in the vicinity.

At the completion of the Future Phase of the proposed project, the two wind hazard exceedences that were identified for the LRDP Phase would be eliminated. However, while those two LRDP Phase exceedances would be eliminated under the Future Phase, a new exceedance would be created at another location. This new wind hazard exceedance under the Future Phase would occur at the intersection of 3rd and 16th Streets for a duration of 2 hours per year. The net effect would be a reduction, by 35 hours per year, in the duration of the wind hazard condition that would exist, compared to the LRDP Phase.

Overall, with respect to the Wind Hazard Criterion, the project would improve wind conditions from the current setting by reducing the number of exceedances from many to two and by reducing the overall duration of exceedances. Current mitigation measures should eliminate the hazards in the LRDP Phase. If buildings on Block 25 of the Mission Bay campus site or on Redevelopment Area Block 31 are designed and constructed before completion of the proposed project, that process should eliminate the future potential wind hazard at the corner of 3rd and 16th Streets. The project would comply with mitigation measure D7 and UCSF mitigation through building design. No further mitigation measures are considered necessary for the project.

### *Added Recommendation*

Note that the specific designs for buildings upwind (to the north and to the west) of the site will strongly affect wind conditions along 16th, Owens and 3rd Streets, and could increase or reduce the number of wind hazard exceedances that occur in the vicinity of the project site. Consideration must be given in their design as to the wind effects in the vicinity and on the project site. Since buildings on Block 25 will be part of the LRDP development of the Mission Bay campus site, it is

recommended that the designs of those buildings, regardless whether the building height reaches the 100 ft. criterion of UCSF Mitigation Measure 4.1-7 and City Mitigation Measure D.7, be wind tested to determine that they do not adversely affect wind conditions on the project site.

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# *ATTACHMENTS*

## *WIND-TUNNEL DATA ANALYSIS PROGRAM*

## *OUTPUT LISTINGS*

**UCSF Mission Bay Hospital**
**San Francisco, California**
**Wind Comfort Analysis**
**Phase 1**
**Wind Test Date: March 2008**

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The second line of the output shows the pedestrian level wind speeds, in mph, which would be exceeded 10% of the time for each measurement location. Section 148 of the Planning Code sets comfort criteria of 11 mph for areas of substantial public pedestrian use and 7 mph for public seating areas. These criteria are not to be exceeded more than 10% of the time.

The third line of output for each location shows the criterion speed and the percentage of the time the criterion would be exceeded. The rows labeled CONTRIB tabulate the percentage contribution to the total or the exceedance from each wind direction. The SUMs are the equivalent number of events.

| Location | 10.0% Exc. Ground Speed | ---Criterion--- Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *Profile Ratios:* | *1.9330* | *1.9330* | *1.7160* | *1.5580* | *1.7850* | |
| 1 | | | | RATIOS | 0.9014 | 0.5932 | 0.3108 | 0.5405 | 0.5807 | |
| | 11.5 | | | CONTRIB | 46.14% | 46.46% | 0.00% | 1.48% | 5.93% | 3,280 |
| | | 11.0 | 11.44 | CONTRIB | 44.28% | 47.13% | 0.00% | 1.79% | 6.81% | 3,750 |
| 2 | | | | RATIOS | 0.9638 | 0.4842 | 0.3144 | 0.5772 | 0.5814 | |
| | 10.5 | | | CONTRIB | 56.60% | 28.91% | 0.00% | 4.45% | 10.04% | 3,280 |
| | | 11.0 | 8.82 | CONTRIB | 61.24% | 26.25% | 0.00% | 3.62% | 8.89% | 2,891 |
| 3 | | | | RATIOS | 1.0222 | 1.1316 | 0.7511 | 0.3706 | 0.7987 | |
| | 18.3 | | | CONTRIB | 22.35% | 65.34% | 9.68% | 0.00% | 2.63% | 3,291 |
| | | 11.0 | 32.05 | CONTRIB | 17.82% | 35.12% | 39.91% | 0.04% | 7.10% | 10,512 |
| 4 | | | | RATIOS | 0.3822 | 0.5677 | 0.7792 | 0.6254 | 0.6011 | |
| | 14.0 | | | CONTRIB | 0.00% | 16.13% | 80.29% | 1.11% | 2.47% | 3,282 |
| | | 11.0 | 20.25 | CONTRIB | 0.45% | 23.42% | 68.76% | 2.70% | 4.66% | 6,641 |
| 5 | | | | RATIOS | 0.9831 | 0.9089 | 0.4920 | 0.3691 | 0.6704 | |
| | 15.0 | | | CONTRIB | 31.86% | 64.03% | 1.02% | 0.00% | 3.09% | 3,282 |
| | | 11.0 | 18.82 | CONTRIB | 29.23% | 53.41% | 10.20% | 0.07% | 7.09% | 6,173 |
| 6 | | | | RATIOS | 0.9010 | 0.8323 | 0.4547 | 0.3741 | 0.6256 | |
| | 13.7 | | | CONTRIB | 31.68% | 63.67% | 1.27% | 0.00% | 3.38% | 3,289 |
| | | 11.0 | 16.06 | CONTRIB | 31.51% | 55.03% | 6.64% | 0.10% | 6.72% | 5,268 |

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| Location | 10.0% Exc. Ground Speed | ---Criterion--- Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | | | | RATIOS | 0.8702 | 1.1619 | 0.5586 | 0.3904 | 0.7262 | |
| | 16.8 | | | CONTRIB | 19.07% | 77.12% | 1.31% | 0.00% | 2.50% | 3,288 |
| | | 11.0 | 22.44 | CONTRIB | 21.16% | 50.85% | 20.30% | 0.10% | 7.59% | 7,358 |
| 10 | | | | RATIOS | 0.5463 | 0.8896 | 0.5718 | 0.6875 | 0.6771 | |
| | 13.4 | | | CONTRIB | 4.92% | 72.69% | 13.69% | 2.69% | 6.00% | 3,283 |
| | | 11.0 | 18.99 | CONTRIB | 8.03% | 51.29% | 28.11% | 5.32% | 7.24% | 6,229 |
| 11 | | | | RATIOS | 0.4815 | 0.7330 | 0.6794 | 0.5581 | 0.6169 | |
| | 13.6 | | | CONTRIB | 1.15% | 53.91% | 40.96% | 0.64% | 3.34% | 3,280 |
| | | 11.0 | 19.53 | CONTRIB | 3.82% | 37.59% | 51.99% | 1.30% | 5.30% | 6,406 |
| 12 | | | | RATIOS | 0.3075 | 0.4523 | 0.7410 | 0.6821 | 0.5635 | |
| | 12.7 | | | CONTRIB | 0.00% | 5.16% | 88.33% | 3.64% | 2.88% | 3,282 |
| | | 11.0 | 15.74 | CONTRIB | 0.00% | 10.81% | 78.77% | 6.24% | 4.18% | 5,163 |
| 13 | | | | RATIOS | 0.6939 | 0.6085 | 0.3171 | 0.5790 | 0.5490 | |
| | 10.7 | | | CONTRIB | 31.09% | 58.28% | 0.00% | 3.95% | 6.68% | 3,284 |
| | | 11.0 | 9.41 | CONTRIB | 31.08% | 59.43% | 0.00% | 3.45% | 6.03% | 3,087 |
| 14 | | | | RATIOS | 0.6464 | 0.4108 | 0.3657 | 0.6793 | 0.5337 | |
| | 9.2 | | | CONTRIB | 37.09% | 25.03% | 7.56% | 18.73% | 11.59% | 3,280 |
| | | 11.0 | 4.88 | CONTRIB | 51.46% | 16.33% | 2.73% | 19.56% | 9.93% | 1,602 |
| 15 | | | | RATIOS | 0.9307 | 0.9595 | 0.3840 | 0.5701 | 0.6995 | |
| | 15.1 | | | CONTRIB | 27.71% | 68.21% | 0.00% | 0.37% | 3.71% | 3,290 |
| | | 11.0 | 17.60 | CONTRIB | 29.66% | 58.83% | 1.21% | 1.66% | 8.63% | 5,772 |
| 16 | | | | RATIOS | 0.3265 | 0.4842 | 0.3997 | 0.6181 | 0.4681 | |
| | 8.9 | | | CONTRIB | 1.82% | 54.95% | 20.34% | 15.06% | 7.82% | 3,280 |
| | | 11.0 | 3.36 | CONTRIB | 0.04% | 68.79% | 9.24% | 15.02% | 6.90% | 1,103 |
| 17 | | | | RATIOS | 0.2640 | 0.6164 | 0.3200 | 0.3520 | 0.3873 | |
| | 8.2 | | | CONTRIB | 0.40% | 88.07% | 6.40% | 0.87% | 4.26% | 3,280 |
| | | 11.0 | 5.73 | CONTRIB | 0.00% | 99.46% | 0.00% | 0.16% | 0.38% | 1,880 |

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| Location | 10.0% Exc. Ground Speed | ---Criterion--- Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
|---|---|---|---|---|---|---|---|---|---|---|
| 18 | | | | RATIOS | 0.5845 | 0.4788 | 0.5421 | 0.6441 | 0.5709 | |
| | 10.8 | | | CONTRIB | 20.87% | 23.40% | 40.77% | 7.32% | 7.64% | 3,280 |
| | | 11.0 | 9.32 | CONTRIB | 21.76% | 23.61% | 39.87% | 7.16% | 7.60% | 3,055 |
| 19 | | | | RATIOS | 0.5998 | 0.4947 | 0.5532 | 0.3742 | 0.5037 | |
| | 10.8 | | | CONTRIB | 22.06% | 27.11% | 46.87% | 0.17% | 3.79% | 3,280 |
| | | 11.0 | 9.32 | CONTRIB | 22.98% | 27.33% | 45.77% | 0.17% | 3.76% | 3,057 |
| 20 | | | | RATIOS | 0.5517 | 0.4844 | 0.4511 | 0.4055 | 0.4727 | |
| | 9.6 | | | CONTRIB | 24.00% | 42.96% | 26.99% | 0.77% | 5.28% | 3,280 |
| | | 11.0 | 5.20 | CONTRIB | 31.04% | 44.62% | 19.02% | 0.60% | 4.72% | 1,704 |
| 21 | | | | RATIOS | 0.5525 | 0.4782 | 0.4477 | 0.4529 | 0.4841 | |
| | 9.5 | | | CONTRIB | 24.31% | 41.41% | 26.46% | 1.61% | 6.20% | 3,280 |
| | | 11.0 | 5.08 | CONTRIB | 32.02% | 43.09% | 18.10% | 1.27% | 5.52% | 1,665 |
| 22 | | | | RATIOS | 0.4678 | 0.5436 | 0.2969 | 0.3875 | 0.4217 | |
| | 8.5 | | | CONTRIB | 21.88% | 69.20% | 2.15% | 1.25% | 5.52% | 3,281 |
| | | 11.0 | 4.62 | CONTRIB | 13.74% | 84.41% | 0.00% | 0.45% | 1.40% | 1,514 |
| 23 | | | | RATIOS | 0.6155 | 0.5064 | 0.3231 | 0.7319 | 0.5527 | |
| | 10.0 | | | CONTRIB | 27.85% | 43.86% | 0.31% | 18.04% | 9.95% | 3,280 |
| | | 11.0 | 6.96 | CONTRIB | 32.54% | 40.74% | 0.00% | 18.24% | 8.48% | 2,281 |
| 24 | | | | RATIOS | 0.9570 | 0.8774 | 0.5925 | 0.2904 | 0.6608 | |
| | 15.0 | | | CONTRIB | 29.86% | 60.49% | 6.85% | 0.00% | 2.80% | 3,287 |
| | | 11.0 | 22.99 | CONTRIB | 23.32% | 41.52% | 29.61% | 0.00% | 5.55% | 7,541 |

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| Location | 10.0% Exc. Ground Speed | ---Criterion--- Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *Profile Ratios:* | *1.9330* | *1.9330* | *1.7160* | *1.5580* | *1.7850* | |
| 1 | | | | RATIOS | 0.9178 | 0.6477 | 0.3331 | 0.2893 | 0.5309 | |
| | 12.0 | | | CONTRIB | 43.68% | 53.50% | 0.00% | 0.00% | 2.82% | 3,290 |
| | | 11.0 | 11.75 | CONTRIB | 43.84% | 52.15% | 0.00% | 0.00% | 4.01% | 3,854 |
| 2 | | | | RATIOS | 0.8546 | 0.7092 | 0.4951 | 0.2572 | 0.5634 | |
| | 12.7 | | | CONTRIB | 33.80% | 56.95% | 6.27% | 0.00% | 2.98% | 3,280 |
| | | 11.0 | 14.22 | CONTRIB | 32.11% | 49.19% | 14.08% | 0.00% | 4.62% | 4,665 |
| 3 | | | | RATIOS | 0.7243 | 0.9145 | 0.7830 | 0.2441 | 0.6519 | |
| | 16.2 | | | CONTRIB | 8.45% | 57.64% | 32.69% | 0.00% | 1.22% | 3,281 |
| | | 11.0 | 28.62 | CONTRIB | 11.20% | 35.32% | 49.20% | 0.00% | 4.28% | 9,385 |
| 4 | | | | RATIOS | 0.4185 | 0.6392 | 0.8214 | 0.5894 | 0.6266 | |
| | 15.0 | | | CONTRIB | 0.00% | 20.19% | 77.30% | 0.48% | 2.02% | 3,280 |
| | | 11.0 | 23.45 | CONTRIB | 1.13% | 25.64% | 67.04% | 1.56% | 4.63% | 7,689 |
| 5 | | | | RATIOS | 0.9261 | 0.9222 | 0.5354 | 0.3778 | 0.6741 | |
| | 14.9 | | | CONTRIB | 28.25% | 65.69% | 2.79% | 0.00% | 3.27% | 3,291 |
| | | 11.0 | 20.13 | CONTRIB | 25.81% | 50.41% | 16.95% | 0.08% | 6.74% | 6,603 |
| 6 | | | | RATIOS | 0.8816 | 0.8329 | 0.4772 | 0.3893 | 0.6314 | |
| | 13.7 | | | CONTRIB | 30.38% | 63.97% | 2.05% | 0.00% | 3.60% | 3,285 |
| | | 11.0 | 16.42 | CONTRIB | 29.72% | 53.88% | 9.50% | 0.13% | 6.77% | 5,386 |

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| Location | 10.0% Exc. Ground Speed | ---Criterion--- Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | | | | RATIOS | 0.7220 | 0.9613 | 0.5507 | 0.3398 | 0.6291 | |
| | 14.3 | | | CONTRIB | 16.99% | 74.62% | 5.55% | 0.00% | 2.84% | 3,280 |
| | | 11.0 | 18.79 | CONTRIB | 16.95% | 55.17% | 22.00% | 0.04% | 5.85% | 6,162 |
| 10 | | | | RATIOS | 0.4318 | 0.6748 | 0.4376 | 0.6992 | 0.5695 | |
| | 10.8 | | | CONTRIB | 4.53% | 67.05% | 9.00% | 11.58% | 7.84% | 3,280 |
| | | 11.0 | 9.40 | CONTRIB | 4.04% | 69.23% | 7.86% | 11.44% | 7.43% | 3,082 |
| 11 | | | | RATIOS | 0.3881 | 0.7073 | 0.5436 | 0.5858 | 0.5621 | |
| | 11.6 | | | CONTRIB | 0.62% | 64.85% | 27.09% | 2.53% | 4.92% | 3,280 |
| | | 11.0 | 11.87 | CONTRIB | 0.93% | 58.73% | 31.92% | 2.97% | 5.46% | 3,892 |
| 12 | | | | RATIOS | 0.2581 | 0.4386 | 0.7686 | 0.6087 | 0.5351 | |
| | 12.9 | | | CONTRIB | 0.00% | 3.53% | 93.16% | 1.55% | 1.76% | 3,281 |
| | | 11.0 | 15.84 | CONTRIB | 0.00% | 8.83% | 85.19% | 2.88% | 3.11% | 5,193 |
| 13 | | | | RATIOS | 0.6077 | 0.6313 | 0.3243 | 0.5986 | 0.5418 | |
| | 10.5 | | | CONTRIB | 24.35% | 63.19% | 0.01% | 5.59% | 6.86% | 3,281 |
| | | 11.0 | 9.04 | CONTRIB | 24.37% | 65.29% | 0.00% | 4.50% | 5.84% | 2,965 |
| 14 | | | | RATIOS | 0.5619 | 0.4229 | 0.4264 | 0.7818 | 0.5622 | |
| | 9.7 | | | CONTRIB | 24.31% | 22.04% | 16.92% | 25.33% | 11.40% | 3,280 |
| | | 11.0 | 5.65 | CONTRIB | 31.67% | 18.12% | 10.21% | 28.51% | 11.48% | 1,854 |
| 15 | | | | RATIOS | 0.9199 | 1.0347 | 0.3986 | 0.5129 | 0.7018 | |
| | 15.7 | | | CONTRIB | 24.88% | 71.95% | 0.00% | 0.11% | 3.05% | 3,295 |
| | | 11.0 | 17.90 | CONTRIB | 28.84% | 60.09% | 1.69% | 0.81% | 8.57% | 5,872 |
| 16 | | | | RATIOS | 0.3839 | 0.4945 | 0.3351 | 0.4590 | 0.4214 | |
| | 8.1 | | | CONTRIB | 11.79% | 64.71% | 10.88% | 5.40% | 7.22% | 3,280 |
| | | 11.0 | 2.78 | CONTRIB | 3.49% | 91.65% | 0.01% | 2.54% | 2.32% | 910 |
| 17 | | | | RATIOS | 0.4150 | 0.6215 | 0.4884 | 0.3742 | 0.4735 | |
| | 10.3 | | | CONTRIB | 4.63% | 63.34% | 28.22% | 0.27% | 3.55% | 3,280 |
| | | 11.0 | 8.10 | CONTRIB | 2.96% | 71.25% | 22.55% | 0.19% | 3.06% | 2,655 |

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| Location | 10.0% Exc. Ground Speed | ---Criterion--- Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
|---|---|---|---|---|---|---|---|---|---|---|
| 18 | | | | RATIOS | 0.5979 | 0.6990 | 0.4971 | 0.7851 | 0.6535 | |
| | 12.3 | | | CONTRIB | 13.68% | 58.36% | 8.78% | 11.00% | 8.17% | 3,280 |
| | | 11.0 | 13.91 | CONTRIB | 15.30% | 49.25% | 14.81% | 11.77% | 8.87% | 4,561 |
| 19 | | | | RATIOS | 0.5865 | 0.4488 | 0.5786 | 0.3192 | 0.4809 | |
| | 10.9 | | | CONTRIB | 20.62% | 16.79% | 59.81% | 0.00% | 2.78% | 3,279 |
| | | 11.0 | 9.75 | CONTRIB | 20.94% | 16.86% | 59.42% | 0.00% | 2.77% | 3,197 |
| 20 | | | | RATIOS | 0.3727 | 0.3425 | 0.2850 | 0.4339 | 0.3635 | |
| | 6.7 | | | CONTRIB | 22.13% | 44.49% | 13.22% | 11.31% | 8.84% | 3,280 |
| | | 11.0 | 0.27 | CONTRIB | 25.74% | 52.28% | 0.00% | 18.40% | 3.58% | 87 |
| 21 | | | | RATIOS | 0.8697 | 0.5484 | 0.3600 | 0.3163 | 0.5116 | |
| | 10.8 | | | CONTRIB | 49.62% | 44.66% | 1.41% | 0.00% | 4.31% | 3,280 |
| | | 11.0 | 9.25 | CONTRIB | 51.23% | 43.83% | 0.81% | 0.00% | 4.13% | 3,035 |
| 22 | | | | RATIOS | 0.4751 | 0.5660 | 0.2830 | 0.4621 | 0.4463 | |
| | 8.8 | | | CONTRIB | 20.91% | 69.57% | 0.17% | 3.17% | 6.17% | 3,280 |
| | | 11.0 | 5.58 | CONTRIB | 12.42% | 83.84% | 0.00% | 1.32% | 2.42% | 1,830 |
| 23 | | | | RATIOS | 0.6358 | 0.5755 | 0.5543 | 0.5285 | 0.5751 | |
| | 11.6 | | | CONTRIB | 21.84% | 40.38% | 30.91% | 1.27% | 5.60% | 3,280 |
| | | 11.0 | 12.70 | CONTRIB | 19.10% | 39.69% | 34.02% | 1.38% | 5.81% | 4,165 |
| 24 | | | | RATIOS | 0.5267 | 0.4544 | 0.4750 | 0.2971 | 0.4351 | |
| | 9.5 | | | CONTRIB | 22.16% | 33.54% | 40.74% | 0.07% | 3.49% | 3,280 |
| | | 11.0 | 4.59 | CONTRIB | 27.06% | 37.89% | 32.93% | 0.00% | 2.12% | 1,505 |

**UCSF Mission Bay Hospital**
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The second line of the output shows the pedestrian level wind speeds, in mph, which would be exceeded 10% of the time for each measurement location. Section 148 of the Planning Code sets comfort criteria of 11 mph for areas of substantial public pedestrian use and 7 mph for public seating areas. These criteria are not to be exceeded more than 10% of the time.

The third line of output for each location shows the criterion speed and the percentage of the time the criterion would be exceeded. The rows labeled CONTRIB tabulate the percentage contribution to the total or the exceedance from each wind direction. The SUMs are the equivalent number of events.

| Location | 10.0% Exc. Ground Speed | ---Criterion--- Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *Profile Ratios:* | *1.9330* | *1.9330* | *1.7160* | *1.5580* | *1.7850* | |
| 1 | | | | RATIOS | 0.8832 | 0.6269 | 0.3490 | 0.2395 | 0.5080 | |
| | 11.6 | | | CONTRIB | 43.48% | 53.83% | 0.00% | 0.00% | 2.69% | 3,281 |
| | | 11.0 | 11.12 | CONTRIB | 44.08% | 52.55% | 0.06% | 0.00% | 3.30% | 3,646 |
| 2 | | | | RATIOS | 0.8426 | 0.6568 | 0.4946 | 0.3027 | 0.5615 | |
| | 12.3 | | | CONTRIB | 35.00% | 53.21% | 8.32% | 0.00% | 3.48% | 3,283 |
| | | 11.0 | 13.32 | CONTRIB | 33.27% | 46.96% | 14.93% | 0.00% | 4.84% | 4,368 |
| 3 | | | | RATIOS | 0.6375 | 0.9172 | 0.7314 | 0.2337 | 0.6160 | |
| | 15.3 | | | CONTRIB | 5.65% | 62.91% | 30.21% | 0.00% | 1.23% | 3,280 |
| | | 11.0 | 25.63 | CONTRIB | 9.52% | 39.50% | 46.96% | 0.00% | 4.02% | 8,404 |
| 4 | | | | RATIOS | 0.4111 | 0.5936 | 0.8281 | 0.5361 | 0.6009 | |
| | 14.7 | | | CONTRIB | 0.00% | 15.78% | 82.42% | 0.29% | 1.51% | 3,282 |
| | | 11.0 | 22.76 | CONTRIB | 0.94% | 23.70% | 70.36% | 0.85% | 4.14% | 7,465 |
| 5 | | | | RATIOS | 0.8697 | 0.9232 | 0.5538 | 0.3295 | 0.6523 | |
| | 14.7 | | | CONTRIB | 25.46% | 67.18% | 4.42% | 0.00% | 2.94% | 3,292 |
| | | 11.0 | 20.42 | CONTRIB | 23.22% | 49.73% | 21.03% | 0.01% | 6.01% | 6,697 |
| 6 | | | | RATIOS | 0.8349 | 0.8287 | 0.5285 | 0.3951 | 0.6347 | |
| | 13.7 | | | CONTRIB | 27.13% | 63.65% | 5.49% | 0.00% | 3.73% | 3,282 |
| | | 11.0 | 17.41 | CONTRIB | 24.96% | 50.46% | 17.96% | 0.14% | 6.48% | 5,709 |

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The second line of the output shows the pedestrian level wind speeds, in mph, which would be exceeded 10% of the time for each measurement location. Section 148 of the Planning Code sets comfort criteria of 11 mph for areas of substantial public pedestrian use and 7 mph for public seating areas. These criteria are not to be exceeded more than 10% of the time.

The third line of output for each location shows the criterion speed and the percentage of the time the criterion would be exceeded. The rows labeled CONTRIB tabulate the percentage contribution to the total or the exceedance from each wind direction. The SUMs are the equivalent number of events.

| Location | 10.0% Exc. Ground Speed | ---Criterion--- Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | | | | RATIOS | 0.7282 | 0.9632 | 0.5567 | 0.3373 | 0.6318 | |
| | 14.3 | | | CONTRIB | 17.24% | 74.13% | 5.82% | 0.00% | 2.81% | 3,284 |
| | | 11.0 | 19.19 | CONTRIB | 16.90% | 54.07% | 23.19% | 0.03% | 5.80% | 6,293 |
| 10 | | | | RATIOS | 0.4342 | 0.6816 | 0.5368 | 0.7400 | 0.6091 | |
| | 11.8 | | | CONTRIB | 1.79% | 59.57% | 21.54% | 10.24% | 6.87% | 3,280 |
| | | 11.0 | 12.80 | CONTRIB | 3.16% | 51.59% | 27.14% | 10.32% | 7.78% | 4,196 |
| 11 | | | | RATIOS | 0.3994 | 0.7164 | 0.5941 | 0.5727 | 0.5761 | |
| | 12.2 | | | CONTRIB | 0.44% | 60.68% | 33.34% | 1.47% | 4.07% | 3,280 |
| | | 11.0 | 15.23 | CONTRIB | 1.01% | 46.62% | 45.50% | 1.98% | 4.89% | 4,995 |
| 12 | | | | RATIOS | 0.2666 | 0.4144 | 0.7219 | 0.6502 | 0.5312 | |
| | 12.3 | | | CONTRIB | 0.00% | 3.36% | 90.69% | 3.39% | 2.55% | 3,282 |
| | | 11.0 | 13.72 | CONTRIB | 0.00% | 6.27% | 85.11% | 5.18% | 3.44% | 4,500 |
| 13 | | | | RATIOS | 0.6520 | 0.6566 | 0.2672 | 0.6033 | 0.5444 | |
| | 10.9 | | | CONTRIB | 26.18% | 63.45% | 0.00% | 4.61% | 5.75% | 3,283 |
| | | 11.0 | 9.78 | CONTRIB | 26.17% | 63.90% | 0.00% | 4.39% | 5.54% | 3,208 |
| 14 | | | | RATIOS | 0.5838 | 0.4347 | 0.4506 | 0.7235 | 0.5596 | |
| | 9.9 | | | CONTRIB | 25.55% | 23.33% | 22.26% | 18.11% | 10.74% | 3,280 |
| | | 11.0 | 6.14 | CONTRIB | 32.90% | 21.09% | 15.91% | 19.80% | 10.29% | 2,015 |
| 15 | | | | RATIOS | 0.9195 | 1.0152 | 0.4120 | 0.6001 | 0.7257 | |
| | 15.6 | | | CONTRIB | 25.16% | 70.65% | 0.00% | 0.41% | 3.77% | 3,280 |
| | | 11.0 | 18.35 | CONTRIB | 28.13% | 58.08% | 2.27% | 2.26% | 9.26% | 6,017 |
| 16 | | | | RATIOS | 0.5066 | 0.5824 | 0.3104 | 0.4648 | 0.4653 | |
| | 9.2 | | | CONTRIB | 21.85% | 68.06% | 1.53% | 2.46% | 6.10% | 3,280 |
| | | 11.0 | 6.54 | CONTRIB | 15.22% | 80.18% | 0.00% | 1.17% | 3.43% | 2,146 |
| 17 | | | | RATIOS | 0.4255 | 0.5279 | 0.4486 | 0.3932 | 0.4494 | |
| | 9.4 | | | CONTRIB | 8.86% | 56.90% | 29.16% | 0.70% | 4.38% | 3,280 |
| | | 11.0 | 4.84 | CONTRIB | 6.60% | 70.54% | 19.32% | 0.49% | 3.05% | 1,588 |

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The second line of the output shows the pedestrian level wind speeds, in mph, which would be exceeded 10% of the time for each measurement location. Section 148 of the Planning Code sets comfort criteria of 11 mph for areas of substantial public pedestrian use and 7 mph for public seating areas. These criteria are not to be exceeded more than 10% of the time.

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| Location | 10.0% Exc. Ground Speed | ---Criterion--- Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
|---|---|---|---|---|---|---|---|---|---|---|
| 18 | | | | RATIOS | 0.5859 | 0.4635 | 0.4245 | 0.8147 | 0.5860 | |
| | 10.1 | | | CONTRIB | 24.22% | 27.37% | 11.98% | 25.10% | 11.33% | 3,280 |
| | | 11.0 | 7.18 | CONTRIB | 28.36% | 26.46% | 7.71% | 26.06% | 11.41% | 2,355 |
| 19 | | | | RATIOS | 0.8041 | 0.4226 | 0.4281 | 0.2918 | 0.4781 | |
| | 9.6 | | | CONTRIB | 51.82% | 23.35% | 19.10% | 0.05% | 5.68% | 3,280 |
| | | 11.0 | 5.89 | CONTRIB | 68.11% | 17.26% | 10.19% | 0.00% | 4.44% | 1,931 |
| 20 | | | | RATIOS | 0.3605 | 0.3667 | 0.5292 | 0.6280 | 0.4854 | |
| | 9.7 | | | CONTRIB | 1.93% | 8.59% | 72.48% | 11.34% | 5.65% | 3,279 |
| | | 11.0 | 4.35 | CONTRIB | 1.07% | 6.94% | 72.50% | 12.94% | 6.54% | 1,427 |
| 21 | | | | RATIOS | 0.8331 | 0.5869 | 0.3190 | 0.4132 | 0.5291 | |
| | 11.1 | | | CONTRIB | 42.66% | 52.54% | 0.00% | 0.34% | 4.46% | 3,281 |
| | | 11.0 | 10.13 | CONTRIB | 42.71% | 52.38% | 0.00% | 0.35% | 4.56% | 3,322 |
| 22 | | | | RATIOS | 0.3787 | 0.5401 | 0.2595 | 0.5581 | 0.4394 | |
| | 8.3 | | | CONTRIB | 9.13% | 70.30% | 0.01% | 12.90% | 7.65% | 3,280 |
| | | 11.0 | 4.23 | CONTRIB | 1.95% | 89.45% | 0.00% | 6.00% | 2.61% | 1,388 |
| 23 | | | | RATIOS | 0.5669 | 0.5559 | 0.6680 | 0.7435 | 0.6459 | |
| | 12.7 | | | CONTRIB | 8.21% | 22.27% | 56.77% | 6.54% | 6.21% | 3,280 |
| | | 11.0 | 18.50 | CONTRIB | 10.17% | 23.32% | 52.81% | 7.26% | 6.44% | 6,067 |
| 24 | | | | RATIOS | 0.4448 | 0.3903 | 0.4477 | 0.3211 | 0.4012 | |
| | 8.7 | | | CONTRIB | 18.51% | 25.78% | 51.63% | 0.33% | 3.75% | 3,280 |
| | | 11.0 | 1.94 | CONTRIB | 24.52% | 26.46% | 47.25% | 0.02% | 1.75% | 638 |

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Section 148 of the Planning Code sets a wind hazard criterion that an hourly average speed of 26 mph for a full hour (a one-minute average speed of 36 mph) not be reached or exceeded one hour per year.

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| 0.011415% Exc. Loca-tion | Ground Speed | ---Criterion--- Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *Profile Ratios:* | *1.9330* | *1.9330* | *1.7160* | *1.5580* | *1.7850* | |
| 1 | | | | RATIOS | 0.9014 | 0.5932 | 0.3108 | 0.5405 | 0.5807 | |
| | 29.4 | | | CONTRIB | 100.00% | 0.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 2 | | | | RATIOS | 0.9638 | 0.4842 | 0.3144 | 0.5772 | 0.5814 | |
| | 31.4 | | | CONTRIB | 100.00% | 0.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000010 | CONTRIB | 100.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 3 | | | | RATIOS | 1.0222 | 1.1316 | 0.7511 | 0.3706 | 0.7987 | |
| | 40.9 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.1695790 | CONTRIB | 0.03% | 99.97% | 0.00% | 0.00% | 0.00% | 56 |
| 4 | | | | RATIOS | 0.3822 | 0.5677 | 0.7792 | 0.6254 | 0.6011 | |
| | 24.4 | | | CONTRIB | 0.00% | 0.04% | 99.96% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 5 | | | | RATIOS | 0.9831 | 0.9089 | 0.4920 | 0.3691 | 0.6704 | |
| | 33.1 | | | CONTRIB | 11.67% | 88.33% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0005707 | CONTRIB | 0.69% | 99.31% | 0.00% | 0.00% | 0.00% | 0 |
| 6 | | | | RATIOS | 0.9010 | 0.8323 | 0.4547 | 0.3741 | 0.6256 | |
| | 30.3 | | | CONTRIB | 11.91% | 88.09% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000027 | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 0 |

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| 0.011415% Exc. | | ---Criterion--- | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Loca- tion | Ground Speed | Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
| 9 | | | | RATIOS | 0.8702 | 1.1619 | 0.5586 | 0.3904 | 0.7262 | |
| | 42.1 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.2289710 | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 75 |
| 10 | | | | RATIOS | 0.5463 | 0.8896 | 0.5718 | 0.6875 | 0.6771 | |
| | 32.2 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0001538 | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 0 |
| 11 | | | | RATIOS | 0.4815 | 0.7330 | 0.6794 | 0.5581 | 0.6169 | |
| | 26.5 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 12 | | | | RATIOS | 0.3075 | 0.4523 | 0.7410 | 0.6821 | 0.5635 | |
| | 23.2 | | | CONTRIB | 0.00% | 0.00% | 95.50% | 4.50% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 13 | | | | RATIOS | 0.6939 | 0.6085 | 0.3171 | 0.5790 | 0.5490 | |
| | 22.8 | | | CONTRIB | 53.77% | 46.22% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 14 | | | | RATIOS | 0.6464 | 0.4108 | 0.3657 | 0.6793 | 0.5337 | |
| | 21.5 | | | CONTRIB | 27.53% | 0.00% | 0.00% | 72.47% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 15 | | | | RATIOS | 0.9307 | 0.9595 | 0.3840 | 0.5701 | 0.6995 | |
| | 34.7 | | | CONTRIB | 0.01% | 99.99% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0053177 | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 2 |
| 16 | | | | RATIOS | 0.3265 | 0.4842 | 0.3997 | 0.6181 | 0.4681 | |
| | 19.0 | | | CONTRIB | 0.00% | 8.58% | 0.00% | 91.42% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 17 | | | | RATIOS | 0.2640 | 0.6164 | 0.3200 | 0.3520 | 0.3873 | |
| | 22.3 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |

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| Location | 0.011415% Exc. Ground Speed | ---Criterion--- Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
|---|---|---|---|---|---|---|---|---|---|---|
| 18 | | | | RATIOS | 0.5845 | 0.4788 | 0.5421 | 0.6441 | 0.5709 | |
| | 19.8 | | | CONTRIB | 7.81% | 0.38% | 0.00% | 91.79% | 0.02% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 19 | | | | RATIOS | 0.5998 | 0.4947 | 0.5532 | 0.3742 | 0.5037 | |
| | 19.6 | | | CONTRIB | 94.80% | 5.20% | 0.01% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 20 | | | | RATIOS | 0.5517 | 0.4844 | 0.4511 | 0.4055 | 0.4727 | |
| | 18.2 | | | CONTRIB | 52.68% | 47.32% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 21 | | | | RATIOS | 0.5525 | 0.4782 | 0.4477 | 0.4529 | 0.4841 | |
| | 18.1 | | | CONTRIB | 62.86% | 37.14% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 22 | | | | RATIOS | 0.4678 | 0.5436 | 0.2969 | 0.3875 | 0.4217 | |
| | 19.7 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 23 | | | | RATIOS | 0.6155 | 0.5064 | 0.3231 | 0.7319 | 0.5527 | |
| | 22.3 | | | CONTRIB | 0.07% | 0.01% | 0.00% | 99.92% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 24 | | | | RATIOS | 0.9570 | 0.8774 | 0.5925 | 0.2904 | 0.6608 | |
| | 32.0 | | | CONTRIB | 16.80% | 83.20% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000673 | CONTRIB | 0.92% | 99.08% | 0.00% | 0.00% | 0.00% | 0 |

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| 0.011415% Exc. Loca-tion | Ground Speed | ---Criterion--- Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *Profile Ratios:* | *1.9330* | *1.9330* | *1.7160* | *1.5580* | *1.7850* | |
| 1 | | | | RATIOS | 0.9178 | 0.6477 | 0.3331 | 0.2893 | 0.5309 | |
| | 29.9 | | | CONTRIB | 100.00% | 0.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 100.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 2 | | | | RATIOS | 0.8546 | 0.7092 | 0.4951 | 0.2572 | 0.5634 | |
| | 27.9 | | | CONTRIB | 92.54% | 7.46% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 3 | | | | RATIOS | 0.7243 | 0.9145 | 0.7830 | 0.2441 | 0.6519 | |
| | 33.1 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0008230 | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 0 |
| 4 | | | | RATIOS | 0.4185 | 0.6392 | 0.8214 | 0.5894 | 0.6266 | |
| | 25.7 | | | CONTRIB | 0.00% | 1.89% | 98.11% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 5 | | | | RATIOS | 0.9261 | 0.9222 | 0.5354 | 0.3778 | 0.6741 | |
| | 33.3 | | | CONTRIB | 0.11% | 99.89% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0013717 | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 0 |
| 6 | | | | RATIOS | 0.8816 | 0.8329 | 0.4772 | 0.3893 | 0.6314 | |
| | 30.2 | | | CONTRIB | 3.47% | 96.53% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000028 | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 0 |

**UCSF Mission Bay Hospital**
**San Francisco, California**
**Wind Hazard Analysis**
**Phase 2a**
**Wind Test Date: March 2008**

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The third line of output for each location shows the criterion speed and the percentage of the time the criterion would be exceeded. The rows labeled CONTRIB tabulate the percentage contribution to the total or the exceedance from each wind direction. The SUMs are the equivalent number of events.

| 0.011415% Exc. | | ---Criterion--- | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Loca- tion | Ground Speed | Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
| 9 | | | | RATIOS | 0.7220 | 0.9613 | 0.5507 | 0.3398 | 0.6291 | |
| | 34.8 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0055235 | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 2 |
| 10 | | | | RATIOS | 0.4318 | 0.6748 | 0.4376 | 0.6992 | 0.5695 | |
| | 24.4 | | | CONTRIB | 0.00% | 99.14% | 0.00% | 0.86% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 11 | | | | RATIOS | 0.3881 | 0.7073 | 0.5436 | 0.5858 | 0.5621 | |
| | 25.6 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 12 | | | | RATIOS | 0.2581 | 0.4386 | 0.7686 | 0.6087 | 0.5351 | |
| | 24.1 | | | CONTRIB | 0.00% | 0.00% | 100.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 13 | | | | RATIOS | 0.6077 | 0.6313 | 0.3243 | 0.5986 | 0.5418 | |
| | 22.8 | | | CONTRIB | 0.01% | 99.99% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 14 | | | | RATIOS | 0.5619 | 0.4229 | 0.4264 | 0.7818 | 0.5622 | |
| | 23.8 | | | CONTRIB | 0.00% | 0.00% | 0.00% | 100.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 15 | | | | RATIOS | 0.9199 | 1.0347 | 0.3986 | 0.5129 | 0.7018 | |
| | 37.5 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0259154 | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 8 |
| 16 | | | | RATIOS | 0.3839 | 0.4945 | 0.3351 | 0.4590 | 0.4214 | |
| | 17.9 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 17 | | | | RATIOS | 0.4150 | 0.6215 | 0.4884 | 0.3742 | 0.4735 | |
| | 22.5 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |

**UCSF Mission Bay Hospital**
**San Francisco, California**
**Wind Hazard Analysis**
**Phase 2a**
**Wind Test Date: March 2008**

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| 0.011415% Exc. | | ---Criterion--- | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Loca-tion | Ground Speed | Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
| 18 | | | | RATIOS | 0.5979 | 0.6990 | 0.4971 | 0.7851 | 0.6535 | |
| | 25.9 | | | CONTRIB | 0.00% | 62.74% | 0.00% | 37.25% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 19 | | | | RATIOS | 0.5865 | 0.4488 | 0.5786 | 0.3192 | 0.4809 | |
| | 19.1 | | | CONTRIB | 98.45% | 0.06% | 1.49% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 20 | | | | RATIOS | 0.3727 | 0.3425 | 0.2850 | 0.4339 | 0.3635 | |
| | 13.4 | | | CONTRIB | 0.12% | 10.53% | 0.00% | 89.35% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 21 | | | | RATIOS | 0.8697 | 0.5484 | 0.3600 | 0.3163 | 0.5116 | |
| | 28.4 | | | CONTRIB | 100.00% | 0.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 22 | | | | RATIOS | 0.4751 | 0.5660 | 0.2830 | 0.4621 | 0.4463 | |
| | 20.5 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 23 | | | | RATIOS | 0.6358 | 0.5755 | 0.5543 | 0.5285 | 0.5751 | |
| | 21.1 | | | CONTRIB | 26.86% | 73.14% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 24 | | | | RATIOS | 0.5267 | 0.4544 | 0.4750 | 0.2971 | 0.4351 | |
| | 17.3 | | | CONTRIB | 65.10% | 34.90% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |

**UCSF Mission Bay Hospital**
**San Francisco, California**
**Wind Hazard Analysis**
**Phase 2b**
**Wind Test Date: March 2008**

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The third line of output for each location shows the criterion speed and the percentage of the time the criterion would be exceeded. The rows labeled CONTRIB tabulate the percentage contribution to the total or the exceedance from each wind direction. The SUMs are the equivalent number of events.

| 0.011415% Exc. Loca-tion | Ground Speed | ---Criterion--- Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *Profile Ratios:* | *1.9330* | *1.9330* | *1.7160* | *1.5580* | *1.7850* | |
| 1 | | | | RATIOS | 0.8832 | 0.6269 | 0.3490 | 0.2395 | 0.5080 | |
| | 28.8 | | | CONTRIB | 100.00% | 0.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 2 | | | | RATIOS | 0.8426 | 0.6568 | 0.4946 | 0.3027 | 0.5615 | |
| | 27.5 | | | CONTRIB | 99.82% | 0.18% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 3 | | | | RATIOS | 0.6375 | 0.9172 | 0.7314 | 0.2337 | 0.6160 | |
| | 33.2 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0009846 | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 0 |
| 4 | | | | RATIOS | 0.4111 | 0.5936 | 0.8281 | 0.5361 | 0.6009 | |
| | 25.9 | | | CONTRIB | 0.00% | 0.01% | 99.99% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 5 | | | | RATIOS | 0.8697 | 0.9232 | 0.5538 | 0.3295 | 0.6523 | |
| | 33.4 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0014619 | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 0 |
| 6 | | | | RATIOS | 0.8349 | 0.8287 | 0.5285 | 0.3951 | 0.6347 | |
| | 30.0 | | | CONTRIB | 0.13% | 99.87% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000021 | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 0 |

**UCSF Mission Bay Hospital**
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**Wind Hazard Analysis**
**Phase 2b**
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The third line of output for each location shows the criterion speed and the percentage of the time the criterion would be exceeded. The rows labeled CONTRIB tabulate the percentage contribution to the total or the exceedance from each wind direction. The SUMs are the equivalent number of events.

| 0.011415% Exc. | | ---Criterion--- | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Loca- | Ground | Speed | % Time | | NW | WNW | W | WSW | OTHER | SUM |
| tion | Speed | Exc. | Exc. | | | | | | | |
| 9 | | | | RATIOS | 0.7282 | 0.9632 | 0.5567 | 0.3373 | 0.6318 | |
| | 34.8 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0057616 | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 2 |
| 10 | | | | RATIOS | 0.4342 | 0.6816 | 0.5368 | 0.7400 | 0.6091 | |
| | 24.8 | | | CONTRIB | 0.00% | 88.30% | 0.00% | 11.70% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 11 | | | | RATIOS | 0.3994 | 0.7164 | 0.5941 | 0.5727 | 0.5761 | |
| | 25.9 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 12 | | | | RATIOS | 0.2666 | 0.4144 | 0.7219 | 0.6502 | 0.5312 | |
| | 22.6 | | | CONTRIB | 0.00% | 0.00% | 98.87% | 1.13% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 13 | | | | RATIOS | 0.6520 | 0.6566 | 0.2672 | 0.6033 | 0.5444 | |
| | 23.8 | | | CONTRIB | 0.05% | 99.95% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 14 | | | | RATIOS | 0.5838 | 0.4347 | 0.4506 | 0.7235 | 0.5596 | |
| | 22.1 | | | CONTRIB | 0.00% | 0.00% | 0.00% | 100.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 15 | | | | RATIOS | 0.9195 | 1.0152 | 0.4120 | 0.6001 | 0.7257 | |
| | 36.7 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0173738 | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 6 |
| 16 | | | | RATIOS | 0.5066 | 0.5824 | 0.3104 | 0.4648 | 0.4653 | |
| | 21.1 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 17 | | | | RATIOS | 0.4255 | 0.5279 | 0.4486 | 0.3932 | 0.4494 | |
| | 19.1 | | | CONTRIB | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |

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**Phase 2b**
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| 0.011415% Exc. | | ---Criterion--- | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Loca-tion | Ground Speed | Speed Exc. | % Time Exc. | | NW | WNW | W | WSW | OTHER | SUM |
| 18 | | | | RATIOS | 0.5859 | 0.4635 | 0.4245 | 0.8147 | 0.5860 | |
| | 24.8 | | | CONTRIB | 0.00% | 0.00% | 0.00% | 100.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 19 | | | | RATIOS | 0.8041 | 0.4226 | 0.4281 | 0.2918 | 0.4781 | |
| | 26.2 | | | CONTRIB | 100.00% | 0.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 20 | | | | RATIOS | 0.3605 | 0.3667 | 0.5292 | 0.6280 | 0.4854 | |
| | 19.1 | | | CONTRIB | 0.00% | 0.00% | 0.00% | 100.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 21 | | | | RATIOS | 0.8331 | 0.5869 | 0.3190 | 0.4132 | 0.5291 | |
| | 27.2 | | | CONTRIB | 100.00% | 0.00% | 0.00% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 22 | | | | RATIOS | 0.3787 | 0.5401 | 0.2595 | 0.5581 | 0.4394 | |
| | 19.5 | | | CONTRIB | 0.00% | 99.29% | 0.00% | 0.71% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 23 | | | | RATIOS | 0.5669 | 0.5559 | 0.6680 | 0.7435 | 0.6459 | |
| | 22.7 | | | CONTRIB | 0.00% | 0.88% | 0.21% | 98.90% | 0.01% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |
| 24 | | | | RATIOS | 0.4448 | 0.3903 | 0.4477 | 0.3211 | 0.4012 | |
| | 14.6 | | | CONTRIB | 50.89% | 45.77% | 3.34% | 0.00% | 0.00% | 4 |
| | | 36.0 | 0.0000000 | CONTRIB | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0 |

# Attachment 2
# Historical Resources Study

ESA

225 Bush Street
Suite 1700
San Francisco, CA 94104
415.896.5900 phone
415.896.0332 fax

www.esassoc.com

# memorandum

date January 2, 2008

to Diane Wong, UCSF

from Brad Brewster

subject Historic Resources Technical Memorandum for 1830 Third Street (Sno-Drift Lounge)

## Introduction

The following historic resources technical memorandum provides UCSF with a description and evaluation of the former Sno-Drift Lounge at 1830 Third Street in San Francisco's Mission Bay neighborhood, as part of UCSF's planning for a proposed hospital in this location. Methodologies used to prepare this report include a site visit by Brad Brewster, ESA Architectural Historian/Preservation Planner on December 30, 2007 to photograph and record the structure, as well as a review of historic archival materials, including previous surveys and historical maps. Photographs are provided in Appendix A.

## Description

The property at 1830 Third Street is a one-story, wood frame building rectangular in plan with a flat roof and terra cotta-clad parapet roof along the front (Third Street) façade with Spanish Revival details. The building has a variety of cladding materials, including painted cement stucco on the front (Third Street) façade, with horizontal wood ship-lap siding on the south-facing facade, and vertical wood tongue-and-groove siding on the north and west-facing façades. The flat roofing materials were not visible, but are likely comprised of built-up or rolled asphalt. The main entrance is centered on the front façade, and is recessed beneath a bracketed wood lintel over the opening. The side or lateral walls of the entrance contain decorative, recessed niches. A fabric awning above the doorway lintel projects from the front entrance. Within the recessed front entrance is a set of modern steel-frame double doors. A pair of light fixtures that once flanked the center bay has since been removed.

Two large sheets of plate glass set beneath decorative wood lintels are located to either side of the main entrance, forming a symmetrical arrangement along the front façade. The windows are set flush against the front façade. A random coursed fieldstone base is located beneath the windows, and wraps into the recessed front entrance. Both the large front windows and the fieldstone cladding beneath them were installed within the last 30 years. The parapet roof is clad in four courses of decorative terra cotta tile, with exposed false rafter tails. Above the central bay is a shallow roof gable, also clad in terra cotta tile. Centered within the gable end is a false louvered vent with an arched top. The north façade has a shallow canvass awning covering a narrow open passage between this building and the building immediately adjacent to it to the north. The west façade also shows evidence of a former fabric awning, although only the metal frame is extant. The sidewalk in front of the building is a red concrete with a diamond pattern etched into the surface.

**History of 1830 Third Street**

Historically, the area which now contains the building at 1830 Third Street was part of Mission Bay, a large, marshy body of water which joined San Francisco Bay. The bay was filled in during the late nineteenth and early twentieth centuries primarily for industrial development and for Southern Pacific Railroad's rail yard, which had its terminus nearby at today's Third and King Streets. A map from 1900 by the Sanborn Fire Insurance Company shows that a small pond covered the very northern portion of the project site block, with two small buildings with flats and a saloon with rooms above abutted the southern edge of the pond, fronting Third Street. By 1915, the Sanborn Map indicated that the pond had been filled, and Southern Pacific Railroad had developed a number of railroad tracks and spurs in the immediate area. This map also shows that a restaurant and another saloon with rooms joined the existing buildings on the corner of Third and 16th Streets.

The building at 1830 Third Street was constructed in 1934, and was listed in City directories as "The Viaduct Café" until 1976. The name refers to an elevated railroad viaduct that was built in 1915 and was located along the eastern side of Third Street between 16th and 18th Streets. Research did not reveal any associations with master architects or builders. The 1939 City Directory lists three individuals associated with the café; Achille J. Muzio, a resident of 2100 Jones Street; Earnest Sozza, a resident of 812 Naples Street; and Joseph Laguzzi, a resident of 1806 Mason Street. Mr. Muzio and Sozza are listed in the 1948 directory, and continue to be associated with the café along with Narchiso De Marchi of 2342a Jones Street. An S. Muzio is listed as the building's owner on a building permit from 1962. The Cargo Incorporated restaurant is listed at this address from 1977 to 1999. The Sno-Drift night club operated the property most recently, although the building is currently vacant.

The building retains a moderate degree of physical integrity. However, the façade was altered in the 1970s with the replacement of its front windows with large, plate glass windows, as well as the addition of the stone trim cladding beneath the windows and within the recessed main entrance. The vertical wood tongue-and-groove siding on the north and west-facing façades, as well as the fabric awnings along the side and rear of the building, are also later replacement materials. Although the building retains some integrity in terms of design and workmanship, the building is lacking primarily in integrity of setting and feeling because the viaduct and other wood frame buildings with similar uses have since been demolished, and new, large-scale developments have been constructed in the last five years (USCF Mission Bay Campus), or are under construction.

**Significance and Evaluation**

The property at 1830 Third Street was surveyed and evaluated in 2001 by the City of San Francisco as part of the Central Waterfront Cultural Resources Survey and was assigned a National Register Status Code (NRSC) of "4D2."In 2003, the State of California converted all NRSC's into California Historical Resource Statues Codes (CHRSCs). All properties listed with a NRSC of "4D2" were converted into CHRSCs of "7N1," identifying these properties as "Needs to Be Reevaluated – may become eligible for NR with restoration or when it meets other specific conditions." The property is physically unchanged from when it was surveyed and evaluated in 2001, although it is currently vacant.

1830 Third Street is an example of a Spanish Revival-styled restaurant in San Francisco's Central Waterfront area, an industrial and residential district which contained a number of smaller, wood frame buildings and large waterfront warehouses. The former café primarily served the needs of the workers who labored along the waterfront warehouses, as well as the residents in the immediate neighborhood. Although the building is historically associated with these past uses, it does not appear to have been individually significant for its contribution to the history of San Francisco's Central Waterfront or to labor history in general. While the building would have some level of contextual significance to the area, the area has undergone such change in the last decade that the context has largely been removed or substantially altered to the extent that the property no longer retains integrity of setting or feeling, especially since the removal of the Third Street Viaduct, for which the building was named, as well as the adjacent new construction in the area. Historical research did not reveal any

associations with individuals important to the history of San Francisco, or to any master architects or builders. Finally, while the building does retain some Spanish Revival-style details, it reflects a more typical and commercial application of this style, rather than a “high-style” example of Spanish Revival style architecture as evidenced in other parts of San Francisco. Physical changes to the front façade of this building have also somewhat altered the integrity of design and materials of the property’s architectural characteristics. As such, the building does not appear to qualify for listing in the National, State, or local register of historical resources.

**Conclusion**

Due to a lack of significant historical and architectural associations, as well as reduced integrity in terms of materials, setting, and feeling, the property at 1830 Third Street does not appear to qualify for listing in the National, State, or local register of historical resources, and therefore is not a historical resource as defined in the California Environmental Quality Act (CEQA).

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# APPENDIX A – CONTEMPORARY PHOTOS

**(December, 2007)**

Front (East) Façade along Third Street

Side (South) Facade

Rear (West) Façade

Side (North) Facade

Front Façade – Window, Cladding, and Sidewalk Details Looking North

Front Façade – Window, Cladding, and Sidewalk Details Looking South

# Attachment 3
# Helicopter Safety Study

# Risk Assessment for Helicopter Operations at the University of California San Francisco (UCSF) Medical Center at Mission Bay

**Arnold Barnett**
**George Eastman Professor of Management Science**
**Massachusetts Institute of Technology**
**Cambridge, Massachusetts**

**March 2008**

Helicopter operations have never taken place at University of California, San Francisco (UCSF) Medical Center at Mission Bay, so there is understandable concern about whether they might pose appreciable risks to the hospital and surrounding community. Here we review various forms of empirical evidence to assess how great such risks might be. To state the conclusion succinctly, the risks are so close to zero as to be virtually unmeasurable.

Our focus is on the risks that helicopter operations present to *third parties on the ground* who are not directly involved with the air ambulance service, rather than to those in the helicopter itself such as patients, pilots, or such emergency services personnel as on-board nurses. For patients, any risks of helicopter travel are presumably dwarfed by the dangers of not reaching the hospital as quickly as possible. For pilots and on-board medical attendants, the risks can be construed as occupational hazards of their chosen work. But for those who live and work near helicopter landing sites ("third parties"), the airborne risks of death, injury, or property damage are not voluntary, and they deserve explicit consideration.

*Fatal Accident Risk to Third Parties*

Clearly, the most frightening prospect for third-party citizens is of being killed in a helicopter accident near the hospital helipad. But the fact that we can visualize such an event does not mean that it reflects a genuine risk. The helicopters that would serve UCSF Medical Center would have turbine engines: over the decade 1997-2006, National Transportation Safety Board

(NTSB) data show that turbine-powered helicopters averaged 1.1 fatal accidents per 100,000 flight hours. That works out to one fatal accident per 90,000 hours of flight. NTSB estimates that the average helicopter flight is about 20 minutes long, meaning that turbine helicopters experienced approximately one fatal accident per 270,000 flights (90,000*3). The statistics for medical helicopters alone have been higher, at an estimated 1.8 fatal accidents per 100,000 flight hours. That works out to approximately one fatal accident per 60,000 hours of flight, or—using the 20-minute estimate again--to *one fatal accident per 180,000 flights*.

There is a further point of great importance: the fatal accidents of medical helicopters rarely take place in the immediate vicinity of a hospital helipad. Far more likely, the accident will occur either en route or at a distant landing site unfamiliar to the pilot (e.g. the location of an automobile accident). Of the 56 fatal events in the US that involved medical helicopters over 1991-2007, only four occurred while landing or taking off at the hospital. Thus, fatal crashes near the hospital occurred at a rate of approximately (4/56)*(1 in 180,000) *= 1 in 2.5 million*.

Moreover, there is the issue of who suffered the fatal injuries. None of the four fatal helicopter events at the hospital caused any ground deaths to third parties[1]. The same holds true for all 18 fatal accidents for medical helicopters that took place over 1991-2007 on either takeoff or landing. In other words, the observed risk to third parties was *zero* for all the millions of medical helicopter operations since 1991 in the United States. That circumstance, however, does not prove that future risk will literally be zero. To be conservative in making a risk projection, we might move towards a worst-case scenario and assume that the chance that a fatal landing or takeoff accident will cause third-party deaths is as high as 10%. (If that were true, then that the

[1] In one accident, a hospital security guard who was helping service the helicopter was fatally injured.

recent record--0 out of 18--involved a healthy dose of good luck[2]). Even then, third-party victims would arise near the hospital at a rate of (1/10)*(1 in 2.5 million), which is once in every 25 million helicopter flights.

Against this backdrop, we should note that helicopter operations at UCSF are estimated to entail 1000 flights per year: 500 arrivals and 500 departures. If each flight brought a 1 in 25 million chance of causing third-party deaths at the hospital, the operations would be expected to go on for 25 million ÷ 1000 = *2,500 years* before the first such deaths occurred there.

Do any special aspects of the UCSF operations lessen the relevance of these projections, which are based on the recent experience of all US medical helicopters? It does not appear so. The designated approach path for the helicopters is over San Francisco Bay, so there are none of the physical obstacles that have caused some past accidents. The two main companies that would provide the helicopter service—REACH and CALSTAR—have performed 69,000 hours of service between them and suffered one fatal accident, which is better than the national EMS fatal-accident rate (cited above). That one accident caused no fatalities on the ground. Both companies have avoided even a single death among the 60,000 patients they transported. There is no reason to believe that the landing site itself—which would need approval by Caltrans—would pose special difficulties. And, given that historical mortality risk to third-parties is close to nonexistent at all times of day, the UCSF's specific operations schedule is immaterial to a risk projection.

It is possible that another medical helicopter service will be initiated in the Bay Area at San Francisco General Hospital, which would land approximately 1.5 miles from the UCSF site. But

[2] If third-party risk were really 1 in 10 for each of the 18 takeoff/landing accidents, the probability of avoiding third-party deaths in all 18 would be below 1 in 6.

such operations would not be expected to raise risks associated with the UCSF service. The most obvious fear is that two helicopters traveling to the different sites would collide. NTSB data show that, since 1991, the roughly 100 million helicopter flights in the United States have generated seven fatal collisions involving two helicopters. This rate—one collision involving two helicopters per 14 million flights—implies that collisions contribute only about 5% of the fatal accident risk for a given helicopter flight. This despite a huge number of situations in which different helicopters either shared landing sites or used adjacent ones. None of the seven collisions caused any deaths to third parties. Such a record suggests that the risk of a collision near UCSF only augments to a minuscule extent a third-party risk level that is already minuscule.

*Serious Injuries and Major Property Damage*

While less alarming than deaths, helicopter accidents that cause either serious injuries to third-parties or considerable damage to homes or offices are of obvious concern. But the data suggest that such outcomes are exceedingly rare in the vicinity of hospitals. On NTSB's listing of 132 accidents/incidents involving medical helicopters over 1991-2005, *not one* caused serious injury to a third party near a hospital, while one caused modest damage to a hospital building[3]. This record was achieved in the course of some eight million medical helicopter flights. (A review of NTSB records for 2006-07 also reveals no medical helicopter accidents that injured third parties or damaged their homes.)

*Final Remarks*

The eight million medical helicopter flights in the US since 1991 have caused no deaths to third parties in the vicinity of hospitals. (In a previous report based on NTSB data going back to 1983—the first full year of electronic NTSB records---the author found that the same is true for

[3] One medical flight hit a home after losing visibility en route, causing serious injury to three occupants. But this accident was not close to the hospital.

1983-90.) The flights have likewise caused no serious third-party injuries or major damage to homes near hospitals. While third-party risk is clearly not zero, efforts to quantify the hazards using broader data about turbine-powered helicopters yield miniscule risk projections for the UCSF Medical Center, which plans only about 1000 helicopter operations per year. UCSF's helicopters will arrive and depart over San Francisco Bay; thus, if risk levels at UCSF do deviate from national patterns, it appears more likely that they would be lower rather than higher.

**Reference**:


1. U.S. National Transportation Safety Board, U.S. Civil Helicopter Safety Statistics-Summary Report 1997-2006

2. Baker S. P., J.G. Grabowski, R.S. Dodd, D. F. Shanahan, M.W. Lamb, and G. H. Li, (2006), "EMS Helicopter Crashes: What Influences Fatal Outcome?," *Annals of Emergency Medicine* vol 47 (4), April 2006, pp. 351-356

3. US National Transportation Safety Board, Aviation Accident Database & Synopses, available at *http://www.ntsb.gov/ntsb/query.asp*. Used aircraft category "helicopters" and reviewed details of all medical helicopter accidents over the period 1991-2007. Also reviewed midair collisions of helicopters.

4. *Helipad Information Sheet*, UCSF Medical Center, Mission Bay Hospital Site, Revised October 24, 2007.

5. Written communication from Brian Watts of Heliplanners (brianwatts@heliplanners.com)

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Arnold Barnett is George Eastman Professor of Management Science at MIT's Sloan School of Management. He holds a BA in Physics from Columbia University and a PhD in Mathematics from MIT. Dr. Barnett's research speciality is applied statistical analysis generally focused on problems of health and safety. His early work on homicide risk was presented to President Ford at the White House, and his studies of US Vietnam war casualties were the subject of a column by William F. Buckley Jr. Aviation safety is among his prime areas of application: he has been described as "the nation's leading expert" on aviation safety by NBC News, and he received the President's Citation in 2002 from the Flight Safety Foundation for "truly outstanding contributions on behalf of safety." He has received the President's Award for "outstanding contributions to the betterment of society" by the Institute for Operations Research and the Management Sciences (INFORMS); he also received the 2001 Expository Writing Award from INFORMS and is a Fellow of that organization. Ten times the students of MIT's Sloan School have honored him for outstanding teaching.

**Primary Research Interests**: Operations Research, Applied Statistics, Applied Mathematical Modeling, Public Policy, Health and Safety

## Outside Experience:

| | |
|---|---|
| 1973-75 | U. S. Atomic Energy Commission (Bethesda, MD) |
| 1975 | Norton Publishing Co. (New York) |
| 1975-90 | Public Systems Evaluation Inc., Enforth (Cambridge) |
| 1975 | U. S. Dept. of Justice, Law Enforcement Assistance Administration (Washington) |
| 1976-81 | Tufts-New England Medical Center, Dept. of Hematology (Boston) |
| 1978-81 | U. S. General Accounting Office, Division of Energy and Minerals (Washington) |
| 1980 | Vermont State College System |
| 1980 | Citizens Crime Commission of New York City |
| 1981 | Professional Development Institute, Ltd. (Ottawa) |
| 1982-84 | National Center for State Courts (Williamsburg, Virginia) |
| 1984 | Manchester Business School (sabbatical) |
| 1984-present | Educational Testing Service (Princeton, New Jersey) |
| 1984-85 | McKinsey and Company (London, Sydney) |
| 1985 | Australian Graduate School of Management (sabbatical) |
| 1987 | U. S. Sentencing Commission (Washington) |
| 1987-95 | KOBA Associates (Washington) |
| 1988 | Abt Associates (Cambridge) |
| 1988 | MacArthur Foundation/National Institute of Justice |

| | |
|---|---|
| 1989 | Centers for Disease Control (Atlanta) |
| 1990-91 | U.S. General Accounting Office (Washington) |
| 1990-91 | Federal Aviation Administration (Atlantic City) |
| 1992-94 | Burns and Levinson, Counsellors-at-Law, Boston |
| 1992-3 | Clinton and Musaka, Counsellors-at-Law, Boston |
| 1993-present | Amsterdam Schiphol airport |
| 1993 | American Airlines |
| 1993-present | Analysis Group (Cambridge) |
| 1994 | Goodwin Proctor and Hoar, Counsellors-at-Law, Boston |
| 1994-95 | Newsweek magazine |
| 1994 | CSSI (Washington) |
| 1994 | Liberty Mutual Insurance |
| 1995-99 | Computerworld magazine |
| 1995 | ATMS (Falls Church, VA) |
| 1995 | Ropes and Gray, Counsellors-at-Law, Boston |
| 1995 | Association of American Railroads |
| 1996 | Verner, Liipfert, Bernhard, McPherson, and Hand (Washington) |
| 1996 | Morgan-Stanley, Hong Kong |
| 1996-present | Gell-Mann Research Associates (Philadelphia) |
| 1997-present | Environmental Science Associates (San Francisco) |
| 1997 | Volpe National Transportation Center |
| 1997 | Coopers & Lybrand |
| 1997 | Holland & Knight Law Offices (Miami) |
| 1998-present | Federal Express Airlines |
| 1999 | Connecticut Home Care Association |
| 1999 | Locke, Liddell, and Sapp (Counselors at Law) (Houston) |
| 1999-present | Urban Institute (Washington) |
| 1999-present | J.P. Morgan and Co. |
| 1999-present | McNatt, Greene, and Thompson Law Offices (Vidalia, GA) |
| 2000 | Amsterdam Schiphol Airport, Committee on Crosswinds and Tailwinds |
| 2000 | University Access Inc. (Los Angeles) |
| 2000 | American Association of Actuaries |
| 2000 | O'Melveny and Myers (Los Angeles) |
| 2000 | Louisville International Airport |
| 2001-present | Cornerstone Research, (New York, Los Angeles, Menlo Park) |
| 2001 | Flight Safety Foundation |
| 2001 | Jenner and Block, (Chicago) |
| 2001 | Simpson, Thacher, and Bartlett (New York) |
| 2000-present | Sonnenschein, Nath and Rosenthal, (Kansas City, Chicago, St. Louis) |
| 2002 | (US) Transportation Security Administration |
| 2002 | Wollmuth, Maher, and Deutsch (New York) |
| 2002 | Finnegan, Henderson, Farabow, Garrett, and Dunner (Washington) |
| 2003 | MCRI (Arlington, Virginia) |
| 2004 | Johnson and Johnson, Inc (New Jersey) |
| 2004 | Wilson, Sonsini, Goodrich, and Rosati (Palo Alto) |
| 2004-present | Winston and Strawn (Chicago) |
| 2005 | Manatt, Phelps, and Phillips (New York) |
| 2006-07 | De Brauw Blackstone Westbroek (The Hague) |

2007 Morrison and Forester (Sacramento)

**Teaching Honors:**

Selected ten times by the students as recipient of an MIT Sloan school or institute-wide Excellence in Teaching Award. One of eight U. S. faculty discussed in the article "B-School Students' Favorite Professors" in Fortune magazine of January 25, 1982. Ranked the most "outstanding" faculty member at the Sloan School in a 1992 Business Week poll of recent graduates. (The Best B-Schools, McGraw Hill, 1993, p. 165)

**Research Honors**

*Awards and Honors:* 1996 President's Award from Institute for Operations Research and the Management Sciences (INFORMS) for outstanding contributions to the betterment of society.

Selected as the 1999 honorary inductee into Omega Rho International Honor Society for scholarly contributions

Selected by the British Operational Research Society as the year 2000 Blackett Memorial Lecturer; lecture was delivered at the Royal Aeronautical Society

Recipient of the 2001 Expository Writing Award of the Institute for Operations Research and the Management Sciences (INFORMS) because influence of research was “greatly enhanced by its expository excellence.”

Recipient of 2002 President’s Citation from the world-wide Flight Safety Foundation for “truly outstanding service on behalf of safety, whether it be valor, professionalism or other service above and beyond expectations.”

Selected in 2003 as a Fellow of the Institute of Management Sciences and Operations Research

**Aviation-Related Publications:**

"Airline Safety: Some Empirical Findings," (with M. Abraham and V. Schimmel) *Management Science*, November 1979, pp. 1045-1056. Volume 25 (This paper was summarized under the title "Risk Assessment" in the *Scientific American* of August 1980.)

"After the Crash: The Passenger Response to the DC-10 Disaster" (with A. J. Lofaso) *Management Science*, 24, pp. 1125-36 (November 1983).

"Speed Kills?" pp. 63-68, March-April. Volume 16
(This column was reviewed in *Mathematics* magazine (6/86) and was the basis of my op-ed piece "See Lightning? Shut Airports" in *The New York Times* of 6/26/86.)

"Thunderstorms and Aviation Safety: A Dialogue," (with R. E. Machol) *Interfaces*, 26, March-April 1988.

"Wind Shear: Down but not Out," *MIT Management*, Summer 1988. Volume 18

"Airline Safety: The Last Decade," (with M. K. Higgins) *Management Science*, January 1989, pp. 1-21. Volume 35

"Air Safety: End of the Golden Age?" *Chance*: New Directions for Statistics and Computing, 3 (2), 1990, pp. 8-13.

"Take the Bargain and Fly," *Advancing the Consumer Interest*, April 1990. (The negative side in a debate on whether the pernicious aspects of U.S. airline deregulation outweight the economic benefits it has brought to travelers.)

"It's Safer to Fly," *Risk Analysis*, 11(1) March 1991 Volume 13

An Unfortunate Pattern in U.S. Domestic Jet Crashes," (with T. Curtis). *Flight Safety Digest*, 10(10), October 1991. (This paper was the subject of the article "Fatalities Likelier on Crowded Jets" in *The New York Times* of 11/1/91.)

"Better than Ever: Nonstop Jet Service in an Era of Hubs and Spokes," (with T. Curtis, J. Goranson, and A. Patrick), Sloan Management *Review*, 33(2), Winter 1992. (This paper was the subject of the article "Why Airline Hubs Can Be Nice" in The Economist of 2/1/92.)

"The Market Response to the Sioux City DC-10 Crash," (with J. Menhigetti and M. Prete), *Risk Analysis*, March 1992.

"Landings at Logan Airport: Describing and Increasing Airport Capacity," (with C. S. Venkatakrishnan and A. Odoni), *Transportation Science* (July-August 1993).

"The On-Time Machines: Some Analyses of Airline Punctuality," (with J. Caulkins, J. Goranson, P. Larkey, and Y. Yuan), *Operations Research* (July-August 1993). Volume 41

"Something Specious in the Air? Some Statistical Misconceptions in Aviation Safety Research," *Transportation Research Record* #1423, (1994)

"How Safe is This Flight?" *Newsweek*, 4/24/95 (I prepared the statistical tables that appeared in the article.)

"Safety in Numbers: Some Statistics about Plane Crashes and Their Consequences," Proceedings of the International Conference on Aviation Safety and Security in the 21st Century, sponsored by the White House Commission on Aviation Safety and Security, January 1997

"A Parallel Approach Path for Estimating Collision Risk During Simultaneous Landings", *Management Science*, March 1999, Volume 45

"Airline Safety: The Recent Record," (with A. Wang), *Flight Safety Digest*, April 2000. (This paper was the subject of my op-ed piece: "Flying? No Point in Trying to Beat the Odds." In *The Wall Street Journal* on 9/9/98.)

"Free-Flight and En Route Air Safety: A First-Order Analysis", *Operations Research*, November-December 2000, Volume 48

"Fatal US Runway Collisions Over the Next Two Decades," (with G. Paull and J. Iaedeluca) *Air Traffic Control Quarterly*, 8(4), 2000

"Safe at Home? An Experiment in Domestic Airline Security." (with R. Shumsky, M. Hansen, A. Odoni and G. Gosling, *Operations Research*, March-April 2001, Volume 49

"Air Safety?: End of the Golden Age?," *Journal of the Operational Research* Society, August 2001, Volume 52. (This paper is based on the year 2000 Blackett Memorial Lecture, which I presented in November 2000 at the Royal Aeronautical Society in London.)

"The Worst Day Ever: September 11 and Commercial Aviation," OR/MS TODAY, December 2001

"Bag Match: At Last," *Congressional Record*, 1/23/02 (testimony to House Aviation Subcommittee, US House of Representatives)

"Aviation Security's False Hope?" *MIT Technology Insider*, May 2003 (and *TechnologyReview.com* August 2003)

"Terror is In the Air," (with S. Martonosi), *Chance*, (American Statistical Association) Spring 2004 Volume 18

"CAPPS II: The Foundation of Aviation Security?" *Risk Analysis* (August, 2004) Volume 24

"Assessing the Effectiveness of Aviation Safety Measures in the Absence of Actual Data," (with G. Paull), *Air Traffic Control Quarterly* (Fall, 2004) Volume 12

"World Airline Safety: The Century So Far," *Flight Safety Digest* (January-February 2006) Volume 33

"O.R. Heroes on Flight 93," OR/MS TODAY, August 2006

"Airlines as Baseball Players: Another Approach to Evaluating Air Carrier Safety Records," (with D. Czerwinski), *Management Science*, September 2006, Volume 52

"How Effective is Security Screening for Airline Passengers?" (with S. Martonosi), *Interfaces* (Special Issue on Homeland Security), November-December 2006, Volume 36

"Match the Bags Again," *Airport Innovation*, April 2007 (inaugural issue)

“Measure for Measure: An Analysis of Aviation-Safety Metrics,” *AeroSafety World* (Flight Safety Foundation), (November 2007)

“Is It Really Safe To Fly?,” a chapter in *Tutorials in Operations Research 2008*, (Institute for Operations Research and the Management Sciences) forthcoming

# Attachment 4
# Helicopter Noise Study

# Helicopter Noise Analysis
# for
# University of California San Francisco
# Mission Bay Hospital Site

HMMH Report No. 302300
March 2008

Prepared for:

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# EXECUTIVE SUMMARY

This report describes the methodology and results of an environmental noise assessment program to determine the effects of placing a University of California San Francisco (UCSF) Hospital campus, with an integrated rooftop helipad for helicopter transport of patients, in the Mission Bay area of San Francisco, California. Harris Miller Miller & Hanson Inc. (HMMH) evaluated potential effects on the surrounding community due to predicted helicopter operations. The potential effects presented in this report are based on federal, state, and local laws and guidelines.

*Noise Measurements*

The noise measurement program had two objectives:

(1) Determine overall sound levels at representative community locations within the proposed hospital environs without the UCSF helicopter

(2) Obtain single-event sound levels for UCSF helicopter and other events in the surrounding community

The program consisted of placing noise monitors at eight community locations with two of those locations set up only during the helicopter flight demonstration flights. The monitors measured existing community sound levels along with sound levels generated by the demonstration flights of helicopter operations flown to represent future use of the proposed rooftop helipad on Sunday morning, October 21, 2007.

The sound levels measured in the surrounding communities to the proposed hospital site were in the typical[1] range for an urban area with generally louder sound levels during the day and quieter sound levels at night (Appendix A, Figure A7).

Maximum sound levels from individual helicopter operations are expected to be short in duration and comparable to other community noise sources measured. As with some existing community noise sources, helicopter arrivals and departures would have the potential to affect speech intelligibility for short periods of time. Lower ambient levels at night could make the helicopter noise more prominent, and, based on the measured sound levels from the demonstration flights, the helicopter operations have the potential to cause sleep disturbance.

*Noise Modeling*

The noise modeling effort (Section 3) determined cumulative noise effects of the helicopter operations based on forecast uses, helicopter types, and flight paths to and from the helipad in accordance with FAA and California Division of Aeronautics directives. Our assessment of cumulative helicopter operations included two daily helicopter operation levels[2]:

[1] United States Environmental Protection Agency, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974

[2] Helicopter operations information provided by UCSF

(1) Average day of 1.4 transports (1.4 helicopter arrivals and 1.4 departures)

(2) Busy day of 3 transports (3 helicopter arrivals and 3 departures)

Based on the provided forecasts, six helicopter types were identified and modeled with their predicted relative use at UCSF by time of day and expected flight path used to arrive and depart the helipad based on prevailing winds and pilot input. The following tables summarize the helicopter operations modeled. Depictions of the modeled flight paths are provided in Section 3, Figure 5 through Figure 7.

**Table ES-1 Modeled Helicopter Usage**

| Helicopter Type | Use |
|---|---|
| Agusta 109 | 6% |
| Bell 407 | 24% |
| Bell 429 | 14% |
| EADS BO105 | 4% |
| Eurocopter EC-135 | 30% |
| MD 902 | 22% |

**Table ES-2 Time of Day Usage**

| Time Period | Use |
|---|---|
| Daytime (7:00 a.m. to 7:00 p.m.) | 62% |
| Evening (7:00 p.m. to 10:00 p.m.), | 15% |
| Nighttime (10:00 p.m. to 7:00 a.m.) | 23% |

**Table ES-3 Flight Path Usage**

| Flight Path | Use |
|---|---|
| **Arrival** | |
| From the east over the Bay | 100% |
| **Departure** | |
| To the east over the Bay | 90% |
| To the north and then east | 1% |
| To the west then along I280 and east | 8% |
| To the west | 1% |

*Results - Compatibility*

Federal [3]and state[4] regulations have established that all residential land use is compatible with cumulative noise exposure of aircraft noise less than 65 dB CNEL, which is based on percent of the population highly annoyed. Studies[5] have shown that 13% of the population is highly annoyed with noise events in a CNEL environment of 65 dB. **The modeling effort determined that the 65-dB CNEL contour from expected UCSF helicopter operations at the proposed helipad site will be mostly contained on the hospital campus and UCSF Mission Bay research campus; see Figure 8 and Figure 9 in Section 3. Therefore, noise from the expected helicopter operations at the proposed helipad is compatible with the existing land use in the surrounding communities.** The table below shows the cumulative helicopter noise modeling results, in terms of CNEL at six community noise measurement sites along with the existing and planned community sound levels obtained from the measurement program. The table also shows the addition of the modeled helicopter CNEL and the measured community CNEL at the six community measurement sites, which indicates that the expected helicopter operations have no effect on the noise environment in terms of CNEL at those six community sites.

**Table ES-4 Community and UCSF Helicopter Cumulative Noise Levels (CNEL)**

| Site (Figure 3 Page 8) | CNEL in dB | | | | |
|---|---|---|---|---|---|
| | Existing[6] | With UCSF Helicopter | | | |
| | | Average Day (Figure 8 Page 29) | | Busy Day (Figure 9 Page 30) | |
| | | Helicopter Only | Total | Helicopter Only | Total |
| **1 - Mariposa & Third** | 67 | 51 | 67 | 55 | 67 |
| **2 - 19th & Texas** | 68 | 45 | 68 | 48 | 68 |
| **3 - De Haro** | 59 | 37 | 59 | 40 | 59 |
| **4 - Jackson Recreation Center** | 64 | 37 | 64 | 40 | 64 |
| **5 - Marina Creek Harbor** | 62 | 40 | 62 | 43 | 62 |
| **6 - UCSF Housing** | 68 | 51 | 68 | 54 | 68 |

Note: CNEL values have been rounded to the nearest dB.

[3] Title 14,Part 150, Code of Federal Regulations, Appendix A – Airport Noise Compatibility Planning

[4] Title 14 – California Code of Regulations, Chapter 3 – Guidelines for Implementation of the California Environmental Quality Act, as amended September 7, 2004.

[5] Schultz, T.J., "Synthesis of Social Surveys on Noise Annoyance", Journal of the Acoustical Society of America, Vol 64, No.2, August 1978.

[6] Average of measured values from week-long measurement program, Table 3, p. 28.

*Results – Activity Interference*

In addition to land use compatibility based on cumulative noise levels, activity interference such as speech interference and sleep disturbance is often a community concern.

Outdoor speech interference may occur under the flight paths for up to 20 seconds during a typical helicopter flyover at 1,000 feet altitude, while indoor interference would normally be less than 10 seconds with windows closed. Closer to the helipad, these times would increase due to (1) helicopters descending to land and (2) ascending to depart the helipad. Comparing the noise levels from all sources from the noise measurement program with the projected helicopter operation noise levels shows that some existing non-helicopter noise sources are equivalent to or louder than the projected helicopters during the day. At night when the community noise levels are generally lower, the helicopter noise would be more prominent.

For sleep disturbance, modeling results indicated areas where the potential for awakening the general public would exist, Section 3, page 41. Using a procedure recently developed by HMMH and under review by the American National Standards Institute (ANSI), contours that show the percent awakening potential were generated. These contours show that for the Proposed helipad for an average day the potential for awakening would be at least:

- 15% within 60 feet of the helipad
- 10% within 110 feet of the helipad
- 5% within approximately 250 feet east and north, 350 feet south and 500 feet east of the helipad

For the busy day, these distances increase to at least:

- 15 % within 100 feet
- 10% within 300 feet
- 5% within approximately 750 feet

**Based on a windshield tour of the project area, no residential properties exist inside these contours.**

It is important to note that there are no Federal or State or local guidelines for determining or mitigating impact based on speech interference or sleep disturbance.

*Cumulative Effects with San Francisco General Hospital Helipad Operations*

HMMH modeled the UCSF 1.4 helicopter transports per day with the San Francisco General Hospital helicopter transports (2 per day) using its proposed Fly Quiet flight paths[7]. This modeling resulted in no change to the 65-dB CNEL contour produced with UCSF only helicopter transports. Percentage awakening potential was also assessed with only a small increase (approximately 50 feet) detected in the 5% awakening contour.

*Potential Noise Mitigation Alternatives*

[7] SFGH Fly Quiet flight paths are those developed to avoid unnecessary overflight of residential areas to reduce noise exposure.

Although the modeled CNEL contours for the Proposed helipad show the entire 65-dB contour mostly within UCSF property, the analyses indicate that the project may cause brief periods of speech interference and occasional sleep disturbance for some portion of the population in the vicinity of the helipad. Mitigation alternatives were evaluated to determine their effectiveness in minimizing the activity interference effects (speech interference and sleep disturbance) on the neighboring community. The alternatives evaluated included:

1. Emphasizing the use of easterly Fly Quiet paths and procedures to helicopter operators
2. Encouraging helicopter operators to replace older and noisier helicopters with quieter ones when feasible
3. Reviewing sound insulation mitigation methods

The review indicated that:

- Flight paths from and to the east are the preferred routes to and from the helipad
- Helicopter operators forecast to have newer and quieter helicopters in their fleets
- Based on the federal and state criteria and the projected CNEL contours, noise levels with a UCSF helipad would be compatible with residential uses in the vicinity

*Conclusions*

The overall conclusions of the noise analysis include:

- The weeklong noise measurement program determined the community areas surrounding the UCSF Mission Bay Hospital project have existing noise exposure levels commensurate with a predominantly urban environment
- The noise measurements from the UCSF helicopter flight demonstration were comparable in magnitude to the existing noise sources within the community
- The multiple arrivals and departures during the UCSF helicopter demonstration did not add to the 24-hour overall noise exposure measured at the measurement sites
- The community will hear the helicopter operations just as they currently hear buses and trucks on the local roads and since helicopters have a unique sound, the community will know the sound source is a helicopter
- The effects of the helicopter operations will be similar to the effects from the other noise sources, such as minimal speech interference and the potential for awakening from nighttime helicopter transports
- Given the projected helicopter types, time of day of the transports, and flight paths to and from the three potential helicopter landing sites, no residential property outside of the UCSF Mission Bay campus will be exposed to 65 dB or greater noise exposure in terms of the CNEL metric
- Using the average noise exposure obtained for each site during the noise measurements and adding the modeled noise exposure from each site increases the total noise exposure at the community sites by less than 0.5 dB CNEL

- The modeling results determined the potential effects of sleep disturbance, speech interruption, and vibration, but found each to be minimal and comparable to the effects from existing community sources
    - Based on a windshield tour of the project area, no residential properties exist inside the 5% or greater percent awakening contours
    - Vibration from helicopter operations is expected to occur within homes nearby, but at much less magnitude than typical residential activity and less than magnitudes known to cause damage to structures
- As shown in Section 4, Figure 31 and Figure 32, the inclusion of the SFGH operations has no effect on the 65-dB CNEL contour and minimal effect on the percent awakening contours

For noise mitigation, HMMH recommends implementation of a Fly Quiet program that includes:

- Using flight paths that arrive and depart over the Bay (easterly operations)
- Working with pilots to determine optimum arrival and departure flight procedures with each helicopter type specific to the UCSF environment
- Continuously training pilots through a pilot training program to ensure all pilots are aware of UCSF's fly quiet program
- Encouraging transport providers replace their aging fleet with quieter helicopters and to operate the quieter helicopter at UCSF
- Logging helicopter transports including transport provider, helicopter type, time of arrival, time of departure, and departure flight path flown

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# 1 INTRODUCTION

The University of California San Francisco (UCSF) engaged the services of Environmental Science Associates (ESA) to conduct an environmental review and prepare the environmental documentation in accordance with the California Environmental Quality Act (CEQA) and Chapter 31 of the San Francisco Administrative Code for the establishment of a medical center in the Mission Bay area with a medical helicopter landing area (helipad) for the Children's Hospital component of the medical center.

## 1.1 Project Description

The project will consist of a rooftop helipad on the proposed medical center located west of Third Street between 16th Street and Mariposa Street in the Mission Bay area of San Francisco. The helipad will be on the main building adjacent to 16th Street at an approximate elevation of 154 feet above Mean Sea Level (MSL), which is approximately 140 feet above street level. Live/work lofts industrial uses, residential parcels and small businesses comprise the majority of the neighboring community south of Mariposa Street while construction is underway on residential units immediately to the north of the UCSF campus site. Interstate 280 is immediately west of the project and the San Francisco Bay is approximately two blocks to the east. Figure 1 provides an overview of the UCSF campus and the surrounding community.

Under contract with ESA, Harris Miller Miller & Hanson Inc. (HMMH) conducted a comprehensive noise study to assess the potential effects of noise caused by the forecast helicopter operations at the Proposed helipad and Sites A and B helipads. The primary technical components of HMMH's scope of work included:

- Data collection, including noise measurements
- Noise modeling
- Evaluation of possible noise mitigation

The remainder of this report includes a brief introduction to noise, the noise measurement program and results, the noise modeling process and results, and recommended noise mitigation.

**Figure 1 Overview of UCSF Campus and Neighboring Community**
*Source: UCSF*

## 1.2 Existing Flight Environment over San Francisco and UCSF

The City of San Francisco and its neighboring communities are exposed to noise from existing aircraft overflights. These overflights are primarily commercial aircraft departures and arrivals from the various Bay Area airports (i.e., San Francisco International Airport and Oakland International Airport), emergency services aircraft, and public service/media/tour helicopters.

In an effort to define the UCSF existing noise environment due to aircraft overflight activity, the Aircraft Noise Abatement Office of San Francisco International Airport (SFO) provided flight track and operations data from their Aircraft Noise and Operations Monitoring System (ANOMS™). The flight track data provided an additional means to establish a baseline of the existing community sound levels with and without aircraft overflights in the UCSF community. As shown in Figure 2, all air traffic in the vicinity of UCSF was at or below 2,500 feet MSL on a typical day in October 2007 recorded by SFO's ANOMS™. Based on this figure and the underlying flight track data, the existing aircraft activity at or below 2,500 feet MSL is limited to helicopters and small single-engine aircraft. On this specific day, the ANOMS™ recorded 44 total aircraft flights with 38 occurring during the day, 2 flights during the evening, and 4 flights during the nighttime.

**Figure 2 All Air Traffic in the Vicinity of UCSF at or below 2,500 feet MSL for a 24-hour period (October 18, 2007)**
*Source: SFO*

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# 2 NOISE MEASUREMENT PROGRAM

HMMH conducted a noise measurement program from Monday, October 15 to Wednesday, October 23, 2007 in the vicinity of UCSF Mission Bay. The measurement program had two principal objectives:

- To measure and characterize the existing noise environment at up to six representative locations in residential areas around the proposed hospital and associated helipad site
- To measure the range of noise levels associated with an arriving and departing helicopter during demonstration flights for comparison to Integrated Noise Model (INM) results

The first section below summarizes the noise measurement program results followed by a more detailed look at the measurement equipment, sites, and actual measurement data collected in the community around the project site.

## 2.1 Summary of Noise Measurement Program

A brief summary of the conclusions derived from the noise measurement program follows:

- The weeklong noise measurement program determined the community areas surrounding the UCSF Mission Bay Hospital project have existing noise exposure levels commensurate with a predominantly urban environment
- The noise measurements from the UCSF helicopter flight demonstration were comparable in magnitude to the existing noise sources within the community
- The multiple arrivals and departures during the UCSF helicopter demonstration did not add to the 24-hour overall noise exposure measured at the measurement sites
- The community will hear the helicopter operations just as they currently hear buses and trucks on the local roads and since helicopters have a unique sound, the community will know the sound source is a helicopter
- The effects of the helicopter operations will be similar to the effects from the other noise sources, such as minimal speech interference and the potential for awakening from nighttime helicopter transports

## 2.2 Noise Measurement Equipment

HMMH conducted noise measurements with Bruel and Kjaer Model 2250 (“B&K 2250”) and Larson Davis Models 820 and 870 (“LD820”,” LD870”) noise monitors. The equipment was calibrated upon setup, daily when accessible, and upon completion of the measurement period. The B&K 2250 monitors were programmed to record flat-weighted one-third octave band data at one second intervals along with A-weighted cumulative noise levels, such as Average or Equivalent Sound Level (Leq) and Community Noise Equivalent Level (CNEL), and A-weighted Maximum Sound Level (LAmax). C-weighted data, such as C-weighted Maximum Sound Level (LCmax) were derived from the flat-weighted one-third octave band data using standard correction values for each frequency band. At one of the measurement sites, the LD820 and LD870 monitors were paired together with one monitor programmed to collect A-weighted data and the other C-weighted data.

The B&K 2250 monitors also recorded the actual sounds at their respective locations in two different modes. This was in addition to the recording of the sound levels indicated above.

- Except for the day leading up to and the day of the helicopter demonstration flights, the recordings of the sounds were set to trigger a recording based on a set sound A-weighted threshold level. For example, if the threshold level was 65 dB, and the sound levels remained below that level, no sound recordings were obtained. If the sound level went above 65 dB for at least 2 seconds, the sound recording would begin until the sound level went below 65 dB or one minute whichever was longer. This provided a playback option to listen to the sounds in the community registered at the microphone location for noise events.
- On the day prior to the helicopter demonstration flights, the monitors were set to record all sound levels such that all activity would be recorded at the microphone location. This was to ensure that all sound levels would be collected during the helicopter flights. After the completion of the helicopter demonstration flights, the monitors were reset to record based on the set threshold.

The portable monitors' clocks were synchronized to local time using the United States National Institute of Standards and Technology (NIST) clock in Boulder, Colorado to facilitate the correlation of aircraft and other noise events measured at multiple sites. All calibrations are traceable to the NIST. All of these instruments meet the American National Standards Institute (ANSI) S1.4-1983 standards for Type I "precision" sound level meters.

## 2.3 Noise Measurement Site Selection

The noise measurement program included eight distinct locations, with two sites collecting data only during the helicopter demonstration flights. Six sites were selected to represent the surrounding communities with measurements and observations conducted during the entire measurement period[8]. These sites were generally selected based on their relationship to the proposed helipad site, line-of-sight to the proposed project site, security of equipment, access to equipment, and limited site interference from other noise sources that may hinder measuring representative noise levels. Two sites were selected under the projected flight paths (or nearly so) to provide data from the helicopter flights to compare with modeled data. These two sites were setup on the day of the flight demonstrations, continually manned by HMMH personnel, and taken down after the completion of the helicopter flights. The measurement locations are listed in Table **1** along with the dates and times of measurements, the number of hours monitored and observed, and the approximate latitude and longitude of the sites and displayed in Figure 3.

[8] The equipment at Site 4 was removed prior to the helicopter flights and placed under one of the projected helicopter flight paths.

**Table 1 Summary of Noise Measurement Sites**

| Site No. | Location | Coordinates | Height Above Sea Level | Approx. Distance* to "Helipad" | Start Time | Stop Time | Hours Mon. | Hours Obs. |
|---|---|---|---|---|---|---|---|---|
| 1 | Mariposa and Third Sts (roof) | N37.76423 W122.38921 | 70 ft. | 830 ft | 10/15/07 2:19 PM | 10/23/07 6:40 AM | 155** | 8 |
| 2 | 19th and Texas Sts (Rear deck) | N37.76165 W122.39534 | 190 ft. | 2,095 ft | 10/15/07 4:07 PM | 10/23/07 11:04 AM | 187 | 8 |
| 3 | De Haro St between 19th and 20th (Rear deck) | N37.76014 W122.40089 | 175 ft. | 3,572 ft | 10/15/07 5:12 PM | 10/23/07 9:05 AM | 173** | 8 |
| 4 | Jackson Recreation Center (Garden) | N37.76379 W122.40008 | 26 ft. | 2,791 ft | 10/16/07 2:34 PM | 10/20/07 2:19 PM | 96** | 8 |
| 5 | Marina Creek Harbor (Dock) | N37.77319 W122.39448 | 0±5 ft. | 2,789 ft | 10/15/07 11:55 AM | 10/23/07 7:23 AM | 188 | 8 |
| 6 | UCSF Housing (Roof) | N37.76907 W122.39046 | 70 ft. | 1,129 ft | 10/15/07 3:09 PM | 10/23/07 8:06 AM | 185 | 8 |
| 4a | Hubbell and 16th Sts (East Corner) | N37.76646 W122.39830 | 17 ft. | 2,136 ft | 10/21/07 7:18 AM | 10/21/07 9:52AM | 2.5 | 2.5 |
| 7 | Agua Vista Park (North end) | N37.76654 W122.38599 | 4 ft. | 1,386 ft | 10/21/07 7:22 AM | 10/21/07 9:53 AM | 2.5 | 2.5 |

Notes: * "Helipad" used for flight demonstration – approx N37.766056 W122.390778
** Site 1 – 29 hours lost due to equipment malfunction; Site 3 – 11 hours lost due to equipment malfunction; Site 4 equipment moved to Site 4a for flight demonstration
Source: HMMH October 2007 Noise Measurement Program

**Figure 3 UCSF Mission Bay Campus Area and Noise Measurement Sites**
*Source: HMMH, October 2007 Noise Measurement Program*

## 2.4 Noise Measurement Program Results

The noise measurement program consisted of two distinct parts – characterize the existing sound environment in the community and measure representative sound levels from a helicopter flying the proposed flight routes during the scheduled demonstration. The monitors gathered one-third octave band data, from which both A- and C-weighted data are derived, for at least seven full days at each site. As noted in Table **1**, two sites experienced slight equipment malfunctions which resulted in less data on those days and one site was moved closer to the proposed flight track of the helicopter during the flight demonstration phase.

### *2.4.1 Characterization of the Existing Sound Environment*

The noise monitors measured all sound levels and calculated a total CNEL for each day. The total CNEL measured at each site is shown in Table 2. For those sites and days where less than 24 hours of data were collected, the CNEL are indicated with an asterisk to indicate partial CNEL calculations.

**Table 2 Measured Daily Total Community Noise Equivalent Levels**

| Date | Site | Measured Total CNEL (dB) | Site | Measured Total CNEL (dB) |
|---|---|---|---|---|
| Tue. 10/16/2007 | 1- Third & Mariposa | 66* | 4- Jackson Rec Center | 63 |
| Wed. 10/17/2007 | | 68 | | 63 |
| Thu. 10/18/2007 | | 68 | | 74 |
| Fri. 10/19/2007 | | 67* | | 65 |
| Sat. 10/20/2007 | | 69* | | 63 |
| Sun. 10/21/2007 | | 67 | | N/A |
| Mon. 10/22/2007 | | 67 | | N/A |
| Tue. 10/16/2007 | 2- 19th & Texas | 67 | 5- Marina Creek Harbor | 63 |
| Wed. 10/17/2007 | | 68 | | 62 |
| Thu. 10/18/2007 | | 69 | | 62 |
| Fri. 10/19/2007 | | 67 | | 62 |
| Sat. 10/20/2007 | | 69 | | 60 |
| Sun. 10/21/2007 | | 69 | | 60 |
| Mon. 10/22/2007 | | 69 | | 62 |
| Tue. 10/16/2007 | 3- De Haro | 56 | 6- UCSF Housing | 70 |
| Wed. 10/17/2007 | | 56 | | 69 |
| Thu. 10/18/2007 | | 60 | | 66 |
| Fri. 10/19/2007 | | 55 | | 67 |
| Sat. 10/20/2007 | | 60* | | 67 |
| Sun. 10/21/2007 | | 60 | | 66 |
| Mon. 10/22/2007 | | 59 | | 66 |

Notes: * Partial data due to equipment malfunctions; 10/21/07 day of helicopter demonstration
Source: HMMH October 2007 Noise Measurement Program

The noise levels measured in the community as presented above ranged from 55 to 74 dB in terms of the 24-hour cumulative CNEL metric. It is worth noting that during the day of the helicopter demonstration flights, the measured CNEL remained within the range measured on the other days throughout the week at each site. The measured CNEL ranged from an "urban" to a "very noisy urban setting" and below a "metropolitan city center", according to the "CNEL chart" provided in Appendix B: Figure B7 Representative Examples of Measured Community Noise Equivalent Levels.

#### *2.4.1.1 Site 1*

Site 1 was located on the roof of a residential building near Third and Mariposa Sts. It was mounted on a 12-foot pole to get the microphone above and away from the roof line. The measured CNEL ranged from 66-69 dB, which includes partial days. These levels are typical of an urban environment per the CNEL chart in Appendix A. During observations, the major contributors to the overall noise level were vehicular traffic on Third and Mariposa Streets, the Muni "T", local construction activities, and occasional helicopter overflights (not associated with the UCSF demonstration). The ranges in LAmax values for these major noise contributors are listed in Table 3. In the absence of these direct noise sources, the background A-weighted sound level was 48-55 dB in early morning and 55-62 dB at other times.

**Table 3 Site 1 - Range of LAmax Values for Noise Sources**

| Noise Source | Range of LAmax, dB |
|---|---|
| Street Traffic (autos, heavy trucks, motorcycles, buses) | 64-84 |
| Muni "T" | 69-72 |
| Construction Activity | 64-66 |
| Other Helicopters | 61-72 |
| Source: HMMH October 2007 Noise Measurement Program | |

#### *2.4.1.2 Site 2*

Site 2 was located on a rear deck of a residence on Potrero Hill at Texas and 19th Sts. that overlooked the UCSF complex. The site had direct line-of-sight to the proposed helipad site. The measured CNEL ranged from 67-69 dB, which are commensurate with a noisy urban environment per the CNEL chart in Appendix A. During observations on the street corner, the major contributors to the overall noise level were traffic on the I-280 freeway, occasional helicopter and light plane overflights (not associated with the UCSF demonstration), Caltrain horns, and street traffic with the ranges in LAmax values shown in Table 4. In the absence of these direct noise sources, the background A-weighted sound level was 48-55 dB in early morning and 57-62 dB at other times.

**Table 4 Site 2 - Range of LAmax Values for Noise Sources**

| Noise Source | Range of LAmax, dB |
|---|---|
| I-280 Freeway Traffic | 61-66 |
| Other Helicopters/Light Aircraft | 63-80 |
| Caltrain Horn | 64-66 |
| Street Traffic | 67-73 |
| Source: HMMH October 2007 Noise Measurement Program | |

#### *2.4.1.3 Site 3*

Site 3 was located on a landing of the deck steps to the rear of a residence on De Haro St. The site was on Potrero Hill with a direct line-of-sight to the northern part of the UCSF complex. The measured CNEL ranged from 55-60 dB, which are commensurate with a suburban to urban environment per the CNEL chart in Appendix A. During observations from De Haro St., the major

contributors to the overall noise level were traffic (buses) on De Haro St., Caltrain horns, freeway traffic, an occasional helicopter (not associated with the UCSF demonstration), and local construction (at residence and several blocks away). The ranges in LAmax values for these major noise contributors are shown in Table 5. In the absence of these direct noise sources, the background A-weighted sound level was 38-45 dB in early morning and 48-52 dB at other times.

**Table 5 Site 3 - Range of LAmax Values for Noise Sources**

| Noise Source | Range of LAmax, dB |
|---|---|
| Traffic on De Haro and I-280 | 52-62 |
| Caltrain Horn | 53-56 |
| Other Helicopters | 63-75 |
| Local Construction | 63-80 |
| Source: HMMH October 2007 Noise Measurement Program | |

#### *2.4.1.4 Site 4*

Site 4 was located in the community garden area of the Jackson Recreation Center bordering on Mariposa St. The site was setup in the afternoon of 10/16/2007 after coordination with the San Francisco Parks District. The site was removed in the afternoon of 10/20/2007 to prepare the equipment for a position under the proposed helicopter flight path on 10/21/2007. The measured CNEL ranged from 63-65 dB, which is commensurate with an urban to noise urban setting per the CNEL chart in Appendix A. The measured CNEL of 74 dB was an anomaly due primarily to students from the neighboring school yelling or speaking loudly directly into the microphone for approximately ten minutes during their lunch break at the Center. During observations, the major contributors to the overall noise level were traffic on 101 and Mariposa St., users of the recreation center's various venues (tennis court, basketball court, play fields, etc.), and occasional aircraft overflights (not associated with the UCSF demonstration). The ranges in LAmax values for these major noise contributors are shown in Table 6. In the absence of these direct noise sources, the background A-weighted sound level was 43-50 dB in early morning and 52-58 dB at other times.

**Table 6 Site 4 - Range of LAmax Values for Noise Sources**

| Noise Source | Range of LAmax, dB |
|---|---|
| Traffic on 101 & Mariposa St. | 59-77 |
| Users of Recreation Center Venues | 60-76 |
| Children Speaking/Yelling | 65-120 |
| Aircraft Overflights | 61-76 |
| Source: HMMH October 2007 Noise Measurement Program | |

#### *2.4.1.5 Site 5*

Site 5 was located on the easternmost part of the dock at Marina Creek Harbor. The site was north of the projected helicopter alternative departure route. The measured CNEL ranged from 60-63 dB, which is commensurate with an urban environment per the CNEL chart in Appendix A. During observations, the major contributors to the overall noise level were construction (both north and

south of the site), aircraft overflights (not associated with the UCSF demonstration), the Muni "T", and traffic on I-280 and Channel St. An occasional sea gull would visit in the vicinity of the site and squawk at levels in the 60-65 dB range. The ranges in LAmax values for these major noise contributors are shown in Table 7. In the absence of these direct noise sources, the background A-weighted sound level was 48-52 dB in early morning and 53-57 dB at other times.

**Table 7 Site 5 - Range of LAmax Values for Noise Sources**

| Noise Source | Range of LAmax, dB |
|---|---|
| Construction | 59-70 |
| Aircraft Overflights (not Demo flights) | 60-78 |
| Muni "T" | 58-60 |
| Traffic on I-280 & Channel St. | 55-65 |
| Birds/Sea Gulls | 60-65 |
| Source: HMMH October 2007 Noise Measurement Program | |

#### *2.4.1.6 Site 6*

Site 6 was located on the roof of the southernmost UCSF housing building with direct line-of-sight to the proposed project. The measured CNEL ranged from 66-70 dB, which are commensurate with a noisy urban environment per the CNEL chart in Appendix A. The ranges in LAmax values for the major noise contributors to the overall noise level during observations are listed in Table 8 and consisted of the vents and air handlers on the building and adjacent building, construction along Third St., aircraft overflights (not associated with the UCSF demonstration), and the Muni "T" and traffic on Third St. In the absence of these direct noise sources, the background A-weighted sound level was 61-63 dB (vents and air handlers).

**Table 8 Site 6 - Range of LAmax Values for Noise Sources**

| Noise Source | Range of LAmax, dB |
|---|---|
| Vents and Air Handlers | 61-63 |
| Construction along Third St. | 63-80 |
| Aircraft Overflights (not Demo flights) | 64-76 |
| Muni "T" and local traffic | 62-67 |
| Source: HMMH October 2007 Noise Measurement Program | |

### *2.4.2 Helicopter Flight Measurements*

On Sunday morning, October 21, 2007, HMMH setup sites 4a and 7 prior to the helicopter flights to complement the other measurement sites. These complementary sites were located under the proposed flight route of the demonstration flight helicopter to the west and east of the "temporary" helipad, which was on the ground within the project site and laid out on an extension of Fourth St. approximately 250 feet south of the Proposed helipad location.

The helicopter for the demonstration, an Agusta A109 helicopter[9] operated by REACH, initially flew an approach and landed at the temporary helipad to allow a community observer to board. The

[9] The Augusta 109 is one of the noisier helicopters in the mix of helicopters that could serve the helipad. See the data and discussion in Section 3 of this report.

helicopter then departed to the east and set up for the three flight routes and a hover over the pier to the east for the demonstration. The three flight routes can be described as following:

- Pass One – an arrival from the east, a hover over the temporary helipad location at approximately 140 feet for 10-20 seconds, and then a departure to the east. The helicopter orientation for the hover was facing north primarily due to the wind being from the north at 10-12 miles per hour.
- Pass Two – similar to Pass One except the departure followed the designed alternate flight path climbing west until reaching I-280, turning north, and then east to fly along the northern boundary of the UCSF complex.
- Pass Three – similar to the other two except the departure followed the designed secondary flight path to the west, climbing to 1,000 feet and approaching the 101 freeway before turning right to the east and continuing over the Bay.

For the hover over the pier, the helicopter remained over the Bay for its approach and departure after hovering at 10-20 feet above the pier. The helicopter then returned to the temporary helipad, approaching from the east, and landed to disembark the observer. The helicopter was shut down for 30-40 minutes. After engine restart, the helicopter began its ascent and departed to the east.

HMMH observers positioned at Sites 4a, 6, and 7 throughout the demonstration observed the helicopter operations and noted the times of arrival, hover, and departure to correlate with the noise monitors at all the respective noise measurement sites.

#### *2.4.2.1 Calculating CNEL Using Measured Noise Levels*

The noise monitors measured the sound levels from all sources and calculated the Total CNEL. Using the measurements associated with the five morning arrivals and departures and the hover over the pier for the flight demonstration helicopter at each site, HMMH calculated the contribution of the five helicopter arrivals and departures to the Total CNEL. Within Table 9 are shown the measured Total CNEL, measured helicopter CNEL from all of the demonstration flights, and the CNEL from all other community sources.

**Table 9 CNEL Values Calculated from Noise Measurements, Sunday, October 21, 2007**

| Site | Community Noise Equivalent Level (CNEL) in dB | | |
|---|---|---|---|
| | Measured Total | Measured Helicopter | Calculated Community |
| 1 - Third and Mariposa | 67 | 49 | 67 |
| 2 - 19th and Texas | 69 | 48 | 69 |
| 3 - DeHaro | 60 | 39 | 60 |
| 4a* - Hubbell and 16th | 65 | 55 | 64 |
| 5 - Marina Creek Harbor | 60 | 40 | 60 |
| 6 - UCSF Housing | 66 | 53 | 66 |
| 7* - Agua Vista Park | 66 | 65 | 56 |

Note: * Only 2+ hours of time at these sites
Source: HMMH October 2007 Noise Measurement Program

#### *2.4.2.2 Single-Event Results*

Both the A- and C-weighted single-event noise levels (Single Event Noise Exposure Level [SENEL] and Lmax) listed in Table **10** through Table 16 were determined from the measurements at each site for the helicopter demonstration flights. As shown, the measured noise levels were not constant for a particular operation (e.g., arrival & hover) but varied by a few decibels. For comparison purposes, other identified community noise sources from the week-long measurement program at each site are included where available. The other noise sources for the short term sites, Site 4a and Site 7, are not included due to the short measurement period. The other aircraft/helicopters were identified through on-site observation and the SFO radar flight track data.

**Table 10 Site1 Single-Event Noise Levels for Helicopter Flights, October 21, 2007**

| Flight Phase | Operation | A-Weighted Noise Levels | | C-Weighted Noise Levels | |
|---|---|---|---|---|---|
| | | LAmax | SENEL | LCmax | SENEL |
| Initial | Arrival & Land | 79.0 | 91.9 | 82.7 | 97.2 |
| | Departure | 74.1 | 86.0 | 80.7 | 93.0 |
| Pass One | Arrival & Hover | 82.7 | 91.7 | 83.8 | 96.7 |
| | Departure | 74.1 | 83.4 | 81.2 | 91.0 |
| Pass Two | Arrival & Hover | 78.2 | 90.0 | 82.9 | 95.9 |
| | Departure | 78.3 | 87.0 | 83.7 | 92.5 |
| Pass Three | Arrival & Hover | 77.6 | 90.5 | 83.6 | 96.0 |
| | Departure | 73.5 | 83.6 | 80.8 | 91.5 |
| Hover at Pier | Hover | 70.1 | 83.7 | 76.3 | 90.4 |
| Final | Arrival & Land | 75.5 | 87.6 | 78.7 | 93.3 |
| | Departure | 73.7 | 84.3 | 80.6 | 92.4 |
| **Other Sources** | | | | | |
| Truck | Mariposa St. (10/16) | 79.1 | 86.0 | 84.9 | 93.2 |
| Helicopter | Overflight (10/20) | 72.5 | 81.2 | 80.5 | 90.2 |
| Ambulance | Siren (10/21) | 98.0 | 100.5 | 98.1 | 100.7 |

Source: HMMH October 2007 Noise Measurement Program

**Table 11 Site 2 Single-Event Noise Levels for Helicopter Flights, October 21, 2007**

| Flight Phase | Operation | A-Weighted Noise Levels | | C-Weighted Noise Levels | |
|---|---|---|---|---|---|
| | | LAmax | SENEL | LCmax | SENEL |
| Initial | Arrival & Land | 80.0 | 91.8 | 84.8 | 96.6 |
| | Departure | 76.0 | 88.2 | 80.8 | 93.3 |
| Pass One | Arrival & Hover | 73.7 | 86.6 | 78.6 | 91.8 |
| | Departure | 68.4 | 79.8 | 74.9 | 86.0 |
| Pass Two | Arrival & Hover | 72.9 | 85.6 | 78.4 | 90.7 |
| | Departure | 78.2 | 87.1 | 83.4 | 92.9 |
| Pass Three | Arrival & Hover | 78.1 | 87.3 | 81.9 | 92.1 |
| | Departure | 76.2 | 88.0 | 80.4 | 93.3 |
| Hover at Pier | Hover | N/D | N/D | N/D | N/D |
| Final | Arrival & Land | 77.8 | 89.5 | 82.2 | 94.6 |
| | Departure | 75.2 | 85.7 | 79.1 | 91.3 |
| **Other Sources** | | | | | |
| Helicopter | Overflight (10/16) | 77.0 | 87.2 | 86.4 | 95.4 |
| Helicopter | Overflight (10/17) | 74.3 | 84.1 | 79.7 | 90.4 |
| Helicopter | Overflight (10/21) | 80.5 | 86.5 | 86.1 | 93.3 |

Note: N/D = not detected above ambient
Source: HMMH October 2007 Noise Measurement Program

**Table 12 Site 3 Single-Event Noise Levels for Helicopter Flights, October 21, 2007**

| Flight Phase | Operation | A-Weighted Noise Levels | | C-Weighted Noise Levels | |
|---|---|---|---|---|---|
| | | LAmax | SENEL | LCmax | SENEL |
| Initial | Arrival & Land | 70.8 | 79.6 | 76.6 | 86.9 |
| | Departure | 60.9 | 73.0 | 69.7 | 82.4 |
| Pass One | Arrival & Hover | 66.4 | 76.3 | 73.1 | 85.1 |
| | Departure | 56.7 | 67.4 | 67.0 | 77.9 |
| Pass Two | Arrival & Hover | 65.5 | 77.1 | 71.1 | 86.0 |
| | Departure | 70.7 | 78.9 | 78.5 | 88.1 |
| Pass Three | Arrival & Hover | 63.9 | 75.9 | 73.1 | 84.7 |
| | Departure | 71.0 | 84.0 | 76.4 | 91.5 |
| Hover at Pier | Hover | N/D | N/D | N/D | N/D |
| Final | Arrival & Land | 64.5 | 78.6 | 71.7 | 87.5 |
| | Departure | 62.5 | 74.9 | 71.3 | 84.3 |
| **Other Sources** | | | | | |
| Cessna 182 | Overflight (10/18) | 64.9 | 73.9 | 78.1 | 84.7 |
| Helicopter | Overflight (10/21) | 74.8 | 83.4 | 80.3 | 88.5 |

Note: N/D = not detected above ambient
Source: HMMH October 2007 Noise Measurement Program

**Table 13 Site 4a Single-Event Noise Levels for Helicopter Flights, October 21, 2007**

| Flight Phase | Operation | A-Weighted Noise Levels | | C-Weighted Noise Levels | |
|---|---|---|---|---|---|
| | | LAmax | SENEL | LCmax | SENEL |
| Initial | Arrival & Land | 76.5 | 87.0 | 80.5 | 92.4 |
| | Departure | 70.3 | 81.8 | 76.8 | 88.1 |
| Pass One | Arrival & Hover | 73.0 | 84.6 | 77.7 | 90.7 |
| | Departure | 73.3 | 81.7 | 76.9 | 86.8 |
| Pass Two | Arrival & Hover | 71.3 | 84.3 | 77.4 | 90.5 |
| | Departure | 75.5 | 85.1 | 84.6 | 94.3 |
| Pass Three | Arrival & Hover | 78.3 | 85.4 | 85.1 | 92.1 |
| | Departure | 76.7 | 90.1 | 82.0 | 96.3 |
| Hover at Pier | Hover | N/D | N/D | N/D | N/D |
| Final | Arrival & Land | 67.0 | 78.3 | 73.8 | 85.7 |
| | Departure | 71.2 | 78.3 | 77.8 | 87.0 |
| **No Other Sources Listed** | | | | | |

Note: N/D = not detected above ambient
Source: HMMH October 2007 Noise Measurement Program

**Table 14 Site 5 Single-Event Noise Levels for Helicopter Flights, October 21, 2007**

| Flight Phase | Operation | A-Weighted Noise Levels | | C-Weighted Noise Levels | |
|---|---|---|---|---|---|
| | | LAmax | SENEL | LCmax | SENEL |
| Initial | Arrival & Land | 60.0 | 73.5 | 71.2 | 85.3 |
| | Departure | 66.7 | 78.4 | 73.9 | 89.0 |
| Pass One | Arrival & Hover | 60.9 | 74.2 | 71.1 | 86.7 |
| | Departure | 61.4 | 76.5 | 75.1 | 89.5 |
| Pass Two | Arrival & Hover | 60.3 | 75.3 | 72.3 | 89.0 |
| | Departure | 75.3 | 85.6 | 82.9 | 94.3 |
| Pass Three | Arrival & Hover | 57.8 | 73.5 | 70.8 | 87.2 |
| | Departure | 71.0 | 84.2 | 80.7 | 94.1 |
| Hover at Pier | Hover | N/D | N/D | N/D | N/D |
| Final | Arrival & Land | 60.9 | 74.2 | 71.9 | 86.8 |
| | Departure | 67.4 | 79.6 | 75.1 | 89.0 |
| **Other Sources** | | | | | |
| Jet Aircraft | Overflight (10/16) | 75.3 | 85.2 | 81.3 | 93.1 |
| Construction | Pile driver (10/16) | 71.6 | 84.8 | 79.1 | 91.9 |
| Unidentified Aircraft | Overflight (10/19) | 77.8 | 85.1 | 84.8 | 93.7 |

Note: N/D = not detected above ambient
Source: HMMH October 2007 Noise Measurement Program

**Table 15 Site 6 Single-Event Noise Levels for Helicopter Flights, October 21, 2007**

| Flight Phase | Operation | A-Weighted Noise Levels | | C-Weighted Noise Levels | |
|---|---|---|---|---|---|
| | | LAmax | SENEL | LCmax | SENEL |
| Initial | Arrival & Land | 80.6 | 94.3 | 84.9 | 99.6 |
| | Departure | 79.7 | 92.0 | 84.6 | 97.6 |
| Pass One | Arrival & Hover | 81.6 | 94.3 | 84.9 | 99.7 |
| | Departure | 79.5 | 88.7 | 80.7 | 91.8 |
| Pass Two | Arrival & Hover | 78.3 | 92.2 | 82.6 | 98.1 |
| | Departure | 75.2 | 90.3 | 84.8 | 97.6 |
| Pass Three | Arrival & Hover | 78.9 | 92.7 | 83.6 | 98.7 |
| | Departure | 77.2 | 91.2 | 83.9 | 98.1 |
| Hover at Pier | Hover | 74.6 | 87.7 | 82.5 | 97.8 |
| Final | Arrival & Land | 75.7 | 90.6 | 85.0 | 97.6 |
| | Departure | 80.9 | 92.1 | 78.2 | 94.1 |
| **Other Sources** | | | | | |
| Helicopter & Unidentified Aircraft | Overflight (10/20) | 72.5 | 84.5 | 82.5 | 94.2 |

Source: HMMH October 2007 Noise Measurement Program

**Table 16 Site 7 Single-Event Noise Levels for Helicopter Flights, October 21, 2007**

| Flight Phase | Operation | A-Weighted Noise Levels | | C-Weighted Noise Levels | |
|---|---|---|---|---|---|
| | | LAmax | SENEL | LCmax | SENEL |
| Initial | Arrival & Land | 82.3 | 95.1 | 90.5 | 102.6 |
| | Departure | 81.3 | 90.6 | 89.6 | 98.2 |
| Pass One | Arrival & Hover | 84.9 | 95.6 | 92.5 | 102.9 |
| | Departure | 81.7 | 91.3 | 89.2 | 98.4 |
| Pass Two | Arrival & Hover | 86.4 | 96.0 | 92.6 | 103.1 |
| | Departure | 67.0 | 81.1 | 77.2 | 91.1 |
| Pass Three | Arrival & Hover | 85.7 | 96.3 | 92.7 | 103.3 |
| | Departure | 73.8 | 85.1 | 80.7 | 94.2 |
| Hover at Pier | Hover | 85.4 | 99.1 | 91.7 | 105.1 |
| Final | Arrival & Land | 84.1 | 94.6 | 92.4 | 102.6 |
| | Departure | 78.5 | 88.6 | 86.5 | 96.3 |
| **No Other Sources Listed** | | | | | |

Source: HMMH October 2007 Noise Measurement Program

The measured single-event sound levels represent typical noise levels that will be associated with helicopters in the vicinity of the hospital. The helicopter single-event sound levels are not time dependent, i.e., the levels would be the same during the day, evening, or night. However, the ambient, or background, sound levels change throughout the day. The measured ambient noise levels during the early morning hours were approximately 5-15 dB less than the daytime or evening levels due primarily to a reduction in street traffic and construction activities. The same LAmax

level of an arriving helicopter that is 10-15 dB above the ambient noise level during the daytime could be in the range of 15-30 dB above the ambient noise level at night. Therefore, a passing helicopter, that during the day would not be particularly noticed or considered much of an annoyance, may be more noticeable during the nighttime hours. As discussed in Appendix A.4.3, the CNEL metric provides a penalty to account for increased sensitivity during the nighttime hours and is used to correlate to the percentage of people highly annoyed.

### *2.4.3 Helicopter Points of Closest Approach from Radar Data*

As described earlier, HMMH requested and received flight track data from SFO's Airport Noise Abatement Office for the week of the noise measurement program to obtain the flight track of the A109 REACH helicopter on October 21, 2007 (Figure 4) and all other aircraft at altitudes at or below 2,500 feet above Mean Sea Level (MSL). The data consisted of Point of Closest Approach (PCA) each aircraft was to each measurement site, depictions of flight paths for three sample days, point-by-point depiction of the REACH helicopter flight profile and flight track depiction, and depiction of all aircraft flying within approximately two miles of the project site during the flight demonstration time period.

The PCA data that SFO ran for each site provided the time of closest approach to each noise measurement site along with the position of the helicopter in terms of altitude MSL and slant distance to each site (Table 17).

**Table 17 Helicopter Demonstration Flight Points of Closest Approach**

| Site | Time of PCA | Helicopter Operation | Altitude above MSL (feet) | Slant Distance (feet) |
|---|---|---|---|---|
| 1 - Third and Mariposa | 8:45:54 am | Pass One ascent and departure | 180 | 522 |
| 2 - 19th and Texas | 9:02:04 am | Final hover and landing | 102 | 1,234 |
| 3 - De Haro | 8:55:49 am | Pass Three departure | 889 | 1,903 |
| 4a - Hubbell and 16th | 8:50:40 am | Pass Two departure | 338 | 787 |
| 5 - Marina Creek Harbor | 8:50:58 am | Pass Two departure | 610 | 1,752 |
| 6 - UCSF Housing | 8:51:03 am | Pass Two departure | 689 | 732 |
| 7 - Agua Vista Park | 8:59:17 am | Hover over pier | 102 | 131 |
| Source: SFO Radar Flight Data | | | | |

**Figure 4 Flight Track Depiction for Reach Helicopter, October 21, 2007**
*Source: SFO Radar Flight Data*

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# 3 HELICOPTER NOISE MODELING

The FAA requires the use of noise modeling results to assess aircraft noise. Although noise measurements are sometimes compared to the noise model results, FAA does not permit the use of noise measurements to calibrate or validate the noise model.

Only FAA-approved noise models may be used for quantifying aviation noise exposure when preparing environmental documentation within the United States. The approved models, the model owner, and the expected use of the models are listed in Table 18.

**Table 18 FAA-Approved Aircraft Noise Models**

| Approved Model | Model Owner | Expected Use |
|---|---|---|
| Integrated Noise Model (INM) | FAA | Commercial Airports and Heliports |
| Noise Integrated Routing System (NIRS) | FAA | Air Traffic Airspace |
| Noisemap | U.S. Air Force | Military Air Installations |
| Sources: 14 CFR Part 150, FAA Notice N7210.360, Air Force Handbook AFH 32-7084, respectively | | |

HMMH used the most recent version of the INM (version 7.0), which was released by the FAA in April 2007 to model all aspects of the noise environment from helicopters using the UCSF proposed helipad.

The INM calculation modules are based on data derived from standards documents produced by the Society of Automotive Engineers Aviation Noise Committee. This committee is composed of international research institutions, engineering firms, aircraft and engine manufacturers, and government regulatory agencies. The INM is designed to estimate long-term average effects using annual-average inputs. It is not a detailed acoustics model, therefore differences between predicted and measured values can and do occur. This is generally due to important local acoustical variables not being averaged or because complicated physical events are not explicitly modeled. The INM calculates the noise of the aircraft alone and, except for rare occurrences, does not incorporate any existing ambient or background noise into its results. The modeling does not account for any existing or projected buildings that may shield or otherwise affect the noise at a receptor location. Therefore, all noise results are aircraft only and are what would be experienced in an outdoor setting.

The first section below summarizes the noise modeling results followed by a more detailed look at the noise model input requirements, comparison of model to measured data, and a detailed review of the modeling outputs.

## 3.1 Summary of Noise Modeling

A brief summary of the conclusions derived from the noise modeling follows:

- HMMH modeled the expected helicopter operations for the UCSF Mission Bay Hospital project at two distinct transport levels of activity:
    - The annual-average day of 1.4 transports (2.8 helicopter operations)
    - A busy day of 3 transports (6 helicopter operations)

- Given the projected helicopter types, time of day of the transports, and flight paths to and from the three potential helicopter landing sites, no residential property outside of the UCSF Mission Bay campus will be exposed to 65 dB or greater noise exposure in terms of the CNEL metric
- Using the average noise exposure obtained for each site during the noise measurements and adding the modeled noise exposure from each site increases the total noise exposure at the community sites by less than 0.5 dB CNEL
- The modeling results determined the potential effects of sleep disturbance, speech interruption, and vibration, but found each to be minimal and comparable to the effects from existing community sources
    - No people reside in the greater than 5% percent awakening contours from UCSF nighttime helicopter transports
    - Vibration from helicopter operations is expected to occur within homes nearby, but at much less magnitude than typical residential activity and less than magnitudes known to cause damage to structures

## 3.2 Noise Model Input

HMMH analyzed three separate helipad locations – Proposed, Site A, and Site B. The location of these helipads and other general descriptions are listed in Table 19.

**Table 19 Helipad Locations**

| Helipad Name | Latitude | Longitude | Elevation in feet above Mean Sea Level | Description |
|---|---|---|---|---|
| Proposed | N37° 46' 00.10" | W122° 23' 24.75" | 154 | On roof - hospital wing |
| Site A | N37° 46'01.45" | W122° 23' 24.75" | 154 | On roof – future building |
| Site B | N37° 46'01.80 | W122° 23' 06.87" | 5 | On pier |

Source: UCSF

The INM requires an accurate account of aircraft activity at the modeled facility. Required data include the numbers and types of operations (i.e., arrival, departure, and hover) for each aircraft type operating at the facility. Since the FAA requires the modeling of the annual number of operations on a daily basis, i.e., ***annual operations divided by 365***, the data are usually collected for operations over a period of one year. For assessments of proposed facilities, estimates generally are based on local conditions using common information from other nearby sites. For the purposes of this analysis, two distinct flight operation levels were provided to HMMH and evaluated:

- average day – 1.4 transports per day (2.8 helicopter operations)
- busy day – 3.0 transports per day (6.0 helicopter operations)

For modeling purposes, each transport consists of one arrival and one departure.

UCSF anticipates that the helicopters owned by the primary emergency medical services will be the main users. These helicopter types are summarized in the following tables for an average day, Table **20**, and busy day, Table 21, along with an estimate of percentage of use by each helicopter type. The estimates of use by helicopter type were provided by the expected helicopter operators based on their best forecast of future equipment and operations.

The number of day, evening, and nighttime operations were based on UCSF estimates of the number of flights and the expected time periods of use: 62% daytime (7:00 a.m. to 7:00 p.m.), 15% evening (7:00 p.m. to 10:00 p.m.), and 23% nighttime (10:00 p.m. to 7:00 a.m.).

Data for all helicopter types are not specifically included in the INM. For those helicopter types not included, HMMH identified and modeled substitute helicopters with best known comparable noise signatures. These INM helicopter types are identified in the following tables.

**Table 20 Average Day Modeled Helicopter Types and Operations for CNEL Calculations**

| Helicopter Type | INM Helicopter Type | % Usage | Operations | | | |
|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Total |
| EC-135 | EC130 | 30% | 0.5208 | 0.1260 | 0.1932 | 0.8400 |
| Agusta 109 | A109 | 6% | 0.1042 | 0.0252 | 0.0386 | 0.1680 |
| EADS BO-105 | BO105 | 4% | 0.0694 | 0.0168 | 0.0258 | 0.1120 |
| Bell 407 | BO105 | 24% | 0.4166 | 0.1008 | 0.1546 | 0.6720 |
| Bell 429 | BO105 | 14% | 0.2430 | 0.0588 | 0.0902 | 0.3920 |
| MD902 | H500D | 22% | 0.3819 | 0.0924 | 0.1417 | 0.6160 |
| | Total | 100% | 1.7360 | 0.4200 | 0.6440 | 2.8000 |

Source: Helicopter Operators, UCSF, HMMH

**Table 21 Busy Day Modeled Helicopter Types and Operations for CNEL Calculations**

| Helicopter Type | INM Helicopter Type | % Usage | Operations | | | |
|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Total |
| EC-135 | EC130 | 30% | 1.1160 | 0.2700 | 0.4140 | 1.8000 |
| Agusta 109 | A109 | 6% | 0.2232 | 0.0540 | 0.0828 | 0.3600 |
| EADS BO-105 | BO105 | 4% | 0.1488 | 0.0360 | 0.0552 | 0.2400 |
| Bell 407 | BO105 | 24% | 0.8928 | 0.2160 | 0.3312 | 1.4400 |
| Bell 429 | BO105 | 14% | 0.5208 | 0.1260 | 0.1932 | 0.8400 |
| MD902 | H500D | 22% | 0.8184 | 0.1980 | 0.3036 | 1.3200 |
| | Total | 100% | 3.7200 | 0.9000 | 1.3800 | 6.0000 |

Source: Helicopter Operators, UCSF, HMMH

The EC130 INM model is considered a conservative substitute for the EC135. The REACH helicopter operator cites the Eurocopter website as stating "*With their new successful model of the civil light helicopter EC 135, the Franco-German company Eurocopter again set standards as regards know-how, performance, price as well as design. After commencing production in 1996, more than 270 helicopters were sold to customers throughout the world. The EC 135 is the quietest helicopter in its class at seven decibels below ICAO regulations*".

In addition to the helicopter types and operations, the model requires the definition of the departure and arrival flight paths which are shown in Figure 5 through Figure 7 for the Proposed, Site A and Site B helipads. The FAA Advisory Circular on Heliport Design[10] recommends, to the extent feasible, that the arrival and departure paths be aligned with the predominant winds. Based on data

[10] Federal Aviation Administration Advisory Circular 150/5390-2B, "Heliport Design", Chapter 2, p. 18, Washington , D.C., September 2004.

from the Potrero Station in San Francisco, the winds are primarily out of the west and northwest directions.

**Figure 5 Arrival and Departure Flight Paths for UCSF Proposed Helipad**
(Not to Scale)
*Source: UCSF*

**Figure 6 Arrival and Departure Flight Paths for UCSF Site A Helipad**

(Not to Scale)
*Source: UCSF*

**Figure 7 Arrival and Departure Flight Paths for UCSF Site B Helipad**
(Not to Scale)
*Source: UCSF*

The flight paths were designed to avoid residential areas as much as feasible thereby minimizing noise exposure and allowing arriving and departing helicopters to fly into the predominant wind. The arrival route was designed to be from the east over the Bay to the extent practical thus reducing any noise exposure to sensitive receivers. The departures were designed to meet varying wind conditions with the primary departure being to the east over the Bay. After approaching the helipad the helicopters turn to a heading of approximately 290 degrees to land. For departures, the helicopters lift off and follow one of the respective departure paths. The wind data and communications with the helicopter operators resulted in the flight track usage rates depicted in Table 22 for the modeled Proposed, Site A, and Site B helipads.

**Table 22 Flight Path Usage for UCSF Proposed, Site A and Site B Helipads**

| Flight Path | Usage Rate | | |
|---|---|---|---|
| | Proposed | Site A | Site B |
| **Arrival** | | | |
| From the east over the Bay | 100% | 100% | 100% |
| **Departure** | | | |
| To the east over the Bay | 90% | 90% | 90% |
| To the north and then east | 1% | 0% | 0% |
| To the west then along I-280 and east | 8% | 9% | 9% |
| To the west | 1% | 1% | 1% |
| Source: UCSF | | | |

Flight profiles for each helicopter type were slightly modified from the standard profiles within the INM using information provided by the helicopter demonstration pilot. A conservative estimate of the approximate time the helicopter remained on the helipad with its engines running was approximately two minutes of ground idle or flight idle time. Therefore, two minutes were included at the end of each arrival profile to simulate cool-down before stopping the rotors. In addition, approximately two minutes of engine running time was added to the beginning of each departure profile to simulate engine startup prior to initiating departure. On departure the helicopter was modeled with a direct ascent to 50 feet above the helipad before initiating forward motion to accelerate and climb on the departure flight path. The INM departure and arrival helicopter profiles shown in Table 23 and Table 24 were used in the modeling process.

**Table 23 Modeled Helicopter Departure Profile**

| Description | Distance (feet) | Altitude Above Helipad (feet) | Duration (seconds) or True Airspeed (knots) |
|---|---|---|---|
| Startup and Ground Idle | 0 | 0 | 90 (seconds) |
| Flight Idle Checks | 0 | 0 | 30 (seconds) |
| Vertical Ascent to 50 feet | 0 | 50 | 5 (seconds) |
| Horizontal Acceleration to 30 knots | 100 | 50 | 30(knots) |
| Climb at 1,000 feet/minute and Accelerate to Departure Reference Speed | 500 | 160 | ~70 (knots) |
| Climb at Constant Speed | 4,800 | 1,000 | ~70 (knots) |
| Horizontal Acceleration to Level Reference Speed | 2,800 | 1,000 | ~120 (knots) |
| Begin Cruise | 93,100 | 1,000 | ~120 (knots) |
| Source: INM 7.0, Helicopter Pilot, HMMH | | | |

**Table 24 Modeled Helicopter Arrival Profile**

| Description | Distance (feet) | Altitude Above Helipad (feet) | Duration (seconds) or True Airspeed (knots) |
|---|---|---|---|
| Cruise at Level Reference Speed | 87,250 | 1,000 | ~120 (knots) |
| Approach Horizontal Deceleration to Approach Reference Speed | 5,000 | 1,000 | ~70 (knots) |
| Constant Speed with Descent to 500 feet at 500 feet /minute | 7,000 | 500 | ~70 (knots) |
| Descent at 500 feet/minute to 15 feet and Deceleration to 0 knots | 3,545 | 15 | 0 (knots) |
| Hover and Vertical Descent | 0 | 0 | 3 (seconds) |
| Flight Idle | 0 | 0 | 30 (seconds) |
| Ground Idle | 0 | 0 | 90 (seconds) |
| Source: INM 7.0, Helicopter Pilot, HMMH | | | |

## 3.3 Comparison of Measurement Results to Modeling Inputs

It is general practice to compare modeled results to measured results when measurement data are available. A-weighted SENEL is used as the comparison noise metric since it is the rudimentary input to the calculation of CNEL. To corroborate the modeling, the modeled arrival and departure profiles were modified to closely follow the conditions during the measurements. This modification included 6 to 8 seconds of hover or descent/ascent time for each profile for a total of 14 seconds. The flight profiles of helicopter operations with the actual helipad would include no hover time. Hover time existed in the demonstration flights for demonstration purposes only to simulate the height of the proposed helipad.

A comparison between the measured and modeled values is provided in Table 25 for the A109 helicopter and measured flight operations. The modeled results are using "average" or planned performance profiles while the measured results vary somewhat for each arrival and departure due to changing conditions. Thus, sometimes the measured level is louder than the modeled and sometimes quieter. The real appraisal of how well the model is performing may be based on the modeled value being somewhat of an average of the measured values. The most significant variances are the result of the model over-predicting the noise level. For Sites 1 and 5, this may be the result of some shielding from existing buildings that is not accounted for in the model. Additionally, other causes are believed to be (1) slight differences in the actual vs. modeled arrival profile of the helicopter, and (2) possible additional extraneous community noises that interfered with the helicopter noise source. The flight demonstration at UCSF only included the A109 helicopter.

**Table 25 SENEL Values for Modeled and Measured Flight Operations**

| Measurement Site | Helicopter Operation | SENEL (dB) | | |
|---|---|---|---|---|
| | | Modeled | Measured | Difference (Modeled – Measured) |
| 1 - Third and Mariposa | Initial Arrival | 91.9 | 91.9 | ±0 |
| | Initial Departure (East) | 94.6 | 86.0 | +8.6 |
| | Pass One Arrival and Hover | 91.9 | 91.7 | +0.2 |
| | Pass One Departure (East) | 94.6 | 83.4 | +11.2 |
| | Pass Two Arrival and Hover | 91.9 | 90.0 | +1.9 |
| | Pass Two Departure (North) | 94.5 | 87.0 | +7.5 |
| | Pass Three Arrival and Hover | 91.9 | 90.5 | +1.4 |
| | Pass Three Departure (West) | 94.8 | 83.6 | +11.2 |
| | Final Arrival | 91.9 | 87.6 | +4.3 |
| | Final Departure (East) | 94.6 | 84.3 | +10.3 |
| 2 - 19th and Texas | Initial Arrival | 86.1 | 91.8 | -5.7 |
| | Initial Departure (East) | 86.3 | 88.2 | -1.9 |
| | Pass One Arrival and Hover | 86.1 | 86.6 | -.05 |
| | Pass One Departure (East) | 86.3 | 79.8 | +6.5 |
| | Pass Two Arrival and Hover | 86.1 | 85.6 | +0.5 |
| | Pass Two Departure (North) | 86.7 | 87.1 | -0.4 |
| | Pass Three Arrival and Hover | 86.1 | 87.3 | -1.2 |
| | Pass Three Departure (West) | 87.0 | 88.0 | -1.0 |
| | Final Arrival | 86.1 | 89.5 | -3.4 |
| | Final Departure (East) | 86.3 | 85.7 | +0.6 |
| 3 – De Haro | Initial Arrival | 76.2 | 79.6 | -3.4 |
| | Initial Departure (East) | 79.3 | 73.0 | +6.3 |
| | Pass One Arrival and Hover | 76.2 | 76.3 | -0.1 |
| | Pass One Departure (East) | 79.3 | 67.4 | +11.9 |
| | Pass Two Arrival and Hover | 76.2 | 77.1 | -0.9 |
| | Pass Two Departure (North) | 79.5 | 78.9 | +0.6 |
| | Pass Three Arrival and Hover | 76.2 | 75.9 | +0.3 |
| | Pass Three Departure (West) | 80.2 | 84.0 | -3.8 |
| | Final Arrival | 76.2 | 78.6 | -2.4 |
| | Final Departure (East) | 79.3 | 74.9 | +4.4 |
| 4a – Hubbell and 16th | Initial Arrival | 80.4 | 87.0 | -6.6 |
| | Initial Departure (East) | 83.3 | 81.8 | +1.5 |
| | Pass One Arrival and Hover | 80.4 | 84.5 | -4.1 |
| | Pass One Departure (East) | 83.3 | 81.7 | +1.6 |
| | Pass Two Arrival and Hover | 80.4 | 84.3 | -3.9 |
| | Pass Two Departure (North) | 84.0 | 85.1 | -1.1 |
| | Pass Three Arrival and Hover | 80.4 | 85.4 | -5.0 |
| | Pass Three Departure (West) | 85.8 | 90.1 | -4.3 |
| | Final Arrival | 80.4 | 78.3 | +2.1 |
| | Final Departure (East) | 83.3 | 78.3 | +5.0 |

Source: INM 7.0, HMMH, October 2007 Noise Measurement Program

**Table 25 SENEL Values for Modeled and Measured Flight Operations (Cont)**

| Measurement Site | Helicopter Operation | SENEL (dB) | | |
|---|---|---|---|---|
| | | Modeled | Measured | Difference (Modeled – Measured) |
| 5 - Marina Creek Harbor | Initial Arrival | 83.1 | 73.5 | +9.6 |
| | Initial Departure (East) | 79.2 | 78.4 | +0.8 |
| | Pass One Arrival and Hover | 83.1 | 74.1 | +9.0 |
| | Pass One Departure (East) | 79.2 | 76.5 | +2.7 |
| | Pass Two Arrival and Hover | 83.1 | 75.3 | +7.8 |
| | Pass Two Departure (North) | 80.1 | 85.6 | -5.5 |
| | Pass Three Arrival and Hover | 83.1 | 73.5 | +9.6 |
| | Pass Three Departure (West) | 83.9 | 84.2 | -0.3 |
| | Final Arrival | 83.1 | 74.2 | +8.9 |
| | Final Departure (East) | 79.2 | 79.6 | -0.4 |
| 6 – UCSF Housing | Initial Arrival | 90.1 | 94.3 | -4.2 |
| | Initial Departure (East) | 89.5 | 92.0 | -2.5 |
| | Pass One Arrival and Hover | 90.1 | 94.3 | -4.2 |
| | Pass One Departure (East) | 89.5 | 88.7 | +0.8 |
| | Pass Two Arrival and Hover | 90.1 | 92.2 | -2.1 |
| | Pass Two Departure (North) | 89.5 | 90.3 | -0.8 |
| | Pass Three Arrival and Hover | 90.1 | 92.7 | -2.6 |
| | Pass Three Departure (West) | 92.7 | 91.2 | +1.5 |
| | Final Arrival | 90.1 | 90.6 | -0.5 |
| | Final Departure (East) | 89.5 | 92.1 | -2.6 |
| 7 – Agua Vista Park | Initial Arrival | 93.4 | 95.1 | -1.7 |
| | Initial Departure (East) | 86.0 | 90.6 | -4.6 |
| | Pass One Arrival and Hover | 93.4 | 95.6 | -2.2 |
| | Pass One Departure (East) | 86.0 | 91.3 | -5.3 |
| | Pass Two Arrival and Hover | 93.4 | 96.0 | -2.6 |
| | Pass Two Departure (North) | 85.7 | 81.1 | +4.6 |
| | Pass Three Arrival and Hover | 93.4 | 96.3 | -2.9 |
| | Pass Three Departure (West) | 89.0 | 85.1 | +3.9 |
| | Final Arrival | 93.4 | 94.6 | -1.2 |
| | Final Departure (East) | 86.0 | 88.6 | -2.6 |

Source: INM 7.0, HMMH, October 2007 Noise Measurement Program

The data above show the variance in the measured levels for similar arrivals or departures. The INM is using a single profile on each arrival or departure and represents an average operation maintaining strict adherence to the defined profile. Any shielding of the sound due to intervening buildings in the measured case is not accounted for in the model. Slight changes to the flight operations of the helicopter may also increase or decrease the noise level below that which is modeled. Thus, the results for a short-term measurement effort can be greater than or less than the long-term noise exposure predicted by the INM. Per FAA environmental assessment requirements, the modeled results are used to determine the long-term effects of the proposed project.

## 3.4 Noise Modeling Results

HMMH modeled the helicopter operations for the Proposed, Site A, and Site B UCSF helipads using the inputs derived from Section 3.2 with the results being output in terms of several different noise metrics.

The INM output included contours of equal noise exposure in terms of CNEL. The 55-dB, 60-dB, and 65-dB CNEL contours modeled using the INM give reference to the number of people highly annoyed with the noise source. The INM also provided the A- and C-weighted single-event noise metrics SENEL, LAmax, and LCmax. Single-event noise levels were used to determine the effects of the helicopter operations. For example, sleep disturbance was estimated with the 95-dB SENEL contour and a percent awakening analysis; speech interference was assessed indoors using the 75-dB LAmax contour; and the onset of vibration was assessed using the 80-dB LCmax contour.

### *3.4.1 Modeled Community Noise Equivalent Level - CNEL*

CNEL has been shown through various studies to correlate well with community annoyance. As previously mentioned, our analysis examined the same two scenarios for each helipad with the only difference being the number of flights to and from the helipad. The modeled CNEL contours for the average day and busy day are shown in Figure 8 through Figure 13 and represent the helicopter noise contributions to the total noise environment. The figures show for the Proposed and Site A helipads that the 65-dB CNEL contours are fully contained on UCSF property for the average day, and the contours extend just east of Third Street for the busy day. For the Site B helipad, the 65-dB CNEL contours are over water and extend a short distance on shore near China Basin St. The direction of arrival tends to slightly dominate the shape of the contour as the arriving helicopter has a shallower descent angle than the ascent angle for a helicopter taking off from the helipad.

**Figure 8 Average Day CNEL Contour for Helicopter Operations to UCSF Mission Bay Hospital Proposed Helipad**
*Source: INM 7.0, HMMH*

**Figure 9 Busy Day CNEL Contour for Helicopter Operations to UCSF Mission Bay Hospital Proposed Helipad**

*Source: INM 7.0, HMMH*

**Figure 10 Average Day CNEL Contour for Helicopter Operations to UCSF Mission Bay Hospital Site A Helipad**
*Source: INM 7.0, HMMH*

**Figure 11 Busy Day CNEL Contour for Helicopter Operations to UCSF Mission Bay Hospital Site A Helipad**
*Source: INM 7.0, HMMH*

**Figure 12 Average Day CNEL Contour for Helicopter Operations to UCSF Mission Bay Hospital Site B Helipad**
*Source: INM 7.0, HMMH*

**Figure 13 Busy Day CNEL Contours for Helicopter Operations to UCSF Mission Bay Hospital Site B Helipad**
*Source: INM 7.0, HMMH*

For purposes of determining the effects on existing conditions, the modeled helicopter CNEL was determined at the noise measurement points and combined with the existing CNEL to derive the new CNEL for each site with the helicopter operations. The results listed in Table 26 through Table 28 show the differences between the CNEL at each measurement point based on existing conditions and the CNEL with the addition of the modeled helicopter operations. Existing CNEL values are the levels that were acquired during the measurement program. Computed sound levels are shown to 0.1 dB for the purpose of comparison to the 65 dB CNEL. Changes on the order of 0.1 dB exceed the accuracy of the noise measurements and model. For example at Site 1 in Table 26, the total CNEL increases from 67.4 (existing) to 67.5 (with helipad). If we rounded to whole decibels, the difference of 0.1 dB would have appeared as 1 dB as 67.4 is rounded to 67 and 67.5 is rounded to 68. As shown in the tables below, the increases in the total community noise exposure with the proposed helipad project are negligible in terms of CNEL.

**Table 26 Proposed Helipad - Comparison of Average Day and Busy Day CNEL at Noise Measurement Locations**

| Site | Community Noise Equivalent Level (CNEL) in dB | | | |
|---|---|---|---|---|
| | Existing | Helicopter | Total | Difference (Total - Existing |
| **Average Day** | | | | |
| 1 - Mariposa & Third | 67.4 | 51.3 | 67.5 | +0.1 |
| 2 - 19th & Texas | 68.4 | 44.7 | 68.4 | ±0 |
| 3 - De Haro | 58.5 | 36.8 | 58.5 | ±0 |
| 4 - Jackson Recreation Center | 63.8 | 37.1 | 63.8 | ±0 |
| 5 - Marina Creek Harbor | 61.5 | 39.9 | 61.5 | ±0 |
| 6 - UCSF Housing | 67.6 | 51.0 | 67.7 | +0.1 |
| **Busy Day** | | | | |
| 1 - Mariposa & Third | 67.4 | 54.6 | 67.6 | +0.2 |
| 2 - 19th & Texas | 68.4 | 48.0 | 68.4 | ±0 |
| 3 - De Haro | 58.5 | 40.2 | 58.5 | ±0 |
| 4 - Jackson Recreation Center | 63.8 | 40.4 | 63.8 | ±0 |
| 5 - Marina Creek Harbor | 61.5 | 43.2 | 61.5 | ±0 |
| 6 - UCSF Housing | 67.6 | 54.3 | 67.8 | +0.2 |

Source: INM 7.0, HMMH October 2007 Noise Measurements

**Table 27 Site A Helipad - Comparison of Average Day and Busy Day CNEL at Noise Measurement Locations**

| Site | Community Noise Equivalent Level (CNEL) in dB | | | |
|---|---|---|---|---|
| | Existing | Helicopter | Total | Difference (Total – Existing) |
| **Average Day** | | | | |
| 1 - Mariposa & Third | 67.4 | 50.1 | 67.5 | +0.1 |
| 2 - 19th & Texas | 68.4 | 44.3 | 68.4 | ±0 |
| 3 - De Haro | 58.5 | 37.2 | 58.5 | ±0 |
| 4 - Jackson Recreation Center | 63.8 | 37.4 | 63.8 | ±0 |
| 5 - Marina Creek Harbor | 61.5 | 40.4 | 61.5 | ±0 |
| 6 - UCSF Housing | 67.6 | 52.9 | 67.7 | +0.1 |
| **Busy Day** | | | | |
| 1 - Mariposa & Third | 67.4 | 53.4 | 67.6 | +0.2 |
| 2 - 19th & Texas | 68.4 | 47.6 | 68.4 | ±0 |
| 3 - De Haro | 58.5 | 40.5 | 58.5 | ±0 |
| 4 - Jackson Recreation Center | 63.8 | 40.7 | 63.8 | ±0 |
| 5 - Marina Creek Harbor | 61.5 | 43.7 | 61.5 | ±0 |
| 6 - UCSF Housing | 67.6 | 56.2 | 67.9 | +0.3 |

Source: INM 7.0, HMMH October 2007 Noise Measurements

**Table 28 Site B Helipad - Comparison of Average Day and Busy Day CNEL at Noise Measurement Locations**

| Site | Community Noise Equivalent Level (CNEL) in dB | | | |
|---|---|---|---|---|
| | Existing | Helicopter | Total | Difference (Total – Existing) |
| **Average Day** | | | | |
| 1 - Mariposa & Third | 67.4 | 45.1 | 67.4 | ±0 |
| 2 - 19th & Texas | 68.4 | 41.0 | 68.4 | ±0 |
| 3 - De Haro | 58.5 | 32.3 | 58.5 | ±0 |
| 4 - Jackson Recreation Center | 63.8 | 32.9 | 63.8 | ±0 |
| 5 - Marina Creek Harbor | 61.5 | 37.9 | 61.5 | ±0 |
| 6 - UCSF Housing | 67.6 | 45.0 | 67.6 | ±0 |
| **Busy Day** | | | | |
| 1 - Mariposa & Third | 67.4 | 48.4 | 67.5 | +0.1 |
| 2 - 19th & Texas | 68.4 | 44.3 | 68.4 | ±0 |
| 3 - De Haro | 58.5 | 35.6 | 58.5 | ±0 |
| 4 - Jackson Recreation Center | 63.8 | 36.2 | 63.8 | ±0 |
| 5 - Marina Creek Harbor | 61.5 | 41.2 | 61.5 | ±0 |
| 6 - UCSF Housing | 67.6 | 48.3 | 67.7 | +0.1 |

Source: INM 7.0, HMMH October 2007 Noise Measurements

### *3.4.2 Modeled A-Weighted Single Event Noise Exposure Level - SENEL*

Single-event noise analyses aid in the assessment of noise effects to supplement the understanding of a particular noise environment defined in terms of the 24-hour CNEL metric. HMMH obtained the SENEL data from the model to assess the potential for sleep disturbance from one aircraft event on the modeled flight paths. FICAN recommends the use of SENEL for determining the maximum percentage of people awakened from an aircraft operation. For example, FICAN suggests that a maximum of 10% of the populace will be awakened by an aircraft noise event producing an indoor sound exposure level of 80 dB SENEL.

The noise level reduction (NLR) of residential structures varies. Conservatively, open windows reduce the outdoor A-weighted noise level by 10-15 dB; and closed windows provide 15-20 dB of reduction. Assuming an average NLR of 15 dB (windows open or closed), an outdoor SENEL of 95 dB will produce an indoor sound exposure level of 80 dB, which will awaken up to 10% of the population (according to the sleep disturbance guidelines recommended by FICAN).

The UCSF LRDP Amendment #2 EIR recommended the use of the 90-dB SENEL to assess awakenings because the EIR expected the population awakened (7.5%) by such events to be "highly annoyed". However, the CNEL standard represents the percentage of people expected to be highly annoyed, which is 12-14% in an environment of 65 dB CNEL. The 95-dB SENEL more appropriately reflects this "highly annoyed" standard as it expects up to 10% of the population to be awakened from these outdoor noise exposure levels. Therefore, it is appropriate and conservative to use the 95-dB SENEL for the assessment of sleep disturbance.

HMMH modeled the 95-dB SENEL contours using the INM for each aircraft type to further determine the noise effects and help assess the potential for sleep disturbance from the expected nighttime helicopter patient transport. Figure 14 through Figure 16 depict representative plots of the 95-dB SENEL contours as modeled for the four INM helicopter types. The 95-dB SENEL contours represent the arrival from the east and the use of any of the departure paths. The arrival (from the east) tends to dominate the shape of the contour as the arriving helicopter has the “blade-slap” effect and a shallower descent angle than the ascent angle on departure. The various modeled departure paths had no effect (size or shape) on the SENEL contours of 95 dB and higher.

**Figure 14 UCSF Proposed Helipad - Areas up to a Maximum of 10% and Greater Awakenings for a Single Transport**
*Source: INM 7.0, HMMH*

**Figure 15 UCSF Site A Helipad - Areas up to a Maximum of 10% and Greater Awakenings for a Single Transport**
*Source: INM 7.0, HMMH*

**Figure 16 UCSF Site B Helipad - Areas up to a Maximum of 10% and Greater Awakenings for a Single Transport**

*Source: INM 7.0 , HMMH*

### *3.4.3 Sleep Disturbance and Percent Awakening*

Until recently, all study results have been difficult to interpret in terms of sleep disturbance for an entire night for populations that experience aircraft noise events. In general, the studies have not provided a reliable method for extending the likely awakening caused by one event to the awakenings probable from many events. A recently proposed method[11] was reviewed and partially funded by the Federal Interagency Committee on Aviation Noise (FICAN) and is currently under review by the American National Standards Institute, Inc. (ANSI). The ANSI S12.9 Part 6 Subcommittee is in the process of balloting a standard[12] for assessing sleep disturbance, which incorporates the process followed for this project as well as the San Francisco General Hospital (SFGH) helipad project. In general, this method provides an approach for addressing this question:

***During a full night of aircraft operations, how many people are likely to be awakened at least once?***

Sleep awakening contours are developed using the recently published method. This method is based on awakening data collected on people sleeping in their own bedrooms, in homes located near airports. Simultaneous measurement of sound levels in the sleeping room and collection of awakening responses (the person pushed a button each time he / she was awakened) permitted identification of the aircraft noise event and its sound level that likely awakened the person. The aircraft were primarily either commercial or military jets, and the subjects were adults over 18 years of age who had lived at least 5 months in their present house.

The contours presented in Figure 17 through Figure 22 show the areas where different percentages of people are likely to be awakened at least once during the night by the projected number of nightly helicopter flights.[13] Hence, at least 10 % of the people living inside the 10% contour are likely to be awakened at least once. Though these contours include the effects of differing sensitivities to awakening, it is not possible to determine for any specific person whether or not they will be awakened. One way to understand the contours, however, is to say that if you live near the 10% contour and you are of average sensitivity to awakening, you have a 10% chance of being awakened at least once from the nighttime operations.

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[11] Anderson, G.S. and N.P. Miller, "Alternative analysis of sleep-awakening data," Noise Control Eng. J. 55(2), p. 224, 2007 March-April.

[12] American National Standard (Draft), "Quantities and Procedures for Description and Measurement of Environmental Sound – Part 6: Methods for Estimation of Awakenings associated with Noise Events Heard in Homes:, BSR/ASA S12.9-200X/Part 6, submitted January 2008.

[13] The noise characteristics of helicopters are different from those of jets, but some studies have found that for estimating peoples' reaction to helicopters, there is no need to measure helicopter noise any differently from other aircraft noise. Other studies have found that helicopters are more annoying than other aircraft at the same sound level. At present, however, there is no clear guidance for distinguishing helicopter noise effects from the effects of noise from other types of aircraft, especially in terms of sleep awakening.

It is worth noting, that there is no research that conclusively demonstrates whether or not there are adverse effects associated with being awakened at night.[14] Virtually everyone awakens "spontaneously" once or more a night for various reasons. On the other hand, it is reasonable to assume that being awakened many times a night could lead to unusual fatigue and adverse effects on performance while awake. Accordingly, as an aid to understanding the awakening contours, in Table **20** and Table 21are listed the number of projected nightly helicopter flights used to produce the contours.

Based on a windshield tour of the project area, no residential properties exist inside the 5% or greater percent awakening contours.

[14] One recent study concludes that there may be a slightly increased incidence of hypertension (high blood pressure) associated with higher levels of night time noise. But the results are inconclusive. See Jarup, L., *et al* "Hypertension and Exposure to Noise near Airports: the HYENA study," Environmental Health Perspectives, Volume 116, Number 3, March 2008.

**Figure 17 UCSF Proposed Helipad Percent Awakening Contours for Average-Day Operations**
*Source: INM 7.0, HMMH*

**Figure 18 UCSF Proposed Helipad Percent Awakening Contours for Busy-Day Operations**
*Source: INM 7.0, HMMH*

**Figure 19 UCSF Site A Helipad Percent Awakening Contours for Average-Day Operations**
*Source: INM 7.0, HMMH*

**Figure 20 UCSF Site A Helipad Percent Awakening Contours for Busy-Day Operations**
*Source: INM 7.0, HMMH*

**Figure 21 UCSF Site B Helipad Percent Awakening Contours for Average-Day Operations**
*Source: INM 7.0, HMMH*

**Figure 22 UCSF Site B Helipad Percent Awakening Contours for Busy-Day Operations**
*Source: INM 7.0, HMMH*

### *3.4.4 Modeled Maximum Sound Level – LAmax (Speech Interference) and LCmax (Vibration)*

HMMH obtained the LAmax data from the model to assess potential speech interference and the LCmax data to assess the threshold of tactile perceptibility level of vibration due to the projected helicopter operations.

*LAmax – Contours and Speech Interference*

HMMH obtained LAmax contours from the INM output for each aircraft type to examine the effects of the helicopter noise on normal speech intelligibility. Using the speech interference guidelines previously discussed, the 75-dB LAmax contours represent the area where the helicopters begin to interfere with normal communication levels indoors with windows closed for older construction not meeting current Title 25 requirements. Figure 23 through Figure 25 show the 75-dB LAmax contours for the four modeled types of helicopters on the proposed arrival and departure flight paths. The LAmax levels normally exceed the 75-dB threshold along the route of flight when in level flight and when arriving and departing the helipad. Outside the 75-dB contour, the helicopter flight may potentially interfere with normal outdoor conversations. The arrival (from the east) tends to dominate the shape of the contour as the arriving helicopter has the "blade-slap" effect and a shallower descent angle than the ascent angle on departure.

Within the INM and using the A109 helicopter as an example, HMMH modeled a grid that extended to the full area of the 60 dB-LAmax contour for the A109 helicopter at cruise altitude of 1,000 feet above the helipad elevation along the level flight track to determine the approximate time that the sound from the helicopter was above the 60-dB and 75-dB LAmax levels. The grid consisted of grid points spaced 300 feet apart and in a line perpendicular to the flight path. At each grid point, the model calculated the time, in minutes, that the sound level from the passing helicopter exceeded 60 dB and 75 dB. Within the 75-dB LAmax contour, the calculated time above 75-dB LAmax ranged from 1 to 8 seconds. Within the 60-dB LAmax contour, the calculated time above 60-dB LAmax ranged from 1 to 15 seconds. Therefore, speech interference outdoors is expected for less than 16 seconds and indoors with windows closed for less than 9 seconds during each helicopter operation with the longer durations occurring for people closer to the actual flight path.

A representative cross-section is shown in Figure 26 of an A109 helicopter flight track at approximately 1,000 feet altitude depicting the variation of LAmax across the track. The figure assumes the ambient noise level is below 60 dB and shows the time above 60 dB in seconds for a typical helicopter flyover. The figure also shows that the sound level exceeds the 75-dB LAmax guideline for speech interference indoors with the windows closed (dashed line) within 1,500 feet and 2,100 feet of the flight track. Thus, depending on the ambient noise level at a particular location and the location's position relative to the helicopter overhead, there may be a brief period of speech interference indoors from the passing helicopter. However, this interference is similar to existing helicopters, aircraft, automobile and bus traffic, and other local community noises (See site noise measurements in Section 2.3.1).

**Figure 23 UCSF Proposed Helipad - Areas of Potential Indoor Speech Interference**
*Source: INM 7.0, HMMH*

**Figure 24 UCSF Site A Helipad - Areas of Potential Indoor Speech Interference**
*Source: INM 7.0, HMMH*

**Figure 25 UCSF Site B Helipad - Areas of Potential Indoor Speech Interference**
*Source: INM 7.0, HMMH*

**Figure 26 Modeled A109 LAmax Variations Across Flight Track**
*Source: INM, HMMH*

*LCmax – Contours and Vibration*

The LCmax levels normally are greatest in the immediate vicinity of the helipad as "blade slap" of arriving helicopters is a major contributor to the low frequency noise levels. The vibration effects of the helicopters are airborne generated and therefore are more confined to vibration of windows or walls and associated with objects rattling. This is different from ground-borne vibration generally associated with heavy construction and pile driving which creates more vibration in floors and walls.

The INM does not adequately model C-weighted metrics for helicopters. Therefore, HMMH obtained C-weighted normalized sound spectral data (50 Hz -10 kHz) for the four modeled helicopter types found in a Letter Report from the John A. Volpe National Transportation Systems Center.[15] These data were used to develop C-weighted inputs to the INM following the procedures outlined in the INM Version 6.0 Technical Manual[16,17] for using SAE AIR-1845[18] and SAE ARP-866A[19] to make adjustments for atmospheric absorption. These adjustments were then made to the noise-power-distance (NPD) curves for the modeled helicopter types followed by the INM modeling of LCmax contours.

Shown in Figure 27 are the A109 modeled spectral data for the various distances used by the INM (50 Hz and above) and spectral data measured at four of the measurement sites when the demonstration helicopter was determined to be at its point of closest approach to the site. Also plotted in the upper left corner (shaded area) are the Hubbard thresholds of perceptible vibration for windows, walls, and floors. As shown in the oval, two of the measurement sites may have experienced perceptible vibration for windows during the demonstration flights.

Various references in Appendix B, dealing primarily with determining vibration effects for jet aircraft at the start of takeoff, indicate that the threshold of sound induced vibration generally occurs at LCmax levels at and above 80 dB. Therefore, Figure 28 through Figure 30 show the 80-dB LCmax contours for the four modeled types of helicopters on the proposed arrival and departure flight paths. Areas inside of these contours would have the potential to experience airborne vibration effects. As depicted, areas to the north, east, and south of the helipad may experience low level of vibration effects during helicopter operations to and from the proposed helipad. The arrival (from the east) tends to dominate the shape of the contour as the arriving helicopter has the "blade-slap" effect and a shallower descent angle than the ascent angle on departure.

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[15] DTS-34-FA065-LR1, "Spectral Classes for FAA's Integrated Noise Model Version 6.0", John A. Volpe Transportation Systems Center, Acoustics Facility, Cambridge MA, December 7, 1999.

[16] Integrated Noise Model (INM) Version 6.0 Technical Manual, ATAC Corporation, January 2002, p 48-49.

[17] The Technical Manual for INM Version 7.0 has not been released; therefore the latest released data was used.

[18] Society of Automotive Engineers, Committee A-21, Aircraft Noise, "Procedure for the Computation of Airplane Noise in the Vicinity of Airports", Aerospace Information Report No. 1845, Warrendale, PA: Society of Automotive Engineers, Inc., March 1986.

[19] Society of Automotive Engineers, Committee A-21, Aircraft Noise, "Standard Values of Atmospheric Absorption as a Function of Temperature and Humidity", Aerospace Research Report No. 866A, Warrendale, PA: Society of Automotive Engineers, Inc., March 1975.

**Figure 27 Modeled and Measured A109 Helicopter Spectra in Relation to Hubbard Threshold of Vibration Criteria**

*Source: INM 7.0, HMMH*

**Figure 28 UCSF Proposed Helipad – Area of Potential Airborne Vibrations**
*Source: INM 7.0, HMMH*

**Figure 29 UCSF Site A Helipad – Area of Potential Airborne Vibrations**
*Source: INM 7.0, HMMH*

**Figure 30 UCSF Site B Helipad – Area of Potential Airborne Vibrations**
*Source: INM 7.0, HMMH*

# 4 CUMULATIVE NOISE EFFECTS WITH SAN FRANCISCO GENERAL HOSPITAL HELICOPTER ACTIVITY

With the San Francisco General Hospital (SFGH) located southeast of the UCSF site also conducting a study for a helipad, HMMH determined the cumulative noise effects for both of the proposed helipads in the UCSF vicinity.

The flight paths to and from the projected UCSF helipad remain north of the SFGH area thereby having a negligible effect on the environment in close proximity to SFGH. The flight paths to and from the projected SFGH helipad do have a component of arrivals and departures on which SFGH helicopters could overfly the UCSF Mission Bay area north of 16th Street. HMMH used the INM 7.0 to model a composite of operations to both UCSF and SFGH helipads for an average day. For SFGH, the average day consisted of 2 flights per day (four operations).

The model used the SFGH Fly Quiet flight paths which account for an increase in use of the arrival and departure flight paths in the vicinity of the UCSF location. The Fly Quiet flight paths were developed to reduce the overflight of residential areas to the extent possible. The arrival profiles of the helicopters on these flight paths will normally be at 1,000 feet MSL or at the beginning of their descent to SFGH. The departure profiles will generally be at or above 1,000 feet MSL. These altitudes are generally higher than those altitudes flown by the existing helicopters that overfly the area on a daily basis. At these altitudes the duration of speech interference from each SFGH overflight would be less than 15 seconds.

*Conclusion*

As shown in Figure 31 the inclusion of the projected SFGH helicopter operations has no effect on the 65-dB CNEL contour. The SFGH helicopter operations also have a minimal effect on the percent awakening contours in Figure 32.

In addition, as a worst case assuming an SFGH helicopter flies over the UCSF Mission Bay Campus during a UCSF helicopter transport, the single-event noise levels of SENEL and Lmax of the two operations together are only minimally higher (likely less than 1 dB) than each individually. This is mostly due to the FAA-required separation of the two helicopters in space for the safe operation of the airspace. The resulting effects are:

- A minimal increase in the duration of speech interference
- A minimal increase for the potential of awakening from this one rare nighttime event, which is depicted in the percent awakening contours in Figure 32

**Figure 31 UCSF Modeled Average Day CNEL Contour including SFGH Overflights**
*Source: INM 7.0, HMMH*

**Figure 32 UCSF Modeled Average Day Percent Awakening Contours including SFGH Overflights**
*Source: INM 7.0, HMMH*

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# 5 POTENTIAL NOISE MITIGATION ALTERNATIVES

A vital part of the noise analysis is to look for alternative procedures or applications that will provide the potential for reducing the noise exposure in the community around the helipad and the helicopter flight paths. The FAA Report to Congress listed several alternatives that warrant investigation[20]. This section will look at three potential alternatives in addition to the analysis completed on the two alternative helipad locations. The following section summarizes the alternatives recommended.

## 5.1 Summary of Recommended Noise Mitigation Alternatives

HMMH recommends the implementation of a Fly Quiet program that includes:

- Using flight paths that arrive and depart over the bay (easterly operations)
- Working with pilots to determine optimum arrival and departure flight procedures with each helicopter type specific to the UCSF environment
- Continuously training pilots through a pilot training program to ensure all pilots are aware of UCSF's fly quiet program
- Encouraging transport providers replace their aging fleet with quieter helicopters and to operate the quieter helicopter at UCSF
- Logging helicopter transports including transport provider, helicopter type, time of arrival, time of departure, and departure flight path flown

## 5.2 Fly Quiet Procedures

The flight paths derived for this project make optimum use of the geographic features (the Bay) and the commercial or industrial areas in the community around the hospital site. Therefore, the preferred flight paths, those that arrive from the east and depart to the east (over the Bay), become a part of the fly quiet procedures for transporting patients at UCSF. In addition, we recommend working with the helicopter pilots to define procedures that may have a positive effect in reducing helicopter noise while the helicopter is over land near USCF. These might include such procedures as flying steeper descents to or ascents from the helipad. The helicopter pilots are the best resource to review their current profiles and procedures to determine if there are any options available that may have the benefit of reducing the helicopter noise signature. The helicopter operators are sensitive to providing their service with the least amount of effect on the overall community environment. Any proposed changes need to account for issues related to safety of flight and operations and airspace restrictions.

## 5.3 Quieter Helicopter Fleet

Any significant changes to helicopter noise output can only occur if the research and development efforts are included in future helicopter manufacturing. With increasing international competition

[20] FAA Report to Congress, 8-2, 2004

and a demand for a quieter environment, the future outlook of helicopter design may include more quiet technology.

As advances are made in helicopter technology to reduce noise signatures, the helicopter operators have an option to replace the older helicopter types for quieter and more efficient models. The group of helicopter operators identified as primary users of the UCSF helipad has already indicated that their helicopter fleets are moving in that direction. Included in their best estimate of the types of aircraft that will be in their fleet when the UCSF helipad becomes operational are some of the newer technology equipment. Efforts should continue to remove the older and noisier helicopters when technically and economically feasible for the service providers at UCSF.

## 5.4 Sound Insulation

In addition to focusing on the source for substantial mitigation, e.g. flight paths, fly quiet procedures, and the fleet, noise mitigation at the receiver can prove beneficial. An example is the sound insulation programs that many commercial airports have elected to provide to the residents living within the 65 dB CNEL contour. The goal of a sound insulation program is to reduce noise levels within qualifying residences through the use of sound-insulation treatments to ensure interior noise levels in living spaces are 45 dB CNEL or lower[21]. Such treatments include, retrofitting windows and doors with special acoustical windows and doors, providing a central ventilation system, reducing the effects of "flanking paths" and "leaks" such as ventilation openings and poorly-fitting door gaskets, and, in some cases, retrofitting roofs and/or walls. These treatments, in general, improve the noise reduction characteristics of the residential structure and reduce the noise levels of most outside noise sources with the windows and doors closed. Therefore, sound insulation is effective at reducing the cumulative interior noise exposure of CNEL by reducing SENEL of outside noise sources. The resulting Noise Level Reduction (NLR) obtained through airport residential sound insulation programs is typically around 30 dB with doors and windows closed. Although we conservatively used an NLR of 15 to 20 dB with windows closed for our analysis for speech interference and sleep disturbance, more typical of the homes tested prior to receiving sound insulation in airport programs is 20 to 25 dB NLR. This implies that the improvement realized through sound insulation is between 5 and 10 dB NLR.

The State of California and the FAA have determined the standard for establishing the limit for non-compatible land use for residences as the 65-dB CNEL contour. For example, San Francisco International Airport (SFO) has a sound insulation program and has followed the standard by not implementing any sound insulation mitigation beyond the 65-dB CNEL contour. For the UCSF project, HMMH expects no residential properties to be within the 65 dB-CNEL contour based on the scenarios analyzed. Thereby, we expect no residential properties to be incompatible with the expected helicopter transport operations at UCSF Mission Bay, thus no property is eligible for sound insulation under State and Federal programs.

[21] Airport Improvement Program (AIP) Handbook, FAA Order 5100.38C.

# 6 CONCLUSIONS

HMMH conducted this comprehensive noise study to assess the potential effects of noise caused by the forecast helicopter operations at the Proposed, Site A, and Site B helipads. The process began with the collection of data which included a week-long noise measurement program with a demonstration flight of the A109 Agusta helicopter. The FAA INM 7.0 was used to model the various noise metrics to provide an evaluation of the projected noise levels and their relationship to specific noise effects – annoyance, sleep disturbance, speech interference, and vibration. The conclusions of this study are discussed in the following paragraphs.

*Noise Measurements*

The noise measurement program was a week in duration and provided information on the existing noise environment around UCSF Mission Bay as well as noise levels associated with five arrivals and departures of a demonstration helicopter flight. The results of the noise measurement program showed that:

- The community areas surrounding the UCSF Mission Bay Hospital project have existing noise exposure levels commensurate with a predominantly urban environment
- The noise levels associated with the helicopter demonstration flights were comparable in magnitude to the existing noise sources within the community, like street traffic, construction, etc.
- The multiple arrivals and departures during the UCSF helicopter demonstration did not add to the 24-hour overall noise exposure measured at the measurement sites
- The community will hear the helicopter operations just as they currently hear buses and trucks on the local roads and since helicopters have a unique sound, the community will know the sound source is a helicopter. Nighttime helicopter operations may be more detectable due to the generally lower ambient noise levels
- The effects of the helicopter operations will be similar to the effects from the other noise sources, such as minimal speech interference and the potential for awakening from nighttime helicopter transports

*Noise Modeling*

The noise modeling used the FAA INM 7.0 with inputs based on project design, expected helicopter transports, flight paths, and forecast helicopter types. The noise modeling differed from the noise measurements in that the model incorporated four helicopter types vs. one to determine the effects of helicopter noise on the surrounding community. The results were:

- Given the projected input information, no residential property outside of the project site or UCSF Mission Bay campus will be exposed to 65 dB or greater noise exposure in terms of the CNEL metric for both volumes of daily transports. The 65-dB CNEL is the only federal or state criteria for determining land use compatibility.
- The total noise exposure at the measured community sites increased by less than 0.5 dB CNEL when the average noise exposure obtained during the noise measurements was added to the modeled noise exposure at each site.

- The modeling results determined the potential effects of sleep disturbance, speech interruption, and vibration, but found each to be minimal and comparable to the effects from existing community sources.
    - Based on a windshield tour of the project area, no residential properties exist inside the 5% or greater percent awakening contours.
    - Vibration from helicopter operations is expected to occur within homes nearby, but at much less magnitude than typical residential activity and less than magnitudes known to cause damage to structures.

*Effects of Both UCSF and SFGH Helipads*

The combined effects of the operations at both the projected SFGH and UCSF helipads were determined to be minimal with respect to both CNEL and percent awakening. The SFGH helicopters are generally at 1,000 feet in altitude and pass just north of the UCSF site. Therefore, it would be similar to a passing touring helicopter, traffic on I-280, or local truck traffic.

*Mitigation Initiatives*

Several mitigation alternatives were discussed that have the potential to reduce noise level exposure. Based on federal and state criteria no residential properties outside of the UCSF campus are eligible for sound insulation based on the projected 65-dB CNEL contours. Based on the results and our familiarity of fly quiet and fly neighborly programs across the country, we recommend UCSF consider the design and implementation of a Fly Quiet Program as part of this project. This program would ensure that the quietest routes were flown whenever conditions permit. It also would involve the helicopter operators and pilots flying the quieter flight procedures, acquiring quieter helicopters as they replace the aging helicopters, and setting up a system to track helicopter operations. The tracking of operations would involve maintaining a log for each helicopter transport including: helicopter provider, helicopter type, time of arrival, time of departure, and flight paths flown. This would provide a record of the flight and provide documentation to report compliance and non-compliance of the Fly Quiet Program measures to the transport providers.

# APPENDIX A AIRCRAFT NOISE TERMINOLOGY

To assist reviewers in interpreting the complex noise metrics used in evaluating airport noise, we present below an introduction to relevant fundamentals of acoustics and noise terminology.

## A.1 Introduction to Acoustics and Noise Terminology

Six acoustical descriptors of noise are introduced here in increasing degree of complexity:

- Decibel, dB
- Weighted decibel;
- Maximum Noise Level, Lmax
- Single Event Noise Exposure Level, SENEL
- Equivalent Sound Level, Leq
- Community Noise Equivalent Level, CNEL

These noise metrics form the basis for the majority of noise analysis conducted at most airports throughout the U.S. In addition, a brief description of slant distance versus altitude is introduced.

### *A.1.1 Decibel, dB*

All sounds come from a sound source -- a musical instrument, a voice speaking, an airplane passing overhead. It takes energy to produce sound. The sound energy produced by any sound source is transmitted through the air in sound waves -- tiny, quick oscillations of pressure just above and just below atmospheric pressure. These oscillations, or sound pressures, impinge on the ear, creating the sound we hear.

Our ears are sensitive to a wide range of sound pressures. Although the loudest sounds that we hear without pain have about one million times more energy than the quietest sounds we hear, our ears are incapable of detecting small differences in these pressures. Thus, to better match how we hear this sound energy, we compress the total range of sound pressures to a more meaningful range by introducing the concept of sound pressure level.

Sound pressure levels are measured in decibels (or dB). Decibels are logarithmic quantities reflecting the ratio of the two pressures, the numerator being the pressure of the sound source of interest, and the denominator being a reference pressure (the quietest sound we can hear).

The logarithmic conversion of sound pressure to sound pressure level (SPL) means that the quietest sound that we can hear (the reference pressure) has a sound pressure level of about 0 dB, while the loudest sounds that we hear without pain have sound pressure levels of about 120 dB. Most sounds in our day-to-day environment have sound pressure levels on the order of 30 to 100 dB.

Because decibels are logarithmic quantities, combining decibels is unlike common arithmetic. For example, if two sound sources each produce 100 dB operating individually and they are then operated together, they produce 103 dB -- not the 200 decibels we might expect. Four equal sources operating simultaneously produce another three decibels of noise, resulting in a total sound pressure level of 106 dB. For every doubling of the number of equal sources, the sound pressure level goes up another three decibels. A tenfold increase in the number of sources makes the sound pressure

level go up 10 dB. A hundredfold increase makes the level go up 20 dB, and it takes a thousand equal sources to increase the level 30 dB.

If one noise source is much louder than another, the two sources operating together will produce virtually the same sound pressure level (and sound to our ears) that the louder source would produce alone. For example, a 100 dB source plus an 80 dB source produce approximately 100 dB of noise when operating together (actually, 100.04 dB). The louder source "masks" the quieter one. But if the quieter source gets louder, it will have an increasing effect on the total sound pressure level such that, when the two sources are equal, as described above, they produce a level three decibels above the sound of either one by itself.

Conveniently, people also hear in a logarithmic fashion. Two useful rules of thumb to remember when comparing sound levels are: (1) a 6 to 10 dB increase in the sound pressure level is sometime described to be about a doubling of loudness, and (2) changes in sound pressure level of less than about three decibels are not readily detectable outside of a laboratory environment.

### *A.1.2 The Weighted Decibel*

Frequency of sound is the rate of repetition of the sound pressure oscillations as they reach our ear. The rate of oscillations is reported in cycles per second or Hertz (Hz). When analyzing the total noise of any source, acousticians often break the noise into frequency components (or bands) to determine how much is low-frequency noise (distant thunder or rumble), how much is middle-frequency noise (speech), and how much is high-frequency noise (whistle). This breakdown is important for two reasons:

(1) People react differently to low-, mid-, and high-frequency noise levels. This is because our ear is better equipped to hear mid and high frequencies but is quite insensitive to lower frequencies. Thus, we find mid- and high-frequency noise to be more annoying.

(2) Engineering solutions to a noise problem are different for different frequency ranges. Low-frequency noise is generally harder to control.

The normal frequency range of hearing for most people extends from a low frequency of about 20 Hz to a high frequency of about 10,000 to 15,000 Hz. People respond to sound most readily when the predominant frequency is in the range of normal conversation, typically around 1,000 to 2,000 Hz. Psycho-acousticians have developed several filters or weightings which roughly match this sensitivity of our ear and thus help us to judge the relative loudness of various sounds made up of many different frequencies.

The most common of these weightings are the A- and C-weightings. These scales differ from each other mostly in the amount each discriminates against sound at lower frequencies. The A scale is most discriminating and emulates the response of the human ear to relatively low-level sounds, i.e., typical community sound levels. The C scale is nearly flat or uniform over the range of hearing. Therefore, the C scale often provides a baseline for comparison with other scales. For example, in industrial noise applications, engineers have determined the amount of low-frequency energy from a measured noise source by subtracting the A-weighted level from the C-weighted level. The C scale emulates the response of the human ear to high-level sounds, much higher than those typically experienced in communities, whether urban or suburban. Figure A1 provides a comparison of these two weightings in the 20 Hz to 20,000 Hz frequency range.

**Figure A1 Frequency Response Comparison of A- and C-Weightings**
*Source: HMMH*

The Environmental Protection Agency (EPA) adopted A-weighted sound levels to describe how people hear sound and to determine any impacts of environmental noise on public health and welfare.[22] The A-weighted sound level was recommended for use because it is convenient to use in noise measurement equipment, accurate for most purposes, and is used extensively throughout the world. A-weighted sound levels (measured in A-weighted decibels) are sometimes denoted dBA.

In addition, the A-weighting network significantly discounts those parts of the total noise that occur at lower frequencies (those below about 500 Hz) and also at very high frequencies (above 10,000 Hz) where we do not hear as well. The network has very little effect, or is nearly "flat," in the middle range of frequencies between 500 and 10,000 Hz where our hearing is most sensitive. Because this network generally matches our ears' sensitivity, sounds having higher A-weighted sound levels are judged to be louder than those with lower A-weighted sound levels, a relationship which otherwise might not be true. It is for this reason that A-weighted sound levels are normally used to evaluate environmental noise sources. Figure A2 presents typical A-weighted sound levels of several common environmental sources.

[22] "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," EPA/ONAC 550/9-74-004, March, 1974

**Figure A2 Common A-Weighted Environmental Sound Levels, in dB**
*Source: HMMH*

### *A.1.3* Maximum Noise Level, LAmax (A-weighted))

An additional dimension to environmental noise is that A-weighted levels vary with time. For example, the sound level increases as an aircraft approaches, then falls and blends into the background as the aircraft recedes into the distance (though even the background varies as birds chirp, the wind blows, or a vehicle passes by). This is illustrated in Figure A3.

**Figure A3 Variation in the A-Weighted Sound Level over Time**
*Source: HMMH*

Because of this variation, it is often convenient to describe a particular noise "event" by its maximum sound level, abbreviated as LAmax. In Figure A3, the LAmax is approximately 85 dB. However, the maximum level describes only one dimension of an event; it provides no information on the cumulative noise exposure generated by a sound source. In fact, two events with identical maximum levels may produce very different total exposures. One may be of very short duration, while the other may continue for an extended period and be judged much more annoying. The next section introduces a measure that accounts for this concept of a noise "dose."

### *A.1.4 Single Event Noise Exposure Level*

The measure of cumulative noise exposure for a single aircraft fly-over in California is the Single Event Noise Exposure Level, or SENEL. SENEL may be thought of as an accumulation of the sound energy over the duration of an event, where duration is defined as the period from when the A-weighted sound level first exceeds a threshold level to when the sound level drops back below the threshold.

SENEL is similar to the Sound Exposure Level (SEL) metric. For SENEL measurements, the threshold is 30 dB below an upper SENEL limit which depends on the aircraft type and distance from either the start of the take-off roll or the landing threshold[23]. For the SEL, the threshold is referenced to the background noise level. These two metrics are functionally equal.

**Figure A4 Single Event Noise Exposure Level**
*Source: HMMH*

The lightly shaded area in Figure A4 illustrates the portion of the sound energy included in this dose. To account for the variety of durations that occur among different noise events, the noise dose is normalized (standardized) to a one-second duration. This normalized dose is the SENEL or SEL; it is shown as the darkly shaded area in Figure A3. It has exactly the same sound energy as the longer event.

Note that because the SENEL is normalized to one second, it will almost always be larger in magnitude than the maximum A-weighted level for the event. In fact, for most aircraft overflights, the SEL is on the order of 7 to 12 dB higher than the LAmax. Also, the fact that it is a cumulative measure means that not only do louder fly-overs have higher SENEL than do quieter ones, but also fly-overs with longer durations have greater SENEL than do shorter ones.

With this metric, we now have a basis for comparing noise events that generally matches our impression of the sound -- the higher the SENEL, the more annoying it is likely to be. In addition, SENEL provides a comprehensive way to describe a noise event for use in modeling noise exposure.

[23] California Department of Aeronautics, "Noise Standards," California Code of Regulations, Title 21 §5025 and §5040 (Register 78, No. 22—6-3-78).

### *A.1.5 Equivalent Sound Level, Leq*

The Equivalent Sound Level, abbreviated Leq, is a measure of the exposure resulting from the accumulation of A-weighted sound levels over a particular period of interest -- for example, an hour, an eight-hour school day, nighttime, or a full 24-hour day. However, because the length of the period can be different depending on the time frame of interest, the applicable period should always be identified or clearly understood when discussing the metric.

Leq may be thought of as a constant sound level over the period of interest that contains as much sound energy as the actual time-varying sound level. This is illustrated in Figure A5. The equivalent level is, in a sense, the total sound energy that occurred during the time in question, but spread evenly over the time period. It is a way of assigning a single number to a time-varying sound level. Since Leq includes all sound energy, it is strongly influenced by the louder events.

**Figure A5 Example of a 1-Minute Equivalent Sound Level**
*Source: HMMH*

As for its application to airport noise issues, Leq is often presented for consecutive one-hour periods to illustrate how the hourly noise dose rises and falls throughout a 24-hour period as well as how certain hours are significantly affected by a few loud aircraft.

### *A.1.6 Community Noise Equivalent Level, CNEL*

In the previous sections, we have been addressing noise measures that account for the moment-to-moment or short-term fluctuations in A-weighted levels as sound sources come and go affecting our overall noise environment. The Community Noise Equivalent Level (CNEL) represents a concept of

noise dose as it occurs over a 24-hour period. The State of California developed the CNEL and promulgated "Noise Standards" in 1970.[24]

Earlier, we illustrated the A-weighted level due to an aircraft event. The example is repeated in the top frame of Figure A6. The level increases as the aircraft approaches, reaching a maximum of 85 dB, and then decreases as the aircraft passes by. The ambient A-weighted level around 55 dB is due to the background sounds that dominate after the aircraft passes. The shaded area reflects the noise dose that a listener receives during the one-minute period of the sample.

The center frame of Figure A6 includes this one-minute interval within a full hour. Now the shaded area represents the noise dose during that hour when sixteen aircraft pass nearby, each producing a single event dose represented by an SENEL. Similarly, the bottom frame includes the one-hour interval within a full 24 hours. Here the shaded area represents the noise dose over a complete day. Note that several overflights occur at night, when the background noise drops some 10 decibels, to approximately 45 dB.

An important note here is that CNEL treats evening (7:00 PM - 9:59 PM) and nighttime (10:00 PM - 6:59 AM) noise differently from daytime (7:00 AM - 6:59 PM) noise. CNEL multiplies each evening operation by 3 and each nighttime operation by 10. This weighting of the operations effectively adds 4.8 decibels to the A-weighted levels of each evening operation and 10.0 decibels to the A-weighted levels occurring at night. These penalties are applied to account for people's greater sensitivity to evening and nighttime noise. In addition, events during the evening and night are often more intrusive because the ambient sound levels during those times are usually lower than daytime ambient sound levels.

The CNEL noise metric is very similar to the Day-Night Level Average Sound (DNL) metric required by the FAA for aircraft noise studies. The difference is that the CNEL metric applies a weighting factor to evening operations; the DNL metric treats the evening hours the same as the daytime hours. For an airport with evening operations, the noise measured as CNEL will be slightly higher than the noise measured as DNL.

Values of CNEL are normally measured with standard monitoring equipment or are predicted with computer models. Measurements are practical for obtaining CNEL values for only relatively limited numbers of locations, and, in the absence of a permanently installed monitoring system, only for relatively short time periods. Thus, most airport noise studies utilize computer-generated estimates of CNEL, determined by accounting for all of the SENEL from individual aircraft operations which comprise the total noise dose at a given location on the ground. This principle is used in all airport noise modeling.

Computed values of CNEL are usually depicted as noise contours that are lines of equal exposure around an airport (much as topographic maps have contour lines of equal elevation). The contours usually reflect long-term (annual average) operating conditions, taking into account the average flights per day, how often each runway is used throughout the year, and where over the surrounding communities the aircraft normally fly.

[24] California Department of Aeronautics, "Noise Standards," California Code of Regulations, Title 21 §5000 and §5090 (Register 90, No. 10—3-10-90).

**Figure A6 A-Weighted Level Fluctuations and Noise Dose**
*Source: HMMH*

Figure A7 shows that representative values of DNL (or CNEL) in our environment range from a low of 40 to 45 decibels in extremely quiet, isolated locations, to highs of 80 or 85 decibels immediately adjacent to a busy truck route or off the end of a runway. More typical values would be in the range of 50 or 55 decibels for a quiet residential community to 60 or 65 decibels in an urban residential neighborhood.

**Figure A7 Representative Examples of Measured Community Noise Equivalent Levels**
*Source: United States Environmental Protection Agency, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974, p.14*

### *A.1.7 Slant Distance and Aircraft Altitude*

When determining the distance between the observer or measurement location and an overflying aircraft, several factors need to be considered. As shown in Figure B8, aircraft altitude is normally given as height in feet above mean sea level (MSL) or above ground level (AGL). The slant distance is the line of sight distance in feet from the observation point to the aircraft. If the aircraft were flying directly over the observation point, then the slant distance would be the same as the aircraft's altitude AGL. This slant distance at the aircraft's point-of-closest-approach will vary with each aircraft overflight and will have an affect on the sound level heard or measured.

**Figure A8 Relationship Between Altitude and Slant Distance**
*Source: HMMH*

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# APPENDIX B INTRODUCTION TO AIRCRAFT NOISE AND VIBRATION

This section provides a brief overview of the factors relevant to the evaluation of helicopter noise and vibration effects from the proposed UCSF Mission Bay rooftop helipad. Appendix A has more detail on the individual noise metrics used to evaluate aircraft noise.

## B.1 Aircraft Noise Metrics

Several noise metrics assist in the evaluation and assessment of aircraft noise, including noise from helicopter operations. The most widely accepted and used noise metric for aircraft noise assessment is the Day-Night Average Sound Level (DNL or Ldn). For aircraft noise, DNL measures the accumulation of noise produced by each and every aircraft operation at any point on the ground within the facility environs during a 24-hour period. The DNL metric also adds a 10-decibel (dB) penalty to the noise that occurs during the nighttime hours of 10 pm to 7 am. This penalty is applied to account for people's greater sensitivity to nighttime noise.

With the exception of the State of California, where the Federal Aviation Administration (FAA) has approved the use of the Community Noise Equivalent Level (CNEL), DNL (sometimes referred to as Ldn) is used throughout the U.S. The CNEL is a more restrictive noise standard than DNL in that it adds an approximate 5-dB penalty for noise that occurs during the evening hours between 7 pm and 10 pm, in addition to DNL's 10-dB nighttime penalty[25]. FAA Order 1050.1E requires that aircraft noise assessments use DNL or, in California, CNEL.

Like DNL and CNEL, the equivalent sound level (Leq) is a measure of total, or cumulative, sound exposure over a particular time period. Because Leq can be measured over any time period, the duration of a particular Leq measurement often is included as a subscript. For example, the equivalent sound level for an 8-hour period would be denoted $Leq_8$. For a 24-hour period, the hourly Leq's, or $Leq_1$ can present an overview of the variation in sound levels throughout the day.

Although FAA requires the use of DNL and CNEL as the primary metrics to assess community exposure to aircraft noise, there is increasing use of single-event noise metrics to supplement these cumulative exposure metrics[26]. This use is in response to community concerns that often refer to specific loud aircraft operations, and to the difficulty in interpreting the meaning of those specific noise events in the context of metrics such as DNL or CNEL. Single-event noise metrics are most often used to help determine the effects of the noise. For example, both speech and sleep disturbance from noise are more easily understood in terms of the single event metrics of maximum A-weighted sound level (LAmax) and Single Event Noise Exposure Level (SENEL), respectively.

The Federal Interagency Committee on Aircraft Noise (FICAN) has published a relationship between the single-event noise metric, Sound Exposure Level (SEL) or SENEL, and sleep

[25] With the CNEL metric, each nighttime event is equivalent to 10 identical events occurring during the daytime (or a 10-dB penalty) and each evening event is equivalent to three identical events occurring during the daytime (or an approximate 5-dB [4.77-dB] penalty).

[26] FAA Order 1050.1E allows for the use of supplemental noise metrics to "characterize specific noise effects".

disturbance. LAmax, which is the maximum sound level that occurs during a particular noise event such as an aircraft flyover, can be used to estimate when speech interference is likely to occur as a result of an aircraft operation. Speech interference is important when evaluating schools and the ability of students to hear instruction during an aircraft operation.

## B.2 Helicopter Noise and Vibration Effects

While significant advances have been made in reducing the noise levels of commercial aircraft, the technology advancement for quieter helicopters has been slow in coming. As pointed out in a 2004 FAA report to Congress[27], the balancing of costs to implement noise improvement with costs to users presents a challenge. The FAA report reviewed the noise characteristics of helicopters and the effects that noise or vibration have on human beings. This section summarizes the conclusions of that report and other relevant literature regarding the nature of helicopter operations that lead to noise and vibration effects and how these effects may change the human environment. Human response to helicopter noise and vibration is discussed in Section B.4.

### *B.2.1 Noise*

Helicopters, also known as rotary wing aircraft, fall into two main categories; piston and turbine powered. For both categories the main rotor supplies both lift and forward thrust and a tail rotor typically provides directional stability and control. Both main and tail rotors are important noise contributors. Rotating blades are highly directional sound sources. With the main rotor operating in the horizontal plane and the tail rotor in the vertical, helicopters can have highly complex, directional noise characteristics, in both the horizontal and vertical planes.

Although the main rotor produces a low-frequency fundamental blade-vortex interaction tone of only 10 to 15 Hz (i.e., 10 to 15 blade passages per second), the higher harmonics of this tone are most audible to human observers. The sound is most pronounced within plus or minus 10 to 15 degrees (in angle direction) of the plane of the rotor. As the aircraft approaches the observer, the main rotor can also produce a separate phenomenon called “blade slap” (the familiar “whop-whop-whop” sound). In general, the heavier the aircraft, the more prominent this sound becomes. The blade slap sound, another blade-vortex interaction phenomenon, is highly directional in the vertical plane and is only forward propagating. Once the aircraft passes over the observer, blade slap generally is no longer audible.

The tail rotor, which operates at higher speeds than the main rotor and has been often referred to as the necessary evil of helicopter design, is often the dominant noise source, especially when the aircraft is approaching the observer. In an effort to improve reliability and reduce noise, some newer helicopters have been designed with no tail rotors (NOTARs). For these aircraft, the directional thrust of the tail rotor is replaced by compressed air flow. An air intake forward of the tail boom provides the air source; the main engine operates a fan that compresses this air down a long tube the length of the tail boom; and at the end of the boom the tube makes a right turn providing the required lateral thrust. NOTAR aircraft can be significantly quieter than those with tail rotors, but can be more expensive to produce.

The profile or mission of a particular helicopter can also affect the noise experienced by an observer. Helicopters flying directly to and from given locations, like a medical helipad, may affect the noise

[27] FAA Report to Congress, “Nonmilitary Helicopter Urban Noise Study”, December 2004.

environment for only a brief period, like a passing truck on the street. On the other hand, a helicopter in public service, providing traffic reports, or providing links to a news report may hover in one location for a while and thereby affect the noise environment for a lengthy period of time.

*Low Frequency Noise*

Helicopters produce low frequency noise in the range of 10-80 Hz which has been related to rattling of windows and other vibration effects. Since A-weighted decibels, which are normally used in environmental analyses, discount low frequency noise, the C-weighted Lmax (LCmax) is generally used when addressing low frequency noise. This is the best available approach for a number of reasons: (1) C-weighting is the only weighting scale currently available in the noise models that addresses low frequency noise, (2) work done by Miller *et al* in the late 1990s showed that the C-weighted metrics appeared to correlate with subjective evaluations of low frequency noise from aircraft departures[28], and (3) the Hubbard criteria show that perceptible wall vibrations are likely to occur for LCmax exceeding 75-80 dB[29]

### B.2.2 Vibration Effects

As noted above, the low frequency output and "blade slap" from helicopters have been associated with structure vibration or rattle. Several studies have been conducted to determine the effects of vibration and rattle on various types of structures (wood frame, adobe, masonry or stone, and brick) due to helicopter overflights.[30, 31, 32, 33]

The Hubbard study addressed the acceleration values and expected resulting damage to walls, floors, and windows based on input noise levels. While there may be some rattling of accessories mounted on walls (pictures, mirrors, plaques, etc.), the conclusion was that no damage to the physical structure was expected due to helicopter overflights.

The Hanson report reviewed findings from studies associated with military aircraft flying 50 feet above ground level on Military Training Routes in the western United States. The conclusion of this review was that the low frequency noise levels generated by helicopters in the weight range (5,000-8,000 pounds) of those used by emergency medical helicopters and projected to use the proposed helipad at UCSF would not cause damage to structures similar to those in close proximity to UCSF.

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[28] Miller, N.P., E.M. Reindel, D.A. Senzig, and R.D. Horonjeff, "Low-frequency Noise from Aircraft Start of Takeoff, Proceedings Internoise 98.

[29] Hubbard, Harvey H., "Noise Induced House Vibrations and Human Perception," Noise Control Engineering Journal, 19 (2), pp 49-55, Sep-Oct 1982.

[30] Hubbard, pp 49-55.

[31] Hanson, Carl E., et al, "Aircraft Noise Effects on Cultural Resources: Review of Technical Literature," Report to National Park Service under Contract CX-2000-0-0025, Sep 1991.

[32] Sutherland, Louis C., "Assessment of Potential Structural Damage from Low Altitude Subsonic Aircraft," Wyle Laboratories Report WR 89-16®, submitted to Martin Marietta Energy Systems, Inc., Oak Ridge, TN, June 1990.

[33] Schomer, Paul D. and R. Neathammer, "The Role of Vibration and Rattle in Human Response to Helicopter Noise", U.S. Army CERL Tech. Report N-85/14, 1985.

The Sutherland report addressed military aircraft flying on Military Training Routes at altitudes of 50 feet and compared them to structural vibrations due to miscellaneous household activities such as walking, jumping, door slams, and nail pounding. The conclusion was that the household activities caused greater vibrations than estimates for subsonic aircraft including light helicopters.

The Schomer study examined human response to helicopter-induced vibrations and rattle. This study used an Army UH-1 helicopter and measured responses for overflights over a frame house and a mobile home. The slant distance between the helicopter and the receiver was determined to have a significant influence on the presence or absence of higher levels of helicopter noise-induced vibrations or rattles.

The vibration effects on buildings may also be related to the age of the structure and how well it is maintained. Windows or doors that have become loose fitting over time may be more susceptible to vibration caused by passing aircraft, vehicular traffic, or other community low frequency sources. Any deterioration in other building structural components may also increase the vibration rattle effects as well as reduce the normal structural noise attenuation.

These studies suggest that, at the closest slant distance (approximately 500 feet) to structures in the vicinity of the proposed helipad and associated flight paths, the light helicopters forecast to use the UCSF helipad may emit moderate levels of low frequency noise. However, resulting vibration levels would be comparable to or less than those levels associated with normal household activities and there would be no physical damage to the structures. The 2004 Report to Congress did not address potential physical damages, but indicated that the low frequency noise from helicopters was more of an annoyance than noise from fixed-wing aircraft.[34]

## B.3 Noise Impact Criteria and Guidelines

Aircraft noise and the impacts it may have on people and communities became a public concern with the introduction of jet aircraft to the commercial travel industry in the early 1960's. Since that time, several laws and regulations have guided the need for assessment and the determination of impact.

### *B.3.1 Federal Criteria*

The ***National Environmental Policy Act of 1969*** (NEPA) required that Federal agencies furnish a detailed statement of the environmental impacts and adverse environmental effects of "major Federal actions significantly affecting the quality of the human environment." The ***Noise Control Act of 1972*** followed NEPA with the purpose, among other things, of requiring that Federal agencies "comply with Federal, State, interstate, and local requirements respecting control and abatement of environmental noise …." The FAA under the direction of the U.S. Department of Transportation (DOT) enacted the ***Aviation Noise Abatement Policy*** (ANAP) in 1976, which first defined the roles and responsibilities for aircraft noise.

In determining compatible land uses, the FAA established guidelines in Part 150 of Title 14 of the Code of Federal Regulations (CFR) that indicated that all land uses are compatible with aircraft noise at exposure levels below 65 dB CNEL (or Ldn). It is important to note that no compatibility criteria have been established for A-weighted single event noise metrics such as SENEL or LAmax. These single event noise metrics are considered supplemental metrics to help describe the CNEL

[34] FAA Report to Congress, 3-10 – 3-11, 2004.

environment and the associated noise effects. As discussed in more detail later, the SENEL and LAmax can be used to help describe the potential for sleep disturbance and speech interference, respectively. The responsibility for determining acceptable and permissible land uses rests with local authorities in response to locally determined needs and values in achieving noise compatible land uses.[35]

The FAA also provides guidance for implementing NEPA for airport projects in FAA Order 5050.4B and provides impact criteria in FAA Order 1050.1E, "Environmental Impacts: Policies and Procedures." FAA Order 1050.1E allows, at the discretion of the agency, the use of supplemental noise metrics to characterize specific noise effects.

### *B.3.2 California Criteria*

For noise assessment, the ***California Environmental Quality Act*** (CEQA) requires the determination of exposure of persons to noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies.

#### *B.3.2.1 California Title 21*

The following are excerpts from California Division of Aeronautics, Noise Standards

"The following rules and regulations are promulgated in accordance with Article 3, Chapter 4, Part 1, Division 9, Public Utilities Code (Regulation of Airports) to provide noise standards governing the operation of aircraft and aircraft engines for all airports operating under a valid permit issued by the Department of Transportation."[36]

"The level of noise acceptable to a reasonable person residing in the vicinity of an airport is established as a CNEL value of 65 dB for purposes of these regulations. This criterion level has been chosen for reasonable persons residing in urban residential areas where houses are of typical California construction and may have windows partially open. It has been selected with reference to speech, sleep and community reaction. As in the Federal criteria, no compatibility criteria have been established for A-weighted single event noise metrics such as SENEL or Lmax."[37]

#### *B.3.2.2 CEQA Requirements/Guidelines*

The Environmental Checklist Form from Appendix G of CEQA[38] provides questions to assist in the evaluation of the potential affects of noise from this project. A copy of the noise portion of the checklist is in Appendix B. In determining the significance of any impact, the lead agency has discretion to select criteria. The criteria recommended by the FAA (FAA Order 1050.1E, Appendix A, Section 14) as they apply to noise sensitive receivers within the CNEL contours are as follows:

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[35] Title 14,Part 150, Code of Federal Regulations, Appendix A – Airport Noise Compatibility Planning

[36] Title 21 – California Code of Regulations, California Airport Noise Standards, Subchapter 6 – Noise Standards, Article 1- General, Section 5001,p 219.

[37] Title 21 – California Code of Regulations, California Airport Noise Standards, Subchapter 6 – Noise Standards, Article 1- General, Section 5006, p 224.

[38] Title 14 – California Code of Regulations, Chapter 3 – Guidelines for Implementation of the California Environmental Quality Act, as amended September 7, 2004.

- A significant impact would occur if the project-related action will cause noise sensitive areas already at or above CNEL 65 dB to experience an increase in noise of CNEL 1.5 dB or greater when compared to no action.
- If noise sensitive areas at or above CNEL 65 dB will have an increase of CNEL 1.5 dB or more, noise sensitive areas lying between CNEL 60 and 65 dB should be examined to identify whether increases of CNEL of 3 dB or more occur due to the proposed action. If so, noise mitigation measures should be considered.
- For air space actions affecting areas beyond the immediate vicinity of an airport, multiple airports or flight operations above 3,000 AGL, populated areas should be examined for changes in CNEL greater than 5 dB.

These guidelines serve as reference in evaluating potential impacts of the project in conjunction with background conditions.

### *B.3.3 City and County of San Francisco General Plan Guidelines*

The Environmental Protection Element of the General Plan includes a section on Transportation Noise[39] that provides general guidance for reducing transportation noise through "sound land use planning and transportation planning." It also states, "In a fully developed city, such as San Francisco, where the land use and circulation patterns are by and large fixed, the ability to reduce the noise impact through a proper relationship of land use and transportation facility location is limited." As such, these guidelines provide a preferred practice for planning new facilities and evaluating the effects of noise on the community and determining possible mitigation alternatives. Except for a brief reference to aircraft in the introduction, this element appears to reference primarily ground transportation noise sources and mitigation alternatives to reduce excessive noise. This report acknowledges this element and that it appears to not be directed toward this type of noise source (helicopter operations to and from a rooftop helipad). However the element contains some general statements that may have relevance, such as "People do react adversely to excessive noise when it interferes with sleep and other activities" and "People want and are entitled to a quiet environment". In addition, the element contains language that was accounted for in the evaluation of mitigation alternatives; "In general, techniques should be designed to quiet the noise at the source, to block the path over which it is transmitted, and to shield or remove the receiver from the noise".

## B.4 The Effects of Noise on People

In 1999, the World Health Organization (WHO) published guidelines[40] for community noise, based on consensus opinions of the international scientific community regarding recommended ideal exposure criteria which are chosen to give protection to the exposed human populations, and to prevent either temporary or long-term impairment of physical, psychological or social functioning of humans. However, the WHO guidelines document does not consider technical, economic, social, or cultural constraints.

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[39] General Plan, Environmental Protection Element, Transportation Noise Section, City and County of San Francisco, 1995.

[40] Guidelines for Community Noise; edited by Birgitta Berglund, Thomas Lindvall, Dietrich H. Schwela; © World Health Organization, 1999.

There have been numerous studies conducted to determine what effect aircraft noise has on individuals. The conclusions from these studies have varied from no effect to substantial. The following sections present the FICAN view of this topic and will concentrate on effects on general physical and mental health, children and learning, speech interference, and sleep disturbance. The guidelines provided here for speech interference and sleep disturbance are intended only to serve as benchmarks to provide context for the sound levels discussed in the report and are not to be interpreted as impact criteria.

### *B.4.1 General Physical and Mental Health Effects*

In spite of considerable worldwide research, there is little solid evidence supporting claims that noise affects human physical and mental health in the workplace or in communities. Our scientific understanding is not able to reliably demonstrate a cause-effect relationship. Researchers have based such claims on laboratory studies of animals or of extremely high noise levels. Many effects observed with intense noises, capable of harming our hearing in a short time, cannot be assumed to occur at moderate and low levels, or to manifest themselves in chronic clinical effects at moderate and low levels.

Many general and specific physiological responses to steady and varying sound are clearly reversible and normal; they include effects on peripheral blood flow, heart rate and cardiac function, respiration, galvanic skin response, pupillary dilatation, and renal and glandular function. Also, startle responses may be elicited by a large variety of sudden, unexpected stimuli, and are reasonably independent of the type of stimulus. They include most of the above responses, such as increased pulse rate and blood pressure, diversion of blood flow to the peripheral limbs and gross musculature. This startle response is inborn, and universal and little modified by learning and experience.[41]

Numerous studies hypothesize and present evidence that chronic exposure to industrial and environmental noise levels can lead to an increased incidence of cardiovascular disease and hypertension, physician contacts and drug purchases. There are just as many studies that contradict these results[42], and, in most cases, these latter studies did not receive the same press coverage as the less rigorous studies, which reported an alarming increase in disease caused by noise. A critical review of 43 studies on the detrimental effects of noise on cardiovascular health, found that a statistically significant increase in blood pressure level was evident only in studies for occupational noise exposure[43]. One study found a relationship between military aircraft noise and blood pressure increase[44]. A recent article in the March 2008 Aviation and Environment News summarized an

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[41] *Handbook of acoustical measurements and noise control, 3rd edition*. Cyril Harris, 1991.Chapter 25, Physiological Effects of Noise. p. 25.1-25.3

[42] Cohen, S. et al *Behavior, Health and Environmental Stress*, Plenum Press, 1986.

[43] Elise E. M. M. van Kempen, Hanneke Kruize, Hendriek C. Boshuizen, Caroline B. Ameling, Brigit A. M. Staatsen, and Augustinus E.M. de Hollander, "The Association between Noise Exposure and Blood Pressure and Ischemic Heart Disease: A Meta-analysis", *Environmental Health Perspectives*, Vol 110, NO, 3, March 2002.

[44] van Brederode NE. "Environmental noise and cardiovascular diseases" *Environmental Noise and Health*. (Altena K, Biesiot W, Van Brederode NE, Van Kamp I, Knottnerus TR, Lako JV, Pulles MRJ, Stewart RE, Veldman JBP, eds). The Hague:Ministry of Housing, Spatial Planning and Environment Report no. GA-DR-03-01, 1988;7.1–7.61.

European Commission report that linked nighttime noise events associated with airport flight paths to increases in blood pressure[45].

It should also be acknowledged that high blood pressure, as well as heart disease, gastric ulcers and other stress-related syndromes can be caused by a complex interaction of many factors. It appears that noise exposure can lead and/or contribute to such syndromes; annoyance, emotion and attitude toward the noise are generally the cause, more than the noise itself. Studies in residential areas indicate that the psychological stress effects are caused by interference of the traffic or aircraft noise with communication and other daily activities, as well as interference with sleep behavior. Aircraft noise from low-flying aircraft can also remind people of and magnify the fear of possible crashes. These differences in the attitude toward the noise and in the annoyance caused by it are probably the best explanation why no consistent results emerge from the large number of studies available.

There is no unambiguous scientific evidence to relate quantitatively any noise environment with the origin of or contribution to any clinical non-auditory disease.[46,47] Most authoritative reviews, such as the WHO Environmental Health Criteria Document on noise, agree that "research on this subject has not yielded any positive evidence, so far, that disease is caused or aggravated by noise exposure, insufficient to cause hearing impairment".

For practical noise control considerations, the present status of our knowledge means that the criteria for evaluating noise impact, with respect to its direct and indirect effects on health, are the same criteria as those applied to prevent any hearing impairment. In other words, by using criteria that prevent noise induced hearing loss, minimize speech and sleep disruption, and minimize community reactions and annoyance, any effects on health will also be prevented. According to Occupational Safety and Health Administration (OSHA) standards, employee monitoring programs for hearing loss are implemented when the noise exposure equals or exceeds an 8-hour time-weighted average (TWA) of 85 dB on the A scale[48] which is far greater than the expected helicopter noise levels associated with the operation of the UCSF helipad. For example, as determined in Section 3 and 4 of this report, the loudest helicopter noise levels expected at the closest sensitive receptor (the future child care center on the hospital property) are 80 to 94 dB. At these A-weighted noise levels, a person would have to be regularly exposed for over two hours each day to cause hearing damage. Due to the number of operations and the amount of time for each operation, we estimate that these noise levels occur at the UCSF property line for less than a minute each day under any of the scenarios reviewed.

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[45] Jarup, L., et al, *"Hypertension and Exposure to Noise near Airports: the HYENA study,"* Environmental Health Perspectives, Volume 116, Number 3, March 2008.

[46] Berglund et al, "Adverse Effects of Aircraft Noise," *Environment International*, 16:315-338.

[47] Taylor, S.W. et al *Health Effects of Noise, A Review of Existing Evidence*, Report to MVMA under contract MU 8018-C1101, 1980.

[48] 29 Code of Federal Regulations, Part 1910.95, *Occupational Noise Exposure,* Occupational Safety and Health Administration, U.S. Department of Labor.

### *B.4.2 Effects on Children and Learning*

The effects of aviation noise on children and their learning can generally be categorized as follows:[49]

- Reading: The strongest, clearest finding in the area is between aircraft noise and reading. To date, there have been more than 20 studies that have found that children in noise impact zones are negatively affected by aircraft noise. The evidence is quite good, and one study includes a dose-response curve. At this point researchers are trying to identify a mechanism to explain the cause-and-effect relationship of the observed delay.
- Motivation: Approximately a dozen laboratory and field studies indicate reduced task persistence in relation to uncontrollable noise. Some of the research has identified a condition of "learned helplessness": if one is continually put in a situation where he or she has little control over the environment, he or she may "learn" helplessness. The critical issue is its uncontrollability – noise is a stimulus that cannot be controlled. Therefore, a child trying to solve problems (puzzles) in a noisy environment may "learn" not to try to solve the problems – these findings are even stronger with more challenging puzzles.
- Language and Speech: A small number of studies suggest delayed language acquisition and interference with speech perception in noisy areas. This data is potentially important because they may provide a model for understanding the linkage between noise and reading. A fundamental building block of reading is language – increasingly, research in psycholinguistics shows language acquisition is critical to developing reading skills. When a child is acquiring language in situations where speech interference is common, it is quite possible that delayed language may result, leading to reading delay. This is especially true of vulnerable children, such as those with hearing problems and those who are learning in a non-native language.
- Memory: A few studies suggest deficits in short- and long-term memory recall in the presence of noise, particularly for more complex material under noise. An interesting finding that has been replicated with studies of adults is that the recall is diminished more when the material is complex. So if the task is easy, noise has little effect, but if it is demanding, noise has a deteriorating effect.

Most studies conducted on the effects of aircraft flyovers on children have been in areas where there are a multitude of flights daily and in areas of noise impact: areas where CNEL is equal to or greater than 65 dB in California. In the UCSF area, the helicopter operations would be infrequent and short in duration and provide only temporary interruption or no interruption at all to daily activities and the CNEL from UCSF helipad operations will be below 65 dB off the UCSF campus.

### *B.4.3 Annoyance*

Annoyance is not a trivial effect of aircraft noise exposure. Annoyance may be caused by events generating community sound levels below the guidelines for speech interference and sleep disturbance. In its 1992 review of selected noise analysis issues, the Federal Interagency Committee on Noise (FICON) acknowledged a correlation between DNL or CNEL and the percent of the exposed population expected to be highly annoyed.[50] FICON also recognized annoyance as the best

[49] Federal Interagency Committee on Aviation Noise, *FICAN Position on Research into Effects of Aircraft Noise on Classroom Learning,* September 2000.
[50] "Federal Agency Review of Selected Airport Noise Analysis Issues", Federal Interagency Committee on Noise, August 1992, pages 3-6.

indication of adverse community reaction to aircraft noise. The prevalence of high annoyance provides much of the rationale for federal and state policies concerning mitigation of aircraft noise impacts in residential areas[51].

The most widely recognized relationship between environmental noise and annoyance is shown in Figure B1. The curve indicates that at levels as low as DNL/CNEL 55, approximately four percent of the people will be highly annoyed, with the percentage increasing more rapidly as exposure increases above DNL/CNEL 65.[52]

| Day - Night Average Sound Level in dB | | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Calculated % HA Points | USAF | 0.41 | 0.831 | 1.66 | 3.31 | 6.48 | 12.29 | 22.1 | 36.47 | 53.74 | 70.16 | 82.64 |
| | SCHULTZ | 0.576 | 1.11 | 2.12 | 4.03 | 7.52 | 13.59 | 23.32 | 37.05 | 53.25 | 68.78 | 81 |

**Figure B1 Percentage of People Highly Annoyed**

*Source: Federal Interagency Committee on Noise (FICON). "Federal Agency Review of Selected Airport Noise Analysis Issues", August 1992 (From data provided by USAF Armstrong Laboratory), pp 3-6.*

### *B.4.4 Speech Interference*

Interference with speech communication disturbs normal domestic or educational activities and may be a source of considerable annoyance. The principal concerns are the effects of noise on telephone use, and radio and television enjoyment. Interference with outdoor speech communication and indoor face-to-face conversation are considered less critical for impact assessment since people normally adjust their voice levels to restore adequate intelligibility. The main issue related to telephone use and radio or television enjoyment is that the listening volumes typically are set and not adjusted for intermittent noise resulting in the intruding noise masking portions of the telephone conversation or radio/television program.

[51] "Findings of the Low-Frequency Noise Expert Panel of the Richfield-MAC Noise Mitigation Agreement of 17 December 1998," September 30, 2000, page I-3.

[52] Schultz, T.J., "Synthesis of Social Surveys on Noise Annoyance", Journal of the Acoustical Society of America, Vol 64, No.2, August 1978.

Since the telephone can block some of the intruding noise from masking the conversation, we have focused on the enjoyment of radio or television as a way of determining the level at which speech interference inside the home may begin to occur.

People tend to set the volume of the radio or television to correspond to the ambient noise level in the room. If we assume the ambient noise level in a living room is 45 dB, the volume would ordinarily be set to a relaxed voice level. This allows people in the room to readily communicate with the television or radio on. If an airplane flies over, a truck or bus drives by, or a conversation starts such that the sound level of the background increases to 70 dB, it would be difficult to hear the television or radio. The program material would not be completely understood unless the volume was turned up to a level corresponding to a loud voice.

The U.S. Environmental Protection Agency developed guidelines[53] for normal levels of voice effort and hearing ability at listener-speaker distances of about three feet. The percent of sentence intelligibility versus the steady A-weighted sound level for relaxed conversation with a normal voice level in a typical living room is shown in Figure B2. According to this chart, sentence intelligibility drops dramatically when the steady A-weighted sound level exceeds 65 dB. The following guidelines are conservative predictors of interference with conversation:

- Speech interference may occur outdoors when the sound level is 60 to 65 dB or higher. (This is a conservative guideline since normal voice sentence intelligibility is 95% with a steady background level of 65 dB. See Figure B2.
- Speech interference may occur indoors, with windows open, when the outdoor sound level is 70 to 75 dB or higher[54].
- Speech interference may occur indoors, with windows closed, when the outdoor sound level is 75 to 80 dB or higher[55].

When indoors, open windows reduce the outdoor A-weighted noise level by 10-15 dB. Closed windows provide 15-20 dB of reduction to the A-weighted noise level.

[53] United States Environmental Protection Agency, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, Mar. 1974, p. D-5.

[54] Indoor speech interference guidelines based upon: von Gierke, Henning E. and Kenneth McK. Eldred, "Effects of Noise on People," *Noise/News International*, Vol. 1, No. 2, June 1993, p. 75.

[55] von Gierke and Eldred, p. 77.

**Figure B2 Sentence Intelligibility with a Normal Voice as a Function of Steady A-Weighted Sound Level**
*Source: United States Environmental Protection Agency, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974, p. D-3.*

### *B.4.5 Sleep Disturbance*

Noise-induced sleep disturbance has been studied, but the results are somewhat ambiguous, and the response of individuals to intruding noise sources varies widely.

#### *B.4.5.1 Studies*

Most of the research on sleep disturbance by noise has focused on how individual noise events produced by aircraft operations affect various measures of the quality of a human subject's sleep. Early research tended to be conducted in laboratory settings, but when studies were made in people's homes (referred to as "field studies") significant differences became apparent between the human responses to nighttime noise in the two types of studies. People were affected much less by noise events in their homes than in the laboratory.[56]

[56] Pearsons, K., *et al*, "Analysis of the predictability of noise-induced sleep disturbance," J.Acoust. Soc. Am. 90, 331-338, or HSD-TR-89-026, Noise and Sonic Boom Impact Technology, Human Systems Division, Air Force Systems Command, Brooks Air Force Base, TX, October 1989.

More recently, several field studies of sleep disturbance and aircraft noise have been conducted in both Europe and the U.S.[57] These studies measured the sleep disturbance of people in their homes that is produced by aircraft noise. In most cases, the study subjects lived in the vicinity of commercial airports. The studies used several different means to measure disturbance. Primarily, they employed wrist worn "actimeters" – devices that registered the amount of movement or motility of the subject's non-dominant wrist. The assumption made is that, though people move naturally during sleep when there are no noise events, if noise events correlate with increased motility, and that motion exceeds what naturally occurs, then the noise event has had a disruptive effect on sleep.[58] Other common measures of sleep disruption include behavioral awakenings (the subject pushes a button when awakened, regardless of reason for awakening), and evening and morning diary entries about such subjects as tiredness, recalled length of time to go to sleep, quality of sleep or remembered number of awakenings.

#### *B.4.5.2 Study Results*

In general, the studies provide "dose-response" relationships that show what percent of subjects were awakened or increased their motility as a result of noise events of different levels. A dose-response relationship recommended by FICAN (see Footnote 57) is shown in Figure B3. These relationships may be interpreted to say, for example, that for single noise events, maximum sound levels indoors within the sleeping room must exceed 70 dB (approximately 80 dB SEL indoors) to awaken or increase the motility of 10% of the sleeping subjects who experience them.[59]

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[57] See, for example:
Ollerhead, J.B., *et al*, "Report of a Field Study of Aircraft Noise and Sleep Disturbance," Department of Safety, Environment and Engineering, London, 1992.
Fidell, S., *et al*, "Field study of noise-induced sleep disturbance," J. Acoust. Soc. Am. 98(2), Pt. 1, August 1995.
Fidell, S., *et al*, "Effects on sleep disturbance of changes in aircraft noise near three airports," J. Acoust. Soc. Am. 107(5), Pt. 1, May 2000.
Passchier-Vermeer, W., *et al*, "Sleep disturbance and aircraft noise exposure, Exposure-effect relationships," TNO report 2002.027, Division of Public Health, The Netherlands, June 2002.
Miedema, H.M.E., *et al*, "Elements for a position paper on night-time transportation noise and sleep disturbance," TNO Inro report 2002-59, Netherlands Organization for Applied Scientific Research, The Netherlands, January 2003.
Federal Interagency Committee on Aviation Noise (FICAN) "Effects of Aviation Noise on Awakenings from Sleep, Annual Report 1997, February 1988.

[58] Movement or motility has been validated as associated with arousal from sleep and awakenings, see Passchier-Vermeer, *et al*.

[59] A Bell 206 helicopter during level cruise produces an SENEL of approximately 80 dB at a slant distance of 1,000 feet. Indoors, the resulting level would be 15 dB to 25 dB lower.

**Figure B3 Recommended Sleep Disturbance Dose-Response Relationship**
*Source: Federal Interagency Committee on Aviation Noise (FICAN) "Effects of Aviation Noise on Awakenings from Sleep, Annual Report 1997, February 1988.*

However, all studies identify factors in addition to noise level that tend to affect whether or not a subject is awakened or disturbed. Most studies have found that the closer to the time of going to sleep the noise event occurs, the less likely it is to produce awakening. For example, aircraft noise events that happen just after someone goes to sleep are less likely to awaken the person than events that happen after many hours of sleep – such as early morning operations between 6 a.m. and 7 a.m.

Another common finding is that people spontaneously awaken several times each night. One study determined that the subjects awakened on average about twice a night, even though no noise event had occurred and that people who awaken spontaneously more often are less likely to be awakened when noise events do occur.[60]

Several, though not all, studies have found that the greater the difference between the aircraft noise levels in a bedroom and the non-aircraft noise levels, the more likely it is that a sleeper will be awakened. Closing windows can reduce the difference between aircraft and non-aircraft levels and thus reduce awakening probability. Similarly, increased non-aircraft noise, as could occur if a ventilation fan were operating in the bedroom, can also decrease the likelihood of awakening.

All studies of noise and awakening have shown that sleep disturbance is a complex phenomenon and that there are likely many factors that affect the probability that a person will awaken. Certainly

[60] Fidell, *et al*, (1995), Footnote 30.

intruding noise is one of these, but alone it cannot be said to be the only factor. It can be said, however, that in general, aircraft noise levels must be quite high inside the bedroom to awaken even a small percent of the people who experience them.

It is recognized that citizens often have a perception of the effects of noise that is different from what we can learn from studies, and that they are often skeptical of study results such as those summarized above. The results of the studies indicate high noise levels in the sleeping room awaken a small percentage of the people who experience them. It should be noted that these results are from studies that focus primarily on commercial airports – ones that are likely to have almost exclusively fixed wing aircraft and primarily jets, rather than the helicopters with which this study is concerned. Nevertheless, we believe the available information is relevant as well to helicopters arriving and departing a hospital helipad.

Based on the above, there are two perspectives from which to examine sleep disturbance. One is based on the assumption that awakening from one aircraft event may occur for a maximum ten percent of the population when the *indoor* sound level exceeds 80 dB SENEL. This conservatively equates to when the *outdoor* sound level associated with a single event exceeds 95 dB.

The second perspective reviews the number of night operations for an average or busy day and computes percent awakening contours based on the aircraft SENEL values.

## B.5 Effects of Weather on Sound Propagation

Atmospheric conditions related to weather conditions throughout the Bay Area can influence the propagation of sound differently throughout the region. In addition, seasonal changes in the Bay Area's climate conditions cause variations in sound propagation depending upon the time of year. During the summer, for example, prevailing onshore winds may result in cooling of moisture-laden air, increasing occurrences of inversions and the formation of fog and stratus clouds along the coast. In the winter, winds tend to blow offshore allowing storms to occur with reduced chances of inversions.[61]

Atmospheric effects that can influence sound propagation include, in roughly increasing order of importance: humidity and precipitation (including fog), temperature and wind gradients (including temperature inversions), and turbulence (or gustiness). The effects of wind, and in particular, of turbulence, generally are of more importance than other factors; however, the importance of temperature gradients is enhanced under calm wind conditions, and under unusual conditions can be extreme. Attenuation caused by humidity is generally of small relative importance to the other effects.

Although these effects vary from location to location and also seasonally, daily, and even hourly, it is possible to provide general information on the effects of weather on sound propagation. This section of the report provides a discussion of these effects as they relate to weather conditions that are prevalent throughout the Bay Area. ***The noise modeling process uses annual average meteorological conditions to compute the noise propagation effects and thus represents the average noise environment.*** Therefore, there may be days when the effects of weather cause a

[61]Bay Area Air Quality Management District Guidelines, Appendix D-Climate, Topography and Air Pollution Potential, December 1999.

louder than average noise environment as well as days when the effects of weather cause a quieter than average noise environment.

*Influence of Humidity, Fog, and Precipitation*

Although there may be a perception of enhanced sound propagation on foggy or humid days in the Bay Area, it is likely that this is due to related weather conditions rather than the actual fog or humidity. In general, humidity and precipitation (including rain, fog, and snow) have little effect on the propagation of sound. During sound propagation through the air, atmospheric absorption converts a small fraction of a sound wave's energy into internal vibrations of oxygen and nitrogen molecules. This effect always is present, but its magnitude varies depending upon the frequency of the sound and the relative humidity.[62] As a practical matter, attenuation due to molecular absorption is most important with high-frequency noise under fairly calm wind conditions. A substantial body of empirical data supports these conclusions.[63]

Although cloud cover and fog have little direct influence on sound propagation, meteorological conditions that are consistent with low clouds or fog may enhance sound propagation. For example, temperature inversions, which may occur during periods of calm winds along with fog and cloud cover, tend to enhance sound propagation and may result in higher sound levels at community locations. In addition, fog and cloud cover may be less likely to occur with temperature lapse conditions (the opposite of temperature inversions). Temperature lapse conditions typically occur on sunny, cloudless days and tend to reduce outdoor sound propagation. Finally, atmospheric turbulence, which reduces outdoor sound propagation, may be less likely to occur on overcast or foggy days.

*Influence of Temperature*

Sometimes there is a perception that sound propagation is affected by changes in temperature. Although the speed of sound is affected by air temperature, it is the variation of temperature within the atmosphere (i.e., the "temperature gradient") rather than the absolute temperature that causes noticeable effects in sound levels.

The velocity of sound in the atmosphere is dependent upon the air temperature.[64] Therefore, if the temperature varies at different heights above the ground, the sound will travel in curved paths rather than straight lines. Normally, during the daytime, the temperature decreases with increasing altitude; this condition, characterized by a negative temperature gradient, is known as temperature lapse. In temperature lapse conditions, sound waves are refracted upwards and an acoustical shadow zone (a region of reduced sound levels) may exist at some distance from the noise source.

Under certain weather conditions, a layer of cool air may be trapped beneath a layer of warmer air. This condition, know as a temperature inversion, is prevalent throughout many regions in the

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[62]Embleton, Tony F. W. "Tutorial on sound propagation outdoors," *Journal of the Acoustical Society of America*, Vol. 100, No. 1, July 1996, p. 31.

[63]Ingard, Uno. "A Review of the Influence of Meteorological conditions on Sound Propagation," *Journal of the Acoustical Society of America*, Vol. 25, No. 3, May 1953, p. 407.

[64]In dry air, the approximate velocity of sound can be obtained from the relationship:

$c = 331 + 0.6T_c$ (c in meters per second, $T_c$ in degrees Celsius). Pierce, Allan D., *Acoustics: An Introduction to its Physical Principles and Applications.* McGraw-Hill. 1981. p. 29.

evening, at night, and early in the morning when heat absorbed by the ground during the day is released into the night sky through radiation[65]. In the Bay Area, prevailing onshore winds during the summer may result in cooling of moisture-laden air, increasing occurrences of inversions along the coast. The effect of an inversion is just the opposite of lapse conditions: sound propagating through the atmosphere refracts downward. Under inversion conditions, shadow zones are less likely to form, and, barring effects due to terrain or other obstructions, sound levels at observer locations are not affected.

Often, however, the downward refraction caused by temperature inversions allows sound rays with originally upward-sloping paths to bypass obstructions and ground effects. As a result, audibility of distant sounds is often somewhat better at night (during the most common time for temperature inversions) than in the daytime[66]. Under extreme conditions, one study found that noise from ground-borne aircraft may be amplified 15 to 20 dB by a temperature inversion. In a similar study, noise caused by an aircraft on the ground registered a higher level at an observer location 1.8 miles away than at a second observer location only 0.2 miles from the aircraft[67].

*Influence of Wind*

In the Bay Area, wind speeds and directions vary throughout the region based on local topography. In general however, prevailing winds are onshore during the summer and offshore during the winter. These seasonal variations in wind direction may cause seasonal differences in sound propagation.

Just as there is a temperature gradient in the atmosphere, there also is a wind gradient; typically, higher wind speeds exist at greater heights above the ground. The wind gradient affects sound propagation similarly to the temperature gradient by causing upward or downward refraction of sound. Because temperature is a scalar quantity (i.e., described by magnitude alone with no regard for direction), the refraction of sound caused by variations in the vertical gradient is the same in all horizontal (compass) directions[68]. Wind, on the other hand, is a vector quantity (described by both magnitude and direction) and affects sound propagation differently in various directions. Wind results in downward refraction downwind and upward refraction upwind with a shadow zone formed in the upwind direction. Receivers in a predominately downwind direction will experience higher sound levels, and those upwind will experience lower sound levels. Sound propagating perpendicular to the wind direction will not be affected.

[65]Embleton, T.F.W., G.J. Thiessen, and J.E. Piercy, "Propagation in an inversion and reflections at the ground," *Journal of the Acoustical Society of America*, Vol. 59, No. 2, February 1976, p. 278.

[66]Ingard, p. 407.

[67]Dickinson, P.J., "Temperature Inversion Effects on Aircraft Noise Propagation," (Letters to the Editor) *Journal of Sound and Vibration.* Vol. 47, No. 3, 1976, p. 442.

[68]Piercy, J.E. and T.F.W. Embleton, "Review of noise propagation in the atmosphere," *Journal of the Acoustical Society of America*, Vol. 61, No. 6, June 1977, p. 141.

The refraction caused by vertical gradients of wind is additive to the refraction due to temperature gradients[69]. One study suggests that for frequencies greater than 500 Hz, the combined effects of these gradients tends towards two extreme values: approximately 0 dB in conditions of downward refraction (inversion or downwind propagation) and -20 dB in upward refraction conditions (lapse or upwind propagation). At lower frequencies, the effects of refraction due to wind and temperature gradients are less pronounced[70].

In addition to the effects caused by wind gradients, gustiness can cause sound levels heard at remote receiver locations to fluctuate. Gustiness can cause considerable attenuation of sound through the effects of eddies traveling with the wind. The attenuation due to eddies is essentially the same in all directions, with or against the flow of the wind, and can often mask the refractive effects discussed above[71]. Common natural sources of turbulence include thermal mixing, wind shear, and convective eddies. Artificial sources include moving vehicles and wind blowing around obstacles.

## B.6 Effects of Terrain on Sound Propagation

The effects of terrain on sound propagation, in particular helicopter noise, also are of interest due to the proximity of Potrero Hill to the proposed helipad and flight paths. There are generally two sound propagation paths of interest when reviewing these effects: ground-to-ground propagation and air-to-ground propagation. The noise modeling program uses a general algorithm to compute the effects of terrain on the sound propagation.

### *B.6.1 Ground-to-Ground Propagation*

In general, the effects of terrain are of most interest when the helicopter is near the ground. In this situation, the sound attenuation due to "ground effect" could be significant (less significant with acoustically "hard" surfaces like asphalt). Ground effect is a phenomenon caused by reflected sound waves which reach our ears just slightly later than the direct sound waves. In areas of extremely steep terrain, the reflected sound waves may reflect the sound wave back in the direction of the receiver. The terrain in the vicinity of the proposed helipad is not steep enough to reflect the sound waves back to a ground receiver, but reflects the major part of the sound wave out into the atmosphere away from the receiver. Any reflected sound would be significantly less than the direct sound wave thus not adding to the perceived sound level. Lastly, the terrain provides a shield to areas beyond the crest of the hill where the noise levels will be further reduced due to the hill blocking the sound propagation path.

### *B.6.2 Air-to-Ground Propagation*

Terrain is generally not a concern in the case of air-to-ground propagation except in areas with significant terrain features such as steep ridges, valleys, or canyons (including "urban canyons" created by tall buildings on either side of the street, which can cause sound to come from unexpected

[69]Piercy and Embleton, p. 1412. Note, in addition, that as a result of the scalar nature of temperature and the vector nature of wind, the following is true: under lapse conditions, the refractive effects of wind and temperature add in the upwind direction and cancel each other in the downwind direction. Under inversion conditions, the opposite is true.

[70]Piercy and Embleton, p. 1413.

[71]Ingard, pp. 409-410.

directions and cause reverberation or sound reflecting off the buildings). Although sound may be reflected or diffracted by terrain features, these effects, even when discernible, are unlikely to significantly increase noise exposure at any location. When using approved modeling programs, noise measurements are generally conducted to validate the predicted noise levels at a point or points on the terrain of interest. The noise measurement and modeling sections of this report provide information on the steps to validate the noise model in the UCSF environs.

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# APPENDIX C CEQA ENVIRONMENTAL CHECKLIST FORM – NOISE EXCERPT

Reference: Title 14 – California Code of Regulations, Chapter 3 – Guidelines for Implementation of the California Environmental Quality Act, as amended September 7, 2004, Page 9.

SAMPLE QUESTION

Issues:

| | Potentially Significant Impact | Less Than Significant With Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| XI. NOISE -- | | | | |
| Would the project result in: | | | | |
| a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? | ☐ | ☐ | ☐ | ☐ |
| b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels? | ☐ | ☐ | ☐ | ☐ |
| c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? | ☐ | ☐ | ☐ | ☐ |
| d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? | ☐ | ☐ | ☐ | ☐ |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☐ | ☐ |
| f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☐ | ☐ |

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# Attachment 5
# Transportation Study

# UCSF Medical Center at Mission Bay Transportation Study

## Expanded Report

Prepared for

University of California
San Francisco

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March 31, 2008

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## 1. INTRODUCTION AND BACKGROUND

The University of California San Francisco (UCSF) is currently undertaking a major phase development for a Medical Center at Blocks X-3 and 36 through 39 in the Mission Bay South area of San Francisco. (Figure 1) As part of this work, UCSF is evaluating alternative alignments of Fourth Street and configurations of Fourth, Owens, Third, 16th and Mariposa Streets surrounding the Project Site.

The proposed UCSF Medical Center would consist of a hospital, an ambulatory care center (ACC), am energy center and parking and would be located in Blocks X-3 and 36 to 39. The site is bounded by 16th Street to the north, Mariposa Street to the south, Owens Street to the east and Third Street to the west. Fourth Street runs parallel to Third Street and Owens Street between the Blocks X-3, 36, 37 and 38 to 39. The location of Blocks X-3 and 36 to 39, and the surrounding street network are as shown in Figure 2.

The Medical Center would be built in two major phases. The first phase would consist of a 289-bed hospital, approximately 240,000 gross sq.ft. of ACC space and about 35,000 sq.ft. energy center, all located on Blocks X3, 36 and 37. The second phase would expand these uses to a total of 550-beds and potentially 436,500 gross sq.ft. of ACC space. The Phase 2 development would be located on Blocks 38 and 39. Table 1 below summarizes the expected staff and visitor population for each development phase on a typical weekday.

**Table 1**
**Average Weekday Staff and Visitor Population**

| **Hospital/Ambulatory Care Center** | **Phase 1 289-Bed + ACC 240,000 gsf** | **Phase 2 550-Bed + ACC 436,500 gsf** |
|---|---|---|
| Physician/Faculty | 279 | 517 |
| Hospital/ACC Staff | 644 | 1,379 |
| House Staff/Intern/Student | 172 | 328 |
| *Subtotal* | *1,095* | *2,224* |
| Hospital Patients | 246 | 468 |
| Visitors to Patients | 615 | 1,170 |
| Outpatients | 1,560 | 2,838 |
| Visitors to Outpatients | 1,560 | 2,838 |
| Visitors to Hospital/ACC Staff | 39 | 93 |
| Vendors to Hospital/ACC Staff | 16 | 37 |
| *Subtotal* | *4,036* | *7,445* |
| **TOTAL Hospital/ACC** | **5,131** | **9,669** |

UCSF Campus Planning (October 2007)

**LEGEND**

- BART Line
- Caltrain

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Figure 1
**PROJECT STUDY AREA LOCATION**
100226/BASE - 06/22/06

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Figure 2
**MISSION BAY AND SURROUNDING STREET NETWORK**
102034/BASE - 11/07/07

The typical configuration of Fourth Street between 16th Street and Mariposa Street as defined in the current *Mission Bay South Infrastructure Plan* is a 50-feet travel way with one 17-feet traffic lane each way to facilitate vehicle and bicycle travel, plus an 8-feet wide on-street parking lane and a 12-feet sidewalk on both sides. The proposed Medical Center Project will maintain the alignment and right-of-way width of Fourth Street between 16th and Mariposa Streets, as presented in the *Mission Bay South Infrastructure Plan*, and will continue to operate as a public street.

In addition, UCSF is evaluating the possibility of changing the planned configuration of Fourth Street as part of the proposed development and is looking into two potential alternatives for the operation of Fourth Street through the Medical Center site. Both alternatives would convert the planned public street right-of-way to private (U.C. Regents') property.

- **Alternative 1** – Fourth Street provides access only to the Project Site from 16th Street on the north and from Mariposa Street on the South (drop offs and pick ups, deliveries, parking) with no though traffic allowed on Fourth Street between 16th Street and Mariposa Street.
- **Alternative 2** – Traffic is allowed to travel on Fourth Street between 16th Street and Mariposa Street, but through vehicles are discouraged with traffic calming measures and pedestrian crosswalks.

# 2. EXISTING CONDITIONS

This section describes current operating conditions of the study intersections considered for the proposed UCSF Medical Center project. The existing street patterns in the vicinity of the Mission Bay West subarea are shown in Figure 3.

## 2.1 Intersection Analysis Methodology

The operating characteristics of intersections are described by the concept of Level of Service (LOS). LOS is a qualitative description of the performance of an intersection based on the average delay per vehicle. Intersection levels of service ranges from LOS A, which indicates free flow conditions with short delays, to LOS F, which indicates congested or overloaded conditions with extremely long delays. Appendix A presents LOS descriptions for signalized and unsignalized intersections

Both signalized and unsignalized intersections have been evaluated using the *2000 Highway Capacity Manual* (HCM) methodology[1]. For signalized intersections, this methodology determines the capacity of each lane group approaching the intersection. The LOS is then based on average delay (in seconds per vehicle) for the various movements within the intersection. A combined weighted average delay and LOS are presented for the intersection. For unsignalized intersections, the average delay and LOS operating conditions are calculated by approach (e.g., northbound) and movement (e.g., northbound left-turn), for those movements that are subject to delay. As such, in the LOS summary tables, the operating conditions for unsignalized intersections are presented for the worst approach.

## 2.2 Intersection Operating Conditions

Existing intersection operating conditions were evaluated for the weekday p.m. peak traffic hour (the highest 60-minute period between 4:00 p.m. and 6:00 p.m.) at the following eight key intersections, located along Mariposa Street and 16th Street in the vicinity of development Blocks X-3 and 36 to 39 in the Mission Bay area. Figures 4 and 5 present the existing traffic turning-movement volumes and the intersection geometric configurations at the study intersections, respectively.

- Mariposa St. / Third St.
- Mariposa St. / Minnesota St.
- Mariposa St. / I-280 NB off-ramp
- Mariposa St. / I-280 SB on-ramp
- 16th St. / Third St.
- 16th St. / Fourth St.
- 16th St. / Owens St.
- 16th St. / Seventh St.-Mississippi St.

[1] As part of the HCM methodology, adjustments are typically made to the capacity of each intersection to account for various factors that reduce the ability of the streets to accommodate vehicle (such as the downtown nature of the area, number of pedestrians, vehicle types, lane widths, grades, on-street parking and queues). These adjustments are performed to ensure that the LOS analysis results reflect the operating conditions that are observed in the field.

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**Figure 3**
**EXISTING NETWORK - MISSION BAY**
100226/BASE - 06/22/06

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WilburSmith ASSOCIATES

**Figure 4**
**EXISTING CONDITIONS – PM PEAK HOUR VOLUMES**
102034/BASE - 11/7/07

**Figure 5**
**EXISTING CONDITIONS – LANE CONFIGURATION**
102034/BASE - 11/7/07

Four of the eight study intersections are currently controlled by traffic signals and the other four are unsignalized intersections. The traffic operations analysis has been performed using TRAFFIX software based on the *Highway Capacity Manual 2000* (*HCM 2000*) methodology. Table 2 presents the results of the intersection LOS analysis for the existing weekday p.m. peak-hour conditions. Appendix B presents the detail LOS calculations for existing conditions.

Under the existing conditions, the intersection Mariposa Street/I-280 SB on-ramp operates as a two-way stop controlled intersection with a stop signal for eastbound approach and no control for westbound approach. TRAFFIX software package is not equipped to analyze stop-controlled intersections that have stop sign for only one of the two approaches of the major street. Therefore, a different procedure is followed so as to analyze this intersection under existing conditions for the purposes of this study; it is assumed that this intersection is a three-legged intersection with eastbound, southbound, and northbound approaches; instead of eastbound, westbound, and northbound approaches. The westbound approach is assumed to be operating as the southbound approach and the southbound through traffic, previously westbound left turn traffic serves as the opposing traffic to the eastbound vehicles. Thus, in the modified methodology eastbound approach is stop-controlled, while southbound approach has no control.

**Table 2**
**Intersection Delay and Level of Service**
**Existing PM Peak Hour**
**Existing Roadway Conditions**

| Intersection Name | Traffic Control Device | Intersection Delay (sec. /veh.) | Intersection Level of Service (LOS) |
|---|---|---|---|
| Mariposa St / Third St | Traffic Signal | 20.0 | C |
| Mariposa St. / Minnesota St. | TWSC | 7.6 (NB) | B |
| Mariposa St / I-280 NB off-ramp | Traffic Signal | 49.9 | D |
| Mariposa St / I-280 SB on-ramp | OWSC | **40.4 (EB)** | **E** |
| 16th St / Third St | Traffic Signal | 20.0 | C |
| 16th St / Fourth St | TWSC | 12.3 (SB) | B |
| 16th St / Owens St | Traffic Signal | 14.0 | B |
| 16th St. / Seventh St.-Mississippi St. | Traffic Signal | 27.4 | C |

Notes:
TWSC – Two-Way Stop-Controlled
OWSC – One-Way Stop-Controlled
For unsignalized intersections, delay is presented for the worst stop-controlled approach.
**Bold** indicates intersection operates at unsatisfactory LOS and Delay

Source: Wilbur Smith Associates (2008)

As Table 2 indicates, seven of the eight study intersections operate at LOS D or better during the p.m. peak hour conditions. The stop-sign-controlled approach at the unsignalized intersection of Mariposa Street / I-280 SB on-ramp operates at LOS E. This intersection is planned to be signalized in the future in accordance with the *Mission Bay South Infrastructure Plan*, agreed upon by Catellus Development Corporation and the City and County of San Francisco.

# 3. TRAVEL DEMAND

## 3.1 Trip Generation

The transportation analysis conducted for the UCSF Medical Center at Mission Bay is based on factors developed from extensive surveys conducted at existing UCSF facilities over the past ten years, data gathered by the San Francisco Planning Department, and information obtained from the *UCSF Amendment #2 Hospital Replacement FEIR* (2005) and the *Mission Bay Plan Final SEIR* (1998) documents. The following paragraphs describe the specific trip generation rates assumed for the medical uses at the site and their p.m. peak hour proportions, as well as their trip distribution characteristics, travel mode splits and typical vehicle occupancy rates.

The time period chosen for analysis of potential transportation impacts was the peak hour of the 4:00 p.m. to 6:00 p.m. afternoon commute period. This time of day traditionally comprises a larger more concentrated portion of the total daily trips in San Francisco, and consequently was chosen to reflect the worst case scenario within a typical weekday.

The average staff and visitation population at the Medical Center for Phase 1 and Phase 2 during a typical weekday are shown in Table 3 below. The daily trip rates and p.m. peak hour trip rates for each population group are shown in Table 4. The trip rates for the p.m. peak hour are given as percentages of the total weekday daily trips. As noted, the trip rates are based on multiple transportation surveys conducted at the different UCSF Medical Center facilities over the past ten years. More detailed results of the trip generation analysis are shown in Appendix C.

**Table 3**
**UCSF Medical Center at Mission Bay**
**Average Weekday Staff and Visitation Population by Phase**

| Population Group | Phase 1 | Phase 2 |
|---|---|---|
| Physician/Faculty | 279 | 517 |
| Hospital Staff | 630 | 1,350 |
| House Staff/Intern/Student | 186 | 357 |
| *Subtotal Faculty/Staff/Students* | *1,095* | *2,224* |
| Hospital Patients | 246 | 468 |
| Visitors to Patients | 615 | 1,170 |
| Outpatients | 1,560 | 2,838 |
| Visitors to Outpatients | 1,560 | 2,838 |
| Visitors to Hospital/ACC Staff | 39 | 94 |
| Vendors to Hospital/ACC Staff | 16 | 37 |
| *Subtotal Patients/Visitors* | *4,036* | *7,445* |
| **Total** | **5,131** | **9,669** |

Source: UCSF Campus Planning (October 2007)

**Table 4**
**UCSF Medical Center at Mission Bay**
**Person Trip Generation Rates**

| Population Group | Weekday Daily Person Trip Rate (1) | Weekday p.m. Peak Hour Trip Rate (Percent of Total Daily Trips) |
|---|---|---|
| Physician/Faculty | 2.23 | 12% |
| Hospital Staff | 2.23 | 23% |
| House Staff/Intern/Student | 2.23 | 13% |
| Hospital Patients | 2.00 | 9% |
| Visitors to Patients | 2.00 | 7% |
| Outpatients | 2.00 | 9% |
| Visitors to Outpatients | 2.00 | 9% |
| Visitors to Hospital/ACC Staff | 2.00 | 7% |
| Vendors to Hospital/ACC Staff | 2.00 | 10% |

Source: UCSF Amendment #2 Hospital Replacement FEIR (2005)

Table 5 and Table 6 present weekday daily and p.m. peak hour person-trip generation for the Phase 1 and Phase 2 of the Medical Center.

**Table 5**
**UCSF Medical Center at Mission Bay**
**Weekday Daily Person Trips**

| Population Group | Phase 1 | Phase 2 |
|---|---|---|
| Physician/Faculty | 622 | 1,153 |
| Hospital Staff | 1,405 | 3,011 |
| House Staff/Intern/Student | 415 | 796 |
| *Subtotal Faculty/Staff/Students* | *2,442* | *4,960* |
| Hospital Patients | 492 | 936 |
| Visitors to Patients | 1,230 | 2,340 |
| Outpatients | 3,120 | 5,676 |
| Visitors to Outpatients | 3,120 | 5,676 |
| Visitors to Hospital/ACC Staff | 78 | 188 |
| Vendors to Hospital/ACC Staff | 32 | 74 |
| *Subtotal Patients/Visitors* | *8,072* | *14,890* |
| **Total** | **10,514** | **19,850** |

Source: Adavant Consulting (2008)

**Table 6**
**UCSF Medical Center at Mission Bay**
**Weekday PM Peak Hour Person Trips**

| Population Group | Phase 1 | Phase 2 |
|---|---|---|
| Physician/Faculty | 75 | 138 |
| Hospital Staff | 323 | 693 |
| House Staff/Intern/Student | 54 | 103 |
| *Subtotal Faculty/Staff/Students* | *452* | *934* |
| Hospital Patients | 89 | 168 |
| Visitors to Patients | 111 | 211 |
| Outpatients | 218 | 397 |
| Visitors to Outpatients | 281 | 511 |
| Visitors to Hospital/ACC Staff | 7 | 17 |
| Vendors to Hospital/ACC Staff | 2 | 5 |
| *Subtotal Patients/Visitors* | *708* | *1,309* |
| **Total** | **1,160** | **2,243** |

Source: Adavant Consulting (2008)

## 3.2 Trip Distribution

The previously generated trips were distributed as originating from or being destined for the East Bay, South Bay, and North Bay or to San Francisco. The East Bay includes Alameda, Contra Costa, Napa and Solano Counties. The North Bay includes Marin and Sonoma Counties. The South Bay is defined as San Mateo and Santa Clara Counties. Table 7 shows the total trip distribution for the Medical Center.

**Table 7**
**UCSF Medical Center at Mission Bay**
**Trip Distribution**

| Geographic Region | Percentage |
|---|---|
| San Francisco | 61% |
| North Bay | (1) |
| East Bay | 10% |
| South Bay | 29% |
| **Total** | **100%** |

Note:
(1) Included in San Francisco geographic region

Source: UCSF Amendment #2 Hospital Replacement FEIR (2005)

## 3.3 Mode Choice

"Mode choice" is the designation of trips to the various means that people use to travel, such as automobile, transit, walking, bicycling, taxi or other mode of transportation. The determination of the mode of transportation used in trips to and from the Medical Center would depend on the population group (faculty, staff, vendor, patient, and visitor) and the purpose of the trip (work,

visit, surgery). Table 8 shows the mode choice factors used for the Medical Center by type of population. Tables 9 and 10 present daily peak hour person-trips by mode of transportation for Phase 1 and Phase 2 of the project.

**Table 8**
**UCSF Medical Center at Mission Bay**
**Mode Choice Allocation**

| Population Group | Drive Alone | Drop off | Car pool | Van pool | MUNI | Other Transit | Bike/ Motor cycle | Walk |
|---|---|---|---|---|---|---|---|---|
| Physician/Faculty | 59% | 5% | 11% | 4% | 6% | 7% | 2% | 6% |
| Hospital Staff | 36% | 5% | 15% | 9% | 21% | 5% | 2% | 7% |
| House Staff/Intern/Student | 36% | 5% | 15% | 9% | 21% | 5% | 2% | 7% |
| Hospital Patients | 36% | 5% | 15% | 9% | 21% | 5% | 2% | 7% |
| Visitors to Patients | 59% | 5% | 11% | 4% | 6% | 7% | 2% | 6% |
| Outpatients | 36% | 5% | 15% | 9% | 21% | 5% | 2% | 7% |
| Visitors to Outpatients | 36% | 5% | 15% | 9% | 21% | 5% | 2% | 7% |
| Visitors to Hospital/ACC Staff | 59% | 5% | 11% | 4% | 6% | 7% | 2% | 6% |
| Vendors to Hospital/ACC Staff | 100% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |

Note:
Totals may not add up to 100 percent due to rounding

Source: UCSF Amendment #2 Hospital Replacement FEIR (2005)

**Table 9**
**UCSF Medical Center at Mission Bay**
**Weekday Daily Person Trips by Mode of Transportation**
**Phase 1**

| Population Group | Drive Alone | Drop off | Car pool | Van pool | MUNI | Other Transit | Bike/ Motor cycle | Walk |
|---|---|---|---|---|---|---|---|---|
| Physician/Faculty | 367 | 31 | 68 | 25 | 37 | 44 | 12 | 37 |
| Hospital Staff | 506 | 70 | 211 | 126 | 295 | 70 | 28 | 98 |
| House Staff/Intern/Student | 149 | 21 | 62 | 37 | 87 | 21 | 8 | 29 |
| *Subtotal Faculty/Staff/Students* | *1,022* | *122* | *341* | *189* | *419* | *135* | *49* | *165* |
| Hospital Patients | 177 | 25 | 74 | 44 | 103 | 25 | 10 | 34 |
| Visitors to Patients | 726 | 62 | 135 | 49 | 74 | 86 | 25 | 74 |
| Outpatients | 1,123 | 156 | 468 | 281 | 655 | 156 | 62 | 218 |
| Visitors to Outpatients | 1,123 | 156 | 468 | 281 | 655 | 156 | 62 | 218 |
| Visitors to Hospital/ACC Staff | 46 | 4 | 9 | 3 | 5 | 5 | 2 | 5 |
| Vendors to Hospital/ACC Staff | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Patients/Visitors* | *3,227* | *402* | *1,154* | *658* | *1,492* | *428* | *161* | *550* |
| **Total** | **4,249** | **524** | **1,495** | **847** | **1,912** | **563** | **210** | **714** |

Source: Adavant Consulting (2008)

**Table 10**
**UCSF Medical Center at Mission Bay**
**Weekday Daily Person Trips by Mode of Transportation**
**Phase 2**

| Population Group | Drive Alone | Drop off | Car pool | Van pool | MUNI | Other Transit | Bike/ Motor cycle | Walk |
|---|---|---|---|---|---|---|---|---|
| Physician/Faculty | 680 | 58 | 127 | 46 | 69 | 81 | 23 | 69 |
| Hospital Staff | 1,084 | 151 | 452 | 271 | 632 | 151 | 60 | 211 |
| House Staff/Intern/Student | 287 | 40 | 119 | 72 | 167 | 40 | 16 | 56 |
| *Subtotal Faculty/Staff/Students* | *2,051* | *248* | *698* | *389* | *869* | *271* | *99* | *336* |
| Hospital Patients | 337 | 47 | 140 | 84 | 197 | 47 | 19 | 66 |
| Visitors to Patients | 1,381 | 117 | 257 | 94 | 140 | 164 | 47 | 140 |
| Outpatients | 2,043 | 284 | 851 | 511 | 1,192 | 284 | 114 | 397 |
| Visitors to Outpatients | 2,043 | 284 | 851 | 511 | 1,192 | 284 | 114 | 397 |
| Visitors to Hospital/ACC Staff | 111 | 9 | 21 | 8 | 11 | 13 | 4 | 11 |
| Vendors to Hospital/ACC Staff | 74 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Patients/Visitors* | *5,989* | *741* | *2,121* | *1,207* | *2,732* | *791* | *296* | *1,012* |
| **Total** | **8,040** | **989** | **2,819** | **1,596** | **3,601** | **1,062** | **396** | **1,347** |

Source: Adavant Consulting (2008)

## 3.4 Auto Occupancy

Automobile occupancy (the number of persons per vehicle) is also very sensitive to the population group and the type of trip. Table 11 details the average auto occupancy rates by population group. Tables 12 and 13 summarize the weekday daily and PM peak hour vehicle trips for Phase 1 and Phase 2 of the project.

**Table 11**
**UCSF Medical Center at Mission Bay**
**Average Auto Occupancy Rates**

| Population Group | Average Auto Occupancy Rate (1) |
|---|---|
| Physician/Faculty | 1.1 |
| Hospital Staff | 1.2 |
| House Staff/Intern/Student | 1.2 |
| Hospital Patients | 1.2 |
| Visitors to Patients | 1.1 |
| Outpatients and their Visitors | 2.4 |
| Visitors to Hospital/ACC Staff | 1.1 |
| Vendors to Hospital/ACC Staff | 1.0 |

Notes:
(1) Average number of persons per vehicle, including the driver

Source: UCSF Amendment #2 Hospital Replacement FEIR (2005)

**Table 12**
**UCSF Medical Center at Mission Bay**
**Weekday Daily Vehicle Trips**

| Population Group | Phase 1 | Phase 2 |
|---|---|---|
| Physician/Faculty | 469 | 869 |
| Hospital Staff | 771 | 1,653 |
| House Staff/Intern/Student | 228 | 437 |
| *Subtotal Faculty/Staff/Students* | *1,468* | *2,959* |
| Hospital Patients | 270 | 514 |
| Visitors to Patients | 927 | 1,764 |
| Outpatients | 1,713 | 3,116 |
| Visitors to Outpatients | | |
| Visitors to Hospital/ACC Staff | 59 | 142 |
| Vendors to Hospital/ACC Staff | 32 | 74 |
| *Subtotal Patients/Visitors* | *3,001* | *5,610* |
| **Total** | **4,469** | **8,569** |

Source: Adavant Consulting (2008)

**Table 13**
**UCSF Medical Center at Mission Bay**
**Weekday PM Peak Hour Vehicle Trips**

| Population Group | Phase 1 | Phase 2 |
|---|---|---|
| Physician/Faculty | 56 | 104 |
| Hospital Staff | 177 | 380 |
| House Staff/Intern/Student | 29 | 57 |
| *Subtotal Faculty/Staff/Students* | *262* | *541* |
| Hospital Patients | 24 | 46 |
| Visitors to Patients | 65 | 124 |
| Outpatients | 154 | 281 |
| Visitors to Outpatients | 0 | 0 |
| Visitors to Hospital/ACC Staff | 4 | 10 |
| Vendors to Hospital/ACC Staff | 4 | 7 |
| *Subtotal Patients/Visitors* | *251* | *468* |
| **Total** | **513** | **1,009** |

Source: Adavant Consulting (2008)

# 4. MISSION BAY PLAN

## 4.1 Land Uses

The Mission Bay Plan (*Final Mission Bay SEIR, September 1998*) assumed that office, research & development and large retail would take place at Blocks X-3 and 36 through 40 in the Mission Bay West Subarea, the area bounded by 16th Street to the north, Third Street to the east, Mariposa Street to the south and I-280 to the west. Table 14 summarizes the types and intensities planned for the Mission Bay West Subarea.

**Table 14**
**Mission Bay Plan – West Subarea Land Uses**

| Land Use Type | Land Use Intensity (sq.ft.) |
|---|---|
| Office/Research & Development | 1,743,000 |
| Neighborhood Retail | 10,100 |
| Large Retail | 50,000 |
| **TOTAL** | **1,803,100** |

Source: UCSF Amendment #2 Hospital Replacement FEIR (2005), Table 4.11-11, p. 4.11-35

## 4.2 Roadway Network

The Mission Bay Plan proposes substantial changes to the existing street patterns in the vicinity of the Mission Bay West subarea, as shown in Figure 6, and as discussed below. Third Street, 16th Street, Mariposa Street, and Owens Street would remain in substantially the same alignment as today.

Third Street has been already reconfigured as part of the Muni Third Street Light Rail project, to accommodate two traffic lanes and a median, with exclusive left-turn lanes at major intersections. The typical median width is 24 feet, necessary to accommodate a double track for the Muni Metro's T-Third light rail service.

Seventh Street will remain in its current alignment and configuration. A new intersection will be created at Mission Bay Drive, which will traverse the Caltrain tracks at a new highway-rail crossing at grade.

16th Street would maintain is existing right-of-way width and exclusive eastbound and westbound left turn lanes would be provided at all intersections between Owens Street and Terry François Boulevard.

Mariposa Street would be widened on the north side by approximately 15 feet, and left turn lanes would be provided at major intersections. At the same time, Owens Street would be extended from 16th Street to Mariposa Street, to connect with the I-280 on- and off-ramps. The Mariposa Street Bridge over the Caltrain tracks would be restriped to provide an exclusive left turn lane in the westbound direction for a total of three lanes, and create a new signalized intersection with Owens Street.

The northbound I-280 off-ramp would be widened to the east to provide an additional lane and better align with Owens Street. Mariposa Street between the I-280 on-ramp and Pennsylvania Avenue would be re-striped to accommodate the lane configurations described above.

The typical configuration of Fourth Street between 16th Street and Mariposa Street as defined in the current *Mission Bay South Infrastructure Plan* is a 50-feet travel way with one 17-feet traffic lane each way to facilitate vehicle and bicycle travel (Class III bicycle facility), plus an 8-feet wide on-street parking lane and a 12-feet sidewalk on both sides. According to the *Mission Bay South Infrastructure Plan*, Fourth Street is also planned to be a designated Class III bikeway (bicycle route signed but not striped), providing an important bicycle route connection between the Mission Bay North area and the UCSF campus.

In addition, the *Final Mission Bay SEIR* and the *Mission Bay South Infrastructure Plan* call for the following five intersections to be signalized as part of the Mission Bay Plan.

- Mariposa St. / Minnesota St.-Fourth St.
- Mariposa St. / I-280 SB on-ramp
- 16th St. / Fourth St.
- Seventh St. / Mission Bay Drive

## 4.3 Intersection Operating Conditions

The future PM peak hour turning movement volumes developed as part of the transportation analyses for Mission Bay SEIR are shown in Figure 7. These turning movement volumes represent a best estimate of future transportation conditions in the Mission Bay West subarea at the complete buildup of the Mission Bay Plan. Figure 8 presents intersection geometric configurations at the six study intersections, as defined in the *Mission Bay South Infrastructure Plan*.

The transportation analyses conducted as part of the Mission Bay SEIR evaluated intersection operating conditions during the weekday p.m. peak traffic hour for the Mission Bay Plan buildout. Table 15 presents the results of the intersection LOS analysis for the Mission Bay Plan in 2025 during the weekday p.m. peak-hour conditions. As shown in the table, all of the study intersections would be controlled by traffic signals and would operate at LOS D or better during the p.m. peak hour conditions.

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**Figure 6**
**MISSION BAY – FUTURE PLANNED NETWORK**
100226/BASE - 06/22/06

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**Figure 7**
**YEAR 2025 PM PEAK HOUR VOLUMES – MISSION BAY PLAN**
101329/BASE - 06/22/07

ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates

**Figure 8**
**YEAR 2025 LANE CONFIGURATIONS – MISSION BAY PLAN**

101329/BASE - 06/22/07

**Table 15**
**Intersection Delay and Level of Service**
**Mission Bay Plan Buildout (2025) – PM Peak Hour**
**Mission Bay South Infrastructure Plan Roadway Conditions**

| Intersection Name | Traffic Control Device | Intersection Delay (sec. /veh.) | Intersection Level of Service (LOS) |
|---|---|---|---|
| Mariposa St / Third St | Traffic Signal | 49.9 | D |
| Mariposa St / Minnesota St-Fourth St (1) | Traffic Signal | 10.2 | B |
| Mariposa St / I-280 NB off-ramp-Owens St. | Traffic Signal | 39.9 | D |
| Mariposa St / I-280 SB on-ramp | Traffic Signal | 35.3 | D |
| 16th St / Third St | Traffic Signal | 43.1 | D |
| 16th St / Fourth St | Traffic Signal | 43.2 | D |
| 16th St / Owens St | Traffic Signal | 54.2 | D |
| 16th St./Seventh St.-Mississippi St. | Traffic Signal | 20.8 | C |
| Seventh St. / Mission Bay Dr. | Traffic Signal | 23.1 | C |

Note:
(1) This intersection was not analyzed in the UCSF Amendment #2 Hospital Replacement FEIR (2005). Intersection delay and level of service results shown in this table for this intersection are taken from the Final Mission Bay SEIR (1998), Volume II, Table VII.G.4, p VII.58. Intersection delay and level of service calculated using the 1994 Highway Capacity Manual Methodology.

Source: UCSF Amendment #2 Hospital Replacement FEIR (2005), Table 4.11-22, p. 4.11-48

# 5. UCSF MEDICAL CENTER PROJECT – FOURTH ST. OPEN AS A PUBLIC ROADWAY

The proposed Medical Center project calls for Fourth Street to be built between 16th Street and Mariposa Street as a public roadway as it is defined in the *Final Mission Bay Final SEIR* and the *Mission Bay South Infrastructure Plan* and has been described in the previous chapter of this report (Section 4.2–Roadway Network).

## 5.1 Intersection Operating Conditions

As described in the first chapter of this report (1–Introduction and Background) the Medical Center would be built in two major phases. The following ten intersections were analyzed for the Phase 1 (Year 2015 after Phase 1 is built and operational) and Phase 2 buildout of Medical Center (Year 2025 after Phase 2 is built and operational) assuming Fourth Street is a public roadway open to all vehicular traffic. These intersections are located along Mariposa Street, Owens Street and 16th Street, surrounding the project site:

- Mariposa St. / Third St
- Mariposa St. / Minnesota St.–Fourth St.
- Mariposa St. / I-280 NB off-ramp–Owens St.
- Mariposa St. / I-280 SB on-ramp
- 16th St. / Third St.
- 16th St. / Fourth St.
- 16th St. / Owens St.
- Owens Street / Center Garage Access
- 16th St. / Seventh St. –Mississippi St.
- Seventh St. / Mission Bay Drive

The traffic volumes at the study intersections for the pm peak hour for the 2025 under this development scenario have been derived from a variety of sources, including forecast traffic volumes for the buildout of Mission Bay obtained from the traffic analysis for the *Final Mission Bay SEIR*, future volumes included in the *UCSF LRDP Amendment #2 Hospital Replacement FEIR* and the traffic generation estimates for the proposed Medical Center developed specifically for this study and described in the third chapter of this report (3-Travel Demand).

The Year 2015 traffic volumes under phase 1 condition were developed assuming that most of the Mission Bay Plan projects would be completed by Year 2015 and the traffic volumes would be 80 percent of the Year 2025 Volumes. The Year 2015 and Year 2025 PM peak hour turning movement volumes, which include the vehicular traffic generated and attracted to the UCSF Medical Center Complex after Phase 1 and Phase 2 is built and operational are shown in Figure 9 and Figure 10 respectively.

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**Figure 9**
**YEAR 2015 PM PEAK HOUR VOLUMES – UCSF MEDICAL CENTER (PHASE - 1) WITH FOURTH ST. OPEN AS A PUBLIC ROADWAY**

ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates

**Figure 10**
**YEAR 2025 PM PEAK HOUR VOLUMES – UCSF MEDICAL CENTER (PHASE - 2) WITH FOURTH ST. OPEN AS A PUBLIC ROADWAY**

The turning movement volumes for Phase 1 and Phase 2 for the UCSF Medical Center represents a best estimate of future transportation conditions in the Mission Bay area in the vicinity of Blocks X-3 and 36 to 39. PM peak hour turning movement volumes have been used in this analysis since this represents the time period when traffic volumes are typically highest. The transportation analyses for the *Mission Bay SEIR* and the *UCSF LRDP Amendment #2 Hospital Replacement FEIR* were also conducted for the PM peak hour only.

For this analysis, Fourth Street was assumed to be configured as one 17-foot wide traffic lane each way to accommodate bicycle lanes (Class II bicycle facility) plus some on-street parking on either sides of the road from 16th Street to Mariposa Street, with exclusive turn lanes provided on the approaches to 16th Street and Mariposa Street. Figures 11 and 12 show the geometric lane configuration and circulation patterns assumed for the analysis of this project.

The traffic operations analysis has been performed using TRAFFIX software based on the *Highway Capacity Manual 2000 (HCM 2000)* methodology. The results of the future intersection LOS analysis performed at the study intersections for the years 2015 and 2025 PM peak hour conditions are summarized in Tables 16 and 17. Detailed calculations are included in Appendix D.

**Table 16**
**Intersection Delay and Level of Service**
**Year 2015 PM Peak Hour**
**UCSF Medical Center Project (Phase 1)**
**Mission Bay South Infrastructure Plan Roadway Conditions**
**with Fourth St. Open as a Public Roadway**

| Intersection Name | Traffic Control Device | Intersection Delay (sec. /veh.) | Intersection Level of Service (LOS) |
|---|---|---|---|
| Mariposa St / Third St | Traffic Signal | 27.4 | C |
| Mariposa St / Minnesota St–Fourth St | Traffic Signal | 18.9 | B |
| Mariposa St / I-280 NB off-ramp–Owens St. | Traffic Signal | 49.2 | D |
| Mariposa St / I-280 SB on-ramp | Traffic Signal | 15.7 | B |
| 16th St / Third St | Traffic Signal | 27.2 | C |
| 16th St / Fourth St | Traffic Signal | 23.5 | C |
| 16th St / Owens St | Traffic Signal | 38.5 | D |
| Owens St. / Center Garage Access | Stop Sign | 15.1 (WB) | C |
| 16th St./Seventh St.-Mississippi St. | Traffic Signal | 36.4 | D |
| Seventh St. / Mission Bay Dr. | Traffic Signal | 30.9 | C |

Notes:
Stop Sign control for the minor (garage) approach only
For unsignalized intersections, delay is presented for the worst stop-controlled approach.

Source: Wilbur Smith Associates (2008)

As shown in Table 16, all the study intersections would operate at an acceptable level of service (LOS D or better) for Phase 1 (2015) during the PM peak hour, thus no mitigation measures are required.

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**Figure 11**
**UCSF MEDICAL CENTER PROJECT - YEAR 2025 GEOMETRIC LANE CONFIGURATION WITH FOURTH STREET OPEN AS A PUBLIC ROADWAY - MITIGATED CONDITIONS**

101329/BASE - 06/22/07

As shown in Table 16, all of the study intersections would operate at an acceptable level of service (LOS D or better) under Year 2015 with the UCSF Medical Center Phase 1 conditions.

**Table 17**
**Intersection Delay and Level of Service**
**Year 2025 PM Peak Hour**
**UCSF Medical Center Project (Phase 2)**
**Mission Bay South Infrastructure Plan Roadway Conditions**
**with Fourth St. Open as a Public Roadway**

| Intersection Name | Traffic Control Device | Intersection Delay (sec. /veh.) | Intersection Level of Service (LOS) |
|---|---|---|---|
| Mariposa St / Third St | Traffic Signal | 53.2 | D |
| Mariposa St / Minnesota St–Fourth St | Traffic Signal | 20.2 | C |
| Mariposa St / I-280 NB off-ramp–Owens St. | Traffic Signal | 53.1 | D |
| Mariposa St / I-280 SB on-ramp | Traffic Signal | 16.5 | B |
| 16th St / Third St | Traffic Signal | 35.7 | D |
| 16th St / Fourth St | Traffic Signal | 37.0 | D |
| 16th St / Owens St | Traffic Signal | **70.4** | **E** |
| Owens St. / Center Garage Access | Stop Sign | **>50.0 (WB)** | **F** |
| 16th St./Seventh St.-Mississippi St. | Traffic Signal | 48.6 | D |
| Seventh St. / Mission Bay Dr. | Traffic Signal | 34.7 | C |

Notes:
Stop Sign control for the minor (garage) approach only
For unsignalized intersections, delay is presented for the worst stop-controlled approach.
**Bold** indicates intersection operates at unsatisfactory LOS and delay

Source: Wilbur Smith Associates (2008)

As shown in Table 17, eight out of ten study intersections would operate at an acceptable level of service (LOS D or better). The intersection of 16th and Owens Streets would operate at LOS E, while the minor (stop controlled) approach at the garage access at center of Owens Street would operate at LOS F with the operation of Phase 2 of the UCSF Medical Center.

The *UCSF LRDP Amendment #2 Hospital Replacement FEIR* prepared in 2005 identified the intersection of 16th and Owens Streets as a significant impact and provided a mitigation measure to reduce the impact to a non-significant level. This mitigation measure is further described in the following section.

## 5.2 Mitigation Measures for Phase 2

As shown in the analysis results described in the previous section for Phase 2 condition, it has been found that the signalized intersection of 16th Street and Owens Street as well as the unsignalized intersection at Owens Street and Center Garage Access would operate at an unacceptable level of service (LOS E or F) under Year 2025 during the PM peak hour with the implementation of Phase 2 of the UCSF Medical Center project. The following are the recommended mitigation measures designed to improve traffic conditions under Phase 2 at the intersections operating at unacceptable LOS.

### 16th Street and Owens Street Intersection

The implementation of a mitigation measure recommended from the *UCSF LRDP Amendment #2 Hospital Replacement FEIR* would improve the operating conditions at this intersection (non-significant impact). The *UCSF LRDP Amendment #2 Hospital Replacement FEIR* recommended the following mitigation measure at this location:

- Southbound Approach: Conversion of the exclusive left turn lane to a shared through-left turn lane and conversion of the shared through-right turn lane to an exclusive right turn lane, resulting in a lane configuration of one shared through-left turn lane, one through lane and one exclusive right turn lane at this approach. This measure can be accomplished by restriping the travel lanes within the existing right-of-way and no roadway widening would be required.

### Owens Street and Center Garage Access Intersection

- Signalization of this intersection and also coordination of the signal phasing at this intersection with the intersections of 16th and Owens Streets, and of Mariposa and I-280 SB on-ramp Intersections.

The implementation of the mitigation measure described above at the intersection of 16th and Owens Streets would improve the LOS from E to D and would reduce the average vehicle delay from 70.4 sec/veh to 50.3 sec/veh. The installation of a new traffic signal at the intersection of Owens Street and Center Garage Access would improve the LOS from F to B.

The improved operation conditions at the mitigated study intersections for Phase 2 conditions are shown in Table 18 on the following page. More detailed mitigated intersection LOS calculations are included in Appendix D.

**Table 18**
**Intersection Delay and Level of Service**
**Year 2025 PM Peak Hour**
**UCSF Medical Center Project (Phase 2)**
**Mission Bay South Infrastructure Plan Roadway Conditions**
**with Fourth St. Open as a Public Roadway**
**Mitigated Conditions**

| Intersection Name | Traffic Control Device | Intersection Delay (sec. /veh.) | Intersection Level of Service (LOS) |
|---|---|---|---|
| Mariposa St / Third St | Traffic Signal | 53.2 | D |
| Mariposa St / Minnesota St–Fourth St | Traffic Signal | 20.2 | C |
| Mariposa St / I-280 NB off-ramp–Owens St. | Traffic Signal | 53.1 | D |
| Mariposa St / I-280 SB on-ramp | Traffic Signal | 16.5 | B |
| 16th St / Third St | Traffic Signal | 35.7 | D |
| 16th St / Fourth St | Traffic Signal | 37.0 | D |
| ***16th St / Owens St*** | ***Traffic Signal*** | ***50.3*** | ***D*** |
| ***Owens St. / Center Garage Access*** | ***Traffic Signal*** | ***15.5*** | ***B*** |
| 16th St./Seventh St./Mississippi St. | Traffic Signal | 48.6 | D |
| Seventh St. / Mission Bay Blvd | Traffic Signal | 34.7 | C |

Notes:
Delay is presented in seconds per vehicle.
Mitigated intersections are shown in ***bold italics***

Source: Wilbur Smith Associates (2008)

# 6. UCSF MEDICAL CENTER ALTERNATIVE 1 – FOURTH ST. CLOSED TO THROUGH TRAFFIC

The proposed Medical Center project calls for Fourth Street to be built between 16th Street and Mariposa Street as a public roadway as it is defined in the Final Mission Bay Final SEIR and the Mission Bay South Infrastructure Plan. In addition, UCSF is evaluating the possibility of changing the planned configuration of Fourth Street as part of the proposed development and is looking into two potential alternatives. Under Alternative 1, Fourth Street would provide access only to the Project Site from 16th Street on the north and from Mariposa Street on the South with no though traffic allowed on Fourth Street between 16th Street and Mariposa Street.

## 6.1 Site Plan Description

Under this development alternative, Fourth Street would not be built in the center of the UCSF site. Fourth Street entrances on 16th and Mariposa Streets would be used for accessing the project site (drop offs and pick ups, access to the garages, deliveries, etc.) but not for through travel. The Fourth Street access points would lead to cul-de-sacs at the Medical Center and parking garage, with a connection to Owens Street and the nearby garage.

As described in Section 1 of this report, the Medical Center would be built in two major phases. Figures 12 and 13 show the Site Plan Circulation diagrams in Phases 1 and 2 of the project with Fourth Street closed to through traffic.

As shown diagrammatically in Figures 12 and 13, a combination of Class I (separate right of way for the exclusive use of bicycles) and Class II (striped bicycle lane adjacent to the traffic lane within the street right-of-way) bicycle facilities would connect 16th and Mariposa Streets following a north-south alignment. Bicycle lanes (Class II) would be provided between 16th Street and the North Access Road and between the South Access Road and Mariposa Street. A dedicated path (Class I) for the exclusive use of bicyclists would connect the North and South Access Roads through the center of the UCSF Medical Centre complex.

## 6.2 Intersection Operating Conditions

Twelve intersections were analyzed for the Phase 1 of Medical Center (Year 2015 after Phase 1 is built and operational) and Phase 2 buildout of Medical Center (Year 2025 after Phase 2 is built and operational) assuming Fourth Street closed to through traffic. These intersections are located along Mariposa Street, Owens Street, 16th Street, and Seventh Street in the vicinity of the project site. It should be noted that the intersection Owens Street and Center Garage Access does not exist during Phase 1 condition, since the proposed garage is not fully built yet. The twelve study intersections are:

- Mariposa St. / Third St
- Mariposa St. / Minnesota St.–Fourth St.
- Mariposa St. / I-280 NB off-ramp–Owens St.
- Mariposa St. / I-280 SB on-ramp
- 16th St. / Third St.
- 16th St. / Fourth St.

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Figure 12
UCSF MEDICAL CENTER ALTERNATIVE 1 (PHASE 1) - SITE PLAN CIRCULATION DIAGRAM WITH FOURTH STREET CLOSED TO THROUGH TRAFFIC

ENGINEERS PLANNERS ECONOMISTS
WilburSmith ASSOCIATES

Figure 13
UCSF MEDICAL CENTER ALTERNATIVE 1 (PHASE 2) - SITE PLAN CIRCULATION DIAGRAM WITH FOURTH STREET CLOSED TO THROUGH TRAFFIC
102034 - 11/7/07

16th St. / Owens St.

- Owens Street / North Access Road
- Owens Street / Center Garage Access
- Owens Street / South Access Road
- 16th St. / Seventh St.-Mississippi St.
- Seventh St. / Mission Bay Dr.

The traffic volumes at the study intersections for the pm peak hour in the Year 2015 and 2025 conditions have been derived by rerouting the through traffic assumed to travel through Fourth Street, as shown in Figure 9 and Figure 10 respectively, to alternative paths such as via Third and Owens Streets. The resulting turning movement volumes are shown in Figure 14 for Year 2015 with Phase 1 conditions and Figure 15 for Year 2025 with Phase 2 conditions.

For this analysis, Fourth Street was assumed to be configured as a single lane roadway in both directions from 16th Street and Mariposa Street to drop off locations at the project site, with striped bicycle lanes and exclusive turn lanes provided on the approaches to 16th Street and Mariposa Street. Figure 16 and Figure 17 show the geometric lane configuration at the study intersections for the Year 2015 and Year 2025 conditions, respectively. The traffic operations analysis at the twelve study intersections was conducted based on the *HCM 2000* methodology.

The results of the future intersection LOS analysis performed at the study intersections for the Phase 1 conditions are summarized in Table 19 (p. 38). Detailed calculations are included in Appendix E. All of the study intersections would operate at an acceptable level of service (LOS D or better) under Phase 1 (Year 2015) conditions, thus no mitigation measures are required.

**Figure 14**
**UCSF MEDICAL CENTER ALTERNATIVE 1 (PHASE 1) - YEAR 2015 PM PEAK HOUR TURNING MOVEMENT VOLUMES WITH FOURTH STREET CLOSED TO THROUGH TRAFFIC**

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**Figure 15**
**UCSF MEDICAL CENTER ALTERNATIVE 1 (PHASE 2) - YEAR 2025 PM PEAK HOUR TURNING MOVEMENT VOLUMES WITH FOURTH STREET CLOSED TO THROUGH TRAFFIC**

ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates

**Figure 16**
**UCSF MEDICAL CENTER ALTERNAIVE I (PHASE I) - YEAR 2015 GEOMETRIC LANE CONFIGURATIONS WITH FOURTH STREET CLOSED TO THROUGH TRAFFIC**

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS

**Figure 17**
**UCSF MEDICAL CENTER ALTERNATIVE 1 (PHASE 2) - YEAR 2025 GEOMETRIC LANE CONFIGURATIONS WITH FOURTH STREET CLOSED TO THROUGH TRAFFIC**

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**Table 19**
**Intersection Delay and Level of Service**
**Year 2015 PM Peak Hour**
**UCSF Medical Center Alternative 1 (Phase 1)**
**Mission Bay South Infrastructure Plan Roadway Conditions**
**with Fourth St. Closed to Through Traffic**

| Intersection Name | Traffic Control Device | Intersection Delay (sec. /veh.) | Intersection Level of Service (LOS) |
|---|---|---|---|
| Mariposa St / Third St | Traffic Signal | 34.8 | C |
| Mariposa St / Minnesota St–Fourth St | Traffic Signal | 15.0 | B |
| Mariposa St / I-280 NB off-ramp–Owens St. | Traffic Signal | 31.9 | C |
| Mariposa St / I-280 SB on-ramp | Traffic Signal | 16.4 | B |
| 16th St / Third St | Traffic Signal | 46.3 | D |
| 16th St / Fourth St | Traffic Signal | 25.9 | C |
| 16th St / Owens St | Traffic Signal | 41.4 | D |
| Owens St. / North Access Rd. | Stop Sign | 10.8 (WB) | B |
| Owens St. / Center Garage Access | Not built in Phase 1 | | |
| Owens St. / South Access Rd. | Stop Sign | 13.8 (WB) | B |
| 16th St. / Seventh St.-Mississippi St. | Traffic Signal | 34.9 | C |
| Seventh St. / Mission Bay Dr. | Traffic Signal | 31.2 | C |

Notes:
Stop Sign control for the minor (garage) approach only
For unsignalized intersections, delay is presented for the worst stop-controlled approach.

Source: Wilbur Smith Associates (2008)

The results of the future intersection LOS analysis performed at the study intersections for the Phase 2 conditions are summarized in Table 20 on the next page Detailed calculations are included in Appendix E. Eight out of the twelve study intersections would operate at an acceptable level of service (LOS D or better) under Phase 2 (Year 2025) conditions. The intersection of Mariposa and Third Streets would operate at LOS E, the intersection of 16th and Owens Streets would operate at LOS F, and the intersection of 16th and Third Streets would operate at LOS E. In addition, the minor (stop controlled) approach at the garage access at the center of Owens Street would operate at LOS F.

**Table 20**
**Intersection Delay and Level of Service**
**Year 2025 PM Peak Hour**
**UCSF Medical Center Alternative 1 (Phase 2)**
**Mission Bay South Infrastructure Plan Roadway Conditions**
**with Fourth St. Closed to Through Traffic**

| Intersection Name | Traffic Control Device | Intersection Delay (sec. /veh.) | Intersection Level of Service (LOS) |
|---|---|---|---|
| Mariposa St / Third St | Traffic Signal | **63.9** | **E** |
| Mariposa St / Minnesota St–Fourth St | Traffic Signal | 14.2 | B |
| Mariposa St / I-280 NB off-ramp–Owens St. | Traffic Signal | 43.3 | D |
| Mariposa St / I-280 SB on-ramp | Traffic Signal | 17.8 | B |
| 16th St / Third St | Traffic Signal | **75.4** | **E** |
| 16th St / Fourth St | Traffic Signal | 46.9 | D |
| 16th St / Owens St | Traffic Signal | **81.8** | **F** |
| Owens St. / North Access Rd. | Stop Sign | 13.2 (WB) | B |
| Owens St. / Center Garage Access | Stop Sign | **>50.0 (WB)** | **F** |
| Owens St. / South Access Rd. | Stop Sign | **43.9 (WB)** | **E** |
| 16th St./Seventh St./Mississippi St. | Traffic Signal | 47.1 | D |
| Seventh St. / Mission Bay Blvd | Traffic Signal | 35.8 | D |

Notes:
Stop Sign control for the minor (garage) approach only
For unsignalized intersections, delay is presented for the worst stop-controlled approach.
**Bold** indicates intersection operates at unsatisfactory LOS and delay

Source: Wilbur Smith Associates (2008)

Table 20 indicates that the intersection of 16th and Owens Street is estimated to operate at an unacceptable level of service (LOS E) in 2025 during the p.m. peak hour with the operation of Phase 2 of the UCSF Medical Center. The *UCSF LRDP Amendment #2 Hospital Replacement FEIR* prepared in 2005 identified this significant impact and provided a mitigation measure to reduce the impact to a non-significant level. This mitigation measure is further described in the following section.

## 6.3 Mitigation Measures for Phase 2

As shown in Table 20, the signalized intersections of Mariposa Street and Third Street, 16th Street and Owens Street and 16th Street and Third Street, as well as the unsignalized intersections at Owens Street with the Center Garage Access and South Garage access roads would operate at an unacceptable level of service (LOS E or F) during the PM peak hour in 2025 with the implementation of Phase 2 of the UCSF Medical Center project. The following are the recommended mitigation measures designed to improve traffic conditions at the intersections operating at unacceptable LOS.

### Mariposa Street and Third Street Intersection

- Southbound Approach: Provision of an exclusive right turn lane and conversion of the shared through-right turn lane to a through lane, resulting in a lane configuration of one exclusive left turn lane, two through lanes and one exclusive right turn lane at this approach. This measure would require widening street right-of-way an additional 11 feet to the west compared to the Mission Bay Plan, for a length of approximately 150 feet.

### 16th Street and Owens Street Intersection

The implementation of a mitigation measure recommended from the *UCSF LRDP Amendment #2 Hospital Replacement FEIR* and provision of additional left turn lane at northbound approach would improve the operating conditions at this intersection (non-significant impact). The *UCSF LRDP Amendment #2 Hospital Replacement FEIR* recommended the following mitigation measure at this location:

- Southbound Approach: Conversion of the exclusive left turn lane to a shared through-left turn lane and conversion of the shared through-right turn lane to an exclusive right turn lane, resulting in a lane configuration of one shared through-left turn lane, one through lane and one exclusive right turn lane at this approach. This measure can be accomplished by restriping the travel lanes within the existing right-of-way and no roadway widening would be required.

In addition, the following measure would also need to be implemented at the intersection of 16th Street and Owens Street Intersection:

- Northbound Approach: Provision of an additional exclusive left turn resulting in a lane configuration of two exclusive left-turn lanes, one through lane and one shared through-right turn lane at this approach.. This measure would require an increase in the width of the roadway by approximately 11 feet to the east, compared to the Mission Bay Plan, for a length of approximately 200 feet.

### 16th Street and Third Street Intersection

- Eastbound Approach: Conversion of the exclusive left turn lane to a shared through-left turn lane and conversion of the shared through-right turn lane to an exclusive right turn lane, resulting in a lane configuration of one shared through-left turn lane, one through lane and one exclusive right turn lane at this approach.
- Westbound Approach: Conversion of the exclusive left turn lane to a shared through-left turn lane, resulting in a lane configuration of one shared through-left turn lane and one shared through-right turn lane at this approach.

These two measures at the intersection of 16th Street and Third Street can be accomplished by restriping the travel lanes within the existing right-of-way and no roadway widening would be required.

### Owens Street and Center Garage Access Intersection

- Signalization of this intersection and also coordination of the signal phasing at this intersection with the intersections of 16$^{th}$ Street and Owens Street, and of Mariposa and I-280 SB on-ramp Intersections.

- Provision of a center turn lane at the UCSF garage access locations. This improvement would increase the width of the roadway by approximately 11 feet to the east between the North and South garage access roads, compared to the Mission Bay Plan.

These two measures would also increase the attractiveness of this intersection to left turning vehicles, resulting in a decrease in expected traffic at the intersection of Owens Street with the South Garage access road, which would then operate at an acceptable level of service (LOS C).

Figure 18 on the next page shows the mitigated geometric lane configurations for Phase 2 at the twelve study intersections.

## 6.4 Improvement Measures

A traffic volume to capacity analysis of southbound Third Street between 16th Street and Mariposa Street has also been conducted as part of the analysis to ascertain the effects of trucks accessing the service yard at the UCSF Medical Center off of Third Street. The results are summarized in Table 21.

**Table 21**
**Traffic Volume-to-Capacity Analysis on Third St. SB from 16th St. to Mariposa St.**
**PM Peak Hour**
**UCSF Medical Center Alternative 1**
**Mission Bay South Infrastructure Plan Roadway Conditions**
**with Fourth St. Closed to Through Traffic**

| SB Traffic Volume (veh./h) (1) | No. of lanes available to SB traffic | Roadway Capacity (veh./h) (2) | Volume to Capacity Ratio |
|---|---|---|---|
| **Phase 1 (2015)** | | | |
| 2,080 | 2 (3) | 2,340 | 0.89 |
| **Phase 2 (2025)** | | | |
| 2,390 | 2 (3) | 2,340 | **1.02** |
| 2,390 | 3 (4) | 3,350 | 0.71 |

Notes:
(1) Includes adjustments to reflect peak hour factors and traffic composition
(2) Adjusted to reflect the presence of trucks accessing the service yard and the potential partial blockage of southbound traffic on Third Street
(3) Two existing SB lanes on Third St.
(4) Two existing SB lanes on Third St. plus a truck pullout lane in front of the service yard

Source: Wilbur Smith Associates (2008)

As shown in Table 21, the two existing southbound lanes on Third Street would not be sufficient (volume-to-capacity ratio above 1.0) in Phase 2 to accommodate the potential partial blockage of one of the lanes caused by trucks entering or exiting the service yard off of Third Street. It is therefore recommended that as an improvement measure a truck pullout lane 11 feet wide and approximately 230 feet long be provided between the two driveways. The provision of the truck pullout lane would add sufficient capacity for southbound traffic (volume-to-capacity ratio of 0.73, below 1.0) in the event of a partial blockage caused by trucks entering or exiting the service yard.

**Figure 18**
**UCSF MEDICAL CENTER ALTERNATIVE I (PHASE 2) - YEAR 2025 GEOMETRIC LANE CONFIGURATIONS WITH FOURTH ST. CLOSED TO THROUGH TRAFFIC - MITIGATED CONDITIONS**

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The implementation of the mitigation measure described above at the intersection of Mariposa Street and Third Street would improve the expected LOS from E to D and would reduce the average vehicle delay from approximately 63.9 sec/veh to 38.8 sec/veh. The mitigation measure at 16th and Owens Streets would improve the LOS from F to D and would reduce the average vehicle delay from 81.8 sec/veh to about 43.9 sec/veh. The mitigation measure at 16th Street and Third Street intersection would improve the LOS from E to D and would reduce the delay from 75.4 sec/veh to 50.6 sec/veh. The installation of a new traffic signal at the intersection of Owens Street and Center Garage Access and the implementation of center turn lanes would improve the LOS from F to B.

The improved operation conditions at the mitigated study intersections are shown in Table 22. More detailed mitigated intersection LOS calculations are included in Appendix E.

**Table 22**
**Intersection Delay and Level of Service**
**Year 2025 PM Peak Hour**
**UCSF Medical Center Alternative 1 (Phase 2)**
**Mission Bay South Infrastructure Plan Roadway Conditions**
**with Fourth St. Closed to Through Traffic**
**Mitigated Conditions**

| Intersection Name | Traffic Control Device | Intersection Delay (sec. /veh.) | Intersection Level of Service (LOS) |
|---|---|---|---|
| ***Mariposa St / Third St*** | ***Traffic Signal*** | ***38.8*** | ***D*** |
| Mariposa St / Minnesota St–Fourth St | Traffic Signal | 13.7 | B |
| Mariposa St / I-280 NB off-ramp–Owens St. | Traffic Signal | 45.2 | D |
| Mariposa St / I-280 SB on-ramp | Traffic Signal | 17.8 | B |
| ***16th St / Third St*** | ***Traffic Signal*** | ***50.6*** | ***D*** |
| 16th St / Fourth St | Traffic Signal | 46.9 | D |
| ***16th St / Owens St*** | ***Traffic Signal*** | ***43.9*** | ***D*** |
| Owens St. / North Access Rd. | Stop Sign | 13.2 (WB) | B |
| ***Owens St. / Center Garage Access*** | ***Traffic Signal*** | ***10.5*** | ***B*** |
| Owens St. / South Access Rd. | Stop Sign | 16.5 (WB) | C |
| 16th St./Seventh St.-Mississippi St. | Traffic Signal | 47.1 | D |
| Seventh St. / Mission Bay Dr. | Traffic Signal | 35.8 | D |

Notes:
Stop Sign control for the minor (garage) approach only
For unsignalized intersections, delay is presented for the worst stop-controlled approach.
Mitigated intersections are shown in ***bold italics***

Source: Wilbur Smith Associates (2008)

# 7. UCSF MEDICAL CENTER ALTERNATIVE 2 – FOURTH ST. OPEN AS A PRIVATE ROADWAY

A second alternative that UCSF is evaluating calls for maintaining the proposed alignment of Fourth Street per the Mission Bay Plan so that traffic would be allowed to travel the entire length between 16th Street and Mariposa Street, but through vehicles would be discouraged with traffic calming measures and pedestrian crosswalks.

## 7.1 Site Plan Description

Under this development alternative Fourth Street would be open through the center of the UCSF site but as a private (U.C. Regents) roadway. Fourth Street would be used primarily for accessing the project site (drop offs and pick ups, access to the garages, deliveries, etc.) but could also be used for through travel. The design of Fourth Street would discourage through traffic with the use of traffic calming measures such as raised crosswalks, narrow lanes and sidewalk bulbouts. A striped bicycle lane adjacent to the vehicle travel lane in the street right-of-way (Class II bicycle facility) would be provided on both sides of Fourth Street, between 16th and Mariposa Streets. It is estimated that approximately 250 to 350 vehicles would travel on Fourth Street during the PM peak hour, compared to 750 to 900 vehicles per hour under public street conditions.

## 7.2 Intersection Operating Conditions

The same 12 study intersections identified in the previous section have been analyzed for this development option. As a baseline condition for this analysis, Fourth Street was assumed to be configured as a single lane roadway in both directions from 16th Street to Mariposa Street, with very limited on-street parking and with exclusive turn lanes provided on the approaches to 16th Street and Mariposa Street.

The future turning movement volumes estimated for the Year 2015 (Phase 1) and Year 2025 (Phase 2) conditions during the p.m. peak hour for this roadway alternative are shown in Figures 19 and 20, respectively. Figures 21 and 22 show the geometric lane configuration at the study intersections for Year 2015 and Year 2025 conditions, respectively. The geometric lane configurations and the traffic control devices at the study intersections used for the analysis of this alternative also include the mitigation measures proposed for Phase 2 (Year 2025) assuming that Fourth Street is closed for through traffic, *with the exception of the reconfiguration of the eastbound and westbound lanes at the intersection of 16th and Third Streets*. The eastbound and westbound (16th Street) approaches to this intersection would retain the same lane configuration as proposed in the Mission Bay Plan and shown in Figure 8, one exclusive left turn, one through lane and one shared through-right turn lane.

The results of the future intersection LOS analysis performed at the study intersections for the year 2015 and 2025 conditions during the p.m. peak hour are summarized in Tables 23 and 24, respectively. Detailed calculations are included in Appendix F. As shown in Tables 23 and 24, under year 2015 and 2025 conditions, all the study intersections would operate at an acceptable level of service (LOS D or better).

**Figure 19**
**UCSF MEDICAL CENTER ALTERNATIVE 2 (PHASE 1) - YEAR 2015 PM PEAK HOUR TURNING MOVEMENT VOLUMES WITH FOURTH STREET OPEN AS A PRIVATE ROADWAY**

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**Figure 20**
**UCSF MEDICAL CENTER ALTERNATIVE 2 (PHASE 2) - YEAR 2025 PM PEAK HOUR TURNING MOVEMENT VOLUMES WITH FOURTH STREET OPEN AS A PRIVATE ROADWAY**

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Wilbur Smith Associates

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Wilbur Smith Associates

**Figure 21**

**UCSF MEDICAL CENTER ALTERNATIVE 2 (PHASE - 1)**
**YEAR 2015 GEOMETRIC LANE CONFIGURATION WITH FOURTH STREET OPEN AS A PRIVATE ROADWAY**

101329/BASE - 11/07/07

ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates

**Figure 22**

**UCSF MEDICAL CENTER ALTERNATIVE 2 (PHASE - 2)**
**YEAR 2025 GEOMETRIC LANE CONFIGURATION WITH FOURTH STREET OPEN AS A PRIVATE ROADWAY - MITIGATED CONDITIONS**

101329/BASE - 11/07/07

**Table 23**
**Intersection Delay and Level of Service**
**Year 2015 PM Peak Hour**
**UCSF Medical Center Alternative 2 (Phase 1)**
**Mission Bay South Infrastructure Plan Roadway Conditions**
**with Fourth Street Open as a Private Roadway**

| Intersection Name | Traffic Control Device | Intersection Delay (sec. /veh.) | Intersection Level of Service (LOS) |
|---|---|---|---|
| Mariposa St / Third St | Traffic Signal | 37.9 | D |
| Mariposa St / Minnesota St–Fourth St | Traffic Signal | 18.3 | B |
| Mariposa St / I-280 NB off-ramp–Owens St. | Traffic Signal | 24.9 | C |
| Mariposa St / I-280 SB on-ramp | Traffic Signal | 16.4 | B |
| 16th St / Third St | Traffic Signal | 35.1 | D |
| 16th St / Fourth St | Traffic Signal | 27.2 | C |
| 16th St / Owens St | Traffic Signal | 41.6 | D |
| Owens St. / North Garage Access | Stop Sign | 10.5 (WB) | B |
| Owens St. / Center Garage Access | Not built in Phase 1 | | |
| Owens St. / South Garage Access | Stop Sign | 13.0 (WB) | B |
| 16th St./Seventh St.-Mississippi St. | Traffic Signal | 34.9 | C |
| Seventh St. / Mission Bay Dr. | Traffic Signal | 31.2 | C |

Notes:
Stop Sign control for the minor (garage) approach only
For unsignalized intersections, delay is presented for the worst stop-controlled approach.

Source: Wilbur Smith Associates (2008)

**Table 24**
**Intersection Delay and Level of Service**
**Year 2025 PM Peak Hour**
**UCSF Medical Center Alternative 2(Phase 2)**
**Mission Bay South Infrastructure Plan Roadway Conditions**
**with Fourth Street Open as a Private Roadway**
**Mitigated Conditions**

| Intersection Name | Traffic Control Device | Intersection Delay (sec. /veh.) | Intersection Level of Service (LOS) |
|---|---|---|---|
| Mariposa St / Third St | Traffic Signal | 49.1 | D |
| Mariposa St / Minnesota St–Fourth St | Traffic Signal | 18.5 | B |
| Mariposa St / I-280 NB off-ramp–Owens St. | Traffic Signal | 41.8 | D |
| Mariposa St / I-280 SB on-ramp | Traffic Signal | 17.8 | B |
| ***16th St / Third St*** | ***Traffic Signal*** | ***45.6*** | ***D*** |
| 16th St / Fourth St | Traffic Signal | 43.1 | D |
| ***16th St / Owens St*** | ***Traffic Signal*** | ***44.0*** | ***D*** |
| Owens St. / North Garage Access | Stop Sign | 12.6 (WB) | B |
| ***Owens St. / Center Garage Access*** | ***Traffic Signal*** | ***10.5*** | ***B*** |
| Owens St. / South Garage Access | Stop Sign | 15.1 (WB) | C |
| 16th St./Seventh St.-Mississippi St. | Traffic Signal | 47.1 | D |
| Seventh St. / Mission Bay Dr. | Traffic Signal | 35.8 | D |

Notes:
Stop Sign control for the minor (garage) approach only
For unsignalized intersections, delay is presented for the worst stop-controlled approach.
Mitigated intersections are shown in ***bold italics***

Source: Wilbur Smith Associates (2008)

# APPENDICES

# Appendix A

# Intersection LOS Analysis Definitions

**Table A-1**
**Level of Service Criteria and Definitions for Signalized Intersections**

| Level of Service | Stopped Delay (seconds/vehicle) | Typical Traffic Condition |
|---|---|---|
| A | ≤ 10.0 | **Very Low Delays:** Progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. |
| B | > 10.0 and ≤ 20.0 | **Minimal Delays:** Generally good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay. Drivers begin to feel restricted. |
| C | > 20.0 and ≤ 35.0 | **Acceptable Delays:** Fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear, though many still pass through the intersection without stopping. Most drivers feel somewhat restricted. |
| D | > 35.0 and ≤ 55.0 | **Tolerable Delays:** The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable. Queues may develop but dissipate rapidly, without excessive delays. |
| E | > 55.0 and ≤ 80.0 | **Significant Delays:** Considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences. Vehicles may wait through several signal cycles and long queues of vehicles form upstream. |
| F | > 80.0 | **Excessive Delays:** Considered to be unacceptable to most drivers. Often occurs with over saturation, that is, when arrival flow rates exceed the capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes to such delay levels. Queues may block upstream intersections. |

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

**Table A-2**
**Level of Service Criteria and Definitions for Two-way STOP-controlled Intersections**

| Level of Service | Average Total Delay (seconds/vehicle) | Typical Traffic Condition |
|---|---|---|
| A | ≤ 10 | Little or no delay |
| B | > 10 and ≤ 15 | Short traffic delays |
| C | > 15 and ≤ 25 | Average traffic delays |
| D | > 25 and ≤ 35 | Long traffic delays |
| E | > 35 and ≤ 50 | Very long traffic delays |
| F | > 50 | * |

* Level of Service F exists when there are insufficient gaps of suitable size to allow a side street demand to cross safely through a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queuing on the minor approaches

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

**Table A-3**
**Level of Service Criteria for All-way STOP-controlled Intersections**

| Level of Service | Average Total Delay (seconds/vehicle) |
|---|---|
| A | ≤ 10 |
| B | > 10 and ≤ 15 |
| C | > 15 and ≤ 25 |
| D | > 25 and ≤ 35 |
| E | > 35 and ≤ 50 |
| F | > 50 |

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

## Intersection Analysis

As part of the *Highway Capacity Manual, 2000* methodology (*HCM*), adjustments are typically made to the capacity of each intersection to account for various factors that reduce the ability of the streets to accommodate vehicles. These adjustments are performed to ensure that the LOS analysis results reflect the operating conditions that are observed in the field.

The following are the standard *HCM* adjustments that were applied in the intersection analyses conducted for this project:

- Area type
- Lane width
- Grade
- Heavy vehicles
- Parking
- Bus blockages
- Conflicting pedestrians
- Vehicle arrival type

# APPENDIX B

# LOS ANALYSIS – EXISTING CONDITIONS

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
Mission Bay Site
Existing PM Conditions

Scenario Report

| | |
|---|---|
| Scenario: | Existing PM |
| Command: | Existing |
| Volume: | Existing |
| Geometry: | Existing |
| Impact Fee: | Default Impact Fee |
| Trip Generation: | Default Trip Generation |
| Trip Distribution: | Default Trip Distribution |
| Paths: | Default Paths |
| Routes: | Default Routes |
| Configuration: | Existing |





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
Mission Bay Site
Existing PM Conditions

Impact Analysis Report
Level Of Service

| Intersection | Base LOS | Base Del/ Veh | Base V/ C | Future LOS | Future Del/ Veh | Future V/ C | Change in |
|---|---|---|---|---|---|---|---|
| # 1 Mariposa Street at 3rd Street | C | 20.0 | 0.608 | C | 20.0 | 0.608 | + 0.000 D/V |
| # 2 Mariposa St / Minnesota St | B | 0.6 | 0.000 | B | 0.6 | 0.000 | + 0.000 D/V |
| # 3 Mariposa Street at I-280 Off R | D | 49.9 | 0.580 | D | 49.9 | 0.580 | + 0.000 D/V |
| # 4 Mariposa Street at I-280 On Ra | E | 40.4 | 0.000 | E | 40.4 | 0.000 | + 0.000 D/V |
| # 5 16th Street at 3rd Street | C | 20.0 | 0.589 | C | 20.0 | 0.589 | + 0.000 D/V |
| # 6 16th Street at 4th Street | B | 12.3 | 0.000 | B | 12.3 | 0.000 | + 0.000 D/V |
| # 7 16th Street at Owens Street | B | 14.0 | 0.326 | B | 14.0 | 0.326 | + 0.000 D/V |
| # 11 16th Street at 7th Street | C | 27.4 | 0.597 | C | 27.4 | 0.597 | + 0.000 D/V |

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
Mission Bay Site
Existing PM Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 Mariposa Street at 3rd Street

Cycle (sec): 90 Critical Vol./Cap.(X): 0.608
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 20.0
Optimal Cycle: 90 Level Of Service: C

| Street Name: | 3rd Street | | | | | | Mariposa Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Ovl | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 0 | 1 | 1 0 | 1 0 | 1 | 1 0 | 1 0 | 1 | 1 0 | 1 0 | 1 | 1 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 56 | 979 | 22 | 18 | 690 | 162 | 152 | 59 | 53 | 15 | 97 | 22 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 56 | 979 | 22 | 18 | 690 | 162 | 152 | 59 | 53 | 15 | 97 | 22 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| PHF Volume: | 63 | 1108 | 25 | 20 | 781 | 183 | 172 | 67 | 60 | 17 | 110 | 25 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 63 | 1108 | 25 | 20 | 781 | 183 | 172 | 67 | 60 | 17 | 110 | 25 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 63 | 1108 | 25 | 20 | 781 | 183 | 172 | 67 | 60 | 17 | 110 | 25 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.84 | 0.82 | 0.82 | 0.84 | 0.79 | 0.79 | 0.84 | 0.78 | 0.78 | 0.84 | 0.81 | 0.81 |
| Lanes: | 1.00 | 1.96 | 0.04 | 1.00 | 1.62 | 0.38 | 1.00 | 1.05 | 0.95 | 1.00 | 1.63 | 0.37 |
| Final Sat.: | 1592 | 3055 | 69 | 1592 | 2441 | 573 | 1592 | 1558 | 1400 | 1592 | 2523 | 572 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.36 | 0.36 | 0.01 | 0.32 | 0.32 | 0.11 | 0.04 | 0.04 | 0.01 | 0.04 | 0.04 |
| Crit Moves: | | **** | | | **** | | **** | | | | **** | |
| Green/Cycle: | 0.07 | 0.60 | 0.60 | 0.02 | 0.55 | 0.73 | 0.18 | 0.20 | 0.20 | 0.05 | 0.07 | 0.07 |
| Volume/Cap: | 0.58 | 0.61 | 0.61 | 0.61 | 0.58 | 0.44 | 0.61 | 0.21 | 0.21 | 0.21 | 0.61 | 0.61 |
| Delay/Veh: | 61.5 | 13.0 | 13.0 | 105.5 | 15.0 | 5.6 | 43.5 | 31.0 | 31.0 | 47.2 | 52.4 | 52.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 61.5 | 13.0 | 13.0 | 105.5 | 15.0 | 5.6 | 43.5 | 31.0 | 31.0 | 47.2 | 52.4 | 52.4 |
| LOS by Move: | E | B | B | F | B | A | D | C | C | D | D | D |
| HCM2kAvgQ: | 3 | 11 | 11 | 1 | 10 | 6 | 5 | 2 | 2 | 1 | 3 | 3 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
Mission Bay Site
Existing PM Conditions

Level Of Service Computation Report
1994 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2 Mariposa St / Minnesota St

Average Delay (sec/veh): 0.6 Worst Case Level Of Service: B

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | - | T | - R | L | - | T | - R | L | - | T | - R | L | - | T | - R |
| Control: | Stop Sign | | | | Stop Sign | | | | Uncontrolled | | | | Uncontrolled | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Lanes: | 0 0 | 1! | 0 | 0 | 0 0 | 0 | 0 | 0 | 0 0 | 1 | 1 | 0 | 0 1 | 1 | 0 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 28 | 0 | 18 | | 0 | 0 | 0 | | 0 | 190 | 26 | | 10 | 381 | 0 | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| Initial Bse: | 28 | 0 | 18 | | 0 | 0 | 0 | | 0 | 190 | 26 | | 10 | 381 | 0 | |
| User Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| PHF Adj: | 0.88 | 0.88 | 0.88 | | 0.88 | 0.88 | 0.88 | | 0.88 | 0.88 | 0.88 | | 0.88 | 0.88 | 0.88 | |
| PHF Volume: | 32 | 0 | 20 | | 0 | 0 | 0 | | 0 | 215 | 29 | | 11 | 431 | 0 | |
| Reduct Vol: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Final Vol.: | 32 | 0 | 20 | | 0 | 0 | 0 | | 0 | 215 | 29 | | 11 | 431 | 0 | |
| Adjusted Volume Module: | | | | | | | | | | | | | | | | |
| Grade: | 0% | | | | 0% | | | | 0% | | | | 0% | | | |
| % Cycle/Cars: | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | |
| % Truck/Comb: | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | |
| PCE Adj: | 1.10 | 1.10 | 1.10 | | 1.10 | 1.10 | 1.10 | | 1.10 | 1.00 | 1.00 | | 1.10 | 1.00 | 1.00 | |
| Cycl/Car PCE: | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | |
| Trck/Cmb PCE: | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | |
| Adj Vol.: | 35 | 0 | 22 | | 0 | 0 | 0 | | 0 | 215 | 29 | | 12 | 431 | 0 | |
| Critical Gap Module: | | | | | | | | | | | | | | | | |
| MoveUp Time: | 3.4 | xxxx | 2.6 | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 2.1 | xxxx | xxxxx | | | | |
| Crit Gp Adj: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | |
| Critical Gp: | 7.0 | xxxx | 5.5 | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 5.5 | xxxx | xxxxx | | | | |
| Capacity Module: | | | | | | | | | | | | | | | | |
| Cnflict Vol: | 672 | xxxx | 122 | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | 244 | xxxx | xxxxx | | | | |
| Potent Cap.: | 394 | xxxx | 1201 | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | 1267 | xxxx | xxxxx | | | | |
| Adj Cap: | 0.99 | xxxx | 1.00 | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | 1.00 | xxxx | xxxxx | | | | |
| Move Cap.: | 388 | xxxx | 1201 | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | 1267 | xxxx | xxxxx | | | | |
| Level Of Service Module: | | | | | | | | | | | | | | | | |
| Control Del: | 10.1 | xxxx | 3.1 | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 2.9 | xxxx | xxxxx | | | | |
| LOS by Move: | * | * | * | * | * | * | * | * | * | A | * | * | | | | |
| Movement: | LT - | LTR - | RT | LT - | LTR - | RT | LT - | LTR - | RT | LT - | LTR - | RT | | | | |
| Shared Cap.: | xxxx | 528 | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | 1267 | xxxx | xxxxx | | | | |
| Shrd ConDel: | xxxxx | 7.6 | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 4.4 | xxxx | xxxxx | | | | |
| Shared LOS: | * | B | * | * | * | * | * | * | * | A | * | * | | | | |
| ApproachDel: | 7.6 | | | xxxxxx | | | 0.0 | | | 0.1 | | | | | | |

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
Mission Bay Site
Existing PM Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #3 Mariposa Street at I-280 Off Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.580
Loss Time (sec): 7 (Y+R=4.0 sec) Average Delay (sec/veh): 49.9
Optimal Cycle: 90 Level Of Service: D

| Street Name: | I-280 Off Ramp | | | | | | Mariposa Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 31 | 0 | 31 | 0 | 0 | 0 | 0 | 52 | 52 | 0 | 52 | 0 |
| Lanes: | 0 0 | 1! 0 | 1 | 0 0 | 0 0 | 0 | 0 0 | 2 0 | 0 | 0 0 | 2 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 465 | 0 | 132 | 0 | 0 | 0 | 0 | 99 | 0 | 0 | 420 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 465 | 0 | 132 | 0 | 0 | 0 | 0 | 99 | 0 | 0 | 420 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| PHF Volume: | 526 | 0 | 149 | 0 | 0 | 0 | 0 | 112 | 0 | 0 | 475 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 526 | 0 | 149 | 0 | 0 | 0 | 0 | 112 | 0 | 0 | 475 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 526 | 0 | 149 | 0 | 0 | 0 | 0 | 112 | 0 | 0 | 475 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.82 | 1.00 | 0.82 | 1.00 | 1.00 | 1.00 | 1.00 | 0.84 | 1.00 | 1.00 | 0.84 | 1.00 |
| Lanes: | 0.88 | 0.00 | 1.12 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| Final Sat.: | 1367 | 0 | 1755 | 0 | 0 | 0 | 0 | 3184 | 0 | 0 | 3184 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.39 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.15 | 0.00 |
| Crit Moves: | **** | | | | | | | | | | **** | |
| Green/Cycle: | 0.34 | 0.00 | 0.34 | 0.00 | 0.00 | 0.00 | 0.00 | 0.58 | 0.00 | 0.00 | 0.58 | 0.00 |
| Volume/Cap: | 1.12 | 0.00 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 | 0.26 | 0.00 |
| Delay/Veh: | 103.0 | 0.0 | 21.4 | 0.0 | 0.0 | 0.0 | 0.0 | 8.4 | 0.0 | 0.0 | 9.8 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 103.0 | 0.0 | 21.4 | 0.0 | 0.0 | 0.0 | 0.0 | 8.4 | 0.0 | 0.0 | 9.8 | 0.0 |
| LOS by Move: | F | A | C | A | A | A | A | A | A | A | A | A |
| HCM2kAvgQ: | 29 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
Mission Bay Site
Existing PM Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #4 Mariposa Street at I-280 On Ramp

Average Delay (sec/veh): 18.0 Worst Case Level Of Service: E[ 40.4]

| Street Name: | I-280 On Ramp | | | | | | | | | Mariposa Street | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | | South Bound | | | | East Bound | | | | | West Bound | | | |
| Movement: | L - T - R | | | | | L - T - R | | | | L - T - R | | | | | L - T - R | | | |
| Control: | Uncontrolled | | | | | Uncontrolled | | | | Stop Sign | | | | | Stop Sign | | | |
| Rights: | Include | | | | | Include | | | | Include | | | | | Ignore | | | |
| Lanes: | 0 0 | 0 | 0 | 0 | 0 | 0 0 | 1 | 0 | 1 | 1 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 0 | 270 | 615 | 99 | 0 | 614 | 0 | 0 | 0 | | | | | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | | | |
| Initial Bse: | 0 | 0 | 0 | 0 | 270 | 615 | 99 | 0 | 614 | 0 | 0 | 0 | | | | | | |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | | | | |
| PHF Adj: | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.00 | | | | | | |
| PHF Volume: | 0 | 0 | 0 | 0 | 306 | 696 | 112 | 0 | 695 | 0 | 0 | 0 | | | | | | |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | |
| Final Vol.: | 0 | 0 | 0 | 0 | 306 | 696 | 112 | 0 | 695 | 0 | 0 | 0 | | | | | | |
| Critical Gap Module: | | | | | | | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 6.4 | xxxx | 6.2 | xxxxx | xxxx | xxxxx | | | | | | |
| FollowUpTim: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 3.5 | xxxx | 3.3 | xxxxx | xxxx | xxxxx | | | | | | |
| Capacity Module: | | | | | | | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | 306 | xxxx | 306 | xxxx | xxxx | xxxxx | | | | | | |
| Potent Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | 686 | xxxx | 734 | xxxx | xxxx | xxxxx | | | | | | |
| Move Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | 686 | xxxx | 734 | xxxx | xxxx | xxxxx | | | | | | |
| Volume/Cap: | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | 0.16 | xxxx | 0.95 | xxxx | xxxx | xxxx | | | | | | |
| Level Of Service Module: | | | | | | | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | 0.6 | xxxx | 13.9 | xxxx | xxxx | xxxxx | | | | | | |
| Control Del: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 11.3 | xxxx | 45.1 | xxxxx | xxxx | xxxxx | | | | | | |
| LOS by Move: | * | * | * | * | * | * | B | * | E | * | * | * | | | | | | |
| Movement: | LT - LTR - RT | | | LT - LTR - RT | | | LT - LTR - RT | | | LT - LTR - RT | | | | | | | | |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | | | | |
| SharedQueue: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | | | |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | | | |
| Shared LOS: | * | * | * | * | * | * | * | * | * | * | * | * | | | | | | |
| ApproachDel: | xxxxxx | | | xxxxxx | | | 40.4 | | | xxxxxx | | | | | | | | |
| ApproachLOS: | * | | | * | | | E | | | * | | | | | | | | |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
Mission Bay Site
Existing PM Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #5 16th Street at 3rd Street

Cycle (sec): 90 Critical Vol./Cap.(X): 0.589
Loss Time (sec): 9 (Y+R=3.0 sec) Average Delay (sec/veh): 20.0
Optimal Cycle: 90 Level Of Service: C

| Street Name: | 3rd Street | | | | | | 16th Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Prot+Permit | | | Permitted | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 2 0 | 1 | 1 0 | 1 0 | 1 1 | 0 | 1 0 | 1 | 0 1 | 0 0 | 1! | 0 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 271 | 871 | 11 | 18 | 658 | 71 | 162 | 100 | 202 | 10 | 87 | 41 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 271 | 871 | 11 | 18 | 658 | 71 | 162 | 100 | 202 | 10 | 87 | 41 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| PHF Volume: | 307 | 986 | 12 | 20 | 745 | 80 | 183 | 113 | 229 | 11 | 98 | 46 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 307 | 986 | 12 | 20 | 745 | 80 | 183 | 113 | 229 | 11 | 98 | 46 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 307 | 986 | 12 | 20 | 745 | 80 | 183 | 113 | 229 | 11 | 98 | 46 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.81 | 0.82 | 0.82 | 0.84 | 0.80 | 0.80 | 0.65 | 0.88 | 0.75 | 0.83 | 0.83 | 0.83 |
| Lanes: | 2.00 | 1.98 | 0.02 | 1.00 | 1.81 | 0.19 | 1.00 | 1.00 | 1.00 | 0.07 | 0.63 | 0.30 |
| Final Sat.: | 3088 | 3088 | 39 | 1592 | 2757 | 298 | 1233 | 1676 | 1424 | 115 | 997 | 470 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.10 | 0.32 | 0.32 | 0.01 | 0.27 | 0.27 | 0.15 | 0.07 | 0.16 | 0.10 | 0.10 | 0.10 |
| Crit Moves: | **** | | | | **** | | | | **** | | | |
| Green/Cycle: | 0.53 | 0.53 | 0.53 | 0.07 | 0.48 | 0.48 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 |
| Volume/Cap: | 0.35 | 0.60 | 0.60 | 0.19 | 0.57 | 0.57 | 0.50 | 0.23 | 0.54 | 0.33 | 0.33 | 0.33 |
| Delay/Veh: | 16.3 | 16.0 | 16.0 | 43.6 | 18.4 | 18.4 | 30.6 | 24.7 | 31.0 | 26.3 | 26.3 | 26.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 16.3 | 16.0 | 16.0 | 43.6 | 18.4 | 18.4 | 30.6 | 24.7 | 31.0 | 26.3 | 26.3 | 26.3 |
| LOS by Move: | B | B | B | D | B | B | C | C | C | C | C | C |
| HCM2kAvgQ: | 3 | 10 | 10 | 1 | 9 | 9 | 5 | 2 | 6 | 4 | 4 | 4 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
Mission Bay Site
Existing PM Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #6 16th Street at 4th Street

Average Delay (sec/veh): 0.9 Worst Case Level Of Service: B[ 12.3]

| Street Name: | 4th Street | | | | | | 16th Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Stop Sign | | | Stop Sign | | | Uncontrolled | | | Uncontrolled | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Lanes: | 0 0 | 0 | 0 0 | 1 0 | 0 | 0 1 | 1 0 | 2 | 0 0 | 0 0 | 1 | 1 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 18 | 0 | 34 | 25 | 446 | 0 | 0 | 401 | 28 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 18 | 0 | 34 | 25 | 446 | 0 | 0 | 401 | 28 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| PHF Volume: | 0 | 0 | 0 | 20 | 0 | 38 | 28 | 505 | 0 | 0 | 454 | 32 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Final Vol.: | 0 | 0 | 0 | 20 | 0 | 38 | 28 | 505 | 0 | 0 | 454 | 32 |
| Critical Gap Module: | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | xxxxx | 6.8 | xxxx | 6.9 | 4.1 | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| FollowUpTim: | xxxxx | xxxx | xxxxx | 3.5 | xxxx | 3.3 | 2.2 | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| Capacity Module: | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | 779 | xxxx | 243 | 486 | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Potent Cap.: | xxxx | xxxx | xxxxx | 333 | xxxx | 758 | 1074 | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Move Cap.: | xxxx | xxxx | xxxxx | 326 | xxxx | 758 | 1074 | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Volume/Cap: | xxxx | xxxx | xxxx | 0.06 | xxxx | 0.05 | 0.03 | xxxx | xxxx | xxxx | xxxx | xxxx |
| Level Of Service Module: | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | 0.2 | xxxx | 0.2 | 0.1 | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| Control Del: | xxxxx | xxxx | xxxxx | 16.8 | xxxx | 10.0 | 8.4 | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| LOS by Move: | * | * | * | C | * | B | A | * | * | * | * | * |
| Movement: | LT - | LTR - | RT | LT - | LTR - | RT | LT - | LTR - | RT | LT - | LTR - | RT |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| SharedQueue: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| Shared LOS: | * | * | * | * | * | * | * | * | * | * | * | * |
| ApproachDel: | xxxxxx | | | 12.3 | | | xxxxxx | | | xxxxxx | | |
| ApproachLOS: | * | | | B | | | * | | | * | | |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
Mission Bay Site
Existing PM Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #7 16th Street at Owens Street

Cycle (sec): 110 Critical Vol./Cap.(X): 0.326
Loss Time (sec): 9 (Y+R=5.0 sec) Average Delay (sec/veh): 14.0
Optimal Cycle: 26 Level Of Service: B

| Street Name: | Owens Street | | | | | | 16th Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 0 0 | 0 0 | 0 | 2 0 | 0 0 | 1 | 1 0 | 2 0 | 0 | 0 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 61 | 0 | 127 | 87 | 410 | 0 | 0 | 286 | 149 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 61 | 0 | 127 | 87 | 410 | 0 | 0 | 286 | 149 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| PHF Volume: | 0 | 0 | 0 | 69 | 0 | 144 | 98 | 464 | 0 | 0 | 324 | 169 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 69 | 0 | 144 | 98 | 464 | 0 | 0 | 324 | 169 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 0 | 0 | 0 | 69 | 0 | 144 | 98 | 464 | 0 | 0 | 324 | 169 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 0.90 | 1.00 | 0.83 | 0.93 | 0.93 | 1.00 | 1.00 | 0.88 | 0.88 |
| Lanes: | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 1.00 | 1.00 | 2.00 | 0.00 | 0.00 | 1.31 | 0.69 |
| Final Sat.: | 0 | 0 | 0 | 3432 | 0 | 1583 | 1769 | 3538 | 0 | 0 | 2207 | 1150 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.09 | 0.06 | 0.13 | 0.00 | 0.00 | 0.15 | 0.15 |
| Crit Moves: | | | | | | **** | **** | | | | **** | |
| Green/Cycle: | 0.00 | 0.00 | 0.00 | 0.00 | 0.41 | 0.00 | 0.14 | 0.50 | 0.00 | 0.00 | 0.32 | 0.00 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | xxxx | 0.00 | xxxx | 0.41 | 0.26 | 0.00 | 0.00 | 0.46 | xxxx |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 36.7 | 13.0 | 0.0 | 0.0 | 24.8 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 36.7 | 13.0 | 0.0 | 0.0 | 24.8 | 0.0 |
| LOS by Move: | A | A | A | A | A | A | D | B | A | A | C | A |
| HCM2kAvgQ: | 0 | 0 | 0 | 6 | 0 | 23 | 3 | 4 | 0 | 0 | 6 | 40 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
Mission Bay Site
Existing PM Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #11 16th Street at 7th Street

Cycle (sec): 110 Critical Vol./Cap.(X): 0.597
Loss Time (sec): 9 (Y+R=5.0 sec) Average Delay (sec/veh): 27.4
Optimal Cycle: 40 Level Of Service: C

| Street Name: | 7th Street | | | | | | 16th Street | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L | T | R | L | T | R | L | T | R | L | T | R |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 0 | 1 0 | 1 | 1 0 | 0 1 | 0 | 0 1 | 0 1 | 0 | 0 1 | 1 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 27 | 403 | 23 | 128 | 166 | 44 | 25 | 346 | 79 | 62 | 185 | 166 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 27 | 403 | 23 | 128 | 166 | 44 | 25 | 346 | 79 | 62 | 185 | 166 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| PHF Volume: | 31 | 456 | 26 | 145 | 188 | 50 | 28 | 392 | 89 | 70 | 209 | 188 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 31 | 456 | 26 | 145 | 188 | 50 | 28 | 392 | 89 | 70 | 209 | 188 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 31 | 456 | 26 | 145 | 188 | 50 | 28 | 392 | 89 | 70 | 209 | 188 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.93 | 0.98 | 0.83 | 0.93 | 0.95 | 0.95 | 0.84 | 0.84 | 0.84 | 0.62 | 0.62 | 0.83 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 0.79 | 0.21 | 0.11 | 1.54 | 0.35 | 0.50 | 1.50 | 1.00 |
| Final Sat.: | 1769 | 1862 | 1583 | 1769 | 1426 | 378 | 177 | 2445 | 558 | 589 | 1757 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.24 | 0.02 | 0.08 | 0.13 | 0.13 | 0.16 | 0.16 | 0.16 | 0.12 | 0.12 | 0.12 |
| Crit Moves: | | **** | | | | **** | | **** | | | | |
| Green/Cycle: | 0.30 | 0.30 | 0.30 | 0.30 | 0.32 | 0.32 | 0.30 | 0.30 | 0.30 | 0.30 | 0.26 | 0.56 |
| Volume/Cap: | 0.06 | 0.82 | 0.05 | 0.27 | 0.41 | 0.41 | 0.53 | 0.53 | 0.53 | 0.40 | 0.45 | 0.21 |
| Delay/Veh: | 22.5 | 38.3 | 22.5 | 24.3 | 24.6 | 24.6 | 26.8 | 26.8 | 26.8 | 25.4 | 28.2 | 9.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 22.5 | 38.3 | 22.5 | 24.3 | 24.6 | 24.6 | 26.8 | 26.8 | 26.8 | 25.4 | 28.2 | 9.8 |
| LOS by Move: | C | D | C | C | C | C | C | C | C | C | C | A |
| HCM2kAvgQ: | 1 | 14 | 1 | 3 | 5 | 5 | 7 | 7 | 7 | 4 | 4 | 3 |

Note: Queue reported is the number of cars per lane.

# APPENDIX C
# TRAVEL DEMAND ANALYSIS

# UCSF Medical Center – Phase 1
# 289-Bed Hospital + 240,000 gsq.ft. ACC Program

**Trip Generation**
**289-Bed Hospital + 240,000 gsq.ft. ACC Program**
**Mission Bay Site**

| Population Group | Average Weekday Staff and Visitor Population | Daily Person Trip Rate /a/ | Net External Daily Person Trips | Mode Splits /b/ | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Drive Alone | | Drop-off | | Carpool | | Vanpool | | MUNI | | Other Transit | | Bike/ Motorycle | | Walk | | Total All Modes | |
| **Hospital/ACC** | | | | | | | | | | | | | | | | | | | | | | | |
| Physician/Faculty | 279 | 2.23 | 622 | 367 | 59% | 31 | 5% | 68 | 11% | 25 | 4% | 37 | 6% | 44 | 7% | 12 | 2% | 37 | 6% | 622 | 100% |
| Hospital Staff | 630 | 2.23 | 1,405 | 506 | 36% | 70 | 5% | 211 | 15% | 126 | 9% | 295 | 21% | 70 | 5% | 28 | 2% | 98 | 7% | 1,405 | 100% |
| House Staff/Intern/Student | 186 | 2.23 | 415 | 149 | 36% | 21 | 5% | 62 | 15% | 37 | 9% | 87 | 21% | 21 | 5% | 8 | 2% | 29 | 7% | 415 | 100% |
| *Subtotal* | *1,095* | *2.23* | *2,442* | *1,022* | *42%* | *122* | *5%* | *341* | *14%* | *189* | *8%* | *419* | *17%* | *135* | *6%* | *49* | *2%* | *165* | *7%* | *2,442* | *100%* |
| Hospital Inpatients | 246 | 2.00 | 492 | 177 | 36% | 25 | 5% | 74 | 15% | 44 | 9% | 103 | 21% | 25 | 5% | 10 | 2% | 34 | 7% | 492 | 100% |
| Visitors to Inpatients | 615 | 2.00 | 1,230 | 726 | 59% | 62 | 5% | 135 | 11% | 49 | 4% | 74 | 6% | 86 | 7% | 25 | 2% | 74 | 6% | 1,230 | 100% |
| ACC Outpatients | 1,560 | 2.00 | 3,120 | 1,123 | 36% | 156 | 5% | 468 | 15% | 281 | 9% | 655 | 21% | 156 | 5% | 62 | 2% | 218 | 7% | 3,120 | 100% |
| Visitors with Outpatients | 1,560 | 2.00 | 3,120 | 1,123 | 36% | 156 | 5% | 468 | 15% | 281 | 9% | 655 | 21% | 156 | 5% | 62 | 2% | 218 | 7% | 3,120 | 100% |
| Visitors to Hospital/ACC Staff | 39 | 2.00 | 78 | 46 | 59% | 4 | 5% | 9 | 11% | 3 | 4% | 5 | 6% | 5 | 7% | 2 | 2% | 5 | 6% | 78 | 100% |
| Vendors to Hospital/ACC Staff | 16 | 2.00 | 32 | 32 | 100% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 32 | 100% |
| *Subtotal* | *4,036* | *2.00* | *8,072* | *3,227* | *40%* | *402* | *5%* | *1,154* | *14%* | *658* | *8%* | *1,492* | *18%* | *428* | *5%* | *161* | *2%* | *550* | *7%* | *8,072* | *100%* |
| **Total Hospital / ACC** | **5,131** | | **10,514** | **4,249** | **40%** | **524** | **5%** | **1,495** | **14%** | **847** | **8%** | **1,912** | **18%** | **563** | **5%** | **210** | **2%** | **714** | **7%** | **10,514** | **100%** |
| **Research/Office** | | | | | | | | | | | | | | | | | | | | | | | |
| Physician/Faculty | - | 2.23 | 0 | 0 | 59% | 0 | 5% | 0 | 11% | 0 | 4% | 0 | 6% | 0 | 7% | 0 | 2% | 0 | 6% | 0 | 100% |
| Research/Office Staff | - | 2.23 | 0 | 0 | 36% | 0 | 5% | 0 | 15% | 0 | 9% | 0 | 21% | 0 | 5% | 0 | 2% | 0 | 7% | 0 | 100% |
| *Subtotal* | *0* | *-* | *0* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *0%* |
| Visitors to Research Staff | - | 2.00 | 0 | 0 | 59% | 0 | 5% | 0 | 11% | 0 | 4% | 0 | 6% | 0 | 7% | 0 | 2% | 0 | 6% | 0 | 100% |
| Vendors to Research Staff | - | 2.00 | 0 | 0 | 100% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 100% |
| *Subtotal* | *0* | *-* | *0* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *0%* |
| **Total Research/Office** | **0** | **-** | **0** | **0** | **-** | **0** | **-** | **0** | **-** | **0** | **-** | **0** | **-** | **0** | **-** | **0** | **-** | **0** | **-** | **0** | **0%** |
| **Grand Total** | **5,131** | **2.05** | **10,514** | **4,249** | **40%** | **524** | **5%** | **1,495** | **14%** | **847** | **8%** | **1,912** | **18%** | **563** | **5%** | **210** | **2%** | **714** | **7%** | **10,514** | **100%** |

/a/ Daily trip rate from the UCSF LRDP EIR, 1997.
/b/ Mode of travel based on Parnassus and Mount Zion transportation surveys, and UCSF LRDP EIR.
/c/ Vehicle trips are calculated based on the following formual: Dive Alone trips + (Drop-off trips x 2) + (Carpool trips / 2) + (Vanpool trips / 10) + (Bike/Motorcycle trips / 4).
Note that outpatient visitors are assumed to accompany the outpatient; therefore, while outpatient visitors will generate person trips, additional vehicle trips would not be generated.
/d/ Source: Parnassus Heights Transportation Surveys, 1992 and 1999
/e/ No parking absentee rate is assumed, as the average weekday faculty, staff, and student population already accounts for absentee rates.
/f/ For parking generation, Mode Split accounts for drive-alone, carpool and vanpool trips.
/g/ Based on UCSF LRDP EIR 1996, Volume 3, Appendix 3, Table2, Footnote (2), page A-54.

**Trip Generation**
**289-Bed Hospital + 240,000 gsq.ft. ACC Program**
**Mission Bay Site**

| Population Group | Daily Vehicle Trips /c/ | Average Vehicle Occupancy (pass. per vehicle) | All Daily Transit Trips | | Peak Hour Percentages /d/ | | | | | | AM Peak Hour | | | | | | PM Peak Hour | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | AM Peak Hour | | | PM Peak Hour | | | Vehicles | | MUNI | | Other Transit | | Vehicles | | | MUNI | | Other Transit | |
| | | | | | % of Daily | % In | % Out | % of Daily | % In | % Out | In | Out | In | Out | In | Out | In | Out | Total | In | Out | In | Out |
| **Hospital/ACC** | | | | | | | | | | | | | | | | | | | | | | | |
| Physician/Faculty | 469 | 1.07 | 81 | 13% | 19% | 100% | 0% | 12% | 0% | 100% | 89 | 0 | 7 | 0 | 8 | 0 | 0 | 56 | 56 | 0 | 4 | 0 | 5 |
| Hospital Staff | 771 | 1.22 | 365 | 26% | 23% | 100% | 0% | 23% | 3% | 97% | 177 | 0 | 68 | 0 | 16 | 0 | 5 | 172 | 177 | 2 | 66 | 0 | 16 |
| House Staff/Intern/Student | 228 | 1.22 | 108 | 26% | 18% | 97% | 3% | 13% | 5% | 95% | 40 | 1 | 15 | 0 | 4 | 0 | 1 | 28 | 29 | 1 | 11 | 0 | 3 |
| *Subtotal* | *1,468* | *1.17* | *554* | *23%* | *21%* | *100%* | *0%* | *18%* | *2%* | *98%* | *306* | *1* | *90* | *0* | *28* | *0* | *6* | *256* | *262* | *3* | *81* | *0* | *24* |
| Hospital Inpatients | 270 | 1.22 | 128 | 26% | 12% | 79% | 21% | 9% | 22% | 78% | 26 | 7 | 10 | 3 | 2 | 1 | 5 | 19 | 24 | 2 | 7 | 0 | 2 |
| Visitors to Inpatients | 927 | 1.07 | 160 | 13% | 10% | 78% | 22% | 7% | 28% | 72% | 72 | 20 | 6 | 2 | 7 | 2 | 18 | 47 | 65 | 1 | 4 | 2 | 4 |
| ACC Outpatients | 1,713 | 2.44 | 811 | 26% | 12% | 79% | 21% | 9% | 22% | 78% | 162 | 43 | 62 | 17 | 15 | 4 | 34 | 120 | 154 | 13 | 46 | 3 | 11 |
| Visitors with Outpatients | | | 811 | 26% | 12% | 79% | 21% | 9% | 22% | 78% | 0 | 0 | 62 | 17 | 15 | 4 | 0 | 0 | 0 | 13 | 46 | 3 | 11 |
| Visitors to Hospital/ACC Staff | 59 | 1.07 | 10 | 13% | 10% | 78% | 22% | 7% | 28% | 72% | 5 | 1 | 0 | 0 | 0 | 0 | 1 | 3 | 4 | 0 | 0 | 0 | 0 |
| Vendors to Hospital/ACC Staff | 32 | 1.00 | 0 | 0% | 19% | 84% | 16% | 10% | 19% | 81% | 5 | 1 | 0 | 0 | 0 | 0 | 1 | 3 | 4 | 0 | 0 | 0 | 0 |
| *Subtotal* | *3,001* | *1.87* | *1,920* | *24%* | *11%* | *79%* | *21%* | *8%* | *24%* | *76%* | *270* | *72* | *140* | *39* | *39* | *11* | *59* | *192* | *251* | *29* | *103* | *8* | *28* |
| **Total Hospital / ACC** | **4,469** | **1.64** | **2,474** | **24%** | **15%** | **89%** | **11%** | **11%** | **13%** | **87%** | **576** | **73** | **230** | **39** | **67** | **11** | **65** | **448** | **513** | **32** | **184** | **8** | **52** |
| **Research/Office** | | | | | | | | | | | | | | | | | | | | | | | |
| Physician/Faculty | 0 | 0.00 | 0 | 0% | 19% | 100% | 0% | 12% | 0% | 100% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Research/Office Staff | 0 | 0.00 | 0 | 0% | 23% | 100% | 0% | 23% | 3% | 97% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal* | *0* | *0.00* | *0* | *0%* | *0%* | *0%* | *100%* | *0%* | *0%* | *100%* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | | | | |
| Visitors to Research Staff | 0 | 0.00 | 0 | 0% | 10% | 78% | 22% | 7% | 28% | 72% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vendors to Research Staff | 0 | 0.00 | 0 | 0% | 19% | 84% | 16% | 10% | 19% | 81% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal* | *0* | *0.00* | *0* | *0%* | *0%* | *0%* | *100%* | *0%* | *0%* | *100%* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Total Research/Office** | **0** | **0.00** | **0** | **0%** | **0%** | **0%** | **100%** | **0%** | **0%** | **100%** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Grand Total** | **4,469** | **1.64** | **2,474** | **24%** | **15%** | **89%** | **11%** | **11%** | **13%** | **87%** | **576** | **73** | **230** | **39** | **67** | **11** | **65** | **448** | **513** | **32** | **184** | **8** | **52** |

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# UCSF Medical Center – Phase 2
# 550-Bed Hospital + 436,500 gsq.ft. ACC Program

**Trip Generation**
**550-Bed Hospital + 436,500 gsq.ft. ACC Program**
**Mission Bay Site**

| Population Group | Average Weekday Staff and Visitor Population | Daily Person Trip Rate /a/ | Net External Daily Person Trips | Mode Splits /b/ | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Drive Alone | | Drop-off | | Carpool | | Vanpool | | MUNI | | Other Transit | | Bike/ Motorycle | | Walk | | Total All Modes | |
| **Hospital/ACC** | | | | | | | | | | | | | | | | | | | | | | | |
| Physician/Faculty | 517 | 2.23 | 1,153 | 680 | 59% | 58 | 5% | 127 | 11% | 46 | 4% | 69 | 6% | 81 | 7% | 23 | 2% | 69 | 6% | 1,153 | 100% |
| Hospital Staff | 1,350 | 2.23 | 3,011 | 1,084 | 36% | 151 | 5% | 452 | 15% | 271 | 9% | 632 | 21% | 151 | 5% | 60 | 2% | 211 | 7% | 3,011 | 100% |
| House Staff/Intern/Student | 357 | 2.23 | 796 | 287 | 36% | 40 | 5% | 119 | 15% | 72 | 9% | 167 | 21% | 40 | 5% | 16 | 2% | 56 | 7% | 796 | 100% |
| *Subtotal* | *2,224* | *2.23* | *4,960* | *2,051* | *41%* | *248* | *5%* | *698* | *14%* | *389* | *8%* | *869* | *18%* | *271* | *5%* | *99* | *2%* | *336* | *7%* | *4,960* | *100%* |
| Hospital Inpatients | 468 | 2.00 | 936 | 337 | 36% | 47 | 5% | 140 | 15% | 84 | 9% | 197 | 21% | 47 | 5% | 19 | 2% | 66 | 7% | 936 | 100% |
| Visitors to Inpatients | 1,170 | 2.00 | 2,340 | 1,381 | 59% | 117 | 5% | 257 | 11% | 94 | 4% | 140 | 6% | 164 | 7% | 47 | 2% | 140 | 6% | 2,340 | 100% |
| ACC Outpatients | 2,838 | 2.00 | 5,676 | 2,043 | 36% | 284 | 5% | 851 | 15% | 511 | 9% | 1,192 | 21% | 284 | 5% | 114 | 2% | 397 | 7% | 5,676 | 100% |
| Visitors with Outpatients | 2,838 | 2.00 | 5,676 | 2,043 | 36% | 284 | 5% | 851 | 15% | 511 | 9% | 1,192 | 21% | 284 | 5% | 114 | 2% | 397 | 7% | 5,676 | 100% |
| Visitors to Hospital/ACC Staff | 94 | 2.00 | 188 | 111 | 59% | 9 | 5% | 21 | 11% | 8 | 4% | 11 | 6% | 13 | 7% | 4 | 2% | 11 | 6% | 188 | 100% |
| Vendors to Hospital/ACC Staff | 37 | 2.00 | 74 | 74 | 100% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 74 | 100% |
| *Subtotal* | *7,445* | *2.00* | *14,890* | *5,989* | *40%* | *741* | *5%* | *2,121* | *14%* | *1,207* | *8%* | *2,732* | *18%* | *791* | *5%* | *296* | *2%* | *1,012* | *7%* | *14,890* | *100%* |
| **Total Hospital / ACC** | **9,669** | | **19,850** | **8,040** | **41%** | **989** | **5%** | **2,819** | **14%** | **1,596** | **8%** | **3,601** | **18%** | **1,062** | **5%** | **396** | **2%** | **1,347** | **7%** | **19,850** | **100%** |
| **Research/Office** | | | | | | | | | | | | | | | | | | | | | | | |
| Physician/Faculty | - | 2.23 | 0 | 0 | 59% | 0 | 5% | 0 | 11% | 0 | 4% | 0 | 6% | 0 | 7% | 0 | 2% | 0 | 6% | 0 | 100% |
| Research/Office Staff | - | 2.23 | 0 | 0 | 36% | 0 | 5% | 0 | 15% | 0 | 9% | 0 | 21% | 0 | 5% | 0 | 2% | 0 | 7% | 0 | 100% |
| *Subtotal* | *0* | *-* | *0* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *0%* |
| Visitors to Research Staff | - | 2.00 | 0 | 0 | 59% | 0 | 5% | 0 | 11% | 0 | 4% | 0 | 6% | 0 | 7% | 0 | 2% | 0 | 6% | 0 | 100% |
| Vendors to Research Staff | - | 2.00 | 0 | 0 | 100% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 100% |
| *Subtotal* | *0* | *-* | *0* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *-* | *0* | *0%* |
| **Total Research / Office** | **0** | **-** | **0** | **0** | **-** | **0** | **-** | **0** | **-** | **0** | **-** | **0** | **-** | **0** | **-** | **0** | **-** | **0** | **-** | **0** | **0%** |
| **Grand Total** | **9,669** | **2.05** | **19,850** | **8,040** | **41%** | **989** | **5%** | **2,819** | **14%** | **1,596** | **8%** | **3,601** | **18%** | **1,062** | **5%** | **396** | **2%** | **1,347** | **7%** | **19,850** | **100%** |

/a/ Daily trip rate from the UCSF LRDP EIR, 1997.
/b/ Mode of travel based on Parnassus and Mount Zion transportation surveys, and UCSF LRDP EIR.
/c/ Vehicle trips are calculated based on the following formual: Dive Alone trips + (Drop-off trips x 2) + (Carpool trips / 2) + (Vanpool trips / 10) + (Bike/Motorcycle trips / 4).
Note that outpatient visitors are assumed to accompany the outpatient; therefore, while outpatient visitors will generate person trips, additional vehicle trips would not be generated.
/d/ Source: Parnassus Heights Transportation Surveys, 1992 and 1999
/e/ No parking absentee rate is assumed, as the average weekday faculty, staff, and student population already accounts for absentee rates.
/f/ For parking generation, Mode Split accounts for drive-alone, carpool and vanpool trips.
/g/ Based on UCSF LRDP EIR 1996, Volume 3, Appendix 3, Table2, Footnote (2), page A-54.

**Trip Generation**

**550-Bed Hospital + 436,500 gsq.ft. ACC Program**

**Mission Bay Site**

| Population Group | Daily Vehicle Trips /c/ | Average Vehicle Occupancy (pass. per vehicle) | All Daily Transit Trips | | Peak Hour Percentages /d/ | | | | | | AM Peak Hour | | | | | | PM Peak Hour | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | AM Peak Hour | | | PM Peak Hour | | | Vehicles | | MUNI | | Other Transit | | Vehicles | | | MUNI | | Other Transit | |
| | | | | | % of Daily | % In | % Out | % of Daily | % In | % Out | In | Out | In | Out | In | Out | In | Out | Total | In | Out | In | Out |
| **Hospital/ACC** | | | | | | | | | | | | | | | | | | | | | | | |
| Physician/Faculty | 869 | 1.07 | 150 | 13% | 19% | 100% | 0% | 12% | 0% | 100% | 165 | 0 | 13 | 0 | 15 | 0 | 0 | 104 | 104 | 0 | 8 | 0 | 10 |
| Hospital Staff | 1,653 | 1.22 | 783 | 26% | 23% | 100% | 0% | 23% | 3% | 97% | 380 | 0 | 145 | 0 | 35 | 0 | 11 | 369 | 380 | 4 | 141 | 1 | 34 |
| House Staff/Intern/Student | 437 | 1.22 | 207 | 26% | 18% | 97% | 3% | 13% | 5% | 95% | 76 | 2 | 29 | 1 | 7 | 0 | 3 | 54 | 57 | 1 | 21 | 0 | 5 |
| *Subtotal* | *2,959* | *1.18* | *1,140* | *23%* | *21%* | *100%* | *0%* | *18%* | *3%* | *97%* | *621* | *2* | *187* | *1* | *57* | *0* | *14* | *527* | *541* | *5* | *170* | *1* | *49* |
| Hospital Inpatients | 514 | 1.22 | 243 | 26% | 12% | 79% | 21% | 9% | 22% | 78% | 49 | 13 | 19 | 5 | 4 | 1 | 10 | 36 | 46 | 4 | 14 | 1 | 3 |
| Visitors to Inpatients | 1,764 | 1.07 | 304 | 13% | 10% | 78% | 22% | 7% | 28% | 72% | 138 | 39 | 11 | 3 | 13 | 4 | 35 | 89 | 124 | 3 | 7 | 3 | 8 |
| ACC Outpatients | 3,116 | 2.44 | 1,476 | 26% | 12% | 79% | 21% | 9% | 22% | 78% | 295 | 79 | 113 | 30 | 27 | 7 | 62 | 219 | 281 | 24 | 84 | 6 | 20 |
| Visitors with Outpatients | | | 1,476 | 26% | 12% | 79% | 21% | 9% | 22% | 78% | 0 | 0 | 113 | 30 | 27 | 7 | 0 | 0 | 0 | 24 | 84 | 6 | 20 |
| Visitors to Hospital/ACC Staff | 142 | 1.07 | 24 | 13% | 10% | 78% | 22% | 7% | 28% | 72% | 11 | 3 | 1 | 0 | 1 | 0 | 3 | 7 | 10 | 0 | 1 | 0 | 1 |
| Vendors to Hospital/ACC Staff | 74 | 1.00 | 0 | 0% | 19% | 84% | 16% | 10% | 19% | 81% | 12 | 2 | 0 | 0 | 0 | 0 | 1 | 6 | 7 | 0 | 0 | 0 | 0 |
| *Subtotal* | *5,610* | *1.85* | *3,524* | *24%* | *11%* | *79%* | *21%* | *8%* | *24%* | *76%* | *505* | *136* | *257* | *68* | *72* | *19* | *111* | *357* | *468* | *55* | *190* | *16* | *52* |
| **Total Hospital / ACC** | **8,569** | **1.61** | **4,663** | **23%** | **15%** | **89%** | **11%** | **12%** | **12%** | **88%** | **1,126** | **138** | **444** | **69** | **129** | **19** | **125** | **884** | **1,009** | **60** | **360** | **17** | **101** |
| **Research/Office** | | | | | | | | | | | | | | | | | | | | | | | |
| Physician/Faculty | 0 | 0.00 | 0 | 0% | 19% | 100% | 0% | 12% | 0% | 100% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Research/Office Staff | 0 | 0.00 | 0 | 0% | 23% | 100% | 0% | 23% | 3% | 97% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal* | *0* | *0.00* | *0* | *0%* | *0%* | *0%* | *100%* | *0%* | *0%* | *100%* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | | | | |
| Visitors to Research Staff | 0 | 0.00 | 0 | 0% | 10% | 78% | 22% | 7% | 28% | 72% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vendors to Research Staff | 0 | 0.00 | 0 | 0% | 19% | 84% | 16% | 10% | 19% | 81% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal* | *0* | *0.00* | *0* | *0%* | *0%* | *0%* | *100%* | *0%* | *0%* | *100%* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Total Research / Office** | **0** | **0.00** | **0** | **0%** | **0%** | **0%** | **100%** | **0%** | **0%** | **100%** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Grand Total** | **8,569** | **1.61** | **4,663** | **23%** | **15%** | **89%** | **11%** | **12%** | **12%** | **88%** | **1,126** | **138** | **444** | **69** | **129** | **19** | **125** | **884** | **1,009** | **60** | **360** | **17** | **101** |

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# APPENDIX D – LOS ANALYSIS

## PROJECT: FOURTH ST OPEN PUBLIC

# PROJECT: FOURTH ST. OPEN AS A PUBLIC ROADWAY
# PHASE 1 (2015) – UNMITIGATED CONDITIONS

UCSF Medical Center at Mission Bay - Transportation Study
Year 2015 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Scenario Report

| | |
|---|---|
| Scenario: | 2015 Cumulative |
| Command: | 2025 Cumulative |
| Volume: | 2025 Cumulative |
| Geometry: | Existing |
| Impact Fee: | Default Impact Fee |
| Trip Generation: | Default Trip Generation |
| Trip Distribution: | Default Trip Distribution |
| Paths: | Default Paths |
| Routes: | Default Routes |
| Configuration: | Existing |





UCSF Medical Center at Mission Bay - Transportation Study
Year 2015 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Impact Analysis Report
Level Of Service

| Intersection | Base LOS | Base Del/ Veh | Base V/ C | Future LOS | Future Del/ Veh | Future V/ C | Change in |
|---|---|---|---|---|---|---|---|
| # 1 Mariposa St / 3rd St | C | 27.4 | 0.928 | C | 27.4 | 0.928 | + 0.000 D/V |
| # 2 Mariposa St / Minnesota St/4th | B | 18.9 | 0.453 | B | 18.9 | 0.453 | + 0.000 D/V |
| # 3 Mariposa St / I-280 NB Off-Ram | D | 49.2 | 0.668 | D | 49.2 | 0.668 | + 0.000 D/V |
| # 4 Mariposa St / I-280 SB On-Ramp | B | 15.7 | 0.647 | B | 15.7 | 0.647 | + 0.000 D/V |
| # 5 16th St / 3rd St | C | 27.2 | 0.844 | C | 27.2 | 0.844 | + 0.000 D/V |
| # 6 16th St / 4th St | C | 23.5 | 0.771 | C | 23.5 | 0.771 | + 0.000 D/V |
| # 7 16th St / Owens St | D | 38.5 | 0.864 | D | 38.5 | 0.864 | + 0.000 D/V |
| # 8 Garage Access at Owens | C | 2.9 | 0.000 | C | 2.9 | 0.000 | + 0.000 D/V |
| # 11 16th St / Mississippi St/7th S | D | 36.4 | 0.771 | D | 36.4 | 0.771 | + 0.000 D/V |
| # 12 7th and Mission Bay Drive | C | 30.9 | 0.648 | C | 30.9 | 0.648 | + 0.000 D/V |

UCSF Medical Center at Mission Bay - Transportation Study
Year 2015 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 Mariposa St / 3rd St

Cycle (sec): 90 Critical Vol./Cap.(X): 0.928
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 27.4
Optimal Cycle: 111 Level Of Service: C

| Street Name: | 3rd St | | | | | | | | Mariposa St | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
| Movement: | L | - | T | - R | L | - | T | - R | L | - | T | - R | L | - | T | - R |
| Control: | Protected | | | | Protected | | | | Permitted | | | | Permitted | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 | 0 | 1 | 1 0 | 1 | 0 | 1 | 1 0 | 1 | 0 | 1 | 1 0 | 1 | 0 | 1 | 1 0 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 71 | 1403 | 35 | 28 | 1540 | 212 | 162 | 241 | 393 | 53 | 157 | 40 | | | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| Initial Bse: | 71 | 1403 | 35 | 28 | 1540 | 212 | 162 | 241 | 393 | 53 | 157 | 40 | | | | |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | | | | |
| PHF Volume: | 75 | 1477 | 37 | 29 | 1621 | 223 | 171 | 254 | 414 | 56 | 165 | 42 | | | | |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Reduced Vol: | 75 | 1477 | 37 | 29 | 1621 | 223 | 171 | 254 | 414 | 56 | 165 | 42 | | | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| Final Vol.: | 75 | 1477 | 37 | 29 | 1621 | 223 | 171 | 254 | 414 | 56 | 165 | 42 | | | | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | |
| Adjustment: | 0.93 | 0.91 | 0.91 | 0.93 | 0.89 | 0.89 | 0.57 | 0.84 | 0.84 | 0.18 | 0.90 | 0.90 | | | | |
| Lanes: | 1.00 | 1.95 | 0.05 | 1.00 | 1.76 | 0.24 | 1.00 | 1.00 | 1.00 | 1.00 | 1.59 | 0.41 | | | | |
| Final Sat.: | 1769 | 3383 | 84 | 1769 | 2974 | 409 | 1074 | 1604 | 1604 | 348 | 2735 | 697 | | | | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.44 | 0.44 | 0.02 | 0.55 | 0.55 | 0.16 | 0.16 | 0.26 | 0.16 | 0.06 | 0.06 | | | | |
| Crit Moves: | **** | | | | **** | | | | **** | | | | | | | |
| Green/Cycle: | 0.05 | 0.61 | 0.61 | 0.02 | 0.59 | 0.59 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 | | | | |
| Volume/Cap: | 0.93 | 0.72 | 0.72 | 0.72 | 0.93 | 0.93 | 0.57 | 0.57 | 0.93 | 0.58 | 0.22 | 0.22 | | | | |
| Delay/Veh: | 124.4 | 14.3 | 14.3 | 114.5 | 25.9 | 25.9 | 35.6 | 29.9 | 51.5 | 50.6 | 25.5 | 25.5 | | | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| AdjDel/Veh: | 124.4 | 14.3 | 14.3 | 114.5 | 25.9 | 25.9 | 35.6 | 29.9 | 51.5 | 50.6 | 25.5 | 25.5 | | | | |
| LOS by Move: | F | B | B | F | C | C | D | C | D | D | C | C | | | | |
| HCM2kAvgQ: | 5 | 16 | 16 | 2 | 29 | 29 | 5 | 7 | 16 | 2 | 2 | 2 | | | | |

Note: Queue reported is the number of cars per lane.





UCSF Medical Center at Mission Bay - Transportation Study
Year 2015 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 Mariposa St / Minnesota St/4th St

Cycle (sec): 60 Critical Vol./Cap.(X): 0.453
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 18.9
Optimal Cycle: 28 Level Of Service: B

| Street Name: | Minnesota St/ 4th St | | | | | | | | Mariposa St | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
| Movement: | L | - | T | - R | L | - | T | - R | L | - | T | - R | L | - | T | - R |
| Control: | Protected | | | | Protected | | | | Protected | | | | Protected | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 0 | 0 | 1! | 0 0 | 0 | 1 | 0 | 0 1 | 1 | 0 | 1 | 1 0 | 1 | 0 | 1 | 1 0 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 51 | 9 | 90 | 221 | 5 | 114 | 115 | 374 | 43 | 18 | 295 | 25 | | | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| Initial Bse: | 51 | 9 | 90 | 221 | 5 | 114 | 115 | 374 | 43 | 18 | 295 | 25 | | | | |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | | | | |
| PHF Volume: | 54 | 9 | 95 | 233 | 5 | 120 | 121 | 394 | 45 | 19 | 311 | 26 | | | | |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Reduced Vol: | 54 | 9 | 95 | 233 | 5 | 120 | 121 | 394 | 45 | 19 | 311 | 26 | | | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| Final Vol.: | 54 | 9 | 95 | 233 | 5 | 120 | 121 | 394 | 45 | 19 | 311 | 26 | | | | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | |
| Adjustment: | 0.89 | 0.89 | 0.89 | 0.93 | 0.93 | 0.83 | 0.93 | 0.92 | 0.92 | 0.93 | 0.92 | 0.92 | | | | |
| Lanes: | 0.34 | 0.06 | 0.60 | 0.98 | 0.02 | 1.00 | 1.00 | 1.79 | 0.21 | 1.00 | 1.84 | 0.16 | | | | |
| Final Sat.: | 572 | 101 | 1009 | 1735 | 39 | 1583 | 1769 | 3125 | 359 | 1769 | 3222 | 273 | | | | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.09 | 0.09 | 0.09 | 0.13 | 0.13 | 0.08 | 0.07 | 0.13 | 0.13 | 0.01 | 0.10 | 0.10 | | | | |
| Crit Moves: | | **** | | **** | | | **** | | | | **** | | | | | |
| Green/Cycle: | 0.21 | 0.21 | 0.21 | 0.30 | 0.30 | 0.30 | 0.15 | 0.34 | 0.34 | 0.03 | 0.21 | 0.21 | | | | |
| Volume/Cap: | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 0.26 | 0.45 | 0.38 | 0.38 | 0.38 | 0.45 | 0.45 | | | | |
| Delay/Veh: | 21.8 | 21.8 | 21.8 | 17.8 | 17.8 | 16.4 | 24.4 | 15.4 | 15.4 | 33.3 | 21.0 | 21.0 | | | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| AdjDel/Veh: | 21.8 | 21.8 | 21.8 | 17.8 | 17.8 | 16.4 | 24.4 | 15.4 | 15.4 | 33.3 | 21.0 | 21.0 | | | | |
| LOS by Move: | C | C | C | B | B | B | C | B | B | C | C | C | | | | |
| HCM2kAvgQ: | 3 | 3 | 3 | 4 | 4 | 2 | 3 | 4 | 4 | 1 | 3 | 3 | | | | |

Note: Queue reported is the number of cars per lane.

UCSF Medical Center at Mission Bay - Transportation Study
Year 2015 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #3 Mariposa St / I-280 NB Off-Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.668
Loss Time (sec): 12 (Y+R=3.0 sec) Average Delay (sec/veh): 49.2
Optimal Cycle: 123 Level Of Service: D

| Street Name: | I-280 NB Off-Ramp | | | | | | Mariposa St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Split Phase | | | Split Phase | | | Prot+Permit | | | Permitted | | |
| Rights: | Include | | | Ovl | | | Include | | | Include | | |
| Min. Green: | 36 | 36 | 36 | 33 | 33 | 33 | 21 | 21 | 0 | 0 | 21 | 21 |
| Lanes: | 1 0 | 1 | 1 0 | 1 0 | 0 0 | 2 | 0 1 | 1 0 | 0 | 0 0 | 2 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 516 | 358 | 249 | 218 | 0 | 590 | 9 | 119 | 0 | 0 | 591 | 37 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 516 | 358 | 249 | 218 | 0 | 590 | 9 | 119 | 0 | 0 | 591 | 37 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 543 | 377 | 262 | 229 | 0 | 621 | 9 | 125 | 0 | 0 | 622 | 39 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 543 | 377 | 262 | 229 | 0 | 621 | 9 | 125 | 0 | 0 | 622 | 39 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 543 | 377 | 262 | 229 | 0 | 621 | 9 | 125 | 0 | 0 | 622 | 39 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.94 | 0.88 | 0.88 | 0.93 | 1.00 | 0.73 | 0.93 | 0.93 | 1.00 | 1.00 | 0.88 | 0.88 |
| Lanes: | 1.00 | 1.18 | 0.82 | 1.00 | 0.00 | 2.00 | 0.14 | 1.86 | 0.00 | 0.00 | 2.82 | 0.18 |
| Final Sat.: | 1787 | 1979 | 1376 | 1769 | 0 | 2786 | 248 | 3279 | 0 | 0 | 4741 | 297 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.30 | 0.19 | 0.19 | 0.13 | 0.00 | 0.22 | 0.04 | 0.04 | 0.00 | 0.00 | 0.13 | 0.13 |
| Crit Moves: | **** | | | **** | | | **** | | | | **** | |
| Green/Cycle: | 0.29 | 0.29 | 0.29 | 0.27 | 0.00 | 0.44 | 0.34 | 0.34 | 0.00 | 0.00 | 0.17 | 0.17 |
| Volume/Cap: | 1.04 | 0.65 | 0.65 | 0.48 | 0.00 | 0.51 | 0.13 | 0.11 | 0.00 | 0.00 | 0.77 | 0.77 |
| Delay/Veh: | 93.3 | 39.6 | 39.6 | 38.6 | 0.0 | 25.3 | 28.7 | 27.8 | 0.0 | 0.0 | 52.9 | 52.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 93.3 | 39.6 | 39.6 | 38.6 | 0.0 | 25.3 | 28.7 | 27.8 | 0.0 | 0.0 | 52.9 | 52.9 |
| LOS by Move: | F | D | D | D | A | C | C | C | A | A | D | D |
| HCM2kAvgQ: | 28 | 12 | 12 | 8 | 0 | 10 | 2 | 2 | 0 | 0 | 10 | 10 |

Note: Queue reported is the number of cars per lane.





UCSF Medical Center at Mission Bay - Transportation Study
Year 2015 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #4 Mariposa St / I-280 SB On-Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.647
Loss Time (sec): 7 (Y+R=4.0 sec) Average Delay (sec/veh): 15.7
Optimal Cycle: 97 Level Of Service: B

| Street Name: | I-280 SB On-Ramp | | | | | | Mariposa St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 36 | 54 | 90 | 0 |
| Lanes: | 0 0 | 0 | 0 0 | 0 0 | 0 0 | 0 | 0 0 | 0 1 | 1 | 2 0 | 1 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 127 | 653 | 1135 | 562 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 127 | 653 | 1135 | 562 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 134 | 687 | 1195 | 592 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 134 | 687 | 1195 | 592 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 134 | 687 | 1195 | 592 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.86 | 0.86 | 0.90 | 0.98 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 1.67 | 2.00 | 1.00 | 0.00 |
| Final Sat.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 530 | 2725 | 3432 | 1862 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.35 | 0.32 | 0.00 |
| Crit Moves: | | | | | | | | **** | | **** | | |
| Green/Cycle: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.37 | 0.37 | 0.56 | 0.93 | 0.00 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.68 | 0.68 | 0.63 | 0.34 | 0.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 27.2 | 27.2 | 15.3 | 0.5 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 27.2 | 27.2 | 15.3 | 0.5 | 0.0 |
| LOS by Move: | A | A | A | A | A | A | A | C | C | B | A | A |
| HCM2kAvgQ: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 11 | 13 | 2 | 0 |

Note: Queue reported is the number of cars per lane.

UCSF Medical Center at Mission Bay - Transportation Study
Year 2015 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #5 16th St / 3rd St

Cycle (sec): 90 Critical Vol./Cap.(X): 0.844
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 27.2
Optimal Cycle: 74 Level Of Service: C

| Street Name: | 3rd St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 2 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 338 | 1270 | 21 | 34 | 1481 | 77 | 81 | 286 | 277 | 21 | 467 | 79 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 338 | 1270 | 21 | 34 | 1481 | 77 | 81 | 286 | 277 | 21 | 467 | 79 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 356 | 1337 | 22 | 36 | 1559 | 81 | 85 | 301 | 292 | 22 | 492 | 83 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 356 | 1337 | 22 | 36 | 1559 | 81 | 85 | 301 | 292 | 22 | 492 | 83 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 356 | 1337 | 22 | 36 | 1559 | 81 | 85 | 301 | 292 | 22 | 492 | 83 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.92 | 0.95 | 0.95 | 0.95 | 0.94 | 0.94 | 0.95 | 0.88 | 0.88 | 0.95 | 0.93 | 0.93 |
| Lanes: | 2.00 | 1.97 | 0.03 | 1.00 | 1.90 | 0.10 | 1.00 | 1.02 | 0.98 | 1.00 | 1.71 | 0.29 |
| Final Sat.: | 3502 | 3544 | 59 | 1805 | 3408 | 177 | 1805 | 1698 | 1645 | 1805 | 3020 | 511 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.10 | 0.38 | 0.38 | 0.02 | 0.46 | 0.46 | 0.05 | 0.18 | 0.18 | 0.01 | 0.16 | 0.16 |
| Crit Moves: | **** | | | | **** | | **** | | | | **** | |
| Green/Cycle: | 0.12 | 0.63 | 0.63 | 0.03 | 0.54 | 0.54 | 0.06 | 0.23 | 0.23 | 0.02 | 0.19 | 0.19 |
| Volume/Cap: | 0.84 | 0.60 | 0.60 | 0.60 | 0.84 | 0.84 | 0.84 | 0.76 | 0.76 | 0.76 | 0.84 | 0.84 |
| Delay/Veh: | 53.2 | 10.4 | 10.4 | 58.7 | 21.0 | 21.0 | 86.5 | 36.7 | 36.7 | 117.8 | 44.5 | 44.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 53.2 | 10.4 | 10.4 | 58.7 | 21.0 | 21.0 | 86.5 | 36.7 | 36.7 | 117.8 | 44.5 | 44.5 |
| LOS by Move: | D | B | B | E | C | C | F | D | D | F | D | D |
| HCM2kAvgQ: | 8 | 12 | 12 | 2 | 23 | 23 | 5 | 10 | 10 | 2 | 11 | 11 |

Note: Queue reported is the number of cars per lane.





UCSF Medical Center at Mission Bay - Transportation Study
Year 2015 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #6 16th St / 4th St

Cycle (sec): 60 Critical Vol./Cap.(X): 0.771
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 23.5
Optimal Cycle: 59 Level Of Service: C

| Street Name: | 4th St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 0 | 1 0 | 1 | 1 0 | 1 0 | 1 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 90 | 97 | 86 | 140 | 223 | 300 | 206 | 417 | 15 | 31 | 827 | 22 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 90 | 97 | 86 | 140 | 223 | 300 | 206 | 417 | 15 | 31 | 827 | 22 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 95 | 102 | 91 | 147 | 235 | 316 | 217 | 439 | 16 | 33 | 871 | 23 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 95 | 102 | 91 | 147 | 235 | 316 | 217 | 439 | 16 | 33 | 871 | 23 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 95 | 102 | 91 | 147 | 235 | 316 | 217 | 439 | 16 | 33 | 871 | 23 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 1.00 | 0.85 | 0.95 | 1.00 | 0.85 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.93 | 0.07 | 1.00 | 1.95 | 0.05 |
| Final Sat.: | 1805 | 1900 | 1615 | 1805 | 1900 | 1615 | 1805 | 3467 | 125 | 1805 | 3502 | 93 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.05 | 0.05 | 0.06 | 0.08 | 0.12 | 0.20 | 0.12 | 0.13 | 0.13 | 0.02 | 0.25 | 0.25 |
| Crit Moves: | **** | | | | | **** | **** | | | | **** | |
| Green/Cycle: | 0.07 | 0.13 | 0.13 | 0.19 | 0.25 | 0.25 | 0.16 | 0.42 | 0.42 | 0.06 | 0.32 | 0.32 |
| Volume/Cap: | 0.77 | 0.41 | 0.43 | 0.43 | 0.49 | 0.77 | 0.77 | 0.30 | 0.30 | 0.30 | 0.77 | 0.77 |
| Delay/Veh: | 52.8 | 25.0 | 25.4 | 22.3 | 19.8 | 29.5 | 36.6 | 11.7 | 11.7 | 28.6 | 21.6 | 21.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 52.8 | 25.0 | 25.4 | 22.3 | 19.8 | 29.5 | 36.6 | 11.7 | 11.7 | 28.6 | 21.6 | 21.6 |
| LOS by Move: | D | C | C | C | B | C | D | B | B | C | C | C |
| HCM2kAvgQ: | 4 | 2 | 2 | 3 | 4 | 8 | 6 | 3 | 3 | 1 | 10 | 10 |

Note: Queue reported is the number of cars per lane.

UCSF Medical Center at Mission Bay - Transportation Study
Year 2015 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #7 16th St / Owens St

Cycle (sec): 110 Critical Vol./Cap.(X): 0.864
Loss Time (sec): 12 (Y+R=3.0 sec) Average Delay (sec/veh): 38.5
Optimal Cycle: 99 Level Of Service: D

| Street Name: | Owens St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| Lanes: | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 83 | 242 | 142 | 38 | 610 | 468 | 112 | 459 | 23 | 9 | 1159 | 50 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 83 | 242 | 142 | 38 | 610 | 468 | 112 | 459 | 23 | 9 | 1159 | 50 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 87 | 255 | 149 | 40 | 642 | 493 | 118 | 483 | 24 | 9 | 1220 | 53 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 87 | 255 | 149 | 40 | 642 | 493 | 118 | 483 | 24 | 9 | 1220 | 53 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 87 | 255 | 149 | 40 | 642 | 493 | 118 | 483 | 24 | 9 | 1220 | 53 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 0.95 | 0.95 | 0.94 | 0.94 | 0.95 | 0.99 | 0.99 | 0.95 | 0.99 | 0.99 |
| Lanes: | 1.00 | 1.26 | 0.74 | 1.00 | 1.13 | 0.87 | 1.00 | 1.90 | 0.10 | 1.00 | 1.92 | 0.08 |
| Final Sat.: | 1805 | 2263 | 1328 | 1805 | 2011 | 1542 | 1805 | 3593 | 180 | 1805 | 3621 | 156 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.05 | 0.11 | 0.11 | 0.02 | 0.32 | 0.32 | 0.07 | 0.13 | 0.13 | 0.01 | 0.34 | 0.34 |
| Crit Moves: | **** | | | | **** | | **** | | | | **** | |
| Green/Cycle: | 0.06 | 0.37 | 0.30 | 0.12 | 0.37 | 0.37 | 0.08 | 0.35 | 0.35 | 0.12 | 0.39 | 0.39 |
| Volume/Cap: | 0.86 | 0.37 | 0.37 | 0.18 | 0.86 | 0.86 | 0.86 | 0.39 | 0.39 | 0.04 | 0.86 | 0.86 |
| Delay/Veh: | 100.7 | 30.3 | 30.3 | 43.7 | 38.3 | 38.3 | 90.1 | 27.2 | 27.2 | 43.1 | 36.5 | 36.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 100.7 | 30.3 | 30.3 | 43.7 | 38.3 | 38.3 | 90.1 | 27.2 | 27.2 | 43.1 | 36.5 | 36.5 |
| LOS by Move: | F | C | C | D | D | D | F | C | C | D | D | D |
| HCM2kAvgQ: | 5 | 5 | 5 | 1 | 21 | 21 | 6 | 6 | 6 | 0 | 23 | 23 |

Note: Queue reported is the number of cars per lane.





UCSF Medical Center at Mission Bay - Transportation Study
Year 2015 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
1994 HCM Unsignalized Method (Base Volume Alternative)

Intersection #8 Garage Access at Owens

Average Delay (sec/veh): 2.9 Worst Case Level Of Service: C

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | - | T | - R | L | - | T | - R | L | - | T | - R | L | - | T | - R |
| Control: | Uncontrolled | | | | Uncontrolled | | | | Stop Sign | | | | Stop Sign | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Lanes: | 0 | 0 | 1 | 1 0 | 0 | 1 | 1 | 0 0 | 0 | 0 | 0 | 0 0 | 1 | 0 | 0 | 0 1 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 386 | 18 | | 19 | 623 | 0 | | 0 | 0 | 0 | | 89 | 0 | 135 | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| Initial Bse: | 0 | 386 | 18 | | 19 | 623 | 0 | | 0 | 0 | 0 | | 89 | 0 | 135 | |
| User Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | |
| PHF Volume: | 0 | 406 | 19 | | 20 | 656 | 0 | | 0 | 0 | 0 | | 94 | 0 | 142 | |
| Reduct Vol: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Final Vol.: | 0 | 406 | 19 | | 20 | 656 | 0 | | 0 | 0 | 0 | | 94 | 0 | 142 | |
| Adjusted Volume Module: | | | | | | | | | | | | | | | | |
| Grade: | 0% | | | | 0% | | | | 0% | | | | 0% | | | |
| % Cycle/Cars: | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | |
| % Truck/Comb: | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | |
| PCE Adj: | 1.10 | 1.00 | 1.00 | | 1.10 | 1.00 | 1.00 | | 1.10 | 1.10 | 1.10 | | 1.10 | 1.10 | 1.10 | |
| Cycl/Car PCE: | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | |
| Trck/Cmb PCE: | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | |
| Adj Vol.: | 0 | 406 | 19 | | 22 | 656 | 0 | | 0 | 0 | 0 | | 103 | 0 | 156 | |
| Critical Gap Module: | | | | | | | | | | | | | | | | |
| MoveUp Time: | xxxxx | xxxx | xxxxx | | 2.1 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | 3.4 | xxxx | 2.6 | |
| Crit Gp Adj: | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | 0.00 | |
| Critical Gp: | xxxxx | xxxx | xxxxx | | 5.5 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | 7.0 | xxxx | 5.5 | |
| Capacity Module: | | | | | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | | 425 | xxxx | xxxxx | | xxxx | xxxx | xxxxx | | 1092 | xxxx | 213 | |
| Potent Cap.: | xxxx | xxxx | xxxxx | | 1013 | xxxx | xxxxx | | xxxx | xxxx | xxxxx | | 212 | xxxx | 1080 | |
| Adj Cap: | xxxx | xxxx | xxxxx | | 1.00 | xxxx | xxxxx | | xxxx | xxxx | xxxxx | | 0.96 | xxxx | 1.00 | |
| Move Cap.: | xxxx | xxxx | xxxxx | | 1013 | xxxx | xxxxx | | xxxx | xxxx | xxxxx | | 205 | xxxx | 1080 | |
| Level Of Service Module: | | | | | | | | | | | | | | | | |
| Control Del: | xxxxx | xxxx | xxxxx | | 3.6 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | 32.2 | xxxx | 3.8 | |
| LOS by Move: | * | * | * | | A | * | * | * | * | * | | | E | * | A | |
| Movement: | LT - | LTR - | RT | | LT - | LTR - | RT | | LT - | LTR - | RT | | LT - | LTR - | RT | |
| Shared Cap.: | xxxx | xxxx | xxxxx | | 1013 | xxxx | xxxxx | | xxxx | xxxx | xxxxx | | xxxx | xxxx | xxxxx | |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | | 10.6 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | xxxxx | xxxx | xxxxx | |
| Shared LOS: | * | * | * | | C | * | * | * | * | * | | | * | * | * | |
| ApproachDel: | 0.0 | | | | 0.1 | | | | xxxxxx | | | | 15.1 | | | |

UCSF Medical Center at Mission Bay - Transportation Study
Year 2015 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #11 16th St / Mississippi St/7th St

Cycle (sec): 110 Critical Vol./Cap.(X): 0.771
Loss Time (sec): 9 (Y+R=5.0 sec) Average Delay (sec/veh): 36.4
Optimal Cycle: 64 Level Of Service: D

| Street Name: | Mississippi St/ 7th St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 0 1 | 0 1 | | 1 0 0 | 1 0 | | 0 1 0 | 1 0 | | 0 1 1 | 0 1 | |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 29 | 277 | 25 | 148 | 134 | 70 | 90 | 421 | 85 | 68 | 1190 | 452 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 29 | 277 | 25 | 148 | 134 | 70 | 90 | 421 | 85 | 68 | 1190 | 452 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 31 | 292 | 26 | 156 | 141 | 74 | 95 | 443 | 89 | 72 | 1253 | 476 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 31 | 292 | 26 | 156 | 141 | 74 | 95 | 443 | 89 | 72 | 1253 | 476 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 31 | 292 | 26 | 156 | 141 | 74 | 95 | 443 | 89 | 72 | 1253 | 476 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 1.00 | 0.85 | 0.95 | 0.95 | 0.95 | 0.50 | 0.50 | 0.50 | 0.80 | 0.80 | 0.85 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 0.66 | 0.34 | 0.30 | 1.41 | 0.29 | 0.11 | 1.89 | 1.00 |
| Final Sat.: | 1805 | 1900 | 1615 | 1805 | 1184 | 619 | 286 | 1336 | 270 | 164 | 2875 | 1615 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.15 | 0.02 | 0.09 | 0.12 | 0.12 | 0.33 | 0.33 | 0.33 | 0.44 | 0.44 | 0.29 |
| Crit Moves: | | **** | | | **** | | | | | | **** | |
| Green/Cycle: | 0.24 | 0.24 | 0.24 | 0.20 | 0.20 | 0.20 | 0.48 | 0.48 | 0.48 | 0.45 | 0.45 | 0.65 |
| Volume/Cap: | 0.07 | 0.65 | 0.07 | 0.43 | 0.60 | 0.60 | 0.69 | 0.69 | 0.69 | 0.98 | 0.98 | 0.46 |
| Delay/Veh: | 32.7 | 41.2 | 32.7 | 39.4 | 42.7 | 42.7 | 24.3 | 24.3 | 24.3 | 49.3 | 49.3 | 10.1 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 32.7 | 41.2 | 32.7 | 39.4 | 42.7 | 42.7 | 24.3 | 24.3 | 24.3 | 49.3 | 49.3 | 10.1 |
| LOS by Move: | C | D | C | D | D | D | C | C | C | D | D | B |
| HCM2kAvgQ: | 1 | 10 | 1 | 5 | 7 | 7 | 10 | 10 | 10 | 29 | 29 | 8 |

Note: Queue reported is the number of cars per lane.





UCSF Medical Center at Mission Bay - Transportation Study
Year 2015 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #12 7th and Mission Bay Drive

Cycle (sec): 110 Critical Vol./Cap.(X): 0.648
Loss Time (sec): 9 (Y+R=5.0 sec) Average Delay (sec/veh): 30.9
Optimal Cycle: 46 Level Of Service: C

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 0 0 2 | 0 1 | | 2 0 1 | 0 0 | | 0 0 0 | 0 0 | | 1 0 0 | 0 2 | |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 756 | 62 | 529 | 280 | 0 | 0 | 0 | 0 | 73 | 0 | 581 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 756 | 62 | 529 | 280 | 0 | 0 | 0 | 0 | 73 | 0 | 581 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 796 | 65 | 557 | 295 | 0 | 0 | 0 | 0 | 77 | 0 | 612 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 796 | 65 | 557 | 295 | 0 | 0 | 0 | 0 | 77 | 0 | 612 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 0 | 796 | 65 | 557 | 295 | 0 | 0 | 0 | 0 | 77 | 0 | 612 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.95 | 0.85 | 0.92 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 0.75 |
| Lanes: | 0.00 | 2.00 | 1.00 | 2.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 2.00 |
| Final Sat.: | 0 | 3610 | 1615 | 3502 | 1900 | 0 | 0 | 0 | 0 | 1805 | 0 | 2842 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.22 | 0.04 | 0.16 | 0.16 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.22 |
| Crit Moves: | | **** | | **** | | | | | | | | **** |
| Green/Cycle: | 0.00 | 0.34 | 0.34 | 0.25 | 0.59 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.00 | 0.33 |
| Volume/Cap: | 0.00 | 0.65 | 0.12 | 0.65 | 0.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 0.00 | 0.65 |
| Delay/Veh: | 0.0 | 31.9 | 25.0 | 39.0 | 11.3 | 0.0 | 0.0 | 0.0 | 0.0 | 25.7 | 0.0 | 32.8 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 31.9 | 25.0 | 39.0 | 11.3 | 0.0 | 0.0 | 0.0 | 0.0 | 25.7 | 0.0 | 32.8 |
| LOS by Move: | A | C | C | D | B | A | A | A | A | C | A | C |
| HCM2kAvgQ: | 0 | 13 | 2 | 10 | 5 | 0 | 0 | 0 | 0 | 2 | 0 | 11 |

Note: Queue reported is the number of cars per lane.

# PROJECT: FOURTH ST. OPEN AS A PUBLIC ROADWAY
# PHASE 2 (2025) – UNMITIGATED CONDITIONS

UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Scenario Report

| | |
|---|---|
| Scenario: | 2025 Cumulative |
| Command: | 2025 Cumulative |
| Volume: | 2025 Cumulative |
| Geometry: | Existing |
| Impact Fee: | Default Impact Fee |
| Trip Generation: | Default Trip Generation |
| Trip Distribution: | Default Trip Distribution |
| Paths: | Default Paths |
| Routes: | Default Routes |
| Configuration: | Existing |





UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Impact Analysis Report
Level Of Service

| Intersection | Base LOS | Base Del/ Veh | Base V/ C | Future LOS | Future Del/ Veh | Future V/ C | Change in |
|---|---|---|---|---|---|---|---|
| # 1 Mariposa St / 3rd St | D | 53.2 | 1.095 | D | 53.2 | 1.095 | + 0.000 D/V |
| # 2 Mariposa St / Minnesota St/4th | C | 20.2 | 0.581 | C | 20.2 | 0.581 | + 0.000 D/V |
| # 3 Mariposa St / I-280 NB Off-Ram | D | 53.1 | 0.750 | D | 53.1 | 0.750 | + 0.000 D/V |
| # 4 Mariposa St / I-280 SB On-Ramp | B | 16.5 | 0.721 | B | 16.5 | 0.721 | + 0.000 D/V |
| # 5 16th St / 3rd St | D | 35.7 | 0.955 | D | 35.7 | 0.955 | + 0.000 D/V |
| # 6 16th St / 4th St | D | 37.0 | 0.948 | D | 37.0 | 0.948 | + 0.000 D/V |
| # 7 16th St / Owens St | E | 70.4 | 1.068 | E | 70.4 | 1.068 | + 0.000 D/V |
| # 8 Garage Access at Owens | F | 103.8 | 0.000 | F | 103.8 | 0.000 | + 0.000 D/V |
| # 11 16th St / Mississippi St/7th S | D | 48.6 | 0.865 | D | 48.6 | 0.865 | + 0.000 D/V |
| # 12 7th and Mission Bay Drive | C | 34.7 | 0.767 | C | 34.7 | 0.767 | + 0.000 D/V |

UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 Mariposa St / 3rd St

Cycle (sec): 90 Critical Vol./Cap.(X): 1.095
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 53.2
Optimal Cycle: 180 Level Of Service: D

| Street Name: | 3rd St | | | | | | | | | Mariposa St | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | | | |
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Protected | | | | | Protected | | | | | Permitted | | | | | Permitted | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Min. Green: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Lanes: | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 79 | 1510 | 38 | | | 33 | 1752 | 231 | | | 164 | 286 | 508 | | | 63 | 172 | 44 | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Initial Bse: | 79 | 1510 | 38 | | | 33 | 1752 | 231 | | | 164 | 286 | 508 | | | 63 | 172 | 44 | | |
| User Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | |
| PHF Volume: | 83 | 1589 | 40 | | | 35 | 1844 | 243 | | | 173 | 301 | 535 | | | 66 | 181 | 46 | | |
| Reduct Vol: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Reduced Vol: | 83 | 1589 | 40 | | | 35 | 1844 | 243 | | | 173 | 301 | 535 | | | 66 | 181 | 46 | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Final Vol.: | 83 | 1589 | 40 | | | 35 | 1844 | 243 | | | 173 | 301 | 535 | | | 66 | 181 | 46 | | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | |
| Adjustment: | 0.93 | 0.91 | 0.91 | | | 0.93 | 0.89 | 0.89 | | | 0.55 | 0.84 | 0.84 | | | 0.14 | 0.90 | 0.90 | | |
| Lanes: | 1.00 | 1.95 | 0.05 | | | 1.00 | 1.77 | 0.23 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.59 | 0.41 | | |
| Final Sat.: | 1769 | 3382 | 85 | | | 1769 | 2993 | 395 | | | 1050 | 1599 | 1599 | | | 272 | 2730 | 698 | | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.05 | 0.47 | 0.47 | | | 0.02 | 0.62 | 0.62 | | | 0.16 | 0.19 | 0.33 | | | 0.24 | 0.07 | 0.07 | | |
| Crit Moves: | **** | | | | | | **** | | | | | | **** | | | | | | | |
| Green/Cycle: | 0.04 | 0.58 | 0.58 | | | 0.02 | 0.56 | 0.56 | | | 0.31 | 0.31 | 0.31 | | | 0.31 | 0.31 | 0.31 | | |
| Volume/Cap: | 1.09 | 0.81 | 0.81 | | | 0.81 | 1.09 | 1.09 | | | 0.54 | 0.62 | 1.09 | | | 0.80 | 0.22 | 0.22 | | |
| Delay/Veh: | 174.6 | 18.5 | 18.5 | | | 131.3 | 71.4 | 71.4 | | | 32.3 | 28.9 | 92.9 | | | 82.7 | 23.7 | 23.7 | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| AdjDel/Veh: | 174.6 | 18.5 | 18.5 | | | 131.3 | 71.4 | 71.4 | | | 32.3 | 28.9 | 92.9 | | | 82.7 | 23.7 | 23.7 | | |
| LOS by Move: | F | B | B | | | F | E | E | | | C | C | F | | | F | C | C | | |
| HCM2kAvgQ: | 6 | 21 | 21 | | | 2 | 47 | 47 | | | 5 | 8 | 26 | | | 4 | 3 | 3 | | |

Note: Queue reported is the number of cars per lane.





UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 Mariposa St / Minnesota St/4th St

Cycle (sec): 60 Critical Vol./Cap.(X): 0.581
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 20.2
Optimal Cycle: 35 Level Of Service: C

| Street Name: | Minnesota St/ 4th St | | | | | | | | | Mariposa St | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | | | |
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Protected | | | | | Protected | | | | | Protected | | | | | Protected | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Min. Green: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Lanes: | 0 | 0 | 1! | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 64 | 11 | 113 | | | 291 | 6 | 192 | | | 148 | 482 | 54 | | | 22 | 371 | 32 | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Initial Bse: | 64 | 11 | 113 | | | 291 | 6 | 192 | | | 148 | 482 | 54 | | | 22 | 371 | 32 | | |
| User Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | |
| PHF Volume: | 67 | 12 | 119 | | | 306 | 6 | 202 | | | 156 | 507 | 57 | | | 23 | 391 | 34 | | |
| Reduct Vol: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Reduced Vol: | 67 | 12 | 119 | | | 306 | 6 | 202 | | | 156 | 507 | 57 | | | 23 | 391 | 34 | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Final Vol.: | 67 | 12 | 119 | | | 306 | 6 | 202 | | | 156 | 507 | 57 | | | 23 | 391 | 34 | | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | |
| Adjustment: | 0.89 | 0.89 | 0.89 | | | 0.93 | 0.93 | 0.83 | | | 0.93 | 0.92 | 0.92 | | | 0.93 | 0.92 | 0.92 | | |
| Lanes: | 0.34 | 0.06 | 0.60 | | | 0.98 | 0.02 | 1.00 | | | 1.00 | 1.80 | 0.20 | | | 1.00 | 1.84 | 0.16 | | |
| Final Sat.: | 573 | 98 | 1011 | | | 1739 | 36 | 1583 | | | 1769 | 3134 | 351 | | | 1769 | 3218 | 278 | | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.12 | 0.12 | 0.12 | | | 0.18 | 0.18 | 0.13 | | | 0.09 | 0.16 | 0.16 | | | 0.01 | 0.12 | 0.12 | | |
| Crit Moves: | | **** | | | | **** | | | | | **** | | | | | | **** | | | |
| Green/Cycle: | 0.20 | 0.20 | 0.20 | | | 0.30 | 0.30 | 0.30 | | | 0.15 | 0.33 | 0.33 | | | 0.03 | 0.21 | 0.21 | | |
| Volume/Cap: | 0.58 | 0.58 | 0.58 | | | 0.58 | 0.58 | 0.42 | | | 0.58 | 0.49 | 0.49 | | | 0.49 | 0.58 | 0.58 | | |
| Delay/Veh: | 24.1 | 24.1 | 24.1 | | | 19.3 | 19.3 | 17.3 | | | 26.9 | 16.2 | 16.2 | | | 36.4 | 22.5 | 22.5 | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| AdjDel/Veh: | 24.1 | 24.1 | 24.1 | | | 19.3 | 19.3 | 17.3 | | | 26.9 | 16.2 | 16.2 | | | 36.4 | 22.5 | 22.5 | | |
| LOS by Move: | C | C | C | | | B | B | B | | | C | B | B | | | D | C | C | | |
| HCM2kAvgQ: | 4 | 4 | 4 | | | 6 | 6 | 3 | | | 4 | 5 | 5 | | | 1 | 5 | 5 | | |

Note: Queue reported is the number of cars per lane.

UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #3 Mariposa St / I-280 NB Off-Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.750
Loss Time (sec): 12 (Y+R=3.0 sec) Average Delay (sec/veh): 53.1
Optimal Cycle: 123 Level Of Service: D

| Street Name: | I-280 NB Off-Ramp | | | | | | Mariposa St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Split Phase | | | Split Phase | | | Prot+Permit | | | Permitted | | |
| Rights: | Include | | | Ovl | | | Include | | | Include | | |
| Min. Green: | 36 | 36 | 36 | 33 | 33 | 33 | 21 | 21 | 0 | 0 | 21 | 21 |
| Lanes: | 1 0 | 1 | 1 0 | 1 0 | 0 0 | 2 | 0 1 | 1 0 | 0 | 0 0 | 2 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 529 | 456 | 280 | 288 | 0 | 787 | 12 | 125 | 0 | 0 | 683 | 48 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 529 | 456 | 280 | 288 | 0 | 787 | 12 | 125 | 0 | 0 | 683 | 48 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 557 | 480 | 295 | 303 | 0 | 828 | 13 | 132 | 0 | 0 | 719 | 51 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 557 | 480 | 295 | 303 | 0 | 828 | 13 | 132 | 0 | 0 | 719 | 51 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 557 | 480 | 295 | 303 | 0 | 828 | 13 | 132 | 0 | 0 | 719 | 51 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.94 | 0.89 | 0.89 | 0.93 | 1.00 | 0.73 | 0.90 | 0.93 | 1.00 | 1.00 | 0.88 | 0.88 |
| Lanes: | 1.00 | 1.24 | 0.76 | 1.00 | 0.00 | 2.00 | 0.18 | 1.82 | 0.00 | 0.00 | 2.80 | 0.20 |
| Final Sat.: | 1787 | 2088 | 1282 | 1769 | 0 | 2786 | 309 | 3215 | 0 | 0 | 4702 | 330 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.31 | 0.23 | 0.23 | 0.17 | 0.00 | 0.30 | 0.04 | 0.04 | 0.00 | 0.00 | 0.15 | 0.15 |
| Crit Moves: | **** | | | **** | | | **** | | | | **** | |
| Green/Cycle: | 0.29 | 0.29 | 0.29 | 0.27 | 0.00 | 0.44 | 0.34 | 0.34 | 0.00 | 0.00 | 0.17 | 0.17 |
| Volume/Cap: | 1.06 | 0.79 | 0.79 | 0.64 | 0.00 | 0.68 | 0.15 | 0.12 | 0.00 | 0.00 | 0.90 | 0.90 |
| Delay/Veh: | 101.3 | 44.2 | 44.2 | 42.6 | 0.0 | 29.1 | 29.2 | 27.9 | 0.0 | 0.0 | 61.9 | 61.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 101.3 | 44.2 | 44.2 | 42.6 | 0.0 | 29.1 | 29.2 | 27.9 | 0.0 | 0.0 | 61.9 | 61.9 |
| LOS by Move: | F | D | D | D | A | C | C | C | A | A | E | E |
| HCM2kAvgQ: | 30 | 16 | 16 | 11 | 0 | 15 | 2 | 2 | 0 | 0 | 14 | 14 |

Note: Queue reported is the number of cars per lane.





UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #4 Mariposa St / I-280 SB On-Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.721
Loss Time (sec): 7 (Y+R=4.0 sec) Average Delay (sec/veh): 16.5
Optimal Cycle: 97 Level Of Service: B

| Street Name: | I-280 SB On-Ramp | | | | | | Mariposa St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 36 | 54 | 90 | 0 |
| Lanes: | 0 0 | 0 | 0 0 | 0 0 | 0 0 | 0 | 0 0 | 0 1 | 1 | 2 0 | 1 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 137 | 663 | 1338 | 662 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 137 | 663 | 1338 | 662 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 144 | 698 | 1408 | 697 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 144 | 698 | 1408 | 697 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 144 | 698 | 1408 | 697 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.86 | 0.86 | 0.90 | 0.98 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.34 | 1.66 | 2.00 | 1.00 | 0.00 |
| Final Sat.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 559 | 2704 | 3432 | 1862 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 | 0.26 | 0.41 | 0.37 | 0.00 |
| Crit Moves: | | | | | | | | **** | | **** | | |
| Green/Cycle: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.37 | 0.37 | 0.56 | 0.93 | 0.00 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.70 | 0.70 | 0.74 | 0.40 | 0.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 27.6 | 27.6 | 17.7 | 0.6 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 27.6 | 27.6 | 17.7 | 0.6 | 0.0 |
| LOS by Move: | A | A | A | A | A | A | A | C | C | B | A | A |
| HCM2kAvgQ: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 | 17 | 3 | 0 |

Note: Queue reported is the number of cars per lane.

UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #5 16th St / 3rd St

| | | | |
|---|---|---|---|
| Cycle (sec): | 90 | Critical Vol./Cap.(X): | 0.955 |
| Loss Time (sec): | 8 (Y+R=4.0 sec) | Average Delay (sec/veh): | 35.7 |
| Optimal Cycle: | 133 | Level Of Service: | D |

| Street Name: | 3rd St | | | | | | | | 16th St | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Protected | | | | | Protected | | | | | Protected | | | | | Protected | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Min. Green: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Lanes: | 2 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 355 | 1370 | 23 | | | 38 | 1687 | 80 | | | 88 | 332 | 296 | | | 24 | 562 | 88 | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Initial Bse: | 355 | 1370 | 23 | | | 38 | 1687 | 80 | | | 88 | 332 | 296 | | | 24 | 562 | 88 | | |
| User Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | |
| PHF Volume: | 374 | 1442 | 24 | | | 40 | 1776 | 84 | | | 93 | 349 | 312 | | | 25 | 592 | 93 | | |
| Reduct Vol: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Reduced Vol: | 374 | 1442 | 24 | | | 40 | 1776 | 84 | | | 93 | 349 | 312 | | | 25 | 592 | 93 | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Final Vol.: | 374 | 1442 | 24 | | | 40 | 1776 | 84 | | | 93 | 349 | 312 | | | 25 | 592 | 93 | | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | |
| Adjustment: | 0.92 | 0.95 | 0.95 | | | 0.95 | 0.94 | 0.94 | | | 0.95 | 0.88 | 0.88 | | | 0.95 | 0.93 | 0.93 | | |
| Lanes: | 2.00 | 1.97 | 0.03 | | | 1.00 | 1.91 | 0.09 | | | 1.00 | 1.06 | 0.94 | | | 1.00 | 1.73 | 0.27 | | |
| Final Sat.: | 3502 | 3540 | 59 | | | 1805 | 3422 | 162 | | | 1805 | 1773 | 1581 | | | 1805 | 3059 | 479 | | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.11 | 0.41 | 0.41 | | | 0.02 | 0.52 | 0.52 | | | 0.05 | 0.20 | 0.20 | | | 0.01 | 0.19 | 0.19 | | |
| Crit Moves: | **** | | | | | | **** | | | | **** | | | | | | **** | | | |
| Green/Cycle: | 0.11 | 0.62 | 0.62 | | | 0.03 | 0.54 | 0.54 | | | 0.05 | 0.24 | 0.24 | | | 0.02 | 0.20 | 0.20 | | |
| Volume/Cap: | 0.96 | 0.66 | 0.66 | | | 0.66 | 0.96 | 0.96 | | | 0.96 | 0.82 | 0.82 | | | 0.82 | 0.96 | 0.96 | | |
| Delay/Veh: | 73.7 | 11.6 | 11.6 | | | 66.0 | 31.1 | 31.1 | | | 119.0 | 39.4 | 39.4 | | | 135.7 | 58.6 | 58.6 | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| AdjDel/Veh: | 73.7 | 11.6 | 11.6 | | | 66.0 | 31.1 | 31.1 | | | 119.0 | 39.4 | 39.4 | | | 135.7 | 58.6 | 58.6 | | |
| LOS by Move: | E | B | B | | | E | C | C | | | F | D | D | | | F | E | E | | |
| HCM2kAvgQ: | 9 | 14 | 14 | | | 2 | 32 | 32 | | | 5 | 12 | 12 | | | 2 | 15 | 15 | | |

Note: Queue reported is the number of cars per lane.





UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #6 16th St / 4th St

| | | | |
|---|---|---|---|
| Cycle (sec): | 60 | Critical Vol./Cap.(X): | 0.948 |
| Loss Time (sec): | 12 (Y+R=4.0 sec) | Average Delay (sec/veh): | 37.0 |
| Optimal Cycle: | 94 | Level Of Service: | D |

| Street Name: | 4th St | | | | | | | | 16th St | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Protected | | | | | Protected | | | | | Protected | | | | | Protected | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Min. Green: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Lanes: | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 162 | 142 | 135 | | | 171 | 281 | 366 | | | 251 | 410 | 26 | | | 42 | 934 | 21 | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Initial Bse: | 162 | 142 | 135 | | | 171 | 281 | 366 | | | 251 | 410 | 26 | | | 42 | 934 | 21 | | |
| User Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | |
| PHF Volume: | 171 | 149 | 142 | | | 180 | 296 | 385 | | | 264 | 432 | 27 | | | 44 | 983 | 22 | | |
| Reduct Vol: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Reduced Vol: | 171 | 149 | 142 | | | 180 | 296 | 385 | | | 264 | 432 | 27 | | | 44 | 983 | 22 | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Final Vol.: | 171 | 149 | 142 | | | 180 | 296 | 385 | | | 264 | 432 | 27 | | | 44 | 983 | 22 | | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | |
| Adjustment: | 0.95 | 1.00 | 0.85 | | | 0.95 | 1.00 | 0.85 | | | 0.95 | 0.94 | 0.94 | | | 0.95 | 0.95 | 0.95 | | |
| Lanes: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.88 | 0.12 | | | 1.00 | 1.96 | 0.04 | | |
| Final Sat.: | 1805 | 1900 | 1615 | | | 1805 | 1900 | 1615 | | | 1805 | 3364 | 213 | | | 1805 | 3520 | 79 | | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.09 | 0.08 | 0.09 | | | 0.10 | 0.16 | 0.24 | | | 0.15 | 0.13 | 0.13 | | | 0.02 | 0.28 | 0.28 | | |
| Crit Moves: | **** | | | | | | | | **** | | **** | | | | | | **** | | | |
| Green/Cycle: | 0.10 | 0.16 | 0.16 | | | 0.19 | 0.25 | 0.25 | | | 0.15 | 0.38 | 0.38 | | | 0.07 | 0.29 | 0.29 | | |
| Volume/Cap: | 0.95 | 0.48 | 0.53 | | | 0.53 | 0.62 | 0.95 | | | 0.95 | 0.34 | 0.34 | | | 0.34 | 0.95 | 0.95 | | |
| Delay/Veh: | 78.9 | 23.9 | 25.1 | | | 23.7 | 22.4 | 53.7 | | | 65.1 | 13.5 | 13.5 | | | 28.1 | 37.4 | 37.4 | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| AdjDel/Veh: | 78.9 | 23.9 | 25.1 | | | 23.7 | 22.4 | 53.7 | | | 65.1 | 13.5 | 13.5 | | | 28.1 | 37.4 | 37.4 | | |
| LOS by Move: | E | C | C | | | C | C | D | | | E | B | B | | | C | D | D | | |
| HCM2kAvgQ: | 7 | 3 | 3 | | | 4 | 6 | 12 | | | 9 | 3 | 3 | | | 1 | 15 | 15 | | |

Note: Queue reported is the number of cars per lane.

UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #7 16th St / Owens St

Cycle (sec): 110 Critical Vol./Cap.(X): 1.068
Loss Time (sec): 12 (Y+R=3.0 sec) Average Delay (sec/veh): 70.4
Optimal Cycle: 180 Level Of Service: E

| Street Name: | Owens St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| Lanes: | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 152 | 352 | 177 | 32 | 768 | 553 | 118 | 478 | 36 | 11 | 1426 | 25 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 152 | 352 | 177 | 32 | 768 | 553 | 118 | 478 | 36 | 11 | 1426 | 25 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 160 | 371 | 186 | 34 | 808 | 582 | 124 | 503 | 38 | 12 | 1501 | 26 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 160 | 371 | 186 | 34 | 808 | 582 | 124 | 503 | 38 | 12 | 1501 | 26 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 160 | 371 | 186 | 34 | 808 | 582 | 124 | 503 | 38 | 12 | 1501 | 26 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 0.95 | 0.95 | 0.94 | 0.94 | 0.95 | 0.99 | 0.99 | 0.95 | 1.00 | 1.00 |
| Lanes: | 1.00 | 1.33 | 0.67 | 1.00 | 1.16 | 0.84 | 1.00 | 1.86 | 0.14 | 1.00 | 1.97 | 0.03 |
| Final Sat.: | 1805 | 2402 | 1208 | 1805 | 2070 | 1491 | 1805 | 3499 | 263 | 1805 | 3723 | 65 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.09 | 0.15 | 0.15 | 0.02 | 0.39 | 0.39 | 0.07 | 0.14 | 0.14 | 0.01 | 0.40 | 0.40 |
| Crit Moves: | **** | | | | **** | | **** | | | | **** | |
| Green/Cycle: | 0.08 | 0.35 | 0.35 | 0.10 | 0.37 | 0.37 | 0.06 | 0.34 | 0.34 | 0.11 | 0.38 | 0.38 |
| Volume/Cap: | 1.07 | 0.44 | 0.44 | 0.18 | 1.07 | 1.07 | 1.07 | 0.43 | 0.43 | 0.06 | 1.07 | 1.07 |
| Delay/Veh: | 143.1 | 28.0 | 28.0 | 45.7 | 80.0 | 80.0 | 154.2 | 28.6 | 28.6 | 44.4 | 78.4 | 78.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 143.1 | 28.0 | 28.0 | 45.7 | 80.0 | 80.0 | 154.2 | 28.6 | 28.6 | 44.4 | 78.4 | 78.4 |
| LOS by Move: | F | C | C | D | F | F | F | C | C | D | E | E |
| HCM2kAvgQ: | 10 | 7 | 7 | 1 | 34 | 34 | 8 | 7 | 7 | 0 | 37 | 37 |

Note: Queue reported is the number of cars per lane.





UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
1994 HCM Unsignalized Method (Base Volume Alternative)

Intersection #8 Garage Access at Owens

Average Delay (sec/veh): 103.8 Worst Case Level Of Service: F

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | - | T | - R | L | - | T | - R | L | - | T | - R | L | - | T | - R |
| Control: | Uncontrolled | | | | Uncontrolled | | | | Stop Sign | | | | Stop Sign | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Lanes: | 0 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 482 | 34 | | 36 | 779 | 0 | | 0 | 0 | 0 | | 176 | 0 | 266 | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| Initial Bse: | 0 | 482 | 34 | | 36 | 779 | 0 | | 0 | 0 | 0 | | 176 | 0 | 266 | |
| User Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | |
| PHF Volume: | 0 | 507 | 36 | | 38 | 820 | 0 | | 0 | 0 | 0 | | 185 | 0 | 280 | |
| Reduct Vol: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Final Vol.: | 0 | 507 | 36 | | 38 | 820 | 0 | | 0 | 0 | 0 | | 185 | 0 | 280 | |
| Adjusted Volume Module: | | | | | | | | | | | | | | | | |
| Grade: | 0% | | | | 0% | | | | 0% | | | | 0% | | | |
| % Cycle/Cars: | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | |
| % Truck/Comb: | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | |
| PCE Adj: | 1.10 | 1.00 | 1.00 | | 1.10 | 1.00 | 1.00 | | 1.10 | 1.10 | 1.10 | | 1.10 | 1.10 | 1.10 | |
| Cycl/Car PCE: | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | |
| Trck/Cmb PCE: | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | | xxxx | xxxx | | |
| Adj Vol.: | 0 | 507 | 36 | | 42 | 820 | 0 | | 0 | 0 | 0 | | 204 | 0 | 308 | |
| Critical Gap Module: | | | | | | | | | | | | | | | | |
| MoveUp Time: | xxxxx | xxxx | xxxxx | | 2.1 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | 3.4 | xxxx | 2.6 | |
| Crit Gp Adj: | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | 0.00 | |
| Critical Gp: | xxxxx | xxxx | xxxxx | | 5.5 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | 7.0 | xxxx | 5.5 | |
| Capacity Module: | | | | | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | | 543 | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | 1383 | xxxx | 272 | |
| Potent Cap.: | xxxx | xxxx | xxxxx | | 876 | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | 138 | xxxx | 1009 | |
| Adj Cap: | xxxx | xxxx | xxxxx | | 1.00 | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | 0.91 | xxxx | 1.00 | |
| Move Cap.: | xxxx | xxxx | xxxxx | | 876 | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | 125 | xxxx | 1009 | |
| Level Of Service Module: | | | | | | | | | | | | | | | | |
| Control Del: | xxxxx | xxxx | xxxxx | | 4.3 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | 967.4 | xxxx | 4.9 | |
| LOS by Move: | * | * | * | | A | * | * | * | * | * | | | F | * | A | |
| Movement: | LT - | LTR - | RT | | LT - | LTR - | RT | | LT - | LTR - | RT | | LT - | LTR - | RT | |
| Shared Cap.: | xxxx | xxxx | xxxxx | | 876 | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | xxxx | xxxx | xxxxx | |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | | 72.6 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | xxxxx | xxxx | xxxxx | |
| Shared LOS: | * | * | * | | F | * | * | * | * | * | | | * | * | * | |
| ApproachDel: | 0.0 | | | | 0.2 | | | | xxxxxx | | | | 388.2 | | | |

UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #11 16th St / Mississippi St/7th St

Cycle (sec): 110 Critical Vol./Cap.(X): 0.865
Loss Time (sec): 9 (Y+R=5.0 sec) Average Delay (sec/veh): 48.6
Optimal Cycle: 90 Level Of Service: D

| Street Name: | Mississippi St/ 7th St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 0 | 1 0 | 1 | 1 0 | 0 1 | 0 | 0 1 | 0 1 | 0 | 0 1 | 1 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 30 | 245 | 25 | 155 | 126 | 77 | 106 | 452 | 87 | 69 | 1522 | 540 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 30 | 245 | 25 | 155 | 126 | 77 | 106 | 452 | 87 | 69 | 1522 | 540 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 32 | 258 | 26 | 163 | 133 | 81 | 112 | 476 | 92 | 73 | 1602 | 568 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 32 | 258 | 26 | 163 | 133 | 81 | 112 | 476 | 92 | 73 | 1602 | 568 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 32 | 258 | 26 | 163 | 133 | 81 | 112 | 476 | 92 | 73 | 1602 | 568 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 1.00 | 0.85 | 0.95 | 0.94 | 0.94 | 0.46 | 0.46 | 0.46 | 0.82 | 0.82 | 0.85 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 0.62 | 0.38 | 0.33 | 1.40 | 0.27 | 0.09 | 1.91 | 1.00 |
| Final Sat.: | 1805 | 1900 | 1615 | 1805 | 1112 | 680 | 288 | 1230 | 237 | 135 | 2973 | 1615 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.14 | 0.02 | 0.09 | 0.12 | 0.12 | 0.39 | 0.39 | 0.39 | 0.54 | 0.54 | 0.35 |
| Crit Moves: | | **** | | | | **** | | | | | **** | |
| Green/Cycle: | 0.21 | 0.21 | 0.21 | 0.17 | 0.17 | 0.17 | 0.54 | 0.54 | 0.54 | 0.50 | 0.50 | 0.67 |
| Volume/Cap: | 0.08 | 0.65 | 0.08 | 0.52 | 0.69 | 0.69 | 0.72 | 0.72 | 0.72 | 1.08 | 1.08 | 0.52 |
| Delay/Veh: | 35.1 | 43.6 | 35.1 | 43.0 | 49.3 | 49.3 | 22.0 | 22.0 | 22.0 | 74.4 | 74.4 | 9.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 35.1 | 43.6 | 35.1 | 43.0 | 49.3 | 49.3 | 22.0 | 22.0 | 22.0 | 74.4 | 74.4 | 9.6 |
| LOS by Move: | D | D | D | D | D | D | C | C | C | E | E | A |
| HCM2kAvgQ: | 1 | 9 | 1 | 6 | 8 | 8 | 11 | 11 | 11 | 42 | 42 | 10 |

Note: Queue reported is the number of cars per lane.





UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #12 7th and Mission Bay Drive

Cycle (sec): 110 Critical Vol./Cap.(X): 0.767
Loss Time (sec): 9 (Y+R=5.0 sec) Average Delay (sec/veh): 34.7
Optimal Cycle: 63 Level Of Service: C

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L - T - R | | | | L - T - R | | | | L - T - R | | | | L - T - R | | | |
| Control: | Protected | | | | Protected | | | | Protected | | | | Protected | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 0 0 | 2 0 | 1 | 1 | 2 0 | 1 0 | 0 | 0 | 0 0 | 0 0 | 0 | 0 | 1 0 | 0 0 | 0 | 2 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 813 | 78 | 661 | 267 | 0 | 0 | 0 | 0 | 0 | 91 | 0 | 726 | | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| Initial Bse: | 0 | 813 | 78 | 661 | 267 | 0 | 0 | 0 | 0 | 0 | 91 | 0 | 726 | | | |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | | | | |
| PHF Volume: | 0 | 856 | 82 | 696 | 281 | 0 | 0 | 0 | 0 | 0 | 96 | 0 | 764 | | | |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Reduced Vol: | 0 | 856 | 82 | 696 | 281 | 0 | 0 | 0 | 0 | 0 | 96 | 0 | 764 | | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| Final Vol.: | 0 | 856 | 82 | 696 | 281 | 0 | 0 | 0 | 0 | 0 | 96 | 0 | 764 | | | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | |
| Adjustment: | 1.00 | 0.95 | 0.85 | 0.92 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 0.75 | | | | |
| Lanes: | 0.00 | 2.00 | 1.00 | 2.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 2.00 | | | | |
| Final Sat.: | 0 | 3610 | 1615 | 3502 | 1900 | 0 | 0 | 0 | 0 | 1805 | 0 | 2842 | | | | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.24 | 0.05 | 0.20 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.27 | | | | |
| Crit Moves: | | **** | | **** | | | | | | | | **** | | | | |
| Green/Cycle: | 0.00 | 0.31 | 0.31 | 0.26 | 0.57 | 0.00 | 0.00 | 0.00 | 0.00 | 0.35 | 0.00 | 0.35 | | | | |
| Volume/Cap: | 0.00 | 0.77 | 0.16 | 0.77 | 0.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.00 | 0.77 | | | | |
| Delay/Veh: | 0.0 | 37.7 | 27.8 | 41.7 | 12.2 | 0.0 | 0.0 | 0.0 | 0.0 | 24.6 | 0.0 | 35.4 | | | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| AdjDel/Veh: | 0.0 | 37.7 | 27.8 | 41.7 | 12.2 | 0.0 | 0.0 | 0.0 | 0.0 | 24.6 | 0.0 | 35.4 | | | | |
| LOS by Move: | A | D | C | D | B | A | A | A | A | C | A | D | | | | |
| HCM2kAvgQ: | 0 | 15 | 2 | 13 | 5 | 0 | 0 | 0 | 0 | 2 | 0 | 15 | | | | |

Note: Queue reported is the number of cars per lane.

# PROJECT: FOURTH ST. OPEN AS A PUBLIC ROADWAY
# PHASE 2 (2025) – MITIGATED CONDITIONS

UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Mitigated Conditions

Scenario Report

| | |
|---|---|
| Scenario: | 2025 Cumulative |
| Command: | 2025 Cumulative |
| Volume: | 2025 Cumulative |
| Geometry: | Existing |
| Impact Fee: | Default Impact Fee |
| Trip Generation: | Default Trip Generation |
| Trip Distribution: | Default Trip Distribution |
| Paths: | Default Paths |
| Routes: | Default Routes |
| Configuration: | Existing |





UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Mitigated Conditions

Impact Analysis Report
Level Of Service

| Intersection | Base LOS | Base Del/ Veh | Base V/ C | Future LOS | Future Del/ Veh | Future V/ C | Change in |
|---|---|---|---|---|---|---|---|
| # 1 Mariposa St / 3rd St | D | 53.2 | 1.095 | D | 53.2 | 1.095 | + 0.000 D/V |
| # 2 Mariposa St / Minnesota St/4th | C | 20.2 | 0.581 | C | 20.2 | 0.581 | + 0.000 D/V |
| # 3 Mariposa St / I-280 NB Off-Ram | D | 53.1 | 0.750 | D | 53.1 | 0.750 | + 0.000 D/V |
| # 4 Mariposa St / I-280 SB On-Ramp | B | 16.5 | 0.721 | B | 16.5 | 0.721 | + 0.000 D/V |
| # 5 16th St / 3rd St | D | 35.7 | 0.955 | D | 35.7 | 0.955 | + 0.000 D/V |
| # 6 16th St / 4th St | D | 37.0 | 0.948 | D | 37.0 | 0.948 | + 0.000 D/V |
| # 7 16th St / Owens St | D | 50.3 | 0.957 | D | 50.3 | 0.957 | + 0.000 D/V |
| # 8 Garage Access at Owens | B | 15.5 | 0.663 | B | 15.5 | 0.663 | + 0.000 D/V |
| # 11 16th St / Mississippi St/7th S | D | 48.6 | 0.865 | D | 48.6 | 0.865 | + 0.000 D/V |
| # 12 7th and Mission Bay Drive | C | 34.7 | 0.767 | C | 34.7 | 0.767 | + 0.000 D/V |

UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 Mariposa St / 3rd St

Cycle (sec): 90 Critical Vol./Cap.(X): 1.095
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 53.2
Optimal Cycle: 180 Level Of Service: D

| Street Name: | 3rd St | | | | | | | | | Mariposa St | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | | | |
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Protected | | | | | Protected | | | | | Permitted | | | | | Permitted | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Min. Green: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Lanes: | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 79 | 1510 | 38 | | | 33 | 1752 | 231 | | | 164 | 286 | 508 | | | 63 | 172 | 44 | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Initial Bse: | 79 | 1510 | 38 | | | 33 | 1752 | 231 | | | 164 | 286 | 508 | | | 63 | 172 | 44 | | |
| User Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | |
| PHF Volume: | 83 | 1589 | 40 | | | 35 | 1844 | 243 | | | 173 | 301 | 535 | | | 66 | 181 | 46 | | |
| Reduct Vol: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Reduced Vol: | 83 | 1589 | 40 | | | 35 | 1844 | 243 | | | 173 | 301 | 535 | | | 66 | 181 | 46 | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Final Vol.: | 83 | 1589 | 40 | | | 35 | 1844 | 243 | | | 173 | 301 | 535 | | | 66 | 181 | 46 | | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | |
| Adjustment: | 0.93 | 0.91 | 0.91 | | | 0.93 | 0.89 | 0.89 | | | 0.55 | 0.84 | 0.84 | | | 0.14 | 0.90 | 0.90 | | |
| Lanes: | 1.00 | 1.95 | 0.05 | | | 1.00 | 1.77 | 0.23 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.59 | 0.41 | | |
| Final Sat.: | 1769 | 3382 | 85 | | | 1769 | 2993 | 395 | | | 1050 | 1599 | 1599 | | | 272 | 2730 | 698 | | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.05 | 0.47 | 0.47 | | | 0.02 | 0.62 | 0.62 | | | 0.16 | 0.19 | 0.33 | | | 0.24 | 0.07 | 0.07 | | |
| Crit Moves: | **** | | | | | | **** | | | | | | **** | | | | | | | |
| Green/Cycle: | 0.04 | 0.58 | 0.58 | | | 0.02 | 0.56 | 0.56 | | | 0.31 | 0.31 | 0.31 | | | 0.31 | 0.31 | 0.31 | | |
| Volume/Cap: | 1.09 | 0.81 | 0.81 | | | 0.81 | 1.09 | 1.09 | | | 0.54 | 0.62 | 1.09 | | | 0.80 | 0.22 | 0.22 | | |
| Delay/Veh: | 174.6 | 18.5 | 18.5 | | | 131.3 | 71.4 | 71.4 | | | 32.3 | 28.9 | 92.9 | | | 82.7 | 23.7 | 23.7 | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| AdjDel/Veh: | 174.6 | 18.5 | 18.5 | | | 131.3 | 71.4 | 71.4 | | | 32.3 | 28.9 | 92.9 | | | 82.7 | 23.7 | 23.7 | | |
| LOS by Move: | F | B | B | | | F | E | E | | | C | C | F | | | F | C | C | | |
| HCM2kAvgQ: | 6 | 21 | 21 | | | 2 | 47 | 47 | | | 5 | 8 | 26 | | | 4 | 3 | 3 | | |

Note: Queue reported is the number of cars per lane.





UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 Mariposa St / Minnesota St/4th St

Cycle (sec): 60 Critical Vol./Cap.(X): 0.581
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 20.2
Optimal Cycle: 35 Level Of Service: C

| Street Name: | Minnesota St/ 4th St | | | | | | | | | Mariposa St | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | | | |
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Protected | | | | | Protected | | | | | Protected | | | | | Protected | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Min. Green: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Lanes: | 0 | 0 | 1! | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 64 | 11 | 113 | | | 291 | 6 | 192 | | | 148 | 482 | 54 | | | 22 | 371 | 32 | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Initial Bse: | 64 | 11 | 113 | | | 291 | 6 | 192 | | | 148 | 482 | 54 | | | 22 | 371 | 32 | | |
| User Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | |
| PHF Volume: | 67 | 12 | 119 | | | 306 | 6 | 202 | | | 156 | 507 | 57 | | | 23 | 391 | 34 | | |
| Reduct Vol: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Reduced Vol: | 67 | 12 | 119 | | | 306 | 6 | 202 | | | 156 | 507 | 57 | | | 23 | 391 | 34 | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Final Vol.: | 67 | 12 | 119 | | | 306 | 6 | 202 | | | 156 | 507 | 57 | | | 23 | 391 | 34 | | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | |
| Adjustment: | 0.89 | 0.89 | 0.89 | | | 0.93 | 0.93 | 0.83 | | | 0.93 | 0.92 | 0.92 | | | 0.93 | 0.92 | 0.92 | | |
| Lanes: | 0.34 | 0.06 | 0.60 | | | 0.98 | 0.02 | 1.00 | | | 1.00 | 1.80 | 0.20 | | | 1.00 | 1.84 | 0.16 | | |
| Final Sat.: | 573 | 98 | 1011 | | | 1739 | 36 | 1583 | | | 1769 | 3134 | 351 | | | 1769 | 3218 | 278 | | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.12 | 0.12 | 0.12 | | | 0.18 | 0.18 | 0.13 | | | 0.09 | 0.16 | 0.16 | | | 0.01 | 0.12 | 0.12 | | |
| Crit Moves: | | **** | | | | **** | | | | | **** | | | | | | **** | | | |
| Green/Cycle: | 0.20 | 0.20 | 0.20 | | | 0.30 | 0.30 | 0.30 | | | 0.15 | 0.33 | 0.33 | | | 0.03 | 0.21 | 0.21 | | |
| Volume/Cap: | 0.58 | 0.58 | 0.58 | | | 0.58 | 0.58 | 0.42 | | | 0.58 | 0.49 | 0.49 | | | 0.49 | 0.58 | 0.58 | | |
| Delay/Veh: | 24.1 | 24.1 | 24.1 | | | 19.3 | 19.3 | 17.3 | | | 26.9 | 16.2 | 16.2 | | | 36.4 | 22.5 | 22.5 | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| AdjDel/Veh: | 24.1 | 24.1 | 24.1 | | | 19.3 | 19.3 | 17.3 | | | 26.9 | 16.2 | 16.2 | | | 36.4 | 22.5 | 22.5 | | |
| LOS by Move: | C | C | C | | | B | B | B | | | C | B | B | | | D | C | C | | |
| HCM2kAvgQ: | 4 | 4 | 4 | | | 6 | 6 | 3 | | | 4 | 5 | 5 | | | 1 | 5 | 5 | | |

Note: Queue reported is the number of cars per lane.

UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #3 Mariposa St / I-280 NB Off-Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.750
Loss Time (sec): 12 (Y+R=3.0 sec) Average Delay (sec/veh): 53.1
Optimal Cycle: 123 Level Of Service: D

| Street Name: | I-280 NB Off-Ramp | | | | | | Mariposa St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Split Phase | | | Split Phase | | | Prot+Permit | | | Permitted | | |
| Rights: | Include | | | Ovl | | | Include | | | Include | | |
| Min. Green: | 36 | 36 | 36 | 33 | 33 | 33 | 21 | 21 | 0 | 0 | 21 | 21 |
| Lanes: | 1 0 | 1 | 1 0 | 1 0 | 0 0 | 2 | 0 1 | 1 0 | 0 | 0 0 | 2 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 529 | 456 | 280 | 288 | 0 | 787 | 12 | 125 | 0 | 0 | 683 | 48 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 529 | 456 | 280 | 288 | 0 | 787 | 12 | 125 | 0 | 0 | 683 | 48 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 557 | 480 | 295 | 303 | 0 | 828 | 13 | 132 | 0 | 0 | 719 | 51 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 557 | 480 | 295 | 303 | 0 | 828 | 13 | 132 | 0 | 0 | 719 | 51 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 557 | 480 | 295 | 303 | 0 | 828 | 13 | 132 | 0 | 0 | 719 | 51 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.94 | 0.89 | 0.89 | 0.93 | 1.00 | 0.73 | 0.90 | 0.93 | 1.00 | 1.00 | 0.88 | 0.88 |
| Lanes: | 1.00 | 1.24 | 0.76 | 1.00 | 0.00 | 2.00 | 0.18 | 1.82 | 0.00 | 0.00 | 2.80 | 0.20 |
| Final Sat.: | 1787 | 2088 | 1282 | 1769 | 0 | 2786 | 309 | 3215 | 0 | 0 | 4702 | 330 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.31 | 0.23 | 0.23 | 0.17 | 0.00 | 0.30 | 0.04 | 0.04 | 0.00 | 0.00 | 0.15 | 0.15 |
| Crit Moves: | **** | | | **** | | | **** | | | | **** | |
| Green/Cycle: | 0.29 | 0.29 | 0.29 | 0.27 | 0.00 | 0.44 | 0.34 | 0.34 | 0.00 | 0.00 | 0.17 | 0.17 |
| Volume/Cap: | 1.06 | 0.79 | 0.79 | 0.64 | 0.00 | 0.68 | 0.15 | 0.12 | 0.00 | 0.00 | 0.90 | 0.90 |
| Delay/Veh: | 101.3 | 44.2 | 44.2 | 42.6 | 0.0 | 29.1 | 29.2 | 27.9 | 0.0 | 0.0 | 61.9 | 61.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 101.3 | 44.2 | 44.2 | 42.6 | 0.0 | 29.1 | 29.2 | 27.9 | 0.0 | 0.0 | 61.9 | 61.9 |
| LOS by Move: | F | D | D | D | A | C | C | C | A | A | E | E |
| HCM2kAvgQ: | 30 | 16 | 16 | 11 | 0 | 15 | 2 | 2 | 0 | 0 | 14 | 14 |

Note: Queue reported is the number of cars per lane.





UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #4 Mariposa St / I-280 SB On-Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.721
Loss Time (sec): 7 (Y+R=4.0 sec) Average Delay (sec/veh): 16.5
Optimal Cycle: 97 Level Of Service: B

| Street Name: | I-280 SB On-Ramp | | | | | | Mariposa St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 36 | 54 | 90 | 0 |
| Lanes: | 0 0 | 0 | 0 0 | 0 0 | 0 0 | 0 | 0 0 | 0 1 | 1 | 2 0 | 1 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 137 | 663 | 1338 | 662 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 137 | 663 | 1338 | 662 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 144 | 698 | 1408 | 697 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 144 | 698 | 1408 | 697 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 144 | 698 | 1408 | 697 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.86 | 0.86 | 0.90 | 0.98 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.34 | 1.66 | 2.00 | 1.00 | 0.00 |
| Final Sat.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 559 | 2704 | 3432 | 1862 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 | 0.26 | 0.41 | 0.37 | 0.00 |
| Crit Moves: | | | | | | | | **** | | **** | | |
| Green/Cycle: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.37 | 0.37 | 0.56 | 0.93 | 0.00 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.70 | 0.70 | 0.74 | 0.40 | 0.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 27.6 | 27.6 | 17.7 | 0.6 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 27.6 | 27.6 | 17.7 | 0.6 | 0.0 |
| LOS by Move: | A | A | A | A | A | A | A | C | C | B | A | A |
| HCM2kAvgQ: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 | 17 | 3 | 0 |

Note: Queue reported is the number of cars per lane.

UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #5 16th St / 3rd St

Cycle (sec): 90 Critical Vol./Cap.(X): 0.955
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 35.7
Optimal Cycle: 133 Level Of Service: D

| Street Name: | 3rd St | | | | | | | | | 16th St | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | | | |
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Protected | | | | | Protected | | | | | Protected | | | | | Protected | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Min. Green: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Lanes: | 2 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 355 | 1370 | 23 | | | 38 | 1687 | 80 | | | 88 | 332 | 296 | | | 24 | 562 | 88 | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Initial Bse: | 355 | 1370 | 23 | | | 38 | 1687 | 80 | | | 88 | 332 | 296 | | | 24 | 562 | 88 | | |
| User Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | |
| PHF Volume: | 374 | 1442 | 24 | | | 40 | 1776 | 84 | | | 93 | 349 | 312 | | | 25 | 592 | 93 | | |
| Reduct Vol: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Reduced Vol: | 374 | 1442 | 24 | | | 40 | 1776 | 84 | | | 93 | 349 | 312 | | | 25 | 592 | 93 | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Final Vol.: | 374 | 1442 | 24 | | | 40 | 1776 | 84 | | | 93 | 349 | 312 | | | 25 | 592 | 93 | | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | |
| Adjustment: | 0.92 | 0.95 | 0.95 | | | 0.95 | 0.94 | 0.94 | | | 0.95 | 0.88 | 0.88 | | | 0.95 | 0.93 | 0.93 | | |
| Lanes: | 2.00 | 1.97 | 0.03 | | | 1.00 | 1.91 | 0.09 | | | 1.00 | 1.06 | 0.94 | | | 1.00 | 1.73 | 0.27 | | |
| Final Sat.: | 3502 | 3540 | 59 | | | 1805 | 3422 | 162 | | | 1805 | 1773 | 1581 | | | 1805 | 3059 | 479 | | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.11 | 0.41 | 0.41 | | | 0.02 | 0.52 | 0.52 | | | 0.05 | 0.20 | 0.20 | | | 0.01 | 0.19 | 0.19 | | |
| Crit Moves: | **** | | | | | | **** | | | | **** | | | | | | **** | | | |
| Green/Cycle: | 0.11 | 0.62 | 0.62 | | | 0.03 | 0.54 | 0.54 | | | 0.05 | 0.24 | 0.24 | | | 0.02 | 0.20 | 0.20 | | |
| Volume/Cap: | 0.96 | 0.66 | 0.66 | | | 0.66 | 0.96 | 0.96 | | | 0.96 | 0.82 | 0.82 | | | 0.82 | 0.96 | 0.96 | | |
| Delay/Veh: | 73.7 | 11.6 | 11.6 | | | 66.0 | 31.1 | 31.1 | | | 119.0 | 39.4 | 39.4 | | | 135.7 | 58.6 | 58.6 | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| AdjDel/Veh: | 73.7 | 11.6 | 11.6 | | | 66.0 | 31.1 | 31.1 | | | 119.0 | 39.4 | 39.4 | | | 135.7 | 58.6 | 58.6 | | |
| LOS by Move: | E | B | B | | | E | C | C | | | F | D | D | | | F | E | E | | |
| HCM2kAvgQ: | 9 | 14 | 14 | | | 2 | 32 | 32 | | | 5 | 12 | 12 | | | 2 | 15 | 15 | | |

Note: Queue reported is the number of cars per lane.





UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #6 16th St / 4th St

Cycle (sec): 60 Critical Vol./Cap.(X): 0.948
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 37.0
Optimal Cycle: 94 Level Of Service: D

| Street Name: | 4th St | | | | | | | | | 16th St | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | | | |
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Protected | | | | | Protected | | | | | Protected | | | | | Protected | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Min. Green: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Lanes: | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 162 | 142 | 135 | | | 171 | 281 | 366 | | | 251 | 410 | 26 | | | 42 | 934 | 21 | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Initial Bse: | 162 | 142 | 135 | | | 171 | 281 | 366 | | | 251 | 410 | 26 | | | 42 | 934 | 21 | | |
| User Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | |
| PHF Volume: | 171 | 149 | 142 | | | 180 | 296 | 385 | | | 264 | 432 | 27 | | | 44 | 983 | 22 | | |
| Reduct Vol: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Reduced Vol: | 171 | 149 | 142 | | | 180 | 296 | 385 | | | 264 | 432 | 27 | | | 44 | 983 | 22 | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Final Vol.: | 171 | 149 | 142 | | | 180 | 296 | 385 | | | 264 | 432 | 27 | | | 44 | 983 | 22 | | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | |
| Adjustment: | 0.95 | 1.00 | 0.85 | | | 0.95 | 1.00 | 0.85 | | | 0.95 | 0.94 | 0.94 | | | 0.95 | 0.95 | 0.95 | | |
| Lanes: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.88 | 0.12 | | | 1.00 | 1.96 | 0.04 | | |
| Final Sat.: | 1805 | 1900 | 1615 | | | 1805 | 1900 | 1615 | | | 1805 | 3364 | 213 | | | 1805 | 3520 | 79 | | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.09 | 0.08 | 0.09 | | | 0.10 | 0.16 | 0.24 | | | 0.15 | 0.13 | 0.13 | | | 0.02 | 0.28 | 0.28 | | |
| Crit Moves: | **** | | | | | | | | **** | | **** | | | | | | **** | | | |
| Green/Cycle: | 0.10 | 0.16 | 0.16 | | | 0.19 | 0.25 | 0.25 | | | 0.15 | 0.38 | 0.38 | | | 0.07 | 0.29 | 0.29 | | |
| Volume/Cap: | 0.95 | 0.48 | 0.53 | | | 0.53 | 0.62 | 0.95 | | | 0.95 | 0.34 | 0.34 | | | 0.34 | 0.95 | 0.95 | | |
| Delay/Veh: | 78.9 | 23.9 | 25.1 | | | 23.7 | 22.4 | 53.7 | | | 65.1 | 13.5 | 13.5 | | | 28.1 | 37.4 | 37.4 | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| AdjDel/Veh: | 78.9 | 23.9 | 25.1 | | | 23.7 | 22.4 | 53.7 | | | 65.1 | 13.5 | 13.5 | | | 28.1 | 37.4 | 37.4 | | |
| LOS by Move: | E | C | C | | | C | C | D | | | E | B | B | | | C | D | D | | |
| HCM2kAvgQ: | 7 | 3 | 3 | | | 4 | 6 | 12 | | | 9 | 3 | 3 | | | 1 | 15 | 15 | | |

Note: Queue reported is the number of cars per lane.

UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #7 16th St / Owens St

Cycle (sec): 110 Critical Vol./Cap.(X): 0.957
Loss Time (sec): 12 (Y+R=3.0 sec) Average Delay (sec/veh): 50.3
Optimal Cycle: 154 Level Of Service: D

| Street Name: | Owens St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Ovl | | | Include | | | Include | | |
| Min. Green: | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| Lanes: | 1 0 | 1 1 | 0 | 0 1 | 1 0 | 1 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 152 | 352 | 177 | 32 | 768 | 553 | 118 | 478 | 36 | 11 | 1426 | 25 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 152 | 352 | 177 | 32 | 768 | 553 | 118 | 478 | 36 | 11 | 1426 | 25 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 160 | 371 | 186 | 34 | 808 | 582 | 124 | 503 | 38 | 12 | 1501 | 26 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 160 | 371 | 186 | 34 | 808 | 582 | 124 | 503 | 38 | 12 | 1501 | 26 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 160 | 371 | 186 | 34 | 808 | 582 | 124 | 503 | 38 | 12 | 1501 | 26 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 0.85 | 0.95 | 0.99 | 0.99 | 0.95 | 1.00 | 1.00 |
| Lanes: | 1.00 | 1.33 | 0.67 | 0.08 | 1.92 | 1.00 | 1.00 | 1.86 | 0.14 | 1.00 | 1.97 | 0.03 |
| Final Sat.: | 1805 | 2402 | 1208 | 152 | 3641 | 1615 | 1805 | 3499 | 263 | 1805 | 3723 | 65 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.09 | 0.15 | 0.15 | 0.22 | 0.22 | 0.36 | 0.07 | 0.14 | 0.14 | 0.01 | 0.40 | 0.40 |
| Crit Moves: | **** | | | | | **** | **** | | | | **** | |
| Green/Cycle: | 0.09 | 0.16 | 0.16 | 0.23 | 0.30 | 0.38 | 0.07 | 0.37 | 0.37 | 0.12 | 0.42 | 0.42 |
| Volume/Cap: | 0.96 | 0.95 | 0.95 | 0.95 | 0.73 | 0.96 | 0.96 | 0.38 | 0.38 | 0.05 | 0.96 | 0.96 |
| Delay/Veh: | 106.3 | 70.1 | 70.1 | 59.9 | 36.5 | 59.4 | 116.3 | 25.3 | 25.3 | 43.1 | 44.5 | 44.5 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 106.3 | 70.1 | 70.1 | 59.9 | 36.5 | 59.4 | 116.3 | 25.3 | 25.3 | 43.1 | 44.5 | 44.5 |
| LOS by Move: | F | E | E | E | D | E | F | C | C | D | D | D |
| HCM2kAvgQ: | 9 | 13 | 13 | 19 | 14 | 24 | 7 | 7 | 7 | 0 | 30 | 30 |

Note: Queue reported is the number of cars per lane.





UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #8 Garage Access at Owens

Cycle (sec): 60 Critical Vol./Cap.(X): 0.663
Loss Time (sec): 9 (Y+R=4.0 sec) Average Delay (sec/veh): 15.5
Optimal Cycle: 43 Level Of Service: B

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 0 0 | 1 1 | 0 | 0 1 | 1 0 | 0 | 0 0 | 0 0 | 0 | 1 0 | 0 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 482 | 34 | 36 | 779 | 0 | 0 | 0 | 0 | 176 | 0 | 266 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 482 | 34 | 36 | 779 | 0 | 0 | 0 | 0 | 176 | 0 | 266 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 507 | 36 | 38 | 820 | 0 | 0 | 0 | 0 | 185 | 0 | 280 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 507 | 36 | 38 | 820 | 0 | 0 | 0 | 0 | 185 | 0 | 280 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 0 | 507 | 36 | 38 | 820 | 0 | 0 | 0 | 0 | 185 | 0 | 280 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.94 | 0.94 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 0.85 |
| Lanes: | 0.00 | 1.87 | 0.13 | 0.09 | 1.91 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Final Sat.: | 0 | 3338 | 235 | 159 | 3444 | 0 | 0 | 0 | 0 | 1805 | 0 | 1615 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.15 | 0.15 | 0.24 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.00 | 0.17 |
| Crit Moves: | | **** | | **** | | | | | | | | **** |
| Green/Cycle: | 0.00 | 0.23 | 0.23 | 0.36 | 0.59 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 | 0.00 | 0.26 |
| Volume/Cap: | 0.00 | 0.66 | 0.66 | 0.66 | 0.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.39 | 0.00 | 0.66 |
| Delay/Veh: | 0.0 | 23.1 | 23.1 | 17.5 | 6.8 | 0.0 | 0.0 | 0.0 | 0.0 | 18.8 | 0.0 | 23.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 23.1 | 23.1 | 17.5 | 6.8 | 0.0 | 0.0 | 0.0 | 0.0 | 18.8 | 0.0 | 23.7 |
| LOS by Move: | A | C | C | B | A | A | A | A | A | B | A | C |
| HCM2kAvgQ: | 0 | 6 | 6 | 8 | 5 | 0 | 0 | 0 | 0 | 3 | 0 | 6 |

Note: Queue reported is the number of cars per lane.

UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #11 16th St / Mississippi St/7th St

Cycle (sec): 110 Critical Vol./Cap.(X): 0.865
Loss Time (sec): 9 (Y+R=5.0 sec) Average Delay (sec/veh): 48.6
Optimal Cycle: 90 Level Of Service: D

| Street Name: | Mississippi St/ 7th St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T | - R | | L - T | - R | | L - T | - R | | L - T | - R | |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 0 | 1 0 | 1 | 1 0 | 0 1 | 0 | 0 1 | 0 1 | 0 | 0 1 | 1 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 30 | 245 | 25 | 155 | 126 | 77 | 106 | 452 | 87 | 69 | 1522 | 540 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 30 | 245 | 25 | 155 | 126 | 77 | 106 | 452 | 87 | 69 | 1522 | 540 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 32 | 258 | 26 | 163 | 133 | 81 | 112 | 476 | 92 | 73 | 1602 | 568 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 32 | 258 | 26 | 163 | 133 | 81 | 112 | 476 | 92 | 73 | 1602 | 568 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 32 | 258 | 26 | 163 | 133 | 81 | 112 | 476 | 92 | 73 | 1602 | 568 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.95 | 1.00 | 0.85 | 0.95 | 0.94 | 0.94 | 0.46 | 0.46 | 0.46 | 0.82 | 0.82 | 0.85 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 0.62 | 0.38 | 0.33 | 1.40 | 0.27 | 0.09 | 1.91 | 1.00 |
| Final Sat.: | 1805 | 1900 | 1615 | 1805 | 1112 | 680 | 288 | 1230 | 237 | 135 | 2973 | 1615 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.14 | 0.02 | 0.09 | 0.12 | 0.12 | 0.39 | 0.39 | 0.39 | 0.54 | 0.54 | 0.35 |
| Crit Moves: | | **** | | | | **** | | | | | **** | |
| Green/Cycle: | 0.21 | 0.21 | 0.21 | 0.17 | 0.17 | 0.17 | 0.54 | 0.54 | 0.54 | 0.50 | 0.50 | 0.67 |
| Volume/Cap: | 0.08 | 0.65 | 0.08 | 0.52 | 0.69 | 0.69 | 0.72 | 0.72 | 0.72 | 1.08 | 1.08 | 0.52 |
| Delay/Veh: | 35.1 | 43.6 | 35.1 | 43.0 | 49.3 | 49.3 | 22.0 | 22.0 | 22.0 | 74.4 | 74.4 | 9.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 35.1 | 43.6 | 35.1 | 43.0 | 49.3 | 49.3 | 22.0 | 22.0 | 22.0 | 74.4 | 74.4 | 9.6 |
| LOS by Move: | D | D | D | D | D | D | C | C | C | E | E | A |
| HCM2kAvgQ: | 1 | 9 | 1 | 6 | 8 | 8 | 11 | 11 | 11 | 42 | 42 | 10 |

Note: Queue reported is the number of cars per lane.





UCSF Medical Center at Mission Bay - Transportation Study
Year 2025 - Fouth St. Open as a Public Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #12 7th and Mission Bay Drive

Cycle (sec): 110 Critical Vol./Cap.(X): 0.767
Loss Time (sec): 9 (Y+R=5.0 sec) Average Delay (sec/veh): 34.7
Optimal Cycle: 63 Level Of Service: C

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L - T | - R | | | L - T | - R | | | L - T | - R | | | L - T | - R | | |
| Control: | Protected | | | | Protected | | | | Protected | | | | Protected | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 0 0 | 2 0 | 1 | 2 | 0 1 | 0 0 | | 0 0 | 0 0 | 0 0 | | 1 | 0 0 | 0 0 | | 2 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 813 | 78 | 661 | 267 | 0 | 0 | 0 | 0 | 0 | 91 | 0 | 726 | | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| Initial Bse: | 0 | 813 | 78 | 661 | 267 | 0 | 0 | 0 | 0 | 0 | 91 | 0 | 726 | | | |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | | | | |
| PHF Volume: | 0 | 856 | 82 | 696 | 281 | 0 | 0 | 0 | 0 | 0 | 96 | 0 | 764 | | | |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Reduced Vol: | 0 | 856 | 82 | 696 | 281 | 0 | 0 | 0 | 0 | 0 | 96 | 0 | 764 | | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| Final Vol.: | 0 | 856 | 82 | 696 | 281 | 0 | 0 | 0 | 0 | 0 | 96 | 0 | 764 | | | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | |
| Adjustment: | 1.00 | 0.95 | 0.85 | 0.92 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 0.75 | | | | |
| Lanes: | 0.00 | 2.00 | 1.00 | 2.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 2.00 | | | | |
| Final Sat.: | 0 | 3610 | 1615 | 3502 | 1900 | 0 | 0 | 0 | 0 | 1805 | 0 | 2842 | | | | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.24 | 0.05 | 0.20 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.27 | | | | |
| Crit Moves: | | **** | | **** | | | | | | | | **** | | | | |
| Green/Cycle: | 0.00 | 0.31 | 0.31 | 0.26 | 0.57 | 0.00 | 0.00 | 0.00 | 0.00 | 0.35 | 0.00 | 0.35 | | | | |
| Volume/Cap: | 0.00 | 0.77 | 0.16 | 0.77 | 0.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.00 | 0.77 | | | | |
| Delay/Veh: | 0.0 | 37.7 | 27.8 | 41.7 | 12.2 | 0.0 | 0.0 | 0.0 | 0.0 | 24.6 | 0.0 | 35.4 | | | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| AdjDel/Veh: | 0.0 | 37.7 | 27.8 | 41.7 | 12.2 | 0.0 | 0.0 | 0.0 | 0.0 | 24.6 | 0.0 | 35.4 | | | | |
| LOS by Move: | A | D | C | D | B | A | A | A | A | C | A | D | | | | |
| HCM2kAvgQ: | 0 | 15 | 2 | 13 | 5 | 0 | 0 | 0 | 0 | 2 | 0 | 15 | | | | |

Note: Queue reported is the number of cars per lane.

# APPENDIX E – LOS ANALYSIS
## ALTERNATIVE 1: FOURTH ST CLOSED

# ALTERNATIVE 1: FOURTH ST. CLOSED AS A PUBLIC RDWY
# PHASE 1 (2015) – UNMITIGATED CONDITIONS

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. Closed
Unmitigated Conditions

Scenario Report

| | |
|---|---|
| Scenario: | 2015 Cumulative |
| Command: | 2025 Cumulative |
| Volume: | 2025 Cumulative |
| Geometry: | Existing |
| Impact Fee: | Default Impact Fee |
| Trip Generation: | Project |
| Trip Distribution: | Project |
| Paths: | Default Paths |
| Routes: | Default Routes |
| Configuration: | Existing |





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. Closed
Unmitigated Conditions

Impact Analysis Report
Level Of Service

| Intersection | Base LOS | Base Del/ Veh | Base V/ C | Future LOS | Future Del/ Veh | Future V/ C | Change in D/V |
|---|---|---|---|---|---|---|---|
| # 1 Mariposa St / 3rd St | C | 31.8 | 0.938 | C | 34.8 | 0.951 | + 3.026 |
| # 2 Mariposa St / Minnesota St/4th | B | 10.2 | 0.266 | B | 15.0 | 0.334 | + 4.744 |
| # 3 Mariposa St / I-280 NB Off-Ram | C | 31.2 | 0.583 | C | 31.9 | 0.603 | + 0.707 |
| # 4 Mariposa St / I-280 SB On-Ramp | B | 16.0 | 0.619 | B | 16.4 | 0.662 | + 0.485 |
| # 5 16th St / 3rd St | D | 42.0 | 1.002 | D | 46.3 | 1.028 | + 4.285 |
| # 6 16th St / 4th St | C | 23.0 | 0.810 | C | 25.9 | 0.823 | + 2.866 |
| # 7 16th St / Owens St | D | 35.7 | 0.808 | D | 41.4 | 0.892 | + 5.681 |
| # 8 Garage Access -North Owens | A | 0.0 | 0.000 | B | 10.8 | 0.000 | +10.784 |
| # 9 Garage Access -Center Owens | A | 0.0 | 0.000 | A | 0.0 | 0.000 | + 0.000 |
| # 10 Garage Access -South Owens | A | 9.0 | 0.000 | B | 13.8 | 0.000 | + 4.805 |
| # 11 16th St / Mississippi St/7th S | C | 24.4 | 0.725 | C | 34.9 | 0.770 | +10.527 |
| # 12 7th and Mission Bay Drive | C | 31.1 | 0.653 | C | 31.2 | 0.667 | + 0.138 |

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Mariposa St / 3rd St

Cycle (sec): 90 Critical Vol./Cap.(X): 0.951
Loss Time (sec): 14 (Y+R=4.0 sec) Average Delay (sec/veh): 34.8
Optimal Cycle: 130 Level Of Service: C

| Street Name: | 3rd St | | | | | | | | | Mariposa St | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | | | |
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Protected | | | | | Protected | | | | | Protected | | | | | Protected | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Min. Green: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Lanes: | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 42 | 1424 | | 35 | | 30 | 1693 | | 223 | | 187 | 241 | | 152 | | 53 | 157 | | 40 | |
| Growth Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| Initial Bse: | 42 | 1424 | | 35 | | 30 | 1693 | | 223 | | 187 | 241 | | 152 | | 53 | 157 | | 40 | |
| Added Vol: | 4 | 7 | | 0 | | 0 | 27 | | 0 | | 0 | 0 | | 46 | | 0 | 0 | | 0 | |
| PasserByVol: | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | |
| Initial Fut: | 46 | 1431 | | 35 | | 30 | 1720 | | 223 | | 187 | 241 | | 198 | | 53 | 157 | | 40 | |
| User Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| PHF Adj: | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | |
| PHF Volume: | 48 | 1506 | | 37 | | 32 | 1811 | | 235 | | 197 | 254 | | 208 | | 56 | 165 | | 42 | |
| Reduct Vol: | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | |
| Reduced Vol: | 48 | 1506 | | 37 | | 32 | 1811 | | 235 | | 197 | 254 | | 208 | | 56 | 165 | | 42 | |
| PCE Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| MLF Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| Final Vol.: | 48 | 1506 | | 37 | | 32 | 1811 | | 235 | | 197 | 254 | | 208 | | 56 | 165 | | 42 | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | | 1900 | | 1900 | 1900 | | 1900 | | 1900 | 1900 | | 1900 | | 1900 | 1900 | | 1900 | |
| Adjustment: | 0.93 | 0.91 | | 0.91 | | 0.93 | 0.89 | | 0.89 | | 0.93 | 0.87 | | 0.87 | | 0.93 | 0.90 | | 0.90 | |
| Lanes: | 1.00 | 1.95 | | 0.05 | | 1.00 | 1.77 | | 0.23 | | 1.00 | 1.10 | | 0.90 | | 1.00 | 1.59 | | 0.41 | |
| Final Sat.: | 1769 | 3384 | | 83 | | 1769 | 2998 | | 389 | | 1769 | 1810 | | 1487 | | 1769 | 2735 | | 697 | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.45 | | 0.45 | | 0.02 | 0.60 | | 0.60 | | 0.11 | 0.14 | | 0.14 | | 0.03 | 0.06 | | 0.06 | |
| Crit Moves: | **** | | | | | | **** | | | | | **** | | | | **** | | | | |
| Green/Cycle: | 0.03 | 0.64 | | 0.64 | | 0.03 | 0.64 | | 0.64 | | 0.12 | 0.15 | | 0.15 | | 0.03 | 0.06 | | 0.06 | |
| Volume/Cap: | 0.95 | 0.70 | | 0.70 | | 0.70 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | |
| Delay/Veh: | 156.0 | 12.5 | | 12.5 | | 106.2 | 26.0 | | 26.0 | | 90.4 | 68.3 | | 68.3 | | 147.5 | 91.4 | | 91.4 | |
| User DelAdj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| AdjDel/Veh: | 156.0 | 12.5 | | 12.5 | | 106.2 | 26.0 | | 26.0 | | 90.4 | 68.3 | | 68.3 | | 147.5 | 91.4 | | 91.4 | |
| LOS by Move: | F | B | | B | | F | C | | C | | F | E | | E | | F | F | | F | |
| HCM2kAvgQ: | 4 | 15 | | 15 | | 2 | 33 | | 33 | | 9 | 11 | | 11 | | 4 | 6 | | 6 | |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #2 Mariposa St / Minnesota St/4th St

Cycle (sec): 60 Critical Vol./Cap.(X): 0.334
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 15.0
Optimal Cycle: 24 Level Of Service: B

| Street Name: | Minnesota St/ 4th St | | | | | | | | | Mariposa St | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | | | |
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Protected | | | | | Protected | | | | | Protected | | | | | Protected | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Min. Green: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Lanes: | 0 | 0 | 1! | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 51 | 0 | | 99 | | 0 | 0 | | 0 | | 0 | 370 | | 43 | | 18 | 302 | | 0 | |
| Growth Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| Initial Bse: | 51 | 0 | | 99 | | 0 | 0 | | 0 | | 0 | 370 | | 43 | | 18 | 302 | | 0 | |
| Added Vol: | 0 | 0 | | 0 | | 46 | 0 | | 89 | | 2 | 0 | | 0 | | 0 | 0 | | 4 | |
| PasserByVol: | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | |
| Initial Fut: | 51 | 0 | | 99 | | 46 | 0 | | 89 | | 2 | 370 | | 43 | | 18 | 302 | | 4 | |
| User Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| PHF Adj: | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | |
| PHF Volume: | 54 | 0 | | 104 | | 48 | 0 | | 94 | | 2 | 389 | | 45 | | 19 | 318 | | 4 | |
| Reduct Vol: | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | |
| Reduced Vol: | 54 | 0 | | 104 | | 48 | 0 | | 94 | | 2 | 389 | | 45 | | 19 | 318 | | 4 | |
| PCE Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| MLF Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| Final Vol.: | 54 | 0 | | 104 | | 48 | 0 | | 94 | | 2 | 389 | | 45 | | 19 | 318 | | 4 | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | | 1900 | | 1900 | 1900 | | 1900 | | 1900 | 1900 | | 1900 | | 1900 | 1900 | | 1900 | |
| Adjustment: | 0.88 | 1.00 | | 0.88 | | 0.93 | 1.00 | | 0.83 | | 0.93 | 0.92 | | 0.92 | | 0.93 | 0.93 | | 0.93 | |
| Lanes: | 0.34 | 0.00 | | 0.66 | | 1.00 | 0.00 | | 1.00 | | 1.00 | 1.79 | | 0.21 | | 1.00 | 1.97 | | 0.03 | |
| Final Sat.: | 567 | 0 | | 1101 | | 1773 | 0 | | 1583 | | 1769 | 3119 | | 362 | | 1769 | 3485 | | 46 | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.09 | 0.00 | | 0.09 | | 0.03 | 0.00 | | 0.06 | | 0.00 | 0.12 | | 0.12 | | 0.01 | 0.09 | | 0.09 | |
| Crit Moves: | **** | | | | | | | | **** | | | **** | | | | **** | | | | |
| Green/Cycle: | 0.28 | 0.00 | | 0.36 | | 0.10 | 0.00 | | 0.18 | | 0.01 | 0.37 | | 0.37 | | 0.03 | 0.40 | | 0.40 | |
| Volume/Cap: | 0.33 | 0.00 | | 0.26 | | 0.26 | 0.00 | | 0.33 | | 0.23 | 0.33 | | 0.33 | | 0.33 | 0.23 | | 0.23 | |
| Delay/Veh: | 17.4 | 0.0 | | 13.9 | | 25.6 | 0.0 | | 22.3 | | 41.9 | 13.6 | | 13.6 | | 31.9 | 11.9 | | 11.9 | |
| User DelAdj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| AdjDel/Veh: | 17.4 | 0.0 | | 13.9 | | 25.6 | 0.0 | | 22.3 | | 41.9 | 13.6 | | 13.6 | | 31.9 | 11.9 | | 11.9 | |
| LOS by Move: | B | A | | B | | C | A | | C | | D | B | | B | | C | B | | B | |
| HCM2kAvgQ: | 3 | 0 | | 2 | | 1 | 0 | | 2 | | 0 | 3 | | 3 | | 1 | 2 | | 2 | |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #3 Mariposa St / I-280 NB Off-Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.603
Loss Time (sec): 9 (Y+R=3.0 sec) Average Delay (sec/veh): 31.9
Optimal Cycle: 99 Level Of Service: C

| Street Name: | I-280 NB Off-Ramp | | | | | | Mariposa St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 36 | 36 | 36 | 33 | 33 | 33 | 21 | 21 | 0 | 0 | 21 | 21 |
| Lanes: | 1 0 | 1 | 1 0 | 1 0 | 0 0 | 2 | 0 1 | 1 0 | 0 | 0 0 | 2 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 516 | 351 | 245 | 198 | 0 | 565 | 98 | 24 | 0 | 0 | 481 | 35 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 516 | 351 | 245 | 198 | 0 | 565 | 98 | 24 | 0 | 0 | 481 | 35 |
| Added Vol: | 0 | 17 | 2 | 0 | 0 | 47 | 1 | 0 | 0 | 0 | 89 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 516 | 368 | 247 | 198 | 0 | 612 | 99 | 24 | 0 | 0 | 570 | 35 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 543 | 387 | 260 | 208 | 0 | 644 | 104 | 25 | 0 | 0 | 600 | 37 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 543 | 387 | 260 | 208 | 0 | 644 | 104 | 25 | 0 | 0 | 600 | 37 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 543 | 387 | 260 | 208 | 0 | 644 | 104 | 25 | 0 | 0 | 600 | 37 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.94 | 0.88 | 0.88 | 0.93 | 1.00 | 0.73 | 0.58 | 0.58 | 1.00 | 1.00 | 0.88 | 0.88 |
| Lanes: | 1.00 | 1.20 | 0.80 | 1.00 | 0.00 | 2.00 | 1.00 | 1.00 | 0.00 | 0.00 | 2.83 | 0.17 |
| Final Sat.: | 1787 | 2010 | 1349 | 1769 | 0 | 2786 | 1111 | 1111 | 0 | 0 | 4746 | 291 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.30 | 0.19 | 0.19 | 0.12 | 0.00 | 0.23 | 0.09 | 0.02 | 0.00 | 0.00 | 0.13 | 0.13 |
| Crit Moves: | **** | | | **** | | | | | | | **** | |
| Green/Cycle: | 0.36 | 0.36 | 0.36 | 0.33 | 0.00 | 0.33 | 0.21 | 0.21 | 0.00 | 0.00 | 0.21 | 0.21 |
| Volume/Cap: | 0.84 | 0.53 | 0.53 | 0.35 | 0.00 | 0.69 | 0.44 | 0.11 | 0.00 | 0.00 | 0.60 | 0.60 |
| Delay/Veh: | 38.1 | 25.3 | 25.3 | 25.3 | 0.0 | 30.9 | 35.0 | 31.5 | 0.0 | 0.0 | 36.1 | 36.1 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 38.1 | 25.3 | 25.3 | 25.3 | 0.0 | 30.9 | 35.0 | 31.5 | 0.0 | 0.0 | 36.1 | 36.1 |
| LOS by Move: | D | C | C | C | A | C | C | C | A | A | D | D |
| HCM2kAvgQ: | 18 | 8 | 8 | 5 | 0 | 11 | 3 | 1 | 0 | 0 | 7 | 7 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #4 Mariposa St / I-280 SB On-Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.662
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 16.4
Optimal Cycle: 98 Level Of Service: B

| Street Name: | I-280 SB On-Ramp | | | | | | Mariposa St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Permitted | | | Permitted | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 54 | 90 | 0 |
| Lanes: | 0 0 | 0 | 0 0 | 0 0 | 0 0 | 0 | 0 0 | 0 1 | 1 | 2 0 | 1 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 121 | 653 | 1036 | 527 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 121 | 653 | 1036 | 527 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 128 | 8 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 122 | 653 | 1164 | 535 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 | 687 | 1225 | 563 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 | 687 | 1225 | 563 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 | 687 | 1225 | 563 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.86 | 0.86 | 0.90 | 0.98 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.31 | 1.69 | 2.00 | 1.00 | 0.00 |
| Final Sat.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 512 | 2742 | 3432 | 1862 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.36 | 0.30 | 0.00 |
| Crit Moves: | | | | | | | | **** | | **** | | |
| Green/Cycle: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.37 | 0.37 | 0.55 | 0.92 | 0.00 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.68 | 0.68 | 0.65 | 0.33 | 0.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 27.8 | 27.8 | 16.2 | 0.6 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 27.8 | 27.8 | 16.2 | 0.6 | 0.0 |
| LOS by Move: | A | A | A | A | A | A | A | C | C | B | A | A |
| HCM2kAvgQ: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 11 | 14 | 2 | 0 |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #5 16th St / 3rd St

| | | | |
|---|---|---|---|
| Cycle (sec): | 90 | Critical Vol./Cap.(X): | 1.028 |
| Loss Time (sec): | 12 (Y+R=4.0 sec) | Average Delay (sec/veh): | 46.3 |
| Optimal Cycle: | 180 | Level Of Service: | D |

| Street Name: | 3rd St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 2 0 | 1 | 1 0 | 1 0 | 1 | 1 0 | 1 0 | 1 | 1 0 | 1 0 | 1 | 1 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 337 | 1319 | 21 | 34 | 1483 | 73 | 42 | 286 | 415 | 47 | 441 | 79 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 337 | 1319 | 21 | 34 | 1483 | 73 | 42 | 286 | 415 | 47 | 441 | 79 |
| Added Vol: | 7 | 0 | 0 | 0 | 0 | 5 | 26 | 0 | 27 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 344 | 1319 | 21 | 34 | 1483 | 78 | 68 | 286 | 442 | 47 | 441 | 79 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 362 | 1388 | 22 | 36 | 1561 | 82 | 72 | 301 | 465 | 49 | 464 | 83 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 362 | 1388 | 22 | 36 | 1561 | 82 | 72 | 301 | 465 | 49 | 464 | 83 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 362 | 1388 | 22 | 36 | 1561 | 82 | 72 | 301 | 465 | 49 | 464 | 83 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.90 | 0.93 | 0.93 | 0.93 | 0.92 | 0.92 | 0.93 | 0.85 | 0.85 | 0.93 | 0.91 | 0.91 |
| Lanes: | 2.00 | 1.97 | 0.03 | 1.00 | 1.90 | 0.10 | 1.00 | 1.00 | 1.00 | 1.00 | 1.70 | 0.30 |
| Final Sat.: | 3432 | 3475 | 55 | 1769 | 3337 | 176 | 1769 | 1608 | 1608 | 1769 | 2931 | 525 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.11 | 0.40 | 0.40 | 0.02 | 0.47 | 0.47 | 0.04 | 0.19 | 0.29 | 0.03 | 0.16 | 0.16 |
| Crit Moves: | **** | | | | **** | | | | **** | **** | | |
| Green/Cycle: | 0.10 | 0.53 | 0.53 | 0.03 | 0.46 | 0.46 | 0.06 | 0.28 | 0.28 | 0.03 | 0.25 | 0.25 |
| Volume/Cap: | 1.03 | 0.75 | 0.75 | 0.75 | 1.03 | 1.03 | 0.64 | 0.66 | 1.03 | 1.03 | 0.64 | 0.64 |
| Delay/Veh: | 95.6 | 18.2 | 18.2 | 92.5 | 54.4 | 54.4 | 53.4 | 30.1 | 72.5 | 181.6 | 32.1 | 32.1 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 95.6 | 18.2 | 18.2 | 92.5 | 54.4 | 54.4 | 53.4 | 30.1 | 72.5 | 181.6 | 32.1 | 32.1 |
| LOS by Move: | F | B | B | F | D | D | D | C | E | F | C | C |
| HCM2kAvgQ: | 10 | 17 | 17 | 2 | 34 | 34 | 3 | 9 | 21 | 4 | 8 | 8 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 16th St / 4th St

| | | | |
|---|---|---|---|
| Cycle (sec): | 60 | Critical Vol./Cap.(X): | 0.823 |
| Loss Time (sec): | 12 (Y+R=4.0 sec) | Average Delay (sec/veh): | 25.9 |
| Optimal Cycle: | 67 | Level Of Service: | C |

| Street Name: | 4th St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 0 | 0 | 1 0 | 1 0 | 0 | 1 0 | 1 0 | 1 | 1 0 | 1 0 | 1 | 1 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 315 | 0 | 344 | 275 | 421 | 0 | 0 | 833 | 22 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 315 | 0 | 344 | 275 | 421 | 0 | 0 | 833 | 22 |
| Added Vol: | 12 | 10 | 30 | 0 | 6 | 0 | 0 | 24 | 12 | 11 | 1 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 12 | 10 | 30 | 315 | 6 | 344 | 275 | 445 | 12 | 11 | 834 | 22 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 13 | 11 | 32 | 332 | 6 | 362 | 289 | 468 | 13 | 12 | 878 | 23 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 13 | 11 | 32 | 332 | 6 | 362 | 289 | 468 | 13 | 12 | 878 | 23 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 13 | 11 | 32 | 332 | 6 | 362 | 289 | 468 | 13 | 12 | 878 | 23 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.93 | 0.87 | 0.87 | 0.93 | 0.84 | 0.84 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Lanes: | 1.00 | 0.25 | 0.75 | 1.00 | 0.02 | 0.98 | 1.00 | 1.95 | 0.05 | 1.00 | 1.95 | 0.05 |
| Final Sat.: | 1769 | 413 | 1240 | 1769 | 27 | 1561 | 1769 | 3431 | 93 | 1769 | 3433 | 91 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.03 | 0.03 | 0.19 | 0.23 | 0.23 | 0.16 | 0.14 | 0.14 | 0.01 | 0.26 | 0.26 |
| Crit Moves: | **** | | | | **** | | **** | | | | **** | |
| Green/Cycle: | 0.01 | 0.03 | 0.03 | 0.26 | 0.28 | 0.28 | 0.20 | 0.49 | 0.49 | 0.02 | 0.31 | 0.31 |
| Volume/Cap: | 0.82 | 0.73 | 0.73 | 0.73 | 0.82 | 0.82 | 0.82 | 0.28 | 0.28 | 0.28 | 0.82 | 0.82 |
| Delay/Veh: | 170.8 | 66.9 | 66.9 | 26.5 | 31.8 | 31.8 | 37.5 | 9.3 | 9.3 | 32.5 | 24.3 | 24.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 170.8 | 66.9 | 66.9 | 26.5 | 31.8 | 31.8 | 37.5 | 9.3 | 9.3 | 32.5 | 24.3 | 24.3 |
| LOS by Move: | F | E | E | C | C | C | D | A | A | C | C | C |
| HCM2kAvgQ: | 1 | 2 | 2 | 7 | 9 | 9 | 8 | 3 | 3 | 1 | 11 | 11 |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #7 16th St / Owens St

Cycle (sec): 110 Critical Vol./Cap.(X): 0.892
Loss Time (sec): 12 (Y+R=5.0 sec) Average Delay (sec/veh): 41.4
Optimal Cycle: 111 Level Of Service: D

| Street Name: | Owens St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| Lanes: | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 17 | 198 | 215 | 38 | 602 | 468 | 112 | 448 | 12 | 53 | 1071 | 50 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 17 | 198 | 215 | 38 | 602 | 468 | 112 | 448 | 12 | 53 | 1071 | 50 |
| Added Vol: | 119 | 72 | 24 | 0 | 4 | 0 | 0 | 12 | 6 | 1 | 12 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 136 | 270 | 239 | 38 | 606 | 468 | 112 | 460 | 18 | 54 | 1083 | 50 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 143 | 284 | 252 | 40 | 638 | 493 | 118 | 484 | 19 | 57 | 1140 | 53 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 143 | 284 | 252 | 40 | 638 | 493 | 118 | 484 | 19 | 57 | 1140 | 53 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 143 | 284 | 252 | 40 | 638 | 493 | 118 | 484 | 19 | 57 | 1140 | 53 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.93 | 0.91 | 0.91 | 0.93 | 0.92 | 0.92 | 0.93 | 0.97 | 0.97 | 0.93 | 0.97 | 0.97 |
| Lanes: | 1.00 | 1.06 | 0.94 | 1.00 | 1.13 | 0.87 | 1.00 | 1.92 | 0.08 | 1.00 | 1.91 | 0.09 |
| Final Sat.: | 1769 | 1837 | 1626 | 1769 | 1965 | 1517 | 1769 | 3562 | 139 | 1769 | 3535 | 163 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.08 | 0.15 | 0.15 | 0.02 | 0.32 | 0.32 | 0.07 | 0.14 | 0.14 | 0.03 | 0.32 | 0.32 |
| Crit Moves: | **** | | | | **** | | **** | | | | **** | |
| Green/Cycle: | 0.09 | 0.35 | 0.35 | 0.10 | 0.36 | 0.36 | 0.07 | 0.33 | 0.33 | 0.11 | 0.36 | 0.36 |
| Volume/Cap: | 0.89 | 0.44 | 0.44 | 0.22 | 0.89 | 0.89 | 0.89 | 0.42 | 0.42 | 0.29 | 0.89 | 0.89 |
| Delay/Veh: | 90.9 | 27.6 | 27.6 | 45.9 | 41.2 | 41.2 | 97.7 | 29.1 | 29.1 | 45.9 | 41.0 | 41.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 90.9 | 27.6 | 27.6 | 45.9 | 41.2 | 41.2 | 97.7 | 29.1 | 29.1 | 45.9 | 41.0 | 41.0 |
| LOS by Move: | F | C | C | D | D | D | F | C | C | D | D | D |
| HCM2kAvgQ: | 8 | 7 | 7 | 1 | 21 | 21 | 7 | 7 | 7 | 2 | 22 | 22 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #8 Garage Access -North Owens

Average Delay (sec/veh): 0.5 Worst Case Level Of Service: B[ 10.8]

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | - T | - R | | L | - T | - R | | L | - T | - R | | L | - T | - R | |
| Control: | Uncontrolled | | | | Uncontrolled | | | | Stop Sign | | | | Stop Sign | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Lanes: | 0 0 | 1 1 | 0 | | 0 0 | 2 0 | 0 | | 0 0 | 0 0 | 0 | | 0 0 | 0 0 | 1 | |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 430 | 0 | 0 | 667 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 430 | 0 | 0 | 667 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Added Vol: | 0 | 150 | 13 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 64 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 580 | 13 | 0 | 679 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 64 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 611 | 14 | 0 | 715 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 67 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Final Vol.: | 0 | 611 | 14 | 0 | 715 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 67 |
| Critical Gap Module: | | | | | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | | 6.9 | | | |
| FollowUpTim: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | | 3.3 | | | |
| Capacity Module: | | | | | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | | 312 | | | |
| Potent Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | | 690 | | | |
| Move Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | | 690 | | | |
| Volume/Cap: | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | | 0.10 | | | |
| Level Of Service Module: | | | | | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | | 0.3 | | | |
| Control Del: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | | 10.8 | | | |
| LOS by Move: | * | * | * | * | * | * | * | * | * | * | * | | B | | | |
| Movement: | LT - | LTR - | RT | LT - | LTR - | RT | LT - | LTR - | RT | LT - | LTR - | RT | | | | |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | | |
| SharedQueue: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| Shared LOS: | * | * | * | * | * | * | * | * | * | * | * | * | | | | |
| ApproachDel: | xxxxxx | | | xxxxxx | | | xxxxxx | | | 10.8 | | | | | | |
| ApproachLOS: | * | | | * | | | * | | | B | | | | | | |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #9 Garage Access -Center Owens

Average Delay (sec/veh): 0.0 Worst Case Level Of Service: A[ 0.0]

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | - | T | - R | L | - | T | - R | L | - | T | - R | L | - | T | - R |
| Control: | Uncontrolled | | | | Uncontrolled | | | | Stop Sign | | | | Stop Sign | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Lanes: | 0 | 0 | 2 | 0 0 | 0 | 0 | 2 | 0 0 | 0 | 0 | 0 | 0 0 | 0 | 0 | 0 | 0 0 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 484 | | 0 | 0 | 667 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 484 | | 0 | 0 | 667 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Added Vol: | 0 | 163 | | 0 | 0 | 12 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| PasserByVol: | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Initial Fut: | 0 | 647 | | 0 | 0 | 679 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 681 | | 0 | 0 | 715 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Reduct Vol: | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Final Vol.: | 0 | 681 | | 0 | 0 | 715 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Critical Gap Module: | | | | | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| FollowUpTim: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| Capacity Module: | | | | | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | | |
| Potent Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | | |
| Move Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | | |
| Volume/Cap: | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | | | | |
| Level Of Service Module: | | | | | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | | |
| Control Del: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| LOS by Move: | * | * | * | * | * | * | * | * | * | * | * | * | | | | |
| Movement: | LT - LTR - RT | | | | LT - LTR - RT | | | | LT - LTR - RT | | | | LT - LTR - RT | | | |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | | |
| SharedQueue: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| Shared LOS: | * | * | * | * | * | * | * | * | * | * | * | * | | | | |
| ApproachDel: | xxxxxx | | | xxxxxx | | | | xxxxxx | | | | xxxxxx | | | | |
| ApproachLOS: | * | | | * | | | | * | | | | * | | | | |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #10 Garage Access -South Owens

Average Delay (sec/veh): 1.9 Worst Case Level Of Service: B[ 13.8]

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | - | T | - R | L | - | T | - R | L | - | T | - R | L | - | T | - R |
| Control: | Uncontrolled | | | | Uncontrolled | | | | Stop Sign | | | | Stop Sign | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Lanes: | 0 | 0 | 1 | 1 0 | 0 | 1 | 1 | 0 0 | 0 | 0 | 0 | 0 0 | 1 | 0 | 0 | 0 1 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 484 | | 0 | 0 | 763 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 484 | | 0 | 0 | 763 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Added Vol: | 0 | 13 | | 5 | 12 | 0 | | 0 | 0 | | 0 | 0 | 47 | | 0 | 150 |
| PasserByVol: | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Initial Fut: | 0 | 497 | | 5 | 12 | 763 | | 0 | 0 | | 0 | 0 | 47 | | 0 | 150 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 523 | | 5 | 13 | 803 | | 0 | 0 | | 0 | 0 | 49 | | 0 | 158 |
| Reduct Vol: | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Final Vol.: | 0 | 523 | | 5 | 13 | 803 | | 0 | 0 | | 0 | 0 | 49 | | 0 | 158 |
| Critical Gap Module: | | | | | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | xxxxx | 4.1 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 6.8 | xxxx | 6.9 | | | | |
| FollowUpTim: | xxxxx | xxxx | xxxxx | 2.2 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 3.5 | xxxx | 3.3 | | | | |
| Capacity Module: | | | | | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | 528 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 953 | xxxx | 264 | | | | |
| Potent Cap.: | xxxx | xxxx | xxxxx | 1049 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 261 | xxxx | 740 | | | | |
| Move Cap.: | xxxx | xxxx | xxxxx | 1049 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 258 | xxxx | 740 | | | | |
| Volume/Cap: | xxxx | xxxx | xxxx | 0.01 | xxxx | xxxx | xxxx | xxxx | xxxx | 0.19 | xxxx | 0.21 | | | | |
| Level Of Service Module: | | | | | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | 0.0 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 0.7 | xxxx | 0.8 | | | | |
| Control Del: | xxxxx | xxxx | xxxxx | 8.5 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 22.2 | xxxx | 11.2 | | | | |
| LOS by Move: | * | * | * | A | * | * | * | * | * | C | * | B | | | | |
| Movement: | LT - LTR - RT | | | | LT - LTR - RT | | | | LT - LTR - RT | | | | LT - LTR - RT | | | |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | | |
| SharedQueue: | xxxxx | xxxx | xxxxx | 0.0 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | 8.5 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| Shared LOS: | * | * | * | A | * | * | * | * | * | * | * | * | | | | |
| ApproachDel: | xxxxxx | | | xxxxxx | | | | xxxxxx | | | | 13.8 | | | | |
| ApproachLOS: | * | | | * | | | | * | | | | B | | | | |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #11 16th St / Mississippi St/7th St

Cycle (sec): 110 Critical Vol./Cap.(X): 0.770
Loss Time (sec): 9 (Y+R=5.0 sec) Average Delay (sec/veh): 34.9
Optimal Cycle: 63 Level Of Service: C

| Street Name: | Mississippi St/ 7th St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 0 | 1 0 | 1 | 1 0 | 0 1 | 0 | 0 1 | 0 1 | 0 | 0 1 | 1 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 29 | 277 | 25 | 144 | 134 | 70 | 90 | 405 | 85 | 68 | 1057 | 429 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 29 | 277 | 25 | 144 | 134 | 70 | 90 | 405 | 85 | 68 | 1057 | 429 |
| Added Vol: | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 13 | 0 | 0 | 90 | 41 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 29 | 277 | 25 | 150 | 134 | 70 | 90 | 418 | 85 | 68 | 1147 | 470 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 31 | 292 | 26 | 158 | 141 | 74 | 95 | 440 | 89 | 72 | 1207 | 495 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 31 | 292 | 26 | 158 | 141 | 74 | 95 | 440 | 89 | 72 | 1207 | 495 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 31 | 292 | 26 | 158 | 141 | 74 | 95 | 440 | 89 | 72 | 1207 | 495 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.93 | 0.98 | 0.83 | 0.93 | 0.93 | 0.93 | 0.49 | 0.49 | 0.49 | 0.78 | 0.78 | 0.83 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 0.66 | 0.34 | 0.30 | 1.41 | 0.29 | 0.11 | 1.89 | 1.00 |
| Final Sat.: | 1769 | 1862 | 1583 | 1769 | 1161 | 606 | 285 | 1323 | 269 | 167 | 2815 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.16 | 0.02 | 0.09 | 0.12 | 0.12 | 0.33 | 0.33 | 0.33 | 0.43 | 0.43 | 0.31 |
| Crit Moves: | | **** | | | | **** | | | | | **** | |
| Green/Cycle: | 0.24 | 0.24 | 0.24 | 0.20 | 0.20 | 0.20 | 0.48 | 0.48 | 0.48 | 0.45 | 0.45 | 0.65 |
| Volume/Cap: | 0.07 | 0.66 | 0.07 | 0.45 | 0.61 | 0.61 | 0.69 | 0.69 | 0.69 | 0.96 | 0.96 | 0.48 |
| Delay/Veh: | 32.7 | 41.8 | 32.7 | 39.5 | 43.1 | 43.1 | 24.4 | 24.4 | 24.4 | 46.1 | 46.1 | 10.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 32.7 | 41.8 | 32.7 | 39.5 | 43.1 | 43.1 | 24.4 | 24.4 | 24.4 | 46.1 | 46.1 | 10.4 |
| LOS by Move: | C | D | C | D | D | D | C | C | C | D | D | B |
| HCM2kAvgQ: | 1 | 10 | 1 | 5 | 7 | 7 | 10 | 10 | 10 | 28 | 28 | 9 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #12 7th and Mission Bay Drive

Cycle (sec): 110 Critical Vol./Cap.(X): 0.667
Loss Time (sec): 9 (Y+R=5.0 sec) Average Delay (sec/veh): 31.2
Optimal Cycle: 48 Level Of Service: C

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 0 0 | 2 0 | 1 | 2 0 | 1 0 | 0 | 0 0 | 0 0 | 0 | 1 0 | 0 0 | 2 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 733 | 62 | 529 | 276 | 0 | 0 | 0 | 0 | 73 | 0 | 581 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 733 | 62 | 529 | 276 | 0 | 0 | 0 | 0 | 73 | 0 | 581 |
| Added Vol: | 0 | 41 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 774 | 62 | 529 | 282 | 0 | 0 | 0 | 0 | 73 | 0 | 581 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 815 | 65 | 557 | 297 | 0 | 0 | 0 | 0 | 77 | 0 | 612 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 815 | 65 | 557 | 297 | 0 | 0 | 0 | 0 | 77 | 0 | 612 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 0 | 815 | 65 | 557 | 297 | 0 | 0 | 0 | 0 | 77 | 0 | 612 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.93 | 0.83 | 0.90 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.73 |
| Lanes: | 0.00 | 2.00 | 1.00 | 2.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 2.00 |
| Final Sat.: | 0 | 3538 | 1583 | 3432 | 1862 | 0 | 0 | 0 | 0 | 1769 | 0 | 2786 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.23 | 0.04 | 0.16 | 0.16 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.22 |
| Crit Moves: | | **** | | **** | | | | | | | | **** |
| Green/Cycle: | 0.00 | 0.35 | 0.35 | 0.24 | 0.59 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.00 | 0.33 |
| Volume/Cap: | 0.00 | 0.67 | 0.12 | 0.67 | 0.27 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 0.00 | 0.67 |
| Delay/Veh: | 0.0 | 32.0 | 24.7 | 39.7 | 11.2 | 0.0 | 0.0 | 0.0 | 0.0 | 26.0 | 0.0 | 33.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 32.0 | 24.7 | 39.7 | 11.2 | 0.0 | 0.0 | 0.0 | 0.0 | 26.0 | 0.0 | 33.6 |
| LOS by Move: | A | C | C | D | B | A | A | A | A | C | A | C |
| HCM2kAvgQ: | 0 | 13 | 1 | 10 | 5 | 0 | 0 | 0 | 0 | 2 | 0 | 11 |

Note: Queue reported is the number of cars per lane.

# ALTERNATIVE 1: FOURTH ST. CLOSED AS A PUBLIC RDWY
# PHASE 2 (2025) – UNMITIGATED CONDITIONS

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Unmitigated Conditions

Scenario Report

| | |
|---|---|
| Scenario: | 2025 Cumulative |
| Command: | 2025 Cumulative |
| Volume: | 2025 Cumulative |
| Geometry: | Existing |
| Impact Fee: | Default Impact Fee |
| Trip Generation: | Project |
| Trip Distribution: | Project |
| Paths: | Default Paths |
| Routes: | Default Routes |
| Configuration: | Existing |





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Unmitigated Conditions

Impact Analysis Report
Level Of Service

| Intersection | Base LOS | Base Del/ Veh | Base V/ C | Future LOS | Future Del/ Veh | Future V/ C | Change in |
|---|---|---|---|---|---|---|---|
| # 1 Mariposa St / 3rd St | D | 50.4 | 1.046 | E | 63.9 | 1.112 | +13.497 D/V |
| # 2 Mariposa St / Minnesota St/4th | B | 10.6 | 0.332 | B | 14.2 | 0.406 | + 3.627 D/V |
| # 3 Mariposa St / I-280 NB Off-Ram | C | 33.2 | 0.629 | D | 43.3 | 0.862 | +10.111 D/V |
| # 4 Mariposa St / I-280 SB On-Ramp | B | 16.2 | 0.659 | B | 17.8 | 0.747 | + 1.685 D/V |
| # 5 16th St / 3rd St | E | 64.0 | 1.125 | E | 75.4 | 1.172 | +11.484 D/V |
| # 6 16th St / 4th St | D | 37.3 | 0.959 | D | 46.9 | 0.982 | + 9.526 D/V |
| # 7 16th St / Owens St | D | 48.8 | 0.946 | F | 81.8 | 1.113 | +32.977 D/V |
| # 8 Garage Access -North Owens | A | 0.0 | 0.000 | B | 13.2 | 0.000 | +13.227 D/V |
| # 9 Garage Access -Center Owens | A | 0.0 | 0.000 | F | 55.0 | 0.000 | +54.988 D/V |
| # 10 Garage Access -South Owens | A | 0.0 | 0.000 | E | 43.9 | 0.000 | +43.856 D/V |
| # 11 16th St / Mississippi St/7th S | C | 23.5 | 0.785 | D | 47.1 | 0.855 | +23.591 D/V |
| # 12 7th and Mission Bay Drive | C | 34.9 | 0.768 | D | 35.8 | 0.794 | + 0.839 D/V |

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Mariposa St / 3rd St

| | | | |
|---|---|---|---|
| Cycle (sec): | 90 | Critical Vol./Cap.(X): | 1.112 |
| Loss Time (sec): | 14 (Y+R=4.0 sec) | Average Delay (sec/veh): | 63.9 |
| Optimal Cycle: | 180 | Level Of Service: | E |

| Street Name: | 3rd St | | | | | | | | | Mariposa St | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | | | |
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Protected | | | | | Protected | | | | | Protected | | | | | Protected | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Min. Green: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Lanes: | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 39 | 1535 | 38 | | | 33 | 1944 | 237 | | | 196 | 286 | 177 | | | 63 | 172 | 44 | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Initial Bse: | 39 | 1535 | 38 | | | 33 | 1944 | 237 | | | 196 | 286 | 177 | | | 63 | 172 | 44 | | |
| Added Vol: | 13 | 7 | 0 | | | 0 | 53 | 0 | | | 0 | 0 | 89 | | | 0 | 0 | 0 | | |
| PasserByVol: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Initial Fut: | 52 | 1542 | 38 | | | 33 | 1997 | 237 | | | 196 | 286 | 266 | | | 63 | 172 | 44 | | |
| User Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | |
| PHF Volume: | 55 | 1623 | 40 | | | 35 | 2102 | 249 | | | 206 | 301 | 280 | | | 66 | 181 | 46 | | |
| Reduct Vol: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Reduced Vol: | 55 | 1623 | 40 | | | 35 | 2102 | 249 | | | 206 | 301 | 280 | | | 66 | 181 | 46 | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Final Vol.: | 55 | 1623 | 40 | | | 35 | 2102 | 249 | | | 206 | 301 | 280 | | | 66 | 181 | 46 | | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | |
| Adjustment: | 0.93 | 0.91 | 0.91 | | | 0.93 | 0.89 | 0.89 | | | 0.93 | 0.86 | 0.86 | | | 0.93 | 0.90 | 0.90 | | |
| Lanes: | 1.00 | 1.95 | 0.05 | | | 1.00 | 1.79 | 0.21 | | | 1.00 | 1.04 | 0.96 | | | 1.00 | 1.59 | 0.41 | | |
| Final Sat.: | 1769 | 3384 | 83 | | | 1769 | 3031 | 360 | | | 1769 | 1701 | 1582 | | | 1769 | 2730 | 698 | | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.48 | 0.48 | | | 0.02 | 0.69 | 0.69 | | | 0.12 | 0.18 | 0.18 | | | 0.04 | 0.07 | 0.07 | | |
| Crit Moves: | **** | | | | | | **** | | | | | **** | | | | **** | | | | |
| Green/Cycle: | 0.03 | 0.63 | 0.63 | | | 0.03 | 0.62 | 0.62 | | | 0.12 | 0.16 | 0.16 | | | 0.03 | 0.07 | 0.07 | | |
| Volume/Cap: | 1.11 | 0.77 | 0.77 | | | 0.77 | 1.11 | 1.11 | | | 0.95 | 1.11 | 1.11 | | | 1.11 | 0.95 | 0.95 | | |
| Delay/Veh: | 206.5 | 14.8 | 14.8 | | | 119.3 | 74.7 | 74.7 | | | 88.2 | 112 | 111.6 | | | 194.1 | 87.9 | 87.9 | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| AdjDel/Veh: | 206.5 | 14.8 | 14.8 | | | 119.3 | 74.7 | 74.7 | | | 88.2 | 112 | 111.6 | | | 194.1 | 87.9 | 87.9 | | |
| LOS by Move: | F | B | B | | | F | E | E | | | F | F | F | | | F | F | F | | |
| HCM2kAvgQ: | 4 | 19 | 19 | | | 2 | 53 | 53 | | | 10 | 16 | 16 | | | 5 | 6 | 6 | | |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #2 Mariposa St / Minnesota St/4th St

| | | | |
|---|---|---|---|
| Cycle (sec): | 60 | Critical Vol./Cap.(X): | 0.406 |
| Loss Time (sec): | 8 (Y+R=4.0 sec) | Average Delay (sec/veh): | 14.2 |
| Optimal Cycle: | 27 | Level Of Service: | B |

| Street Name: | Minnesota St/ 4th St | | | | | | | | | Mariposa St | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | | | |
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Protected | | | | | Protected | | | | | Protected | | | | | Protected | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Min. Green: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Lanes: | 0 | 0 | 1! | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 64 | 0 | 124 | | | 0 | 0 | 0 | | | 0 | 463 | 54 | | | 22 | 376 | 0 | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Initial Bse: | 64 | 0 | 124 | | | 0 | 0 | 0 | | | 0 | 463 | 54 | | | 22 | 376 | 0 | | |
| Added Vol: | 0 | 0 | 0 | | | 47 | 0 | 77 | | | 3 | 42 | 0 | | | 0 | 7 | 7 | | |
| PasserByVol: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Initial Fut: | 64 | 0 | 124 | | | 47 | 0 | 77 | | | 3 | 505 | 54 | | | 22 | 383 | 7 | | |
| User Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | | 0.95 | 0.95 | 0.95 | | |
| PHF Volume: | 67 | 0 | 131 | | | 49 | 0 | 81 | | | 3 | 532 | 57 | | | 23 | 403 | 7 | | |
| Reduct Vol: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Reduced Vol: | 67 | 0 | 131 | | | 49 | 0 | 81 | | | 3 | 532 | 57 | | | 23 | 403 | 7 | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| Final Vol.: | 67 | 0 | 131 | | | 49 | 0 | 81 | | | 3 | 532 | 57 | | | 23 | 403 | 7 | | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | | 1900 | 1900 | 1900 | | |
| Adjustment: | 0.88 | 1.00 | 0.88 | | | 0.93 | 1.00 | 0.83 | | | 0.93 | 0.92 | 0.92 | | | 0.93 | 0.93 | 0.93 | | |
| Lanes: | 0.34 | 0.00 | 0.66 | | | 1.00 | 0.00 | 1.00 | | | 1.00 | 1.81 | 0.19 | | | 1.00 | 1.96 | 0.04 | | |
| Final Sat.: | 568 | 0 | 1100 | | | 1773 | 0 | 1583 | | | 1769 | 3148 | 337 | | | 1769 | 3464 | 63 | | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.12 | 0.00 | 0.12 | | | 0.03 | 0.00 | 0.05 | | | 0.00 | 0.17 | 0.17 | | | 0.01 | 0.12 | 0.12 | | |
| Crit Moves: | **** | | | | | | | **** | | | | **** | | | | **** | | | | |
| Green/Cycle: | 0.29 | 0.00 | 0.34 | | | 0.08 | 0.00 | 0.13 | | | 0.01 | 0.42 | 0.42 | | | 0.03 | 0.44 | 0.44 | | |
| Volume/Cap: | 0.41 | 0.00 | 0.35 | | | 0.35 | 0.00 | 0.41 | | | 0.26 | 0.41 | 0.41 | | | 0.41 | 0.26 | 0.26 | | |
| Delay/Veh: | 17.6 | 0.0 | 15.3 | | | 27.6 | 0.0 | 25.5 | | | 41.1 | 12.5 | 12.5 | | | 33.1 | 10.7 | 10.7 | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | | |
| AdjDel/Veh: | 17.6 | 0.0 | 15.3 | | | 27.6 | 0.0 | 25.5 | | | 41.1 | 12.5 | 12.5 | | | 33.1 | 10.7 | 10.7 | | |
| LOS by Move: | B | A | B | | | C | A | C | | | D | B | B | | | C | B | B | | |
| HCM2kAvgQ: | 3 | 0 | 3 | | | 1 | 0 | 2 | | | 0 | 4 | 4 | | | 1 | 3 | 3 | | |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #3 Mariposa St / I-280 NB Off-Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.862
Loss Time (sec): 9 (Y+R=3.0 sec) Average Delay (sec/veh): 43.3
Optimal Cycle: 99 Level Of Service: D

| Street Name: | I-280 NB Off-Ramp | | | | | | Mariposa St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 36 | 36 | 36 | 33 | 33 | 33 | 21 | 21 | 0 | 0 | 21 | 21 |
| Lanes: | 1 0 | 1 | 1 0 | 1 0 | 0 0 | 2 | 0 1 | 1 0 | 0 | 0 0 | 2 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 529 | 438 | 273 | 248 | 0 | 706 | 121 | 6 | 0 | 0 | 495 | 43 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 529 | 438 | 273 | 248 | 0 | 706 | 121 | 6 | 0 | 0 | 495 | 43 |
| Added Vol: | 0 | 33 | 3 | 42 | 0 | 199 | 2 | 0 | 0 | 0 | 77 | 7 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 529 | 471 | 276 | 290 | 0 | 905 | 123 | 6 | 0 | 0 | 572 | 50 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 557 | 496 | 291 | 305 | 0 | 953 | 129 | 6 | 0 | 0 | 602 | 53 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 557 | 496 | 291 | 305 | 0 | 953 | 129 | 6 | 0 | 0 | 602 | 53 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 557 | 496 | 291 | 305 | 0 | 953 | 129 | 6 | 0 | 0 | 602 | 53 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.94 | 0.89 | 0.89 | 0.93 | 1.00 | 0.73 | 0.61 | 0.61 | 1.00 | 1.00 | 0.88 | 0.88 |
| Lanes: | 1.00 | 1.26 | 0.74 | 1.00 | 0.00 | 2.00 | 1.00 | 1.00 | 0.00 | 0.00 | 2.76 | 0.24 |
| Final Sat.: | 1787 | 2129 | 1248 | 1769 | 0 | 2786 | 1160 | 1160 | 0 | 0 | 4619 | 404 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.31 | 0.23 | 0.23 | 0.17 | 0.00 | 0.34 | 0.11 | 0.01 | 0.00 | 0.00 | 0.13 | 0.13 |
| Crit Moves: | **** | | | | | **** | | | | | **** | |
| Green/Cycle: | 0.36 | 0.36 | 0.36 | 0.33 | 0.00 | 0.33 | 0.21 | 0.21 | 0.00 | 0.00 | 0.21 | 0.21 |
| Volume/Cap: | 0.86 | 0.64 | 0.64 | 0.52 | 0.00 | 1.03 | 0.53 | 0.03 | 0.00 | 0.00 | 0.61 | 0.61 |
| Delay/Veh: | 40.1 | 27.3 | 27.3 | 27.4 | 0.0 | 69.3 | 36.6 | 30.9 | 0.0 | 0.0 | 36.4 | 36.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 40.1 | 27.3 | 27.3 | 27.4 | 0.0 | 69.3 | 36.6 | 30.9 | 0.0 | 0.0 | 36.4 | 36.4 |
| LOS by Move: | D | C | C | C | A | E | D | C | A | A | D | D |
| HCM2kAvgQ: | 19 | 11 | 11 | 8 | 0 | 24 | 4 | 0 | 0 | 0 | 7 | 7 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #4 Mariposa St / I-280 SB On-Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.747
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 17.8
Optimal Cycle: 98 Level Of Service: B

| Street Name: | I-280 SB On-Ramp | | | | | | Mariposa St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Permitted | | | Permitted | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 54 | 90 | 0 |
| Lanes: | 0 0 | 0 | 0 0 | 0 0 | 0 0 | 0 | 0 0 | 0 1 | 1 | 2 0 | 1 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 127 | 663 | 1140 | 591 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 127 | 663 | 1140 | 591 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 260 | 17 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 130 | 663 | 1400 | 608 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 137 | 698 | 1474 | 640 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 137 | 698 | 1474 | 640 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 137 | 698 | 1474 | 640 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.86 | 0.86 | 0.90 | 0.98 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 1.67 | 2.00 | 1.00 | 0.00 |
| Final Sat.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 534 | 2724 | 3432 | 1862 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 | 0.26 | 0.43 | 0.34 | 0.00 |
| Crit Moves: | | | | | | | | **** | | **** | | |
| Green/Cycle: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.37 | 0.37 | 0.55 | 0.92 | 0.00 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.70 | 0.70 | 0.78 | 0.37 | 0.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 28.2 | 28.2 | 19.5 | 0.6 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 28.2 | 28.2 | 19.5 | 0.6 | 0.0 |
| LOS by Move: | A | A | A | A | A | A | A | C | C | B | A | A |
| HCM2kAvgQ: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 | 19 | 3 | 0 |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #5 16th St / 3rd St

Cycle (sec): 90 Critical Vol./Cap.(X): 1.172
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 75.4
Optimal Cycle: 180 Level Of Service: E

| Street Name: | 3rd St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 2 0 | 1 | 1 0 | 1 0 | 1 | 1 0 | 1 0 | 1 | 1 0 | 1 0 | 1 | 1 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 353 | 1432 | 23 | 38 | 1690 | 73 | 12 | 332 | 467 | 57 | 529 | 88 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 353 | 1432 | 23 | 38 | 1690 | 73 | 12 | 332 | 467 | 57 | 529 | 88 |
| Added Vol: | 7 | 0 | 0 | 0 | 0 | 10 | 51 | 0 | 53 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 360 | 1432 | 23 | 38 | 1690 | 83 | 63 | 332 | 520 | 57 | 529 | 88 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 379 | 1507 | 24 | 40 | 1779 | 87 | 66 | 349 | 547 | 60 | 557 | 93 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 379 | 1507 | 24 | 40 | 1779 | 87 | 66 | 349 | 547 | 60 | 557 | 93 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 379 | 1507 | 24 | 40 | 1779 | 87 | 66 | 349 | 547 | 60 | 557 | 93 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.90 | 0.93 | 0.93 | 0.93 | 0.92 | 0.92 | 0.93 | 0.85 | 0.85 | 0.93 | 0.91 | 0.91 |
| Lanes: | 2.00 | 1.97 | 0.03 | 1.00 | 1.91 | 0.09 | 1.00 | 1.00 | 1.00 | 1.00 | 1.71 | 0.29 |
| Final Sat.: | 3432 | 3475 | 56 | 1769 | 3349 | 164 | 1769 | 1608 | 1608 | 1769 | 2970 | 494 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.11 | 0.43 | 0.43 | 0.02 | 0.53 | 0.53 | 0.04 | 0.22 | 0.34 | 0.03 | 0.19 | 0.19 |
| Crit Moves: | **** | | | | **** | | | | **** | **** | | |
| Green/Cycle: | 0.09 | 0.52 | 0.52 | 0.03 | 0.45 | 0.45 | 0.05 | 0.29 | 0.29 | 0.03 | 0.27 | 0.27 |
| Volume/Cap: | 1.17 | 0.83 | 0.83 | 0.83 | 1.17 | 1.17 | 0.70 | 0.75 | 1.17 | 1.17 | 0.70 | 0.70 |
| Delay/Veh: | 146.2 | 21.7 | 21.7 | 114.5 | 109 | 109.2 | 63.4 | 31.6 | 123.1 | 224.1 | 32.3 | 32.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 146.2 | 21.7 | 21.7 | 114.5 | 109 | 109.2 | 63.4 | 31.6 | 123.1 | 224.1 | 32.3 | 32.3 |
| LOS by Move: | F | C | C | F | F | F | E | C | F | F | C | C |
| HCM2kAvgQ: | 12 | 21 | 21 | 3 | 48 | 48 | 3 | 11 | 30 | 5 | 10 | 10 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 16th St / 4th St

Cycle (sec): 60 Critical Vol./Cap.(X): 0.982
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 46.9
Optimal Cycle: 106 Level Of Service: D

| Street Name: | 4th St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 0 | 0 | 1 0 | 1 0 | 0 | 1 0 | 1 0 | 1 | 1 0 | 1 0 | 1 | 1 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 390 | 0 | 421 | 337 | 415 | 0 | 0 | 940 | 21 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 390 | 0 | 421 | 337 | 415 | 0 | 0 | 940 | 21 |
| Added Vol: | 24 | 19 | 58 | 0 | 5 | 0 | 0 | 47 | 12 | 11 | 5 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 24 | 19 | 58 | 390 | 5 | 421 | 337 | 462 | 12 | 11 | 945 | 21 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 25 | 20 | 61 | 411 | 5 | 443 | 355 | 486 | 13 | 12 | 995 | 22 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 25 | 20 | 61 | 411 | 5 | 443 | 355 | 486 | 13 | 12 | 995 | 22 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 25 | 20 | 61 | 411 | 5 | 443 | 355 | 486 | 13 | 12 | 995 | 22 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.93 | 0.87 | 0.87 | 0.93 | 0.83 | 0.83 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Lanes: | 1.00 | 0.25 | 0.75 | 1.00 | 0.01 | 0.99 | 1.00 | 1.95 | 0.05 | 1.00 | 1.96 | 0.04 |
| Final Sat.: | 1769 | 408 | 1244 | 1769 | 19 | 1568 | 1769 | 3434 | 89 | 1769 | 3451 | 77 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.05 | 0.05 | 0.23 | 0.28 | 0.28 | 0.20 | 0.14 | 0.14 | 0.01 | 0.29 | 0.29 |
| Crit Moves: | **** | | | | **** | | **** | | | | **** | |
| Green/Cycle: | 0.01 | 0.05 | 0.05 | 0.25 | 0.29 | 0.29 | 0.20 | 0.48 | 0.48 | 0.02 | 0.29 | 0.29 |
| Volume/Cap: | 0.98 | 0.93 | 0.93 | 0.93 | 0.98 | 0.98 | 0.98 | 0.30 | 0.30 | 0.30 | 0.98 | 0.98 |
| Delay/Veh: | 199.0 | 102 | 101.6 | 48.2 | 58.6 | 58.6 | 66.2 | 9.7 | 9.7 | 33.1 | 44.7 | 44.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 199.0 | 102 | 101.6 | 48.2 | 58.6 | 58.6 | 66.2 | 9.7 | 9.7 | 33.1 | 44.7 | 44.7 |
| LOS by Move: | F | F | F | D | E | E | E | A | A | C | D | D |
| HCM2kAvgQ: | 2 | 4 | 4 | 12 | 14 | 14 | 12 | 3 | 3 | 1 | 16 | 16 |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #7 16th St / Owens St

Cycle (sec): 110 Critical Vol./Cap.(X): 1.113
Loss Time (sec): 12 (Y+R=5.0 sec) Average Delay (sec/veh): 81.8
Optimal Cycle: 180 Level Of Service: F

| Street Name: | Owens St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| Lanes: | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 21 | 247 | 267 | 32 | 753 | 553 | 118 | 457 | 15 | 66 | 1266 | 25 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 21 | 247 | 267 | 32 | 753 | 553 | 118 | 457 | 15 | 66 | 1266 | 25 |
| Added Vol: | 231 | 140 | 47 | 0 | 15 | 0 | 0 | 12 | 24 | 5 | 24 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 252 | 387 | 314 | 32 | 768 | 553 | 118 | 469 | 39 | 71 | 1290 | 25 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 265 | 407 | 331 | 34 | 808 | 582 | 124 | 494 | 41 | 75 | 1358 | 26 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 265 | 407 | 331 | 34 | 808 | 582 | 124 | 494 | 41 | 75 | 1358 | 26 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 265 | 407 | 331 | 34 | 808 | 582 | 124 | 494 | 41 | 75 | 1358 | 26 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.93 | 0.91 | 0.91 | 0.93 | 0.92 | 0.92 | 0.93 | 0.97 | 0.97 | 0.93 | 0.98 | 0.98 |
| Lanes: | 1.00 | 1.10 | 0.90 | 1.00 | 1.16 | 0.84 | 1.00 | 1.85 | 0.15 | 1.00 | 1.96 | 0.04 |
| Final Sat.: | 1769 | 1918 | 1556 | 1769 | 2029 | 1461 | 1769 | 3397 | 282 | 1769 | 3642 | 71 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.15 | 0.21 | 0.21 | 0.02 | 0.40 | 0.40 | 0.07 | 0.15 | 0.15 | 0.04 | 0.37 | 0.37 |
| Crit Moves: | **** | | | | **** | | **** | | | | **** | |
| Green/Cycle: | 0.13 | 0.41 | 0.41 | 0.09 | 0.36 | 0.36 | 0.06 | 0.30 | 0.30 | 0.09 | 0.33 | 0.33 |
| Volume/Cap: | 1.11 | 0.52 | 0.52 | 0.22 | 1.11 | 1.11 | 1.11 | 0.48 | 0.48 | 0.45 | 1.11 | 1.11 |
| Delay/Veh: | 139.5 | 25.0 | 25.0 | 47.5 | 97.7 | 97.7 | 170.3 | 31.6 | 31.6 | 48.9 | 99.0 | 99.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 139.5 | 25.0 | 25.0 | 47.5 | 97.7 | 97.7 | 170.3 | 31.6 | 31.6 | 48.9 | 99.0 | 99.0 |
| LOS by Move: | F | C | C | D | F | F | F | C | C | D | F | F |
| HCM2kAvgQ: | 16 | 10 | 10 | 1 | 36 | 36 | 9 | 8 | 8 | 3 | 36 | 36 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #8 Garage Access -North Owens

Average Delay (sec/veh): 0.9 Worst Case Level Of Service: B[ 13.2]

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | - T | - R | | L | - T | - R | | L | - T | - R | | L | - T | - R | |
| Control: | Uncontrolled | | | | Uncontrolled | | | | Stop Sign | | | | Stop Sign | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Lanes: | 0 0 | 1 1 | 0 | | 0 0 | 2 0 | 0 | | 0 0 | 0 0 | 0 | | 0 0 | 0 0 | 1 | |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 535 | 0 | 0 | 834 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 535 | 0 | 0 | 834 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Added Vol: | 0 | 292 | 13 | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 125 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 827 | 13 | 0 | 879 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 125 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 871 | 14 | 0 | 925 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 132 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Final Vol.: | 0 | 871 | 14 | 0 | 925 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 132 |
| Critical Gap Module: | | | | | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | 6.9 | | | | |
| FollowUpTim: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | 3.3 | | | | |
| Capacity Module: | | | | | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | 442 | | | | |
| Potent Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | 569 | | | | |
| Move Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | 569 | | | | |
| Volume/Cap: | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | 0.23 | | | | |
| Level Of Service Module: | | | | | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | 0.9 | | | | |
| Control Del: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | 13.2 | | | | |
| LOS by Move: | * | * | * | * | * | * | * | * | * | * | * | B | | | | |
| Movement: | LT - | LTR - | RT | LT - | LTR - | RT | LT - | LTR - | RT | LT - | LTR - | RT | | | | |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | | |
| SharedQueue: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| Shared LOS: | * | * | * | * | * | * | * | * | * | * | * | * | | | | |
| ApproachDel: | xxxxxx | | | xxxxxx | | | xxxxxx | | | 13.2 | | | | | | |
| ApproachLOS: | * | | | * | | | * | | | B | | | | | | |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #9 Garage Access -Center Owens

Average Delay (sec/veh): 7.5 Worst Case Level Of Service: F[ 55.0]

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | - | T | - R | L | - | T | - R | L | - | T | - R | L | - | T | - R |
| Control: | Uncontrolled | | | | Uncontrolled | | | | Stop Sign | | | | Stop Sign | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Lanes: | 0 | 0 | 1 | 1 0 | 1 | 0 | 2 | 0 0 | 0 | 0 | 0 | 0 0 | 1 | 0 | 0 | 0 1 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 602 | | 0 | 0 | 834 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 602 | | 0 | 0 | 834 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Added Vol: | 0 | 169 | | 20 | 22 | 22 | | 0 | 0 | | 0 | 0 | 122 | | 0 | 136 |
| PasserByVol: | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Initial Fut: | 0 | 771 | | 20 | 22 | 856 | | 0 | 0 | | 0 | 0 | 122 | | 0 | 136 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 812 | | 21 | 23 | 901 | | 0 | 0 | | 0 | 0 | 128 | | 0 | 143 |
| Reduct Vol: | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Final Vol.: | 0 | 812 | | 21 | 23 | 901 | | 0 | 0 | | 0 | 0 | 128 | | 0 | 143 |
| Critical Gap Module: | | | | | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | xxxxx | | 4.1 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | 6.8 | xxxx | | 6.9 |
| FollowUpTim: | xxxxx | xxxx | xxxxx | | 2.2 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | 3.5 | xxxx | | 3.3 |
| Capacity Module: | | | | | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | | 833 | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | 1319 | xxxx | | 416 |
| Potent Cap.: | xxxx | xxxx | xxxxx | | 809 | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | 151 | xxxx | | 591 |
| Move Cap.: | xxxx | xxxx | xxxxx | | 809 | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | 148 | xxxx | | 591 |
| Volume/Cap: | xxxx | xxxx | xxxx | | 0.03 | xxxx | xxxx | xxxx | xxxx | xxxx | | | 0.87 | xxxx | | 0.24 |
| Level Of Service Module: | | | | | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | | 0.1 | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | 5.8 | xxxx | | 0.9 |
| Control Del: | xxxxx | xxxx | xxxxx | | 9.6 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | 101.8 | xxxx | | 13.0 |
| LOS by Move: | * | * | * | | A | * | * | * | * | * | | | F | * | | B |
| Movement: | LT - LTR - RT | | | | LT - LTR - RT | | | | LT - LTR - RT | | | | LT - LTR - RT | | | |
| Shared Cap.: | xxxx | xxxx | xxxxx | | xxxx | xxxx | xxxxx | | xxxx | xxxx | xxxxx | | xxxx | xxxx | xxxxx | |
| SharedQueue: | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | |
| Shared LOS: | * | * | * | | * | * | * | | * | * | * | | * | * | * | |
| ApproachDel: | xxxxxx | | | | xxxxxx | | | | xxxxxx | | | | 55.0 | | | |
| ApproachLOS: | * | | | | * | | | | * | | | | F | | | |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #10 Garage Access -South Owens

Average Delay (sec/veh): 6.1 Worst Case Level Of Service: E[ 43.9]

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | - | T | - R | L | - | T | - R | L | - | T | - R | L | - | T | - R |
| Control: | Uncontrolled | | | | Uncontrolled | | | | Stop Sign | | | | Stop Sign | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Lanes: | 0 | 0 | 1 | 1 0 | 1 | 0 | 2 | 0 0 | 0 | 0 | 0 | 0 0 | 1 | 0 | 0 | 0 1 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 602 | | 0 | 0 | 954 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 602 | | 0 | 0 | 954 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Added Vol: | 0 | 32 | | 10 | 22 | 122 | | 0 | 0 | | 0 | 0 | 119 | | 0 | 156 |
| PasserByVol: | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Initial Fut: | 0 | 634 | | 10 | 22 | 1076 | | 0 | 0 | | 0 | 0 | 119 | | 0 | 156 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 667 | | 11 | 23 | 1133 | | 0 | 0 | | 0 | 0 | 125 | | 0 | 164 |
| Reduct Vol: | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Final Vol.: | 0 | 667 | | 11 | 23 | 1133 | | 0 | 0 | | 0 | 0 | 125 | | 0 | 164 |
| Critical Gap Module: | | | | | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | xxxxx | | 4.1 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | 6.8 | xxxx | | 6.9 |
| FollowUpTim: | xxxxx | xxxx | xxxxx | | 2.2 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | 3.5 | xxxx | | 3.3 |
| Capacity Module: | | | | | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | | 678 | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | 1285 | xxxx | | 339 |
| Potent Cap.: | xxxx | xxxx | xxxxx | | 924 | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | 159 | xxxx | | 663 |
| Move Cap.: | xxxx | xxxx | xxxxx | | 924 | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | 156 | xxxx | | 663 |
| Volume/Cap: | xxxx | xxxx | xxxx | | 0.03 | xxxx | xxxx | xxxx | xxxx | xxxx | | | 0.80 | xxxx | | 0.25 |
| Level Of Service Module: | | | | | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | | 0.1 | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | 5.2 | xxxx | | 1.0 |
| Control Del: | xxxxx | xxxx | xxxxx | | 9.0 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | 85.3 | xxxx | | 12.2 |
| LOS by Move: | * | * | * | | A | * | * | * | * | * | | | F | * | | B |
| Movement: | LT - LTR - RT | | | | LT - LTR - RT | | | | LT - LTR - RT | | | | LT - LTR - RT | | | |
| Shared Cap.: | xxxx | xxxx | xxxxx | | xxxx | xxxx | xxxxx | | xxxx | xxxx | xxxxx | | xxxx | xxxx | xxxxx | |
| SharedQueue: | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | |
| Shared LOS: | * | * | * | | * | * | * | | * | * | * | | * | * | * | |
| ApproachDel: | xxxxxx | | | | xxxxxx | | | | xxxxxx | | | | 43.9 | | | |
| ApproachLOS: | * | | | | * | | | | * | | | | E | | | |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #11 16th St / Mississippi St/7th St

Cycle (sec): 110 Critical Vol./Cap.(X): 0.855
Loss Time (sec): 9 (Y+R=5.0 sec) Average Delay (sec/veh): 47.1
Optimal Cycle: 87 Level Of Service: D

| Street Name: | Mississippi St/ 7th St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 0 | 1 0 | 1 | 1 0 | 0 1 | 0 | 0 1 | 0 1 | 0 | 0 1 | 1 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 30 | 245 | 25 | 148 | 126 | 77 | 106 | 419 | 87 | 69 | 1274 | 495 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 30 | 245 | 25 | 148 | 126 | 77 | 106 | 419 | 87 | 69 | 1274 | 495 |
| Added Vol: | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 25 | 0 | 0 | 175 | 80 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 30 | 245 | 25 | 159 | 126 | 77 | 106 | 444 | 87 | 69 | 1449 | 575 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 32 | 258 | 26 | 167 | 133 | 81 | 112 | 467 | 92 | 73 | 1525 | 605 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 32 | 258 | 26 | 167 | 133 | 81 | 112 | 467 | 92 | 73 | 1525 | 605 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 32 | 258 | 26 | 167 | 133 | 81 | 112 | 467 | 92 | 73 | 1525 | 605 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.93 | 0.98 | 0.83 | 0.93 | 0.92 | 0.92 | 0.45 | 0.45 | 0.45 | 0.80 | 0.80 | 0.83 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 0.62 | 0.38 | 0.33 | 1.40 | 0.27 | 0.09 | 1.91 | 1.00 |
| Final Sat.: | 1769 | 1862 | 1583 | 1769 | 1090 | 666 | 288 | 1205 | 236 | 138 | 2904 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.14 | 0.02 | 0.09 | 0.12 | 0.12 | 0.39 | 0.39 | 0.39 | 0.53 | 0.53 | 0.38 |
| Crit Moves: | | **** | | | **** | | | | | | **** | |
| Green/Cycle: | 0.21 | 0.21 | 0.21 | 0.18 | 0.18 | 0.18 | 0.53 | 0.53 | 0.53 | 0.49 | 0.49 | 0.67 |
| Volume/Cap: | 0.09 | 0.66 | 0.08 | 0.52 | 0.67 | 0.67 | 0.74 | 0.74 | 0.74 | 1.07 | 1.07 | 0.57 |
| Delay/Veh: | 35.1 | 44.2 | 35.1 | 42.2 | 47.3 | 47.3 | 23.2 | 23.2 | 23.2 | 72.5 | 72.5 | 10.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 35.1 | 44.2 | 35.1 | 42.2 | 47.3 | 47.3 | 23.2 | 23.2 | 23.2 | 72.5 | 72.5 | 10.3 |
| LOS by Move: | D | D | D | D | D | D | C | C | C | E | E | B |
| HCM2kAvgQ: | 1 | 9 | 1 | 6 | 8 | 8 | 11 | 11 | 11 | 40 | 40 | 11 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #12 7th and Mission Bay Drive

Cycle (sec): 110 Critical Vol./Cap.(X): 0.794
Loss Time (sec): 9 (Y+R=5.0 sec) Average Delay (sec/veh): 35.8
Optimal Cycle: 69 Level Of Service: D

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 0 0 | 2 0 | 1 | 2 0 | 1 0 | 0 | 0 0 | 0 0 | 0 | 1 0 | 0 0 | 2 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 768 | 78 | 661 | 260 | 0 | 0 | 0 | 0 | 91 | 0 | 726 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 768 | 78 | 661 | 260 | 0 | 0 | 0 | 0 | 91 | 0 | 726 |
| Added Vol: | 0 | 80 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 848 | 78 | 661 | 271 | 0 | 0 | 0 | 0 | 91 | 0 | 726 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 893 | 82 | 696 | 285 | 0 | 0 | 0 | 0 | 96 | 0 | 764 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 893 | 82 | 696 | 285 | 0 | 0 | 0 | 0 | 96 | 0 | 764 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 0 | 893 | 82 | 696 | 285 | 0 | 0 | 0 | 0 | 96 | 0 | 764 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.93 | 0.83 | 0.90 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.73 |
| Lanes: | 0.00 | 2.00 | 1.00 | 2.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 2.00 |
| Final Sat.: | 0 | 3538 | 1583 | 3432 | 1862 | 0 | 0 | 0 | 0 | 1769 | 0 | 2786 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.25 | 0.05 | 0.20 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.27 |
| Crit Moves: | | **** | | **** | | | | | | | | **** |
| Green/Cycle: | 0.00 | 0.32 | 0.32 | 0.26 | 0.57 | 0.00 | 0.00 | 0.00 | 0.00 | 0.35 | 0.00 | 0.35 |
| Volume/Cap: | 0.00 | 0.79 | 0.16 | 0.79 | 0.27 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.00 | 0.79 |
| Delay/Veh: | 0.0 | 38.2 | 27.2 | 43.3 | 12.0 | 0.0 | 0.0 | 0.0 | 0.0 | 25.0 | 0.0 | 37.1 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 38.2 | 27.2 | 43.3 | 12.0 | 0.0 | 0.0 | 0.0 | 0.0 | 25.0 | 0.0 | 37.1 |
| LOS by Move: | A | D | C | D | B | A | A | A | A | C | A | D |
| HCM2kAvgQ: | 0 | 16 | 2 | 13 | 5 | 0 | 0 | 0 | 0 | 2 | 0 | 15 |

Note: Queue reported is the number of cars per lane.

# Alternative 1: Fourth St. Closed as a Public Rdwy
# Phase 2 (2025) – Mitigated Conditions

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Mitigated Conditions

Scenario Report

| | |
|---|---|
| Scenario: | 2025 Cumulative |
| Command: | 2025 Cumulative |
| Volume: | 2025 Cumulative |
| Geometry: | Existing |
| Impact Fee: | Default Impact Fee |
| Trip Generation: | Project |
| Trip Distribution: | Project |
| Paths: | Default Paths |
| Routes: | Default Routes |
| Configuration: | Existing |





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Mitigated Conditions

Impact Analysis Report
Level Of Service

| Intersection | Base LOS | Base Del/ Veh | Base V/ C | Future LOS | Future Del/ Veh | Future V/ C | Change in D/V |
|---|---|---|---|---|---|---|---|
| # 1 Mariposa St / 3rd St | C | 32.3 | 0.929 | D | 38.8 | 0.994 | + 6.578 |
| # 2 Mariposa St / Minnesota St/4th | B | 10.6 | 0.332 | B | 13.7 | 0.393 | + 3.140 |
| # 3 Mariposa St / I-280 NB Off-Ram | C | 33.2 | 0.629 | D | 45.2 | 0.866 | +11.981 |
| # 4 Mariposa St / I-280 SB On-Ramp | B | 16.2 | 0.659 | B | 17.8 | 0.747 | + 1.685 |
| # 5 16th St / 3rd St | D | 43.9 | 1.018 | D | 50.6 | 1.063 | + 6.621 |
| # 6 16th St / 4th St | D | 37.3 | 0.959 | D | 46.9 | 0.982 | + 9.526 |
| # 7 16th St / Owens St | D | 36.6 | 0.868 | D | 43.9 | 0.955 | + 7.343 |
| # 8 Garage Access -North Owens | A | 0.0 | 0.000 | B | 13.2 | 0.000 | +13.227 |
| # 9 Garage Access -Center Owens | A | 0.9 | 0.292 | B | 10.5 | 0.452 | + 9.594 |
| # 10 Garage Access -South Owens | A | 0.0 | 0.000 | C | 16.5 | 0.000 | +16.536 |
| # 11 16th St / Mississippi St/7th S | C | 23.5 | 0.785 | D | 47.1 | 0.855 | +23.591 |
| # 12 7th and Mission Bay Drive | C | 34.9 | 0.768 | D | 35.8 | 0.794 | + 0.839 |

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Mariposa St / 3rd St

Cycle (sec): 90 Critical Vol./Cap.(X): 0.994
Loss Time (sec): 14 (Y+R=4.0 sec) Average Delay (sec/veh): 38.8
Optimal Cycle: 160 Level Of Service: D

| Street Name: | 3rd St | | | | | | | | | Mariposa St | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | | |
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Protected | | | | | Protected | | | | | Protected | | | | | Protected | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Min. Green: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Lanes: | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 39 | 1535 | | 38 | | 33 | 1944 | | 237 | | 196 | 286 | | 177 | | 63 | 172 | | 44 | |
| Growth Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| Initial Bse: | 39 | 1535 | | 38 | | 33 | 1944 | | 237 | | 196 | 286 | | 177 | | 63 | 172 | | 44 | |
| Added Vol: | 13 | 7 | | 0 | | 0 | 53 | | 0 | | 0 | 0 | | 89 | | 0 | 0 | | 0 | |
| PasserByVol: | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | |
| Initial Fut: | 52 | 1542 | | 38 | | 33 | 1997 | | 237 | | 196 | 286 | | 266 | | 63 | 172 | | 44 | |
| User Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| PHF Adj: | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | |
| PHF Volume: | 55 | 1623 | | 40 | | 35 | 2102 | | 249 | | 206 | 301 | | 280 | | 66 | 181 | | 46 | |
| Reduct Vol: | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | |
| Reduced Vol: | 55 | 1623 | | 40 | | 35 | 2102 | | 249 | | 206 | 301 | | 280 | | 66 | 181 | | 46 | |
| PCE Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| MLF Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| Final Vol.: | 55 | 1623 | | 40 | | 35 | 2102 | | 249 | | 206 | 301 | | 280 | | 66 | 181 | | 46 | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | | 1900 | | 1900 | 1900 | | 1900 | | 1900 | 1900 | | 1900 | | 1900 | 1900 | | 1900 | |
| Adjustment: | 0.93 | 0.91 | | 0.91 | | 0.93 | 0.93 | | 0.79 | | 0.93 | 0.86 | | 0.86 | | 0.93 | 0.90 | | 0.90 | |
| Lanes: | 1.00 | 1.95 | | 0.05 | | 1.00 | 2.00 | | 1.00 | | 1.00 | 1.04 | | 0.96 | | 1.00 | 1.59 | | 0.41 | |
| Final Sat.: | 1769 | 3384 | | 83 | | 1769 | 3538 | | 1500 | | 1769 | 1701 | | 1582 | | 1769 | 2730 | | 698 | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.48 | | 0.48 | | 0.02 | 0.59 | | 0.17 | | 0.12 | 0.18 | | 0.18 | | 0.04 | 0.07 | | 0.07 | |
| Crit Moves: | **** | | | | | | **** | | | | | **** | | | | **** | | | | |
| Green/Cycle: | 0.03 | 0.60 | | 0.60 | | 0.02 | 0.60 | | 0.60 | | 0.14 | 0.18 | | 0.18 | | 0.04 | 0.08 | | 0.08 | |
| Volume/Cap: | 0.99 | 0.79 | | 0.79 | | 0.79 | 0.99 | | 0.28 | | 0.85 | 0.99 | | 0.99 | | 0.99 | 0.85 | | 0.85 | |
| Delay/Veh: | 163.3 | 16.8 | | 16.8 | | 127.2 | 36.2 | | 9.5 | | 66.9 | 72.8 | | 72.8 | | 151.9 | 67.9 | | 67.9 | |
| User DelAdj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| AdjDel/Veh: | 163.3 | 16.8 | | 16.8 | | 127.2 | 36.2 | | 9.5 | | 66.9 | 72.8 | | 72.8 | | 151.9 | 67.9 | | 67.9 | |
| LOS by Move: | F | B | | B | | F | D | | A | | E | E | | E | | F | E | | E | |
| HCM2kAvgQ: | 4 | 20 | | 20 | | 2 | 39 | | 3 | | 8 | 14 | | 14 | | 5 | 6 | | 6 | |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #2 Mariposa St / Minnesota St/4th St

Cycle (sec): 60 Critical Vol./Cap.(X): 0.393
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 13.7
Optimal Cycle: 26 Level Of Service: B

| Street Name: | Minnesota St/ 4th St | | | | | | | | | Mariposa St | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | | |
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Protected | | | | | Protected | | | | | Protected | | | | | Protected | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Min. Green: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Lanes: | 0 | 0 | 1! | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 64 | 0 | | 124 | | 0 | 0 | | 0 | | 0 | 463 | | 54 | | 22 | 376 | | 0 | |
| Growth Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| Initial Bse: | 64 | 0 | | 124 | | 0 | 0 | | 0 | | 0 | 463 | | 54 | | 22 | 376 | | 0 | |
| Added Vol: | 0 | 0 | | 0 | | 47 | 0 | | 60 | | 3 | 42 | | 0 | | 0 | 7 | | 7 | |
| PasserByVol: | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | |
| Initial Fut: | 64 | 0 | | 124 | | 47 | 0 | | 60 | | 3 | 505 | | 54 | | 22 | 383 | | 7 | |
| User Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| PHF Adj: | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | |
| PHF Volume: | 67 | 0 | | 131 | | 49 | 0 | | 63 | | 3 | 532 | | 57 | | 23 | 403 | | 7 | |
| Reduct Vol: | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | |
| Reduced Vol: | 67 | 0 | | 131 | | 49 | 0 | | 63 | | 3 | 532 | | 57 | | 23 | 403 | | 7 | |
| PCE Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| MLF Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| Final Vol.: | 67 | 0 | | 131 | | 49 | 0 | | 63 | | 3 | 532 | | 57 | | 23 | 403 | | 7 | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | | 1900 | | 1900 | 1900 | | 1900 | | 1900 | 1900 | | 1900 | | 1900 | 1900 | | 1900 | |
| Adjustment: | 0.88 | 1.00 | | 0.88 | | 0.93 | 1.00 | | 0.83 | | 0.93 | 0.92 | | 0.92 | | 0.93 | 0.93 | | 0.93 | |
| Lanes: | 0.34 | 0.00 | | 0.66 | | 1.00 | 0.00 | | 1.00 | | 1.00 | 1.81 | | 0.19 | | 1.00 | 1.96 | | 0.04 | |
| Final Sat.: | 568 | 0 | | 1100 | | 1773 | 0 | | 1583 | | 1769 | 3148 | | 337 | | 1769 | 3464 | | 63 | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.12 | 0.00 | | 0.12 | | 0.03 | 0.00 | | 0.04 | | 0.00 | 0.17 | | 0.17 | | 0.01 | 0.12 | | 0.12 | |
| Crit Moves: | **** | | | | | | | | **** | | | **** | | | | **** | | | | |
| Green/Cycle: | 0.30 | 0.00 | | 0.33 | | 0.08 | 0.00 | | 0.10 | | 0.01 | 0.43 | | 0.43 | | 0.03 | 0.46 | | 0.46 | |
| Volume/Cap: | 0.39 | 0.00 | | 0.36 | | 0.36 | 0.00 | | 0.39 | | 0.26 | 0.39 | | 0.39 | | 0.39 | 0.26 | | 0.26 | |
| Delay/Veh: | 17.1 | 0.0 | | 15.8 | | 27.9 | 0.0 | | 26.8 | | 40.3 | 11.9 | | 11.9 | | 32.7 | 10.1 | | 10.1 | |
| User DelAdj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| AdjDel/Veh: | 17.1 | 0.0 | | 15.8 | | 27.9 | 0.0 | | 26.8 | | 40.3 | 11.9 | | 11.9 | | 32.7 | 10.1 | | 10.1 | |
| LOS by Move: | B | A | | B | | C | A | | C | | D | B | | B | | C | B | | B | |
| HCM2kAvgQ: | 3 | 0 | | 3 | | 1 | 0 | | 2 | | 0 | 4 | | 4 | | 1 | 3 | | 3 | |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #3 Mariposa St / I-280 NB Off-Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.866
Loss Time (sec): 9 (Y+R=3.0 sec) Average Delay (sec/veh): 45.2
Optimal Cycle: 99 Level Of Service: D

| Street Name: | I-280 NB Off-Ramp | | | | | | Mariposa St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 36 | 36 | 36 | 33 | 33 | 33 | 21 | 21 | 0 | 0 | 21 | 21 |
| Lanes: | 1 0 | 1 | 1 0 | 1 0 | 0 0 | 2 | 0 1 | 1 | 0 0 | 0 0 | 2 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 529 | 438 | 273 | 248 | 0 | 706 | 121 | 6 | 0 | 0 | 495 | 43 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 529 | 438 | 273 | 248 | 0 | 706 | 121 | 6 | 0 | 0 | 495 | 43 |
| Added Vol: | 0 | 33 | 3 | 42 | 0 | 217 | 2 | 0 | 0 | 0 | 60 | 7 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 529 | 471 | 276 | 290 | 0 | 923 | 123 | 6 | 0 | 0 | 555 | 50 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 557 | 496 | 291 | 305 | 0 | 972 | 129 | 6 | 0 | 0 | 584 | 53 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 557 | 496 | 291 | 305 | 0 | 972 | 129 | 6 | 0 | 0 | 584 | 53 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 557 | 496 | 291 | 305 | 0 | 972 | 129 | 6 | 0 | 0 | 584 | 53 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.94 | 0.89 | 0.89 | 0.93 | 1.00 | 0.73 | 0.61 | 0.61 | 1.00 | 1.00 | 0.88 | 0.88 |
| Lanes: | 1.00 | 1.26 | 0.74 | 1.00 | 0.00 | 2.00 | 1.00 | 1.00 | 0.00 | 0.00 | 2.75 | 0.25 |
| Final Sat.: | 1787 | 2129 | 1248 | 1769 | 0 | 2786 | 1157 | 1157 | 0 | 0 | 4607 | 415 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.31 | 0.23 | 0.23 | 0.17 | 0.00 | 0.35 | 0.11 | 0.01 | 0.00 | 0.00 | 0.13 | 0.13 |
| Crit Moves: | **** | | | | | **** | | | | | **** | |
| Green/Cycle: | 0.36 | 0.36 | 0.36 | 0.33 | 0.00 | 0.33 | 0.21 | 0.21 | 0.00 | 0.00 | 0.21 | 0.21 |
| Volume/Cap: | 0.86 | 0.64 | 0.64 | 0.52 | 0.00 | 1.05 | 0.53 | 0.03 | 0.00 | 0.00 | 0.60 | 0.60 |
| Delay/Veh: | 40.1 | 27.3 | 27.3 | 27.4 | 0.0 | 75.4 | 36.6 | 30.9 | 0.0 | 0.0 | 36.1 | 36.1 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 40.1 | 27.3 | 27.3 | 27.4 | 0.0 | 75.4 | 36.6 | 30.9 | 0.0 | 0.0 | 36.1 | 36.1 |
| LOS by Move: | D | C | C | C | A | E | D | C | A | A | D | D |
| HCM2kAvgQ: | 19 | 11 | 11 | 8 | 0 | 25 | 4 | 0 | 0 | 0 | 7 | 7 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #4 Mariposa St / I-280 SB On-Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.747
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 17.8
Optimal Cycle: 98 Level Of Service: B

| Street Name: | I-280 SB On-Ramp | | | | | | Mariposa St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Permitted | | | Permitted | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 54 | 90 | 0 |
| Lanes: | 0 0 | 0 | 0 0 | 0 0 | 0 0 | 0 | 0 0 | 0 | 1 1 | 2 0 | 1 | 0 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 127 | 663 | 1140 | 591 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 127 | 663 | 1140 | 591 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 260 | 17 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 130 | 663 | 1400 | 608 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 137 | 698 | 1474 | 640 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 137 | 698 | 1474 | 640 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 137 | 698 | 1474 | 640 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.86 | 0.86 | 0.90 | 0.98 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 1.67 | 2.00 | 1.00 | 0.00 |
| Final Sat.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 534 | 2724 | 3432 | 1862 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 | 0.26 | 0.43 | 0.34 | 0.00 |
| Crit Moves: | | | | | | | | **** | | **** | | |
| Green/Cycle: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.37 | 0.37 | 0.55 | 0.92 | 0.00 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.70 | 0.70 | 0.78 | 0.37 | 0.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 28.2 | 28.2 | 19.5 | 0.6 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 28.2 | 28.2 | 19.5 | 0.6 | 0.0 |
| LOS by Move: | A | A | A | A | A | A | A | C | C | B | A | A |
| HCM2kAvgQ: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 | 19 | 3 | 0 |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #5 16th St / 3rd St

Cycle (sec): 90 Critical Vol./Cap.(X): 1.063
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 50.6
Optimal Cycle: 180 Level Of Service: D

| Street Name: | 3rd St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Ovl | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 2 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 0 1 | 1 0 | 1 | 0 1 | 0 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 353 | 1432 | 23 | 38 | 1690 | 73 | 12 | 332 | 467 | 57 | 529 | 88 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 353 | 1432 | 23 | 38 | 1690 | 73 | 12 | 332 | 467 | 57 | 529 | 88 |
| Added Vol: | 7 | 0 | 0 | 0 | 0 | 10 | 51 | 0 | 53 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 360 | 1432 | 23 | 38 | 1690 | 83 | 63 | 332 | 520 | 57 | 529 | 88 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 379 | 1507 | 24 | 40 | 1779 | 87 | 66 | 349 | 547 | 60 | 557 | 93 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 379 | 1507 | 24 | 40 | 1779 | 87 | 66 | 349 | 547 | 60 | 557 | 93 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 379 | 1507 | 24 | 40 | 1779 | 87 | 66 | 349 | 547 | 60 | 557 | 93 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.90 | 0.93 | 0.93 | 0.93 | 0.92 | 0.92 | 0.66 | 0.66 | 0.74 | 0.79 | 0.80 | 0.79 |
| Lanes: | 2.00 | 1.97 | 0.03 | 1.00 | 1.91 | 0.09 | 0.32 | 1.68 | 1.00 | 0.17 | 1.57 | 0.26 |
| Final Sat.: | 3432 | 3475 | 56 | 1769 | 3349 | 164 | 401 | 2113 | 1402 | 256 | 2373 | 395 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.11 | 0.43 | 0.43 | 0.02 | 0.53 | 0.53 | 0.17 | 0.17 | 0.39 | 0.23 | 0.23 | 0.23 |
| Crit Moves: | **** | | | | **** | | | | **** | | | |
| Green/Cycle: | 0.10 | 0.57 | 0.57 | 0.03 | 0.50 | 0.50 | 0.26 | 0.26 | 0.37 | 0.26 | 0.26 | 0.26 |
| Volume/Cap: | 1.06 | 0.76 | 0.76 | 0.76 | 1.06 | 1.06 | 0.63 | 0.63 | 1.06 | 0.89 | 0.89 | 0.89 |
| Delay/Veh: | 105.8 | 16.1 | 16.1 | 89.4 | 63.1 | 63.1 | 31.2 | 31.2 | 86.1 | 44.2 | 44.2 | 44.2 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 105.8 | 16.1 | 16.1 | 89.4 | 63.1 | 63.1 | 31.2 | 31.2 | 86.1 | 44.2 | 44.2 | 44.2 |
| LOS by Move: | F | B | B | F | E | E | C | C | F | D | D | D |
| HCM2kAvgQ: | 11 | 18 | 18 | 3 | 40 | 40 | 6 | 6 | 24 | 14 | 14 | 13 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 16th St / 4th St

Cycle (sec): 60 Critical Vol./Cap.(X): 0.982
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 46.9
Optimal Cycle: 106 Level Of Service: D

| Street Name: | 4th St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 0 | 0 1 | 0 | 1 0 | 0 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 390 | 0 | 421 | 337 | 415 | 0 | 0 | 940 | 21 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 390 | 0 | 421 | 337 | 415 | 0 | 0 | 940 | 21 |
| Added Vol: | 24 | 19 | 58 | 0 | 5 | 0 | 0 | 47 | 12 | 11 | 5 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 24 | 19 | 58 | 390 | 5 | 421 | 337 | 462 | 12 | 11 | 945 | 21 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 25 | 20 | 61 | 411 | 5 | 443 | 355 | 486 | 13 | 12 | 995 | 22 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 25 | 20 | 61 | 411 | 5 | 443 | 355 | 486 | 13 | 12 | 995 | 22 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 25 | 20 | 61 | 411 | 5 | 443 | 355 | 486 | 13 | 12 | 995 | 22 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.93 | 0.87 | 0.87 | 0.93 | 0.83 | 0.83 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Lanes: | 1.00 | 0.25 | 0.75 | 1.00 | 0.01 | 0.99 | 1.00 | 1.95 | 0.05 | 1.00 | 1.96 | 0.04 |
| Final Sat.: | 1769 | 408 | 1244 | 1769 | 19 | 1568 | 1769 | 3434 | 89 | 1769 | 3451 | 77 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.05 | 0.05 | 0.23 | 0.28 | 0.28 | 0.20 | 0.14 | 0.14 | 0.01 | 0.29 | 0.29 |
| Crit Moves: | **** | | | | **** | | **** | | | | **** | |
| Green/Cycle: | 0.01 | 0.05 | 0.05 | 0.25 | 0.29 | 0.29 | 0.20 | 0.48 | 0.48 | 0.02 | 0.29 | 0.29 |
| Volume/Cap: | 0.98 | 0.93 | 0.93 | 0.93 | 0.98 | 0.98 | 0.98 | 0.30 | 0.30 | 0.30 | 0.98 | 0.98 |
| Delay/Veh: | 199.0 | 102 | 101.6 | 48.2 | 58.6 | 58.6 | 66.2 | 9.7 | 9.7 | 33.1 | 44.7 | 44.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 199.0 | 102 | 101.6 | 48.2 | 58.6 | 58.6 | 66.2 | 9.7 | 9.7 | 33.1 | 44.7 | 44.7 |
| LOS by Move: | F | F | F | D | E | E | E | A | A | C | D | D |
| HCM2kAvgQ: | 2 | 4 | 4 | 12 | 14 | 14 | 12 | 3 | 3 | 1 | 16 | 16 |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #7 16th St / Owens St

Cycle (sec): 110 Critical Vol./Cap.(X): 0.955
Loss Time (sec): 12 (Y+R=5.0 sec) Average Delay (sec/veh): 43.9
Optimal Cycle: 153 Level Of Service: D

| Street Name: | Owens St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Permitted | | | Protected | | | Protected | | |
| Rights: | Include | | | Ovl | | | Include | | | Include | | |
| Min. Green: | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| Lanes: | 2 0 | 1 1 | 0 | 0 1 | 1 0 | 1 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 21 | 247 | 267 | 32 | 753 | 553 | 118 | 457 | 15 | 66 | 1266 | 25 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 21 | 247 | 267 | 32 | 753 | 553 | 118 | 457 | 15 | 66 | 1266 | 25 |
| Added Vol: | 231 | 140 | 47 | 0 | 15 | 0 | 0 | 12 | 24 | 5 | 24 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 252 | 387 | 314 | 32 | 768 | 553 | 118 | 469 | 39 | 71 | 1290 | 25 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 265 | 407 | 331 | 34 | 808 | 582 | 124 | 494 | 41 | 75 | 1358 | 26 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 265 | 407 | 331 | 34 | 808 | 582 | 124 | 494 | 41 | 75 | 1358 | 26 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 265 | 407 | 331 | 34 | 808 | 582 | 124 | 494 | 41 | 75 | 1358 | 26 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.93 | 0.91 | 0.91 | 0.86 | 0.86 | 0.76 | 0.93 | 0.97 | 0.97 | 0.93 | 0.98 | 0.98 |
| Lanes: | 2.00 | 1.10 | 0.90 | 0.08 | 1.92 | 1.00 | 1.00 | 1.85 | 0.15 | 1.00 | 1.96 | 0.04 |
| Final Sat.: | 3538 | 1918 | 1556 | 131 | 3149 | 1446 | 1769 | 3397 | 282 | 1769 | 3642 | 71 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.07 | 0.21 | 0.21 | 0.26 | 0.26 | 0.40 | 0.07 | 0.15 | 0.15 | 0.04 | 0.37 | 0.37 |
| Crit Moves: | **** | | | | | **** | **** | | | | **** | |
| Green/Cycle: | 0.08 | 0.43 | 0.43 | 0.35 | 0.35 | 0.42 | 0.07 | 0.35 | 0.35 | 0.11 | 0.39 | 0.39 |
| Volume/Cap: | 0.95 | 0.50 | 0.50 | 0.74 | 0.74 | 0.96 | 0.95 | 0.41 | 0.41 | 0.38 | 0.95 | 0.95 |
| Delay/Veh: | 90.9 | 23.4 | 23.4 | 34.3 | 34.3 | 57.5 | 114.4 | 27.0 | 27.0 | 46.6 | 46.0 | 46.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 90.9 | 23.4 | 23.4 | 34.3 | 34.3 | 57.5 | 114.4 | 27.0 | 27.0 | 46.6 | 46.0 | 46.0 |
| LOS by Move: | F | C | C | C | C | E | F | C | C | D | D | D |
| HCM2kAvgQ: | 8 | 9 | 9 | 14 | 14 | 24 | 7 | 7 | 7 | 3 | 28 | 28 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #8 Garage Access -North Owens

Average Delay (sec/veh): 0.9 Worst Case Level Of Service: B[ 13.2]

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Uncontrolled | | | Uncontrolled | | | Stop Sign | | | Stop Sign | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Lanes: | 0 0 | 1 1 | 0 | 0 0 | 2 0 | 0 | 0 0 | 0 0 | 0 | 0 0 | 0 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 535 | 0 | 0 | 834 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 535 | 0 | 0 | 834 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Added Vol: | 0 | 292 | 13 | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 125 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 827 | 13 | 0 | 879 | 0 | 0 | 0 | 0 | 0 | 0 | 125 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 871 | 14 | 0 | 925 | 0 | 0 | 0 | 0 | 0 | 0 | 132 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Final Vol.: | 0 | 871 | 14 | 0 | 925 | 0 | 0 | 0 | 0 | 0 | 0 | 132 |
| Critical Gap Module: | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | 6.9 |
| FollowUpTim: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | 3.3 |
| Capacity Module: | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | 442 |
| Potent Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | 569 |
| Move Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | 569 |
| Volume/Cap: | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | 0.23 |
| Level Of Service Module: | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | 0.9 |
| Control Del: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | 13.2 |
| LOS by Move: | * | * | * | * | * | * | * | * | * | * | * | B |
| Movement: | LT - LTR - RT | | | LT - LTR - RT | | | LT - LTR - RT | | | LT - LTR - RT | | |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| SharedQueue: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| Shared LOS: | * | * | * | * | * | * | * | * | * | * | * | * |
| ApproachDel: | xxxxxx | | | xxxxxx | | | xxxxxx | | | 13.2 | | |
| ApproachLOS: | * | | | * | | | * | | | B | | |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #9 Garage Access -Center Owens

Cycle (sec): 60 Critical Vol./Cap.(X): 0.452
Loss Time (sec): 9 (Y+R=4.0 sec) Average Delay (sec/veh): 10.5
Optimal Cycle: 30 Level Of Service: B

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | - | T | - R | L | - | T | - R | L | - | T | - R | L | - | T | - R |
| Control: | Protected | | | | Protected | | | | Protected | | | | Protected | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Min. Green: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Lanes: | 0 | 0 | 1 | 1 0 | 1 | 0 | 2 | 0 0 | 0 | 0 | 0 | 0 0 | 1 | 0 | 0 | 0 1 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 602 | 0 | | 0 | 834 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| Initial Bse: | 0 | 602 | 0 | | 0 | 834 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Added Vol: | 0 | 169 | 20 | | 22 | 22 | 0 | | 0 | 0 | 0 | | 227 | 0 | 136 | |
| PasserByVol: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Initial Fut: | 0 | 771 | 20 | | 22 | 856 | 0 | | 0 | 0 | 0 | | 227 | 0 | 136 | |
| User Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | |
| PHF Volume: | 0 | 812 | 21 | | 23 | 901 | 0 | | 0 | 0 | 0 | | 239 | 0 | 143 | |
| Reduct Vol: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Reduced Vol: | 0 | 812 | 21 | | 23 | 901 | 0 | | 0 | 0 | 0 | | 239 | 0 | 143 | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| Final Vol.: | 0 | 812 | 21 | | 23 | 901 | 0 | | 0 | 0 | 0 | | 239 | 0 | 143 | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | | 1900 | 1900 | 1900 | | 1900 | 1900 | 1900 | | 1900 | 1900 | 1900 | |
| Adjustment: | 1.00 | 0.93 | 0.93 | | 0.93 | 0.93 | 1.00 | | 1.00 | 1.00 | 1.00 | | 0.93 | 1.00 | 0.83 | |
| Lanes: | 0.00 | 1.95 | 0.05 | | 1.00 | 2.00 | 0.00 | | 0.00 | 0.00 | 0.00 | | 1.00 | 0.00 | 1.00 | |
| Final Sat.: | 0 | 3435 | 89 | | 1769 | 3538 | 0 | | 0 | 0 | 0 | | 1769 | 0 | 1583 | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.24 | 0.24 | | 0.01 | 0.25 | 0.00 | | 0.00 | 0.00 | 0.00 | | 0.14 | 0.00 | 0.09 | |
| Crit Moves: | | **** | | | **** | | | | | | | | **** | | | |
| Green/Cycle: | 0.00 | 0.52 | 0.52 | | 0.03 | 0.55 | 0.00 | | 0.00 | 0.00 | 0.00 | | 0.30 | 0.00 | 0.30 | |
| Volume/Cap: | 0.00 | 0.45 | 0.45 | | 0.45 | 0.46 | 0.00 | | 0.00 | 0.00 | 0.00 | | 0.45 | 0.00 | 0.30 | |
| Delay/Veh: | 0.0 | 9.1 | 9.1 | | 34.9 | 8.3 | 0.0 | | 0.0 | 0.0 | 0.0 | | 17.7 | 0.0 | 16.6 | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| AdjDel/Veh: | 0.0 | 9.1 | 9.1 | | 34.9 | 8.3 | 0.0 | | 0.0 | 0.0 | 0.0 | | 17.7 | 0.0 | 16.6 | |
| LOS by Move: | A | A | A | | C | A | A | | A | A | A | | B | A | B | |
| HCM2kAvgQ: | 0 | 5 | 5 | | 1 | 6 | 0 | | 0 | 0 | 0 | | 4 | 0 | 2 | |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #10 Garage Access -South Owens

Average Delay (sec/veh): 1.6 Worst Case Level Of Service: C[ 16.5]

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | - | T | - R | L | - | T | - R | L | - | T | - R | L | - | T | - R |
| Control: | Uncontrolled | | | | Uncontrolled | | | | Stop Sign | | | | Stop Sign | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Lanes: | 0 | 0 | 1 | 1 0 | 1 | 0 | 2 | 0 0 | 0 | 0 | 0 | 0 0 | 1 | 0 | 0 | 0 1 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 602 | 0 | | 0 | 954 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| Initial Bse: | 0 | 602 | 0 | | 0 | 954 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Added Vol: | 0 | 32 | 10 | | 22 | 227 | 0 | | 0 | 0 | 0 | | 32 | 0 | 156 | |
| PasserByVol: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Initial Fut: | 0 | 634 | 10 | | 22 | 1181 | 0 | | 0 | 0 | 0 | | 32 | 0 | 156 | |
| User Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | |
| PHF Volume: | 0 | 667 | 11 | | 23 | 1243 | 0 | | 0 | 0 | 0 | | 34 | 0 | 164 | |
| Reduct Vol: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Final Vol.: | 0 | 667 | 11 | | 23 | 1243 | 0 | | 0 | 0 | 0 | | 34 | 0 | 164 | |
| Critical Gap Module: | | | | | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | xxxxx | | 4.1 | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | | 6.8 | xxxx | 6.9 | |
| FollowUpTim: | xxxxx | xxxx | xxxxx | | 2.2 | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | | 3.5 | xxxx | 3.3 | |
| Capacity Module: | | | | | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | | 678 | xxxx | xxxxx | | xxxx | xxxx | xxxxx | | 1341 | xxxx | 339 | |
| Potent Cap.: | xxxx | xxxx | xxxxx | | 924 | xxxx | xxxxx | | xxxx | xxxx | xxxxx | | 146 | xxxx | 663 | |
| Move Cap.: | xxxx | xxxx | xxxxx | | 924 | xxxx | xxxxx | | xxxx | xxxx | xxxxx | | 144 | xxxx | 663 | |
| Volume/Cap: | xxxx | xxxx | xxxx | | 0.03 | xxxx | xxxx | | xxxx | xxxx | xxxx | | 0.23 | xxxx | 0.25 | |
| Level Of Service Module: | | | | | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | | 0.1 | xxxx | xxxxx | | xxxx | xxxx | xxxxx | | 0.9 | xxxx | 1.0 | |
| Control Del: | xxxxx | xxxx | xxxxx | | 9.0 | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | | 37.6 | xxxx | 12.2 | |
| LOS by Move: | * | * | * | | A | * | * | | * | * | * | | E | * | B | |
| Movement: | LT - | LTR - | RT | | LT - | LTR - | RT | | LT - | LTR - | RT | | LT - | LTR - | RT | |
| Shared Cap.: | xxxx | xxxx | xxxxx | | xxxx | xxxx | xxxxx | | xxxx | xxxx | xxxxx | | xxxx | xxxx | xxxxx | |
| SharedQueue: | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | | xxxxx | xxxx | xxxxx | |
| Shared LOS: | * | * | * | | * | * | * | | * | * | * | | * | * | * | |
| ApproachDel: | xxxxxx | | | | xxxxxx | | | | xxxxxx | | | | 16.5 | | | |
| ApproachLOS: | * | | | | * | | | | * | | | | C | | | |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #11 16th St / Mississippi St/7th St

Cycle (sec): 110 Critical Vol./Cap.(X): 0.855
Loss Time (sec): 9 (Y+R=5.0 sec) Average Delay (sec/veh): 47.1
Optimal Cycle: 87 Level Of Service: D

| Street Name: | Mississippi St/ 7th St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T | - R | | L - T | - R | | L - T | - R | | L - T | - R | |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 0 | 1 0 | 1 | 1 0 | 0 1 | 0 | 0 1 | 0 1 | 0 | 0 1 | 1 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 30 | 245 | 25 | 148 | 126 | 77 | 106 | 419 | 87 | 69 | 1274 | 495 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 30 | 245 | 25 | 148 | 126 | 77 | 106 | 419 | 87 | 69 | 1274 | 495 |
| Added Vol: | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 25 | 0 | 0 | 175 | 80 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 30 | 245 | 25 | 159 | 126 | 77 | 106 | 444 | 87 | 69 | 1449 | 575 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 32 | 258 | 26 | 167 | 133 | 81 | 112 | 467 | 92 | 73 | 1525 | 605 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 32 | 258 | 26 | 167 | 133 | 81 | 112 | 467 | 92 | 73 | 1525 | 605 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 32 | 258 | 26 | 167 | 133 | 81 | 112 | 467 | 92 | 73 | 1525 | 605 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.93 | 0.98 | 0.83 | 0.93 | 0.92 | 0.92 | 0.45 | 0.45 | 0.45 | 0.80 | 0.80 | 0.83 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 0.62 | 0.38 | 0.33 | 1.40 | 0.27 | 0.09 | 1.91 | 1.00 |
| Final Sat.: | 1769 | 1862 | 1583 | 1769 | 1090 | 666 | 288 | 1205 | 236 | 138 | 2904 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.14 | 0.02 | 0.09 | 0.12 | 0.12 | 0.39 | 0.39 | 0.39 | 0.53 | 0.53 | 0.38 |
| Crit Moves: | | **** | | | **** | | | | | | **** | |
| Green/Cycle: | 0.21 | 0.21 | 0.21 | 0.18 | 0.18 | 0.18 | 0.53 | 0.53 | 0.53 | 0.49 | 0.49 | 0.67 |
| Volume/Cap: | 0.09 | 0.66 | 0.08 | 0.52 | 0.67 | 0.67 | 0.74 | 0.74 | 0.74 | 1.07 | 1.07 | 0.57 |
| Delay/Veh: | 35.1 | 44.2 | 35.1 | 42.2 | 47.3 | 47.3 | 23.2 | 23.2 | 23.2 | 72.5 | 72.5 | 10.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 35.1 | 44.2 | 35.1 | 42.2 | 47.3 | 47.3 | 23.2 | 23.2 | 23.2 | 72.5 | 72.5 | 10.3 |
| LOS by Move: | D | D | D | D | D | D | C | C | C | E | E | B |
| HCM2kAvgQ: | 1 | 9 | 1 | 6 | 8 | 8 | 11 | 11 | 11 | 40 | 40 | 11 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Closed
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #12 7th and Mission Bay Drive

Cycle (sec): 110 Critical Vol./Cap.(X): 0.794
Loss Time (sec): 9 (Y+R=5.0 sec) Average Delay (sec/veh): 35.8
Optimal Cycle: 69 Level Of Service: D

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L - T | - R | | | L - T | - R | | | L - T | - R | | | L - T | - R | | |
| Control: | Protected | | | | Protected | | | | Protected | | | | Protected | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 0 0 | 2 0 | 1 | 1 | 2 0 | 1 0 | 0 | 0 | 0 0 | 0 0 | 0 | 1 | 1 0 | 0 0 | 2 | |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 768 | 78 | 661 | 260 | 0 | 0 | 0 | 0 | 0 | 91 | 0 | 726 | | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| Initial Bse: | 0 | 768 | 78 | 661 | 260 | 0 | 0 | 0 | 0 | 91 | 0 | 726 | | | | |
| Added Vol: | 0 | 80 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Initial Fut: | 0 | 848 | 78 | 661 | 271 | 0 | 0 | 0 | 0 | 91 | 0 | 726 | | | | |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | | | | |
| PHF Volume: | 0 | 893 | 82 | 696 | 285 | 0 | 0 | 0 | 0 | 96 | 0 | 764 | | | | |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Reduced Vol: | 0 | 893 | 82 | 696 | 285 | 0 | 0 | 0 | 0 | 96 | 0 | 764 | | | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| Final Vol.: | 0 | 893 | 82 | 696 | 285 | 0 | 0 | 0 | 0 | 96 | 0 | 764 | | | | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | |
| Adjustment: | 1.00 | 0.93 | 0.83 | 0.90 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.73 | | | | |
| Lanes: | 0.00 | 2.00 | 1.00 | 2.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 2.00 | | | | |
| Final Sat.: | 0 | 3538 | 1583 | 3432 | 1862 | 0 | 0 | 0 | 0 | 1769 | 0 | 2786 | | | | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.25 | 0.05 | 0.20 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.27 | | | | |
| Crit Moves: | | **** | | **** | | | | | | | | **** | | | | |
| Green/Cycle: | 0.00 | 0.32 | 0.32 | 0.26 | 0.57 | 0.00 | 0.00 | 0.00 | 0.00 | 0.35 | 0.00 | 0.35 | | | | |
| Volume/Cap: | 0.00 | 0.79 | 0.16 | 0.79 | 0.27 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.00 | 0.79 | | | | |
| Delay/Veh: | 0.0 | 38.2 | 27.2 | 43.3 | 12.0 | 0.0 | 0.0 | 0.0 | 0.0 | 25.0 | 0.0 | 37.1 | | | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | |
| AdjDel/Veh: | 0.0 | 38.2 | 27.2 | 43.3 | 12.0 | 0.0 | 0.0 | 0.0 | 0.0 | 25.0 | 0.0 | 37.1 | | | | |
| LOS by Move: | A | D | C | D | B | A | A | A | A | C | A | D | | | | |
| HCM2kAvgQ: | 0 | 16 | 2 | 13 | 5 | 0 | 0 | 0 | 0 | 2 | 0 | 15 | | | | |

Note: Queue reported is the number of cars per lane.

# APPENDIX F – LOS ANALYSIS

## ALTERNATIVE 2: FOURTH ST OPEN PRIVATE

# ALTERNATIVE 2: FOURTH ST. OPEN AS A PRIVATE ROADWAY
# PHASE 1 (2015) – MITIGATED CONDITIONS

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. as a Private Roadway
Unmitigated Conditions

Scenario Report

| | |
|---|---|
| Scenario: | 2015 Cumulative |
| Command: | 2025 Cumulative |
| Volume: | 2025 Cumulative |
| Geometry: | Existing |
| Impact Fee: | Default Impact Fee |
| Trip Generation: | Project |
| Trip Distribution: | Project |
| Paths: | Default Paths |
| Routes: | Default Routes |
| Configuration: | Existing |





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. as a Private Roadway
Unmitigated Conditions

Impact Analysis Report
Level Of Service

| Intersection | Base LOS | Base Del/ Veh | Base V/ C | Future LOS | Future Del/ Veh | Future V/ C | Change in D/V |
|---|---|---|---|---|---|---|---|
| # 1 Mariposa St / 3rd St | C | 33.1 | 0.940 | D | 37.9 | 0.990 | + 4.812 |
| # 2 Mariposa St / Minnesota St/4th | B | 17.2 | 0.335 | B | 18.3 | 0.369 | + 1.072 |
| # 3 Mariposa St / I-280 NB Off-Ram | C | 31.1 | 0.589 | C | 24.9 | 0.609 | -6.236 |
| # 4 Mariposa St / I-280 SB On-Ramp | B | 16.0 | 0.619 | B | 16.4 | 0.662 | + 0.485 |
| # 5 16th St / 3rd St | C | 32.5 | 0.920 | D | 35.1 | 0.945 | + 2.624 |
| # 6 16th St / 4th St | C | 25.1 | 0.844 | C | 27.2 | 0.857 | + 2.090 |
| # 7 16th St / Owens St | D | 35.8 | 0.808 | D | 41.6 | 0.892 | + 5.799 |
| # 8 Garage Access -North Owens | A | 0.0 | 0.000 | B | 10.5 | 0.000 | +10.474 |
| # 9 Garage Access -Center Owens | A | 0.0 | 0.000 | A | 0.0 | 0.000 | + 0.000 |
| # 10 Garage Access -South Owens | A | 9.0 | 0.000 | B | 13.0 | 0.000 | + 3.963 |
| # 11 16th St / Mississippi St/7th S | C | 24.4 | 0.725 | C | 34.9 | 0.770 | +10.527 |
| # 12 7th and Mission Bay Drive | C | 31.1 | 0.653 | C | 31.2 | 0.667 | + 0.138 |

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. as a Private Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Mariposa St / 3rd St

| | | | |
|---|---|---|---|
| Cycle (sec): | 90 | Critical Vol./Cap.(X): | 0.990 |
| Loss Time (sec): | 14 (Y+R=4.0 sec) | Average Delay (sec/veh): | 37.9 |
| Optimal Cycle: | 156 | Level Of Service: | D |

| Street Name: | 3rd St | | | | | | | | Mariposa St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | |
| Movement: | L - T - R | | | | L - T - R | | | | L - T - R | | | |
| Control: | Protected | | | | Protected | | | | Protected | | | |
| Rights: | Include | | | | Include | | | | Include | | | |
| Min. Green: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Lanes: | 1 0 | 1 | 1 | 0 | 1 0 | 1 | 1 | 0 | 1 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 55 | 1411 | 35 | | 30 | 1587 | 223 | | 187 | 241 | 258 | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| Initial Bse: | 55 | 1411 | 35 | | 30 | 1587 | 223 | | 187 | 241 | 258 | |
| Added Vol: | 4 | 7 | 0 | | 0 | 27 | 0 | | 0 | 0 | 46 | |
| PasserByVol: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Initial Fut: | 59 | 1418 | 35 | | 30 | 1614 | 223 | | 187 | 241 | 304 | |
| User Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | |
| PHF Volume: | 62 | 1493 | 37 | | 32 | 1699 | 235 | | 197 | 254 | 320 | |
| Reduct Vol: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Reduced Vol: | 62 | 1493 | 37 | | 32 | 1699 | 235 | | 197 | 254 | 320 | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| Final Vol.: | 62 | 1493 | 37 | | 32 | 1699 | 235 | | 197 | 254 | 320 | |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | | 1900 | 1900 | 1900 | | 1900 | 1900 | 1900 | |
| Adjustment: | 0.93 | 0.91 | 0.91 | | 0.93 | 0.89 | 0.89 | | 0.93 | 0.85 | 0.85 | |
| Lanes: | 1.00 | 1.95 | 0.05 | | 1.00 | 1.76 | 0.24 | | 1.00 | 1.00 | 1.00 | |
| Final Sat.: | 1769 | 3384 | 84 | | 1769 | 2973 | 411 | | 1769 | 1620 | 1620 | |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.44 | 0.44 | | 0.02 | 0.57 | 0.57 | | 0.11 | 0.16 | 0.20 | |
| Crit Moves: | **** | | | | | **** | | | | | **** | |
| Green/Cycle: | 0.04 | 0.59 | 0.59 | | 0.02 | 0.58 | 0.58 | | 0.15 | 0.20 | 0.20 | |
| Volume/Cap: | 0.99 | 0.75 | 0.75 | | 0.75 | 0.99 | 0.99 | | 0.74 | 0.78 | 0.99 | |
| Delay/Veh: | 154.1 | 16.2 | 16.2 | | 119.7 | 36.8 | 36.8 | | 53.6 | 42.4 | 70.8 | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| AdjDel/Veh: | 154.1 | 16.2 | 16.2 | | 119.7 | 36.8 | 36.8 | | 53.6 | 42.4 | 70.8 | |
| LOS by Move: | F | B | B | | F | D | D | | D | D | E | |
| HCM2kAvgQ: | 4 | 18 | 18 | | 2 | 36 | 36 | | 7 | 9 | 15 | |

| Street Name: | Mariposa St | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | West Bound | | | | | | | | | | | |
| Movement: | L - T - R | | | | | | | | | | | |
| Control: | Protected | | | | | | | | | | | |
| Rights: | Include | | | | | | | | | | | |
| Min. Green: | 0 | 0 | 0 | | | | | | | | | |
| Lanes: | 1 0 | 1 | 1 | 0 | | | | | | | | |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 53 | 157 | 40 | | | | | | | | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | | | | | | | | |
| Initial Bse: | 53 | 157 | 40 | | | | | | | | | |
| Added Vol: | 0 | 0 | 0 | | | | | | | | | |
| PasserByVol: | 0 | 0 | 0 | | | | | | | | | |
| Initial Fut: | 53 | 157 | 40 | | | | | | | | | |
| User Adj: | 1.00 | 1.00 | 1.00 | | | | | | | | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | | | | | | | | |
| PHF Volume: | 56 | 165 | 42 | | | | | | | | | |
| Reduct Vol: | 0 | 0 | 0 | | | | | | | | | |
| Reduced Vol: | 56 | 165 | 42 | | | | | | | | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | | | | | | | | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | | | | | | | | | |
| Final Vol.: | 56 | 165 | 42 | | | | | | | | | |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | | | | | | | | | |
| Adjustment: | 0.93 | 0.90 | 0.90 | | | | | | | | | |
| Lanes: | 1.00 | 1.59 | 0.41 | | | | | | | | | |
| Final Sat.: | 1769 | 2735 | 697 | | | | | | | | | |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.03 | 0.06 | 0.06 | | | | | | | | | |
| Crit Moves: | **** | | | | | | | | | | | |
| Green/Cycle: | 0.03 | 0.08 | 0.08 | | | | | | | | | |
| Volume/Cap: | 0.99 | 0.74 | 0.74 | | | | | | | | | |
| Delay/Veh: | 160.4 | 56.6 | 56.6 | | | | | | | | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | | | | | | | | | |
| AdjDel/Veh: | 160.4 | 56.6 | 56.6 | | | | | | | | | |
| LOS by Move: | F | E | E | | | | | | | | | |
| HCM2kAvgQ: | 4 | 5 | 5 | | | | | | | | | |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. as a Private Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #2 Mariposa St / Minnesota St/4th St

| | | | |
|---|---|---|---|
| Cycle (sec): | 60 | Critical Vol./Cap.(X): | 0.369 |
| Loss Time (sec): | 8 (Y+R=4.0 sec) | Average Delay (sec/veh): | 18.3 |
| Optimal Cycle: | 25 | Level Of Service: | B |

| Street Name: | Minnesota St/ 4th St | | | | | | | | Mariposa St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | |
| Movement: | L - T - R | | | | L - T - R | | | | L - T - R | | | |
| Control: | Protected | | | | Protected | | | | Protected | | | |
| Rights: | Include | | | | Include | | | | Include | | | |
| Min. Green: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Lanes: | 0 0 | 1! | 0 | 0 | 0 1 | 0 | 0 | 1 | 1 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 51 | 0 | 99 | | 106 | 0 | 26 | | 64 | 370 | 43 | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| Initial Bse: | 51 | 0 | 99 | | 106 | 0 | 26 | | 64 | 370 | 43 | |
| Added Vol: | 0 | 0 | 0 | | 46 | 0 | 89 | | 2 | 0 | 0 | |
| PasserByVol: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Initial Fut: | 51 | 0 | 99 | | 152 | 0 | 115 | | 66 | 370 | 43 | |
| User Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | |
| PHF Volume: | 54 | 0 | 104 | | 160 | 0 | 121 | | 69 | 389 | 45 | |
| Reduct Vol: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Reduced Vol: | 54 | 0 | 104 | | 160 | 0 | 121 | | 69 | 389 | 45 | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| Final Vol.: | 54 | 0 | 104 | | 160 | 0 | 121 | | 69 | 389 | 45 | |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | | 1900 | 1900 | 1900 | | 1900 | 1900 | 1900 | |
| Adjustment: | 0.88 | 1.00 | 0.88 | | 0.93 | 1.00 | 0.83 | | 0.93 | 0.92 | 0.92 | |
| Lanes: | 0.34 | 0.00 | 0.66 | | 1.00 | 0.00 | 1.00 | | 1.00 | 1.79 | 0.21 | |
| Final Sat.: | 567 | 0 | 1101 | | 1773 | 0 | 1583 | | 1769 | 3119 | 362 | |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.09 | 0.00 | 0.09 | | 0.09 | 0.00 | 0.08 | | 0.04 | 0.12 | 0.12 | |
| Crit Moves: | | | | **** | **** | | | | **** | | | |
| Green/Cycle: | 0.28 | 0.00 | 0.26 | | 0.24 | 0.00 | 0.22 | | 0.11 | 0.34 | 0.34 | |
| Volume/Cap: | 0.34 | 0.00 | 0.37 | | 0.37 | 0.00 | 0.34 | | 0.37 | 0.37 | 0.37 | |
| Delay/Veh: | 17.8 | 0.0 | 18.9 | | 19.4 | 0.0 | 20.1 | | 26.2 | 15.3 | 15.3 | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| AdjDel/Veh: | 17.8 | 0.0 | 18.9 | | 19.4 | 0.0 | 20.1 | | 26.2 | 15.3 | 15.3 | |
| LOS by Move: | B | A | B | | B | A | C | | C | B | B | |
| HCM2kAvgQ: | 3 | 0 | 3 | | 3 | 0 | 2 | | 2 | 3 | 3 | |

| Street Name: | Mariposa St | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | West Bound | | | | | | | | | | | |
| Movement: | L - T - R | | | | | | | | | | | |
| Control: | Protected | | | | | | | | | | | |
| Rights: | Include | | | | | | | | | | | |
| Min. Green: | 0 | 0 | 0 | | | | | | | | | |
| Lanes: | 1 0 | 1 | 1 | 0 | | | | | | | | |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 18 | 302 | 13 | | | | | | | | | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | | | | | | | | |
| Initial Bse: | 18 | 302 | 13 | | | | | | | | | |
| Added Vol: | 0 | 0 | 4 | | | | | | | | | |
| PasserByVol: | 0 | 0 | 0 | | | | | | | | | |
| Initial Fut: | 18 | 302 | 17 | | | | | | | | | |
| User Adj: | 1.00 | 1.00 | 1.00 | | | | | | | | | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | | | | | | | | |
| PHF Volume: | 19 | 318 | 18 | | | | | | | | | |
| Reduct Vol: | 0 | 0 | 0 | | | | | | | | | |
| Reduced Vol: | 19 | 318 | 18 | | | | | | | | | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | | | | | | | | | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | | | | | | | | | |
| Final Vol.: | 19 | 318 | 18 | | | | | | | | | |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | | | | | | | | | |
| Adjustment: | 0.93 | 0.92 | 0.92 | | | | | | | | | |
| Lanes: | 1.00 | 1.89 | 0.11 | | | | | | | | | |
| Final Sat.: | 1769 | 3322 | 187 | | | | | | | | | |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.10 | 0.10 | | | | | | | | | |
| Crit Moves: | | **** | | | | | | | | | | |
| Green/Cycle: | 0.03 | 0.26 | 0.26 | | | | | | | | | |
| Volume/Cap: | 0.37 | 0.37 | 0.37 | | | | | | | | | |
| Delay/Veh: | 33.1 | 18.5 | 18.5 | | | | | | | | | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | | | | | | | | | |
| AdjDel/Veh: | 33.1 | 18.5 | 18.5 | | | | | | | | | |
| LOS by Move: | C | B | B | | | | | | | | | |
| HCM2kAvgQ: | 1 | 3 | 3 | | | | | | | | | |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. as a Private Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #3 Mariposa St / I-280 NB Off-Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.609
Loss Time (sec): 9 (Y+R=3.0 sec) Average Delay (sec/veh): 24.9
Optimal Cycle: 99 Level Of Service: C

| Street Name: | I-280 NB Off-Ramp | | | | | | Mariposa St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 36 | 36 | 36 | 33 | 33 | 33 | 21 | 21 | 0 | 0 | 21 | 21 |
| Lanes: | 1 0 | 1 | 1 0 | 1 0 | 0 0 | 2 | 0 1 | 1 0 | 0 | 0 0 | 2 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 516 | 351 | 245 | 198 | 0 | 539 | 34 | 88 | 0 | 0 | 507 | 35 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 516 | 351 | 245 | 198 | 0 | 539 | 34 | 88 | 0 | 0 | 507 | 35 |
| Added Vol: | 0 | 17 | 2 | 0 | 0 | 47 | 1 | 0 | 0 | 0 | 89 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 516 | 368 | 247 | 198 | 0 | 586 | 35 | 88 | 0 | 0 | 596 | 35 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 543 | 387 | 260 | 208 | 0 | 617 | 37 | 93 | 0 | 0 | 627 | 37 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 543 | 387 | 260 | 208 | 0 | 617 | 37 | 93 | 0 | 0 | 627 | 37 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 543 | 387 | 260 | 208 | 0 | 617 | 37 | 93 | 0 | 0 | 627 | 37 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.94 | 0.88 | 0.88 | 0.93 | 1.00 | 0.73 | 0.67 | 0.67 | 1.00 | 1.00 | 0.88 | 0.88 |
| Lanes: | 1.00 | 1.20 | 0.80 | 1.00 | 0.00 | 2.00 | 0.57 | 1.43 | 0.00 | 0.00 | 2.83 | 0.17 |
| Final Sat.: | 1787 | 2010 | 1349 | 1769 | 0 | 2786 | 728 | 1830 | 0 | 0 | 4763 | 280 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.30 | 0.19 | 0.19 | 0.12 | 0.00 | 0.22 | 0.05 | 0.05 | 0.00 | 0.00 | 0.13 | 0.13 |
| Crit Moves: | **** | | | **** | | | | | | | **** | |
| Green/Cycle: | 0.50 | 0.50 | 0.50 | 0.36 | 0.00 | 0.36 | 0.22 | 0.22 | 0.00 | 0.00 | 0.22 | 0.22 |
| Volume/Cap: | 0.61 | 0.39 | 0.39 | 0.32 | 0.00 | 0.61 | 0.23 | 0.23 | 0.00 | 0.00 | 0.61 | 0.61 |
| Delay/Veh: | 19.1 | 15.5 | 15.5 | 23.0 | 0.0 | 26.8 | 32.2 | 32.2 | 0.0 | 0.0 | 36.0 | 36.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 19.1 | 15.5 | 15.5 | 23.0 | 0.0 | 26.8 | 32.2 | 32.2 | 0.0 | 0.0 | 36.0 | 36.0 |
| LOS by Move: | B | B | B | C | A | C | C | C | A | A | D | D |
| HCM2kAvgQ: | 12 | 6 | 6 | 5 | 0 | 9 | 2 | 2 | 0 | 0 | 7 | 7 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. as a Private Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #4 Mariposa St / I-280 SB On-Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.662
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 16.4
Optimal Cycle: 98 Level Of Service: B

| Street Name: | I-280 SB On-Ramp | | | | | | Mariposa St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Permitted | | | Permitted | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 54 | 90 | 0 |
| Lanes: | 0 0 | 0 | 0 0 | 0 0 | 0 0 | 0 | 0 0 | 0 1 | 1 | 2 0 | 1 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 121 | 653 | 1036 | 527 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 121 | 653 | 1036 | 527 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 128 | 8 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 122 | 653 | 1164 | 535 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 | 687 | 1225 | 563 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 | 687 | 1225 | 563 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 | 687 | 1225 | 563 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.86 | 0.86 | 0.90 | 0.98 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.31 | 1.69 | 2.00 | 1.00 | 0.00 |
| Final Sat.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 512 | 2742 | 3432 | 1862 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.36 | 0.30 | 0.00 |
| Crit Moves: | | | | | | | | **** | | **** | | |
| Green/Cycle: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.37 | 0.37 | 0.55 | 0.92 | 0.00 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.68 | 0.68 | 0.65 | 0.33 | 0.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 27.8 | 27.8 | 16.2 | 0.6 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 27.8 | 27.8 | 16.2 | 0.6 | 0.0 |
| LOS by Move: | A | A | A | A | A | A | A | C | C | B | A | A |
| HCM2kAvgQ: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 11 | 14 | 2 | 0 |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. as a Private Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #5 16th St / 3rd St

| | | | |
|---|---|---|---|
| Cycle (sec): | 90 | Critical Vol./Cap.(X): | 0.945 |
| Loss Time (sec): | 12 (Y+R=4.0 sec) | Average Delay (sec/veh): | 35.1 |
| Optimal Cycle: | 126 | Level Of Service: | D |

| Street Name: | 3rd St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 2 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 337 | 1306 | 21 | 34 | 1483 | 73 | 42 | 286 | 309 | 47 | 441 | 79 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 337 | 1306 | 21 | 34 | 1483 | 73 | 42 | 286 | 309 | 47 | 441 | 79 |
| Added Vol: | 7 | 0 | 0 | 0 | 0 | 5 | 26 | 0 | 27 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 344 | 1306 | 21 | 34 | 1483 | 78 | 68 | 286 | 336 | 47 | 441 | 79 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 362 | 1375 | 22 | 36 | 1561 | 82 | 72 | 301 | 354 | 49 | 464 | 83 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 362 | 1375 | 22 | 36 | 1561 | 82 | 72 | 301 | 354 | 49 | 464 | 83 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 362 | 1375 | 22 | 36 | 1561 | 82 | 72 | 301 | 354 | 49 | 464 | 83 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.90 | 0.93 | 0.93 | 0.93 | 0.92 | 0.92 | 0.93 | 0.86 | 0.86 | 0.93 | 0.91 | 0.91 |
| Lanes: | 2.00 | 1.97 | 0.03 | 1.00 | 1.90 | 0.10 | 1.00 | 1.00 | 1.00 | 1.00 | 1.70 | 0.30 |
| Final Sat.: | 3432 | 3475 | 56 | 1769 | 3337 | 176 | 1769 | 1626 | 1626 | 1769 | 2931 | 525 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.11 | 0.40 | 0.40 | 0.02 | 0.47 | 0.47 | 0.04 | 0.19 | 0.22 | 0.03 | 0.16 | 0.16 |
| Crit Moves: | **** | | | | **** | | | | **** | **** | | |
| Green/Cycle: | 0.11 | 0.58 | 0.58 | 0.03 | 0.50 | 0.50 | 0.05 | 0.23 | 0.23 | 0.03 | 0.21 | 0.21 |
| Volume/Cap: | 0.94 | 0.69 | 0.69 | 0.69 | 0.94 | 0.94 | 0.77 | 0.80 | 0.94 | 0.94 | 0.77 | 0.77 |
| Delay/Veh: | 71.7 | 14.3 | 14.3 | 74.9 | 32.7 | 32.7 | 72.7 | 38.6 | 55.7 | 147.3 | 38.6 | 38.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 71.7 | 14.3 | 14.3 | 74.9 | 32.7 | 32.7 | 72.7 | 38.6 | 55.7 | 147.3 | 38.6 | 38.6 |
| LOS by Move: | E | B | B | E | C | C | E | D | E | F | D | D |
| HCM2kAvgQ: | 9 | 15 | 15 | 2 | 28 | 28 | 4 | 11 | 15 | 4 | 9 | 9 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. as a Private Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 16th St / 4th St

| | | | |
|---|---|---|---|
| Cycle (sec): | 60 | Critical Vol./Cap.(X): | 0.857 |
| Loss Time (sec): | 12 (Y+R=4.0 sec) | Average Delay (sec/veh): | 27.2 |
| Optimal Cycle: | 73 | Level Of Service: | C |

| Street Name: | 4th St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 0 | 0 1 | 0 | 1 0 | 0 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 77 | 0 | 209 | 132 | 318 | 227 | 421 | 0 | 0 | 833 | 22 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 77 | 0 | 209 | 132 | 318 | 227 | 421 | 0 | 0 | 833 | 22 |
| Added Vol: | 12 | 10 | 30 | 0 | 6 | 0 | 0 | 24 | 12 | 11 | 1 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 12 | 87 | 30 | 209 | 138 | 318 | 227 | 445 | 12 | 11 | 834 | 22 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 13 | 92 | 32 | 220 | 145 | 335 | 239 | 468 | 13 | 12 | 878 | 23 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 13 | 92 | 32 | 220 | 145 | 335 | 239 | 468 | 13 | 12 | 878 | 23 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 13 | 92 | 32 | 220 | 145 | 335 | 239 | 468 | 13 | 12 | 878 | 23 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.93 | 0.94 | 0.94 | 0.93 | 0.88 | 0.88 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Lanes: | 1.00 | 0.74 | 0.26 | 1.00 | 0.30 | 0.70 | 1.00 | 1.95 | 0.05 | 1.00 | 1.95 | 0.05 |
| Final Sat.: | 1769 | 1332 | 459 | 1769 | 504 | 1162 | 1769 | 3431 | 93 | 1769 | 3433 | 91 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.07 | 0.07 | 0.12 | 0.29 | 0.29 | 0.14 | 0.14 | 0.14 | 0.01 | 0.26 | 0.26 |
| Crit Moves: | **** | | | | **** | | **** | | | | **** | |
| Green/Cycle: | 0.01 | 0.12 | 0.12 | 0.22 | 0.34 | 0.34 | 0.16 | 0.43 | 0.43 | 0.02 | 0.30 | 0.30 |
| Volume/Cap: | 0.86 | 0.56 | 0.56 | 0.56 | 0.86 | 0.86 | 0.86 | 0.31 | 0.31 | 0.31 | 0.86 | 0.86 |
| Delay/Veh: | 191.1 | 28.1 | 28.1 | 22.6 | 31.1 | 31.1 | 46.9 | 11.2 | 11.2 | 33.8 | 27.0 | 27.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 191.1 | 28.1 | 28.1 | 22.6 | 31.1 | 31.1 | 46.9 | 11.2 | 11.2 | 33.8 | 27.0 | 27.0 |
| LOS by Move: | F | C | C | C | C | C | D | B | B | C | C | C |
| HCM2kAvgQ: | 1 | 3 | 3 | 4 | 12 | 12 | 7 | 3 | 3 | 1 | 12 | 12 |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. as a Private Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #7 16th St / Owens St

Cycle (sec): 110 Critical Vol./Cap.(X): 0.892
Loss Time (sec): 12 (Y+R=5.0 sec) Average Delay (sec/veh): 41.6
Optimal Cycle: 111 Level Of Service: D

| Street Name: | Owens St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| Lanes: | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 17 | 182 | 167 | 38 | 602 | 468 | 112 | 448 | 12 | 27 | 1071 | 50 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 17 | 182 | 167 | 38 | 602 | 468 | 112 | 448 | 12 | 27 | 1071 | 50 |
| Added Vol: | 119 | 72 | 24 | 0 | 4 | 0 | 0 | 12 | 6 | 1 | 12 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 136 | 254 | 191 | 38 | 606 | 468 | 112 | 460 | 18 | 28 | 1083 | 50 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 143 | 267 | 201 | 40 | 638 | 493 | 118 | 484 | 19 | 29 | 1140 | 53 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 143 | 267 | 201 | 40 | 638 | 493 | 118 | 484 | 19 | 29 | 1140 | 53 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 143 | 267 | 201 | 40 | 638 | 493 | 118 | 484 | 19 | 29 | 1140 | 53 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.93 | 0.92 | 0.92 | 0.93 | 0.92 | 0.92 | 0.93 | 0.97 | 0.97 | 0.93 | 0.97 | 0.97 |
| Lanes: | 1.00 | 1.14 | 0.86 | 1.00 | 1.13 | 0.87 | 1.00 | 1.92 | 0.08 | 1.00 | 1.91 | 0.09 |
| Final Sat.: | 1769 | 1990 | 1496 | 1769 | 1965 | 1517 | 1769 | 3562 | 139 | 1769 | 3535 | 163 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.08 | 0.13 | 0.13 | 0.02 | 0.32 | 0.32 | 0.07 | 0.14 | 0.14 | 0.02 | 0.32 | 0.32 |
| Crit Moves: | **** | | | | **** | | **** | | | | **** | |
| Green/Cycle: | 0.09 | 0.34 | 0.34 | 0.11 | 0.36 | 0.36 | 0.07 | 0.33 | 0.33 | 0.11 | 0.36 | 0.36 |
| Volume/Cap: | 0.89 | 0.40 | 0.40 | 0.20 | 0.89 | 0.89 | 0.89 | 0.42 | 0.42 | 0.15 | 0.89 | 0.89 |
| Delay/Veh: | 90.9 | 27.9 | 27.9 | 44.6 | 41.2 | 41.2 | 97.7 | 29.1 | 29.1 | 44.7 | 41.0 | 41.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 90.9 | 27.9 | 27.9 | 44.6 | 41.2 | 41.2 | 97.7 | 29.1 | 29.1 | 44.7 | 41.0 | 41.0 |
| LOS by Move: | F | C | C | D | D | D | F | C | C | D | D | D |
| HCM2kAvgQ: | 8 | 6 | 6 | 1 | 21 | 21 | 7 | 7 | 7 | 1 | 22 | 22 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. as a Private Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #8 Garage Access -North Owens

Average Delay (sec/veh): 0.5 Worst Case Level Of Service: B[ 10.5]

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L - | T - | R | L - | T - | R | L - | T - | R | L - | T - | R |
| Control: | Uncontrolled | | | Uncontrolled | | | Stop Sign | | | Stop Sign | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Lanes: | 0 0 | 1 1 | 0 | 0 0 | 2 0 | 0 | 0 0 | 0 0 | 0 | 0 0 | 0 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 366 | 0 | 0 | 641 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 366 | 0 | 0 | 641 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Added Vol: | 0 | 150 | 13 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 64 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 516 | 13 | 0 | 653 | 0 | 0 | 0 | 0 | 0 | 0 | 64 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 543 | 14 | 0 | 687 | 0 | 0 | 0 | 0 | 0 | 0 | 67 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Final Vol.: | 0 | 543 | 14 | 0 | 687 | 0 | 0 | 0 | 0 | 0 | 0 | 67 |
| Critical Gap Module: | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | 6.9 |
| FollowUpTim: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | 3.3 |
| Capacity Module: | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | 278 |
| Potent Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | 725 |
| Move Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | 725 |
| Volume/Cap: | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | 0.09 |
| Level Of Service Module: | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | 0.3 |
| Control Del: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | 10.5 |
| LOS by Move: | * | * | * | * | * | * | * | * | * | * | * | B |
| Movement: | LT - | LTR - | RT | LT - | LTR - | RT | LT - | LTR - | RT | LT - | LTR - | RT |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx |
| SharedQueue: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx |
| Shared LOS: | * | * | * | * | * | * | * | * | * | * | * | * |
| ApproachDel: | xxxxxx | | | xxxxxx | | | xxxxxx | | | 10.5 | | |
| ApproachLOS: | * | | | * | | | * | | | B | | |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. as a Private Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #9 Garage Access -Center Owens

Average Delay (sec/veh): 0.0 Worst Case Level Of Service: A[ 0.0]

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | - | T | - R | L | - | T | - R | L | - | T | - R | L | - | T | - R |
| Control: | Uncontrolled | | | | Uncontrolled | | | | Stop Sign | | | | Stop Sign | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Lanes: | 0 | 0 | 2 | 0 0 | 0 | 0 | 2 | 0 0 | 0 | 0 | 0 | 0 0 | 0 | 0 | 0 | 0 0 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 420 | 0 | 0 | 641 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 420 | 0 | 0 | 641 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Added Vol: | 0 | 163 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 583 | 0 | 0 | 653 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 614 | 0 | 0 | 687 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Final Vol.: | 0 | 614 | 0 | 0 | 687 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Critical Gap Module: | | | | | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| FollowUpTim: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| Capacity Module: | | | | | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | | |
| Potent Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | | |
| Move Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | | |
| Volume/Cap: | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | | | | |
| Level Of Service Module: | | | | | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | | |
| Control Del: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| LOS by Move: | * | * | * | * | * | * | * | * | * | * | * | * | | | | |
| Movement: | LT - LTR - RT | | | | LT - LTR - RT | | | | LT - LTR - RT | | | | LT - LTR - RT | | | |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | | |
| SharedQueue: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| Shared LOS: | * | * | * | * | * | * | * | * | * | * | * | * | | | | |
| ApproachDel: | xxxxxx | | | xxxxxx | | | xxxxxx | | | xxxxxx | | | | | | |
| ApproachLOS: | * | | | * | | | * | | | * | | | | | | |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. as a Private Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #10 Garage Access -South Owens

Average Delay (sec/veh): 1.9 Worst Case Level Of Service: B[ 13.0]

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | - | T | - R | L | - | T | - R | L | - | T | - R | L | - | T | - R |
| Control: | Uncontrolled | | | | Uncontrolled | | | | Stop Sign | | | | Stop Sign | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Lanes: | 0 | 0 | 1 | 1 0 | 0 | 1 | 1 | 0 0 | 0 | 0 | 0 | 0 0 | 1 | 0 | 0 | 0 1 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 420 | 0 | 0 | 737 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 420 | 0 | 0 | 737 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Added Vol: | 0 | 13 | 5 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 47 | 0 | 150 | |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Initial Fut: | 0 | 433 | 5 | 12 | 737 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 47 | 0 | 150 | |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | |
| PHF Volume: | 0 | 456 | 5 | 13 | 776 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 49 | 0 | 158 | |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Final Vol.: | 0 | 456 | 5 | 13 | 776 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 49 | 0 | 158 | |
| Critical Gap Module: | | | | | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | xxxxx | 4.1 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 6.8 | xxxx | 6.9 | | | | |
| FollowUpTim: | xxxxx | xxxx | xxxxx | 2.2 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 3.5 | xxxx | 3.3 | | | | |
| Capacity Module: | | | | | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | 461 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 872 | xxxx | 231 | | | | |
| Potent Cap.: | xxxx | xxxx | xxxxx | 1111 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 294 | xxxx | 778 | | | | |
| Move Cap.: | xxxx | xxxx | xxxxx | 1111 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 291 | xxxx | 778 | | | | |
| Volume/Cap: | xxxx | xxxx | xxxx | 0.01 | xxxx | xxxx | xxxx | xxxx | xxxx | 0.17 | xxxx | 0.20 | | | | |
| Level Of Service Module: | | | | | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | 0.0 | xxxx | xxxxx | xxxx | xxxx | xxxxx | 0.6 | xxxx | 0.8 | | | | |
| Control Del: | xxxxx | xxxx | xxxxx | 8.3 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | 19.9 | xxxx | 10.8 | | | | |
| LOS by Move: | * | * | * | A | * | * | * | * | * | C | * | B | | | | |
| Movement: | LT - LTR - RT | | | | LT - LTR - RT | | | | LT - LTR - RT | | | | LT - LTR - RT | | | |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | | |
| SharedQueue: | xxxxx | xxxx | xxxxx | 0.0 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | 8.3 | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| Shared LOS: | * | * | * | A | * | * | * | * | * | * | * | * | | | | |
| ApproachDel: | xxxxxx | | | xxxxxx | | | xxxxxx | | | | 13.0 | | | | | |
| ApproachLOS: | * | | | * | | | * | | | | B | | | | | |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. as a Private Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #11 16th St / Mississippi St/7th St

| | | | |
|---|---|---|---|
| Cycle (sec): | 110 | Critical Vol./Cap.(X): | 0.770 |
| Loss Time (sec): | 9 (Y+R=5.0 sec) | Average Delay (sec/veh): | 34.9 |
| Optimal Cycle: | 63 | Level Of Service: | C |

| Street Name: | Mississippi St/ 7th St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 0 | 1 0 | 1 | 1 0 | 0 1 | 0 | 0 1 | 0 1 | 0 | 0 1 | 1 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 29 | 277 | 25 | 144 | 134 | 70 | 90 | 405 | 85 | 68 | 1057 | 429 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 29 | 277 | 25 | 144 | 134 | 70 | 90 | 405 | 85 | 68 | 1057 | 429 |
| Added Vol: | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 13 | 0 | 0 | 90 | 41 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 29 | 277 | 25 | 150 | 134 | 70 | 90 | 418 | 85 | 68 | 1147 | 470 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 31 | 292 | 26 | 158 | 141 | 74 | 95 | 440 | 89 | 72 | 1207 | 495 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 31 | 292 | 26 | 158 | 141 | 74 | 95 | 440 | 89 | 72 | 1207 | 495 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 31 | 292 | 26 | 158 | 141 | 74 | 95 | 440 | 89 | 72 | 1207 | 495 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.93 | 0.98 | 0.83 | 0.93 | 0.93 | 0.93 | 0.49 | 0.49 | 0.49 | 0.78 | 0.78 | 0.83 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 0.66 | 0.34 | 0.30 | 1.41 | 0.29 | 0.11 | 1.89 | 1.00 |
| Final Sat.: | 1769 | 1862 | 1583 | 1769 | 1161 | 606 | 285 | 1323 | 269 | 167 | 2815 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.16 | 0.02 | 0.09 | 0.12 | 0.12 | 0.33 | 0.33 | 0.33 | 0.43 | 0.43 | 0.31 |
| Crit Moves: | | **** | | | | **** | | | | | **** | |
| Green/Cycle: | 0.24 | 0.24 | 0.24 | 0.20 | 0.20 | 0.20 | 0.48 | 0.48 | 0.48 | 0.45 | 0.45 | 0.65 |
| Volume/Cap: | 0.07 | 0.66 | 0.07 | 0.45 | 0.61 | 0.61 | 0.69 | 0.69 | 0.69 | 0.96 | 0.96 | 0.48 |
| Delay/Veh: | 32.7 | 41.8 | 32.7 | 39.5 | 43.1 | 43.1 | 24.4 | 24.4 | 24.4 | 46.1 | 46.1 | 10.4 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 32.7 | 41.8 | 32.7 | 39.5 | 43.1 | 43.1 | 24.4 | 24.4 | 24.4 | 46.1 | 46.1 | 10.4 |
| LOS by Move: | C | D | C | D | D | D | C | C | C | D | D | B |
| HCM2kAvgQ: | 1 | 10 | 1 | 5 | 7 | 7 | 10 | 10 | 10 | 28 | 28 | 9 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2015 Fourth St. as a Private Roadway
Unmitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #12 7th and Mission Bay Drive

| | | | |
|---|---|---|---|
| Cycle (sec): | 110 | Critical Vol./Cap.(X): | 0.667 |
| Loss Time (sec): | 9 (Y+R=5.0 sec) | Average Delay (sec/veh): | 31.2 |
| Optimal Cycle: | 48 | Level Of Service: | C |

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 0 0 | 2 0 | 1 | 2 0 | 1 0 | 0 | 0 0 | 0 0 | 0 | 1 0 | 0 0 | 2 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 733 | 62 | 529 | 276 | 0 | 0 | 0 | 0 | 73 | 0 | 581 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 733 | 62 | 529 | 276 | 0 | 0 | 0 | 0 | 73 | 0 | 581 |
| Added Vol: | 0 | 41 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 774 | 62 | 529 | 282 | 0 | 0 | 0 | 0 | 73 | 0 | 581 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 815 | 65 | 557 | 297 | 0 | 0 | 0 | 0 | 77 | 0 | 612 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 815 | 65 | 557 | 297 | 0 | 0 | 0 | 0 | 77 | 0 | 612 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 0 | 815 | 65 | 557 | 297 | 0 | 0 | 0 | 0 | 77 | 0 | 612 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.93 | 0.83 | 0.90 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.73 |
| Lanes: | 0.00 | 2.00 | 1.00 | 2.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 2.00 |
| Final Sat.: | 0 | 3538 | 1583 | 3432 | 1862 | 0 | 0 | 0 | 0 | 1769 | 0 | 2786 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.23 | 0.04 | 0.16 | 0.16 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.22 |
| Crit Moves: | | **** | | **** | | | | | | | | **** |
| Green/Cycle: | 0.00 | 0.35 | 0.35 | 0.24 | 0.59 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.00 | 0.33 |
| Volume/Cap: | 0.00 | 0.67 | 0.12 | 0.67 | 0.27 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 0.00 | 0.67 |
| Delay/Veh: | 0.0 | 32.0 | 24.7 | 39.7 | 11.2 | 0.0 | 0.0 | 0.0 | 0.0 | 26.0 | 0.0 | 33.6 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 32.0 | 24.7 | 39.7 | 11.2 | 0.0 | 0.0 | 0.0 | 0.0 | 26.0 | 0.0 | 33.6 |
| LOS by Move: | A | C | C | D | B | A | A | A | A | C | A | C |
| HCM2kAvgQ: | 0 | 13 | 1 | 10 | 5 | 0 | 0 | 0 | 0 | 2 | 0 | 11 |

Note: Queue reported is the number of cars per lane.

# Alternative 2: Fourth St. Open as a Private Roadway
# Phase 2 (2025) – Mitigated Conditions

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Open as a Private Roadway
Mitigated Conditions

Scenario Report

| | |
|---|---|
| Scenario: | 2025 Cumulative |
| Command: | 2025 Cumulative |
| Volume: | 2025 Cumulative |
| Geometry: | Existing |
| Impact Fee: | Default Impact Fee |
| Trip Generation: | Project |
| Trip Distribution: | Project |
| Paths: | Default Paths |
| Routes: | Default Routes |
| Configuration: | Existing |





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Open as a Private Roadway
Mitigated Conditions

Impact Analysis Report
Level Of Service

| Intersection | Base LOS | Base Del/ Veh | Base V/ C | Future LOS | Future Del/ Veh | Future V/ C | Change in |
|---|---|---|---|---|---|---|---|
| # 1 Mariposa St / 3rd St | C | 34.9 | 0.958 | D | 49.1 | 1.057 | +14.230 D/V |
| # 2 Mariposa St / Minnesota St/4th | B | 17.7 | 0.423 | B | 18.5 | 0.470 | + 0.773 D/V |
| # 3 Mariposa St / I-280 NB Off-Ram | C | 32.7 | 0.637 | D | 41.8 | 0.860 | + 9.090 D/V |
| # 4 Mariposa St / I-280 SB On-Ramp | B | 16.2 | 0.659 | B | 17.8 | 0.747 | + 1.685 D/V |
| # 5 16th St / 3rd St | E | 55.8 | 0.902 | D | 45.6 | 1.029 | -10.169 D/V |
| # 6 16th St / 4th St | D | 37.3 | 0.960 | D | 43.1 | 0.983 | + 5.835 D/V |
| # 7 16th St / Owens St | D | 36.7 | 0.868 | D | 44.0 | 0.955 | + 7.344 D/V |
| # 8 Garage Access -North Owens | A | 0.0 | 0.000 | B | 12.6 | 0.000 | +12.591 D/V |
| # 9 Garage Access -Center Owens | A | 0.9 | 0.280 | B | 10.5 | 0.447 | + 9.637 D/V |
| # 10 Garage Access -South Owens | A | 0.0 | 0.000 | C | 15.1 | 0.000 | +15.084 D/V |
| # 11 16th St / Mississippi St/7th S | C | 23.5 | 0.785 | D | 47.1 | 0.855 | +23.591 D/V |
| # 12 7th and Mission Bay Drive | C | 34.9 | 0.768 | D | 35.8 | 0.794 | + 0.839 D/V |

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Open as a Private Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Mariposa St / 3rd St

Cycle (sec): 90 Critical Vol./Cap.(X): 1.057
Loss Time (sec): 14 (Y+R=4.0 sec) Average Delay (sec/veh): 49.1
Optimal Cycle: 180 Level Of Service: D

| Street Name: | 3rd St | | | | | | | | | Mariposa St | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | | |
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Protected | | | | | Protected | | | | | Protected | | | | | Protected | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Min. Green: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Lanes: | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 55 | 1519 | | 38 | | 33 | 1812 | | 237 | | 196 | | 286 | | 309 | | 63 | 172 | | 44 |
| Growth Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Initial Bse: | 55 | 1519 | | 38 | | 33 | 1812 | | 237 | | 196 | | 286 | | 309 | | 63 | 172 | | 44 |
| Added Vol: | 13 | 7 | | 0 | | 0 | 53 | | 0 | | 0 | | 0 | | 89 | | 0 | 0 | | 0 |
| PasserByVol: | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | 0 | | 0 |
| Initial Fut: | 68 | 1526 | | 38 | | 33 | 1865 | | 237 | | 196 | | 286 | | 398 | | 63 | 172 | | 44 |
| User Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 |
| PHF Adj: | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | | 0.95 | | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 |
| PHF Volume: | 72 | 1606 | | 40 | | 35 | 1963 | | 249 | | 206 | | 301 | | 419 | | 66 | 181 | | 46 |
| Reduct Vol: | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | 0 | | 0 |
| Reduced Vol: | 72 | 1606 | | 40 | | 35 | 1963 | | 249 | | 206 | | 301 | | 419 | | 66 | 181 | | 46 |
| PCE Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 |
| MLF Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Final Vol.: | 72 | 1606 | | 40 | | 35 | 1963 | | 249 | | 206 | | 301 | | 419 | | 66 | 181 | | 46 |
| Saturation Flow Module: | | | | | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | | 1900 | | 1900 | 1900 | | 1900 | | 1900 | | 1900 | | 1900 | | 1900 | 1900 | | 1900 |
| Adjustment: | 0.93 | 0.91 | | 0.91 | | 0.93 | 0.93 | | 0.79 | | 0.93 | | 0.85 | | 0.85 | | 0.93 | 0.90 | | 0.90 |
| Lanes: | 1.00 | 1.95 | | 0.05 | | 1.00 | 2.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | 1.59 | | 0.41 |
| Final Sat.: | 1769 | 3383 | | 84 | | 1769 | 3538 | | 1500 | | 1769 | | 1615 | | 1615 | | 1769 | 2730 | | 698 |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.04 | 0.47 | | 0.47 | | 0.02 | 0.55 | | 0.17 | | 0.12 | | 0.19 | | 0.26 | | 0.04 | 0.07 | | 0.07 |
| Crit Moves: | **** | | | | | | **** | | | | | | | | **** | | **** | | | |
| Green/Cycle: | 0.04 | 0.54 | | 0.54 | | 0.02 | 0.53 | | 0.53 | | 0.18 | | 0.25 | | 0.25 | | 0.04 | 0.10 | | 0.10 |
| Volume/Cap: | 1.06 | 0.88 | | 0.88 | | 0.88 | 1.06 | | 0.32 | | 0.65 | | 0.76 | | 1.06 | | 1.06 | 0.65 | | 0.65 |
| Delay/Veh: | 169.1 | 24.2 | | 24.2 | | 153.1 | 59.1 | | 13.2 | | 44.3 | | 37.2 | | 84.4 | | 173.6 | 48.0 | | 48.0 |
| User DelAdj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 |
| AdjDel/Veh: | 169.1 | 24.2 | | 24.2 | | 153.1 | 59.1 | | 13.2 | | 44.3 | | 37.2 | | 84.4 | | 173.6 | 48.0 | | 48.0 |
| LOS by Move: | F | C | | C | | F | E | | B | | D | | D | | F | | F | D | | D |
| HCM2kAvgQ: | 5 | 24 | | 24 | | 3 | 41 | | 4 | | 6 | | 10 | | 20 | | 5 | 4 | | 4 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Open as a Private Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #2 Mariposa St / Minnesota St/4th St

Cycle (sec): 60 Critical Vol./Cap.(X): 0.470
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 18.5
Optimal Cycle: 29 Level Of Service: B

| Street Name: | Minnesota St/ 4th St | | | | | | | | | Mariposa St | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | | |
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Protected | | | | | Protected | | | | | Protected | | | | | Protected | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Min. Green: | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 | 0 | | |
| Lanes: | 0 | 0 | 1! | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 64 | | 0 | | 124 | 132 | | 0 | | 33 | 80 | | 463 | | 54 | 22 | | 376 | | 16 |
| Growth Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 |
| Initial Bse: | 64 | | 0 | | 124 | 132 | | 0 | | 33 | 80 | | 463 | | 54 | 22 | | 376 | | 16 |
| Added Vol: | 0 | | 0 | | 0 | 47 | | 0 | | 60 | 3 | | 42 | | 0 | 0 | | 7 | | 7 |
| PasserByVol: | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 |
| Initial Fut: | 64 | | 0 | | 124 | 179 | | 0 | | 93 | 83 | | 505 | | 54 | 22 | | 383 | | 23 |
| User Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 |
| PHF Adj: | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | | 0.95 |
| PHF Volume: | 67 | | 0 | | 131 | 188 | | 0 | | 98 | 87 | | 532 | | 57 | 23 | | 403 | | 24 |
| Reduct Vol: | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 |
| Reduced Vol: | 67 | | 0 | | 131 | 188 | | 0 | | 98 | 87 | | 532 | | 57 | 23 | | 403 | | 24 |
| PCE Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 |
| MLF Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 |
| Final Vol.: | 67 | | 0 | | 131 | 188 | | 0 | | 98 | 87 | | 532 | | 57 | 23 | | 403 | | 24 |
| Saturation Flow Module: | | | | | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | | 1900 | | 1900 | 1900 | | 1900 | | 1900 | | 1900 | | 1900 | 1900 | | 1900 | | 1900 |
| Adjustment: | 0.88 | 1.00 | | 0.88 | | 0.93 | 1.00 | | 0.83 | | 0.93 | | 0.92 | | 0.92 | 0.93 | | 0.92 | | 0.92 |
| Lanes: | 0.34 | 0.00 | | 0.66 | | 1.00 | 0.00 | | 1.00 | | 1.00 | | 1.81 | | 0.19 | 1.00 | | 1.89 | | 0.11 |
| Final Sat.: | 568 | | 0 | | 1100 | 1769 | | 0 | | 1583 | 1769 | | 3148 | | 337 | 1769 | | 3307 | | 199 |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.12 | 0.00 | | 0.12 | | 0.11 | 0.00 | | 0.06 | | 0.05 | | 0.17 | | 0.17 | 0.01 | | 0.12 | | 0.12 |
| Crit Moves: | | | | **** | | **** | | | | | | | **** | | | **** | | | | |
| Green/Cycle: | 0.32 | 0.00 | | 0.25 | | 0.23 | 0.00 | | 0.16 | | 0.11 | | 0.36 | | 0.36 | 0.03 | | 0.28 | | 0.28 |
| Volume/Cap: | 0.38 | 0.00 | | 0.47 | | 0.47 | 0.00 | | 0.38 | | 0.44 | | 0.47 | | 0.47 | 0.47 | | 0.44 | | 0.44 |
| Delay/Veh: | 16.4 | 0.0 | | 19.8 | | 20.9 | 0.0 | | 23.3 | | 26.5 | | 15.1 | | 15.1 | 35.6 | | 18.3 | | 18.3 |
| User DelAdj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 |
| AdjDel/Veh: | 16.4 | 0.0 | | 19.8 | | 20.9 | 0.0 | | 23.3 | | 26.5 | | 15.1 | | 15.1 | 35.6 | | 18.3 | | 18.3 |
| LOS by Move: | B | A | | B | | C | A | | C | | C | | B | | B | D | | B | | B |
| HCM2kAvgQ: | 3 | 0 | | 4 | | 4 | 0 | | 2 | | 2 | | 5 | | 5 | 1 | | 4 | | 4 |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Open as a Private Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #3 Mariposa St / I-280 NB Off-Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.860
Loss Time (sec): 9 (Y+R=3.0 sec) Average Delay (sec/veh): 41.8
Optimal Cycle: 99 Level Of Service: D

| Street Name: | I-280 NB Off-Ramp | | | | | | Mariposa St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 36 | 36 | 36 | 33 | 33 | 33 | 21 | 21 | 0 | 0 | 21 | 21 |
| Lanes: | 1 0 | 1 | 1 0 | 1 0 | 0 0 | 2 | 0 1 | 1 | 0 0 | 0 0 | 2 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 529 | 438 | 273 | 248 | 0 | 673 | 41 | 86 | 0 | 0 | 528 | 43 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 529 | 438 | 273 | 248 | 0 | 673 | 41 | 86 | 0 | 0 | 528 | 43 |
| Added Vol: | 0 | 33 | 3 | 42 | 0 | 217 | 2 | 0 | 0 | 0 | 60 | 7 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 529 | 471 | 276 | 290 | 0 | 890 | 43 | 86 | 0 | 0 | 588 | 50 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 557 | 496 | 291 | 305 | 0 | 937 | 45 | 91 | 0 | 0 | 619 | 53 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 557 | 496 | 291 | 305 | 0 | 937 | 45 | 91 | 0 | 0 | 619 | 53 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 557 | 496 | 291 | 305 | 0 | 937 | 45 | 91 | 0 | 0 | 619 | 53 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.94 | 0.89 | 0.89 | 0.93 | 1.00 | 0.73 | 0.63 | 0.63 | 1.00 | 1.00 | 0.88 | 0.88 |
| Lanes: | 1.00 | 1.26 | 0.74 | 1.00 | 0.00 | 2.00 | 0.67 | 1.33 | 0.00 | 0.00 | 2.76 | 0.24 |
| Final Sat.: | 1787 | 2129 | 1248 | 1769 | 0 | 2786 | 795 | 1590 | 0 | 0 | 4629 | 394 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.31 | 0.23 | 0.23 | 0.17 | 0.00 | 0.34 | 0.06 | 0.06 | 0.00 | 0.00 | 0.13 | 0.13 |
| Crit Moves: | **** | | | | | **** | | | | | **** | |
| Green/Cycle: | 0.36 | 0.36 | 0.36 | 0.33 | 0.00 | 0.33 | 0.21 | 0.21 | 0.00 | 0.00 | 0.21 | 0.21 |
| Volume/Cap: | 0.86 | 0.64 | 0.64 | 0.52 | 0.00 | 1.01 | 0.27 | 0.27 | 0.00 | 0.00 | 0.63 | 0.63 |
| Delay/Veh: | 40.1 | 27.3 | 27.3 | 27.4 | 0.0 | 64.8 | 32.9 | 32.9 | 0.0 | 0.0 | 36.7 | 36.7 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 40.1 | 27.3 | 27.3 | 27.4 | 0.0 | 64.8 | 32.9 | 32.9 | 0.0 | 0.0 | 36.7 | 36.7 |
| LOS by Move: | D | C | C | C | A | E | C | C | A | A | D | D |
| HCM2kAvgQ: | 19 | 11 | 11 | 8 | 0 | 23 | 2 | 2 | 0 | 0 | 8 | 8 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Open as a Private Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #4 Mariposa St / I-280 SB On-Ramp

Cycle (sec): 90 Critical Vol./Cap.(X): 0.747
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 17.8
Optimal Cycle: 98 Level Of Service: B

| Street Name: | I-280 SB On-Ramp | | | | | | Mariposa St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Permitted | | | Permitted | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 54 | 90 | 0 |
| Lanes: | 0 0 | 0 | 0 0 | 0 0 | 0 0 | 0 | 0 0 | 0 | 1 1 | 2 0 | 1 0 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 127 | 663 | 1140 | 591 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 127 | 663 | 1140 | 591 | 0 |
| Added Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 260 | 17 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 130 | 663 | 1400 | 608 | 0 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 137 | 698 | 1474 | 640 | 0 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 137 | 698 | 1474 | 640 | 0 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 137 | 698 | 1474 | 640 | 0 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.86 | 0.86 | 0.90 | 0.98 | 1.00 |
| Lanes: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 1.67 | 2.00 | 1.00 | 0.00 |
| Final Sat.: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 534 | 2724 | 3432 | 1862 | 0 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 | 0.26 | 0.43 | 0.34 | 0.00 |
| Crit Moves: | | | | | | | | **** | | **** | | |
| Green/Cycle: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.37 | 0.37 | 0.55 | 0.92 | 0.00 |
| Volume/Cap: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.70 | 0.70 | 0.78 | 0.37 | 0.00 |
| Delay/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 28.2 | 28.2 | 19.5 | 0.6 | 0.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 28.2 | 28.2 | 19.5 | 0.6 | 0.0 |
| LOS by Move: | A | A | A | A | A | A | A | C | C | B | A | A |
| HCM2kAvgQ: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 | 19 | 3 | 0 |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Open as a Private Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #5 16th St / 3rd St

Cycle (sec): 90 Critical Vol./Cap.(X): 1.029
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 45.6
Optimal Cycle: 180 Level Of Service: D

| Street Name: | 3rd St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Ovl | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 2 0 | 1 1 | 0 | 1 0 | 1 1 | 0 | 0 1 | 1 0 | 1 | 0 1 | 0 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 353 | 1416 | 23 | 38 | 1690 | 73 | 12 | 332 | 335 | 57 | 529 | 88 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 353 | 1416 | 23 | 38 | 1690 | 73 | 12 | 332 | 335 | 57 | 529 | 88 |
| Added Vol: | 7 | 0 | 0 | 0 | 0 | 10 | 51 | 0 | 53 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 360 | 1416 | 23 | 38 | 1690 | 83 | 63 | 332 | 388 | 57 | 529 | 88 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 379 | 1491 | 24 | 40 | 1779 | 87 | 66 | 349 | 408 | 60 | 557 | 93 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 379 | 1491 | 24 | 40 | 1779 | 87 | 66 | 349 | 408 | 60 | 557 | 93 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 379 | 1491 | 24 | 40 | 1779 | 87 | 66 | 349 | 408 | 60 | 557 | 93 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.90 | 0.93 | 0.93 | 0.93 | 0.92 | 0.92 | 0.55 | 0.55 | 0.73 | 0.74 | 0.75 | 0.74 |
| Lanes: | 2.00 | 1.97 | 0.03 | 1.00 | 1.91 | 0.09 | 0.32 | 1.68 | 1.00 | 0.17 | 1.57 | 0.26 |
| Final Sat.: | 3432 | 3474 | 56 | 1769 | 3349 | 164 | 335 | 1768 | 1388 | 240 | 2223 | 370 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.11 | 0.43 | 0.43 | 0.02 | 0.53 | 0.53 | 0.20 | 0.20 | 0.29 | 0.25 | 0.25 | 0.25 |
| Crit Moves: | **** | | | | **** | | | | | | **** | |
| Green/Cycle: | 0.11 | 0.59 | 0.59 | 0.03 | 0.52 | 0.52 | 0.24 | 0.24 | 0.35 | 0.24 | 0.24 | 0.24 |
| Volume/Cap: | 1.03 | 0.72 | 0.72 | 0.72 | 1.03 | 1.03 | 0.81 | 0.81 | 0.84 | 1.03 | 1.03 | 1.03 |
| Delay/Veh: | 94.9 | 14.4 | 14.4 | 81.0 | 50.8 | 50.8 | 41.7 | 41.7 | 39.2 | 76.1 | 76.1 | 76.1 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 94.9 | 14.4 | 14.4 | 81.0 | 50.8 | 50.8 | 41.7 | 41.7 | 39.2 | 76.1 | 76.1 | 76.1 |
| LOS by Move: | F | B | B | F | D | D | D | D | D | E | E | E |
| HCM2kAvgQ: | 10 | 17 | 17 | 2 | 38 | 38 | 8 | 8 | 13 | 17 | 17 | 17 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Open as a Private Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 16th St / 4th St

Cycle (sec): 60 Critical Vol./Cap.(X): 0.983
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 43.1
Optimal Cycle: 107 Level Of Service: D

| Street Name: | 4th St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 0 | 0 1 | 0 | 1 0 | 0 1 | 0 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 96 | 0 | 258 | 165 | 338 | 277 | 415 | 0 | 0 | 940 | 21 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 96 | 0 | 258 | 165 | 338 | 277 | 415 | 0 | 0 | 940 | 21 |
| Added Vol: | 24 | 19 | 58 | 0 | 5 | 0 | 0 | 47 | 12 | 11 | 5 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 24 | 115 | 58 | 258 | 170 | 338 | 277 | 462 | 12 | 11 | 945 | 21 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 25 | 121 | 61 | 272 | 179 | 356 | 292 | 486 | 13 | 12 | 995 | 22 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 25 | 121 | 61 | 272 | 179 | 356 | 292 | 486 | 13 | 12 | 995 | 22 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 25 | 121 | 61 | 272 | 179 | 356 | 292 | 486 | 13 | 12 | 995 | 22 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.93 | 0.93 | 0.93 | 0.93 | 0.88 | 0.88 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Lanes: | 1.00 | 0.66 | 0.34 | 1.00 | 0.33 | 0.67 | 1.00 | 1.95 | 0.05 | 1.00 | 1.96 | 0.04 |
| Final Sat.: | 1769 | 1176 | 593 | 1769 | 561 | 1115 | 1769 | 3434 | 89 | 1769 | 3451 | 77 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.01 | 0.10 | 0.10 | 0.15 | 0.32 | 0.32 | 0.16 | 0.14 | 0.14 | 0.01 | 0.29 | 0.29 |
| Crit Moves: | **** | | | | **** | | **** | | | | **** | |
| Green/Cycle: | 0.01 | 0.14 | 0.14 | 0.20 | 0.32 | 0.32 | 0.17 | 0.44 | 0.44 | 0.02 | 0.29 | 0.29 |
| Volume/Cap: | 0.98 | 0.76 | 0.76 | 0.76 | 0.98 | 0.98 | 0.98 | 0.32 | 0.32 | 0.32 | 0.98 | 0.98 |
| Delay/Veh: | 199.4 | 37.8 | 37.8 | 31.4 | 54.2 | 54.2 | 72.3 | 11.1 | 11.1 | 34.1 | 44.9 | 44.9 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 199.4 | 37.8 | 37.8 | 31.4 | 54.2 | 54.2 | 72.3 | 11.1 | 11.1 | 34.1 | 44.9 | 44.9 |
| LOS by Move: | F | D | D | C | D | D | E | B | B | C | D | D |
| HCM2kAvgQ: | 2 | 5 | 5 | 7 | 16 | 16 | 11 | 3 | 3 | 1 | 16 | 16 |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Open as a Private Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #7 16th St / Owens St

Cycle (sec): 110 Critical Vol./Cap.(X): 0.955
Loss Time (sec): 12 (Y+R=5.0 sec) Average Delay (sec/veh): 44.0
Optimal Cycle: 153 Level Of Service: D

| Street Name: | Owens St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Permitted | | | Protected | | | Protected | | |
| Rights: | Include | | | Ovl | | | Include | | | Include | | |
| Min. Green: | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| Lanes: | 2 0 | 1 1 | 0 | 0 1 | 1 0 | 1 | 1 0 | 1 1 | 0 | 1 0 | 1 1 | 0 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 21 | 227 | 207 | 32 | 753 | 553 | 118 | 457 | 15 | 33 | 1266 | 25 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 21 | 227 | 207 | 32 | 753 | 553 | 118 | 457 | 15 | 33 | 1266 | 25 |
| Added Vol: | 231 | 140 | 47 | 0 | 15 | 0 | 0 | 12 | 24 | 5 | 24 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 252 | 367 | 254 | 32 | 768 | 553 | 118 | 469 | 39 | 38 | 1290 | 25 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 265 | 386 | 267 | 34 | 808 | 582 | 124 | 494 | 41 | 40 | 1358 | 26 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 265 | 386 | 267 | 34 | 808 | 582 | 124 | 494 | 41 | 40 | 1358 | 26 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 265 | 386 | 267 | 34 | 808 | 582 | 124 | 494 | 41 | 40 | 1358 | 26 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.93 | 0.92 | 0.92 | 0.89 | 0.89 | 0.76 | 0.93 | 0.97 | 0.97 | 0.93 | 0.98 | 0.98 |
| Lanes: | 2.00 | 1.18 | 0.82 | 0.08 | 1.92 | 1.00 | 1.00 | 1.85 | 0.15 | 1.00 | 1.96 | 0.04 |
| Final Sat.: | 3538 | 2067 | 1430 | 135 | 3239 | 1446 | 1769 | 3397 | 282 | 1769 | 3642 | 71 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.07 | 0.19 | 0.19 | 0.25 | 0.25 | 0.40 | 0.07 | 0.15 | 0.15 | 0.02 | 0.37 | 0.37 |
| Crit Moves: | **** | | | | | **** | **** | | | | **** | |
| Green/Cycle: | 0.08 | 0.43 | 0.43 | 0.35 | 0.35 | 0.42 | 0.07 | 0.35 | 0.35 | 0.11 | 0.39 | 0.39 |
| Volume/Cap: | 0.95 | 0.44 | 0.44 | 0.72 | 0.72 | 0.96 | 0.95 | 0.41 | 0.41 | 0.20 | 0.95 | 0.95 |
| Delay/Veh: | 90.9 | 22.6 | 22.6 | 33.6 | 33.6 | 57.5 | 114.4 | 27.0 | 27.0 | 45.0 | 46.0 | 46.0 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 90.9 | 22.6 | 22.6 | 33.6 | 33.6 | 57.5 | 114.4 | 27.0 | 27.0 | 45.0 | 46.0 | 46.0 |
| LOS by Move: | F | C | C | C | C | E | F | C | C | D | D | D |
| HCM2kAvgQ: | 8 | 8 | 8 | 14 | 14 | 24 | 7 | 7 | 7 | 1 | 28 | 28 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Open as a Private Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #8 Garage Access -North Owens

Average Delay (sec/veh): 0.9 Worst Case Level Of Service: B[ 12.6]

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | - | T | - R | L | - | T | - R | L | - | T | - R | L | - | T | - R |
| Control: | Uncontrolled | | | | Uncontrolled | | | | Stop Sign | | | | Stop Sign | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Lanes: | 0 0 | 1 | 1 | 0 | 0 0 | 2 | 0 | 0 | 0 0 | 0 | 0 | 0 | 0 0 | 0 | 0 | 1 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 455 | | 0 | 0 | 801 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 455 | | 0 | 0 | 801 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Added Vol: | 0 | 292 | | 13 | 0 | 45 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 125 |
| PasserByVol: | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Initial Fut: | 0 | 747 | | 13 | 0 | 846 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 125 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 786 | | 14 | 0 | 891 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 132 |
| Reduct Vol: | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 |
| Final Vol.: | 0 | 786 | | 14 | 0 | 891 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 132 |
| Critical Gap Module: | | | | | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | | 6.9 | | | |
| FollowUpTim: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | | 3.3 | | | |
| Capacity Module: | | | | | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | | 400 | | | |
| Potent Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | | 605 | | | |
| Move Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | | 605 | | | |
| Volume/Cap: | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | xxxx | | 0.22 | | | |
| Level Of Service Module: | | | | | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | | 0.8 | | | |
| Control Del: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | | 12.6 | | | |
| LOS by Move: | * | * | * | * | * | * | * | * | * | * | * | | B | | | |
| Movement: | LT - | LTR - | RT | LT - | LTR - | RT | LT - | LTR - | RT | LT - | LTR - | RT | | | | |
| Shared Cap.: | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | xxxx | xxxx | xxxxx | | | | |
| SharedQueue: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| Shrd ConDel: | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | xxxxx | xxxx | xxxxx | | | | |
| Shared LOS: | * | * | * | * | * | * | * | * | * | * | * | * | | | | |
| ApproachDel: | xxxxxx | | | xxxxxx | | | xxxxxx | | | 12.6 | | | | | | |
| ApproachLOS: | * | | | * | | | * | | | B | | | | | | |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Open as a Private Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #9 Garage Access -Center Owens

Cycle (sec): 60 Critical Vol./Cap.(X): 0.447
Loss Time (sec): 9 (Y+R=4.0 sec) Average Delay (sec/veh): 10.5
Optimal Cycle: 30 Level Of Service: B

| Approach: | North Bound | | | | South Bound | | | | East Bound | | | | West Bound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | - | T | - R | L | - | T | - R | L | - | T | - R | L | - | T | - R |
| Control: | Protected | | | | Protected | | | | Protected | | | | Protected | | | |
| Rights: | Include | | | | Include | | | | Include | | | | Include | | | |
| Min. Green: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Lanes: | 0 | 0 | 1 | 1 0 | 1 | 0 | 2 | 0 0 | 0 | 0 | 0 | 0 0 | 1 | 0 | 0 | 0 1 |
| Volume Module: | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 522 | 0 | | 0 | 801 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Growth Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| Initial Bse: | 0 | 522 | 0 | | 0 | 801 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Added Vol: | 0 | 169 | 20 | | 22 | 22 | 0 | | 0 | 0 | 0 | | 227 | 0 | 136 | |
| PasserByVol: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Initial Fut: | 0 | 691 | 20 | | 22 | 823 | 0 | | 0 | 0 | 0 | | 227 | 0 | 136 | |
| User Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| PHF Adj: | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | | 0.95 | 0.95 | 0.95 | |
| PHF Volume: | 0 | 727 | 21 | | 23 | 866 | 0 | | 0 | 0 | 0 | | 239 | 0 | 143 | |
| Reduct Vol: | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | |
| Reduced Vol: | 0 | 727 | 21 | | 23 | 866 | 0 | | 0 | 0 | 0 | | 239 | 0 | 143 | |
| PCE Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| MLF Adj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| Final Vol.: | 0 | 727 | 21 | | 23 | 866 | 0 | | 0 | 0 | 0 | | 239 | 0 | 143 | |
| Saturation Flow Module: | | | | | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | | 1900 | 1900 | 1900 | | 1900 | 1900 | 1900 | | 1900 | 1900 | 1900 | |
| Adjustment: | 1.00 | 0.93 | 0.93 | | 0.93 | 0.93 | 1.00 | | 1.00 | 1.00 | 1.00 | | 0.93 | 1.00 | 0.83 | |
| Lanes: | 0.00 | 1.94 | 0.06 | | 1.00 | 2.00 | 0.00 | | 0.00 | 0.00 | 0.00 | | 1.00 | 0.00 | 1.00 | |
| Final Sat.: | 0 | 3425 | 99 | | 1769 | 3538 | 0 | | 0 | 0 | 0 | | 1769 | 0 | 1583 | |
| Capacity Analysis Module: | | | | | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.21 | 0.21 | | 0.01 | 0.24 | 0.00 | | 0.00 | 0.00 | 0.00 | | 0.14 | 0.00 | 0.09 | |
| Crit Moves: | **** | | | | | **** | | | | | | | **** | | | |
| Green/Cycle: | 0.00 | 0.52 | 0.52 | | 0.03 | 0.55 | 0.00 | | 0.00 | 0.00 | 0.00 | | 0.30 | 0.00 | 0.30 | |
| Volume/Cap: | 0.00 | 0.41 | 0.41 | | 0.41 | 0.45 | 0.00 | | 0.00 | 0.00 | 0.00 | | 0.45 | 0.00 | 0.30 | |
| Delay/Veh: | 0.0 | 9.1 | 9.1 | | 33.3 | 8.3 | 0.0 | | 0.0 | 0.0 | 0.0 | | 17.5 | 0.0 | 16.4 | |
| User DelAdj: | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | |
| AdjDel/Veh: | 0.0 | 9.1 | 9.1 | | 33.3 | 8.3 | 0.0 | | 0.0 | 0.0 | 0.0 | | 17.5 | 0.0 | 16.4 | |
| LOS by Move: | A | A | A | | C | A | A | | A | A | A | | B | A | B | |
| HCM2kAvgQ: | 0 | 5 | 5 | | 1 | 5 | 0 | | 0 | 0 | 0 | | 4 | 0 | 2 | |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Open as a Private Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #10 Garage Access -South Owens

Average Delay (sec/veh): 1.6 Worst Case Level Of Service: C[ 15.1]

| Approach: | North Bound | | | | | South Bound | | | | | East Bound | | | | | West Bound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R | L | - | T | - | R |
| Control: | Uncontrolled | | | | | Uncontrolled | | | | | Stop Sign | | | | | Stop Sign | | | | |
| Rights: | Include | | | | | Include | | | | | Include | | | | | Include | | | | |
| Lanes: | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Volume Module: | | | | | | | | | | | | | | | | | | | | |
| Base Vol: | 0 | 522 | | 0 | | 0 | 921 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | |
| Growth Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| Initial Bse: | 0 | 522 | | 0 | | 0 | 921 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | |
| Added Vol: | 0 | 32 | | 10 | | 22 | 227 | | 0 | | 0 | 0 | | 0 | | 32 | 0 | | 156 | |
| PasserByVol: | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | |
| Initial Fut: | 0 | 554 | | 10 | | 22 | 1148 | | 0 | | 0 | 0 | | 0 | | 32 | 0 | | 156 | |
| User Adj: | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.00 | |
| PHF Adj: | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | | 0.95 | 0.95 | | 0.95 | |
| PHF Volume: | 0 | 583 | | 11 | | 23 | 1208 | | 0 | | 0 | 0 | | 0 | | 34 | 0 | | 164 | |
| Reduct Vol: | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | | 0 | 0 | | 0 | |
| Final Vol.: | 0 | 583 | | 11 | | 23 | 1208 | | 0 | | 0 | 0 | | 0 | | 34 | 0 | | 164 | |
| Critical Gap Module: | | | | | | | | | | | | | | | | | | | | |
| Critical Gp: | xxxxx | xxxx | | xxxxx | | 4.1 | xxxx | | xxxxx | | xxxxx | xxxx | | xxxxx | | 6.8 | xxxx | | 6.9 | |
| FollowUpTim: | xxxxx | xxxx | | xxxxx | | 2.2 | xxxx | | xxxxx | | xxxxx | xxxx | | xxxxx | | 3.5 | xxxx | | 3.3 | |
| Capacity Module: | | | | | | | | | | | | | | | | | | | | |
| Cnflict Vol: | xxxx | xxxx | | xxxxx | | 594 | xxxx | | xxxxx | | xxxx | xxxx | | xxxxx | | 1239 | xxxx | | 297 | |
| Potent Cap.: | xxxx | xxxx | | xxxxx | | 992 | xxxx | | xxxxx | | xxxx | xxxx | | xxxxx | | 170 | xxxx | | 705 | |
| Move Cap.: | xxxx | xxxx | | xxxxx | | 992 | xxxx | | xxxxx | | xxxx | xxxx | | xxxxx | | 167 | xxxx | | 705 | |
| Volume/Cap: | xxxx | xxxx | | xxxx | | 0.02 | xxxx | | xxxx | | xxxx | xxxx | | xxxx | | 0.20 | xxxx | | 0.23 | |
| Level Of Service Module: | | | | | | | | | | | | | | | | | | | | |
| 2Way95thQ: | xxxx | xxxx | | xxxxx | | 0.1 | xxxx | | xxxxx | | xxxx | xxxx | | xxxxx | | 0.7 | xxxx | | 0.9 | |
| Control Del: | xxxxx | xxxx | | xxxxx | | 8.7 | xxxx | | xxxxx | | xxxxx | xxxx | | xxxxx | | 31.8 | xxxx | | 11.6 | |
| LOS by Move: | * | * | | * | | A | * | | * | | * | * | | * | | D | * | | B | |
| Movement: | LT - | LTR - | | RT | | LT - | LTR - | | RT | | LT - | LTR - | | RT | | LT - | LTR - | | RT | |
| Shared Cap.: | xxxx | xxxx | | xxxxx | | xxxx | xxxx | | xxxxx | | xxxx | xxxx | | xxxxx | | xxxx | xxxx | | xxxxx | |
| SharedQueue: | xxxxx | xxxx | | xxxxx | | xxxxx | xxxx | | xxxxx | | xxxxx | xxxx | | xxxxx | | xxxxx | xxxx | | xxxxx | |
| Shrd ConDel: | xxxxx | xxxx | | xxxxx | | xxxxx | xxxx | | xxxxx | | xxxxx | xxxx | | xxxxx | | xxxxx | xxxx | | xxxxx | |
| Shared LOS: | * | * | | * | | * | * | | * | | * | * | | * | | * | * | | * | |
| ApproachDel: | xxxxxx | | | | | xxxxxx | | | | | xxxxxx | | | | | | 15.1 | | | |
| ApproachLOS: | * | | | | | * | | | | | * | | | | | | C | | | |

Note: Queue reported is the number of cars per lane.

UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Open as a Private Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #11 16th St / Mississippi St/7th St

Cycle (sec): 110 Critical Vol./Cap.(X): 0.855
Loss Time (sec): 9 (Y+R=5.0 sec) Average Delay (sec/veh): 47.1
Optimal Cycle: 87 Level Of Service: D

| Street Name: | Mississippi St/ 7th St | | | | | | 16th St | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Split Phase | | | Split Phase | | | Permitted | | | Permitted | | |
| Rights: | Include | | | Include | | | Include | | | Ovl | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 1 0 | 1 0 | 1 | 1 0 | 0 1 | 0 | 0 1 | 0 1 | 0 | 0 1 | 1 0 | 1 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 30 | 245 | 25 | 148 | 126 | 77 | 106 | 419 | 87 | 69 | 1274 | 495 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 30 | 245 | 25 | 148 | 126 | 77 | 106 | 419 | 87 | 69 | 1274 | 495 |
| Added Vol: | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 25 | 0 | 0 | 175 | 80 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 30 | 245 | 25 | 159 | 126 | 77 | 106 | 444 | 87 | 69 | 1449 | 575 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 32 | 258 | 26 | 167 | 133 | 81 | 112 | 467 | 92 | 73 | 1525 | 605 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 32 | 258 | 26 | 167 | 133 | 81 | 112 | 467 | 92 | 73 | 1525 | 605 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 32 | 258 | 26 | 167 | 133 | 81 | 112 | 467 | 92 | 73 | 1525 | 605 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 0.93 | 0.98 | 0.83 | 0.93 | 0.92 | 0.92 | 0.45 | 0.45 | 0.45 | 0.80 | 0.80 | 0.83 |
| Lanes: | 1.00 | 1.00 | 1.00 | 1.00 | 0.62 | 0.38 | 0.33 | 1.40 | 0.27 | 0.09 | 1.91 | 1.00 |
| Final Sat.: | 1769 | 1862 | 1583 | 1769 | 1090 | 666 | 288 | 1205 | 236 | 138 | 2904 | 1583 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.02 | 0.14 | 0.02 | 0.09 | 0.12 | 0.12 | 0.39 | 0.39 | 0.39 | 0.53 | 0.53 | 0.38 |
| Crit Moves: | | **** | | | **** | | | | | | **** | |
| Green/Cycle: | 0.21 | 0.21 | 0.21 | 0.18 | 0.18 | 0.18 | 0.53 | 0.53 | 0.53 | 0.49 | 0.49 | 0.67 |
| Volume/Cap: | 0.09 | 0.66 | 0.08 | 0.52 | 0.67 | 0.67 | 0.74 | 0.74 | 0.74 | 1.07 | 1.07 | 0.57 |
| Delay/Veh: | 35.1 | 44.2 | 35.1 | 42.2 | 47.3 | 47.3 | 23.2 | 23.2 | 23.2 | 72.5 | 72.5 | 10.3 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 35.1 | 44.2 | 35.1 | 42.2 | 47.3 | 47.3 | 23.2 | 23.2 | 23.2 | 72.5 | 72.5 | 10.3 |
| LOS by Move: | D | D | D | D | D | D | C | C | C | E | E | B |
| HCM2kAvgQ: | 1 | 9 | 1 | 6 | 8 | 8 | 11 | 11 | 11 | 40 | 40 | 11 |

Note: Queue reported is the number of cars per lane.





UCSF MEDICAL CENTER AT MISSION BAY - TRANSPORTATION STUDY
YEAR 2025 Fourth St. Open as a Private Roadway
Mitigated Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #12 7th and Mission Bay Drive

Cycle (sec): 110 Critical Vol./Cap.(X): 0.794
Loss Time (sec): 9 (Y+R=5.0 sec) Average Delay (sec/veh): 35.8
Optimal Cycle: 69 Level Of Service: D

| Approach: | North Bound | | | South Bound | | | East Bound | | | West Bound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement: | L - T - R | | | L - T - R | | | L - T - R | | | L - T - R | | |
| Control: | Protected | | | Protected | | | Protected | | | Protected | | |
| Rights: | Include | | | Include | | | Include | | | Include | | |
| Min. Green: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lanes: | 0 0 | 2 0 | 1 | 2 0 | 1 0 | 0 | 0 0 | 0 0 | 0 | 1 0 | 0 0 | 2 |
| Volume Module: | | | | | | | | | | | | |
| Base Vol: | 0 | 768 | 78 | 661 | 260 | 0 | 0 | 0 | 0 | 91 | 0 | 726 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 0 | 768 | 78 | 661 | 260 | 0 | 0 | 0 | 0 | 91 | 0 | 726 |
| Added Vol: | 0 | 80 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 0 | 848 | 78 | 661 | 271 | 0 | 0 | 0 | 0 | 91 | 0 | 726 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| PHF Volume: | 0 | 893 | 82 | 696 | 285 | 0 | 0 | 0 | 0 | 96 | 0 | 764 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced Vol: | 0 | 893 | 82 | 696 | 285 | 0 | 0 | 0 | 0 | 96 | 0 | 764 |
| PCE Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| MLF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Final Vol.: | 0 | 893 | 82 | 696 | 285 | 0 | 0 | 0 | 0 | 96 | 0 | 764 |
| Saturation Flow Module: | | | | | | | | | | | | |
| Sat/Lane: | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Adjustment: | 1.00 | 0.93 | 0.83 | 0.90 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 0.93 | 1.00 | 0.73 |
| Lanes: | 0.00 | 2.00 | 1.00 | 2.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 2.00 |
| Final Sat.: | 0 | 3538 | 1583 | 3432 | 1862 | 0 | 0 | 0 | 0 | 1769 | 0 | 2786 |
| Capacity Analysis Module: | | | | | | | | | | | | |
| Vol/Sat: | 0.00 | 0.25 | 0.05 | 0.20 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.27 |
| Crit Moves: | | **** | | **** | | | | | | | | **** |
| Green/Cycle: | 0.00 | 0.32 | 0.32 | 0.26 | 0.57 | 0.00 | 0.00 | 0.00 | 0.00 | 0.35 | 0.00 | 0.35 |
| Volume/Cap: | 0.00 | 0.79 | 0.16 | 0.79 | 0.27 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.00 | 0.79 |
| Delay/Veh: | 0.0 | 38.2 | 27.2 | 43.3 | 12.0 | 0.0 | 0.0 | 0.0 | 0.0 | 25.0 | 0.0 | 37.1 |
| User DelAdj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 0.0 | 38.2 | 27.2 | 43.3 | 12.0 | 0.0 | 0.0 | 0.0 | 0.0 | 25.0 | 0.0 | 37.1 |
| LOS by Move: | A | D | C | D | B | A | A | A | A | C | A | D |
| HCM2kAvgQ: | 0 | 16 | 2 | 13 | 5 | 0 | 0 | 0 | 0 | 2 | 0 | 15 |

Note: Queue reported is the number of cars per lane.

# Attachment 6
# SFMTA DEIR Comment Letter

Gavin Newsom | Mayor

Rev. Dr. James McCray Jr. | Chairman
Tom Nolan | Vice-Chairman
Cameron Beach | Director
Shirley Breyer Black | Director
Malcolm Heinicke | Director
Jerry Lee | Director
Bruce Oka | Director

Nathaniel P. Ford, Sr. | Executive Director/CEO

# MEMORANDUM

**TO:** **Michelle Schaefer, Environmental Coordinator, UCSF Campus Planning**
**Catherine Reilly, San Francisco Redevelopment Agency**

**FROM:** **Rana Ahmadi** RA.

**THROUGH:** **Jerry Robbins** JR

**SUBJECT:** **Comments on the Mission Bay Medical Center Draft EIR, State Clearing House No 2008012075**

**DATE:** **July 3, 2008**

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Thank you for the submittal of the Draft Environmental Impact Report (DEIR) for the UCSF Medical Center at Mission Bay dated April 2008. We have reviewed the DEIR and have the following comments:

Fourth Street Closure, Page 6-10: MTA is not prepared to support the closure of 4th Street, proposed as an additional alternative to the Medical Center at Mission Bay, at this time. As the EIR indicates, the closure of 4th Street would create several significant traffic impacts and require several mitigation measures to reduce these impacts to a less than significant level. These impacts would not occur under the Mission Bay South Plan as approved, which provides for through traffic on 4th Street. Although the mitigation measures proposed to eliminate the traffic impacts may reduce the intersection levels of service to acceptable levels, MTA is concerned about the proposed designs in light of various MTA policies. Therefore MTA would like to continue working with you, the Redevelopment Agency, and affected City agencies on design refinements to determine whether MTA could support implementation of such measures. Until MTA is satisfied that the design of such measures meets our various policies for vehicular and pedestrian movement and other design considerations, we want to reserve judgment on this alternative. In the meantime, we support keeping 4th Street open in order to eliminate the significant traffic impacts associated with this alternative.

To this end, MTA is available to work with UCSF to cooperatively design a pedestrian friendly open 4th Street to accommodate the large number of pedestrian crossings between the parking garage west of 4th Street and the medical facilities east of 4th Street.

Third Street Sidewalk: The DEIR proposes widening the western sidewalk of 3rd Street between 16th Street and Mariposa Street in conjunction with the closure of 4th Street. The existing sidewalk on 3rd Street is narrow and MTA supports and requests the widening of the sidewalk to 15 feet, with or without the 4th Street Close Alternative, with the development of the medical center. The widened sidewalk would also accommodate the large number of transit riders accessing the medical center from the Third Street stop at Mariposa. A widened sidewalk would also be consistent with the Better Street Plans policies

Incorporation of Mitigation Measures to LRDP Phase: Pages 4.6-28 and 6-18: There are a variety of mitigation measures noted in the DEIR to eliminate the significant traffic impacts in conjunction with the "4th Street Closed" alternative as shown on page 6-18 of the DEIR and the Future Phase Buildout Year 2025 as shown on page 4.6-28, Table 4.16-14. Page 4.6-12 of the DEIR notes that "UCSF would implement in the LRDP Phase traffic improvement measures that mirror the mitigation measures required for the 4th Street Closed to Through Traffic (No 4th Street) Alternative..." As stated above, MTA does not support the implementation of the mitigation measures associated with the 4th Street closure alternative as part of the LRDP Phase.

The list below identifies MTA observations about the proposed mitigation measures for the LRDP Phase and the 4th Street Closure Alternative:

LRDP Phase, Future 2025: Under the LRDP Phase the traffic on two intersections would be significantly impacted. Mitigation measures are proposed to eliminate the significant impacts on these two intersections:

1) *Owens Street and Center Garage Access*: This intersection would need mitigation with LRDP Phase, Future 2025 Buildout scenario. MTA finds the signalization of the intersection feasible if such signalization is necessary and funding is available to implement the design. MTA understands that UCSF would bear the financial responsibility for the signalization of the intersection when needed as noted on page 6-14 "the University would be obligated to mitigate the impact." MTA will work with the University on any agreements that may be necessary to ensure that this measure can and will be implemented.

2) *16th Street and Owens Street Intersection, Southbound.* The proposed street lane configuration for the southbound direction is proposed as part of the LRDP Phase, Future 2025 Buildout scenario. MTA finds this mitigation measure is feasible if the design configuration is necessary and funding is available to implement the design. The University will need to coordinate the details of signal phasing and other design configurations with the MTA. As with the previous mitigation measure, MTA will work with the University on any agreements that may be necessary to ensure that this measure can and will be implemented.

<u>4th Street Closed Alternative</u>:

In addition to the two impacts listed above, the 4th Street Closed Alternative would create four additional traffic impacts. Mitigation measures are proposed to eliminate the significant impacts on these four intersections:

1) *Mariposa and Third Street Intersection*: This intersection would need mitigation only with the "4th Street Closed" alternative. This measure would add a southbound right turn lane turn on 3rd Street, increasing the pedestrian crossing distance at the T-line stop. Heavy volumes of transit riders would have to cross Third Street to access the medical center.

2) *16th Street and Owens Street Intersection, North*bound: This intersection would need mitigation with the "4th Street Closed" alternative. The provision of two left turn lanes on the northbound approach is proposed in conjunction with the "4th Street Closed" alternative. This mitigation is not consistent with the Better Street Plans policies due to the increased pedestrian crossing distance on Owens Street and pedestrian safety concerns on 16th Street for double left-turn lanes on the west sidewalk of 16th Street.

3) *16th Street and Third Street Intersection*: This intersection would need mitigation only with the "4th Street Closed" alternative. MTA is concerned about the striping for this intersection and believes the current design needs additional work.

4) *Owens Street and South Garage Access*: This intersection would need mitigation with the "4th Street Closed" alternative. MTA finds this mitigation measure is feasible if the design configuration is necessary and funding is available to implement the design.

These mitigation measures need additional design refinement and input from the MTA before the MTA can affirmatively support such measures. As stated above,

the MTA does not recommend that the University move forward with the measures associated with the 4th Street closure Alternative at this time; however, we do look forward to working with the University and other affected governmental agencies to determine if design improvements will make such measure acceptable.

Transit Impact: The DEIR does not address transit impacts for Phase 1 and Phase 2. The project would create 4,663 additional daily transit trips of which 3,601 would be on Muni and the remainder on other transit systems, as shown on Table 4.6-10 on page 4.6-22 of the DEIR. The project would create a substantial amount of additional PM peak transit trips that would exceed Muni's capacity.

Providing the additional transit demand generated by the project would impose a serious financial burden on Muni's fiscal operations. Funding sources or other mechanism need to be identified to mitigate these impacts.

Street Design: The MTA has some additional comments about street design as shown in the EIR and will continue to work with the University on incorporating these concepts.

In general the design of the streets of the medical center is auto-oriented in contrast to the draft Better Streets Plan and the well established Transit First Policy in San Francisco. Please refer to the following website for the Better streets Plan and Transit First Policy information:

http://www.sfgov.org/site/uploadedfiles/planning/Citywide/Better_Streets/index.htm.

http://www.sfmta.com/cms/bcomm/3179.html

The design of streets should consider and be consistent with the character of San Francisco streets and incorporate the design elements proposed in the Better Streets Plan to create a more pedestrian friendly environment by:

Narrowing the streets or providing a median when streets cannot be narrowed. Installation of a median on Owens Street would create a shorter crossing distance for pedestrians.

Installation of bulbouts where the street lane configuration permits would shorten the crossing distance for pedestrians. Installation of a bulbout at the southeastern corner of Owens Street at Mariposa Street should be considered.

Creating tighter corner turning radii would force the cars to reduce their speeds and would create a safer pedestrian environment. This treatment should be considered in the design of all streets.

Providing landscaping and tree planting is encouraged as part of the overall des