UCI

FINAL

TIERED INITIAL STUDY &

MITIGATED NEGATIVE DECLARATION

East Campus Student Apartments Phase IV

May 2017

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1.1 Project Title

East Campus Student Apartments Phase IV

1.2 Lead Agency Name and Address

University of California, Irvine
Office of Environmental Planning and Sustainability
4199 Campus Drive, Suite 380, Irvine, CA 92697-2325

1.3 Contact Person and Phone Number

Richard Demerjian, Assistant Vice Chancellor
(949) 824-7058

1.4 Project Location

The University of California, Irvine (UCI) is located in the city of Irvine, Orange County, California approximately four miles inland from the Pacific Ocean (see Exhibit 1-1). The north project site is located in the East Campus of UCI with Campus Drive to the north, California Avenue to the west, Arroyo Drive to the south. The south project site is located in the East Campus with the Anteater Recreation Center (ARC) service road to the north and California Avenue to the west.

1.5 Custodian of the Administrative Record

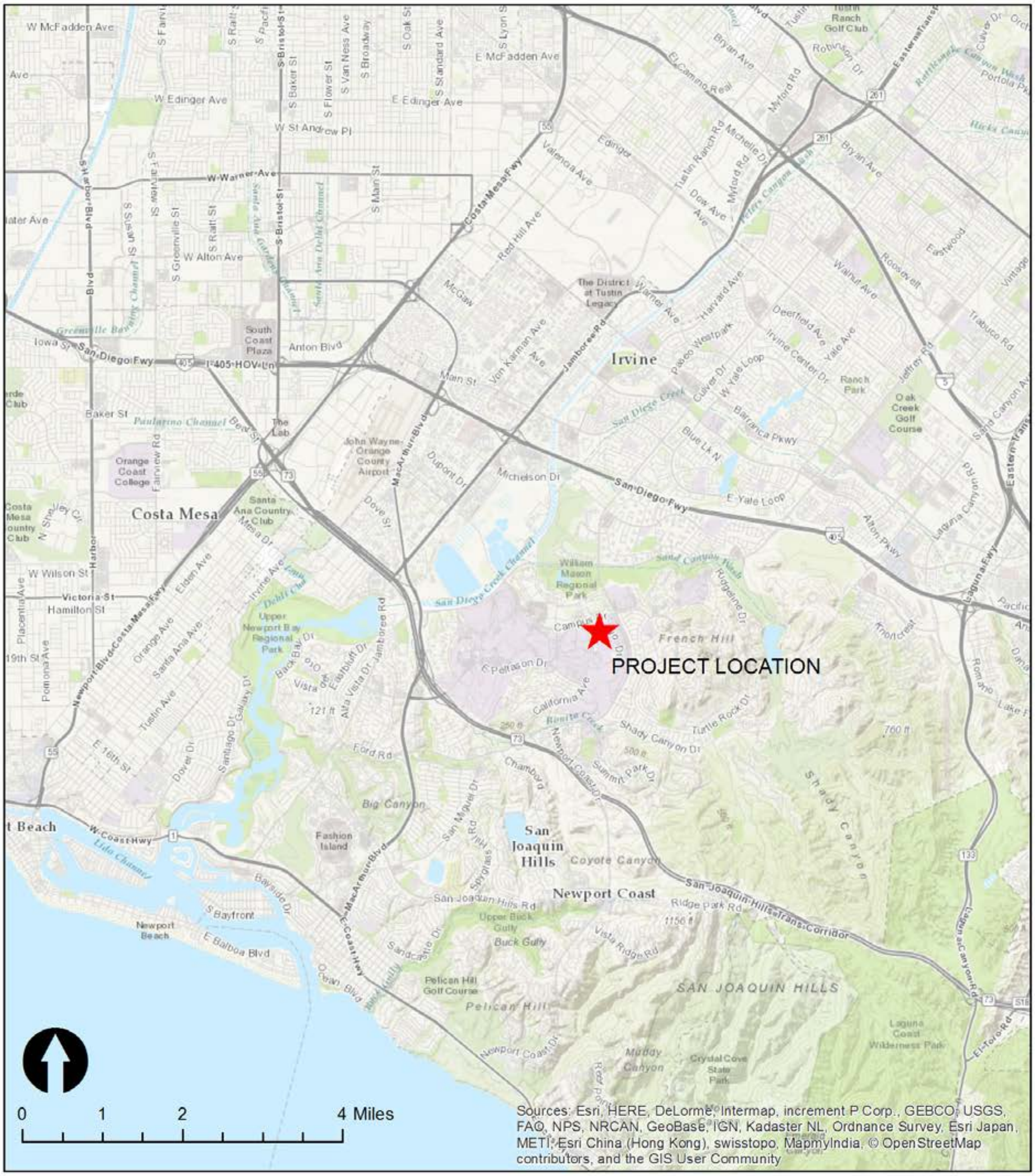
University of California, Irvine
Office of Environmental Planning and Sustainability
4199 Campus Drive, Suite 380, Irvine, CA 92697-2325

1.6 Documents Incorporated by Reference

The University of California, Irvine Long Range Development Plan (LRDP, UCI, 2007) is a comprehensive land use plan, based on projections through horizon year 2026, which guides campus growth. It provides policies and guidelines to support key academic and student life goals, identifies development objectives, delineates campus land uses, and estimates new building space needed to support project program expansion.

The Long Range Development Plan Environmental Impact Report (LRDP EIR, PBS&J, 2007) analyzes potential environmental impacts associated with the implementation of the 2007 LRDP pursuant to California Environmental Quality Act (CEQA) Guidelines Sections 15152 and 15168. This document is used to tier subsequent environmental analyses, including this Initial Study/Mitigated Negative Declaration (IS/MND), for campus development.

Exhibit 1-1
Regional Location



2.0 PROJECT DESCRIPTION

2.1 Environmental Setting and Surrounding Land Uses

The north project site, which includes the student apartments, support facilities, and parking structure of Phase IVa and all of Phase IVb, is located in the East Campus. Off-campus multi-family residential, Cambridge Court, lies to the north across Campus Drive; open space and Vista del Campo Norte student housing lie to the east; Puerta del Sol student housing and the Early Childhood Education Center lie to the west across California Avenue; and Arroyo Vista student housing lies to the south across Arroyo Drive. The existing on-site uses are two surface parking lots, AV-1 and CT, and undeveloped land used for construction staging (see Exhibits 2-1 and 2-3).

The south project site, which includes a surface parking lot and the extension of Arroyo Drive, is located south of the residential project site in the East Campus. The Anteater Recreation Center and playfields lie to the north and northeast of the project site across the service road, open space lies to the south and east, and Palo Verde student housing lies to the west across California Avenue. The existing on-site use is the tenant-operated nursery, Shadetree Partnership (see Exhibits 2-2 and 2-4).

2.2 Description of Project

The proposed project would serve demand for affordable student housing at UCI, moving the campus towards its Long Range Development Plan (LRDP) goal of providing housing for 50 percent of its student enrollment. Three previous phases of the East Campus Student Apartments on the UCI campus have been completed. Phase I (Vista Del Campo) opened in 2004 and consists of 488 units and 1,488 beds. Phase II (Vista Del Campo Norte) opened in 2006 and consists of 545 units and 1,564 beds. Thirdly, Phase III (Puerta Del Sol and Camino Del Sol) opened in 2008 and consists of 720 units with 2,111 beds. Phase IV would provide an additional 675 units and 2,450 beds in two Phases. As of Fall 2016, UCI provided a total of 14,000 on-campus student housing beds. UCI's 2007 LRDP established the goal of providing on-campus housing for 50 percent of its student enrollment. The current campus housing supply accommodates approximately 44 percent of enrollment. The Phase IVa project coupled with the previously approved Middle Earth residence hall expansion project, both anticipated to open in fall 2019, will result in UCI providing housing for 46 percent of the campus enrollment.

Phase IVa would demolish the existing 183-space Arroyo Vista 1 (AV-1) and 374-space California Temporary (CT) surface parking lots to construct an approximately 600,000-gross-square-foot (GSF) residential structure with a community center, recreational facilities, and open space on 9.2 acres of the north project site. The structure would include approximately 1,500 beds within 425 student apartments including bedrooms, kitchens/dining rooms, bathrooms, and living rooms. A long-term bicycle parking facility and five-story parking structure with 550 spaces would be constructed to the east of the residential facility accessible by driveways constructed at Campus and Arroyo Drives (see Exhibit 2-5). The proposed access driveway along Campus Drive is currently under review by the City of Irvine (City) due to its location on and adjacent to City property. If approved, an encroachment permit would be obtained from the City prior to construction.

Phase IVb would construct an approximately 400,000-GSF residential structure with 950 beds in 250 apartment units, a community center, recreational facilities, and open space east of the Phase IVa parking structure on the remaining 4.1 acres of the north project site.

On the south project site, the tenant-operated nursery would be removed to construct a 250-space surface parking lot ("South Parking Lot") and to extend existing Arroyo Drive to a stop-controlled intersection at California Avenue. The South Parking Lot and Arroyo Drive extension are not required to support the Phase IVa housing project and may not be constructed until after Phase IVa is completed. Sufficient parking supply would exist in the east campus at the completion of Phase IVa to serve Phase IVa parking needs and other UCI residential parking demand currently served by Parking Lot AV-1. Bus parking for the UCI shuttle system (Anteater Shuttle), currently housed in the CT parking lot, would be relocated to UCI Parking Lot 36 prior to Phase IVa construction.

Construction and operation of the proposed project would increase the amount of greenhouse gas emissions generated by the campus. However, as discussed further in Section 4.6, Greenhouse Gas Emissions, the project would not impede the campus' ability to reduce emissions as required by the Carbon Neutrality Initiative and Section A of the UC Sustainable Practices Policy. Per Section A, Green Building Design, of the UC Sustainable Practices Policy, the proposed project would meet or exceed Leadership in Energy and Environmental Design (LEED) Silver by incorporating measures that would result in significant energy savings, construction waste reduction, recycled material use, and water conservation. Such features would include an overall energy efficiency that exceeds California Title 24 criteria by at least 20 percent.

North Site (Phase IVa and Phase IVb)

The two residential building's exterior character, constructed during Phases IVa and IVb, would be compatible in architectural style and color to surrounding on-campus residential neighborhoods and surrounding off-campus residential communities. The buildings would be stepped, with a four-story elevation facing Campus Drive and the remainder of the building would be five stories. Building elevations would include variation of texture and color, which combined with the stepped building height, would enrich the architectural character of the building exterior (see Exhibits 2-6 and 2-7).

The four-and-five story buildings are configured to create a series of outdoor courtyards to provide active and passive recreation space to student residents. The courtyards are connected by a series of two-story breezeways to provide access and promote interaction for the residents living in the community. Phases IVa and IVb each include community center space in the first floor of the buildings to provide meeting, study, and activity spaces for residents, and would be located in high pedestrian traffic locations areas along Arroyo Drive. Outdoor recreational spaces would include a pool, seating and outdoor dining areas, barbecue areas, and green space for student use.

Exhibit 2-1
Project Location and Adjacent Land Uses – North Site (Phases IVa and IVb)

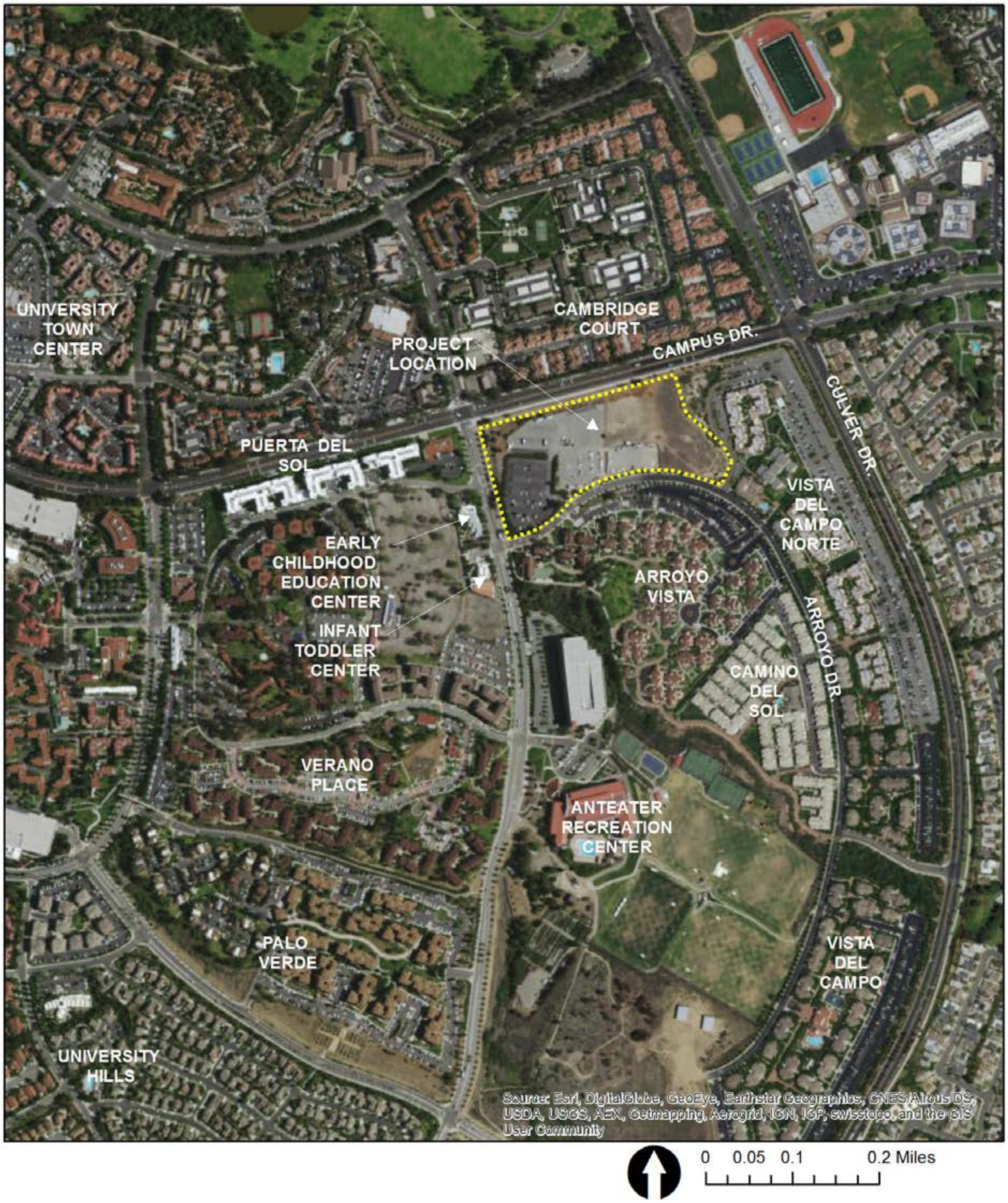
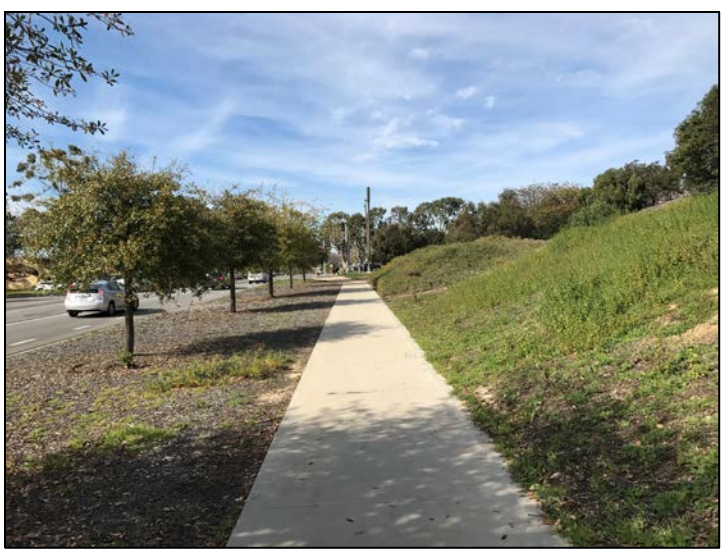


Exhibit 2-2
Project Location and Adjacent Land Uses – South Site

Exhibit 2-3
Existing Project Views, North Site (Phases IVa and IVb)

View 1: Southwest project site boundary looking north toward the on-site AV-1 surface parking lot.

View 2: Northern project site boundary looking northwest toward Campus Drive and California Avenue intersection.



View 3: Southwest corner of project site looking north toward Campus Drive and California Avenue intersection.

View 4: Northwest corner of project site looking south toward Arroyo Drive.

View 5: Southern area of project site looking south toward Arroyo Vista student housing.

View 6: Southern boundary of project site looking west along Arroyo Drive.

View 7: Center of project site looking west toward the on-site CT surface parking lot.

View 8: Southern area of project site looking northeast toward Campus Drive and Cambridge Court.

View 9: Center of project site looking west toward Vista del Campo Norte student apartments.

Exhibit 2-4
Existing Project Views, South Site

View 1: Western project boundary looking east toward the nursery.

View 2: End of Arroyo Drive looking west toward the Anteater Recreation Center and Palo Verde student housing.

View 3: North of project site looking north toward Anteater Recreation Center.

Exhibit 2-5
Conceptual Site Plan – North Site

Exhibit 2-6
Conceptual Perspective – North Site (Phases IVa and IVb)

View from Corner of Campus Drive

Exhibit 2-7
Conceptual Perspective – North Site (Phases IVa and IVb)

View along California Avenue

Exhibit 2-8
Conceptual Perspective – North Site (Phases IVa and IVb)

View of Parking Structure along Campus Drive

The parking structure would include a two-story, enclosed maintenance building that would front on Campus Drive. The remainder of the parking structure would be five stories with photovoltaic panels located on the roof (see Exhibit 2-8). An enclosed bicycle parking facility would be located in front of the parking structure adjacent to Arroyo Drive. The parking structure and bicycle parking facility would be consistent in architectural style and color with the surrounding residential structures. The stepped architecture of the parking/maintenance building, stepped configuration of the apartment buildings, and significant landscaping would provide a high-quality campus edge along Campus Drive where the project interfaces with the off-campus community.

Parking for the residential structures would be provided at 0.55 spaces per bed, based on current East Campus student apartment parking demand and UCI transportation demand management practices, which would be located in the 550-parking structure to be constructed in Phase IVa and in the nearby existing parking facilities with sufficient capacity (East Campus Parking Structure and Vista del Campo Norte surface lot). Displaced parking capacity resulting from Lot AV-1 demolition will also be accommodated in the East Campus Parking Structure. Bicycle parking is anticipated to be constructed at 0.75 spaces per bed throughout the project site.

Phases IVa and IVb also includes two community centers that would provide meeting and activity spaces for residents and would be located in high accessibility areas along Arroyo Drive. Other recreational facilities, such as a pool, barbecue areas, and green space would be provided for student use.

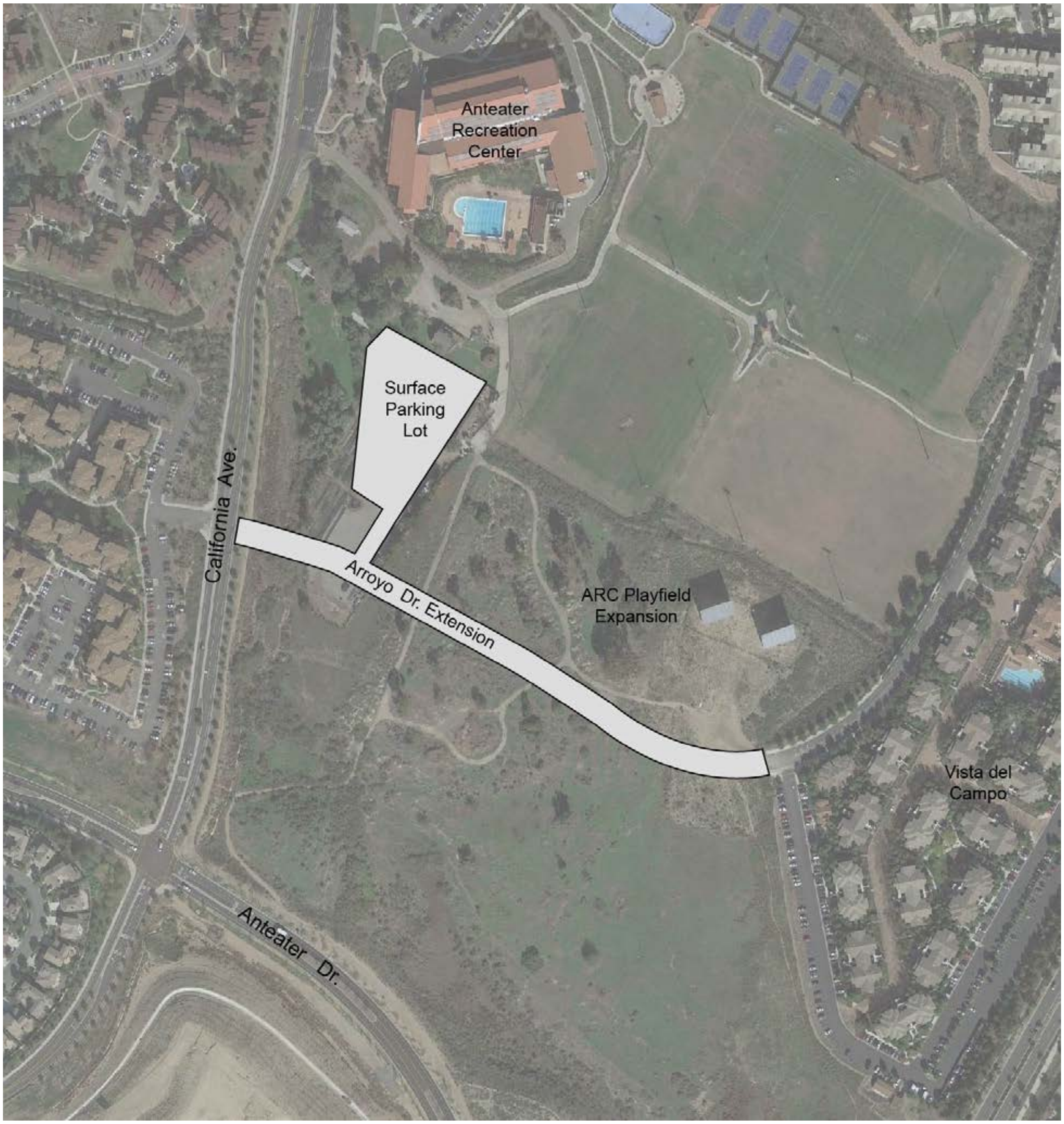
South Site

The south parking lot would be constructed of asphalt and would include installation of lighting for 24-hour use, landscaping, and drainage. The Arroyo Drive extension would continue the existing roadway and connect to California Avenue as a stop-controlled intersection. The roadway will cross wetland and riparian habitat which will require regulatory consultation and permits prior to construction. Potential impacts are addressed further in Section 4.3, Biological Resources. Access to the south parking lot would be either from the existing service road north of the project site or the Arroyo Drive extension (see Exhibit 2-9).

2.2.1 Project Phasing and Site Development

Phase IVa construction at the north project site is anticipated to begin August 2017 and would occur over 24 months with an anticipated opening in Fall 2019. Demolition would occur during the first four weeks to remove existing paving and lighting at the AV-1 and CT surface parking lots and on-site ornamental vegetation. Installation of utilities, mass excavation, and grading would take place in the six months following demolition. The estimated export of earthwork on the north project site is estimated at 63,000 cubic yards and would be transported to the south project site.

Exhibit 2-9
Conceptual Site Plan – South Site



The construction schedule of the south parking lot and Arroyo Drive extension are unknown at this time and may occur concurrent with, or following, Phase IVa. The Arroyo Drive extension would not begin grading until the appropriate regulatory approvals are obtained. Demolition at the south site would remove the tenant-operated Shadetree Nursery and existing vegetation.

The construction schedule for Phase IVb is unknown at this time; however, it would not start until after the completion of Phase IVa and is anticipated to take 20 months to complete. All demolition and grading would be completed during Phase IVa and is not included in the Phase IVb construction schedule. No pile driving or excavation of sedimentary rock other than topsoils would occur on either the north or south project sites.

Appropriate acoustical and visual buffers, as determined during the final design stage, would be utilized during construction to minimize potential project related aesthetic and/or noise impacts to existing sensitive receptors.

2.2.2 Access

Construction staging would occur on the north project site and east of the south project site near the current termination Arroyo Drive (a site used for construction staging for previous phases of East Campus Student Apartments). Site access and haul routes during construction would occur along Campus Drive to California Avenue to Arroyo Drive. For operation access at the north site, on-site pedestrian and bicycle pathways and the location of a shuttle service stop adjacent to the north project site would provide safe and convenient access to the Academic Core of the campus. Breezeways connecting the interiors of the residential structures would increase accessibility of the project site from north to south. Operational vehicle access would be at Arroyo and/or Campus Drives.

Operational access to the south parking lot would be from either Arroyo Drive or the service road north of the project site. The extension of Arroyo Drive would increase vehicular, bicycle, and shuttle connectivity of East Campus housing to the Academic Core.

2.2.3 Utilities

A finalized stormwater drainage plan would be completed during the final design phase; however, existing hydrology patterns on the site would be maintained to the extent practical as determined during the project's final design stage in compliance with the Regional Water Quality Control Board – Santa Ana Region (RWQCB) standards and the Storm Water Pollution Prevent Plan (SWPPP).

A finalized utility plan for electrical; domestic, sanitary sewer, fire, and irrigation water; telecommunication; and gas would be completed prior to construction. If any existing connections conflict with the project design, alternative and/or temporary utilities would be provided to all adjacent structures during relocation.

2.3 Consistency with the LRDP

The applicable land use plan is the 2007 LRDP and the University is the only agency with land use jurisdiction over projects located on the campus. The project sites are designated Mixed Use – Neighborhood in the 2007 LRDP, which allows for residential facilities for undergraduate and graduate students, recreation facilities, parking, and other residential support uses. All proposed uses are compliant with the land use designation. The project is consistent with the total overall on-campus student bed count analyzed in the 2007 LRDP EIR. Therefore, the proposed project is consistent with the 2007 LRDP.

2.4 Discretionary Approval Authority and Other Public Agencies Whose Approval Is Required

Lead Agency

University of California

As a public agency principally responsible for approving or carrying out the proposed project, the University of California is the Lead Agency under CEQA and is responsible for reviewing and certifying the adequacy of the environmental document and approving the proposed project. The Board of Regents of the University of California (The Regents) would consider design of Phase IVa and CEQA approval of the proposed project in May 2017. Phase IVb, although included in the CEQA approval, design would be approved by The Regents at a later time.

Responsible Agencies

Army Corps of Engineers

California Department of Fish and Wildlife

Regional Water Quality Control Board

3.0 DETERMINATION

On the basis of the initial study that follows:

	I find that the proposed project meets the criteria for the Section 15332 In-Fill Development Project Class 32 exemption and is CATEGORICALLY EXEMPT from the provisions of CEQA.
	I find that the proposed project WOULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
X	I find that although the proposed project could have a significant effect on the environment, the project impacts were adequately addressed in an earlier document or there will not be a significant effect in this case because revisions in the project have been made that will avoid or reduce any potential significant effects to a less than significant level. A MITIGATED NEGATIVE DECLARATION will be prepared.
	I find that the proposed project MAY have a significant effect on the environment. An ENVIRONMENTAL IMPACT REPORT will be prepared.

Signature | 5.1.17 Date

Printed Name | For

4.0 EVALUATION OF ENVIRONMENTAL IMPACTS

The University has defined the column headings in the Initial Study checklist as follows:

- **"Potentially Significant Impact"** is appropriate if there is substantial evidence that the project's effect may be significant. If there are one or more "Potentially Significant Impacts," a Project EIR will be prepared.
- **"Project Impact Adequately Addressed in LRDP EIR"** applies where the potential impacts of the proposed project were adequately addressed in the LRDP EIR and mitigation measures identified in the LRDP EIR will mitigate any impacts of the proposed project to the extent feasible. All applicable LRDP EIR mitigation measures are incorporated into the project as proposed. The impact analysis in this document summarizes and cross-references (including section/page numbers) the relevant analysis in the LRDP EIR.
- **"Less Than Significant with Project-level Mitigation Incorporated"** applies where the incorporation of project-specific mitigation measures will reduce an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." All project-level mitigation measures must be described, including a brief explanation of how the measures reduce the effect to a less than significant level.
- **"Less Than Significant Impact"** applies where the project will not result in any significant effects. The effects may or may not have been discussed in the LRDP EIR. The project impact is less than significant without the incorporation of LRDP or project-level mitigation.
- **"No Impact"** applies where a project would not result in any impact in the category or the category does not apply. Information is provided to show that the impact does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer may be based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project specific screening analysis).

4.1 Aesthetics

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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			

Discussion

Aesthetics issues are discussed in Section 4.1 of the 2007 LRDP EIR.

a) Scenic Vista: No Impact

There are no identified scenic vistas surrounding either the north or south project sites or anywhere else on campus (LRDP EIR, page 4.1-6). Furthermore, the project sites are surrounded by areas of the East Campus and the City of Irvine that have been previously developed with compatible uses consisting of academic buildings, recreational facilities, and student housing and is discussed further in 4.1-1(c) below. Therefore, the proposed project would not affect a scenic vista and no impact would occur. No mitigation is required.

b) Scenic Resources within a State Scenic Highway: No Impact

The California Scenic Highway Mapping System indicates that there are no Officially Designated State Scenic Highways located within proximity to the project site.[1] The closest Eligible State Scenic Highway – Not Officially Designated, Pacific Coast Highway, is located more than three miles southwest. Therefore, the proposed project would not affect scenic resources within a state highway and no impact would occur. No mitigation is required.

c) *Visual Character: Less than Significant Impact*

At the north project site, two surface parking lots would be demolished to construct two residential structures, two community centers, a parking structure with a maintenance facility, a bicycle parking facility, access roadways, and recreational space. All areas adjacent to the project site have been urbanized and built-out previously with four-story Vista del Campo Norte student housing to the east, three-story Arroyo Vista student housing to the south, four-story Puerta del Sol student housing to the west, and multi-family residential across Campus Drive in the City of Irvine.

The residential buildings would be stepped, with the four-story elevation facing Campus Drive and the remainder of the building at five stories. Building elevations would include variation of texture and color, which combined with the stepped building height, would prevent a monolithic effect to the structure. The building's exterior character, guided by the UCI Physical Design Framework, would be compatible in architectural style and color to surrounding on-campus residential neighborhoods and surrounding off-campus residential communities.

At the south project site, as an optional segment of the project, the tenant-operated nursery would be removed to extend the existing Arroyo Drive to intersect with California Avenue and construct a surface parking lot. The roadway extension would increase accessibility to the previous East Campus Student Apartment phases, and the surface lot would replace the spaces lost during the north project site demolition. Both uses are compatible with the East Campus area and the overall needs of the campus. Therefore, the proposed project would retain the visual character of the campus and impacts would be less than significant. No mitigation is required.

d) *Light or Glare: Project Impact Adequately Addressed in the LRDP EIR*

Both project sites would include outdoor lighting to provide safe levels of illumination for pedestrians, bicyclists, and motorists, such as exterior building mounted fixtures, street lighting, and lighting within the parking structure and surface lot to allow 24-hour access. Although both project sites have been previously developed, due to the project's higher density than the existing state, ambient lighting levels would increase. However, both project sites are located within moderately to highly urbanized areas of the East Campus and the increase in ambient lighting levels would be minimal. Furthermore, all outdoor surfaces would be designed in accordance with mitigation measure Aes-2A, and a lighting plan would be approved during pre-

[1] http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/index.htm. Accessed October 6, 2016.

construction in accordance with mitigation measure Aes-2B. Therefore, with implementation of LRDP EIR mitigation measures Aes-2A and Aes-2B, potential impacts due to the creation of light and glare would be reduced to a less than significant level.

Mitigation Measures

Aes-2A: Prior to project design approval for future projects that implement the 2007 LRDP, UCI shall ensure that the projects include design features to minimize glare impacts. These design features shall include use of non-reflective exterior surfaces and low-reflectance glass (e.g., double or triple glazing glass, high technology glass, low-E glass, or equivalent materials with low reflectivity) on all project surfaces that could produce glare.

Aes-2B: Prior to approval of construction documents for future projects that implement the 2007 LRDP, UCI shall approve an exterior lighting plan for each project. In accordance with UCI's Campus Standards and Design Criteria for outdoor lighting, the plan shall include, but not be limited to, the following design features:

- Full-cutoff lighting fixtures to direct lighting to the specific location intended for illumination (e.g., roads, walkways, or recreation fields) and to minimize stray light spillover into adjacent residential areas, sensitive biological habitat, and other light-sensitive receptors;
- Appropriate intensity of lighting to provide campus safety and security while minimizing light pollution and energy consumption; and
- Shielding direct lighting within parking areas, parking structures, or roadways away from adjacent residential areas, sensitive biological habitat, and other light-sensitive receptors through site configuration, grading, lighting design, or barriers such as earthen berms, walls, or landscaping.

4.2 Air Quality

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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		
d) Expose sensitive receptors to substantial pollutant concentrations?				X	
e) Create objectionable odors affecting a substantial number of people?				X	

Discussion

Air quality issues are discussed in Section 4.2 of the 2007 LRDP EIR. A project-specific Air

Quality Assessment was prepared by Michael Baker International, Inc. and is included as Appendix A.

a) Air Quality Management Plan Consistency: No Impact

On March 3, 2017, the South Coast Air Quality Management District (SCAQMD) Governing Board approved the 2016 Air Quality Management Plan (AQMP), which outlines its strategies for meeting the National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$ and ozone. According to the SCAQMD CEQA Air Quality Handbook, in order to determine consistency with the AQMP, two main criteria must be addressed.

Criterion 1:

With respect to the first criterion, SCAQMD methodologies require that an air quality analysis for a project include forecasts of project emissions in relation to contributing to air quality violations and delay of attainment.

- Would the project result in an increase in the frequency or severity of existing air quality violations?

Since the consistency criteria identified under the first criterion pertain to pollutant concentrations, rather than to total regional emissions, an analysis of a project's pollutant emissions relative to localized pollutant concentrations is used as the basis for evaluating project consistency. As discussed in 4.2(d) below, localized concentrations of CO, NO_X, PM_{10}, and $PM_{2.5}$ would be less than significant during project operations. Therefore, the proposed project would not result in an increase in the frequency or severity of existing air quality violations. Because reactive organic gases (ROGs) are not a criteria pollutant, there is no ambient standard or localized threshold for ROGs. Due to the role ROG plays in ozone formation, it is classified as a precursor pollutant and only a regional emissions threshold has been established.

- Would the project cause or contribute to new air quality violations?

As discussed in 4.2(b) below, operations of the proposed project would result in emissions that would be below the SCAQMD operational thresholds. Therefore, the proposed project would not have the potential to cause or affect a violation of the ambient air quality standards.

- Would the project delay timely attainment of air quality standards or the interim emissions reductions specified in the AQMP?

The proposed project would result in less than significant impacts with regard to localized concentrations during project operations. Therefore, the proposed project would not delay the timely attainment of air quality standards or 2016 AQMP emissions reductions.

Criterion 2:

With respect to the second criterion for determining consistency with SCAQMD and Southern California Association of Governments (SCAG) air quality policies, it is important to recognize that air quality planning within the Basin focuses on attainment of ambient air quality standards at the earliest feasible date. Projections for achieving air quality goals are based on assumptions regarding population, housing, and growth trends. Thus, the SCAQMD's second criterion for determining project consistency focuses on whether or not the proposed project exceeds the assumptions utilized in preparing the forecasts presented in the 2016 AQMP. Determining whether or not a project exceeds the assumptions reflected in the 2016 AQMP involves the evaluation of the three criteria outlined below.

- Would the project be consistent with the population, housing, and employment growth projections utilized in the preparation of the AQMP?

In the case of the 2016 AQMP, several sources of data form the basis for the projections of air pollutant emissions including: the City of Irvine General Plan (General Plan), UCI's 2007 Long Range Development Plan (LRDP), SCAG's Growth Management Chapter of the Regional Comprehensive Plan (RCP), and SCAG's 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). The RTP/SCS also provides socioeconomic forecast projections of regional population growth. The General Plan Land Use Map designates the project site as "Educational Facilities", and the LRDP designates the site as Mixed Use - Neighborhood. According to the LRDP, the Student Housing designation permits residential facilities intended to accommodate single undergraduate and graduate students, student groups (including fraternities, sororities, and academically-themed collectives), students with families, and other University affiliates. Other permitted uses include residential parking, child care and pre-school facilities, recreation facilities, meeting and classroom space, food service and retail, and other residential support uses. The project proposes to construct two residential structures ranging from one to five stories and totaling 1,000,000 GSF. The project would provide student housing and community facilities for UCI students, and therefore complies with the site's intended use. Additionally, the project would be consistent with the City's General Plan and UCI's LRDP and assumed emissions for the project site, since no change in the site's land use designation is proposed. Thus, the project is generally consistent with the types, intensity, and patterns of land use envisioned for the site vicinity in the RCP. The population, housing, and employment forecasts, which are adopted by SCAG's Regional Council, are based on the local plans and policies applicable to the cities; these are used by SCAG in all phases of implementation and review. Additionally, as SCAQMD incorporated these same projections into the 2016 AQMP, it can be concluded that the project would be consistent with the projections. As a result, the project would not exceed growth assumptions within the City's General Plan. Therefore, the project would be consistent with the 2016 AQMP and a less than significant impact would occur.

- Would the project implement all feasible air quality mitigation measures?

Compliance with all feasible emission reduction measures identified by the SCAQMD would be required as identified in 4.2(b) and 4.2(c) below. As such, the proposed project would meet this AQMP consistency criterion.

- Would the project be consistent with the land use planning strategies set forth in the AQMP?

The project is consistent with the LRDP land use designations for the site, and would serve to implement various LRDP policies. Compliance with emission reduction measures identified by the SCAQMD would be required as identified in 4.2(b) and 4.2(c) below. As such, the proposed project meets this AQMP consistency criterion.

In conclusion, the determination of 2016 AQMP consistency is primarily concerned with the long-term influence of a project on air quality in the Basin. The proposed project would not result in a long-term impact on the region's ability to meet State and federal air quality standards. Also, the proposed project would be consistent with the goals and policies of the AQMP for control of fugitive dust. As discussed above, the proposed project's long-term influence would also be consistent with the SCAQMD and SCAG's goals and policies and is, therefore, considered consistent with the 2016 AQMP and no impact would occur. No mitigation is required.

b) Air Quality Standards: Less Than Significant Impact with Project-level Mitigation Incorporated

Short-Term Construction

Short-term air quality impacts are predicted to occur during grading and construction operations associated with implementation of the proposed project. Temporary air emissions would result from the following activities:

- Particulate (fugitive dust) emissions from grading and building construction; and
- Exhaust emissions from the construction equipment and the motor vehicles of the construction crew.

Construction Phase IVa proposes to develop a 600,000 GSF residential structure; a northern site 550-space parking structure and adjoining maintenance shop; and a southern site 250-space surface parking lot with an adjoining Arroyo Drive roadway extension. Phase IVb of construction would consist of the development of a 400,000 GSF residential structure. Construction would involve activities associated with demolition of the paved area, site preparation, grading, building construction, paving and architectural coating. Site grading would require approximately 75,000 cubic yards of soil export off-site and 14,000 cubic yards of fill. Project construction equipment would include excavators, graders, dozers, scrapers, and tractors/loaders/backhoes during grading; rough terrain forklifts, cranes, tractors/loaders/backhoes, and welders during building construction; pavers, paving equipment, and rollers during paving; and air compressors during architectural coating. Emissions for each construction phase have been quantified based upon the phase durations and equipment types. The analysis of daily construction emissions has been prepared utilizing the California Emissions Estimator Model (CalEEMod) version 2016.3.1. Table 4.2-1, Short-Term (Construction) Emissions, presents the anticipated daily short-term construction emissions.

Table 4.2-1
Short-Term (Construction) Emissions

Emissions Source	Pollutant (pounds/day) [1, 2]					
	ROG[3]	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
2017						
Unmitigated Emissions	6.06	75.75	41.33	0.07	9.53	6.24
Mitigated Emissions	6.06	75.75	41.33	0.07	5.97	4.33
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Is Threshold Exceeded After Mitigation?	***No***	***No***	***No***	***No***	***No***	***No***
2018						
Unmitigated Emissions	9.64	67.10	68.87	0.21	16.58	5.84
Mitigated Emissions	9.64	67.10	68.87	0.21	16.58	5.63
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Is Threshold Exceeded After Mitigation?	***No***	***No***	***No***	***No***	***No***	***No***
2019						
Unmitigated Emissions	51.22	48.40	63.85	0.21	16.35	5.41
Mitigated Emissions	51.22	48.40	63.85	0.21	16.35	5.41
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Is Threshold Exceeded After Mitigation?	***No***	***No***	***No***	***No***	***No***	***No***
2020						
Unmitigated Emissions	51.12	33.68	46.59	0.14	11.17	3.89
Mitigated Emissions	51.12	33.68	46.59	0.14	11.17	3.89
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Is Threshold Exceeded After Mitigation?	***No***	***No***	***No***	***No***	***No***	***No***
2021						
Unmitigated Emissions	44.27	30.48	44.25	0.14	10.96	3.69
Mitigated Emissions	44.27	30.48	44.25	0.14	10.96	3.69
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Is Threshold Exceeded After Mitigation?	***No***	***No***	***No***	***No***	***No***	***No***

Notes:
1. Emissions were calculated using CalEEMod, as recommended by the SCAQMD.
2. The reduction/credits for construction emission mitigations are based on mitigation included in CalEEMod and as typically required by the SCAQMD. The mitigation includes the following: properly maintain mobile and other construction equipment; replace ground cover in disturbed areas quickly; water exposed surfaces three times daily; cover stock piles with tarps; water all haul roads twice daily; and limit speeds on unpaved roads to 15 miles per hour.

3. Both ROGs and VOCs are subsets of organic gases that are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels. Although they represent slightly different subsets of organic gases, they are used interchangeably for the purposes of this analysis.

Fugitive Dust Emissions

Construction activities are a source of fugitive dust (PM_{10} and $PM_{2.5}$) emissions that may have a substantial, temporary impact on local air quality. In addition, fugitive dust may be a nuisance to those living and working in the project area. Fugitive dust emissions are associated with land clearing, ground excavation, cut-and-fill, and truck travel on unpaved roadways (including demolition as well as construction activities). Fugitive dust emissions vary substantially from day to day, depending on the level of activity, specific operations, and weather conditions. Fugitive dust from grading and construction is expected to be short-term and would cease upon project completion. Additionally, most of this material is inert silicates, rather than the complex organic particulates released from combustion sources, which are more harmful to health.

Dust (larger than 10 microns) generated by such activities usually becomes more of a local nuisance than a serious health problem. Of particular health concern is the amount of PM_{10} (particulate matter smaller than 10 microns) generated as a part of fugitive dust emissions. PM_{10} poses a serious health hazard alone or in combination with other pollutants. Fine Particulate Matter ($PM_{2.5}$) is mostly produced by mechanical processes. These include automobile tire wear, industrial processes such as cutting and grinding, and re-suspension of particles from the ground or road surfaces by wind and human activities such as construction or agriculture. $PM_{2.5}$ is mostly derived from combustion sources, such as automobiles, trucks, and other vehicle exhaust, as well as from stationary sources. These particles are either directly emitted or are formed in the atmosphere from the combustion of gases such as NO_X and SO_X combining with ammonia. $PM_{2.5}$ components from material in the earth's crust, such as dust, are also present, with the amount varying in different locations.

Mitigation Measure AQ-1 would require the project contractor to implement construction emissions Best Management Practices (BMPs) during construction, including, but not limited to, dust control techniques (i.e., daily watering), a traffic management plan, and adherence to SCAQMD Rules 402 and 403 (which require watering of inactive and perimeter areas, track out requirements, etc.), to reduce PM_{10} and $PM_{2.5}$ concentrations. These are standard dust control measures that the SCAQMD requires for all projects. As indicated in Table 4.2-1, total PM_{10} and $PM_{2.5}$ emissions would be below the SCAQMD threshold with the implementation of project-specific mitigation measure AQ-1. Therefore, particulate matter impacts during construction would be reduced to a less than significant level.

ROG Emissions

In addition to gaseous and particulate emissions, the application of asphalt and surface coatings creates ROG emissions, which are O_3 precursors. In accordance with the methodology prescribed by the SCAQMD, the ROG emissions associated with paving have been quantified with CalEEMod. Architectural coatings were also quantified with CalEEMod based upon the size of the buildings.

The highest concentration of ROG emissions would be generated during the application of architectural coatings on the building. As required by law, all architectural coatings for the proposed project structures would comply with SCAQMD Regulation XI, Rule 1113 – Architectural Coating. Rule 1113 provides specifications on painting practices as well as regulates the ROG content of paint. As shown in Table 4.2-1, project construction would not result in an exceedance of ROG emissions during any years of construction. Therefore, impacts would be less than significant.

Construction Equipment and Worker Vehicle Exhaust

Exhaust emissions from construction activities include emissions associated with the transport of machinery and supplies to and from the project site, emissions produced on-site as the equipment is used, and emissions from trucks transporting materials to and from the site. Standard SCAQMD regulations, such as maintaining all construction equipment in proper tune, shutting down equipment when not in use for extended periods of time, and implementing SCAQMD Rule 403 would be adhered to. As noted in Table 4.2-1, construction equipment exhaust would not exceed SCAQMD thresholds. Therefore, impacts are less than significant.

Naturally Occurring Asbestos

Asbestos is a term used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California. Asbestos is classified as a known human carcinogen by State, Federal, and international agencies and was identified as a toxic air contaminant by the California Air Resources Board in 1986.

Asbestos can be released from serpentinite and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. These rocks have been commonly used for unpaved gravel roads, landscaping, fill projects, and other improvement projects in some localities. Asbestos may be released to the atmosphere due to vehicular traffic on unpaved roads, during grading for development projects, and at quarry operations. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed. According to the Department of Conservation Division of Mines and Geology, A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos Report (August 2000), serpentinite and ultramafic rocks are not known to occur within the project area. There, there would be no impact.

Construction Odors

Potential odors could arise from the diesel construction equipment used on-site, as well as from architectural coatings and asphalt off-gassing. Odors generated from the referenced sources are common in the man-made environment and are not known to be substantially offensive to adjacent receptors. Additionally, odors generated during construction activities would be temporary and would decrease rapidly. Therefore, construction odors are not considered to be a significant impact.

Total Daily Construction Emissions

In accordance with the SCAQMD Guidelines, CalEEMod was utilized to model construction emissions for ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$. Construction Phase IVa and Phase IVb would span 44 months. Phase IVa construction would start in August of 2017 and be completed in 24 months; Phase IVb construction would start after the completion of Phase 4a, in fall of 2019 at the earliest, and be completed in 20 months. The greatest emissions would be generated during the initial stages of construction. Additionally, the greatest amount of ROG emissions would typically occur during the final stages of development due to the application of architectural coatings.

CalEEMod allows the user to input mitigation measures such as watering the construction area to limit fugitive dust. Mitigation measures that were input into CalEEMod allow for certain reduction credits and result in a decrease of pollutant emissions. Reduction credits are based upon studies developed by CARB, SCAQMD, and other air quality management districts throughout California, and were programmed within CalEEMod. As depicted in Table 4.2-1, construction emissions would be less than significant with implementation of project-specific mitigation measure AQ-1. There, impacts due to construction related air emissions would be reduced to a less than significant level.

Long-Term Operational Emissions

Mobile Source Emissions

Mobile sources are emissions from motor vehicles, including tailpipe and evaporative emissions. Depending upon the pollutant being discussed, the potential air quality impact may be of either regional or local concern. For example, ROG, NO_X, SO_X, PM_{10}, and $PM_{2.5}$ are all pollutants of regional concern (NO_X and ROG react with sunlight to form O_3 [photochemical smog], and wind currents readily transport SO_X, PM_{10}, and $PM_{2.5}$). However, CO tends to be a localized pollutant, dispersing rapidly at the source.

Project-generated vehicle emissions have been estimated using CalEEMod. Trip generation rates associated with the project were based on traffic data within the *UCI East Campus Student Apartments Phase 4 Traffic Study* (Traffic Study) for the proposed project, prepared by Stantec Consulting Services (dated March 2017). The proposed project would result in approximately 2,310 new daily trips. Table 4.2-2, *Long-Term Air Emissions*, presents the anticipated mobile source emissions. As shown in Table 4.2-2, mitigated emissions generated by vehicle traffic associated with the proposed project would not exceed established SCAQMD regional thresholds.

Table 4.2-2
Long-Term Air Emissions

Source	Estimated Emissions (pounds/day)[1]					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Area Sources	28.24	2.35	203.21	0.01	1.11	1.11
Energy Sources	0.69	5.91	2.51	0.04	0.48	0.48
Mobile Sources	3.20	11.00	29.90	0.08	7.11	1.97
Total Emissions	32.14	19.27	235.63	0.13	8.70	3.56
SCAQMD Threshold	*55*	*55*	*550*	*150*	*150*	*55*
Is Threshold Exceeded? (Significant Impact)	**No**	**No**	**No**	**No**	**No**	**No**

Area Source Emissions

Area source emissions would be generated due to an increased demand for consumer products, architectural coating, and landscaping. The proposed project would not include wood burning fireplaces or other devices per SCAQMD Rule 445 (Wood Burning Devices). As shown in Table 4.2-2, mitigated area source emissions from the proposed project would not exceed SCAQMD thresholds for ROG, NO_X, CO, SO_X, PM_{10}, or $PM_{2.5}$.

Energy Source Emissions

Energy source emissions would be generated as a result of electricity and natural gas (non-hearth) usage associated with the proposed project. The primary use of electricity and natural gas by the project would be for space heating and cooling, water heating, ventilation, lighting, appliances, and electronics. As shown in Table 4.2-2, mitigated energy source emissions from the proposed project would not exceed SCAQMD thresholds for ROG, NO_X, CO, SO_X, PM_{10}, or $PM_{2.5}$.

As indicated in Table 4.2-2, mitigated operational emissions from the proposed project would not exceed SCAQMD thresholds. If stationary sources, such as backup generators, are installed on-site, they would be required to obtain the applicable permits from SCAQMD for operation of such equipment. The SCAQMD is responsible for issuing permits for the operation of stationary sources in order to reduce air pollution, and to attain and maintain the national and California ambient air quality standards in the Basin. Backup generators would be used only in emergency situations, and would not contribute a substantial amount of emissions capable of exceeding SCAQMD thresholds. Thus, operational air quality impacts would be less than significant.

c) Cumulatively Considerable Net Increase of Any Criteria Pollutants: Less Than Significant Impact with Project-level Mitigation Incorporated

With respect to the proposed project's construction-related air quality emissions and cumulative Basin-wide conditions, the SCAQMD has developed strategies to reduce criteria pollutant emissions outlined in the 2016 AQMP pursuant to Federal Clean Air Act mandates. As such, the proposed project would comply with SCAQMD Rule 403 requirements, and implement all feasible mitigation measures (Mitigation Measure AQ-1). Rule 403 requires that fugitive dust be controlled with the best available control measures in order to reduce dust so that it does not remain visible in the atmosphere beyond the property line of the proposed project. In addition, the proposed project would comply with adopted 2016 AQMP emissions control measures. Per SCAQMD rules and mandates, as well as the CEQA requirement that significant impacts be mitigated to the extent feasible, these same requirements (i.e., Rule 403 compliance, the implementation of all feasible mitigation measures, and compliance with adopted AQMP emissions control measures) would also be imposed on construction projects throughout the Basin, which would include related projects.

As discussed previously, the proposed project would not result in long-term air quality impacts, as emissions would not exceed the SCAQMD adopted operational thresholds. Additionally, adherence to SCAQMD rules and regulations would alleviate potential impacts related to cumulative conditions on a project-by-project basis. Emission reduction technology, strategies, and plans are constantly being developed. As a result, the proposed project would not contribute a cumulatively considerable net increase of any nonattainment criteria pollutant. Therefore, cumulative operational impacts associated with implementation of the proposed project would be less than significant.

d) Sensitive Receptors: Less Than Significant Impact

Sensitive receptors are defined as facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers. CARB has identified the following groups of individuals as the most likely to be affected by air pollution: the elderly over 65, children under 14, athletes, and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis.

On-campus sensitive receptors near the project site include surrounding residences adjacent to the north, east, and south of the project site. In order to identify impacts to sensitive receptors, the SCAQMD recommends addressing localized significance thresholds (LSTs) for construction and operations impacts (area sources only). The CO hotspot analysis following the LST analysis addresses localized mobile source impacts.

Localized Significance Thresholds (LST)

LSTs were developed in response to SCAQMD Governing Boards' Environmental Justice Enhancement Initiative (I-4). The SCAQMD provided the Final Localized Significance Threshold Methodology (dated June 2003 [revised 2008]) for guidance. The LST methodology assists lead agencies in analyzing localized air quality impacts. The SCAQMD provides the LST screening lookup tables for one, two, and five acre projects emitting CO, NO_X, $PM_{2.5}$, or PM_{10}. The LST methodology and associated mass rates are not designed to evaluate localized impacts from mobile sources traveling over the roadways. The SCAQMD recommends that any project over five acres should perform air quality dispersion modeling to assess impacts to nearby sensitive receptors. The project is located within Source Receptor Area (SRA) 20, Central Orange County Coastal.

Construction

The SCAQMD guidance on applying CalEEMod to LSTs specifies the amount of acres a particular piece of equipment would likely disturb per day. Based on the SCAQMD guidance on applying CalEEMod to LSTs, the project would disturb at most four acres of land per day. However, the AQMD provides thresholds for one, two, and five acre sites. Therefore, the LST thresholds for two acres was conservatively utilized for the construction LST analysis. The closest sensitive receptors to the project site are residential uses that adjoin the project site to the north, east, and south. These sensitive land uses may be potentially affected by air pollutant emissions generated during on-site construction activities. LST thresholds are provided for distances to sensitive receptors of 25, 50, 100, 200, and 500 meters. As the nearest sensitive uses adjoin the project site, the lowest available LST values for 25 meters were used. Table 4.2-3, Localized Significance of Construction Emissions, shows the localized unmitigated and mitigated construction-related emissions. It is noted that the localized emissions presented in Table 4.2-3 are less than those in Table 4.2-1 because localized emissions include only on-site emissions (i.e., from construction equipment and fugitive dust), and do not include off-site emissions (i.e., from hauling activities). As seen in Table 4.2-3, mitigated on-site emissions would not exceed the LSTs for SRA 20.

Operations

For project operations, the five acre threshold was conservatively utilized, as the project site is approximately 13.3 acres. As the nearest sensitive uses are adjacent to the project site, the most conservative LST values for 25 meters were used. As seen in Table 8, *Localized Significance of Operational Emissions*, project-related mitigated operational area source emissions would be negligible and would be below the LSTs. The mitigated area source emissions presented in Table 8 were derived from the CalEEMod, and include the following proposed project features that would reduce operational area emissions: use low VOC paint and low VOC cleaning supplies, and no hearth. As such, operational LST impacts would be less than significant in this regard.

Carbon Monoxide Hotspots

Intersection Hotspots

CO emissions are a function of vehicle idling time, meteorological conditions, and traffic flow. Under certain extreme meteorological conditions, CO concentrations near a congested roadway or intersection may reach unhealthful levels (i.e., adversely affecting residents, school children, hospital patients, the elderly, etc.).

Table 4.2-3
Localized Significance of Construction Emissions

Source	Pollutant (pounds/day)[1]			
	NO_X	CO	PM_{10}	$PM_{2.5}$
2017				
Total Unmitigated On-Site Emissions[2,3]	67.94	38.78	9.28	6.16
Total Mitigated On-Site Emissions[2,3]	67.94	38.78	5.73	4.25
Localized Significance Threshold[1]	131	945	7	5
Thresholds Exceeded?	***No***	***No***	***No***	***No***
2018				
Total Unmitigated On-Site Emissions[4]	59.52	35.09	8.84	5.76
Total Mitigated On-Site Emissions[4]	59.52	35.09	5.29	3.85
Localized Significance Threshold[1]	131	945	7	5
Thresholds Exceeded?	***No***	***No***	***No***	***No***
2019				
Total Unmitigated On-Site Emissions[4]	21.08	17.16	1.29	1.21
Total Mitigated On-Site Emissions[4]	21.08	17.16	1.29	1.21
Localized Significance Threshold[1]	131	945	7	5
Thresholds Exceeded?	***No***	***No***	***No***	***No***
2020				
Total Unmitigated On-Site Emissions[4]	19.19	16.85	1.12	1.05
Total Mitigated On-Site Emissions[4]	19.19	16.85	1.12	1.05
Localized Significance Threshold[1]	131	945	7	5
Thresholds Exceeded?	***No***	***No***	***No***	***No***
2021				
Total Unmitigated On-Site Emissions[4]	17.43	16.58	0.96	0.90
Total Mitigated On-Site Emissions[4]	17.43	16.58	0.96	0.90
Localized Significance Threshold[1]	131	945	7	5
Thresholds Exceeded?	***No***	***No***	***No***	***No***

Notes:
1. The Localized Significance Threshold was determined using Appendix C of the SCAQMD Final Localized Significant Threshold Methodology guidance document for pollutants NO_X, CO, PM_{10}, and $PM_{2.5}$. The Localized Significance Threshold was based on the anticipated daily acreage disturbance for construction, the distance to sensitive receptors, and the source receptor area (SRA 20).
2. The Demolition Phase represents the worst case scenario for NO_X and CO.
3. The Grading Phase represents the worst case scenario for PM_{10}, and $PM_{2.5}$.
4. The Building Construction Phase represents the worst case scenario for NO_x, CO, PM_{10}, and $PM_{2.5}$.

Table 4.2-4
Localized Significance of Operational Emissions

Source	Pollutant (pounds/day)			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Total Unmitigated Area Source Emissions	32.56	887.27	115.26	115.26
Total Mitigated Area Source Emissions[1]	1.44	124.44	0.68	0.68
Localized Significance Threshold[2]	*197*	*1,711*	*4*	*2*
Thresholds Exceeded?	***No***	***No***	***No***	***No***

Note:
1. The proposed project does not include hearths.
2. The Localized Significance Threshold was determined using Appendix C of the SCAQMD Final Localized Significant Threshold Methodology guidance document for pollutants NO_X, CO, PM_{10}, and $PM_{2.5}$. The Localized Significance Threshold was based on the total acreage, the distance to sensitive receptors, and the source receptor area (SRA 20).

The SCAQMD requires a quantified assessment of CO hotspots when a project increases the volume-to-capacity ratio (also called the intersection capacity utilization) by 0.02 (two percent) for any intersection with an existing level of service LOS D or worse. Because traffic congestion is highest at intersections where vehicles queue and are subject to reduced speeds, these hot spots are typically produced at intersections.

The project is located in the South Coast Air Basin (Basin), which is designated as an attainment/maintenance area for the Federal CO standards and an attainment area for State standards. There has been a decline in CO emissions even though vehicle miles traveled on U.S. urban and rural roads have increased. On-road mobile source CO emissions have declined 24 percent between 1989 and 1998, despite a 23 percent rise in motor vehicle miles traveled over the same 10 years. California trends have been consistent with national trends; CO emissions declined 20 percent in California from 1985 through 1997 while vehicle miles traveled increased 18 percent in the 1990s. CO emissions have continued to decline since this time. The Basin was re-designated as attainment in 2007, and is no longer addressed in the SCAQMD's AQMP. Three major control programs have contributed to the reduced per-vehicle CO emissions: exhaust standards, cleaner burning fuels, and motor vehicle inspection/maintenance programs.

A detailed CO analysis was conducted in the Federal Attainment Plan for Carbon Monoxide (CO Plan) for the SCAQMD's 2003 Air Quality Management Plan. The 2003 Air Quality Management Plan is the most recent AQMP that addresses CO concentrations. The locations selected for microscale modeling in the CO Plan are worst-case intersections in the Basin, and would likely experience the highest CO concentrations. Thus, CO analysis within the CO Plan is utilized in a comparison to the proposed project, since it represents a worst-case scenario with heavy traffic volumes within the Basin.

Of these locations, the Wilshire Boulevard/Veteran Avenue intersection in Los Angeles experienced the highest CO concentration (4.6 parts per million [ppm]), which is well below the 35-ppm 1-hr CO Federal standard. The Wilshire Boulevard/Veteran Avenue intersection is one of the most congested intersections in Southern California with an average daily traffic (ADT) volume of approximately 100,000 vehicles per day. As the CO hotspots were not experienced at the Wilshire Boulevard/Veteran Avenue intersection, it can be reasonably inferred that CO hotspots would not be experienced at any intersections within the vicinity of the project site due to the low volume of traffic (2,310 new daily trips) that would occur as a result of project implementation. Therefore, impacts would be less than significant.

Parking Structure Hotspots

Carbon monoxide concentrations are a function of vehicle idling time, meteorological conditions, and traffic flow. Therefore, parking structures tend to be of concern regarding CO hotspots, as they are enclosed spaces with frequent cars operating in cold start mode. Approximately 550 parking spaces would be located within the parking structure onsite and approximately 250 surface parking spaces would be located 0.41 miles south of the project site. The proposed project would be required to comply with the ventilation requirements of the International Mechanical Code (Section 403.5 [Public Garages]), which requires that mechanical ventilation systems for public garages to operate automatically upon detection of a concentration of carbon monoxide of 25 ppm by approved detection devices. The 25 ppm trigger is the maximum allowable concentration for continuous exposure in any eight hour period according to the American Conference of Governmental Industrial Hygienists.

Therefore, impacts to sensitive receptors would be less than significant. No mitigation is required.

e) Objectionable Odors: Less than Significant Impact

According to the SCAQMD *CEQA Air Quality Handbook*, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The proposed project does not include any uses identified by the SCAQMD as being associated with odors.

Construction activities associated with the project may generate detectable odors from heavy-duty equipment exhaust. Construction-related odors would be short-term in nature, dissipate rapidly, and cease upon project completion. Any impacts to existing adjacent land uses would be short-term. Therefore, impacts due to objectionable odors would be less than significant. No mitigation is required.

Mitigation Measures

AQ-1: Prior to initiating construction, UCI shall ensure that the project construction contract includes a construction emissions mitigation plan, including measures compliant with SCAQMD Rule 403 (Fugitive Dust), to be implemented and supervised by the on-site construction supervisor, which shall include, but not be limited to, the following BMPs:

- During grading and site preparation activities, exposed soil areas shall be stabilized via frequent watering, non-toxic chemical stabilization, or equivalent measures at a rate to be determined by the on-site construction supervisor.

- During windy days when fugitive dust can be observed leaving the construction site, additional applications of water shall be required at a rate to be determined by the onsite construction supervisor.
- Disturbed areas designated for landscaping shall be prepared as soon as possible after completion of construction activities.
- Areas of the construction site that will remain inactive for three months or longer following clearing, grubbing and/or grading shall receive appropriate BMP treatments (e.g., revegetation, mulching, covering with tarps, etc.) to prevent fugitive dust generation.
- All exposed soil or material stockpiles that will not be used within 3 days shall be enclosed, covered, or watered twice daily, or shall be stabilized with approved nontoxic chemical soil binders at a rate to be determined by the on-site construction supervisor.
- Unpaved access roads shall be stabilized via frequent watering, non-toxic chemical stabilization, temporary paving, or equivalent measures at a rate to be determined by the on-site construction supervisor.
- Trucks transporting materials to and from the site shall allow for at least two feet of freeboard (i.e., minimum vertical distance between the top of the load and the top of the trailer). Alternatively, trucks transporting materials shall be covered.
- Speed limit signs at 15 mph or less shall be installed on all unpaved roads within construction sites.
- Where visible soil material is tracked onto adjacent public paved roads, the paved roads shall be swept and debris shall be returned to the construction site or transported off site for disposal.
- Wheel washers, dirt knock-off grates/mats, or equivalent measures shall be installed within the construction site where vehicles exit unpaved roads onto paved roads.
- Diesel powered construction equipment shall be maintained in accordance with manufacturer's requirements, and shall be retrofitted with diesel particulate filters where available and practicable.
- Heavy duty diesel trucks and gasoline powered equipment shall be turned off if idling is anticipated to last for more than 5 minutes.
- Where feasible, the construction contractor shall use alternatively fueled construction equipment, such as electric or natural gas-powered equipment or biofuel.

- Heavy construction equipment shall use low NOx diesel fuel to the extent that it is readily available at the time of construction.

- To the extent feasible, construction activities shall rely on the campus's existing electricity infrastructure rather than electrical generators powered by internal combustion engines.

- The construction contractor shall develop a construction traffic management plan that includes the following:

- Scheduling heavy-duty truck deliveries to avoid peak traffic periods Consolidating truck deliveries.

- Where possible, the construction contractor shall provide a lunch shuttle or on-site lunch service for construction workers.

- The construction contractor shall, to the extent possible, use pre-coated architectural materials that do not require painting. Water-based or low VOC coatings shall be used that are compliant with SCAQMD Rule 1113. Spray equipment with high transfer efficiency, such as the high volume-low pressure spray method, or manual coatings application shall be used to reduce VOC emissions to the extent possible.

- Project constructions plans and specifications will include a requirement to define and implement a work program that would limit the emissions of reactive organic gases (ROG's) during the application of architectural coatings to the extent necessary to keep total daily ROG's for each project to below 75 pounds per day, or the current SCAQMD threshold, throughout that period of construction activity to the extent feasible. The specific program may include any combination of restrictions on the types of paints and coatings, application methods, and the amount of surface area coated as determined by the contractor.

- The construction contractor shall maintain signage along the construction perimeter with the name and telephone number of the individual in charge of implementing the construction emissions mitigation plan, and with the telephone number of the SCAQMD's complaint line. The contractor's representative shall maintain a log of any public complaints and corrective actions taken to resolve complaints.

4.3 Biological Resources

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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 CA Department of Fish and Wildlife 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 Wildlife or US 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		

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?					X
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 applicable habitat conservation plan?					X

Discussion

Biological resources issues are discussed in Section 4.3 of the 2007 LRDP EIR.

a) Sensitive Species: Less than Significant Impact with Project-level Mitigation Incorporated

Both project sites have been previously graded and are currently occupied with existing development, excluding the portion of the project that would extend Arroyo Drive. As discussed in the LRDP EIR, two sensitive plant species, Southern tarplant and Palmer's grappling hook, have the potential to occur within the East Campus; however, neither were observed on either the north or south sites. Furthermore, if any direct impacts to either species were to occur, it would be less than significant because it would not reduce regional populations to a less than self-sustaining level (page 4.3-37).

Existing on-site ornamental vegetation, where birds protected under the Migratory Bird Treaty

Act (MBTA) may occur during the nesting season, would be removed during demolition and grading. Construction is anticipated to begin during the 2017 nesting season and could potentially impact any bird species located in on-site or adjacent vegetation. Therefore, compliance with project-specific mitigation measure BR-1, which would require bird surveying 30 days prior to construction, would reduce potential impacts to sensitive species to a less than significant level.

b) Riparian Habitat: Less than Significant Impact with Project-level Mitigation Incorporated

c) Wetlands: Less than Significant Impact with Project-level Mitigation Incorporated

As shown in Figure 4.3-2C (Plant Communities Map – East Campus, Northern Area) in the LRDP EIR and campus-wide jurisdictional delineation, no wetlands or riparian habitat exist on the third-party residential housing project site.

As shown in Figure 4.3-2D (Plant Communities – East Campus, Southern Area) and the campus-wide jurisdictional delineation, a wetland and willow riparian habitat is located to the west of the proposed surface parking lot that runs along California Avenue. The extension of Arroyo Drive, an optional segment of the project, would potentially require the take of the wetland and riparian habitat. However, a project-specific jurisdictional delineation would be prepared during the planning and design phases of the Arroyo Drive extension and permits allowing the take of the wetlands and riparian habitat would be obtained from the appropriate agencies, the Army Corps of Engineers, California Department of Fish and Wildlife, and/or Regional Water Quality Control Board. A replacement mitigation program would be implemented on the campus as part of the consultation and permit approval with the aforementioned agencies. Therefore, with implementation of project-specific mitigation measure BR-2, impacts to riparian habitat and wetlands would be reduced to a less than significant level.

d) Wildlife Corridors: No Impact

The 2007 LRDP EIR determined that the campus is bordered by mixed use, residential uses, and roadways with limited wildlife movement corridors in the vicinity. The project sites are also located more than a mile from drainage culverts that were placed under the State Route 73 (SR-73) Toll Road to support movement between the Bonita Canyon Wetland areas, San Joaquin Hills, and the Natural Community Conservation Plan Reserve System lands on the campus (LRDP EIR, page 4.3-47). As discussed in Section 2.0, Project Description, the project sites are located in an urbanized area of the campus, which is not conducive to wildlife movement. Therefore, the proposed project would not interfere with wildlife corridors and no impact would occur. No mitigation is required.

e) Conflict with Applicable Policies: No Impact

The proposed project is located in an area of the East Campus that is largely built-out and urbanized and there are no applicable policies protecting biological resources. Therefore, the proposed project would not conflict with local policies protecting biological resources and no impact would occur. No mitigation is required.

f) Conflict with a Natural Community Conservation Plan or Habitat Conservation Plan: No Impact

The East Campus is not located within a Habitat Conservation Plan, Natural Community Conservation Plan, or any other habitat conservation plan. Therefore, no impacts would occur. No mitigation is required.

Mitigation Measures

BR-1: If construction occurs during the nesting season (February 1 through August 31), pre-constructing surveys for active nests shall be performed within 30 days prior to the commencement of any clearing or grading activities at locations within 500 feet of the approved limits of disturbance where suitable nesting habitat exists. Construction activities within 300 feet of active nests shall be monitored by a qualified biologist until the biologist determines that the nest is no longer active. Construction may encroach within the 300-foot buffer only at the discretion of the biologist.

BR-2: During the design phase of the surface parking lot and extension of Arroyo Drive, a project-specific jurisdictional delineation shall be prepared. Appropriate permits shall be obtained through the Army Corps of Engineers, California Department of Fish and Wildlife, and Regional Water Quality Control Board and a mitigation replacement program shall be implemented.

4.4 Cultural Resources

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:					
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?					X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 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	
e) Cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code 21074?				X	

Discussion

Cultural resources issues are discussed in Section 4.4 of the 2007 LRDP EIR.

a) Historical Resources: No Impact

Existing on-site uses to be removed are the AV-1 and CT surface parking lots on the north project site and the tenant-operated nursery, Shadetree, on the south project site. To qualify a property as historically significant under the California Register of Historic Resources, there is a set of four criteria listed under CEQA Guidelines Section 15064.5; however, with very few exceptions, to qualify a property must generally be at least 50 years old. Neither use, based on the criteria nor age of structure, would be considered an historical resource. Furthermore, as shown in the LRDP EIR Table 4.4-2, none of the potential historical resources listed exist on either project site (page 4.4-15). Therefore, impacts to historical resources would not occur. No mitigation is required.

b) Archaeological Resources: Project Impact Adequately Addressed in EIR

Recorded archaeological resources located within the UCI campus are summarized in Table 4.4-1 of the 2007 LRDP EIR. Two archaeological sites have been discovered and recorded in the East Campus, none of which are located on or adjacent to either the north or south project sites. Data and artifacts from both have been recovered and no further archaeological testing is required. To date, with grading that has previously occurred on both project sites, there has been no evidence of any archaeological resources within the project boundaries. There is some possibility, however, that unknown archaeological remains could occur beneath the ground surface (LRDP EIR, page 4.4-4). Earth moving activities could possibly uncover previously undetected archaeological remains associated with prehistoric cultures, and a loss of a significant archaeological resource could result if such materials are not properly identified. Therefore, monitoring during grading by a qualified archaeologist through implementation of LRDP EIR mitigation measure Cul-1C would reduce impacts to archaeological resources to a less than significant level.

c) Paleontological Resources: Project Impact Adequately Addressed in EIR

Paleontological investigations conducted for the 1989 LRDP determined that the Topanga Formation geologic units under the campus are considered to be of high paleontological sensitivity for vertebrate and invertebrate fossils. The assessment noted that one of the most unique features on the campus is the micro-paleontological material found along Bonita Canyon Drive, consisting of microscopic fossils of single-celled animals that inhabited the sea floor. The fossils contained in these exposures are of regional and interregional significance because they provide the basis for comparisons between the depositional histories of various parts of the Los Angeles Basin (LRDP EIR, page 4.4-19). Given the geological setting and recognized high sensitivity for vertebrate and invertebrate fossils on the campus, excavation operations, such as trenching and/or tunneling that cut into geologic formations, might expose fossil remains. According to the 2007 LRDP EIR, any project involving excavation into either the Topanga Formation or the terrace deposits could have an adverse effect on paleontological resources. Therefore, implementation of LRDP EIR mitigation measures Cul-4A, Cul-4B, and Cul-4C, which requires monitoring during grading and proper recovery if fossils are found, would reduce impacts to paleontological resources to a less than significant level (LRDP EIR, page 4.4-20).

d) Human Remains: Less than Significant Impact

Human remains may be uncovered during earth moving activities associated with construction of the project. In the event that human remains are discovered during construction, UCI would comply with Section 7050.5 of the California Health and Safety Code and Public Resources Code 5097.98, which requires notification of the County Coroner to determine whether the remains are of forensic interest. If the Coroner, with the aid of a supervising archeologist, determines that the remains appear to be Native American, s/he would contact the Native American Heritage Commission (NAHC) within 24 hours, who would in turn, notify the person they identify as the most likely descendent (MLD) of the human remains. Further actions would be determined by the MLD who has 24 hours after notification of the NAHC to make recommendations regarding the disposition of the remains. Therefore, compliance with the California Health and Safety Code and Public Resources Code would reduce potential impacts to human remains to a less than significant level. No mitigation is required.

e) Tribal Cultural Resources: Less than Significant Impact

In accordance with AB 52, notification letters were mailed to the Gabrieleño Band of Mission Indians – Kizh Nation and Juaneño Band of Mission Indians – Acjachemen Nation on February 1, 2017. UCI received a telephone call from the Gabrieleño Band of Mission Indians requesting that an affiliated Native American monitor be on-site during ground disturbance activities. UCI will continue to consult with the Gabrieleño Band of Mission Indians regarding their interest in an on-site tribal monitor.

As discussed in 4.4(b) above, there is no evidence of archaeological resources within or adjacent to the project site, which has been previously disturbed. For these reasons, UCI does not anticipate encountering tribal resources during construction of the project. Additionally, the implementation of LRDP EIR mitigation measure Cul-1C (hiring a qualified archaeologist to monitor ground-disturbing activities and to ensure the protection of any resources that may be discovered) would reduce any potentially significant impact to a less than significant level, as described in the LRDP EIR. Therefore, impacts to tribal resources would be less than significant. No mitigation is required.

Mitigation Measures

Cul-1C: Prior to land clearing, grading, or similar land development activities for future projects that implement the 2007 LRDP in areas of identified archaeological sensitivity, UCI shall retain a qualified archaeologist (and, if necessary, a culturally affiliated Native American) to monitor these activities. In the event of an unexpected archaeological discovery during grading, the on-site construction supervisor shall redirect work away from the location of the archaeological find. A qualified archaeologist shall oversee the evaluation and recovery of archaeological resources, in accordance with the procedures listed below, after which the on-site construction supervisor shall be notified and shall direct work to continue in the location of the archaeological find. A record of monitoring activity shall be submitted to UCI each month and at the end of monitoring. If an archaeological discovery is determined to be significant, the archaeologist shall prepare and implement a data recovery plan. The plan shall include, but not be limited to, the following measures:

a. Perform appropriate technical analyses;

b. File an resulting reports with South Coast Information Center; and

c. Provide the recovered materials to an appropriate repository for curation, in consultation with a culturally-affiliated Native American.

Cul-4A: Prior to grading or excavation for future project that implement the 2007 LRDP and would excavate sedimentary rock material other than topsoil, UCI shall retain a qualified paleontologist to monitor these activities. In the event fossils are discovered during grading, the on-site construction supervisor shall be notified and shall redirect work away from the location of the discovery. The recommendations of the paleontologist shall be implemented with respect to the evaluation and recovery of fossils, in accordance with mitigation measures Cul-4B and Cul-4C, after which the on-site construction supervisor shall be notified and shall direct work to continue in the location of the fossil discovery. A record of monitoring activity shall be submitted to UCI each month and at the end of monitoring.

Cul-4B: If the fossils are determined to be significant, then mitigation measure Cul-4C shall be implemented.

Cul-4C: For significant fossils as determined by mitigation measure Cul-4B, the paleontologist shall prepare and implement a data recovery plan. The plan shall include, but not be limited to, the following measures:

a. The paleontologist shall ensure that all significant fossils collected are cleaned, identified, catalogued, and permanently curated with an appropriate institution with a research interest in the materials (which may include UCI);

b. The paleontologist shall ensure that specialty studies are completed, as appropriate, for any significant fossil collected; and

c. The paleontologist shall ensure that curation of fossils are completed in consultation with UCI. A letter of acceptance from the curation institution shall be submitted to UCI.

4.5 Geology and Soils

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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**	

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?				X	
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 waste water disposal systems where sewers are not available for the disposal of waste water?					X

Discussion

Geology and soils issues are discussed in Section 4.5 of the 2007 LRDP EIR.

a) Expose People or Structures to:

i) Fault Rupture: Less than Significant Impact

No active or potentially active earthquake faults have been identified on the UCI campus through the State Alquist-Priolo Earthquake Fault Zoning Act program, but a locally mapped fault trace, known as the "UCI Campus Fault," traverses the project site. A Restricted Use Zone (RUZ) extending 50 feet beyond both sides of this fault has been established to prevent the construction of new development on the fault in case of rupture (LRDP EIR, pages 4.5-8 through 9). The RUZ does not extend into either the north or south project sites and is located approximately one-quarter mile south. Grading, foundation, and building structure elements would be designed to meet or exceed the California Building Code (CBC) seismic safety standards and comply with the UC Seismic Safety Policy. Therefore, due to location and compliance with the CBC, impacts due to fault rupture would be less than significant.

ii) Seismic Ground Shaking: Less than Significant Impact

The entire campus, like most of southern California, is located in a seismically active area where strong ground shaking could occur during movements along any one of several faults in the region. An earthquake of magnitude 7.5 on the Richter scale could occur along the Newport-Inglewood Fault, the nearest major fault located approximately 4.5 miles southwest of the campus. Earthquakes along the San Andreas Fault, about 35 miles northeast of the campus could generate an 8.0 magnitude level of energy, and movement along the San Jacinto Fault, about 30 miles away, could release ground motion energy estimated at 7.5 on the Richter scale (LRDP EIR, page 4.5-2).

An earthquake along any number of local or regional faults could generate strong ground motions at the subject site that could dislodge objects from walls, ceilings, and shelves or even damage and destroy buildings and other structures, and people residing in the proposed development could be exposed to these hazards. However, grading, foundation, and building structure elements would be designed to meet or exceed the CBC seismic safety standards. In addition, the University has adopted a number of programs and procedures to reduce the hazards from seismic shaking including through compliance with the UC Seismic Safety Policy. Therefore, compliance with the CBC, UC Seismic Safety Policy, and implementation of recommendations in the site-specific geotechnical study conducted during the design phase would reduce any potential hazards associated with seismic ground shaking to a less than significant level. No mitigation is required.

iii) Liquefaction: Less than Significant Impact

The 2007 LRDP EIR indicates that a majority of soils on the UCI campus are characterized as terraced deposits. It is unlikely that these soils would be subject to liquefaction due to the denseness of the material and depth to groundwater. Therefore, compliance with the CBC, UC Seismic Safety Policy, and implementation of recommendations in the site-specific geotechnical investigation conducted during the design phase would reduce any potential hazards associated with liquefaction or landslides to a less than significant level. No mitigation is required.

iv) Landslide: Less than Significant Impact

Landslides may occur due to earthquakes, which is due to generally weak soil and rock on sloping terrain. The north and south project sites, which have both been partially graded previously, are located on relatively flat terrace. Furthermore, the project site is not located in an area considered to be susceptible to landslides according the California Geological Survey. Therefore, impacts due to landslides would be less than significant. No mitigation is required.

b) Soil Erosion: Less than Significant Impact

As noted in the LRDP EIR, earth-disturbing activities associated with project construction that may result in soil erosion would be temporary. The project would comply with the CBC, which regulates excavation and grading activities, and the National Pollutant Discharge Elimination System (NPDES) general permit for construction activities, which requires preparation of an erosion control plan and implementation of construction best management practices (BMPs) to prevent soil erosion. Such BMPs could include silt fences, watering for dust control, straw-bale check dams, and hydroseeding. The LRDP EIR concluded that with implementation of these routine control measures potential construction-related erosion impacts would be less than significant (LRDP EIR, page 4.5-10). Soil erosion may also occur due to increases in stormwater runoff due to increased impermeable surfaces. However, as discussed in Section 4.8, Hydrology and Water Quality, stormwater runoff velocities would be reduced to preexisting conditions to the extent feasible (MM Hyd-1A). Therefore, impacts due to soil erosion would be less than significant. No mitigation is required.

c) Soil Instability: Less than Significant Impact

If loose or compressible soil materials occur on site, they may be subject to settlement under increased loads. Soil instability may also occur due to an increase in moisture content from site irrigation or changes in drainage conditions. Typical measures to treat such unstable materials involve removal and replacement with properly compacted fill, compaction grouting, or deep dynamic compaction. A site-specific geotechnical investigation would be conducted during the design phase and any recommendations would be implemented in accordance with the CBC. Therefore, impacts associated with unstable materials would be reduced to a less than significant level. No mitigation is required.

d) Expansive Soils: Less than Significant Impact

Expansive topsoils are prevalent on campus and are generally a dark brown sandy clay, clayey sand, or lean clay, which can be detrimental to foundations, concrete slabs, flatwork, and pavement. Topsoil throughout the campus is highly expansive, ranging from eight to 12 percent swell with an underlying material generally consisting of non-expansive to moderately expansive terrace deposits with a swell ranging from zero to eight percent.

The CBC includes provisions for construction on expansive soils. Proper fill selection, moisture control, and compaction during construction can prevent these soils from causing significant damage. Expansive soils can be treated by removal (typically the upper three feet below finish grade) and replacement with low expansive soils, lime-treatment, and/or moisture conditioning. The geotechnical investigations and soils testing to be conducted as part of the routine final design process would determine the extent of any expansive or compressible soils that occur on the site. Therefore, adherence to the CBC and implementation of the recommendations in the project-specific geotechnical investigation conducted during the design phase would reduce impacts due to expansive soils to a less than significant level. No mitigation is required.

e) Septic Tanks or Alternative Waste Disposal Systems: No Impact

All wastewater generated by the proposed project would be conveyed via local sewers directly into the existing public sanitary sewer system maintained by the Irvine Ranch Water District (IRWD). Therefore, the proposed project would not provide a sanitary waste disposal system and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.6 Greenhouse Gas Emissions

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:					
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?				X	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?					X

Discussion

In March 2010, the CEQA Guidelines were revised to require analysis of greenhouse gas (GHG) emissions. Because it was not required at the time the 2007 LRDP EIR was adopted, a GHG analysis was not included. GHG emissions are addressed in this section and uses a project-specific Greenhouse Gas Assessment prepared by Michael Baker International, Inc. (Appendix B).

a) Greenhouse Gas Emissions: Less than Significant Impact

Project-related GHG emissions would include emissions from direct and indirect sources. The proposed project would result in direct and indirect emissions of CO_2, N_2O, and CH_4, and would not result in other GHGs that would facilitate a meaningful analysis. Therefore, this analysis focuses on these three forms of GHG emissions. Direct project-related GHG emissions include emissions from construction activities, area sources, and mobile sources, while indirect sources include emissions from electricity consumption, water demand, and solid waste generation. Operational GHG estimations are based on energy emissions from natural gas usage and automobile emissions. Project GHG emissions were calculated using the California Emissions Estimator Model (CalEEMod) version 2016.3.1, which relies on trip generation data, and specific land use information to calculate emissions. As indicated in the *UCI East Campus Student Apartments Phase 4 Traffic Study* (Traffic Study) for the proposed project, prepared by Stantec Consulting Services (dated March 2017), the proposed project would result in approximately 2,310 new daily trips. Table 4.6-1, *Greenhouse Gas Emissions*, presents the estimated CO_2, N_2O, and CH_4 emissions of the proposed project without GHG-reducing design features and mitigation measures

As shown in Table 4.6-1, GHG emissions resulting from both construction and operation of the proposed project would result in approximately 7,290.42 $MTCO_2eq$/yr. The project proposes up to 1,500 beds in the 600,000 GSF building and up to 950 beds in the 400,000 GSF building, therefore the project service population is 2,450. Dividing the GHG emissions by the project's service population (2,450) would result in approximately 2.97 $MTCO_2eq$ per SP per year, which is below the 2020 and 2035 significance thresholds (4.8 $MTCO_2eq$ per SP per year, and 3.0 $MTCO_2eq$ per SP per year, respectively). Therefore, the project's contribution of GHG emissions would be less than significant.

Table 4.6-1
Greenhouse Gas Emissions

Source	CO_2	CH_4		N_2O		Total Metric Tons of CO_2eq
	Metric Tons/yr[1]	Metric Tons/yr[1]	Metric Tons of CO_2eq[2]	Metric Tons/yr[1]	Metric Tons of CO_2eq[2]	
Direct Emissions						
• Construction (total of 6,840.25 $MTCO_2eq$ amortized over 30 years)	228.01	0.02	0.48	0.00	0.00	228.49
• Area Source	41.29	0.04	1.02	0.00	0.00	42.31
• Mobile Source	1,427.60	0.07	1.83	0.00	0.00	1,429.42
Total Mitigated Direct Emissions[3]	**1,696.90**	**0.13**	**3.32**	**0.00**	**0.00**	**1,700.22**
Indirect Emissions						
• Energy	4,124.02	0.14	3.57	0.05	14.13	4,141.73
• Water Demand	1,107.95	5.14	128.48	0.13	38.56	1,274.97
• Solid Waste Generation	70.03	4.14	103.47	0.00	0.00	173.50
Total Mitigated Indirect Emissions[3]	**5,302.00**	**9.42**	**235.51**	**0.18**	**52.69**	**5,590.20**
Total Mitigated Project-Related Emissions[3]	***7,290.42 $MTCO_2eq$/yr***					
Total Service Population Emissions[4]	***2.97 $MTCO_2eq$/yr***[5]					
Year 2020 Threshold of	***4.8 $MTCO_2eq$ per SP per year***					

Significance	
Year 2035 Threshold of Significance	***3.0 MTCO$_2$eq per SP per year***
Mitigated GHG Emissions Exceed Threshold?	***No***

Notes:
1. Emissions calculated using CalEEMod.
2. CO_2 Equivalent values calculated using the EPA Website, *Greenhouse Gas Equivalencies Calculator*, http://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator, accessed March 2017.
3. Totals may be slightly off due to rounding.
4. Service population emissions are based on a service population of 2,450 beds.
5. The project's total service population emissions were calculated by dividing the total proposed project-related emissions (7,290.42 MTCO$_2$eq/yr) by the service population (2,450); therefore, 7,290.42/2,450 = 2.97.

Project Design Features

It is noted that Table 4.6-1 includes reduced emissions from the project's design features in compliance with the Sustainable Practices Policy. Such features include the use of water conservation measures, such as low-flow faucets, showers, toilets, water-efficient landscaping and irrigation systems, and use of reclaimed water and grey water. In addition, the project would meet or exceed the Leadership in Energy and Environmental Design (LEED) Silver or Gold rating (or an equivalent rating such as the Build it Green GreenPoint Rated program), utilize high-efficiency lighting and energy efficient appliances (i.e., Energy Star dishwashers), and exceed Title 24 standards by 20 percent.

Direct Project-Related Sources of Greenhouse Gases

- Construction Emissions. Construction GHG emissions are typically summed and amortized over the lifetime of the project (assumed to be 30 years), then added to the operational emissions.[1] As seen in Table 1, the proposed project would result in 6,840.25 MTCO$_2$eq/yr, which represents 228.49 MTCO$_2$eq/yr when amortized over 30 years.

- Area Source. Area source emissions occur from hearths, architectural coatings, landscaping equipment, and consumer products. The project proposes a student housing development and would not include hearths. Area source GHG emissions woud primarily occur from landscaping and consumer products. Area source emissions were calculated using CalEEMod and project-specific land use data. As noted in Table 1, the proposed project would result in 42.31 MTCO$_2$eq/year from area source GHG emissions.

- Mobile Source. The CalEEMod model relies upon trip generation data and project specific land use data to calculate mobile source emissions. The project would directly result in

[1] The project lifetime is based on the standard 30 year assumption of the South Coast Air Quality Management District, *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold,* October 2008.

1,429.42 $MTCO_2eq$/yr of mobile source-generated GHG emissions.

Indirect Project-Related Sources of Greenhouse Gases

- Energy Consumption. Energy consumption emissions were calculated using CalEEMod and project-specific land use data. Electricity would be provided to the project site via Southern California Edison (SCE). The project would indirectly result in 4,141.73 $MTCO_2eq$/year due to energy consumption.

- Water Demand. The project operations would result in a demand of approximately 272 million gallons of water per year. Emissions from indirect energy impacts due to water supply would result in 1,274.97 $MTCO_2eq$/year.

- Solid Waste. Solid waste associated with operations of the proposed project would result in 173.50 $MTCO_2eq$/year.

Total Project-Related Sources of Greenhouse Gases

As depicted in Table 4.6-1, the project's GHG emissions would be 1.750.56 MTCO2eq/yr, which would not exceed the 3.0 MTCO2eq per year per service population GHG threshold. Therefore, impacts due to greenhouse gas emissions would be less than significant. No mitigation is required.

b) Conflict with a Greenhouse Gas Plan, Policy, or Regulation: No Impact

The UC Sustainable Practices Policy establishes goals and policies to reduce GHG emissions from various sources at the campus. Although construction of the proposed project would increase the amount of GHG emissions generated by the campus, as discussed in Section 2.0, Project Description, the project would incorporate various sustainable project design features (e.g., water conservation measures, exceed LEED Silver rating, exceed Title 24 by 20 percent, and use energy efficient lighting, etc.) in compliance with the UC Sustainable Practices Policy. In order for the campus to reach the carbon neutrality goal of zero emissions of scope 1 and 2 sources by 2025 and scope 3 sources by 2050 as required by the Carbon Neutrality Initiative and the UC Sustainable Practices Policy, the campus is looking into a number of solutions including, but not limited to, energy efficiency projects on the campus and in the surrounding community and purchasing of offsets. Furthermore, the proposed project would not impede the campus' ability to reduce emissions as it is an infill development project and would achieve a high attainment of energy efficiency in accordance with UC policy.

In addition, UCI adopted a Climate Action Plan (CAP) in 2007, and updated in 2016, in cooperation with AB 32, and has guided an array of climate action protection strategies and projects to reduce UCI GHG emissions. The purpose of this CAP is to identify UCI's long-term vision and commitment to reduce its GHG emissions in support of University of California Sustainability Practices Policy and campus sustainability goals. These commitments include reduction of GHG emissions to 1990 levels by the year 2020 (a reduction of approximately 49 percent from projected emissions), climate neutrality by the year 2025 (for on-site combustion of fossil fuels and purchased electricity), and climate neutrality by the year 2050 (for UCI commuters and University funded air travel). The CAP does not contain GHG thresholds. As discussed in 4.6(a) above, the project's GHG emissions would not exceed the 3.0 MTCO2eq per year per service population threshold in compliance with AB 32. Therefore, the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.7 Hazards and Hazardous Materials

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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	

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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 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 a 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	

Discussion

Hazards and hazardous materials issues are discussed in Section 4.6 of the 2007 LRDP EIR.

a) *Transport, Use, Disposal of Hazardous Materials: Less than Significant Impact*

b) *Release of Hazardous Materials: Less than Significant Impact*

For the residential uses at the north project site, long-term hazards would be storage, use, and disposal of minor quantities of materials typical of residential uses, such as solvents, cleaners, paints, and fertilizers. For the parking structure, roadways, and surface lots on the north and south project sites, fertilizers, pesticides, paint, asphalt, fuels, and other hazardous materials would be used in limited quantities for maintenance. Implementation of the 2007 LRDP, including this project, would increase hazardous materials use and waste generation on campus; however, UCI policy implemented by the Office of Environmental Health and Safety (EH&S) requires transportation of all hazardous materials conform to all federal, State, and local requirements. Furthermore, due to the type and quantity, significant hazards from materials stored within residential uses and parking facilities is unlikely.

Temporary, short-term related hazards for the north and south project sites would include transport, storage, use, and disposal of asphalt, fuels, solvents, paints, thinners, acids, curing compounds, grease, oil, fertilizers, coating materials, and other hazardous substances used during construction. The contractor ensures responsibility, as part of the contract, that hazardous materials and waste are handled, stored, and disposed of in accordance with all applicable federal, State, and local laws and regulations and routine construction control measures (LRDP EIR, page 4.6-7). Therefore, compliance with federal, State, and local regulation would reduce potential impacts from the release of hazardous materials to a less than significant level. No mitigation is required.

c) *Proximity to Schools: Less than Significant*

University High School is located within one-quarter mile of the north project site. However, the proposed project at this site would construct residential uses and a parking structure, which are not uses that would generate hazardous emissions or handle large quantities of hazardous materials. No schools are located within one-quarter mile of the south project site. Therefore, the proposed project would not emit large hazardous emissions and impacts to schools would be less than significant. No mitigation is required.

d) *Hazardous Materials Sites: Less than Significant Impact*

The 2007 LRDP EIR concluded that there are no recorded hazardous sites on the main campus (page 4.6-32), and review of the State Department of Toxic Substance Control[1] confirms there are no hazardous materials sites located on either the north or south project sites. However, three leaking underground storage tanks (LUST), Campus Gas, Fire Station #4, and Campus Cleaners,

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[1] http://geotracker.waterboards.ca.gov/. Accessed March 2, 2017.

were identified across Campus Drive from the north project site, two of which were closed as of March 2017. However, due to the proximity of the LUST sites, a soil and gas investigation was performed in February 2017, which included 14 boring samples at five and ten feet to test the north project site for soil contamination. Of the 14 samples, one tested positive for benzene at ten feet; however, it was not detected at the five-foot sample and was isolated by clean upper soils. Therefore, the proposed project does not require further action regarding vapor concerns and impacts due to hazardous materials sites are less than significant. No mitigation is required.

e) Airport Land Use Plan: Less than Significant Impact

The closest airport, John Wayne Airport (JWA), is located three miles northwest of the campus, and is located within JWA's planning area. The Airport Land Use Commission for Orange County has established Runway Protection Zones (RPZ) for JWA, also called Accident Potential Zones (APZ), which define the surrounding areas that are more likely to be affected if an aircraft-related accident were to occur. Those zones do not extend to the campus, including the project site, and because most aircraft accidents take place on or immediately adjacent to the runway it is unlikely that aircraft operating at JWA pose a safety threat to the campus. Additionally, as reported in the 2007 LRDP EIR, no accidents have occurred near the campus within the past 26 years (page 4.6-33). Therefore, impacts due to the proximity to an airport or private airstrip would be less than significant. No mitigation is required.

f) Private Airstrip: No Impact

No private airstrips are located within the vicinity of the campus. Therefore, because the proposed project is not located near a private airstrip, it would not affect public safety and no impact would occur. No mitigation is required.

g) Emergency Response: Project Impact Adequately Addressed in the LRDP EIR

In the event of road closures at either the north or south project site, prior to the start of construction, the contractor would comply with LRDP EIR mitigation measure Haz-6A to ensure sufficient notification to the UCI Fire Marshal to allow coordination of emergency services that may be affected (LRDP EIR, page 4.6-34). Furthermore, the proposed project during both construction and operation would comply with UCI's Emergency Response Plan that addresses roles and responsibilities, communications, training, and procedures in order to respond to emergency situations. Therefore, with implementation of LRDP EIR mitigation measure Haz-6A, potential impacts to emergency response on or surrounding the campus would be reduced to a less than significant impact.

h) Wildland Fires: Less than Significant Impact

The LRDP EIR indicates that areas prone to wildland fire are vegetation communities such as coastal sage scrub and grassland (page 4.6-35), which does not exist on or adjacent to the north project site. The south project site is located on or adjacent to open space that includes various types of vegetation communities. However, a surface parking lot and roadway extension would be constructed at the south project site, which are made of asphalt and concrete and are not susceptible to fire. Therefore, impacts due to wildland fire would be less than significant. No mitigation is required.

Mitigation Measures

Haz-6A: Prior to initiating on-site construction for future projects that implement the 2007 LRDP and would involve a lane or roadway closure, the construction contractor and/or UCI Design and Construction Services shall notify the UCI Fire Marshal. If determined necessary by the UCI Fire Marshal, local emergency services shall be notified of the lane or roadway closure by the Fire Marshal.

4.8 Hydrology and Water Quality

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:					
a) Violate any water quality standards or waste discharge requirements?		X			
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 which 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		X			

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
runoff in a manner which would result in flooding on- or off-site?					
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?		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	

Discussion

Hydrology and water quality issues are discussed in Section 4.7 of the 2007 LRDP EIR.

a) *Water Quality Standards: Project Impact Adequately Addressed in LRDP EIR*

Applicable water quality standards developed by the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Board (RWQCB) for storm water are set forth in required permits, including the General Construction Storm Water Permit, which would control pollutants contained in runoff generated from campus properties (LRDP EIR, page 4.17-19).

Potential water quality impacts during the construction would be stockpiled soils and materials stored outdoors on or adjacent to the project sites during construction. Pollutants associated with these construction activities that could result in water quality impacts include soils, debris, other materials generated during site clearing and grading, fuels and other fluids associated with the equipment used for construction, paints and other hazardous materials, concrete slurries, and asphalt materials. These pollutants could impact water quality if washed, blown, or tracked off site to areas susceptible to wash off by storm water or non-storm water and could drain to one or more of the local receiving waters (LRDP EIR, page 4.7-21). Landscaping could also result in water quality impacts due to the use of fertilizers. If discharged, they could adversely affect aquatic plants and animals downstream in receiving waters through a reduction in oxygen levels and an increase in eutrophication. (LRDP EIR, page 4.7-21).

The proposed project would comply with the General Construction Storm Water Permit program, which would implement construction control measures to be specified in the project's Storm Water Pollution Prevention Plan (SWPPP) and install and maintain the post-construction BMPs to be specified in the project's Water Quality Management Plan (WQMP). Compliance with the permit would ensure that runoff from the developed site does not violate any water quality standards.

This project would not generate any point sources of wastewater or other liquid or solid water contaminants. All of the wastewater that would be generated would be discharged into a local sanitary sewer system that would convey the flows into Irvine Ranch Water District's (IRWD) regional wastewater collection and treatment system. Furthermore, potential impacts to San Diego Creek related to the project's post-construction activities would be reduced to below a level of significance with implementation of LRDP EIR mitigation measures Hyd-2A and Hyd-2B.

Therefore, in compliance with the storm water permits described above and implementation of LRDP EIR mitigation measures Hyd-2A and Hyd-2B, construction and post construction impacts would be reduced to a less than significant level.

b) *Groundwater: No Impact*

UCI does not use groundwater and instead is provided water by IRWD. This issue was adequately addressed in the 2007 LRDP Initial Study and further analysis in the EIR was not required (LRDP EIR, page 4.7-27). Therefore, the proposed project would not affect groundwater tables and no impact would occur. No mitigation is required.

c) *Erosion On or Off-site: Project Impact Adequately Address in LRDP EIR*

For the north and south project sites, features that control run-off volumes and durations to minimize or eliminate erosion and siltation would be depicted on final construction plans. Any slopes would be landscaped and energy dissipaters and other control devices would be incorporated as needed. Drainage control measures would be implemented during rough grading to ensure that discharge volumes and durations are controlled on newly graded channels. Standard construction strategies such as desiltation basins, rip-rap, sandbag chevrons, straw waddles, etc. would be incorporated into the project's SWPPP both during and after grading. Therefore, potential erosion or siltation impacts during and following construction would be reduced to less than significant level through compliance with the conditions of the General Construction Storm Water Permit and LRDP EIR mitigation measures Hyd-2A and 2B. Therefore, impacts due to erosion would be reduced to a less than significant level.

d) *Substantially Alter Drainage Pattern: Project Impact Adequately Address in LRDP EIR*

Approximately 50 percent of the north project site and a substantial part of the south project site is currently undeveloped and would be converted to impervious surfaces (rooftops, driveways, roadways, parking lots) that would increase the rate and amount of runoff during Phases 4a and 4b. To avoid significant flooding impacts on or off site, the proposed storm drain system would be design in accordance with the drainage criteria set forth in the LRDP mitigation measures Hyd-1A and Hyd-1B. The drainage system would be built to maintain or reduce peak runoff from 25-year and 100-year storm events. Additional hydrological analysis would be conducted as part of the final design process to specify all primary and secondary drainage control facilities required to satisfy flood control criteria, as well as site design, mechanical, structural, and non-structural measures to filter pollutants from site runoff, prior to discharge into the existing storm drain networks. Therefore, with implementation of Hyd-1A, impacts to the alteration of the drainage pattern would be reduced to a less than significant level.

e) *Drainage System Capacity/Substantial Additional Polluted Runoff: Project Impact Adequately Address in LRDP EIR*

Although storm drain facilities exist on both the north and south project sites, due to redevelopment of the existing uses, they may be altered during the final design phase. As stated in 4.8(d) above, construction of the proposed project at both the north and south project sites would include a storm water drainage system in order to address the increase in impermeable surfaces that would occur due to increased development. The on-site drainage system, as discussed above, would be design to provide sufficient capacity to manage the level of water runoff anticipated upon completion of construction and a plan would be finalized during the design phase. Therefore, with implementation of Hyd-1A, impacts due to additional polluted runoff would be less than significant.

f) Substantially Degrade Water Quality: Less than Significant Impact

Refer to the previous responses to items 4.8(a) to 4.8(e). There are no other project elements that would affect the water quality of the site or its surroundings. Therefore, in compliance with the NPDES, impacts to water quality would be less than significant. No mitigation is required.

g) Place Housing with a 100-year Flood Hazard Area: No Impact

The campus, including the project site, is located in a FEMA Flood Zone X. This issue was adequately addressed in the 2007 LRDP Initial Study and further analysis in the EIR was not required (LRDP EIR, page 4.7-27). Therefore, the proposed project would not place housing within a 100-year flood hazard area no impact would occur. No mitigation is required.

h) Place Structures within a 100-year Flood Hazard Area: No Impact

Because there are no 100-year flood hazard areas on the campus, the proposed project would not place any structures in a manner that would impede or redirect flood flows. This issue was adequately addressed in the 2007 LRDP Initial Study and further analysis in the EIR was not required (LRDP EIR, page 4.7-27). Therefore, the proposed project would not place structures in a 100-year flood hazard area and no impact would occur. No mitigation is required.

i) Expose People or Structures to a Significant Risk Involving Flooding: Less than Significant Impact

Because the project site is not within a levee or dam inundation area, the proposed project would not expose people or structures to risk due to flooding. The LRDP EIR determined that it is unlikely that flooding because of dam or levee failure would have an effect on the campus due to its height above mean sea level (msl). This issue was adequately addressed in the 2007 LRDP Initial Study and further analysis in the EIR was not required (LRDP EIR, page 4.7-27). Therefore, impacts due to exposure of people or structures to flooding would be less than significant. No mitigation is required.

j) Seiche, Tsunami, or Mudflow: Less than Significant Impact

The campus is located approximately three miles from the Pacific Ocean where sufficient evacuation notice would be provided by the West Coast and Alaska Tsunami Warning Center in the occurrence of a tsunami. The site is not located in an area with potential for seiche and is relatively flat, which is not conducive for mudflows (LRDP EIR, pages 4.7-24 through 25). Therefore, impacts due to exposure of people or structures to seiche, tsunami, or mudflow would be less than significant. No mitigation is required.

Mitigation Measures

Hyd-1A: As early as possible in the planning process of future projects that implement the 2007 LRDP and would result in land disturbance of 1 acre or greater, and for all development projects occurring on the North Campus in the watershed of the San Joaquin Freshwater Marsh, a qualified engineer shall complete a drainage study. Design features and other recommendations from the drainage study shall be incorporated into project development plans and construction documents. Design features shall be consistent with UCI's Storm Water Management Program, shall be operational at the time of project occupancy, and shall be maintained by UCI. At a minimum, all drainage studies required by this mitigation measure shall include, but not be limited to, the following design features:

Site design that controls runoff discharge volumes and durations shall be utilized, where applicable and feasible, to maintain or reduce the peak runoff for the 10-year, 6-hour storm event in the post-development condition compared to the pre-development condition, or as defined by current water quality regulatory requirements.

Measures that control runoff discharge volumes and durations shall be utilized, where applicable and feasible, on manufactured slopes and newly-graded drainage channels, such as energy dissipaters, revegetation (e.g., hydroseeding and/or plantings), and slope/channel stabilizers.

Hyd-2A: Prior to initiating on-site construction for future projects that implement the 2007 LRDP, UCI shall approve an erosion control plan for project construction. The plan shall include, but not be limited to, the following applicable measures to protect downstream areas from sediment and other pollutants during site grading and construction:

- Proper storage, use, and disposal of construction materials.
- Removal of sediment from surface runoff before it leaves the site through the use of silt fences, gravel bags, fiber rolls or other similar measures around the site perimeter.
- Protection of storm drain inlets on-site or downstream of the construction site through the use of gravel bags, fiber rolls, filtration inserts, or other similar measures.
- Stabilization of cleared or graded slopes through the use of plastic sheeting, geotextile fabric, jute matting, tackifiers, hydro-mulching, revegetation (e.g., hydroseeding and/or plantings), or other similar measures.
- Protection or stabilization of stockpiled soils through the use of tarping, plastic sheeting, tackifiers, or other similar measures.
- Prevention of sediment tracked or otherwise transported onto adjacent roadways through use of gravel strips or wash facilities at exit areas (or equivalent measures).
- Removal of sediment tracked or otherwise transported onto adjacent roadways through periodic street sweeping.
- Maintenance of the above-listed sediment control, storm drain inlet protection, slope/stockpile stabilization measures.

Hyd-2B: Prior to project design approval for future projects that implement the 2007 LRDP and would result in land disturbance of 1 acre or more, the UCI shall ensure that the projects include the design features listed below, or their equivalent, in addition to those listed in mitigation measure Hyd-1A. Equivalent design features may be applied consistent with applicable MS4 permits (UCI's Storm Water Management Plan) at that time. All applicable design features shall be incorporated into project development plans and construction documents; shall be operational at the time of project occupancy; and shall be maintained by UCI.

- All new storm drain inlets and catch basins within the project site shall be marked with prohibitive language and/or graphical icons to discourage illegal dumping per UCI standards.

- Outdoor areas for storage of materials that may contribute pollutants to the storm water conveyance system shall be covered and protected by secondary containment.

- Permanent trash container areas shall be enclosed to prevent off-site transport of trash, or drainage from open trash container areas shall be directed to the sanitary sewer system.

- At least one treatment control is required for new parking areas or structures, or for any other new uses identified by UCI as having the potential to generate substantial pollutants. Treatment controls include, but are not limited to, detention basins, infiltration basins, wet ponds or wetlands, bio-swales, filtration devices/inserts at storm drain inlets, hydrodynamic separator systems, increased use of street sweepers, pervious pavement, native California plants and vegetation to minimize water usage, and climate controlled irrigation systems to minimize overflow. Treatment controls shall incorporate volumetric or flow-based design standards to mitigate (infiltrate, filter, or treat) storm water runoff, as appropriate.

4.9 Land Use and Planning

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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 LRDP, general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?					X
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?					X

Discussion

Land use and planning issues are discussed in Section 4.8 of the 2007 LRDP EIR.

a) Divide an Established Community: No Impact

The two project sites are designated in the 2007 LRDP as Mixed Use – Neighborhood, which allows for student residential, parking facilities, and recreational facilities. From the north project site, off-campus residential lies to the north across Campus Drive, Vista del Campo Norte student housing lies to the east, Puerta del Sol student housing and the Early Childhood Education Center lie to the west across California Avenue, and Arroyo Vista student housing lies to the south across Arroyo Drive. For the south site, Anteater Recreation Center and playfields lie to the north and northeast, open space lies to the south and east, and Palo Verde student housing lies to the west. The addition of student housing, parking, and recreational facilities would be consistent with existing uses.

The proposed project would not affect the land use pattern of the surrounding community, either on or off campus. No existing pedestrian or bikeways would be removed as part of the project. Instead, the construction of student housing on the north site would increase pedestrian circulation on campus by creating increased accessibility through the construction of pedestrian pathways that would connect Campus Drive to the main campus.

For vehicular circulation, no streets would be removed as part of the project. The optional extension of Arroyo Drive would benefit traffic circulation on the campus by increasing accessibility between the Academic Core and residential uses located in the East Campus. Therefore, the proposed project would not divide an established community and no impact would occur. No mitigation is required.

b) Conflict with an Applicable Land Use Plan: No Impact

As discussed in Section 2.0, Project Description, the applicable land use plan is the 2007 LRDP and the University is the only agency with land use jurisdiction over projects located on the campus. As stated above, the project sites are designated Mixed Use – Neighborhood in the 2007 LRDP, which allows for residential facilities for undergraduate and graduate students, recreational facilities, parking, and other residential support uses. All proposed uses are compliant with the land use designation, and is consistent with the total overall on-campus student bed count analyzed in the 2007 LRDP EIR.

In 2002, UCI and the City of Irvine signed a Memorandum of Understanding (MOU) as part of a previous phase of the East Campus Student Apartments, which includes design guidelines, including, but not limited to, building setbacks, building massing, landscaping, and automobile and bicycle parking requirements. Although the University has autonomy for land use and project design approval for on-campus student housing, the University and City entered into the MOU voluntarily to cooperate in the planning and implementation of student housing in the East Campus. UCI and the City are currently working together to confirm applicable design guidelines for the Phase 4 project in support of the MOU. The project will comply with the applicable design guidelines; therefore, the proposed project is consistent with the land use plan and no impact would occur. No mitigation is required.

c) Conflict with an Applicable Conservation Plan: No Impact

The East Campus, including the project site, is not located within a Habitat Conservation Plan, Natural Community Conservation Plan, or any other land conservation plan. Therefore, the proposed project would not conflict with an applicable conservation plan and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.10 Noise

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project result in:					
a) Exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies?			X		
b) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing			X		
c) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			X		
d) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?				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					X

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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?					X

Discussion

Noise issues are discussed in Section 4.9 of the 2007 LRDP EIR. A project-specific Noise Assessment was prepared by Michael Baker International, Inc. and is included as Appendix C.

a) Noise Standards: No Impact

b) Permanent Ambient Noise: Less than Significant Impact

c) Temporary Ambient Noise: Project Impact Adequately Addressed in the LRDP EIR

SHORT-TERM CONSTRUCTION

Construction Phase IVa proposes to develop a 600,000 GSF residential structure; a northern site 550-space parking structure and adjoining maintenance shop; and a southern site 250-space surface parking lot with an adjoining Arroyo Drive roadway extension. Phase 4B of construction would consist of the development of a 400,000 GSF residential structure. Construction activities would include site preparation, grading, paving, building construction, and architectural coating. Ground-borne noise and other types of construction-related noise impacts would typically occur during excavation activities of the grading phase. This phase of construction has the potential to create the highest levels of noise. Typical noise levels generated by construction equipment are shown in Table 4.10-1, *Maximum Noise Levels Generated by Construction Equipment*. It should be noted that the noise levels identified in Table 7 are maximum sound levels (L_{max}), which are the highest individual sound occurring at an individual time period. Operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be due to random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts).

Table 4.10-1
Maximum Noise Levels Generated by Construction Equipment

Type of Equipment	*Acoustical Use Factor[1]*	*L_{max} at 50 Feet (dBA)*
Concrete Saw	*20*	*90*
Crane	*16*	*81*
Concrete Mixer Truck	*40*	*79*
Backhoe	*40*	*78*
Dozer	*40*	*82*
Excavator	*40*	*81*
Forklift	*40*	*78*
Paver	*50*	*77*
Roller	*20*	*80*
Tractor	*40*	*84*
Water Truck	*40*	*80*
Grader	*40*	*85*
General Industrial Equipment	*50*	*85*

Note:
1. Acoustical Use Factor (percent): Estimates the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

Pursuant to *Municipal Code* Section 6-8-205(A), construction activities may occur between the hours of 7:00 a.m. and 7:00 p.m. on weekdays, and 9:00 a.m. and 6:00 p.m. on Saturdays. No construction activities shall be permitted outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted. These permitted hours of construction are included in the code in recognition that construction activities undertaken during daytime hours are a typical part of living in an urban environment and do not cause a significant disruption. It should be noted that the noise levels depicted in Table 4.10-1 are maximum noise levels, which would occur sporadically when construction equipment is operated in proximity to sensitive receptors. With implementation of time limits specified in the City's Noise Ordinance, noise impacts would be reduced to a less than significant level. Additionally, to further reduce the potential for nuisance noise impacts, mitigation measure NOI-1 would be implemented to incorporate best management practices during construction and to ensure nuisances do not occur. Implementation of mitigation measure NOI-1 would further minimize impacts from construction noise as it requires construction equipment to be equipped with properly operating and maintained mufflers and other state required noise attenuation devices. There, with implementation of project-specific mitigation measure NOI-1, impacts from construction activities would be reduced to a less than significant level.

LONG-TERM OPERATIONAL IMPACTS

Off-Site Mobile Noise

Existing Plus Project Conditions

Future development generated by the proposed project would result in additional traffic on adjacent roadways, thereby increasing vehicular noise in the vicinity of existing and proposed land uses. Based on the Traffic Study, the proposed project would result in approximately 2,310 daily trips. The "Existing Without Project" and "Existing Plus Project" scenarios are compared in Table 4.10-2, Existing Plus Project Traffic Noise Levels. As depicted in Table 4.10-2, under the "Existing Without Project" scenario, noise levels would range from approximately 55.4 dBA to 68.9 dBA, with the highest noise levels occurring along Culver Drive (between Campus Drive and Vista del Campo Road). The "Existing Plus Project" scenario noise levels would range from approximately 55.9 dBA to 68.9 dBA with the highest noise levels also occurring along Culver Drive (between Campus Drive and Vista del Campo Road). The noise levels would result in a maximum increase of 0.9 dBA as a result of the proposed project. This increase would occur along Arroyo Drive (California Avenue to Project Access).

It is noted that traffic noise levels would exceed the State of California "normally acceptable" limit of 65 dBA for multi-family residential land uses along Culver Drive and Campus Drive. However, under Existing Plus Project conditions, traffic noise along these roadways would also exceed 65 dBA under existing conditions, and the project's contribution to traffic noise levels would not be perceivable (i.e., increases would be less than 3 dB). Therefore, the proposed project would not significantly increase noise levels along the roadway segments analyzed, and a less than significant impact would occur.

Table 4.10-2

Existing Plus Project Traffic Noise Levels

Roadway Segment	Existing Without Project	Existing Plus Project	Differen

	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			ce In dBA @ 100 Feet from Roadway
			60 CNEL	65 CNEL	70 CNEL			60 CNEL	65 CNEL	70 CNEL	
Campus Drive											
California Avenue to Culver Drive	15,200	65.7	473	150	47	15,700	65.8	488	154	49	0.1
California Avenue											
Campus Drive to Arroyo Drive	13,300	64.0	312	99	31	14,600	64.4	342	108	34	0.4
Culver Drive											
Campus Drive to Vista del Campo Road	23,400	68.9	944	299	94	23,400	68.9	944	299	94	0.0
Arroyo Drive											
California Avenue to Project Access	8,300	57.8	71	23	7	10,200	58.7	88	28	9	0.9
Vista del Campo Road											
Arroyo Drive to Culver Drive	3,300	55.4	41	13	4	3,700	55.9	46	14	5	0.5

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level

Source: Noise modeling is based on traffic data within the *UCI East Campus Student Apartments Phase 4 Traffic Study*, prepared by Stantec Consulting Services, Inc. (March 2017).

Year 2035 With Project Conditions

The "Year 2035 Without Project" and "Year 2035 With Project" scenarios are compared in Table 4.10-3, Year 2035 Project Traffic Noise Levels. As depicted in Table 4.10-3, under the "Year 2035 Without Project" scenario, noise levels would range from approximately 58.0 dBA to 69.2 dBA, with the highest noise levels occurring along Culver Drive (between Campus Drive and Vista del Campo Road). The "Year 2035 With Project" scenario noise levels would range from approximately 58.3 dBA to 69.2 dBA with the highest noise levels also occurring along Culver Drive (between Campus Drive and Vista del Campo Road). The noise levels would result in a maximum increase of 0.8 dBA as a result of the proposed project. This increase in noise would occur along Arroyo Drive (between California Avenue and Project Access). Since the proposed project would not significantly increase noise levels along the roadway segments analyzed, a less than significant impact would occur.

Table 4.10-3

Year 2035 Project Traffic Noise Levels

Roadway Segment	Year 2035 Without Project					Year 2035 With Project					Difference In dBA @ 100 Feet from Roadway
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			
			60 CNEL	65 CNEL	70 CNEL			60 CNEL	65 CNEL	70 CNEL	
Campus Drive											
California Avenue to Culver Drive	18,000	66.4	559	177	56	18,500	66.6	575	182	58	0.2
California Avenue											
Campus Drive to Arroyo Drive	20,000	65.7	468	148	47	21,300	66.0	500	158	50	0.3
Culver Drive											
Campus Drive to Vista del Campo Road	25,000	69.2	1,009	319	101	25,000	69.2	1,009	319	101	0.0
Arroyo Drive											
California Avenue to Project Access	9,000	58.2	77	24	8	10,900	59.0	94	30	9	0.8
Vista del Campo Road											
Arroyo Drive to Culver Drive	6,000	58.0	74	23	7	6,400	58.3	79	25	8	0.3

Cumulative Mobile Source Impacts

A project's contribution to a cumulative traffic noise increase would be considered significant when the combined effect exceeds perception level (i.e., auditory level increase) threshold. The combined effect compares the "cumulative with project" condition to "existing" conditions. This comparison accounts for the traffic noise increase generated by a project combined with the traffic noise increase generated by projects in the cumulative project list. The following criteria have been utilized to evaluate the combined effect of the cumulative noise increase.

Combined Effect. The cumulative with project noise level ("Year 2035 With Project") would cause a significant cumulative impact if a 3.0 dB increase over existing conditions occurs and the resulting noise level exceeds the applicable exterior standard at a sensitive use.

Although there may be a significant noise increase due to the proposed project in combination with other related projects (combined effects), it must also be demonstrated that the project has an incremental effect. In other words, a significant portion of the noise increase must be due to the proposed project. The following criteria have been utilized to evaluate the incremental effect of the cumulative noise increase.

Incremental Effects. The "Year 2035 With Project" causes a 1.0 dBA increase in noise over the "Future Without Project" noise level.

A significant impact would result only if both the combined and incremental effects criteria have been exceeded. Noise by definition is a localized phenomenon, and reduces as distance from the source increases. Consequently, only the proposed project and growth due to occur in the project site's general vicinity would contribute to cumulative noise impacts. Table 4.10-4, Cumulative Noise Scenario, lists the traffic noise effects along roadway segments in the project vicinity for "Existing," "Year 2035 Without Project," and "Year 2035 With Project," conditions, including incremental and net cumulative impacts.

Table 4.10-4

Cumulative Noise Scenario

Roadway Segment	Existing	Future Without Project	Future With Project	Combined Effects	Incremental Effects	Cumulatively Significant Impact?
	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	Difference in dBA Between Existing and Future With Project	Difference in dBA Between Future Without Project and Future With Project	
Campus Drive						

Roadway Segment	Existing	Future Without Project	Future With Project	Combined Effects	Incremental Effects	Cumulatively Significant Impact?
	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	Difference in dBA Between Existing and Future With Project	Difference in dBA Between Future Without Project and Future With Project	
California Avenue to Culver Drive	65.7	66.4	66.6	0.9	0.2	*No*
California Avenue						
Campus Drive to Arroyo Drive	64.0	65.7	66.0	2.0	0.3	*No*
Culver Drive						
Campus Drive to Vista del Campo Road	68.9	69.2	69.2	0.3	0.0	*No*
Arroyo Drive						
California Avenue to Project Access	57.8	58.2	59.0	1.2	0.8	*No*
Vista del Campo Road						
Arroyo Drive to Culver Drive	55.4	58.0	58.3	2.9	0.3	*No*

As indicated in Table 4.10-4, the *Combined Effects* and *Incremental Effects* are not exceeded, separately or jointly, along any roadway segments. As such, none of the roadway segments would exceed both the *Incremental Effects* and *Combined Effects* criteria; thus, none of the roadway segments would be significantly impacted. Therefore, the proposed project, in combination with cumulative background traffic noise levels, would result in less than significant impacts.

On-Site Impacts from Roadway Noise

The proposed project includes the construction of two residential structures for campus housing approximately 100 feet from the Campus Drive centerline and 85 fee from the California Avenue centerline. Based on the modeled noise levels in Table 4.10-3, the loudest exterior noise levels would be approximately 66.6 dBA at 100 feet from the centerline of Campus Drive and 66.0 dBA at 100 feet from the centerline of California Avenue, which would exceed the state's noise standards of 65 dBA CNEL (multi-family campus housing, dormitories, lodging). It was previously determined in the UCI 2007 Long Range Development Flan Final Environmental Impact Report (2007 LRPD EIR, prepared by ATKINS, November 2007) that future residents would be exposed to noise levels above the state noise standards at buildout of the LRDP. Thus, the project would be required to utilize window treatments (minimum Sound Transmission Class rating of 32) to attenuate interior traffic noise levels to below 45 dBA CNEL in compliance with mitigation measure NOI-2. It is noted that exterior areas of frequent human use are set back further from the roadways and would not be within the 65 dBA noise contour. As such, traffic noise would not create an impact at the project site. Therefore, a less than significant impact would occur.

Stationary Noise Impacts

Mechanical Equipment

The primary stationary noise source associated with the proposed residential development would be heating, ventilation, and air conditioning (HVAC) units. HVAC units would be positioned on or adjacent to the proposed structures. HVAC systems typically result in noise levels that average between 40 and 50 dBA Leq at 50 feet from the equipment. Based on the building location and proposed setbacks the HVAC units would be located more than 100 feet from any sensitive receptor. At this distance, noise levels form HVAC units would be approximately 44 dBA, which is below the State of California "normally acceptable" limit of 65 dBA for multi-family residential land uses, and 60 dBA for single-family residential uses. Therefore, noise from the HVAC units would not be perceptible from adjoining residences on the project site. Therefore, impacts from mechanical equipment would be less than significant.

d) Groundborne Vibration: Project Impact Adequately Addressed in the LRDP EIR

SHORT-TERM CONSTRUCTION

Project construction can generate varying degrees of groundborne vibration, depending on the construction procedure and the construction equipment used. Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Groundborne vibrations from construction activities rarely reach levels that damage structures.

The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations. In general, the FTA architectural damage criterion for continuous vibrations (i.e., 0.2 inch/second) appears to be conservative. The types of construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. For example, for a building that is constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.20 inch per second (in/sec) is considered safe and would not result in any construction vibration damage. The vibration produced by construction equipment, is illustrated in Table 4.10-5, Typical Vibration Levels for Construction Equipment.

Groundborne vibration decreases rapidly with distance. As indicated in Table 4.10-5, based on the Federal Transit Administration (FTA) data, vibration velocities from typical heavy construction equipment operation that would be used during project construction range from 0.003 to 0.089 in/sec peak particle velocity (PPV) at 25 feet from the source of activity. The closest sensitive receptors would be located approximately 110 feet south of the project site. At this distance, vibration velocities from construction equipment would not exceed 0.010 in/sec PPV, which is below the FTA's 0.20 PPV threshold. Therefore, vibration impacts associated with the proposed project would be less than significant.

LONG-TERM OPERATIONAL IMPACTS

The project proposes two residential structures that would not generate ground-borne vibration that could be felt at surrounding uses. The proposed project would not involve railroads or substantial heavy truck operations, and therefore would not result in vibration impacts at surrounding uses.

Table 4.10-5

Typical Vibration Levels for Construction Equipment

Equipment	Approximate peak particle velocity at 25 feet (inches/second)[1]	Approximate peak particle velocity at 110 feet (inches/second)[2]
Large bulldozer	*0.089*	*0.010*
Loaded trucks	*0.076*	*0.008*
Small bulldozer	*0.003*	*0.000*

Notes:
1 – Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Guidelines*, May 2006. Table 12-2.
2 – Calculated using the following formula:

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

where: PPV (equip) = the peak particle velocity in in/sec of the equipment adjusted for the distance
PPV (ref) = the reference vibration level in in/sec from Table 12-2 of the FTA *Transit Noise and Vibration Impact Assessment Guidelines*
D = the distance from the equipment to the receiver

e) Public Airport Noise: No Impact

As discussed in the 2007 LRDP EIR (page 4.9-33), the nearest airport, John Wayne, 60 CNEL contour does not extend to the UCI campus. Therefore, the proposed project would not be subject to aircraft noise in excess of regulatory limits and no impact would occur. No mitigation is required.

f) Private Airport Noise: No Impact

There are no private airstrips in the vicinity of the campus. Therefore, the proposed project would not be subject to excessive noise levels due to a private airport and no impact would occur. No mitigation is required.

Mitigation Measures

NOI-1: The Project Applicant and/or Contractor shall implement the following noise-attenuating measures during construction of the proposed project:

- Construction contracts specify that all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers and other state required noise attenuation devices.

- The Contractor shall provide evidence that a construction staff member will be designated as a Noise Disturbance Coordinator and will be present on-site during construction activities. The Noise Disturbance Coordinator shall be responsible for responding to any local complaints about construction noise. When a complaint is received, the Noise Disturbance Coordinator shall implement reasonable measures to resolve the complaint, as deemed acceptable by the Community Development Director (or designee). All notices that are sent to residential units immediately surrounding the construction site and all signs posted at the construction site shall include the contact name and the telephone number for the Noise Disturbance Coordinator.

- Construction noise reduction methods shall be used where feasible. These reduction methods include shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources, maximizing the distance between construction equipment staging areas and occupied residential areas, and electric air compressors and similar power tools.

- Construction haul routes shall be designed to avoid noise sensitive uses (e.g., residences, convalescent homes, etc.), to the extent feasible.
- During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers.
- Construction activities shall not take place outside of the allowable hours specified by the City's *Municipal Code* Section 6-8-205(A) (7:00 a.m. and 7:00 p.m. on weekdays, and 9:00 a.m. and 6:00 p.m. on Saturdays; construction activities are not permitted on Sundays or legal holidays).

NOI-2: During project plan review and prior to construction, UCI shall ensure that the project design includes the following project design features:

- Specific window treatments, such as dual glazing (a minimum Sound Transmission Class rating of 32) and mechanical ventilation shall be utilized in residential units immediately along California Avenue and Campus Drive.

4.11 Population and Housing

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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	
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

Discussion

Population and housing issues are discussed in Section 4.10 of the 2007 LRDP EIR.

a) Induce Substantial Population Growth: Less than Significant Impact

The proposed project would construct student housing, a parking structure, and community center, and related residential facilities on the north site. In order to operate the new residential structure, it is anticipated approximately 19 new full-time staff would be hired, significantly less than 0.1 percent of the existing on-campus population. The remaining needed staff is anticipated to be approximately 29 UCI students, which would not increase the campus population. By expanding housing, the University is working toward the overall goal of housing 50 percent of enrolled students on-campus that would otherwise be living in off-campus facilities in local communities, such as the cities of Irvine, Newport Beach, and Costa Mesa. The proposed project would accommodate existing campus populations and would not induce substantial population growth either on or off campus.

South of the existing Anteater Recreation Center (ARC), an optional surface parking lot and an extension of the existing Arroyo Drive to connect to California Avenue would be constructed. Neither use would induce population growth and would be mainly utilized by existing on-campus uses.

As of Fall 2016, UCI provided a total of 14,000 on-campus student housing beds. UCI's 2007 LRDP established the goal of providing on-campus housing for 50 percent of its student enrollment. The current campus housing supply accommodates approximately 44 percent of enrollment. The Phase IVa project coupled with the previously approved Middle Earth residence hall expansion project, both anticipated to open in fall 2019, would result in UCI providing housing for 46 percent of the campus enrollment.

The proposed project is consistent with the overall student bed count and associated infrastructure of the East Campus analyzed within the 2007 LRDP EIR, which concluded that LRDP-induced housing construction would reduce overall physical impacts on local jurisdictions (page 4.10-13). Furthermore, infrastructure built on the campus does not service off-site uses and would not indirectly induce population growth. Therefore, the proposed project would not substantially induce population growth directly or indirectly and impacts would be less than significant. No mitigation is required.

b) Displace Existing Housing: No Impact

c) Displace a Substantial Number of People: No Impact

No existing housing would be demolished during construction, and instead would construct additional housing on the campus. Therefore, the proposed project would not displace people or housing that would require the construction of replacement housing elsewhere and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.12 Public Services

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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 public services:					
a) Fire protection?				X	
b) Police protection?				X	
c) Schools?				X	
d) Parks?				X	
e) Other public facilities?				X	

Discussion

Public service issues are discussed in Section 4.11 of the 2007 LRDP EIR.

a) Fire Protection: Less than Significant

Fire protection and emergency response services to the campus are provided by the Orange County Fire Authority (OCFA). The primary responder serving the campus, OCFA Fire Station #4, is located north of the campus on the corner of California and Harvard Avenues. The capacity of service for Station #4, as determined by OCFA, is approximately 3,500 calls per year of which UCI generated 668 calls or 30 percent of the station's calls during 2005. According to an analysis conducted by OCFA in November 2006, this station had adequate capacity to accommodate existing demand on the main campus. Built in 1966, the station has no current plans for its expansion. (LRDP EIR, page 4.11-6).

As discussed in Section 4.11, Population and Housing, the proposed project would increase full-time staff population by 19, and physical impacts associated with construction of on-campus student housing was addressed in the analysis of the 2007 LRDP EIR. It concluded it would not result in a significant increased demand for fire services (page 4.11-6). Furthermore, the project site is located within a five travel minute coverage area by OCFA. Fire Station #4 has a reliability of 83 percent where a unit is on-site within seven minutes and 20 seconds.[1] This is within the standard adopted by OCFA, where a unit should be on-site within seven minutes and 20 seconds for 80 percent of emergency calls.

UCI employs a State Fire Marshal whom is responsible for the campus fire prevention practices and provides services such as plan review and construction inspections. The UCI Fire Marshal reviews and approves all development plans for each new campus project in accordance with California building and fire codes (LRDP EIR, page 4.11-7). Therefore, the proposed project would not require the need for new fire protection facilities and impacts to services would be less than significant. No mitigation is required.

b) Police Protection: Less than Significant

The UCI Police Department (UCIPD) is located in the Public Services building on the East Campus approximately 0.5-mile west of the north site and 0.5-mile northwest of the south site. The UCIPD provides all police services (all patrol, investigation, crime prevention education, and related law enforcement duties) for the campus (LRDP EIR, page 4.11-3).

As discussed in Section 4.11, Population and Housing, the proposed project would increase the full-time staff by 19 or significantly less than 0.1 percent of the campus population and would not result in an increase in demand for police services. Furthermore, there are no current plans to expand or construct additional police facilities on the campus. Therefore, the proposed project would not require the construction of new police facilities and impacts to services would be less than significant. No mitigation is required.

c) Schools: Less than Significant

The Irvine Unified School District (IUSD) provides kindergarten through grade 12 (k-12) public education services for school age children residing on or near the UCI campus. As discussed above and in Section 4.11, Population and Housing, the proposed project would not substantially increase the campus population. Therefore, the proposed project would not require the need for new off-campus educational facilities and impacts to services would be less than significant. No mitigation is required.

d) Parks: Less than Significant Impact

The proposed project would construct recreational and open space as part of the residential structure, the physical effects of which have been analyzed in this IS/MND. Other recreational facilities located throughout the campus, including Aldrich Park, Crawford Athletics Complex, and the Anteater Recreation Center have sufficient capacity to support the project and would not

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[1] http://www.ocfa.org/Uploads/Orange%20County%20Fire%20Authority%20SOC_FINAL.pdf. Accessed February 22, 2017.

require the construction of new park facilities. Therefore, impacts to parks would be less than significant. No mitigation is required.

e) Other Public Facilities: Less than Significant

As discussed above and in Section 4.11, Population and Housing, the proposed project would not substantially increase on-campus population. Furthermore, public facilities, such as libraries, exist on-campus and would not result in the need for the construction of new facilities within the surrounding community. Therefore, impacts to other public facilities would be less than significant. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.13 Recreation

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:					
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X	
b) Include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?				X	

Discussion

Recreation issues are discussed in Section 4.12 of the 2007 LRDP EIR.

a) Physically Deteriorate Existing Facilities: Less than Significant Impact

As discussed in Section 4.11, Population and Housing, the proposed project would not substantially increase faculty, staff, or student populations on the campus. In addition, recreational space would be constructed and maintained as part of the north site's residential structures. The student residents would also have access to the recreational facilities at the previous East Campus Student Apartment phases, Anteater Recreation Center (ARC), Aldrich Park, and Crawford Athletics Complex on the UCI campus. Furthermore, the 2007 LRDP EIR assumed that the current level of maintenance of the ARC and on-campus facilities would continue and that substantial facility deterioration would not occur (page 4.12-5). Therefore, impacts to recreational facilities would be less than significant. No mitigation is required.

b) Construction of Recreational Facilities: Less than Significant

Recreational space would be constructed on the north site, which would include community centers, a pool, barbecue areas, and open space to be utilized by the residents. Although new recreational facilities would be constructed as part of the project, the uses are consistent with the existing land use and, as discussed in further detail in Sections 4.1 through 4.14, no adverse physical effects on the environment are anticipated that are not mitigatable. Therefore, impacts due to the construction of recreational facilities would be less than significant. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.14 Transportation/Traffic

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:					
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?				X	
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads 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 results in substantial safety risks?					X

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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) Conflict with adopted policies plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?					X

Discussion

Transportation and traffic issues are discussed in Section 4.13 of the 2007 LRDP EIR. This analysis is based on the traffic study prepared by Austin-Foust Associates, Inc. (now Stantec Consulting Services, Inc.) in 2007. In addition, a 2017 project-level study was prepared by Stantec Consulting Services, Inc. (Appendix D).

a) Performance of the Circulation System: Less than Significant Impact

As discussed in Section 4.11, Population and Housing, the anticipated population increase is 19 new staff members for operations. All students to be housed are existing and would not result in direct population growth. Based on previous East Campus Student Apartment phases on the UCI campus, anticipated parking permit take rate is 0.55. Parking for residents and staff would be provided in the newly constructed parking structure or the existing Vista del Campo Norte surface lot or the East Campus Parking Structure. Table 4.14-1 summarizes the trip generation rates per bed and the resulting total trip generation for the proposed project.

Table 4.14-1
Project Trip Generation Summary

Land Use	Amount	AM Peak Hour			PM Peak Hour			ADT
		In	Out	Total	In	Out	Total	
Trip Generation								
Phase 4a								
Student Housing	1,500 Bed	7	74	81	65	39	104	1,403
Staff	19	2	Negl.	2	1	2	3	19
Total Phase 4a		9	74	83	66	41	107	1,422
Phase 4b								
Student Housing	950 Bed	4	47	51	40	24	64	888
Total Phase 4a + 4b								
Total		13	121	134	106	65	171	2,310
Trip Rates (MCTM)								
Student Housing	Bed	0.005	0.050	0.055	0.043	0.026	0.069	0.935
Staff	Person	0.105	0.024	0.105	0.053	0.105	0.158	1.00
LRDP Adjustment								
Graduate Housing	434 Bed	2	25	27	22	14	36	477
Support	27 TSF	21	5	26	10	21	31	324
Total LRDP Adjustment		-10	91	81	74	30	104	1,509

Source: *UCI Main Campus Traffic Model (MCTM)*

ADT = average daily trips

LRDP = Long-Range Development Plan

Negl. = Negligible

The trips generated by the project would use Campus Drive and Arroyo Drive to access the surrounding streets. Project trip distribution was determined based on ADT volume forecasts from ITAM. Approximately 56 percent of project trips are oriented toward Campus Drive to the west and California Avenue and Culver Drive to the north, 8 percent of project trips are oriented west on Anteater Drive towards Bison Avenue, and 36 percent of project trips are oriented toward Culver Drive/Bonita Canyon Drive to the south via Vista Del Campo or Anteater Drive. From there, project trips will disperse along Campus Drive, Culver Drive, Bonita Canyon Drive, Newport Coast Drive, Shady Canyon Drive, and SR-73.

Approximately 825 parking spaces would be required for Phase IVa (55 percent student vehicle ownership). The new parking structure is assumed to be completed with construction of Phase IVa (approximately 550 spaces). The remaining vehicles were assumed to park in the Vista del Campo Norte parking lot. Approximately 1,350 parking spaces would be required for Phase IVa + IVb of the project. Parking would be provided in the new parking structure, ECPS, and Vista del Campo Norte parking lot.

Existing Plus Project Conditions

Impacts from Phases IVa and IVb of the project are analyzed under existing conditions. Existing-plus-project peak hour volumes were obtained by adding the project-generated peak hour trips to the existing intersection turning movement volumes at the study intersections. The existing-plus-project volumes were adjusted to account for the relocation of the surface parking lot from the project site to the location south of the ARC as part of Phase IVa. These existing-plus-project volumes do not assume the optional extension of Arroyo Drive. Impacts from the optional extension of Arroyo Drive are presented later in this chapter.

Project Phase 4a

The existing and existing-plus-Phase 4a LOS at the study intersections based on existing lane configurations are summarized in Table 4.14-2.

Table 4.14-2
Existing-Plus-Phase IVa Intersection LOS Summary

	Existing				Existing + Project Phase 4a			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Intersection	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS
ICU Methodology – Signalized Intersections								
1. California & Campus	.39	A	.60	A	.40	A	.63	B
8. Culver & Campus	.51	A	.55	A	.51	A	.55	A
9. Culver & Vista Del Campo	.37	A	.39	A	.37	A	.39	A
HCM Delay Methodology – Stop-Controlled Intersections								
2. California & Arroyo	10 sec	A	16 sec	C	11 sec	B	18 sec	C
3. California & Palo Verde/Arroyo (future)	11 sec	B	11 sec	B	11 sec	B	11 sec	B
4. Parking Structure (future) & Campus	N/A	--	N/A	--	9 sec	A	12 sec	B
5. Parking Lot AV2 & Arroyo	8 sec	A	9 sec	A	9 sec	A	9 sec	A
6. Parking Structure (future) &	N/A	--	N/A	--	8 sec	A	9 sec	A

Arroyo								
7. Arroyo & Vista Del Campo	7 sec	A	8 sec	A	8 sec	A	8 sec	A

As this table shows, the signalized study intersections continue to operate at LOS B or better with the addition of project Phase 4a traffic, and the stop-controlled intersections operate at LOS C or better during the AM and PM peak hours. Therefore, Phase IVa has a less than significant impact on the on-campus and off-campus study intersections, and no mitigation is necessary.

Project Phase IVa + IVb

Project Phase 4b traffic was added to the existing-plus-Phase IVa volumes presented above. Table 4.14-3 summarizes the existing and existing-plus-Phase IVa + IVb LOS based on existing lane configurations.

Table 4.14-3
Existing-Plus-Phase IVa + IVb Intersection LOS Summary

Intersection	Existing				Existing + Project Phase 4a + 4b			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS
ICU Methodology – Signalized Intersections								
1. California & Campus	.39	A	.60	A	.40	A	.65	B
8. Culver & Campus	.51	A	.55	A	.51	A	.55	A
9. Culver & Vista Del Campo	.37	A	.39	A	.37	A	.39	A
HCM Delay Methodology – Stop-Controlled Intersections								
2. California & Arroyo	10 sec	A	16 sec	C	11 sec	B	19 sec	C
3. California & Palo Verde/Arroyo (future)	11 sec	B	11 sec	B	11 sec	B	11 sec	B
4. Parking Structure (future) & Campus	N/A	--	N/A	--	10 sec	A	12 sec	B
5. Parking Lot AV2 & Arroyo	8 sec	A	9 sec	A	9 sec	A	9 sec	A
6. Parking Structure (future) & Arroyo	N/A	--	N/A	--	8 sec	A	9 sec	A
7. Arroyo & Vista Del Campo	7 sec	A	8 sec	A	8 sec	A	8 sec	A

The signalized study intersections would continue to operate at acceptable LOS B or better during the AM and PM peak hours with the addition of project traffic, and the stop-controlled intersections would continue to operate at LOS C or better. Phase IVa + IVb would have no significant impact on the on-campus or off-campus study intersections, and no mitigation is required.

Arroyo Drive Extension Impacts

The extension of Arroyo Drive is an optional component of the project, and could be constructed concurrently with Phase IVa of the project. With the extension of Arroyo Drive, the relocated parking lot would take access from the new roadway, and Vista del Campo and Vista del Campo Norte could use the extension for more direct access to California Avenue. The impact of the Arroyo Drive extension are summarized in this section.

Project Phase 4a

The existing and existing-plus-Phase IVa with Arroyo Drive extension LOS at the study intersections based on existing lane configurations (except at the Arroyo Drive intersection where a fourth leg is added) are summarized in Table 4.14-4.

Table 4.14-4
Existing-Plus-Phase IVa with Arroyo Drive Extension Intersection LOS Summary

	Existing				Existing + Project Phase 4a With Extension			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Intersection	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS
ICU Methodology – Signalized Intersections								
1. California & Campus	.39	A	.60	A	.40	A	.63	B
8. Culver & Campus	.51	A	.55	A	.51	A	.55	A
9. Culver & Vista Del Campo	.37	A	.39	A	.37	A	.39	A
HCM Delay Methodology – Stop-Controlled Intersections								
2. California & Arroyo	10 sec	A	16 sec	C	10 sec	B	16 sec	C
3. California & Palo Verde/Arroyo (future)	11 sec	B	11 sec	B	10 sec	B	12 sec	B
4. Parking Structure (future) & Campus	N/A	--	N/A	--	9 sec	A	12 sec	B
5. Parking Lot AV2 & Arroyo	8 sec	A	9 sec	A	8 sec	A	9 sec	A
6. Parking Structure (future) & Arroyo	N/A	--	N/A	--	8 sec	A	8 sec	A
7. Arroyo & Vista Del Campo	7 sec	A	8 sec	A	7 sec	A	8 sec	A

As this table shows, with the optional extension of Arroyo Drive, the study intersections would continue to operate at acceptable LOS C or better during the AM and PM peak hours, and Phase IVa of the project has no significant impact on the on-campus or off-campus study intersections.

Therefore, no mitigation is necessary.

Project Phase 4a + 4b

Table 4.14-5 summarizes the existing and existing-plus-Phase 4a + 4b LOS.

Table 4.15-5
Existing-Plus-Phase IVa + IVb with Arroyo Drive Extension
Intersection LOS Summary

	Existing				Existing + Project Phase 4a + 4b With Arroyo Drive			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Intersection	**ICU/Delay**	**LOS**	**ICU/Delay**	**LOS**	**ICU/Delay**	**LOS**	**ICU/Delay**	**LOS**
ICU Methodology – Signalized Intersections								
1. California & Campus	.39	A	.60	A	.40	A	.65	B
8. Culver & Campus	.51	A	.55	A	.51	A	.55	A
9. Culver & Vista Del Campo	.37	A	.39	A	.37	A	.39	A
HCM Delay Methodology – Stop-Controlled Intersections								
2. California & Arroyo	10 sec	A	16 sec	C	11 sec	B	17 sec	C
3. California & Palo Verde/Arroyo (future)	11 sec	B	11 sec	B	12 sec	B	12 sec	B
4. Parking Structure (future) & Campus	N/A	--	N/A	--	10 sec	A	12 sec	B
5. Parking Lot AV2 & Arroyo	8 sec	A	9 sec	A	8 sec	A	9 sec	A
6. Parking Structure (future) & Arroyo	N/A	--	N/A	--	8 sec	A	8 sec	A
7. Arroyo & Vista Del Campo	7 sec	A	8 sec	A	7 sec	A	8 sec	A

The intersections would continue to operate at acceptable LOS C or better with the optional Arroyo Drive extension during the AM and PM peak hours. Phase 4a + 4b would have no significant impact on the on-campus or off-campus study intersections, and no mitigation is required.

Long-Range Analysis

The proposed project would add 81 AM and 104 PM peak hour trips above the level of trips analyzed in the 2007 LRDP EIR Traffic Study. Table 4.14-6 summarizes the 2035 with-Project LOS for the study intersections.

Table 4.14-6
2035 with-Project Intersection LOS Summary

Intersection	2035 No-Project				2035 with-Project			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS
ICU Methodology – Signalized Intersections								
1. California & Campus	.52	A	.80	C	.54	A	.80	C
2. California & Arroyo (future signal)	.32	A	.55	A	.33	A	.57	A
3. California & Palo Verde/Arroyo (future signal)	.28	A	.26	A	.28	A	.26	A
8. Culver & Campus	.60	A	.62	B	.60	A	.62	B
9. Culver & Vista Del Campo	.46	A	.45	A	.46	A	.45	A
HCM Delay Methodology – Stop-Controlled Intersections								
4. Parking Structure (future) & Campus	N/A	--	N/A	--	10 sec	B	14 sec	B
5. Parking Lot AV2 & Arroyo	8 sec	A	10 sec	A	9 sec	A	10 sec	A
6. Parking Structure (future) & Arroyo	N/A	--	N/A	--	9 sec	A	9 sec	A
7. Arroyo & Vista Del Campo	8 sec	A	9 sec	A	8 sec	A	9 sec	A

The intersection of California Avenue and Campus Drive will operate at LOS C during the AM and PM peak hour with buildout of the proposed project. All other study intersections would operate at LOS B or better during the AM and PM peak hours under buildout conditions with the addition of the proposed project.

The study intersections will operate at acceptable LOS under long-range conditions. Buildout of the project has no significant impact on the study intersections under LRDP buildout conditions; therefore, no mitigation is necessary.

Conclusions

The proposed East Campus Student Apartments Phase IV will be developed in two phases. Phase IVa of the project consists of approximately 1,500 beds, 19 staff, residential amenities and a parking structure, and would generate approximately 1,422 daily trips, 83 trips during the AM peak hour, and 107 trips during the PM peak hour. Phase IVa would have no significant impact on the study area intersections under existing conditions.

Phase IVb of the project would add 950 beds. The total of Phase IVa and IVb of the project would generate approximately 2,310 daily trips, 134 AM peak hour trips, and 171 PM peak hour trips. The total project would have no significant impact on the study area intersections under existing conditions.

The extension of Arroyo Drive is an optional component of Phase IVa of the project. Phase IVa and Phase IVb of the project would have no significant impact on the study intersections during the AM and PM peak hours with the extension of Arroyo Drive.

With this project, the UCI campus remains under the total number of beds analyzed in the LRDP EIR Traffic Study overall. Therefore, the project is consistent with the overall LRDP student bed count. The study intersections would operate at acceptable LOS C or better with the proposed project. Therefore, the proposed project would have no significant impact on the long-range circulation system. The project has no significant impact on the surrounding circulation system under existing or long-range conditions; therefore, no mitigation is necessary.

b) Conflict with Congestion Management Program: No Impact

The nearest elements of the Orange County Congestion Management Plan (CMP) highways and arterials network are Jamboree Road and MacArthur Boulevard, located approximately 2.5 miles from the project site. CMP monitoring is conducted at the intersections of Jamboree Road/I-405 northbound and southbound ramps and at Jamboree Road/ MacArthur Boulevard (LRDP FEIR VI page 4.13-23). The proposed project would allow additional students to live on-campus and would not result in increased traffic at any CMP intersections, all of which are located off-campus. Therefore, it would not conflict with the CMP and no impact would occur. No mitigation is required.

c) Air Traffic Patterns: No Impact

The proposed project site is located approximately 1.5 miles southeast of JWA. The Initial Study prepared for the 2007 LRDP concluded that the campus is not situated under the preferred arrival or departure tracks associated with the airport and that future campus buildings would not penetrate the 100:1 Imaginary Surface for designated flight patterns (LRDP EIR VII page 25). Therefore, the proposed project would not affect air traffic patterns and no impact would occur. No mitigation is required.

d) Hazards Due to a Design Feature: Less than Significant Impact

All of the project's transportation network would be designed in accordance with the same standards applied to other elements of the campus transportation network and would have no unique aspects not anticipated in the LRDP EIR. The 2007 LRDP EIR determined no impacts would occur from hazards due to design features or incompatible uses, which was addressed in the LRDP Initial Study (LRDP EIR, page 4.13-61). Therefore, impacts due to potential hazards of a design feature would be less than significant. No mitigation is required.

e) Inadequate Emergency Access: Less than Significant Impact

Project construction would not require complete closure of any adjacent streets; however, the optional Arroyo Drive extension, if built, would ultimately improve operational emergency access to the East Campus. Access by fire protection, ambulances, police, or other emergency vehicles would be maintained for the active construction zones and surrounding land uses. Any closures during construction would be reviewed by the UCI Fire Marshal prior to construction to ensure adequate emergency access at all times. Therefore, with review of the proposed project by the UCI Fire Marshal, impacts related to emergency access would be less than significant. No mitigation is required.

f) Public Transit, Bicycle, or Pedestrian Facilities: No Impact

UCI administers an extensive program of Transportation Demand Management (TDM) measures that encourage commuters to use alternate modes of transportation, including walking, bicycling, carpooling, vanpooling, and riding the UCI shuttle, other local shuttle systems, train, or bus. With these measures, UCI has been successful in achieving an average vehicle ridership higher than the AQMD regional goal (LRDP EIR, page 4.13-58). The proposed project would comply with the UC Sustainable Practices Policy, which requires each campus to incorporate alternative means of transportation to, from, and within each campus to improve the quality of life on campus and in the surrounding community. Also, because students do not have access to parking within the Academic Core, alternative modes of transportation, such as walking or bicycling, would be utilized by the residents for daily campus activities. Pedestrian routes would run from north to south of the north project site and improve circulation by connecting to Campus Drive. In addition, a bus stop is located adjacent to the project site to be utilized by the students. Therefore, the proposed project would not conflict with alternative transportation plans, policies and programs and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.15 Utilities and Service Systems

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:					
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 facilities, the construction of which could cause significant environmental effects?				**X**	
c) Require or result in the construction of new storm water 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**	

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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 applicable federal, state, and local statutes and regulations related to solid waste?					X

Discussion

Utilities and service systems issues are discussed in Section 4.14 of the 2007 LRDP EIR.

a) Regional Water Quality Control Board Wastewater Treatment Requirements: No Impact

Wastewater from the proposed project would be discharged to the campus' sanitary sewer network, which conveys flows to the Irvine Ranch Water District (IRWD) wastewater treatment system. Wastewater from the UCI campus is treated at the Michelson Water Reclamation Plant (MWRP), which provides a tertiary level of treatment in accordance with the wastewater treatment standards enforced by the Santa Ana Regional Water Quality Control Board (RWQCB).

Wastewater flows from the project would consist of the same kinds of chemical composition found in toilets, sinks, and shower outflows that are typical of housing development uses throughout the IRWD service area. No new kinds of wastewater collection or treatment systems or processes would be required to adequately dispose of project wastewater.

Furthermore, in compliance with the General Permit for Waste Discharge Requirements for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s), the campus implements a Stormwater Management Plan and all contractors must comply with UCI's Stormwater Pollution Prevention Best Management Practices (BMPs). A project-specific Stormwater Pollution Prevention Plan (SWPPP), in compliance with the RWQCB, would be completed prior to the start of construction. Therefore, the proposed project would not exceed wastewater treatment requirements of the Regional Water Quality Control Board and no impact would occur. No mitigation is required.

b) Construction of New Water or Wastewater Treatment Facilities or Expansion of Existing Facilities: Less than Significant Impact

Water and wastewater infrastructure would be constructed on-site to serve the proposed project, and the new infrastructure would connect to existing distribution systems. Potable and reclaimed water service and wastewater collection and treatment service would be provided by the IRWD.

Construction impacts would occur as part of the general site development phase while utility improvements are installed; however, no alterations to existing main line facilities would be required to provide adequate potable or irrigation water flows to this project, or to provide sufficient sanitary sewer service. Furthermore, it is estimated that by 2025 UCI would contribute to approximately 19 percent of IRWD's total treated wastewater, and would be accommodated by planned increases of wastewater treatment capacity by IRWD (LRDP EIR, page 4.14-15). Therefore, construction of these components would not result in the construction of new or expansion of water or wastewater treatment facilities and impacts would be less than significant. No mitigation is required.

c) Stormwater Drainage Facilities: Less Than Significant Impact

As discussed in Section 4.8, Hydrology and Water Quality, existing hydrology patterns on the site would be maintained to the extent practical as determined during the project's final design stage through the use of catch basins to convey runoff from the project. Wastewater runoff and stormwater facilities are regulated by the MS4 requirements, including stormwater collection and treatment BMPs, which would reduce physical impacts associated with the construction of new stormwater drainage facilities. Therefore, in compliance with the MS4 permit, impacts due to stormwater drainage facilities would be less than significant. No mitigation is required.

d) Water Supplies: Less than Significant Impact

The 2015 IRWD Urban Water Management Plan (UWMP, 2016) projects district-wide water supply availability and demand through 2035. IRWD staff in consultation with UCI reviewed projected water service demand related to implementation of the 2007 LRDP for consistency with the 2005 UWMP and concluded that water supply reliability would not be compromised (LRDP EIR, page 4.14-17). The 2007 LRDP buildout has been included in the recent 2015 UWMP. Because the proposed project does not increase campus population or estimated water demand beyond what was analyzed in the 2007 LRDP EIR, the irrigation needs throughout the campus would continue to be fully met through reclaimed water supplies. Furthermore, the proposed project would not significantly increase on-campus population.

Although implementation of the 2007 LRDP would result in less than significant impacts to water supply, UCI continues to cooperatively and continually work with IRWD to reduce domestic water demand on campus consistent with UCI sustainability goals, as follows:

- Continue to use reclaimed water for all landscape irrigation uses where feasible and permissible by law.
- Work with IRWD to identify opportunities for additional uses of reclaimed water on-campus to reduce domestic water demand including central utility plant applications, dual plumbing systems in buildings, and other applications to reduce demand for domestic water.
- Work collaboratively with IRWD to identify feasible programs, projects, and measures to reduce domestic water demand.

Therefore, because the proposed project's domestic and reclaimed water demand is consistent with the projections developed for the 2007 LRDP EIR and anticipated in the UWMP forecasts, impacts would be less than significant. No mitigation is required.

e) Wastewater Capacity: Less than Significant Impact

The Michaelson Water Recycling Plant (MWRP) currently treats up to 28 million gallons per day (mgd) of wastewater, and an additional upgrade to 33 mgd is scheduled to be completed in 2025. IRWD forecasts a total service area demand for wastewater treatment of 26.11 mgd by 2025, including the projected increase associated with full implementation of the 2007 LRDP. Because the proposed project is consistent with the LRDP EIR as discussed in Section 2.0, Project Description, the MWRP would have sufficient capacity to accommodate the anticipated wastewater generation throughout the IRWD service area. Therefore, the impact to wastewater treatment capacity would be less than significant (LRDP EIR, pages 4.14-12 through 13). No mitigation is required.

f) Landfill Capacity: Less than Significant Impact

The Frank R. Bowerman Landfill is permitted to receive a daily maximum of 11,500 tons per day and is expected to close in the year 2053. The Olinda Landfill and Prima Deshecha Landfill also serve the County of Orange, which are utilized if the Frank R. Bowerman Landfill reaches its daily capacity. Olinda Landfill permits 8,000 tons daily with an expected closure in 2030; Prima Deshecha Landfill is scheduled to close in 2067 and permits 4,000 tons daily.

Orange County Waste & Recycling and the three landfills are in compliance with the California Integrated Waste Management Act of 1989 (AB 939), which requires each jurisdiction to maintain 15 years of solid waste disposal capacity. Therefore, based on available landfill capacity, impacts would be less than significant. No mitigation is required.

g) Solid Waste Regulations: No Impact

The University of California is not subject to Assembly Bill 939 or other local agency regulations pertaining to solid waste management. Nonetheless, the University of California has adopted the Sustainable Practices Policy that requires campuses to undertake aggressive programs to reduce solid waste generation and disposal (LRDP EIR, 4.14-20). This includes voluntary compliance with the State Agency Integrated Waste Management Plan and prioritization of waste and recycling for LEED credits, including a life cycle assessment for reuse of building materials. Furthermore, under Section F, Recycling and Waste Management, requires the ultimate goal of zero waste by 2020. As of 2016, the campus has an 81 percent diversion rate from local landfills that has been achieved through recycling, composting, and reusing. Continued outreach programs, increased sustainable purchasing options, and proper hazardous waste disposal have the campus on track to reach 95 percent, or "zero waste," by 2020. The project would not require any unique waste collection or disposal methods or facilities and would not conflict with or obstruct any federal, State, or local programs to reduce solid waste generation. Therefore, the proposed project would not violate solid waste regulations and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures required.

4.16 Mandatory Findings of Significance

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?				X	
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of past, present, and probably future projects?)				X	

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

a) Degrade the Environment, Reduce Habitat or Wildlife Populations, Eliminate Examples of California History: Less than Significant Impact

As discussed under Sections 4.1 through 4.15, no significant environmental impacts that are not mitigatable were identified in the responses to questions regarding project effects. The south project site does contain sensitive biological resources that would be impacted if the optional Arroyo Drive extension is constructed; however, project-level mitigation measure BR-2 would reduce impacts to a less than significant level by obtaining appropriate permits, which would require implementation of a habitat replacement program. There are no known cultural resources on the previously developed sites, and in the unexpected event that a prehistoric or archaeological resource is discovered during grading, compliance with LRDP EIR mitigation measures Cul-1C, Cul-4A, Cul-4B, and Cul-4C would reduce impacts to a less than significant level.

b) Cumulatively Considerable Impacts: Less Than Significant Impact

Long-term environmental consequences resulting from the cumulative effect of completing development through implementation of the 2007 LRDP were thoroughly evaluated in the 2007 LRDP EIR. As discussed in Section 2.0, Project Description, the project is consistent with the LRDP land use policies. No new or increased severity of impacts beyond what was anticipated in the 2007 LRDP EIR have been identified as a result of the analysis completed for this IS/MND. As discussed in Sections 4.1 through 4.15, project-level impacts have been determined to be less than significant, no impact, or mitigated to a less than significant level. Therefore, the proposed project would not result in cumulatively considerable impacts.

c) Direct or Indirect Effects on Humans: Less Than Significant Impact

No significant impacts on human beings have been identified in this IS/MND. Short-term adverse impacts during the construction phase (dust, exhaust emissions, and noise) would be less than significant with the incorporation and implementation of the identified routine control measures set forth in the LRDP EIR and project-specific mitigation. There is no evidence of site contamination with hazardous wastes or substances and this residential development would not emit hazardous air emissions or involve consumption, generation, transport or disposal of dangerous quantities of hazardous materials or wastes. Access to the project site by emergency vehicles would be maintained throughout construction, and the developed site would not constrain emergency access to any portion of the campus. Therefore, impacts due to direct or indirect effects on humans would be less than significant.

5.0 PREPARERS

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APPENDIX A

Air Quality Assessment

AIR QUALITY ASSESSMENT

for the

UCI East Campus Phase 4 Project

University of California, Irvine

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SYMBOLS, ABBREVIATIONS, AND ACRONYMS

AB	Assembly Bill
AQMP	Air Quality Management Plan
Basin	South Coast Air Basin
BAU	business as usual
CAAQS	California Ambient Air Quality Standards
CAFE	corporate average fleet fuel economy
CalGreen	California Green Building Standards
CARB	California Air Resources Board
CCAA	California Clean Air Act
CEQA	California Environmental Quality Act
CFCs	Chlorofluorocarbons
CH_4	Methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2eq	carbon dioxide equivalent
EAP	Energy Action Plan
EECAP	energy efficiency climate action plans
EPA	U.S. Environmental Protection Agency
FCAA	Federal Clean Air Act
GHG	greenhouse gas
GSF	gross square foot
GWP	Global Warming Potential
H_2O	water vapor
HCFCs	Hydrochlorofluorocarbons
HFCs	Hydrofluorocarbons
hp	horsepower
HPLV	high-pressure-low-volume
HVAC	heating, ventilation, and air conditioning
I-4	Environmental Justice Enhancement Initiative
IPCC	International Panel for Climate Change
lbs	pounds
LEED	Leadership in Engineering and Environmental Design
LOS	level of service
LSTs	Localized Significance Thresholds
Metro	Los Angeles County Metropolitan Transportation Authority
MMT	million metric tons
mpg	miles per gallon
MPO	metropolitan planning organization
$MTCO_2eq$	metric tons of carbon dioxide equivalents
MU-T	Mixed-Use Transit
N_2O	nitrous oxide

NAAQS	National Ambient Air Quality Standards
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
OAL	Office of Administrative Law
O_3	ozone
OPR	Office of Planning and Research
PFCs	Perfluorocarbons
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
ppm	parts per million
PST	Pacific Standard Time
RCP	Regional Comprehensive Plan
RH	relative humidity
ROG	Reactive Organic Gasses
RTP	Regional Transportation Plan
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCS	Sustainable Community Strategy
SF_6	Sulfur hexafluoride
SGVCOG	San Gabriel Valley Council of Governments
SGVEWP	San Gabriel Valley Energy Wise Partnership
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_x	sulfur oxides
SRA	Source receptor Area
UNFCCC	United Nations Framework Convention on Climate Change
$\mu g/m^3$	micrograms per cubic meter
UV-B	ultraviolet B rays
VMT	vehicle miles traveled
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

The purpose of this Air Quality Assessment is to evaluate potential short- and long-term air quality impacts resulting from implementation of the proposed East Campus Phase 4 Project ("project" or "proposed project") on the University of California, Irvine (UCI) campus. The project is located at the southeast corner of the Campus Drive and California Avenue intersection, on the UCI campus.

The project proposes two phases of construction (Phase 4a and Phase 4b) to develop two residential structures, a southern project site surface parking lot, and a northern project site parking structure with an associated maintenance shop. Phase 4a would demolish the existing 183-space Arroyo Vista 1 (AV-1) and 374-space California Temporary (CT) parking lots to construct an approximately 600,000-gross-square-foot (GSF) residential structure with a community center, recreational facilities, circulation, and open space on the north project site. The structure would contain approximately 1,500 beds within 425 student apartments including bedrooms, kitchens, bathrooms, and living room space. A five-story parking structure with 550 spaces and a maintenance shop would be constructed to the east of the residential facility and long-term bicycle parking facility.

On the south project site, the existing nursery would be removed to construct a 250-space surface parking lot in order to replace those demolished at the north project site and extend the existing Arroyo Drive to California Avenue. The 250 space surface parking lot and Arroyo Drive extension are optional elements of the project, but are included in this analysis.

Phase 4b would construct an approximately 400,000-GSF residential structure with 950 beds in 250 apartment units, a community center, circulation, and open space east of the Phase 4a parking structure on the north project site.

<u>Temporary Impacts</u>. Mitigated construction emissions from project implementation would not exceed established South Coast Air Quality Management District (SCAQMD) thresholds.

<u>Long-Term Impacts</u>. The analysis has demonstrated that project implementation would result in less than significant long-term regional and localized air quality impacts. Carbon monoxide hot-spots impacts would also be less than significant. The proposed project would result in less than significant impacts for all long-term operational emissions.

<u>Cumulative Impacts</u>. The proposed project would not result in long-term air quality impacts, as emissions would not exceed the SCAQMD adopted operational thresholds. Additionally, adherence to SCAQMD rules and regulations would alleviate potential impacts related to cumulative conditions on a project-by-project basis. The project would not result in significant operational emissions of criteria pollutants.

1.0 INTRODUCTION

The purpose of this Air Quality Assessment is to evaluate potential short- and long-term air quality impacts resulting from implementation of the proposed East Campus Phase 4 Project ("project" or "proposed project") on the University of California, Irvine (UCI) campus.

1.1 PROJECT LOCATION

The project site is located 1.5 miles south of Interstate 405 (I-405), and 1.4 miles north of State Route 73 (SR-73); refer to Exhibit 1, *Regional Vicinity* Locally, the project is located at the southeast corner of the Campus Drive and California Avenue intersection, on the UCI campus.

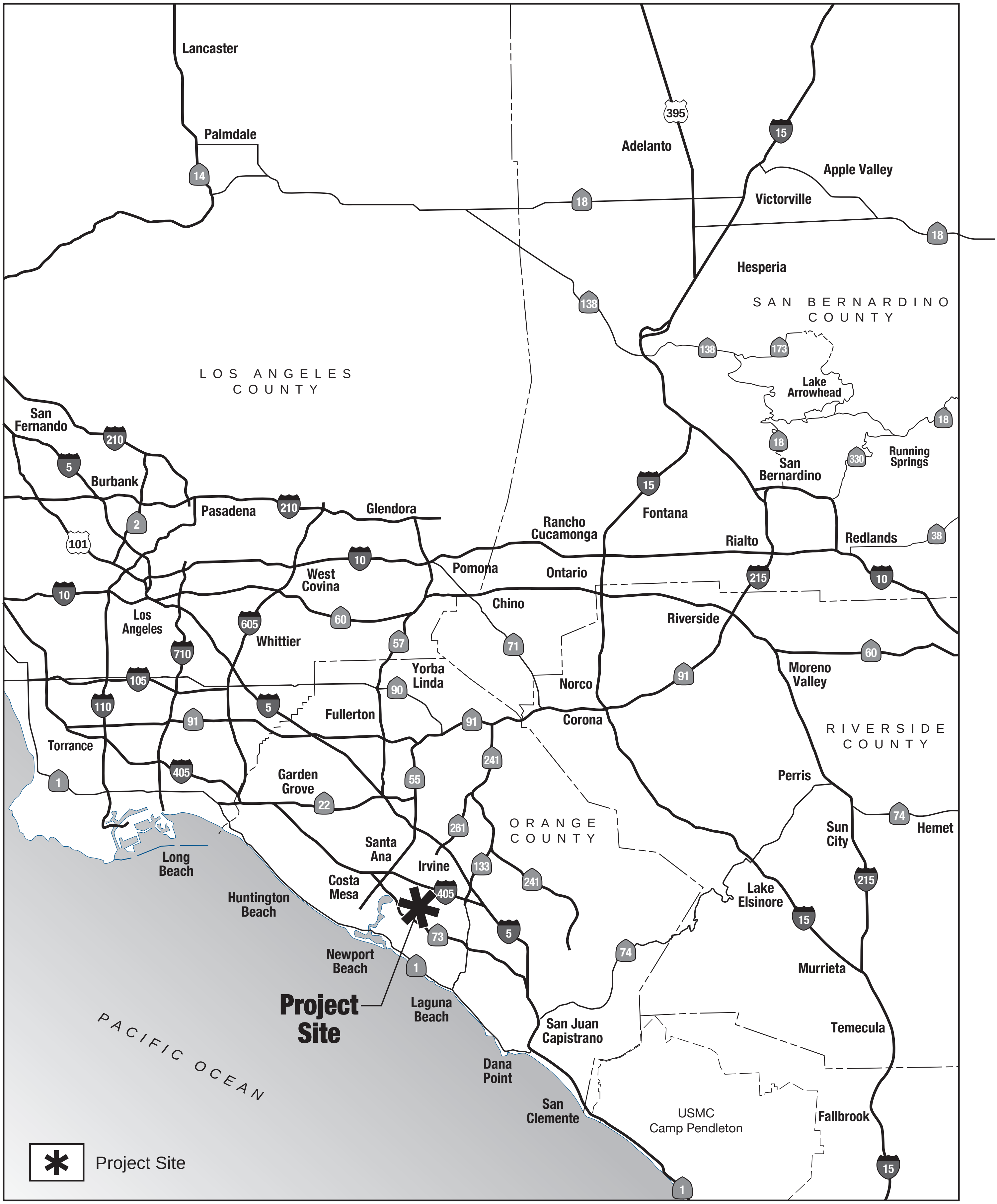
The north project site, which includes a portion of Phase 4a and all of Phase 4b, is located in the East Campus on the UCI campus. Off-campus residential, Cambridge Court, lies to the north across Campus Drive; open space and Vista del Campo Norte student housing lie to the east; Puerta del Sol student housing and the Early Childhood Education Center lie to the west across California Avenue; and Arroyo Vista student housing lies to the south across Arroyo Drive.

The south project site, which includes a portion of Phase 4a, is located directly south of the residential northern project site described above and within the East Campus. The Anteater Recreation Center and playfields lie to the north and northeast of the south project site, open space to the south and east, and Palo Verde student housing to the west across California Avenue; refer to Exhibit 2, *Site Vicinity*.

1.2 PROJECT DESCRIPTION

The project proposes two phases of construction (Phase 4a and Phase 4b) to develop two residential structures, a southern site surface parking lot, and a northern site parking structure with an associated maintenance shop. Phase 4a would demolish the existing 183-space AV-1 and 374-space CT parking lots to construct an approximately 600,000-gross-square-foot (GSF) residential structure with a community center, recreational facilities, circulation, and open space on the north project site. The structure would contain approximately 1,500 beds within 425 student apartments including bedrooms, kitchens, bathrooms, and living room space. A five-story parking structure with 550 spaces and a maintenance shop would be constructed to the east of the residential facility and long-term bicycle parking facility.

On the south project site, the existing nursery would be removed to construct a 250-space surface parking lot in order to replace those demolished at the north project site and extend the existing Arroyo Drive to a stop-controlled intersection at California Avenue. The 250 space parking lot and Arroyo Drive extension are optional elements of the project, but are included in this analysis. Phase 4b would construct an approximately 400,000-GSF residential structure with 950 beds in 250 apartment units, a community center, circulation, and open space east of the Phase 4a parking structure on the north project site; refer to Exhibit 3, *Conceptual Site Plan*.



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03/07/17 JN 158401 mas

UCI EAST CAMPUS PHASE 4 PROJECT
AIR QUALITY ASSESSMENT

Regional Vicinity

Exhibit 1

Source: Aerial - Google Earth Pro, March 2017

Michael Baker INTERNATIONAL

not to scale

03/07/17 JN 158401 mas

UCI EAST CAMPUS PHASE 4 PROJECT • AIR QUALITY ASSESSMENT

Site Vicinity

Exhibit 2

Source: KTGY, January 2017

Michael Baker INTERNATIONAL

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UCI EAST CAMPUS PHASE 4 PROJECT • AIR QUALITY ASSESSMENT

Conceptual Site Plan

Exhibit 3

2.0 ENVIRONMENTAL SETTING

The California Air Resources Board (CARB) divides the State into 15 air basins that share similar meteorological and topographical features. The project site lies within the northwestern portion of the South Coast Air Basin (Basin). The Basin is a 6,600-square mile area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties, in addition to the San Gorgonio Pass area in Riverside County. The Basin's terrain and geographical location (i.e., a coastal plain with connecting broad valleys and low hills) determine its distinctive climate.

The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. The climate is mild and tempered by cool sea breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The extent and severity of the air pollution problem in the Basin is a function of the area's natural physical characteristics (weather and topography), as well as man-made influences (development patterns and lifestyle). Factors such as wind, sunlight, temperature, humidity, rainfall, and topography all affect the accumulation and/or dispersion of pollutants throughout the Basin.

CLIMATE

The average annual temperature varies little throughout the Basin, averaging 75 degrees Fahrenheit (°F). However, with a less-pronounced oceanic influence, the eastern inland portions of the Basin show greater variability in annual minimum and maximum temperatures. All portions of the Basin have had recorded temperatures over 100°F in recent years.

Although the Basin has a semi-arid climate, the air near the surface is moist due to the presence of a shallow marine layer. Except for infrequent periods when dry, continental air is brought into the Basin by offshore winds, the ocean effect is dominant. Periods with heavy fog are frequent, and low stratus clouds, occasionally referred to as "high fog," are a characteristic climate feature. Annual average relative humidity is 70 percent at the coast and 57 percent in the eastern part of the Basin. Precipitation in the Basin is typically nine to 14 inches annually and is rarely in the form of snow or hail due to typically warm weather. The frequency and amount of rainfall is greater in the coastal areas of the Basin.

The height of the inversion is important in determining pollutant concentration. When the inversion is approximately 2,500 feet above sea level, the sea breezes carry the pollutants inland to escape over the mountain slopes or through the passes. At a height of 1,200 feet, the terrain prevents the pollutants from entering the upper atmosphere, resulting in a settlement in the foothill communities. Below 1,200 feet, the inversion puts a tight lid on pollutants, concentrating them in a shallow layer over the entire coastal basin. Usually, inversions are lower before sunrise than during the day. Mixing heights for inversions are lower in the summer and more persistent, being partly responsible for the high levels of ozone (O_3) observed during summer months in the Basin. Smog in southern California is generally the result of these temperature inversions combining with coastal day winds and local mountains to contain the pollutants for long periods of time, allowing them to form secondary pollutants by reacting with sunlight. The Basin has a limited ability to disperse these pollutants due to typically low wind speeds.

The area in which the project is located offers clear skies and sunshine, yet is still susceptible to air inversions. These inversions trap a layer of stagnant air near the ground, where it is then further loaded with pollutants. These inversions cause haziness, which is caused by moisture, suspended dust, and a variety of chemical aerosols emitted by trucks, automobiles, furnaces, and other sources.

Irvine experiences average high temperatures of up to 83 degrees (˚) Fahrenheit (F) during the month of August, and average low temperatures of 47 ˚F during the month of December. The City experiences approximately 14.42 inches of precipitation per year, with the most precipitation occurring in the month of February.[1]

[1] U.S. Climate Data, *Climate Irvine - California*, http://www.usclimatedata.com/climate/irvine/california/united-states/usca2494, accessed on March 8, 2017.

3.0 STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS

3.1 AMBIENT AIR QUALITY STANDARDS

CARB and the U.S. Environmental Protection Agency (EPA) establish ambient air quality standards for major pollutants at thresholds intended to protect public health. The standards for some pollutants are based on other values such as protection of crops or avoidance of nuisance conditions. Table 1, *State and National Ambient Air Quality Standards and Attainment Status*, summarizes the State California Ambient Air Quality Standards (CAAQS) and the Federal National Ambient Air Quality Standards (NAAQS).

CARB designates all areas within the State as either attainment (having air quality better than the CAAQS) or nonattainment (having a pollution concentration that exceeds the CAAQS more than once in three years). Likewise, the EPA designates all areas of the U.S. as either being in attainment of the NAAQS or nonattainment if pollution concentrations exceed the NAAQS. Because attainment/nonattainment is pollutant-specific, an area may be classified as nonattainment for one pollutant and attainment for another. Similarly, because the State and national standards differ, an area could be classified as attainment for the Federal standard of a pollutant while it may be nonattainment for the State standard of the same pollutant. Some areas are unclassified, which means no monitoring data are available. Unclassified areas are considered to be in attainment. The attainment status of SCAQMD for CAAQS and NAAQS for the area where the proposed project is located is shown in Table 1 and is discussed in more detail below under "Ambient Air Monitoring."

3.2 AMBIENT AIR MONITORING

CARB monitors ambient air quality at approximately 250 air monitoring stations across the state. Air quality monitoring stations usually measure pollutant concentrations ten feet aboveground level; therefore, air quality is often referred to in terms of ground-level concentrations. The project site is located within Source Receptor Area (SRA) 20, Central Orange County Coastal. The closest air monitoring station to the project site is the Costa Mesa – Mesa Verde Drive Monitoring Station. Local air quality data from 2013 to 2015 is provided in Table 2, *Summary of Air Quality Data*. This table lists the monitored maximum concentrations and number of exceedances of Federal/State air quality standards for each year.

Ozone. Ozone (O_3) occurs in two layers of the atmosphere. The layer surrounding the earth's surface is the troposphere. The troposphere extends approximately 10 miles above ground level, where it meets the second layer, the stratosphere. The stratospheric (the "good" ozone) layer extends upward from about ten to 30 miles and protects life on earth from the sun's harmful ultraviolet rays (UV-B). "Bad" ozone is a photochemical pollutant, and needs volatile organic compounds (VOCs), Nitrogen Oxides (NO_X) and sunlight to form; therefore, VOCs and NO_X are ozone precursors. VOCs and NO_X are emitted from various sources throughout the

Table 1
State and National Ambient Air Quality Standards and Attainment Status

Pollutant	Averaging Time	California[1]		Federal[2]	
		Standard[3]	Attainment Status	Standards[3, 4]	Attainment Status
Ozone (O_3)	1 Hour	0.09 ppm (180 $\mu g/m^3$)	Nonattainment	N/A[5]	N/A[5]
	8 Hours	0.070 ppm (137 $\mu g/m^3$)	Nonattainment	0.070 ppm (137 $\mu g/m^3$)	Extreme Nonattainment
Particulate Matter (PM_{10})	24 Hours	50 $\mu g/m^3$	Nonattainment	150 $\mu g/m^3$	Serious/Maintenance
	Annual Arithmetic Mean	20 $\mu g/m^3$	Nonattainment	N/A[6]	N/A[6]
Fine Particulate Matter ($PM_{2.5}$)[7]	24 Hours	No Separate State Standard		35 $\mu g/m^3$	Serious Nonattainment
	Annual Arithmetic Mean	12 $\mu g/m^3$	Nonattainment	12 $\mu g/m^3$	Moderate Nonattainment
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Attainment	35 ppm (40 mg/m^3)	Serious/Maintenance
	8 Hours	9.0 ppm (10 mg/m^3)	Attainment	9 ppm (10 mg/m^3)	Serious/Maintenance
Nitrogen Dioxide (NO_2)[8]	1 Hour	0.18 ppm (339 $\mu g/m^3$)	Unclassified/Attainment	0.100 ppm (188 $\mu g/m^3$)	Unclassified/Attainment
	Annual Arithmetic Mean	0.030 ppm (57 $\mu g/m^3$)	Attainment	0.053 ppm (100 $\mu g/m^3$)	Attainment/Maintenance
Lead (Pb)[9, 10]	30 days average	1.5 $\mu g/m^3$	Attainment	N/A	N/A
	Calendar Quarter	N/A	N/A	1.5 $\mu g/m^3$	Unclassified/Attainment
	Rolling 3-Month Average	N/A	N/A	0.15 $\mu g/m^3$	Unclassified/Attainment
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 $\mu g/m^3$)	Attainment	75 ppb (196 $\mu g/m^3$)	Designation Pending (Expect Unclassified/Attainment)
	24 Hours	0.04 ppm (105 $\mu g/m^3$)	Attainment	0.14 ppm (for certain areas)[12]	Unclassified/Attainment
	Annual Arithmetic Mean	N/A	N/A	0.030 ppm (for certain areas)	Unclassified/Attainment
Visibility-Reducing Particles[12]	8 Hours (10 a.m. to 6 p.m., PST)	Extinction coefficient = 0.23 km@<70% RH	Unclassified	No Federal Standards	
Sulfates	24 Hour	25 $\mu g/m^3$	Attainment	No Federal Standards	
Hydrogen Sulfide	1 Hour	0.03 ppm (42 $\mu g/m^3$)	Attainment	No Federal Standards	
Vinyl Chloride[9, 10]	24 Hour	0.01 ppm (26 $\mu g/m^3$)	Attainment	No Federal Standards	

$\mu g/m^3$ = micrograms per cubic meter; ppm = parts per million; ppb = parts per billion; km = kilometer(s); RH = relative humidity; PST = Pacific Standard Time; N/A = Not Applicable

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, suspended particulate matter-PM_{10} and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations. In 1990, CARB identified vinyl chloride as a toxic air contaminant, but determined that there was not sufficient available scientific evidence to support the identification of a threshold exposure level. This action allows the implementation of health-protective control measures at levels below the 0.010 ppm ambient concentration specified in the 1978 standard.
2. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. The EPA also may designate an area as attainment/unclassifiable, if: (1) it has monitored air quality data that show that the area has not violated the ozone standard over a three-year period; or (2) there is not enough information to determine the air quality in the area. For PM_{10}, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 mg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 mm of mercury. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 mm of mercury (1,013.2 millibar); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.
5. The Federal 1-hour ozone standard was revoked on June 15, 2005 in all areas except the 14 8-hour ozone nonattainment Early Action Compact (EAC) areas.
6. The EPA revoked the annual PM_{10} standard in 2006 (effective December 16, 2006).
7. On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM_{10} standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
8. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved. Note that the 1-hour national standard is in units of ppb. California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
9. CARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
10. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average.
11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved. Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
12. In 1989, CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Source: California Air Resources Board, March 2017, and U.S. Environmental Protection Agency, March 2017.

Table 2
Summary of Air Quality Data

Pollutant	California Standard	Federal Primary Standard	Year	Maximum Concentration[3]	Days (Samples) State/Federal Std. Exceeded
Ozone (O_3)[1] (1-hour)	0.09 ppm for 1 hour	NA[6]	2013 2014 2015	0.095 ppm 0.096 0.099	1/0 1/0 1/0
Ozone (O_3)[1] (8-hour)	0.070 ppm for 8 hours	0.070 ppm for 8 hours	2013 2014 2015	0.084 ppm 0.080 0.080	2/1 6/4 2/1
Carbon Monoxide (CO)[1] (1-hour)	20 ppm for 1 hour	35 ppm for 1 hour	2013 2014 2015	2.44 ppm 2.68 2.98	0/0 0/0 0/0
Carbon Monoxide (CO)[1] (8-hour)	9.0 ppm for 8 hours	9.0 ppm for 8 hours	2013 2014 2015	NA NA NA	NA/NA NA/NA NA/NA
Nitrogen Dioxide (NO_2)[1]	0.18 ppm for 1 hour	0.100 ppm for 1 hour	2013 2014 2015	0.076 ppm 0.060 0.052	0/0 0/0 0/0
Fine Particulate Matter ($PM_{2.5}$)[2, 4]	No Separate Standard	35 μg/m³ for 24 hours	2013 2014 2015	28.0 μg/m³ 25.5 31.5	NA/[6] NA/[6] NA/[6]
Particulate Matter (PM_{10})[2, 4, 5]	50 μg/m³ for 24 hours	150 μg/m³ for 24 hours	2013 2014 2015	51.0 μg/m³ 541.0 49.0	0/0 0/0 0/0

Source: Aerometric Data Analysis and Measurement System (ADAM), summaries from 2013 to 2015, https://www.arb.ca.gov/adam.

ppm = parts per million; PM_{10} = particulate matter 10 microns in diameter or less; NM = not measured; μg/m³ = micrograms per cubic meter; $PM_{2.5}$ = particulate matter 2.5 microns in diameter or less; NA = not applicable; * = data not available.

Notes:
1. Data collected from the Costa Mesa – Mesa Verde Drive Monitoring Station located at 2850 Mesa Verde Drive, Costa Mesa, California 92626.
2. Data collected from the Mission Viejo – 2601 Via Pera Monitoring Station located at 26081 Via Pera, Mission Viejo, CA 92691.
3. Maximum concentration is measured over the same period as the California Standards.
4. PM_{10} exceedances are based on State thresholds established prior to amendments adopted on June 20, 2002.
5. PM_{10} and $PM_{2.5}$ exceedances are derived from the number of samples exceeded, not days.
6. The Federal standard was revoked in June 2005.

City. Significant ozone formation generally requires an adequate amount of precursors in the atmosphere and several hours in a stable atmosphere with strong sunlight.

Many respiratory ailments, as well as cardiovascular disease, are aggravated by exposure to high ozone levels. Ozone also damages natural ecosystems (such as forests and foothill plant communities) and damages agricultural crops and some man-made materials (such as rubber, paint, and plastics). Societal costs from ozone damage include increased healthcare costs, the loss of human and animal life, accelerated replacement of industrial equipment and reduced crop yields.

Carbon Monoxide. Carbon monoxide (CO) is an odorless, colorless toxic gas that is emitted by mobile and stationary sources as a result of incomplete combustion of hydrocarbons or other carbon-based fuels. In cities, automobile exhaust can cause as much as 95 percent of all CO emissions. At high concentrations, CO can reduce the oxygen-carrying capacity of the blood and cause headaches, dizziness, and unconsciousness.

Nitrogen Dioxide. Nitrogen oxides (NO_X) are a family of highly reactive gases that are a primary precursor to the formation of ground-level O_3, and react in the atmosphere to form acid rain. NO_2 (often used interchangeably with NO_X) is a reddish-brown gas that can cause breathing difficulties at high levels. Peak readings of NO_2 occur in areas that have a high concentration of combustion sources (e.g., motor vehicle engines, power plants, refineries, and other industrial operations).

NO_2 can irritate and damage the lungs, and lower resistance to respiratory infections such as influenza. The health effects of short-term exposure are still unclear. However, continued or frequent exposure to NO_2 concentrations that are typically much higher than those normally found in the ambient air may increase acute respiratory illnesses in children and increase the incidence of chronic bronchitis and lung irritation. Chronic exposure to NO_2 may aggravate eyes and mucus membranes and cause pulmonary dysfunction.

Coarse Particulate Matter (PM_{10}). PM_{10} refers to suspended particulate matter, which is smaller than ten microns or ten one-millionths of a meter. PM_{10} arises from sources such as road dust, diesel soot, combustion products, construction operations, and dust storms. PM_{10} scatters light and significantly reduces visibility. In addition, these particulates penetrate the lungs and can potentially damage the respiratory tract. On June 19, 2003, CARB adopted amendments to the statewide 24-hour particulate matter standards based upon requirements set forth in the Children's Environmental Health Protection Act (SB 25).

Fine Particulate Matter ($PM_{2.5}$). Due to increased concerns over health impacts related to fine particulate matter (particulate matter 2.5 microns in diameter or less), both State and Federal $PM_{2.5}$ standards have been created. Particulate matter impacts primarily affect infants, children, the elderly, and those with pre-existing cardiopulmonary disease. In 1997, the EPA announced new $PM_{2.5}$ standards. Industry groups challenged the new standard in court and the implementation of the standard was blocked. However, upon appeal by the EPA, the U.S. Supreme Court reversed this decision and upheld the EPA's new standards.

On June 20, 2002, CARB adopted amendments for statewide annual ambient particulate matter air quality standards. These standards were revised/established due to increasing concerns by CARB that previous standards were inadequate, as almost everyone in California is exposed to levels at or above the current State standards during some parts of the year, and the statewide potential for significant health impacts associated with particulate matter exposure was determined to be large and wide-ranging.

Reactive Organic Gases and Volatile Organic Compounds. Hydrocarbons are organic gases that are formed solely of hydrogen and carbon. There are several subsets of organic gases including reactive organic gases (ROGs) and VOCs. Both ROGs and VOCs are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels. The major sources of hydrocarbons are combustion engine exhaust, oil refineries, and oil-fueled power plants; other common sources are petroleum fuels, solvents, dry cleaning solutions, and paint (via evaporation).

3.3 SENSITIVE RECEPTORS

Sensitive populations are more susceptible to the effects of air pollution than is the general population. Sensitive populations (sensitive receptors) that are in proximity to localized sources of toxics and CO are of particular concern. Land uses considered sensitive receptors include residences, schools, playgrounds, childcare centers, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Table 3, *Sensitive Receptors*, lists the distances and locations of sensitive receptors within the project vicinity. The distances depicted in Table 3 are based on the distance from the project site to the outdoor activity area of the closest receptor.

Table 3
Sensitive Receptors

Type	Name	Distance from Project Site (feet)[1]	Direction from Project Site	Location
Residential	Residential Uses	130 feet	North	North of Campus Drive
		117 feet	East	Southwest corner of Campus Drive and Culver Drive
		110 feet	South	South of Arroyo Drive
		330 feet	West	South of Campus Drive
Schools	University High School	1,100 feet	Northeast	4771 Campus Drive
	Turtle Rock Elementary School	3,100 feet	Southeast	5151 Amalfi Drive
	Turtle Rock Preschool	3,050 feet	East	1 Concordia
	Montessori Schools of Irvine	3,250 feet	Southwest	101 Russell Place
	Tarbut V'Torah Community Day School	5,250 feet	South	5200 Bonita Canyon Drive
Places of Worship	Bethel Korean Church	4,600 feet	Northwest	18700 Harvard Avenue
	St. Elizabeth Ann Seton Church	2,260 feet	Northeast	9 Hillgate
	Good Shepherd Chapel	4,240 feet	Northeast	1530 Concordia
	Light of Christ Lutheran Church	4,740 feet	North	18182 Culver Drive
	University United Methodist Church	3,070 feet	North	18422 Culver Drive
Parks/Recreational Areas	William R Mason Regional Park	3,450 feet	Northwest	18712 University Drive
	University Community Park	4,300 feet	Northeast	1 Beech Tree Lane
	Aldrich Park	4,060 feet	Southwest	Near Ring Road
	Stanford Park	4,400 feet	Northwest	North of Campus Drive
	Anteater Recreation Center	1,360 feet	South	East of California Avenue

Note:
1. Distances are measured from the exterior project boundary only and not from individual construction areas within the interior of the project site.

Source: Google Earth, 2017.

4.0 REGULATORY SETTING

4.1 FEDERAL

Air quality is federally protected by the Clean Air Act and its amendments. Under the Federal Clean Air Act (FCAA), the EPA developed the primary and secondary NAAQS for the criteria air pollutants including ozone, NO_2, CO, SO_2, PM_{10}, $PM_{2.5}$, and lead. Proposed projects in or near nonattainment areas could be subject to more stringent air-permitting requirements. The Clean Air Act requires each state to prepare a State Implementation Plan (SIP) to demonstrate how it will attain the NAAQS within the federally imposed deadlines.

The EPA can withhold certain transportation funds from states that fail to comply with the planning requirements of the Clean Air Act. If a state fails to correct these planning deficiencies within two years of Federal notification, the EPA is required to develop a Federal implementation plan for the identified nonattainment area or areas. The provisions of 40 CFR Parts 51 and 93 apply in all nonattainment and maintenance areas for transportation-related criteria pollutants for which the area is designated nonattainment or has a maintenance plan. The EPA has designated enforcement of air pollution control regulations to the individual states.

4.2 STATE

In 1988, the California Clean Air Act (CCAA) was adopted and led to the establishment of CAAQS for the same major pollutants as the NAAQS and standards for visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. There are currently no NAAQS for these latter pollutants. CARB is responsible for enforcing air pollution regulations in California. The CCAA requires all air pollution control districts in California to endeavor to achieve and maintain state ambient air-quality standards by the earliest practicable date and to develop plans and regulations specifying how they will meet this goal.

4.3 REGIONAL

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

The *2016 Air Quality Management Plan* (2016 AQMP), which was adopted in March 2017, proposes policies and measures to achieve federal and state standards for improved air quality in the South Coast Air Basin and those portions of the Salton Sea Air Basin (formerly named the Southeast Desert Air Basin) that are under the South Coast Air Quality Management District's (SCAQMD's) jurisdiction. The AQMP relies on a regional and multi-level partnership of governmental agencies at the federal, state, regional, and local level. These agencies (EPA, CARB, local governments, Southern California Association of Governments [SCAG], and the SCAQMD) are the primary agencies that implement the AQMP programs. The 2016 AQMP incorporates the latest scientific and technical information and planning assumptions, including the 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy, updated emission inventory methodologies for various source categories, and SCAG's latest growth forecasts.

The 2016 AQMP addresses several state and federal planning requirements, incorporating new scientific information, primarily in the form of updated emissions inventories, ambient measurements, and new meteorological air quality models. The 2016 AQMP highlights the reductions and the interagency planning necessary to identify additional strategies, especially in the area of mobile sources, to meet all federal criteria pollutant standards within the timeframes allowed under Federal Clean Air Act. The primary task of the 2016 AQMP is to bring the Basin into attainment with federal health-based standards.

4.4 LOCAL

University of California, Irvine

<u>Environmental Health and Safety Department</u>

UCI's Environmental Health and Safety (EH&S) Department is responsible for implementing UCI's Clean Air Program which assesses and facilitates UCI's compliance with air quality laws and regulations. In addition to the permitting programs required by California law and SCAQMD rules, UCI is required to implement a federal operating permit program, which meets federal EPA regulations adopted pursuant to Title V of the FCAA Amendments. Title V Program activities include assisting with SCAQMD Permit to Operate administration; monitoring, record keeping, and reporting activities; and developing regulatory programs and informational guidelines to ensure the campus remains in compliance with State and federal regulations.

Several different departments at UCI are involved with this program. Academic department chairs and directors are responsible for reporting new air emission sources to EH&S and maintaining records. Facilities Management and Design and Construction Services provide building and renovation plans to EH&S for review and also report new air emission sources to EH&S. Parking and Transportation Services, while not directly involved with the Clean Air Program, reduce air emissions by implementing the Alternative Transportation Program to reduce vehicular traffic and associated emissions.

5.0 POTENTIAL AIR QUALITY IMPACTS

CEQA THRESHOLDS

The environmental analysis in this section is patterned after the Initial Study Checklist recommended by the State *CEQA Guidelines*, as amended. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this section. Accordingly, a project may create a significant environmental impact if it causes one or more of the following to occur:

- Conflict with or obstruct implementation of the applicable air quality plan (refer to Impact Statement AQ-1);
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation (refer to Impact Statement AQ-2);
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable Federal or State ambient air quality standard (including releasing emissions that exceed quantitative thresholds for O_3 precursors) (refer to Impact Statement AQ-3);
- Expose sensitive receptors to substantial pollutant concentrations (refer to Impact Statement AQ-4);
- Create objectionable odors affecting a substantial number of people (refer to Impact Statement AQ-5);

Based on these standards and thresholds, the effects of the proposed project have been categorized as either a "less than significant impact" or a "potentially significant impact." Mitigation measures are recommended for potentially significant impacts.

AIR QUALITY THRESHOLDS

Under CEQA, the SCAQMD is an expert commenting agency on air quality within its jurisdiction or impacting its jurisdiction. Under the FCAA, the SCAQMD has adopted Federal attainment plans for O_3 and $PM_{2.5}$. The SCAQMD reviews projects to ensure that they would not: (1) cause or contribute to any new violation of any air quality standard; (2) increase the frequency or severity of any existing violation of any air quality standard; or (3) delay timely attainment of any air quality standard or any required interim emission reductions or other milestones of any Federal attainment plan.

The *CEQA Air Quality Handbook* also provides significance thresholds for both construction and operation of projects within the SCAQMD jurisdictional boundaries. If the SCAQMD thresholds are exceeded, a potentially significant impact could result. However, ultimately the lead agency determines the thresholds of significance for impacts. If a project proposes development in excess of the established thresholds, as outlined in Table 4, *South Coast Air Quality Management District Emissions Thresholds*, a significant air quality impact may occur and additional analysis is warranted to fully assess the significance of impacts.

Table 4
South Coast Air Quality Management District Emissions Thresholds

Phase	Pollutant (lbs/day)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Construction	75	100	550	150	150	55
Operational	55	55	550	150	150	55
Source: South Coast Air Quality Management District, CEQA Air Quality Handbook, November 1993.						

Local Carbon Monoxide Standards

The significance of localized project impacts depends on whether ambient CO levels in the vicinity of the project are above or below State and Federal CO standards, as follows:

- If the project causes an exceedance of either the State one-hour or eight-hour CO concentrations, the project would be considered to have a significant local impact.

- If ambient levels already exceed a State or Federal standard, then project emissions would be considered significant if they increase one-hour CO concentrations by 1.0 ppm or more, or eight-hour CO concentrations by 0.45 ppm or more.

Localized Significance Thresholds

Localized Significance Thresholds (LSTs) were developed in response to SCAQMD Governing Boards' Environmental Justice Enhancement Initiative (I-4). The SCAQMD provided the *Final Localized Significance Threshold Methodology* (dated July 2008) for guidance. The LST methodology assists lead agencies in analyzing localized impacts associated with project-specific level proposed projects. The SCAQMD provides the LST lookup tables for one-, two-, and five-acre projects emitting CO, NO_X, or PM_{10}. The LST methodology and associated mass rates are not designed to evaluate localized impacts from mobile sources traveling over the roadways. The SCAQMD recommends that any project over five acres should perform air quality dispersion modeling to assess impacts to nearby sensitive receptors.

Cumulative Emissions Thresholds

The SCAQMD's 2016 AQMP was prepared to accommodate growth, meet State and Federal air quality standards, and minimize the fiscal impact that pollution control measures have on the local economy. According to the SCAQMD *CEQA Air Quality Handbook*, project-related emissions that fall below the established construction and operational thresholds should be considered less than significant unless there is pertinent information to the contrary. If a project exceeds these emission thresholds, the SCAQMD *CEQA Air Quality Handbook* states that the significance of a project's contribution to cumulative impacts should be determined based on whether the rate of growth in average daily trips exceeds the rate of growth in population.

AQ-1 CONFLICT WITH OR OBSTRUCT IMPLEMENTATION OF THE APPLICABLE AIR QUALITY PLAN?

Level of Significance Before Mitigation: *Potentially Significant Impact.*

On March 3, 2017, the SCAQMD Governing Board approved the 2016 AQMP, which outlines its strategies for meeting the NAAQS for $PM_{2.5}$ and ozone. According to the SCAQMD CEQA Air Quality Handbook, in order to determine consistency with the AQMP, two main criteria must be addressed.

Criterion 1:

With respect to the first criterion, SCAQMD methodologies require that an air quality analysis for a project include forecasts of project emissions in relation to contributing to air quality violations and delay of attainment.

a) *Would the project result in an increase in the frequency or severity of existing air quality violations?*

   Since the consistency criteria identified under the first criterion pertain to pollutant concentrations, rather than to total regional emissions, an analysis of a project's pollutant emissions relative to localized pollutant concentrations is used as the basis for evaluating project consistency. As discussed in Impact Statement AQ-4, below, localized concentrations of CO, NO_X, PM_{10}, and $PM_{2.5}$ would be less than significant during project operations. Therefore, the proposed project would not result in an increase in the frequency or severity of existing air quality violations. Because reactive organic gases (ROGs) are not a criteria pollutant, there is no ambient standard or localized threshold for ROGs. Due to the role ROG plays in ozone formation, it is classified as a precursor pollutant and only a regional emissions threshold has been established.

b) *Would the project cause or contribute to new air quality violations?*

   As discussed in Impact Statement AQ-2, operations of the proposed project would result in emissions that would be below the SCAQMD operational thresholds. Therefore, the proposed project would not have the potential to cause or affect a violation of the ambient air quality standards.

c) *Would the project delay timely attainment of air quality standards or the interim emissions reductions specified in the AQMP?*

The proposed project would result in less than significant impacts with regard to localized concentrations during project operations. As such, the proposed project would not delay the timely attainment of air quality standards or 2016 AQMP emissions reductions.

Criterion 2:

With respect to the second criterion for determining consistency with SCAQMD and SCAG air quality policies, it is important to recognize that air quality planning within the Basin focuses on attainment of ambient air quality standards at the earliest feasible date. Projections for achieving air quality goals are based on assumptions regarding population, housing, and growth trends. Thus, the SCAQMD's second criterion for determining project consistency focuses on whether or not the proposed project exceeds the assumptions utilized in preparing the forecasts presented in the 2016 AQMP. Determining whether or not a project exceeds the assumptions reflected in the 2016 AQMP involves the evaluation of the three criteria outlined below. The following discussion provides an analysis of each of these criteria.

a) *Would the project be consistent with the population, housing, and employment growth projections utilized in the preparation of the AQMP?*

In the case of the 2016 AQMP, several sources of data form the basis for the projections of air pollutant emissions including: the *City of Irvine General Plan* (General Plan), UCI's *2007 Long Range Development Plan* (LRDP), SCAG's *Growth Management* Chapter of the *Regional Comprehensive Plan* (RCP), and SCAG's *2016-2040 Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS). The RTP/SCS also provides socioeconomic forecast projections of regional population growth. The General Plan Land Use Map designates the project site as "Educational Facilities", and the LRDP designates the site as Mixed Use - Neighborhood. According to the LRDP, the Student Housing designation permits residential facilities intended to accommodate single undergraduate and graduate students, student groups (including fraternities, sororities, and academically-themed collectives), students with families, and other University affiliates. Other permitted uses include residential parking, child care and pre-school facilities, recreation facilities, meeting and classroom space, food service and retail, and other residential support uses. The project proposes to construct two residential structures ranging from one to five stories and totaling 1,000,000 GSF. The project would provide student housing and community facilities for UCI students, and therefore complies with the site's intended use. Additionally, the project would be consistent with the City's General Plan and UCI's LRDP and assumed emissions for the project site, since no change in the site's land use designation is proposed. Thus, the project is generally consistent with the types, intensity, and patterns of land use envisioned for the site vicinity in the RCP. The population, housing, and employment forecasts, which are adopted by SCAG's Regional Council, are based on the local plans and policies applicable to the cities; these are used by SCAG in all phases of implementation and review. Additionally, as SCAQMD incorporated these same projections into the 2016 AQMP, it can be concluded that the project would be consistent with the projections. As a result, the project would not exceed growth assumptions within the City's General Plan. Therefore, the project would be consistent with the 2016 AQMP and a less than significant impact would occur.

b) *Would the project implement all feasible air quality mitigation measures?*

Compliance with all feasible emission reduction measures identified by the SCAQMD would be required as identified in Impact Statement AQ-2 and AQ-3. As such, the proposed project would meet this AQMP consistency criterion.

c) *Would the project be consistent with the land use planning strategies set forth in the AQMP?*

The project is consistent with the LRDP land use designations for the site, and would serve to implement various LRDP policies. Compliance with emission reduction measures identified by the SCAQMD would be required as identified in Impact Statement AQ-2 and Impact Statement AQ-3. As such, the proposed project meets this AQMP consistency criterion.

In conclusion, the determination of 2016 AQMP consistency is primarily concerned with the long-term influence of a project on air quality in the Basin. The proposed project would not result in a long-term impact on the region's ability to meet State and Federal air quality standards. Also, the proposed project would be consistent with the goals and policies of the AQMP for control of fugitive dust. As discussed above, the proposed project's long-term influence would also be consistent with the SCAQMD and SCAG's goals and policies and is, therefore, considered consistent with the 2016 AQMP.

Mitigation Measures: Refer to Mitigation Measures AQ-1, below.

Level of Significance After Mitigation. *Less Than Significant Impact.*

AQ-2 VIOLATE ANY AIR QUALITY STANDARDS OR CONTRIBUTE SUBSTANTIALLY TO AN EXISTING OR PROJECTED AIR QUALITY VIOLATION?

Level of Significance Before Mitigation: *Potentially Significant Impact.*

SHORT-TERM CONSTRUCTION

Short-term air quality impacts are predicted to occur during grading and construction operations associated with implementation of the proposed project. Temporary air emissions would result from the following activities:

- Particulate (fugitive dust) emissions from grading and building construction; and
- Exhaust emissions from the construction equipment and the motor vehicles of the construction crew.

Construction Phase 4A proposes to develop a 600,000 GSF residential structure; a northern site 550-space parking structure and adjoining maintenance shop; and a southern site 250-space surface parking lot with an adjoining Arroyo Drive roadway extension. Phase 4B of construction would consist of the development of a 400,000 GSF residential structure. Construction would involve activities associated with demolition of the paved area, site preparation, grading, building construction, paving and architectural coating. Site grading would require approximately 75,000 cubic yards of soil export off-site and 14,000 cubic yards of fill. Project construction equipment would include excavators, graders, dozers, scrapers, and tractors/loaders/backhoes during grading; rough terrain forklifts, cranes, tractors/loaders/backhoes, and welders during building construction; pavers, paving equipment, and rollers during paving; and air compressors during architectural coating. Emissions for each construction phase have been quantified based upon the phase durations and equipment types. The analysis of daily construction emissions has been prepared utilizing the California Emissions Estimator Model (CalEEMod) version 2016.3.1. Refer to Appendix A, *Air Quality Emissions Data*, for the CalEEMod outputs and results. Table 5, *Short-Term (Construction) Emissions*, presents the anticipated daily short-term construction emissions.

Fugitive Dust Emissions

Construction activities are a source of fugitive dust (PM_{10} and $PM_{2.5}$) emissions that may have a substantial, temporary impact on local air quality. In addition, fugitive dust may be a nuisance to those living and working in the project area. Fugitive dust emissions are associated with land clearing, ground excavation, cut-and-fill, and truck travel on unpaved roadways (including demolition as well as construction activities). Fugitive dust emissions vary substantially from day to day, depending on the level of activity, specific operations, and weather conditions. Fugitive dust from grading and construction is expected to be short-term and would cease upon project completion. Additionally, most of this material is inert silicates, rather than the complex organic particulates released from combustion sources, which are more harmful to health.

Table 5
Short-Term (Construction) Emissions

Emissions Source	Pollutant (pounds/day) [1, 2]					
	ROG[3]	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
2017						
Unmitigated Emissions	6.06	75.75	41.33	0.07	9.53	6.24
Mitigated Emissions	6.06	75.75	41.33	0.07	5.97	4.33
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Is Threshold Exceeded After Mitigation?	*No*	*No*	*No*	*No*	*No*	*No*
2018						
Unmitigated Emissions	9.64	67.10	68.87	0.21	16.58	5.84
Mitigated Emissions	9.64	67.10	68.87	0.21	16.58	5.63
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Is Threshold Exceeded After Mitigation?	*No*	*No*	*No*	*No*	*No*	*No*
2019						
Unmitigated Emissions	51.22	48.40	63.85	0.21	16.35	5.41
Mitigated Emissions	51.22	48.40	63.85	0.21	16.35	5.41
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Is Threshold Exceeded After Mitigation?	*No*	*No*	*No*	*No*	*No*	*No*
2020						
Unmitigated Emissions	51.12	33.68	46.59	0.14	11.17	3.89
Mitigated Emissions	51.12	33.68	46.59	0.14	11.17	3.89
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Is Threshold Exceeded After Mitigation?	*No*	*No*	*No*	*No*	*No*	*No*
2021						
Unmitigated Emissions	44.27	30.48	44.25	0.14	10.96	3.69
Mitigated Emissions	44.27	30.48	44.25	0.14	10.96	3.69
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Is Threshold Exceeded After Mitigation?	*No*	*No*	*No*	*No*	*No*	*No*

Notes:
1. Emissions were calculated using CalEEMod, as recommended by the SCAQMD.
2. The reduction/credits for construction emission mitigations are based on mitigation included in CalEEMod and as typically required by the SCAQMD. The mitigation includes the following: properly maintain mobile and other construction equipment; replace ground cover in disturbed areas quickly; water exposed surfaces three times daily; cover stock piles with tarps; water all haul roads twice daily; and limit speeds on unpaved roads to 15 miles per hour.
3. Both ROGs and VOCs are subsets of organic gases that are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels. Although they represent slightly different subsets of organic gases, they are used interchangeably for the purposes of this analysis.

Refer to Appendix A, *Air Quality Emissions Data*, for assumptions used in this analysis.

Dust (larger than 10 microns) generated by such activities usually becomes more of a local nuisance than a serious health problem. Of particular health concern is the amount of PM_{10} (particulate matter smaller than 10 microns) generated as a part of fugitive dust emissions. PM_{10} poses a serious health hazard alone or in combination with other pollutants. Fine Particulate Matter ($PM_{2.5}$) is mostly produced by mechanical processes. These include automobile tire wear, industrial processes such as cutting and grinding, and re-suspension of particles from the ground or road surfaces by wind and human activities such as construction or agriculture. $PM_{2.5}$ is mostly derived from combustion sources, such as automobiles, trucks, and other vehicle exhaust, as well as from stationary sources. These particles are either directly emitted or are formed in the atmosphere from the combustion of gases such as NO_X and SO_X combining with ammonia. $PM_{2.5}$ components from material in the earth's crust, such as dust, are also present, with the amount varying in different locations.

Mitigation Measure AQ-1 would require the project contractor to implement construction emissions Best Management Practices (BMPs) during construction, including, but not limited to, dust control techniques (i.e., daily watering), a traffic management plan, and adherence to SCAQMD Rules 402 and 403 (which require watering of inactive and perimeter areas, track out requirements, etc.), to reduce PM_{10} and $PM_{2.5}$ concentrations. It is noted that the BMPs required in Mitigation Measure AQ-1 are applicable measures from LRDP EIR Mitigation Measure Air-2B. These are standard dust control measures that the SCAQMD requires for all projects. As indicated in Table 5, total PM_{10} and $PM_{2.5}$ emissions would be below the SCAQMD threshold with the implementation of Mitigation Measure AQ-1. Therefore, particulate matter impacts during construction would be less than significant.

ROG Emissions[2]

In addition to gaseous and particulate emissions, the application of asphalt and surface coatings creates ROG emissions, which are O_3 precursors. In accordance with the methodology prescribed by the SCAQMD, the ROG emissions associated with paving have been quantified with CalEEMod. Architectural coatings were also quantified with CalEEMod based upon the size of the buildings.

The highest concentration of ROG emissions would be generated during the application of architectural coatings on the building. As required by law, all architectural coatings for the proposed project structures would comply with SCAQMD Regulation XI, Rule 1113 – Architectural Coating.[3] Rule 1113 provides specifications on painting practices as well as regulates the ROG content of paint. As shown in Table 5, project construction would not result in an exceedance of ROG emissions during any years of construction. Therefore, impacts would be less than significant in this regard.

Construction Equipment and Worker Vehicle Exhaust

Exhaust emissions from construction activities include emissions associated with the transport of machinery and supplies to and from the project site, emissions produced on-site as the equipment is used, and emissions from trucks transporting materials to and from the site.

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[2] ROGs and VOCs are subsets of organic gases that are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels. Although they represent slightly different subsets of organic gases, they are used interchangeably for the purposes of this analysis.

[3] South Coast Air Quality Management District, *Regulation XI Source Specific Standards*, http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1113.pdf?sfvrsn=15, accessed on March 8, 2017.

Standard SCAQMD regulations, such as maintaining all construction equipment in proper tune, shutting down equipment when not in use for extended periods of time, and implementing SCAQMD Rule 403 would be adhered to. As noted in Table 5, construction equipment exhaust would not exceed SCAQMD thresholds. Therefore, impacts are less than significant in this regard.

Naturally Occurring Asbestos

Asbestos is a term used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California. Asbestos is classified as a known human carcinogen by State, Federal, and international agencies and was identified as a toxic air contaminant by the California Air Resources Board in 1986.

Asbestos can be released from serpentinite and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. These rocks have been commonly used for unpaved gravel roads, landscaping, fill projects, and other improvement projects in some localities. Asbestos may be released to the atmosphere due to vehicular traffic on unpaved roads, during grading for development projects, and at quarry operations. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed. According to the Department of Conservation Division of Mines and Geology, *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos Report* (August 2000), serpentinite and ultramafic rocks are not known to occur within the project area. Thus, there would be no impact in this regard.

Construction Odors

Potential odors could arise from the diesel construction equipment used on-site, as well as from architectural coatings and asphalt off-gassing. Odors generated from the referenced sources are common in the man-made environment and are not known to be substantially offensive to adjacent receptors. Additionally, odors generated during construction activities would be temporary and would decrease rapidly. Therefore, construction odors are not considered to be a significant impact.

Total Daily Construction Emissions

In accordance with the SCAQMD Guidelines, CalEEMod was utilized to model construction emissions for ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$. Construction Phase 4A and Phase 4B would span 44 months; Phase 4A construction would start in August of 2017 and be completed in 24 months; Phase 4B construction would start after the completion of Phase 4a, in fall of 2019 at the earliest, and be completed in 20 months. The greatest emissions would be generated during the initial stages of construction. Additionally, the greatest amount of ROG emissions would typically occur during the final stages of development due to the application of architectural coatings.

CalEEMod allows the user to input mitigation measures such as watering the construction area to limit fugitive dust. Mitigation measures that were input into CalEEMod allow for certain reduction credits and result in a decrease of pollutant emissions. Reduction credits are based upon studies developed by CARB, SCAQMD, and other air quality management districts throughout California, and were programmed within CalEEMod. As indicated in Table 5, CalEEMod calculates the reduction associated with recommended mitigation measures. As depicted in Table 5, construction emissions would be less than significant with implementation of Mitigation Measure AQ-1. Thus, construction related air emissions would be less than significant.

LONG-TERM OPERATIONAL EMISSIONS

Mobile Source Emissions

Mobile sources are emissions from motor vehicles, including tailpipe and evaporative emissions. Depending upon the pollutant being discussed, the potential air quality impact may be of either regional or local concern. For example, ROG, NO_X, SO_X, PM_{10}, and $PM_{2.5}$ are all pollutants of regional concern (NO_X and ROG react with sunlight to form O_3 [photochemical smog], and wind currents readily transport SO_X, PM_{10}, and $PM_{2.5}$). However, CO tends to be a localized pollutant, dispersing rapidly at the source.

Project-generated vehicle emissions have been estimated using CalEEMod. Trip generation rates associated with the project were based on traffic data within the *UCI East Campus Student Apartments Phase 4 Traffic Study* (Traffic Study) for the proposed project, prepared by Stantec Consulting Services (dated March 2017). The proposed project would result in approximately 2,310 new daily trips. Table 6, *Long-Term Air Emissions*, presents the anticipated mobile source emissions. As shown in Table 6, mitigated emissions generated by vehicle traffic associated with the proposed project would not exceed established SCAQMD regional thresholds.

Table 6
Long-Term Air Emissions

Source	Estimated Emissions (pounds/day) [1]					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Area Sources	28.24	2.35	203.21	0.01	1.11	1.11
Energy Sources	0.69	5.91	2.51	0.04	0.48	0.48
Mobile Sources	3.20	11.00	29.90	0.08	7.11	1.97
Total Emissions	32.14	19.27	235.63	0.13	8.70	3.56
SCAQMD Threshold	*55*	*55*	*550*	*150*	*150*	*55*
Is Threshold Exceeded? (Significant Impact)	No	No	No	No	No	No

Notes:
1. Based on CalEEMod modeling results, mitigated seasonal emissions for area and mobile emissions have been modeled.

Source: Refer to Appendix A, *Air Quality Emissions Data*, for assumptions used in this analysis.

Area Source Emissions

Area source emissions would be generated due to an increased demand for consumer products, architectural coating, and landscaping. The proposed project would not include wood burning fireplaces or other devices per SCAQMD Rule 445 (Wood Burning Devices). As shown in Table 6, mitigated area source emissions from the proposed project would not exceed SCAQMD thresholds for ROG, NO_X, CO, SO_X, PM_{10}, or $PM_{2.5}$.

Energy Source Emissions

Energy source emissions would be generated as a result of electricity and natural gas (non-hearth) usage associated with the proposed project. The primary use of electricity and natural gas by the project would be for space heating and cooling, water heating, ventilation, lighting, appliances, and electronics. As shown in Table 6, mitigated energy source emissions from the proposed project would not exceed SCAQMD thresholds for ROG, NO_X, CO, SO_X, PM_{10}, or $PM_{2.5}$.

Conclusion

As indicated in Table 6, mitigated operational emissions from the proposed project would not exceed SCAQMD thresholds. If stationary sources, such as backup generators, are installed on-site, they would be required to obtain the applicable permits from SCAQMD for operation of such equipment. The SCAQMD is responsible for issuing permits for the operation of stationary sources in order to reduce air pollution, and to attain and maintain the national and California ambient air quality standards in the Basin. Backup generators would be used only in emergency situations, and would not contribute a substantial amount of emissions capable of exceeding SCAQMD thresholds. Thus, operational air quality impacts would be less than significant.

Mitigation Measures:

AQ-1 Prior to initiating construction, UCI shall ensure that the project construction contract includes a construction emissions mitigation plan, including measures compliant with SCAQMD Rule 403 (Fugitive Dust), to be implemented and supervised by the on-site construction supervisor, which shall include, but not be limited to, the following BMPs:

i. During grading and site preparation activities, exposed soil areas shall be stabilized via frequent watering, non-toxic chemical stabilization, or equivalent measures at a rate to be determined by the on-site construction supervisor.

ii. During windy days when fugitive dust can be observed leaving the construction site, additional applications of water shall be required at a rate to be determined by the onsite construction supervisor.

iii. Disturbed areas designated for landscaping shall be prepared as soon as possible after completion of construction activities.

iv. Areas of the construction site that will remain inactive for three months or longer following clearing, grubbing and/or grading shall receive appropriate BMP treatments (e.g., revegetation, mulching, covering with tarps, etc.) to prevent fugitive dust generation.

v. All exposed soil or material stockpiles that will not be used within 3 days shall be enclosed, covered, or watered twice daily, or shall be stabilized with approved nontoxic chemical soil binders at a rate to be determined by the on-site construction supervisor.

vi. Unpaved access roads shall be stabilized via frequent watering, non-toxic chemical stabilization, temporary paving, or equivalent measures at a rate to be determined by the on-site construction supervisor.

vii. Trucks transporting materials to and from the site shall allow for at least two feet of freeboard (i.e., minimum vertical distance between the top of the load and the top of the trailer). Alternatively, trucks transporting materials shall be covered.

viii. Speed limit signs at 15 mph or less shall be installed on all unpaved roads within construction sites.

ix. Where visible soil material is tracked onto adjacent public paved roads, the paved roads shall be swept and debris shall be returned to the construction site or transported off site for disposal.

x. Wheel washers, dirt knock-off grates/mats, or equivalent measures shall be installed within the construction site where vehicles exit unpaved roads onto paved roads.

xi. Diesel powered construction equipment shall be maintained in accordance with manufacturer's requirements, and shall be retrofitted with diesel particulate filters where available and practicable.

xii. Heavy duty diesel trucks and gasoline powered equipment shall be turned off if idling is anticipated to last for more than 5 minutes.

xiii. Where feasible, the construction contractor shall use alternatively fueled construction equipment, such as electric or natural gas-powered equipment or biofuel.

xiv. Heavy construction equipment shall use low NOx diesel fuel to the extent that it is readily available at the time of construction.

xv. To the extent feasible, construction activities shall rely on the campus's existing electricity infrastructure rather than electrical generators powered by internal combustion engines.

xvi. The construction contractor shall develop a construction traffic management plan that includes the following:

- Scheduling heavy-duty truck deliveries to avoid peak traffic periods Consolidating truck deliveries.

xvii. Where possible, the construction contractor shall provide a lunch shuttle or on-site lunch service for construction workers.

xviii. The construction contractor shall, to the extent possible, use pre-coated architectural materials that do not require painting. Water-based or low VOC coatings shall be used that are compliant with SCAQMD Rule 1113. Spray equipment with high transfer efficiency, such as the high volume-low pressure spray method, or manual coatings application shall be used to reduce VOC emissions to the extent possible.

xix. Project constructions plans and specifications will include a requirement to define and implement a work program that would limit the emissions of reactive organic gases (ROG's) during the application of architectural coatings to the extent necessary to keep total daily ROG's for each project to below 75 pounds per day, or the current SCAQMD threshold, throughout that period of construction activity to the extent feasible. The specific program may include any combination of restrictions on the types of paints and coatings, application methods, and the amount of surface area coated as determined by the contractor.

xx. The construction contractor shall maintain signage along the construction perimeter with the name and telephone number of the individual in charge of implementing the construction emissions mitigation plan, and with the telephone number of the SCAQMD's complaint line. The contractor's representative shall maintain a log of any public complaints and corrective actions taken to resolve complaints.

(Mitigation Measure AQ-1 correlates with Mitigation Measure Air-2B in the 2007 LRDP EIR).

Level of Significance After Mitigation. *Less than Significant Impact.*

AQ-3 RESULT IN A CUMULATIVELY CONSIDERABLE NET INCREASE OF ANY CRITERIA POLLUTANT FOR WHICH THE REGION IS NONATTAINMENT FOR FEDERAL OR STATE STANDARDS?

Level of Significance Before Mitigation: *Potentially Significant Impact.*

With respect to the proposed project's construction-related air quality emissions and cumulative Basin-wide conditions, the SCAQMD has developed strategies to reduce criteria pollutant emissions outlined in the 2016 AQMP pursuant to Federal Clean Air Act mandates. As such, the proposed project would comply with SCAQMD Rule 403 requirements, and implement all feasible mitigation measures (Mitigation Measure AQ-1). Rule 403 requires that fugitive dust be controlled with the best available control measures in order to reduce dust so that it does not remain visible in the atmosphere beyond the property line of the proposed project. In addition, the proposed project would comply with adopted 2016 AQMP emissions control measures. Per SCAQMD rules and mandates, as well as the CEQA requirement that significant impacts be mitigated to the extent feasible, these same requirements (i.e., Rule 403 compliance, the implementation of all feasible mitigation measures, and compliance with adopted AQMP emissions control measures) would also be imposed on construction projects throughout the Basin, which would include related projects.

As discussed previously, the proposed project would not result in long-term air quality impacts, as emissions would not exceed the SCAQMD adopted operational thresholds. Additionally, adherence to SCAQMD rules and regulations would alleviate potential impacts related to cumulative conditions on a project-by-project basis. Emission reduction technology, strategies, and plans are constantly being developed. As a result, the proposed project would not contribute a cumulatively considerable net increase of any nonattainment criteria pollutant. Therefore, cumulative operational impacts associated with implementation of the proposed project would be less than significant.

Mitigation Measures: Refer to Mitigation Measure AQ-1.

Level of Significance After Mitigation. *Less Than Significant Impact.*

AQ-4 EXPOSE SENSITIVE RECEPTORS TO SUBSTANTIAL POLLUTANT CONCENTRATIONS?

Level of Significance Before Mitigation: *Potentially Significant Impact.*

Sensitive receptors are defined as facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and

people with illnesses. Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers. CARB has identified the following groups of individuals as the most likely to be affected by air pollution: the elderly over 65, children under 14, athletes, and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis.
On-campus sensitive receptors near the project site include surrounding residences adjacent to the north, east, and south of the project site. In order to identify impacts to sensitive receptors, the SCAQMD recommends addressing localized significance thresholds (LSTs) for construction and operations impacts (area sources only). The CO hotspot analysis following the LST analysis addresses localized mobile source impacts.

LOCALIZED SIGNIFICANCE THRESHOLDS (LST)

LSTs were developed in response to SCAQMD Governing Boards' Environmental Justice Enhancement Initiative (I-4). The SCAQMD provided the *Final Localized Significance Threshold Methodology* (dated June 2003 [revised 2008]) for guidance. The LST methodology assists lead agencies in analyzing localized air quality impacts. The SCAQMD provides the LST screening lookup tables for one, two, and five acre projects emitting CO, NO_X, $PM_{2.5}$, or PM_{10}. The LST methodology and associated mass rates are not designed to evaluate localized impacts from mobile sources traveling over the roadways. The SCAQMD recommends that any project over five acres should perform air quality dispersion modeling to assess impacts to nearby sensitive receptors. The project is located within Source Receptor Area (SRA) 20, Central Orange County Coastal.

Construction

The SCAQMD guidance on applying CalEEMod to LSTs specifies the amount of acres a particular piece of equipment would likely disturb per day. Based on the SCAQMD guidance on applying CalEEMod to LSTs, the project would disturb at most four acres of land per day. However, the AQMD provides thresholds for one, two, and five acre sites. Therefore, the LST thresholds for two acres was conservatively utilized for the construction LST analysis. The closest sensitive receptors to the project site are residential uses that adjoin the project site to the north, east, and south. These sensitive land uses may be potentially affected by air pollutant emissions generated during on-site construction activities. LST thresholds are provided for distances to sensitive receptors of 25, 50, 100, 200, and 500 meters. As the nearest sensitive uses adjoin the project site, the lowest available LST values for 25 meters were used. Table 7, *Localized Significance of Construction Emissions*, shows the localized unmitigated and mitigated construction-related emissions. It is noted that the localized emissions presented in Table 7 are less than those in Table 5 because localized emissions include only on-site emissions (i.e., from construction equipment and fugitive dust), and do not include off-site emissions (i.e., from hauling activities). As seen in Table 7, mitigated on-site emissions would not exceed the LSTs for SRA 20.

Operations

For project operations, the five acre threshold was conservatively utilized, as the project site is approximately 13.3 acres. As the nearest sensitive uses are adjacent to the project site, the most conservative LST values for 25 meters were used. As seen in Table 8, *Localized Significance of Operational Emissions*, project-related mitigated operational area source emissions would be negligible and would be below the LSTs. The mitigated area source emissions presented in Table 8 were derived from the CalEEMod, and include the following proposed project features that would reduce operational area emissions: use low VOC paint and low VOC cleaning supplies, and no hearth. As such, operational LST impacts would be less than significant in this regard.

Table 7
Localized Significance of Construction Emissions

Source	Pollutant (pounds/day)[1]			
	NO_X	CO	PM_{10}	$PM_{2.5}$
2017				
Total Unmitigated On-Site Emissions[2,3]	67.94	38.78	9.28	6.16
Total Mitigated On-Site Emissions[2,3]	67.94	38.78	5.73	4.25
Localized Significance Threshold[1]	131	945	7	5
Thresholds Exceeded?	*No*	*No*	*No*	*No*
2018				
Total Unmitigated On-Site Emissions[4]	59.52	35.09	8.84	5.76
Total Mitigated On-Site Emissions[4]	59.52	35.09	5.29	3.85
Localized Significance Threshold[1]	131	945	7	5
Thresholds Exceeded?	*No*	*No*	*No*	*No*
2019				
Total Unmitigated On-Site Emissions[4]	21.08	17.16	1.29	1.21
Total Mitigated On-Site Emissions[4]	21.08	17.16	1.29	1.21
Localized Significance Threshold[1]	131	945	7	5
Thresholds Exceeded?	*No*	*No*	*No*	*No*
2020				
Total Unmitigated On-Site Emissions[4]	19.19	16.85	1.12	1.05
Total Mitigated On-Site Emissions[4]	19.19	16.85	1.12	1.05
Localized Significance Threshold[1]	131	945	7	5
Thresholds Exceeded?	*No*	*No*	*No*	*No*
2021				
Total Unmitigated On-Site Emissions[4]	17.43	16.58	0.96	0.90
Total Mitigated On-Site Emissions[4]	17.43	16.58	0.96	0.90
Localized Significance Threshold[1]	131	945	7	5
Thresholds Exceeded?	*No*	*No*	*No*	*No*

Notes:
1. The Localized Significance Threshold was determined using Appendix C of the SCAQMD Final Localized Significant Threshold Methodology guidance document for pollutants NO_X, CO, PM_{10}, and $PM_{2.5}$. The Localized Significance Threshold was based on the anticipated daily acreage disturbance for construction, the distance to sensitive receptors, and the source receptor area (SRA 20).
2. The Demolition Phase represents the worst case scenario for NO_X and CO.
3. The Grading Phase represents the worst case scenario for PM_{10}, and $PM_{2.5}$.
4. The Building Construction Phase represents the worst case scenario for NO_x, CO, PM_{10}, and $PM_{2.5}$.

Table 8
Localized Significance of Operational Emissions

Source	Pollutant (pounds/day)			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Total Unmitigated Area Source Emissions	32.56	887.27	115.26	115.26
Total Mitigated Area Source Emissions[1]	1.44	124.44	0.68	0.68
Localized Significance Threshold[2]	*197*	*1,711*	*4*	*2*
Thresholds Exceeded?	*No*	*No*	*No*	*No*

Note:
1. The proposed project does not include hearths.
2. The Localized Significance Threshold was determined using Appendix C of the SCAQMD Final Localized Significant Threshold Methodology guidance document for pollutants NO_X, CO, PM_{10}, and $PM_{2.5}$. The Localized Significance Threshold was based on the total acreage, the distance to sensitive receptors, and the source receptor area (SRA 20).

CARBON MONOXIDE HOTSPOTS

Intersection Hotspots

CO emissions are a function of vehicle idling time, meteorological conditions, and traffic flow. Under certain extreme meteorological conditions, CO concentrations near a congested roadway or intersection may reach unhealthful levels (i.e., adversely affecting residents, school children, hospital patients, the elderly, etc.).

The SCAQMD requires a quantified assessment of CO hotspots when a project increases the volume-to-capacity ratio (also called the intersection capacity utilization) by 0.02 (two percent) for any intersection with an existing level of service LOS D or worse. Because traffic congestion is highest at intersections where vehicles queue and are subject to reduced speeds, these hot spots are typically produced at intersections.

The project is located in the South Coast Air Basin (Basin), which is designated as an attainment/maintenance area for the Federal CO standards and an attainment area for State standards. There has been a decline in CO emissions even though vehicle miles traveled on U.S. urban and rural roads have increased. On-road mobile source CO emissions have declined 24 percent between 1989 and 1998, despite a 23 percent rise in motor vehicle miles traveled over the same 10 years. California trends have been consistent with national trends; CO emissions declined 20 percent in California from 1985 through 1997 while vehicle miles traveled increased 18 percent in the 1990s. CO emissions have continued to decline since this time. The Basin was re-designated as attainment in 2007, and is no longer addressed in the SCAQMD's AQMP. Three major control programs have contributed to the reduced per-vehicle CO emissions: exhaust standards, cleaner burning fuels, and motor vehicle inspection/maintenance programs.

A detailed CO analysis was conducted in the *Federal Attainment Plan for Carbon Monoxide* (CO Plan) for the SCAQMD's 2003 Air Quality Management Plan. The 2003 *Air Quality Management Plan* is the most recent AQMP that addresses CO concentrations. The locations selected for microscale modeling in the CO Plan are worst-case intersections in the Basin, and would likely experience the highest CO concentrations. Thus, CO analysis within the CO Plan is utilized in a comparison to the proposed project, since it represents a worst-case scenario with heavy traffic volumes within the Basin.

Of these locations, the Wilshire Boulevard/Veteran Avenue intersection in Los Angeles experienced the highest CO concentration (4.6 parts per million [ppm]), which is well below the 35-ppm 1-hr CO Federal standard. The Wilshire Boulevard/Veteran Avenue intersection is one of the most congested intersections in Southern California with an average daily traffic (ADT) volume of approximately 100,000 vehicles per day. As the CO hotspots were not experienced at the Wilshire Boulevard/Veteran Avenue intersection, it can be reasonably inferred that CO hotspots would not be experienced at any intersections within the vicinity of the project site due to the low volume of traffic (2,310 new daily trips) that would occur as a result of project implementation. Therefore, impacts would be less than significant in this regard.

Parking Structure Hotspots

Carbon monoxide concentrations are a function of vehicle idling time, meteorological conditions, and traffic flow. Therefore, parking structures tend to be of concern regarding CO hotspots, as they are enclosed spaces with frequent cars operating in cold start mode. Approximately 550 parking spaces would be located within the parking structure onsite and approximately 250 surface parking spaces would be located 0.41 miles south of the project site. The proposed project would be required to comply with the ventilation requirements of the International Mechanical Code (Section 403.5 [Public Garages]), which requires that mechanical ventilation systems for public garages to operate automatically upon detection of a concentration of carbon monoxide of 25 ppm by approved detection devices. The 25 ppm trigger is the maximum allowable concentration for continuous exposure in any eight hour period according to the American Conference of Governmental Industrial Hygienists.[4]

Mitigation Measures: Refer to Mitigation Measure AQ-1.

Level of Significance After Mitigation. *Less Than Significant Impact.*

AQ-5 CREATE OBJECTIONABLE ODORS AFFECTING A SUBSTANTIAL NUMBER OF PEOPLE?

Level of Significance Before Mitigation: *Less Than Significant Impact.*

According to the SCAQMD *CEQA Air Quality Handbook*, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The proposed project does not include any uses identified by the SCAQMD as being associated with odors.

[4] INTEC Controls, *Carbon Monoxide (CO) Detection and Control Systems for Parking Structures, Guidelines for the Design Engineer*, http://www.inteccontrols.com/pdfs/CO_Parking_Garage_Design_Guidelines.pdf, Accessed March 3, 2017.

Construction activities associated with the project may generate detectable odors from heavy-duty equipment exhaust. Construction-related odors would be short-term in nature, dissipate rapidly, and cease upon project completion. Any impacts to existing adjacent land uses would be short-term and are less than significant.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation. *Less Than Significant Impact.*

6.0 REFERENCES

6.1 LIST OF PREPARERS

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Achilles Malisos, Manager of Air and Noise Studies
Danielle Regimbal, Environmental Analyst
Faye Stroud, Graphics

6.2 DOCUMENTS

1. City of Irvine, *City of Irvine General Plan*, Supp. No. 9, July 2015.

2. City of Irvine, *Municipal Code*, codified through Ordinance No. 15-02, adopted April 28, 2015.

3. City of Irvine, *CEQA Manual*, May 2012.

4. KTGY Architecture + Planning, Conceptual Design, January 27, 2017.

5. South Coast Air Quality Management District, *2016 Air Quality Management Plan*, http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan, accessed March 8, 2017.

6. South Coast Air Quality Management District, *CEQA Air Quality Handbook*, November 1993.

7. South Coast Air Quality Management District, *Final Localized Significance Threshold Methodology*, July 2008.

8. South Coast Air Quality Management District, *Regulation XI Source Specific Standards*, http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1113.pdf?sfvrsn=15, accessed on March 8, 2017.

9. Stantec Consulting Services, *UCI East Campus Student Apartments Phase 4 Traffic Study*, March 1, 2017.

10. U.S. Climate Data, *Climate Irvine - California*, http://www.usclimatedata.com/climate/irvine/california/united-states/usca2494, accessed on March 8, 2017.

6.3 WEB SITES/PROGRAMS

California Air Resources Board, *Aerometric Data Analysis and Measurement System (ADAM)*, summaries from 2013 to 2015, http://www.arb.ca.gov/adam.

Environ International Corporation and the South Coast Air Quality Management District, *California Emissions Estimator Model (CalEEMod) Version 2016.3.1*, 2016.

Google Earth, 2017.

APPENDIX A: AIR QUALITY EMISSIONS DATA

UCI East Campus Phase 4 [Building A]

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking Structure	550.00	Space	4.95	220,000.00	0
Parking Lot	250.00	Space	2.25	100,000.00	0
Apartments High Rise	1,500.00	Dwelling Unit	24.19	600,000.00	4290

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Building sqft 600,000

Construction Phase - Anticipated schedule

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Trips and VMT - Exported soil would be moved to the south site.

Grading - Approximate site acreage

Architectural Coating -

Vehicle Trips - Per traffic study

Woodstoves - Project is student housing, no hearths

Area Coating -

Construction Off-road Equipment Mitigation - Per Rule 403

Mobile Land Use Mitigation -

Mobile Commute Mitigation -

Area Mitigation -

Energy Mitigation - LEED+2016 Title 24+RPS

Water Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Parking	19,200.00	17,856.00
tblArchitecturalCoating	ConstArea_Residential_Exterior	405,000.00	1,012,500.00
tblArchitecturalCoating	ConstArea_Residential_Interior	1,215,000.00	3,037,500.00
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	6
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	15
tblConstructionPhase	NumDays	35.00	190.00
tblConstructionPhase	NumDays	500.00	374.00
tblConstructionPhase	NumDays	30.00	22.00
tblConstructionPhase	NumDays	45.00	99.00
tblConstructionPhase	NumDays	35.00	22.00
tblFleetMix	FleetMixLandUseSubType	Enclosed Parking Structure	Apartments High Rise
tblFleetMix	FleetMixLandUseSubType	Parking Lot	Enclosed Parking Structure
tblFleetMix	FleetMixLandUseSubType	Apartments High Rise	Parking Lot
tblGrading	AcresOfGrading	247.50	11.00
tblGrading	MaterialExported	0.00	62,130.00
tblLandUse	BuildingSpaceSquareFeet	1,500,000.00	600,000.00

tblLandUse	LandUseSquareFeet	1,500,000.00	600,000.00
tblProjectCharacteristics	OperationalYear	2018	2019
tblTripsAndVMT	HaulingTripLength	20.00	0.10
tblTripsAndVMT	VendorTripNumber	213.00	209.00
tblTripsAndVMT	WorkerTripNumber	1,214.00	1,205.00
tblTripsAndVMT	WorkerTripNumber	243.00	241.00
tblVehicleTrips	ST_TR	4.98	0.94
tblVehicleTrips	SU_TR	3.65	0.94
tblVehicleTrips	WD_TR	4.20	0.94

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	6.0551	75.7461	41.3289	0.0708	6.4436	3.0864	9.5300	3.3956	2.8400	6.2356	0.0000	7,283.9892	7,283.9892	2.1413	0.0000	7,337.5220
2018	9.6411	67.1016	68.8717	0.2109	14.8045	2.6444	16.5812	3.9564	2.4332	5.8378	0.0000	21,408.4812	21,408.4812	2.1253	0.0000	21,446.4146
2019	51.2219	48.4003	63.8463	0.2070	14.8045	1.5431	16.3475	3.9564	1.4517	5.4081	0.0000	21,000.9754	21,000.9754	1.4548	0.0000	21,037.3445
2020	51.1237	2.3251	9.1226	0.0279	2.6938	0.1288	2.8226	0.7144	0.1273	0.8418	0.0000	2,767.6550	2,767.6550	0.0785	0.0000	2,769.6179
Maximum	**51.2219**	**75.7461**	**68.8717**	**0.2109**	**14.8045**	**3.0864**	**16.5812**	**3.9564**	**2.8400**	**6.2356**	**0.0000**	**21,408.4812**	**21,408.4812**	**2.1413**	**0.0000**	**21,446.4146**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Year	lb/day										lb/day					
2017	6.0551	75.7461	41.3289	0.0708	2.8879	3.0864	5.9743	1.4871	2.8400	4.3271	0.0000	7,283.989 2	7,283.989 2	2.1413	0.0000	7,337.522 0
2018	9.6411	67.1016	68.8717	0.2109	14.8045	2.6444	16.5812	3.9564	2.4332	5.6280	0.0000	21,408.48 12	21,408.48 12	2.1253	0.0000	21,446.41 46
2019	51.2219	48.4003	63.8463	0.2070	14.8045	1.5431	16.3475	3.9564	1.4517	5.4081	0.0000	21,000.97 54	21,000.97 54	1.4548	0.0000	21,037.34 45
2020	51.1237	2.3251	9.1226	0.0279	2.6938	0.1288	2.8226	0.7144	0.1273	0.8418	0.0000	2,767.655 0	2,767.655 0	0.0785	0.0000	2,769.617 9
Maximum	**51.2219**	**75.7461**	**68.8717**	**0.2109**	**14.8045**	**3.0864**	**16.5812**	**3.9564**	**2.8400**	**5.6280**	**0.0000**	**21,408.48 12**	**21,408.48 12**	**2.1413**	**0.0000**	**21,446.41 46**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**9.18**	**0.00**	**7.85**	**15.87**	**0.00**	**11.56**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

<u>Unmitigated Operational</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	409.9151	32.5637	887.2750	1.9526		115.2642	115.2642		115.2642	115.2642	14,050.37 76	27,223.00 36	41,273.38 12	42.1201	0.9536	42,610.56 93
Energy	0.6225	5.3197	2.2637	0.0340		0.4301	0.4301		0.4301	0.4301		6,791.095 9	6,791.095 9	0.1302	0.1245	6,831.452 0
Mobile	2.5891	11.1927	34.2025	0.1169	10.2192	0.1355	10.3547	2.7327	0.1275	2.8602		11,848.42 19	11,848.42 19	0.5342		11,861.77 78
Total	**413.1267**	**49.0762**	**923.7413**	**2.1035**	**10.2192**	**115.8298**	**126.0490**	**2.7327**	**115.8218**	**118.5545**	**14,050.37 76**	**45,862.52 13**	**59,912.89 89**	**42.7845**	**1.0781**	**61,303.79 91**

<u>Mitigated Operational</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Area	16.8611	1.4413	124.4473	6.5400e-003		0.6817	0.6817		0.6817	0.6817	0.0000	223.0036	223.0036	0.2192	0.0000	228.4835
Energy	0.4146	3.5428	1.5076	0.0226		0.2864	0.2864		0.2864	0.2864		4,522.7780	4,522.7780	0.0867	0.0829	4,549.6546
Mobile	1.9440	6.6141	17.8705	0.0497	4.1295	0.0604	4.1898	1.1043	0.0568	1.1610		5,041.2524	5,041.2524	0.2664		5,047.9124
Total	**19.2196**	**11.5982**	**143.8254**	**0.0789**	**4.1295**	**1.0286**	**5.1580**	**1.1043**	**1.0249**	**2.1292**	**0.0000**	**9,787.0339**	**9,787.0339**	**0.5723**	**0.0829**	**9,826.0505**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**95.35**	**76.37**	**84.43**	**96.25**	**59.59**	**99.11**	**95.91**	**59.59**	**99.12**	**98.20**	**100.00**	**78.66**	**83.66**	**98.66**	**92.31**	**83.97**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	8/1/2017	8/30/2017	5	22	
2	Grading	Grading	8/31/2017	1/16/2018	5	99	
3	Building Construction A	Building Construction	1/17/2018	6/24/2019	5	374	Building A
4	Paving	Paving	6/25/2019	7/24/2019	5	22	
5	Architectural Coating A	Architectural Coating	7/25/2019	4/15/2020	5	190	Building A

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 11

Acres of Paving: 7.2

Residential Indoor: 3,037,500; Residential Outdoor: 1,012,500; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40

Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction A	Cranes	1	7.00	231	0.29
Building Construction A	Forklifts	3	8.00	89	0.20
Building Construction A	Generator Sets	1	8.00	84	0.74
Building Construction A	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction A	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating A	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	7,766.00	14.70	6.90	0.10	LD_Mix	HDT_Mix	HHDT
Building Construction A	9	1,205.00	209.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating A	1	241.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.1031	42.7475	23.0122	0.0388		2.1935	2.1935		2.0425	2.0425		3,924.2833	3,924.2833	1.0730		3,951.1070
Total	**4.1031**	**42.7475**	**23.0122**	**0.0388**		**2.1935**	**2.1935**		**2.0425**	**2.0425**		**3,924.2833**	**3,924.2833**	**1.0730**		**3,951.1070**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0837	0.0573	0.6168	1.7000e-003	0.1677	1.1200e-003	0.1688	0.0445	1.0300e-003	0.0455		169.1567	169.1567	4.9500e-003		169.2805
Total	**0.0837**	**0.0573**	**0.6168**	**1.7000e-003**	**0.1677**	**1.1200e-003**	**0.1688**	**0.0445**	**1.0300e-003**	**0.0455**		**169.1567**	**169.1567**	**4.9500e-003**		**169.2805**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Off-Road	4.1031	42.7475	23.0122	0.0388		2.1935	2.1935		2.0425	2.0425	0.0000	3,924.2833	3,924.2833	1.0730		3,951.1070
Total	**4.1031**	**42.7475**	**23.0122**	**0.0388**		**2.1935**	**2.1935**		**2.0425**	**2.0425**	**0.0000**	**3,924.2833**	**3,924.2833**	**1.0730**		**3,951.1070**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0837	0.0573	0.6168	1.7000e-003	0.1677	1.1200e-003	0.1688	0.0445	1.0300e-003	0.0455		169.1567	169.1567	4.9500e-003		169.2805
Total	**0.0837**	**0.0573**	**0.6168**	**1.7000e-003**	**0.1677**	**1.1200e-003**	**0.1688**	**0.0445**	**1.0300e-003**	**0.0455**		**169.1567**	**169.1567**	**4.9500e-003**		**169.2805**

3.3 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.2109	0.0000	6.2109	3.3337	0.0000	3.3337			0.0000			0.0000
Off-Road	5.7483	67.9396	38.7826	0.0620		3.0727	3.0727		2.8269	2.8269		6,344.8863	6,344.8863	1.9441		6,393.4879
Total	**5.7483**	**67.9396**	**38.7826**	**0.0620**	**6.2109**	**3.0727**	**9.2836**	**3.3337**	**2.8269**	**6.1606**		**6,344.8863**	**6,344.8863**	**1.9441**		**6,393.4879**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1951	7.7302	1.7240	6.4700e-003	9.1800e-003	0.0122	0.0214	2.6400e-003	0.0117	0.0143		713.5606	713.5606	0.1907		718.3269
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1116	0.0763	0.8224	2.2600e-003	0.2236	1.4900e-003	0.2250	0.0593	1.3700e-003	0.0607		225.5423	225.5423	6.6000e-003		225.7073
Total	**0.3068**	**7.8065**	**2.5464**	**8.7300e-003**	**0.2327**	**0.0137**	**0.2465**	**0.0619**	**0.0131**	**0.0750**		**939.1029**	**939.1029**	**0.1973**		**944.0342**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.6552	0.0000	2.6552	1.4252	0.0000	1.4252			0.0000			0.0000
Off-Road	5.7483	67.9396	38.7826	0.0620		3.0727	3.0727		2.8269	2.8269	0.0000	6,344.8863	6,344.8863	1.9441		6,393.4878
Total	**5.7483**	**67.9396**	**38.7826**	**0.0620**	**2.6552**	**3.0727**	**5.7279**	**1.4252**	**2.8269**	**4.2521**	**0.0000**	**6,344.8863**	**6,344.8863**	**1.9441**		**6,393.4878**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	0.1951	7.7302	1.7240	6.4700e-003	9.1800e-003	0.0122	0.0214	2.6400e-003	0.0117	0.0143		713.5606	713.5606	0.1907		718.3269
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1116	0.0763	0.8224	2.2600e-003	0.2236	1.4900e-003	0.2250	0.0593	1.3700e-003	0.0607		225.5423	225.5423	6.6000e-003		225.7073
Total	**0.3068**	**7.8065**	**2.5464**	**8.7300e-003**	**0.2327**	**0.0137**	**0.2465**	**0.0619**	**0.0131**	**0.0750**		**939.1029**	**939.1029**	**0.1973**		**944.0342**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.2109	0.0000	6.2109	3.3337	0.0000	3.3337			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230		6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**6.2109**	**2.6337**	**8.8446**	**3.3337**	**2.4230**	**5.7567**		**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1726	7.5129	1.5721	6.5500e-003	0.0461	9.1400e-003	0.0552	0.0117	8.7400e-003	0.0204		724.3107	724.3107	0.1755		728.6992
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1009	0.0669	0.7294	2.2000e-003	0.2236	1.4800e-003	0.2250	0.0593	1.3600e-003	0.0607		218.9595	218.9595	5.8200e-003		219.1050

Total	**0.2735**	**7.5798**	**2.3016**	**8.7500e-003**	**0.2696**	**0.0106**	**0.2802**	**0.0710**	**0.0101**	**0.0811**		**943.2702**	**943.2702**	**0.1814**		**947.8042**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.6552	0.0000	2.6552	1.4252	0.0000	1.4252			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230	0.0000	6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**2.6552**	**2.6337**	**5.2889**	**1.4252**	**2.4230**	**3.8482**	**0.0000**	**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1726	7.5129	1.5721	6.5500e-003	0.0461	9.1400e-003	0.0552	0.0117	8.7400e-003	0.0204		724.3107	724.3107	0.1755		728.6992
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1009	0.0669	0.7294	2.2000e-003	0.2236	1.4800e-003	0.2250	0.0593	1.3600e-003	0.0607		218.9595	218.9595	5.8200e-003		219.1050
Total	**0.2735**	**7.5798**	**2.3016**	**8.7500e-003**	**0.2696**	**0.0106**	**0.2802**	**0.0710**	**0.0101**	**0.0811**		**943.2702**	**943.2702**	**0.1814**		**947.8042**

3.4 Building Construction A - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099		2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**		**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8833	24.9721	7.3427	0.0516	1.3355	0.1879	1.5233	0.3843	0.1797	0.5640		5,595.2381	5,595.2381	0.5245		5,608.3501
Worker	6.0783	4.0323	43.9486	0.1324	13.4691	0.0890	13.5580	3.5721	0.0820	3.6540		13,192.3080	13,192.3080	0.3507		13,201.0762
Total	**6.9616**	**29.0044**	**51.2913**	**0.1840**	**14.8045**	**0.2768**	**15.0814**	**3.9564**	**0.2617**	**4.2181**		**18,787.5461**	**18,787.5461**	**0.8752**		**18,809.4263**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099	0.0000	2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**	**0.0000**	**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8833	24.9721	7.3427	0.0516	1.3355	0.1879	1.5233	0.3843	0.1797	0.5640		5,595.2381	5,595.2381	0.5245		5,608.3501
Worker	6.0783	4.0323	43.9486	0.1324	13.4691	0.0890	13.5580	3.5721	0.0820	3.6540		13,192.3080	13,192.3080	0.3507		13,201.0762
Total	**6.9616**	**29.0044**	**51.2913**	**0.1840**	**14.8045**	**0.2768**	**15.0814**	**3.9564**	**0.2617**	**4.2181**		**18,787.5461**	**18,787.5461**	**0.8752**		**18,809.4263**

3.4 Building Construction A - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8170	23.7422	6.8837	0.0513	1.3354	0.1632	1.4986	0.3843	0.1561	0.5404		5,566.8223	5,566.8223	0.5070		5,579.4977
Worker	5.6026	3.5793	39.7988	0.1288	13.4691	0.0900	13.5590	3.5721	0.0829	3.6549		12,842.5730	12,842.5730	0.3164		12,850.4833
Total	**6.4197**	**27.3215**	**46.6825**	**0.1801**	**14.8045**	**0.2532**	**15.0577**	**3.9564**	**0.2390**	**4.1954**		**18,409.3953**	**18,409.3953**	**0.8234**		**18,429.9810**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8170	23.7422	6.8837	0.0513	1.3354	0.1632	1.4986	0.3843	0.1561	0.5404		5,566.8223	5,566.8223	0.5070		5,579.4977

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Worker	5.6026	3.5793	39.7988	0.1288	13.4691	0.0900	13.5590	3.5721	0.0829	3.6549		12,842.5730	12,842.5730	0.3164		12,850.4833
Total	**6.4197**	**27.3215**	**46.6825**	**0.1801**	**14.8045**	**0.2532**	**15.0577**	**3.9564**	**0.2390**	**4.1954**		**18,409.3953**	**18,409.3953**	**0.8234**		**18,429.9810**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586		2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.2680					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.7224**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**		**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1395	0.0891	0.9908	3.2100e-003	0.6269	2.2400e-003	0.6291	0.1605	2.0600e-003	0.1626		319.7321	319.7321	7.8800e-003		319.9290
Total	**0.1395**	**0.0891**	**0.9908**	**3.2100e-003**	**0.6269**	**2.2400e-003**	**0.6291**	**0.1605**	**2.0600e-003**	**0.1626**		**319.7321**	**319.7321**	**7.8800e-003**		**319.9290**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586	0.0000	2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.2680					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.7224**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**	**0.0000**	**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

<u>**Mitigated Construction Off-Site**</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1395	0.0891	0.9908	3.2100e-003	0.6269	2.2400e-003	0.6291	0.1605	2.0600e-003	0.1626		319.7321	319.7321	7.8800e-003		319.9290
Total	**0.1395**	**0.0891**	**0.9908**	**3.2100e-003**	**0.6269**	**2.2400e-003**	**0.6291**	**0.1605**	**2.0600e-003**	**0.1626**		**319.7321**	**319.7321**	**7.8800e-003**		**319.9290**

3.6 Architectural Coating A - 2019

<u>**Unmitigated Construction On-Site**</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	49.8349					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		282.0423
Total	**50.1014**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**282.0423**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	1.1205	0.7159	7.9598	0.0258	2.6938	0.0180	2.7118	0.7144	0.0166	0.7310		2,568.5146	2,568.5146	0.0633		2,570.0967
Total	**1.1205**	**0.7159**	**7.9598**	**0.0258**	**2.6938**	**0.0180**	**2.7118**	**0.7144**	**0.0166**	**0.7310**		**2,568.5146**	**2,568.5146**	**0.0633**		**2,570.0967**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	49.8349					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		282.0423
Total	**50.1014**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**282.0423**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	1.1205	0.7159	7.9598	0.0258	2.6938	0.0180	2.7118	0.7144	0.0166	0.7310		2,568.5146	2,568.5146	0.0633		2,570.0967
Total	**1.1205**	**0.7159**	**7.9598**	**0.0258**	**2.6938**	**0.0180**	**2.7118**	**0.7144**	**0.0166**	**0.7310**		**2,568.5146**	**2,568.5146**	**0.0633**		**2,570.0967**

3.6 Architectural Coating A - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	49.8349					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**50.0771**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	1.0466	0.6412	7.2912	0.0249	2.6938	0.0178	2.7116	0.7144	0.0164	0.7308		2,486.2070	2,486.2070	0.0567		2,487.6251
Total	**1.0466**	**0.6412**	**7.2912**	**0.0249**	**2.6938**	**0.0178**	**2.7116**	**0.7144**	**0.0164**	**0.7308**		**2,486.2070**	**2,486.2070**	**0.0567**		**2,487.6251**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	49.8349					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**50.0771**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	1.0466	0.6412	7.2912	0.0249	2.6938	0.0178	2.7116	0.7144	0.0164	0.7308		2,486.2070	2,486.2070	0.0567		2,487.6251
Total	**1.0466**	**0.6412**	**7.2912**	**0.0249**	**2.6938**	**0.0178**	**2.7116**	**0.7144**	**0.0164**	**0.7308**		**2,486.2070**	**2,486.2070**	**0.0567**		**2,487.6251**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Increase Diversity

Improve Destination Accessibility

Increase Transit Accessibility

Improve Pedestrian Network

Implement School Bus Program

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.9440	6.6141	17.8705	0.0497	4.1295	0.0604	4.1898	1.1043	0.0568	1.1610		5,041.2524	5,041.2524	0.2664		5,047.9124
Unmitigated	2.5891	11.1927	34.2025	0.1169	10.2192	0.1355	10.3547	2.7327	0.1275	2.8602		11,848.4219	11,848.4219	0.5342		11,861.7778

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	1,410.00	1,410.00	1410.00	4,818,184	1,946,973
Enclosed Parking Structure	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	1,410.00	1,410.00	1,410.00	4,818,184	1,946,973

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking Structure	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.552373	0.044229	0.211123	0.119112	0.017503	0.005797	0.024455	0.015685	0.001637	0.001633	0.004830	0.000583	0.001041
Enclosed Parking Structure	0.552373	0.044229	0.211123	0.119112	0.017503	0.005797	0.024455	0.015685	0.001637	0.001633	0.004830	0.000583	0.001041
Parking Lot	0.552373	0.044229	0.211123	0.119112	0.017503	0.005797	0.024455	0.015685	0.001637	0.001633	0.004830	0.000583	0.001041

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.4146	3.5428	1.5076	0.0226		0.2864	0.2864		0.2864	0.2864		4,522.7780	4,522.7780	0.0867	0.0829	4,549.6546
NaturalGas Unmitigated	0.6225	5.3197	2.2637	0.0340		0.4301	0.4301		0.4301	0.4301		6,791.0959	6,791.0959	0.1302	0.1245	6,831.4520

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments High Rise	57724.3	0.6225	5.3197	2.2637	0.0340		0.4301	0.4301		0.4301	0.4301		6,791.0959	6,791.0959	0.1302	0.1245	6,831.4520
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.6225**	**5.3197**	**2.2637**	**0.0340**		**0.4301**	**0.4301**		**0.4301**	**0.4301**		**6,791.0959**	**6,791.0959**	**0.1302**	**0.1245**	**6,831.4520**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments High Rise	38.4436	0.4146	3.5428	1.5076	0.0226		0.2864	0.2864		0.2864	0.2864		4,522.7780	4,522.7780	0.0867	0.0829	4,549.6546
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.4146**	**3.5428**	**1.5076**	**0.0226**		**0.2864**	**0.2864**		**0.2864**	**0.2864**		**4,522.7780**	**4,522.7780**	**0.0867**	**0.0829**	**4,549.6546**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	16.8611	1.4413	124.4473	6.5400e-003		0.6817	0.6817		0.6817	0.6817	0.0000	223.0036	223.0036	0.2192	0.0000	228.4835
Unmitigated	409.9151	32.5637	887.2750	1.9526		115.2642	115.2642		115.2642	115.2642	14,050.3776	27,223.0036	41,273.3812	42.1201	0.9536	42,610.5693

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.0530					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	11.9933					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	393.0540	31.1225	762.8278	1.9460		114.5825	114.5825		114.5825	114.5825	14,050.3776	27,000.0000	41,050.3776	41.9009	0.9536	42,382.0858
Landscaping	3.8148	1.4413	124.4473	6.5400e-003		0.6817	0.6817		0.6817	0.6817		223.0036	223.0036	0.2192		228.4835
Total	**409.9151**	**32.5637**	**887.2750**	**1.9526**		**115.2642**	**115.2642**		**115.2642**	**115.2642**	**14,050.3776**	**27,223.0036**	**41,273.3812**	**42.1201**	**0.9536**	**42,610.5693**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

SubCategory	lb/day										lb/day					
Architectural Coating	1.0530					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	11.9933					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.8148	1.4413	124.4473	6.5400e-003		0.6817	0.6817		0.6817	0.6817		223.0036	223.0036	0.2192		228.4835
Total	**16.8611**	**1.4413**	**124.4473**	**6.5400e-003**		**0.6817**	**0.6817**		**0.6817**	**0.6817**	**0.0000**	**223.0036**	**223.0036**	**0.2192**	**0.0000**	**228.4835**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Turf Reduction

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

UCI East Campus Phase 4 [Building B]

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments High Rise	950.00	Dwelling Unit	15.32	400,000.00	2717

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Building sqft 600,000

Construction Phase - Anticipated schedule

Off-road Equipment -

Trips and VMT -

Grading - Approximate site acreage

Architectural Coating - Per site plan

Vehicle Trips - Per traffic study

Woodstoves - Project is student housing, no hearths

Construction Off-road Equipment Mitigation - Per Rule 403

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation - LEED+2016 Title 24+RPS

Water Mitigation -

Waste Mitigation -

Area Coating - Per site plan

Off-road Equipment -

Off-road Equipment -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	0	17856
tblAreaCoating	Area_Residential_Exterior	270000	400000
tblAreaCoating	Area_Residential_Interior	810000	1215000
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	6
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	15
tblConstructionPhase	NumDays	20.00	65.00
tblConstructionPhase	NumDays	300.00	440.00
tblConstructionPhase	PhaseEndDate	2/20/2020	3/31/2021
tblConstructionPhase	PhaseEndDate	6/24/2019	3/31/2021
tblConstructionPhase	PhaseStartDate	7/25/2019	12/31/2020
tblConstructionPhase	PhaseStartDate	1/17/2018	7/25/2019
tblFireplaces	NumberGas	807.50	1,275.00
tblFireplaces	NumberNoFireplace	95.00	150.00
tblFireplaces	NumberWood	47.50	75.00
tblLandUse	BuildingSpaceSquareFeet	950,000.00	400,000.00
tblLandUse	LandUseSquareFeet	950,000.00	400,000.00
tblProjectCharacteristics	OperationalYear	2018	2019
tblSolidWaste	SolidWasteGenerationRate	437.00	690.00
tblVehicleTrips	ST_TR	4.98	0.94
tblVehicleTrips	SU_TR	3.65	0.94
tblVehicleTrips	WD_TR	4.20	0.94
tblWater	IndoorWaterUseRate	61,896,324.34	97,731,038.43
tblWater	OutdoorWaterUseRate	39,021,595.78	61,613,045.97

tblWoodstoves	NumberCatalytic	47.50	75.00
tblWoodstoves	NumberNoncatalytic	47.50	75.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	5.9402	34.6976	43.1145	0.1251	8.2972	1.4206	9.7178	2.2152	1.3360	3.5511	0.0000	12,598.2946	12,598.2946	1.0584	0.0000	12,624.7542
2020	44.7739	33.6769	46.5924	0.1396	9.8286	1.3451	11.1736	2.6213	1.2711	3.8924	0.0000	14,001.6743	14,001.6743	1.0729	0.0000	14,028.4955
2021	44.2667	30.4756	44.2498	0.1364	9.8285	1.1327	10.9613	2.6213	1.0698	3.6911	0.0000	13,684.9220	13,684.9220	1.0359	0.0000	13,710.8195
Maximum	**44.7739**	**34.6976**	**46.5924**	**0.1396**	**9.8286**	**1.4206**	**11.1736**	**2.6213**	**1.3360**	**3.8924**	**0.0000**	**14,001.6743**	**14,001.6743**	**1.0729**	**0.0000**	**14,028.4955**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	5.9402	34.6976	43.1145	0.1251	8.2972	1.4206	9.7178	2.2152	1.3360	3.5511	0.0000	12,598.2946	12,598.2946	1.0584	0.0000	12,624.7542
2020	44.7739	33.6769	46.5924	0.1396	9.8286	1.3451	11.1736	2.6213	1.2711	3.8924	0.0000	14,001.6743	14,001.6743	1.0729	0.0000	14,028.4955
2021	44.2667	30.4756	44.2498	0.1364	9.8285	1.1327	10.9613	2.6213	1.0698	3.6911	0.0000	13,684.9220	13,684.9220	1.0359	0.0000	13,710.8195
Maximum	**44.7739**	**34.6976**	**46.5924**	**0.1396**	**9.8286**	**1.4206**	**11.1736**	**2.6213**	**1.3360**	**3.8924**	**0.0000**	**14,001.6743**	**14,001.6743**	**1.0729**	**0.0000**	**14,028.4955**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	404.4332	32.0348	841.5921	1.9502		115.0141	115.0141		115.0141	115.0141	14,050.3776	27,141.1247	41,191.5023	42.0395	0.9536	42,526.6736
Energy	0.3943	3.3691	1.4337	0.0215		0.2724	0.2724		0.2724	0.2724		4,301.0274	4,301.0274	0.0824	0.0789	4,326.5863
Mobile	1.6398	7.0887	21.6616	0.0741	6.4722	0.0858	6.5580	1.7307	0.0808	1.8115		7,504.0005	7,504.0005	0.3384		7,512.4593
Total	**406.4672**	**42.4927**	**864.6874**	**2.0458**	**6.4722**	**115.3723**	**121.8444**	**1.7307**	**115.3672**	**117.0979**	**14,050.3776**	**38,946.1526**	**52,996.5302**	**42.4603**	**1.0325**	**54,365.7191**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	11.3792	0.9123	78.7644	4.1400e-003		0.4316	0.4316		0.4316	0.4316	0.0000	141.1247	141.1247	0.1385	0.0000	144.5878
Energy	0.2769	2.3666	1.0071	0.0151		0.1913	0.1913		0.1913	0.1913		3,021.1462	3,021.1462	0.0579	0.0554	3,039.0994
Mobile	1.2593	4.3886	12.0300	0.0344	2.8808	0.0415	2.9223	0.7704	0.0390	0.8094		3,489.5736	3,489.5736	0.1804		3,494.0836
Total	**12.9154**	**7.6674**	**91.8014**	**0.0537**	**2.8808**	**0.6644**	**3.5453**	**0.7704**	**0.6620**	**1.4323**	**0.0000**	**6,651.8445**	**6,651.8445**	**0.3768**	**0.0554**	**6,677.7707**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e

Percent Reduction	**96.82**	**81.96**	**89.38**	**97.38**	**55.49**	**99.42**	**97.09**	**55.49**	**99.43**	**98.78**	**100.00**	**82.92**	**87.45**	**99.11**	**94.64**	**87.72**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Building Construction B	Building Construction	7/25/2019	3/31/2021	5	440	Building B
2	Architectural Coating B	Architectural Coating	12/31/2020	3/31/2021	5	65	Building B

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 810,000; Residential Outdoor: 270,000; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Building Construction B	Cranes	1	7.00	231	0.29
Building Construction B	Forklifts	3	8.00	89	0.20
Building Construction B	Generator Sets	1	8.00	84	0.74
Building Construction B	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction B	Welders	1	8.00	46	0.45
Architectural Coating B	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating B	1	137.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction B	9	684.00	102.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Building Construction B - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3988	11.5871	3.3595	0.0250	0.6517	0.0797	0.7314	0.1876	0.0762	0.2638		2,716.8224	2,716.8224	0.2474		2,723.0085
Worker	3.1802	2.0317	22.5912	0.0731	7.6455	0.0511	7.6966	2.0276	0.0470	2.0747		7,289.8920	7,289.8920	0.1796		7,294.3822
Total	**3.5790**	**13.6188**	**25.9507**	**0.0982**	**8.2972**	**0.1307**	**8.4280**	**2.2152**	**0.1232**	**2.3384**		**10,006.7144**	**10,006.7144**	**0.4271**		**10,017.3907**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3988	11.5871	3.3595	0.0250	0.6517	0.0797	0.7314	0.1876	0.0762	0.2638		2,716.8224	2,716.8224	0.2474		2,723.0085
Worker	3.1802	2.0317	22.5912	0.0731	7.6455	0.0511	7.6966	2.0276	0.0470	2.0747		7,289.8920	7,289.8920	0.1796		7,294.3822
Total	**3.5790**	**13.6188**	**25.9507**	**0.0982**	**8.2972**	**0.1307**	**8.4280**	**2.2152**	**0.1232**	**2.3384**		**10,006.7144**	**10,006.7144**	**0.4271**		**10,017.3907**

3.2 Building Construction B - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3403	10.6226	3.0741	0.0248	0.6517	0.0564	0.7081	0.1875	0.0540	0.2415		2,697.5536	2,697.5536	0.2350		2,703.4275
Worker	2.9705	1.8199	20.6935	0.0708	7.6455	0.0506	7.6961	2.0276	0.0466	2.0742		7,056.2887	7,056.2887	0.1610		7,060.3135
Total	**3.3107**	**12.4425**	**23.7677**	**0.0956**	**8.2972**	**0.1069**	**8.4042**	**2.2152**	**0.1005**	**2.3157**		**9,753.8423**	**9,753.8423**	**0.3960**		**9,763.7411**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3403	10.6226	3.0741	0.0248	0.6517	0.0564	0.7081	0.1875	0.0540	0.2415		2,697.553 6	2,697.553 6	0.2350		2,703.427 5
Worker	2.9705	1.8199	20.6935	0.0708	7.6455	0.0506	7.6961	2.0276	0.0466	2.0742		7,056.288 7	7,056.288 7	0.1610		7,060.313 5
Total	**3.3107**	**12.4425**	**23.7677**	**0.0956**	**8.2972**	**0.1069**	**8.4042**	**2.2152**	**0.1005**	**2.3157**		**9,753.842 3**	**9,753.842 3**	**0.3960**		**9,763.741 1**

3.2 Building Construction B - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.363 9	2,553.363 9	0.6160		2,568.764 3
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.363 9**	**2,553.363 9**	**0.6160**		**2,568.764 3**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2857	9.5465	2.8471	0.0246	0.6517	0.0206	0.6723	0.1875	0.0197	0.2073		2,674.3278	2,674.3278	0.2255		2,679.9652
Worker	2.7952	1.6414	19.1703	0.0683	7.6455	0.0495	7.6950	2.0276	0.0456	2.0732		6,811.4922	6,811.4922	0.1459		6,815.1386
Total	**3.0808**	**11.1879**	**22.0174**	**0.0929**	**8.2972**	**0.0701**	**8.3673**	**2.2152**	**0.0653**	**2.2805**		**9,485.8200**	**9,485.8200**	**0.3714**		**9,495.1039**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2857	9.5465	2.8471	0.0246	0.6517	0.0206	0.6723	0.1875	0.0197	0.2073		2,674.3278	2,674.3278	0.2255		2,679.9652
Worker	2.7952	1.6414	19.1703	0.0683	7.6455	0.0495	7.6950	2.0276	0.0456	2.0732		6,811.4922	6,811.4922	0.1459		6,815.1386
Total	**3.0808**	**11.1879**	**22.0174**	**0.0929**	**8.2972**	**0.0701**	**8.3673**	**2.2152**	**0.0653**	**2.2805**		**9,485.8200**	**9,485.8200**	**0.3714**		**9,495.1039**

3.3 Architectural Coating B - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	38.5062					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**38.7483**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5950	0.3645	4.1448	0.0142	1.5313	0.0101	1.5415	0.4061	9.3200e-003	0.4154		1,413.3210	1,413.3210	0.0323		1,414.1271
Total	**0.5950**	**0.3645**	**4.1448**	**0.0142**	**1.5313**	**0.0101**	**1.5415**	**0.4061**	**9.3200e-003**	**0.4154**		**1,413.3210**	**1,413.3210**	**0.0323**		**1,414.1271**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Archit. Coating	38.5062					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**38.7483**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5950	0.3645	4.1448	0.0142	1.5313	0.0101	1.5415	0.4061	9.3200e-003	0.4154		1,413.3210	1,413.3210	0.0323		1,414.1271
Total	**0.5950**	**0.3645**	**4.1448**	**0.0142**	**1.5313**	**0.0101**	**1.5415**	**0.4061**	**9.3200e-003**	**0.4154**		**1,413.3210**	**1,413.3210**	**0.0323**		**1,414.1271**

3.3 Architectural Coating B - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	38.5062					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941		281.4481	281.4481	0.0193		281.9309
Total	**38.7251**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**		**281.4481**	**281.4481**	**0.0193**		**281.9309**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5599	0.3288	3.8397	0.0137	1.5313	9.9100e-003	1.5413	0.4061	9.1300e-003	0.4152		1,364.2901	1,364.2901	0.0292		1,365.0205
Total	**0.5599**	**0.3288**	**3.8397**	**0.0137**	**1.5313**	**9.9100e-003**	**1.5413**	**0.4061**	**9.1300e-003**	**0.4152**		**1,364.2901**	**1,364.2901**	**0.0292**		**1,365.0205**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	38.5062					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941	0.0000	281.4481	281.4481	0.0193		281.9309
Total	**38.7251**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**	**0.0000**	**281.4481**	**281.4481**	**0.0193**		**281.9309**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5599	0.3288	3.8397	0.0137	1.5313	9.9100e-003	1.5413	0.4061	9.1300e-003	0.4152		1,364.2901	1,364.2901	0.0292		1,365.0205
Total	**0.5599**	**0.3288**	**3.8397**	**0.0137**	**1.5313**	**9.9100e-003**	**1.5413**	**0.4061**	**9.1300e-003**	**0.4152**		**1,364.2901**	**1,364.2901**	**0.0292**		**1,365.0205**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Increase Diversity

Improve Destination Accessibility

Increase Transit Accessibility

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.2593	4.3886	12.0300	0.0344	2.8808	0.0415	2.9223	0.7704	0.0390	0.8094		3,489.5736	3,489.5736	0.1804		3,494.0836
Unmitigated	1.6398	7.0887	21.6616	0.0741	6.4722	0.0858	6.5580	1.7307	0.0808	1.8115		7,504.0005	7,504.0005	0.3384		7,512.4593

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT

Apartments High Rise	893.00	893.00	893.00	3,051,517	1,358,263
Total	893.00	893.00	893.00	3,051,517	1,358,263

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.552373	0.044229	0.211123	0.119112	0.017503	0.005797	0.024455	0.015685	0.001637	0.001633	0.004830	0.000583	0.001041

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.2769	2.3666	1.0071	0.0151		0.1913	0.1913		0.1913	0.1913		3,021.1462	3,021.1462	0.0579	0.0554	3,039.0994
NaturalGas Unmitigated	0.3943	3.3691	1.4337	0.0215		0.2724	0.2724		0.2724	0.2724		4,301.0274	4,301.0274	0.0824	0.0789	4,326.5863

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments High Rise	36558.7	0.3943	3.3691	1.4337	0.0215		0.2724	0.2724		0.2724	0.2724		4,301.0274	4,301.0274	0.0824	0.0789	4,326.5863
Total		**0.3943**	**3.3691**	**1.4337**	**0.0215**		**0.2724**	**0.2724**		**0.2724**	**0.2724**		**4,301.0274**	**4,301.0274**	**0.0824**	**0.0789**	**4,326.5863**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments High Rise	25.6797	0.2769	2.3666	1.0071	0.0151		0.1913	0.1913		0.1913	0.1913		3,021.1462	3,021.1462	0.0579	0.0554	3,039.0994
Total		**0.2769**	**2.3666**	**1.0071**	**0.0151**		**0.1913**	**0.1913**		**0.1913**	**0.1913**		**3,021.1462**	**3,021.1462**	**0.0579**	**0.0554**	**3,039.0994**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	11.3792	0.9123	78.7644	4.1400e-003		0.4316	0.4316		0.4316	0.4316	0.0000	141.1247	141.1247	0.1385	0.0000	144.5878
Unmitigated	404.4332	32.0348	841.5921	1.9502		115.0141	115.0141		115.0141	115.0141	14,050.3776	27,141.1247	41,191.5023	42.0395	0.9536	42,526.6736

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.0481					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.9200					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	393.0540	31.1225	762.8278	1.9460		114.5825	114.5825		114.5825	114.5825	14,050.3776	27,000.0000	41,050.3776	41.9009	0.9536	42,382.0858
Landscaping	2.4111	0.9123	78.7644	4.1400e-003		0.4316	0.4316		0.4316	0.4316		141.1247	141.1247	0.1385		144.5878
Total	**404.4332**	**32.0348**	**841.5921**	**1.9502**		**115.0141**	**115.0141**		**115.0141**	**115.0141**	**14,050.3776**	**27,141.1247**	**41,191.5023**	**42.0395**	**0.9536**	**42,526.6736**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.0481					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.9200					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.4111	0.9123	78.7644	4.1400e-003		0.4316	0.4316		0.4316	0.4316		141.1247	141.1247	0.1385		144.5878
Total	**11.3792**	**0.9123**	**78.7644**	**4.1400e-003**		**0.4316**	**0.4316**		**0.4316**	**0.4316**	**0.0000**	**141.1247**	**141.1247**	**0.1385**	**0.0000**	**144.5878**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Turf Reduction

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

UCI East Campus Phase 4 [Building A]

Orange County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking Structure	550.00	Space	4.95	220,000.00	0
Parking Lot	250.00	Space	2.25	100,000.00	0
Apartments High Rise	1,500.00	Dwelling Unit	24.19	600,000.00	4290

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Building sqft 600,000

Construction Phase - Anticipated schedule

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Trips and VMT - Exported soil would be moved to the south site.

Grading - Approximate site acreage

Architectural Coating -

Vehicle Trips - Per traffic study

Woodstoves - Project is student housing, no hearths

Area Coating -

Construction Off-road Equipment Mitigation - Per Rule 403

Mobile Land Use Mitigation -

Mobile Commute Mitigation -

Area Mitigation -

Energy Mitigation - LEED+2016 Title 24+RPS

Water Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Parking	19,200.00	17,856.00
tblArchitecturalCoating	ConstArea_Residential_Exterior	405,000.00	1,012,500.00
tblArchitecturalCoating	ConstArea_Residential_Interior	1,215,000.00	3,037,500.00
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	6
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	15
tblConstructionPhase	NumDays	35.00	190.00
tblConstructionPhase	NumDays	500.00	374.00
tblConstructionPhase	NumDays	30.00	22.00
tblConstructionPhase	NumDays	45.00	99.00
tblConstructionPhase	NumDays	35.00	22.00
tblFleetMix	FleetMixLandUseSubType	Enclosed Parking Structure	Apartments High Rise
tblFleetMix	FleetMixLandUseSubType	Parking Lot	Enclosed Parking Structure
tblFleetMix	FleetMixLandUseSubType	Apartments High Rise	Parking Lot
tblGrading	AcresOfGrading	247.50	11.00
tblGrading	MaterialExported	0.00	62,130.00
tblLandUse	BuildingSpaceSquareFeet	1,500,000.00	600,000.00

tblLandUse	LandUseSquareFeet	1,500,000.00	600,000.00
tblProjectCharacteristics	OperationalYear	2018	2019
tblTripsAndVMT	HaulingTripLength	20.00	0.10
tblTripsAndVMT	VendorTripNumber	213.00	209.00
tblTripsAndVMT	WorkerTripNumber	1,214.00	1,205.00
tblTripsAndVMT	WorkerTripNumber	243.00	241.00
tblVehicleTrips	ST_TR	4.98	0.94
tblVehicleTrips	SU_TR	3.65	0.94
tblVehicleTrips	WD_TR	4.20	0.94

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	6.0222	76.0570	40.9882	0.0718	6.4436	3.0837	9.5273	3.3956	2.8374	6.2330	0.0000	7,394.5810	7,394.5810	2.1209	0.0000	7,447.6045
2018	8.9213	67.4009	71.6028	0.2197	14.8045	2.6421	16.5778	3.9564	2.4310	5.8357	0.0000	22,292.3390	22,292.3390	2.1062	0.0000	22,330.0579
2019	51.0946	48.0523	66.4208	0.2156	14.8045	1.5401	16.3446	3.9564	1.4489	5.4052	0.0000	21,866.6201	21,866.6201	1.4466	0.0000	21,902.7845
2020	51.0033	2.2673	9.7200	0.0293	2.6938	0.1288	2.8226	0.7144	0.1273	0.8418	0.0000	2,908.4531	2,908.4531	0.0817	0.0000	2,910.4951
Maximum	**51.0946**	**76.0570**	**71.6028**	**0.2197**	**14.8045**	**3.0837**	**16.5778**	**3.9564**	**2.8374**	**6.2330**	**0.0000**	**22,292.3390**	**22,292.3390**	**2.1209**	**0.0000**	**22,330.0579**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Year	lb/day										lb/day					
2017	6.0222	76.0570	40.9882	0.0718	2.8879	3.0837	5.9716	1.4871	2.8374	4.3245	0.0000	7,394.5810	7,394.5810	2.1209	0.0000	7,447.6045
2018	8.9213	67.4009	71.6028	0.2197	14.8045	2.6421	16.5778	3.9564	2.4310	5.6247	0.0000	22,292.3390	22,292.3390	2.1062	0.0000	22,330.0579
2019	51.0946	48.0523	66.4208	0.2156	14.8045	1.5401	16.3446	3.9564	1.4489	5.4052	0.0000	21,866.6201	21,866.6201	1.4466	0.0000	21,902.7845
2020	51.0033	2.2673	9.7200	0.0293	2.6938	0.1288	2.8226	0.7144	0.1273	0.8418	0.0000	2,908.4531	2,908.4531	0.0817	0.0000	2,910.4951
Maximum	**51.0946**	**76.0570**	**71.6028**	**0.2197**	**14.8045**	**3.0837**	**16.5778**	**3.9564**	**2.8374**	**5.6247**	**0.0000**	**22,292.3390**	**22,292.3390**	**2.1209**	**0.0000**	**22,330.0579**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**9.18**	**0.00**	**7.85**	**15.87**	**0.00**	**11.57**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	409.9151	32.5637	887.2750	1.9526		115.2642	115.2642		115.2642	115.2642	14,050.3776	27,223.0036	41,273.3812	42.1201	0.9536	42,610.5693
Energy	0.6225	5.3197	2.2637	0.0340		0.4301	0.4301		0.4301	0.4301		6,791.0959	6,791.0959	0.1302	0.1245	6,831.4520
Mobile	2.6234	10.8285	35.7354	0.1225	10.2192	0.1348	10.3540	2.7327	0.1269	2.8596		12,405.3336	12,405.3336	0.5375		12,418.7698
Total	**413.1610**	**48.7119**	**925.2741**	**2.1090**	**10.2192**	**115.8292**	**126.0483**	**2.7327**	**115.8212**	**118.5539**	**14,050.3776**	**46,419.4330**	**60,469.8106**	**42.7878**	**1.0781**	**61,860.7911**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Area	16.8611	1.4413	124.4473	6.5400e-003		0.6817	0.6817		0.6817	0.6817	0.0000	223.0036	223.0036	0.2192	0.0000	228.4835
Energy	0.4146	3.5428	1.5076	0.0226		0.2864	0.2864		0.2864	0.2864		4,522.7780	4,522.7780	0.0867	0.0829	4,549.6546
Mobile	1.9647	6.4955	17.8759	0.0521	4.1295	0.0597	4.1892	1.1043	0.0561	1.1604		5,284.2223	5,284.2223	0.2622		5,290.7766
Total	**19.2404**	**11.4796**	**143.8308**	**0.0813**	**4.1295**	**1.0279**	**5.1573**	**1.1043**	**1.0243**	**2.1285**	**0.0000**	**10,030.0038**	**10,030.0038**	**0.5681**	**0.0829**	**10,068.9147**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**95.34**	**76.43**	**84.46**	**96.15**	**59.59**	**99.11**	**95.91**	**59.59**	**99.12**	**98.20**	**100.00**	**78.39**	**83.41**	**98.67**	**92.31**	**83.72**

3.0 Construction Detail

<u>Construction Phase</u>

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	8/1/2017	8/30/2017	5	22	
2	Grading	Grading	8/31/2017	1/16/2018	5	99	
3	Building Construction A	Building Construction	1/17/2018	6/24/2019	5	374	Building A
4	Paving	Paving	6/25/2019	7/24/2019	5	22	
5	Architectural Coating A	Architectural Coating	7/25/2019	4/15/2020	5	190	Building A

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 11

Acres of Paving: 7.2

Residential Indoor: 3,037,500; Residential Outdoor: 1,012,500; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40

Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction A	Cranes	1	7.00	231	0.29
Building Construction A	Forklifts	3	8.00	89	0.20
Building Construction A	Generator Sets	1	8.00	84	0.74
Building Construction A	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction A	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating A	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	7,766.00	14.70	6.90	0.10	LD_Mix	HDT_Mix	HHDT
Building Construction A	9	1,205.00	209.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating A	1	241.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.1031	42.7475	23.0122	0.0388		2.1935	2.1935		2.0425	2.0425		3,924.2833	3,924.2833	1.0730		3,951.1070
Total	**4.1031**	**42.7475**	**23.0122**	**0.0388**		**2.1935**	**2.1935**		**2.0425**	**2.0425**		**3,924.2833**	**3,924.2833**	**1.0730**		**3,951.1070**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0744	0.0521	0.6618	1.7900e-003	0.1677	1.1200e-003	0.1688	0.0445	1.0300e-003	0.0455		178.7065	178.7065	5.2000e-003		178.8364
Total	**0.0744**	**0.0521**	**0.6618**	**1.7900e-003**	**0.1677**	**1.1200e-003**	**0.1688**	**0.0445**	**1.0300e-003**	**0.0455**		**178.7065**	**178.7065**	**5.2000e-003**		**178.8364**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Off-Road	4.1031	42.7475	23.0122	0.0388		2.1935	2.1935		2.0425	2.0425	0.0000	3,924.2833	3,924.2833	1.0730		3,951.1070
Total	**4.1031**	**42.7475**	**23.0122**	**0.0388**		**2.1935**	**2.1935**		**2.0425**	**2.0425**	**0.0000**	**3,924.2833**	**3,924.2833**	**1.0730**		**3,951.1070**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0744	0.0521	0.6618	1.7900e-003	0.1677	1.1200e-003	0.1688	0.0445	1.0300e-003	0.0455		178.7065	178.7065	5.2000e-003		178.8364
Total	**0.0744**	**0.0521**	**0.6618**	**1.7900e-003**	**0.1677**	**1.1200e-003**	**0.1688**	**0.0445**	**1.0300e-003**	**0.0455**		**178.7065**	**178.7065**	**5.2000e-003**		**178.8364**

3.3 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.2109	0.0000	6.2109	3.3337	0.0000	3.3337			0.0000			0.0000
Off-Road	5.7483	67.9396	38.7826	0.0620		3.0727	3.0727		2.8269	2.8269		6,344.8863	6,344.8863	1.9441		6,393.4879
Total	**5.7483**	**67.9396**	**38.7826**	**0.0620**	**6.2109**	**3.0727**	**9.2836**	**3.3337**	**2.8269**	**6.1606**		**6,344.8863**	**6,344.8863**	**1.9441**		**6,393.4879**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1746	8.0480	1.3232	7.3600e-003	9.1800e-003	9.5200e-003	0.0187	2.6400e-003	9.1100e-003	0.0117		811.4194	811.4194	0.1700		815.6681
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0992	0.0694	0.8825	2.3900e-003	0.2236	1.4900e-003	0.2250	0.0593	1.3700e-003	0.0607		238.2753	238.2753	6.9300e-003		238.4485
Total	**0.2738**	**8.1174**	**2.2057**	**9.7500e-003**	**0.2327**	**0.0110**	**0.2437**	**0.0619**	**0.0105**	**0.0724**		**1,049.6947**	**1,049.6947**	**0.1769**		**1,054.1166**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.6552	0.0000	2.6552	1.4252	0.0000	1.4252			0.0000			0.0000
Off-Road	5.7483	67.9396	38.7826	0.0620		3.0727	3.0727		2.8269	2.8269	0.0000	6,344.8863	6,344.8863	1.9441		6,393.4878
Total	**5.7483**	**67.9396**	**38.7826**	**0.0620**	**2.6552**	**3.0727**	**5.7279**	**1.4252**	**2.8269**	**4.2521**	**0.0000**	**6,344.8863**	**6,344.8863**	**1.9441**		**6,393.4878**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	0.1746	8.0480	1.3232	7.3600e-003	9.1800e-003	9.5200e-003	0.0187	2.6400e-003	9.1100e-003	0.0117		811.4194	811.4194	0.1700		815.6681
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0992	0.0694	0.8825	2.3900e-003	0.2236	1.4900e-003	0.2250	0.0593	1.3700e-003	0.0607		238.2753	238.2753	6.9300e-003		238.4485
Total	**0.2738**	**8.1174**	**2.2057**	**9.7500e-003**	**0.2327**	**0.0110**	**0.2437**	**0.0619**	**0.0105**	**0.0724**		**1,049.6947**	**1,049.6947**	**0.1769**		**1,054.1166**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.2109	0.0000	6.2109	3.3337	0.0000	3.3337			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230		6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**6.2109**	**2.6337**	**8.8446**	**3.3337**	**2.4230**	**5.7567**		**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1539	7.8182	1.1982	7.4600e-003	0.0461	6.9100e-003	0.0530	0.0117	6.6100e-003	0.0183		824.6337	824.6337	0.1561		828.5353
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0896	0.0609	0.7856	2.3200e-003	0.2236	1.4800e-003	0.2250	0.0593	1.3600e-003	0.0607		231.3351	231.3351	6.1300e-003		231.4883

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Total	**0.2435**	**7.8791**	**1.9838**	**9.7800e-003**	**0.2696**	**8.3900e-003**	**0.2780**	**0.0710**	**7.9700e-003**	**0.0790**		**1,055.9689**	**1,055.9689**	**0.1622**		**1,060.0236**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.6552	0.0000	2.6552	1.4252	0.0000	1.4252			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230	0.0000	6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**2.6552**	**2.6337**	**5.2889**	**1.4252**	**2.4230**	**3.8482**	**0.0000**	**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1539	7.8182	1.1982	7.4600e-003	0.0461	6.9100e-003	0.0530	0.0117	6.6100e-003	0.0183		824.6337	824.6337	0.1561		828.5353
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0896	0.0609	0.7856	2.3200e-003	0.2236	1.4800e-003	0.2250	0.0593	1.3600e-003	0.0607		231.3351	231.3351	6.1300e-003		231.4883
Total	**0.2435**	**7.8791**	**1.9838**	**9.7800e-003**	**0.2696**	**8.3900e-003**	**0.2780**	**0.0710**	**7.9700e-003**	**0.0790**		**1,055.9689**	**1,055.9689**	**0.1622**		**1,060.0236**

3.4 Building Construction A - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099		2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**		**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8466	24.9325	6.6893	0.0529	1.3355	0.1845	1.5199	0.3843	0.1765	0.5608		5,733.4623	5,733.4623	0.4976		5,745.9009
Worker	5.3952	3.6679	47.3330	0.1399	13.4691	0.0890	13.5580	3.5721	0.0820	3.6540		13,937.9416	13,937.9416	0.3691		13,947.1687
Total	**6.2418**	**28.6004**	**54.0224**	**0.1928**	**14.8045**	**0.2734**	**15.0780**	**3.9564**	**0.2584**	**4.2148**		**19,671.4039**	**19,671.4039**	**0.8666**		**19,693.0696**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099	0.0000	2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**	**0.0000**	**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8466	24.9325	6.6893	0.0529	1.3355	0.1845	1.5199	0.3843	0.1765	0.5608		5,733.4623	5,733.4623	0.4976		5,745.9009
Worker	5.3952	3.6679	47.3330	0.1399	13.4691	0.0890	13.5580	3.5721	0.0820	3.6540		13,937.9416	13,937.9416	0.3691		13,947.1687
Total	**6.2418**	**28.6004**	**54.0224**	**0.1928**	**14.8045**	**0.2734**	**15.0780**	**3.9564**	**0.2584**	**4.2148**		**19,671.4039**	**19,671.4039**	**0.8666**		**19,693.0696**

3.4 Building Construction A - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.7836	23.7173	6.2696	0.0525	1.3354	0.1602	1.4956	0.3843	0.1533	0.5376		5,705.0493	5,705.0493	0.4816		5,717.0898
Worker	4.9662	3.2562	42.9875	0.1361	13.4691	0.0900	13.5590	3.5721	0.0829	3.6549		13,569.9906	13,569.9906	0.3336		13,578.3312
Total	**5.7498**	**26.9735**	**49.2570**	**0.1886**	**14.8045**	**0.2502**	**15.0547**	**3.9564**	**0.2362**	**4.1925**		**19,275.0399**	**19,275.0399**	**0.8152**		**19,295.4210**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.7836	23.7173	6.2696	0.0525	1.3354	0.1602	1.4956	0.3843	0.1533	0.5376		5,705.0493	5,705.0493	0.4816		5,717.0898

Worker	4.9662	3.2562	42.9875	0.1361	13.4691	0.0900	13.5590	3.5721	0.0829	3.6549		13,569.9906	13,569.9906	0.3336		13,578.3312
Total	**5.7498**	**26.9735**	**49.2570**	**0.1886**	**14.8045**	**0.2502**	**15.0547**	**3.9564**	**0.2362**	**4.1925**		**19,275.0399**	**19,275.0399**	**0.8152**		**19,295.4210**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586		2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.2680					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.7224**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**		**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1236	0.0811	1.0702	3.3900e-003	0.6269	2.2400e-003	0.6291	0.1605	2.0600e-003	0.1626		337.8421	337.8421	8.3100e-003		338.0497
Total	**0.1236**	**0.0811**	**1.0702**	**3.3900e-003**	**0.6269**	**2.2400e-003**	**0.6291**	**0.1605**	**2.0600e-003**	**0.1626**		**337.8421**	**337.8421**	**8.3100e-003**		**338.0497**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586	0.0000	2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	0.2680					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.7224**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**	**0.0000**	**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1236	0.0811	1.0702	3.3900e-003	0.6269	2.2400e-003	0.6291	0.1605	2.0600e-003	0.1626		337.8421	337.8421	8.3100e-003		338.0497
Total	**0.1236**	**0.0811**	**1.0702**	**3.3900e-003**	**0.6269**	**2.2400e-003**	**0.6291**	**0.1605**	**2.0600e-003**	**0.1626**		**337.8421**	**337.8421**	**8.3100e-003**		**338.0497**

3.6 Architectural Coating A - 2019

Unmitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Archit. Coating	49.8349					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		282.0423
Total	**50.1014**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**282.0423**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.9933	0.6512	8.5975	0.0272	2.6938	0.0180	2.7118	0.7144	0.0166	0.7310		2,713.9981	2,713.9981	0.0667		2,715.6662
Total	**0.9933**	**0.6512**	**8.5975**	**0.0272**	**2.6938**	**0.0180**	**2.7118**	**0.7144**	**0.0166**	**0.7310**		**2,713.9981**	**2,713.9981**	**0.0667**		**2,715.6662**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	49.8349					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		282.0423
Total	**50.1014**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**282.0423**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.9933	0.6512	8.5975	0.0272	2.6938	0.0180	2.7118	0.7144	0.0166	0.7310		2,713.998 1	2,713.998 1	0.0667		2,715.666 2
Total	**0.9933**	**0.6512**	**8.5975**	**0.0272**	**2.6938**	**0.0180**	**2.7118**	**0.7144**	**0.0166**	**0.7310**		**2,713.998 1**	**2,713.998 1**	**0.0667**		**2,715.666 2**

3.6 Architectural Coating A - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	49.8349					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**50.0771**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.9262	0.5835	7.8886	0.0264	2.6938	0.0178	2.7116	0.7144	0.0164	0.7308		2,627.005 1	2,627.005 1	0.0599		2,628.502 2
Total	**0.9262**	**0.5835**	**7.8886**	**0.0264**	**2.6938**	**0.0178**	**2.7116**	**0.7144**	**0.0164**	**0.7308**		**2,627.005 1**	**2,627.005 1**	**0.0599**		**2,628.502 2**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	49.8349					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**50.0771**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.9262	0.5835	7.8886	0.0264	2.6938	0.0178	2.7116	0.7144	0.0164	0.7308		2,627.005 1	2,627.005 1	0.0599		2,628.502 2
Total	**0.9262**	**0.5835**	**7.8886**	**0.0264**	**2.6938**	**0.0178**	**2.7116**	**0.7144**	**0.0164**	**0.7308**		**2,627.005 1**	**2,627.005 1**	**0.0599**		**2,628.502 2**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Increase Diversity

Improve Destination Accessibility

Increase Transit Accessibility

Improve Pedestrian Network

Implement School Bus Program

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.9647	6.4955	17.8759	0.0521	4.1295	0.0597	4.1892	1.1043	0.0561	1.1604		5,284.222 3	5,284.222 3	0.2622		5,290.776 6
Unmitigated	2.6234	10.8285	35.7354	0.1225	10.2192	0.1348	10.3540	2.7327	0.1269	2.8596		12,405.33 36	12,405.33 36	0.5375		12,418.76 98

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	1,410.00	1,410.00	1410.00	4,818,184	1,946,973
Enclosed Parking Structure	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	1,410.00	1,410.00	1,410.00	4,818,184	1,946,973

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking Structure	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.552373	0.044229	0.211123	0.119112	0.017503	0.005797	0.024455	0.015685	0.001637	0.001633	0.004830	0.000583	0.001041
Enclosed Parking Structure	0.552373	0.044229	0.211123	0.119112	0.017503	0.005797	0.024455	0.015685	0.001637	0.001633	0.004830	0.000583	0.001041
Parking Lot	0.552373	0.044229	0.211123	0.119112	0.017503	0.005797	0.024455	0.015685	0.001637	0.001633	0.004830	0.000583	0.001041

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.4146	3.5428	1.5076	0.0226		0.2864	0.2864		0.2864	0.2864		4,522.7780	4,522.7780	0.0867	0.0829	4,549.6546
NaturalGas Unmitigated	0.6225	5.3197	2.2637	0.0340		0.4301	0.4301		0.4301	0.4301		6,791.0959	6,791.0959	0.1302	0.1245	6,831.4520

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments High Rise	57724.3	0.6225	5.3197	2.2637	0.0340		0.4301	0.4301		0.4301	0.4301		6,791.0959	6,791.0959	0.1302	0.1245	6,831.4520
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.6225**	**5.3197**	**2.2637**	**0.0340**		**0.4301**	**0.4301**		**0.4301**	**0.4301**		**6,791.0959**	**6,791.0959**	**0.1302**	**0.1245**	**6,831.4520**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments High Rise	38.4436	0.4146	3.5428	1.5076	0.0226		0.2864	0.2864		0.2864	0.2864		4,522.7780	4,522.7780	0.0867	0.0829	4,549.6546
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.4146**	**3.5428**	**1.5076**	**0.0226**		**0.2864**	**0.2864**		**0.2864**	**0.2864**		**4,522.7780**	**4,522.7780**	**0.0867**	**0.0829**	**4,549.6546**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	16.8611	1.4413	124.4473	6.5400e-003		0.6817	0.6817		0.6817	0.6817	0.0000	223.0036	223.0036	0.2192	0.0000	228.4835
Unmitigated	409.9151	32.5637	887.2750	1.9526		115.2642	115.2642		115.2642	115.2642	14,050.3776	27,223.0036	41,273.3812	42.1201	0.9536	42,610.5693

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.0530					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	11.9933					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	393.0540	31.1225	762.8278	1.9460		114.5825	114.5825		114.5825	114.5825	14,050.3776	27,000.0000	41,050.3776	41.9009	0.9536	42,382.0858
Landscaping	3.8148	1.4413	124.4473	6.5400e-003		0.6817	0.6817		0.6817	0.6817		223.0036	223.0036	0.2192		228.4835
Total	**409.9151**	**32.5637**	**887.2750**	**1.9526**		**115.2642**	**115.2642**		**115.2642**	**115.2642**	**14,050.3776**	**27,223.0036**	**41,273.3812**	**42.1201**	**0.9536**	**42,610.5693**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

SubCategory	lb/day										lb/day					
Architectural Coating	1.0530					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	11.9933					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.8148	1.4413	124.4473	6.5400e-003		0.6817	0.6817		0.6817	0.6817		223.0036	223.0036	0.2192		228.4835
Total	**16.8611**	**1.4413**	**124.4473**	**6.5400e-003**		**0.6817**	**0.6817**		**0.6817**	**0.6817**	**0.0000**	**223.0036**	**223.0036**	**0.2192**	**0.0000**	**228.4835**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Turf Reduction

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

UCI East Campus Phase 4 [Building B]

Orange County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments High Rise	950.00	Dwelling Unit	15.32	400,000.00	2717

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Building sqft 600,000

Construction Phase - Anticipated schedule

Off-road Equipment -

Trips and VMT -

Grading - Approximate site acreage

Architectural Coating - Per site plan

Vehicle Trips - Per traffic study

Woodstoves - Project is student housing, no hearths

Construction Off-road Equipment Mitigation - Per Rule 403

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation - LEED+2016 Title 24+RPS

Water Mitigation -

Waste Mitigation -

Area Coating - Per site plan

Off-road Equipment -

Off-road Equipment -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	0	17856
tblAreaCoating	Area_Residential_Exterior	270000	400000
tblAreaCoating	Area_Residential_Interior	810000	1215000
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	6
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	15
tblConstructionPhase	NumDays	20.00	65.00
tblConstructionPhase	NumDays	300.00	440.00
tblConstructionPhase	PhaseEndDate	2/20/2020	3/31/2021
tblConstructionPhase	PhaseEndDate	6/24/2019	3/31/2021
tblConstructionPhase	PhaseStartDate	7/25/2019	12/31/2020
tblConstructionPhase	PhaseStartDate	1/17/2018	7/25/2019
tblFireplaces	NumberGas	807.50	1,275.00
tblFireplaces	NumberNoFireplace	95.00	150.00
tblFireplaces	NumberWood	47.50	75.00
tblLandUse	BuildingSpaceSquareFeet	950,000.00	400,000.00
tblLandUse	LandUseSquareFeet	950,000.00	400,000.00
tblProjectCharacteristics	OperationalYear	2018	2019
tblSolidWaste	SolidWasteGenerationRate	437.00	690.00
tblVehicleTrips	ST_TR	4.98	0.94
tblVehicleTrips	SU_TR	3.65	0.94
tblVehicleTrips	WD_TR	4.20	0.94
tblWater	IndoorWaterUseRate	61,896,324.34	97,731,038.43
tblWater	OutdoorWaterUseRate	39,021,595.78	61,613,045.97

tblWoodstoves	NumberCatalytic	47.50	75.00
tblWoodstoves	NumberNoncatalytic	47.50	75.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	5.5626	34.5021	44.6248	0.1298	8.2972	1.4191	9.7164	2.2152	1.3346	3.5497	0.0000	13,078.6622	13,078.6622	1.0558	0.0000	13,105.0562
2020	44.3491	33.4837	48.3581	0.1451	9.8286	1.3441	11.1727	2.6213	1.2702	3.8915	0.0000	14,549.2842	14,549.2842	1.0723	0.0000	14,576.0924
2021	43.8614	30.3210	45.9241	0.1417	9.8285	1.1320	10.9605	2.6213	1.0691	3.6904	0.0000	14,215.0094	14,215.0094	1.0353	0.0000	14,240.8920
Maximum	**44.3491**	**34.5021**	**48.3581**	**0.1451**	**9.8286**	**1.4191**	**11.1727**	**2.6213**	**1.3346**	**3.8915**	**0.0000**	**14,549.2842**	**14,549.2842**	**1.0723**	**0.0000**	**14,576.0924**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	5.5626	34.5021	44.6248	0.1298	8.2972	1.4191	9.7164	2.2152	1.3346	3.5497	0.0000	13,078.6622	13,078.6622	1.0558	0.0000	13,105.0562
2020	44.3491	33.4837	48.3581	0.1451	9.8286	1.3441	11.1727	2.6213	1.2702	3.8915	0.0000	14,549.2842	14,549.2842	1.0723	0.0000	14,576.0924
2021	43.8614	30.3210	45.9241	0.1417	9.8285	1.1320	10.9605	2.6213	1.0691	3.6904	0.0000	14,215.0094	14,215.0094	1.0353	0.0000	14,240.8920
Maximum	**44.3491**	**34.5021**	**48.3581**	**0.1451**	**9.8286**	**1.4191**	**11.1727**	**2.6213**	**1.3346**	**3.8915**	**0.0000**	**14,549.2842**	**14,549.2842**	**1.0723**	**0.0000**	**14,576.0924**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	404.4332	32.0348	841.5921	1.9502		115.0141	115.0141		115.0141	115.0141	14,050.3776	27,141.1247	41,191.5023	42.0395	0.9536	42,526.6736
Energy	0.3943	3.3691	1.4337	0.0215		0.2724	0.2724		0.2724	0.2724		4,301.0274	4,301.0274	0.0824	0.0789	4,326.5863
Mobile	1.6615	6.8580	22.6324	0.0776	6.4722	0.0854	6.5575	1.7307	0.0804	1.8111		7,856.7113	7,856.7113	0.3404		7,865.2209
Total	**406.4889**	**42.2620**	**865.6582**	**2.0493**	**6.4722**	**115.3719**	**121.8440**	**1.7307**	**115.3668**	**117.0975**	**14,050.3776**	**39,298.8634**	**53,349.2410**	**42.4623**	**1.0325**	**54,718.4807**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	11.3792	0.9123	78.7644	4.1400e-003		0.4316	0.4316		0.4316	0.4316	0.0000	141.1247	141.1247	0.1385	0.0000	144.5878
Energy	0.2769	2.3666	1.0071	0.0151		0.1913	0.1913		0.1913	0.1913		3,021.1462	3,021.1462	0.0579	0.0554	3,039.0994
Mobile	1.2731	4.3027	12.1001	0.0361	2.8808	0.0411	2.9219	0.7704	0.0386	0.8090		3,657.1418	3,657.1418	0.1780		3,661.5930
Total	**12.9292**	**7.5816**	**91.8715**	**0.0553**	**2.8808**	**0.6640**	**3.5448**	**0.7704**	**0.6615**	**1.4319**	**0.0000**	**6,819.4128**	**6,819.4128**	**0.3745**	**0.0554**	**6,845.2801**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e

Percent Reduction	96.82	82.06	89.39	97.30	55.49	99.42	97.09	55.49	99.43	98.78	100.00	82.65	87.22	99.12	94.64	87.49

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Building Construction B	Building Construction	7/25/2019	3/31/2021	5	440	Building B
2	Architectural Coating B	Architectural Coating	12/31/2020	3/31/2021	5	65	Building B

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 810,000; Residential Outdoor: 270,000; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Building Construction B	Cranes	1	7.00	231	0.29
Building Construction B	Forklifts	3	8.00	89	0.20
Building Construction B	Generator Sets	1	8.00	84	0.74
Building Construction B	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction B	Welders	1	8.00	46	0.45
Architectural Coating B	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating B	1	137.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction B	9	684.00	102.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Building Construction B - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.580 2	2,591.580 2	0.6313		2,607.363 5
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.580 2**	**2,591.580 2**	**0.6313**		**2,607.363 5**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3824	11.5749	3.0598	0.0256	0.6517	0.0782	0.7299	0.1876	0.0748	0.2624		2,784.282 5	2,784.282 5	0.2351		2,790.158 7
Worker	2.8190	1.8484	24.4012	0.0773	7.6455	0.0511	7.6966	2.0276	0.0470	2.0747		7,702.799 6	7,702.799 6	0.1894		7,707.534 0
Total	**3.2014**	**13.4233**	**27.4610**	**0.1029**	**8.2972**	**0.1293**	**8.4265**	**2.2152**	**0.1219**	**2.3370**		**10,487.08 21**	**10,487.08 21**	**0.4244**		**10,497.69 27**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3824	11.5749	3.0598	0.0256	0.6517	0.0782	0.7299	0.1876	0.0748	0.2624		2,784.2825	2,784.2825	0.2351		2,790.1587
Worker	2.8190	1.8484	24.4012	0.0773	7.6455	0.0511	7.6966	2.0276	0.0470	2.0747		7,702.7996	7,702.7996	0.1894		7,707.5340
Total	**3.2014**	**13.4233**	**27.4610**	**0.1029**	**8.2972**	**0.1293**	**8.4265**	**2.2152**	**0.1219**	**2.3370**		**10,487.0821**	**10,487.0821**	**0.4244**		**10,497.6927**

3.2 Building Construction B - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3258	10.6261	2.8047	0.0254	0.6517	0.0554	0.7072	0.1875	0.0530	0.2406		2,765.5151	2,765.5151	0.2237		2,771.1069
Worker	2.6286	1.6560	22.3891	0.0748	7.6455	0.0506	7.6961	2.0276	0.0466	2.0742		7,455.8983	7,455.8983	0.1700		7,460.1474
Total	**2.9544**	**12.2821**	**25.1938**	**0.1002**	**8.2972**	**0.1060**	**8.4032**	**2.2152**	**0.0996**	**2.3148**		**10,221.4134**	**10,221.4134**	**0.3936**		**10,231.2543**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3258	10.6261	2.8047	0.0254	0.6517	0.0554	0.7072	0.1875	0.0530	0.2406		2,765.5151	2,765.5151	0.2237		2,771.1069
Worker	2.6286	1.6560	22.3891	0.0748	7.6455	0.0506	7.6961	2.0276	0.0466	2.0742		7,455.8983	7,455.8983	0.1700		7,460.1474
Total	**2.9544**	**12.2821**	**25.1938**	**0.1002**	**8.2972**	**0.1060**	**8.4032**	**2.2152**	**0.0996**	**2.3148**		**10,221.4134**	**10,221.4134**	**0.3936**		**10,231.2543**

3.2 Building Construction B - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2722	9.5690	2.5952	0.0252	0.6517	0.0199	0.6716	0.1875	0.0190	0.2065		2,741.6835	2,741.6835	0.2150		2,747.0582
Worker	2.4688	1.4938	20.7751	0.0722	7.6455	0.0495	7.6950	2.0276	0.0456	2.0732		7,197.0080	7,197.0080	0.1541		7,200.8610
Total	**2.7410**	**11.0628**	**23.3702**	**0.0973**	**8.2972**	**0.0694**	**8.3666**	**2.2152**	**0.0646**	**2.2797**		**9,938.6915**	**9,938.6915**	**0.3691**		**9,947.9191**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2722	9.5690	2.5952	0.0252	0.6517	0.0199	0.6716	0.1875	0.0190	0.2065		2,741.6835	2,741.6835	0.2150		2,747.0582
Worker	2.4688	1.4938	20.7751	0.0722	7.6455	0.0495	7.6950	2.0276	0.0456	2.0732		7,197.0080	7,197.0080	0.1541		7,200.8610
Total	**2.7410**	**11.0628**	**23.3702**	**0.0973**	**8.2972**	**0.0694**	**8.3666**	**2.2152**	**0.0646**	**2.2797**		**9,938.6915**	**9,938.6915**	**0.3691**		**9,947.9191**

3.3 Architectural Coating B - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	38.5062					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**38.7483**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5265	0.3317	4.4844	0.0150	1.5313	0.0101	1.5415	0.4061	9.3200e-003	0.4154		1,493.3597	1,493.3597	0.0340		1,494.2108
Total	**0.5265**	**0.3317**	**4.4844**	**0.0150**	**1.5313**	**0.0101**	**1.5415**	**0.4061**	**9.3200e-003**	**0.4154**		**1,493.3597**	**1,493.3597**	**0.0340**		**1,494.2108**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Archit. Coating	38.5062					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**38.7483**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5265	0.3317	4.4844	0.0150	1.5313	0.0101	1.5415	0.4061	9.3200e-003	0.4154		1,493.3597	1,493.3597	0.0340		1,494.2108
Total	**0.5265**	**0.3317**	**4.4844**	**0.0150**	**1.5313**	**0.0101**	**1.5415**	**0.4061**	**9.3200e-003**	**0.4154**		**1,493.3597**	**1,493.3597**	**0.0340**		**1,494.2108**

3.3 Architectural Coating B - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	38.5062					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941		281.4481	281.4481	0.0193		281.9309
Total	**38.7251**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**		**281.4481**	**281.4481**	**0.0193**		**281.9309**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.4945	0.2992	4.1611	0.0145	1.5313	9.9100e-003	1.5413	0.4061	9.1300e-003	0.4152		1,441.5060	1,441.5060	0.0309		1,442.2777
Total	**0.4945**	**0.2992**	**4.1611**	**0.0145**	**1.5313**	**9.9100e-003**	**1.5413**	**0.4061**	**9.1300e-003**	**0.4152**		**1,441.5060**	**1,441.5060**	**0.0309**		**1,442.2777**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	38.5062					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941	0.0000	281.4481	281.4481	0.0193		281.9309
Total	**38.7251**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**	**0.0000**	**281.4481**	**281.4481**	**0.0193**		**281.9309**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.4945	0.2992	4.1611	0.0145	1.5313	9.9100e-003	1.5413	0.4061	9.1300e-003	0.4152		1,441.5060	1,441.5060	0.0309		1,442.2777
Total	**0.4945**	**0.2992**	**4.1611**	**0.0145**	**1.5313**	**9.9100e-003**	**1.5413**	**0.4061**	**9.1300e-003**	**0.4152**		**1,441.5060**	**1,441.5060**	**0.0309**		**1,442.2777**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Increase Diversity

Improve Destination Accessibility

Increase Transit Accessibility

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.2731	4.3027	12.1001	0.0361	2.8808	0.0411	2.9219	0.7704	0.0386	0.8090		3,657.1418	3,657.1418	0.1780		3,661.5930
Unmitigated	1.6615	6.8580	22.6324	0.0776	6.4722	0.0854	6.5575	1.7307	0.0804	1.8111		7,856.7113	7,856.7113	0.3404		7,865.2209

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT

Apartments High Rise	893.00	893.00	893.00	3,051,517	1,358,263
Total	893.00	893.00	893.00	3,051,517	1,358,263

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.552373	0.044229	0.211123	0.119112	0.017503	0.005797	0.024455	0.015685	0.001637	0.001633	0.004830	0.000583	0.001041

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.2769	2.3666	1.0071	0.0151		0.1913	0.1913		0.1913	0.1913		3,021.1462	3,021.1462	0.0579	0.0554	3,039.0994
NaturalGas Unmitigated	0.3943	3.3691	1.4337	0.0215		0.2724	0.2724		0.2724	0.2724		4,301.0274	4,301.0274	0.0824	0.0789	4,326.5863

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments High Rise	36558.7	0.3943	3.3691	1.4337	0.0215		0.2724	0.2724		0.2724	0.2724		4,301.0274	4,301.0274	0.0824	0.0789	4,326.5863
Total		**0.3943**	**3.3691**	**1.4337**	**0.0215**		**0.2724**	**0.2724**		**0.2724**	**0.2724**		**4,301.0274**	**4,301.0274**	**0.0824**	**0.0789**	**4,326.5863**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments High Rise	25.6797	0.2769	2.3666	1.0071	0.0151		0.1913	0.1913		0.1913	0.1913		3,021.1462	3,021.1462	0.0579	0.0554	3,039.0994
Total		**0.2769**	**2.3666**	**1.0071**	**0.0151**		**0.1913**	**0.1913**		**0.1913**	**0.1913**		**3,021.1462**	**3,021.1462**	**0.0579**	**0.0554**	**3,039.0994**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Mitigated	11.3792	0.9123	78.7644	4.1400e-003		0.4316	0.4316		0.4316	0.4316	0.0000	141.1247	141.1247	0.1385	0.0000	144.5878
Unmitigated	404.4332	32.0348	841.5921	1.9502		115.0141	115.0141		115.0141	115.0141	14,050.3776	27,141.1247	41,191.5023	42.0395	0.9536	42,526.6736

6.2 Area by SubCategory

Unmitigated

SubCategory	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Architectural Coating	1.0481					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.9200					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	393.0540	31.1225	762.8278	1.9460		114.5825	114.5825		114.5825	114.5825	14,050.3776	27,000.0000	41,050.3776	41.9009	0.9536	42,382.0858
Landscaping	2.4111	0.9123	78.7644	4.1400e-003		0.4316	0.4316		0.4316	0.4316		141.1247	141.1247	0.1385		144.5878
Total	**404.4332**	**32.0348**	**841.5921**	**1.9502**		**115.0141**	**115.0141**		**115.0141**	**115.0141**	**14,050.3776**	**27,141.1247**	**41,191.5023**	**42.0395**	**0.9536**	**42,526.6736**

Mitigated

SubCategory	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Architectural Coating	1.0481					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.9200					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.4111	0.9123	78.7644	4.1400e-003		0.4316	0.4316		0.4316	0.4316		141.1247	141.1247	0.1385		144.5878
Total	**11.3792**	**0.9123**	**78.7644**	**4.1400e-003**		**0.4316**	**0.4316**		**0.4316**	**0.4316**	**0.0000**	**141.1247**	**141.1247**	**0.1385**	**0.0000**	**144.5878**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Turf Reduction

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX B

Greenhouse Gas Assessment

Michael Baker
INTERNATIONAL

GREENHOUSE GAS ASSESSMENT
for the
UCI East Campus Phase 4 Project
University of California, Irvine

Consultant:

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March 21, 2017

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This document is designed for double-sided printing to conserve natural resources.

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SYMBOLS, ABBREVIATIONS, AND ACRONYMS

AB	Assembly Bill
AQMP	Air Quality Management Plan
Basin	South Coast Air Basin
BAU	business as usual
CAAQS	California Ambient Air Quality Standards
CAFE	corporate average fleet fuel economy
CalGreen	California Green Building Standards
CARB	California Air Resources Board
CCAA	California Clean Air Act
CEQA	California Environmental Quality Act
CFCs	Chlorofluorocarbons
CH_4	Methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2eq	carbon dioxide equivalent
EAP	Energy Action Plan
EECAP	energy efficiency climate action plans
EPA	U.S. Environmental Protection Agency
FCAA	Federal Clean Air Act
GHG	greenhouse gas
GSF	gross square foot
GWP	Global Warming Potential
H_2O	water vapor
HCFCs	Hydrochlorofluorocarbons
HFCs	Hydrofluorocarbons
hp	horsepower
HPLV	high-pressure-low-volume
HVAC	heating, ventilation, and air conditioning
I-4	Environmental Justice Enhancement Initiative
IPCC	International Panel for Climate Change
lbs	pounds
LEED	Leadership in Engineering and Environmental Design
LOS	level of service
LSTs	Localized Significance Thresholds
Metro	Los Angeles County Metropolitan Transportation Authority
MMT	million metric tons
mpg	miles per gallon
MPO	metropolitan planning organization
$MTCO_2eq$	metric tons of carbon dioxide equivalents
MU-T	Mixed-Use Transit
N_2O	nitrous oxide

NAAQS	National Ambient Air Quality Standards
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
OAL	Office of Administrative Law
O_3	ozone
OPR	Office of Planning and Research
PFCs	Perfluorocarbons
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
ppm	parts per million
PST	Pacific Standard Time
RCP	Regional Comprehensive Plan
RH	relative humidity
ROG	Reactive Organic Gasses
RTP	Regional Transportation Plan
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCS	Sustainable Community Strategy
SF_6	Sulfur hexafluoride
SGVCOG	San Gabriel Valley Council of Governments
SGVEWP	San Gabriel Valley Energy Wise Partnership
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_x	sulfur oxides
SRA	Source receptor Area
UNFCCC	United Nations Framework Convention on Climate Change
$\mu g/m^3$	micrograms per cubic meter
UV-B	ultraviolet B rays
VMT	vehicle miles traveled
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

The purpose of this Greenhouse Gas Assessment is to evaluate potential short- and long-term greenhouse gas (GHG) impacts resulting from implementation of the proposed East Campus Phase 4 Project ("project" or "proposed project") on the University of California, Irvine (UCI) campus. The project is located at the southeast corner of the Campus Drive and California Avenue intersection, on the UCI campus.

The project proposes two phases of construction (Phase 4a and Phase 4b) to develop two residential structures, a southern project site surface parking lot, and a northern project site parking structure with an associated maintenance shop. Phase 4a would demolish the existing 183-space Arroyo Vista 1 (AV-1) and 374-space California Temporary (CT) parking lots to construct an approximately 600,000-gross-square-foot (GSF) residential structure with a community center, recreational facilities, circulation, and open space on the north project site. The structure would contain approximately 1,500 beds within 425 student apartments including bedrooms, kitchens, bathrooms, and living room space. A five-story parking structure with 550 spaces and a maintenance shop would be constructed to the east of the residential facility and long-term bicycle parking facility.

On the south project site, the existing nursery would be removed to construct a 250-space surface parking lot in order to replace those demolished at the north project site and extend the existing Arroyo Drive to California Avenue The 250 space surface parking lot and Arroyo Drive extension are optional elements of the project, but are included in this analysis.
Phase 4b would construct an approximately 400,000-GSF residential structure with 950 beds in 250 apartment units, a community center, circulation, and open space east of the Phase 4a parking structure on the north project site.

Greenhouse Gas Impacts. The proposed project would result in less than significant GHG impacts. Additionally, the project would not conflict with a plan, policy, or regulation adopted for the purposes of reducing GHG emissions.

1.0 INTRODUCTION

The purpose of this Greenhouse Gas Assessment is to evaluate potential short- and long-term air quality impacts resulting from implementation of the proposed East Campus Phase 4 Project ("project" or "proposed project") on the University of California, Irvine (UCI) campus.

1.1 PROJECT LOCATION

The project site is located 1.5 miles south of Interstate 405 (I-405), and 1.4 miles north of State Route 73 (SR-73); refer to Exhibit 1, *Regional Vicinity* Locally, the project is located at the southeast corner of the Campus Drive and California Avenue intersection, on the UCI campus.

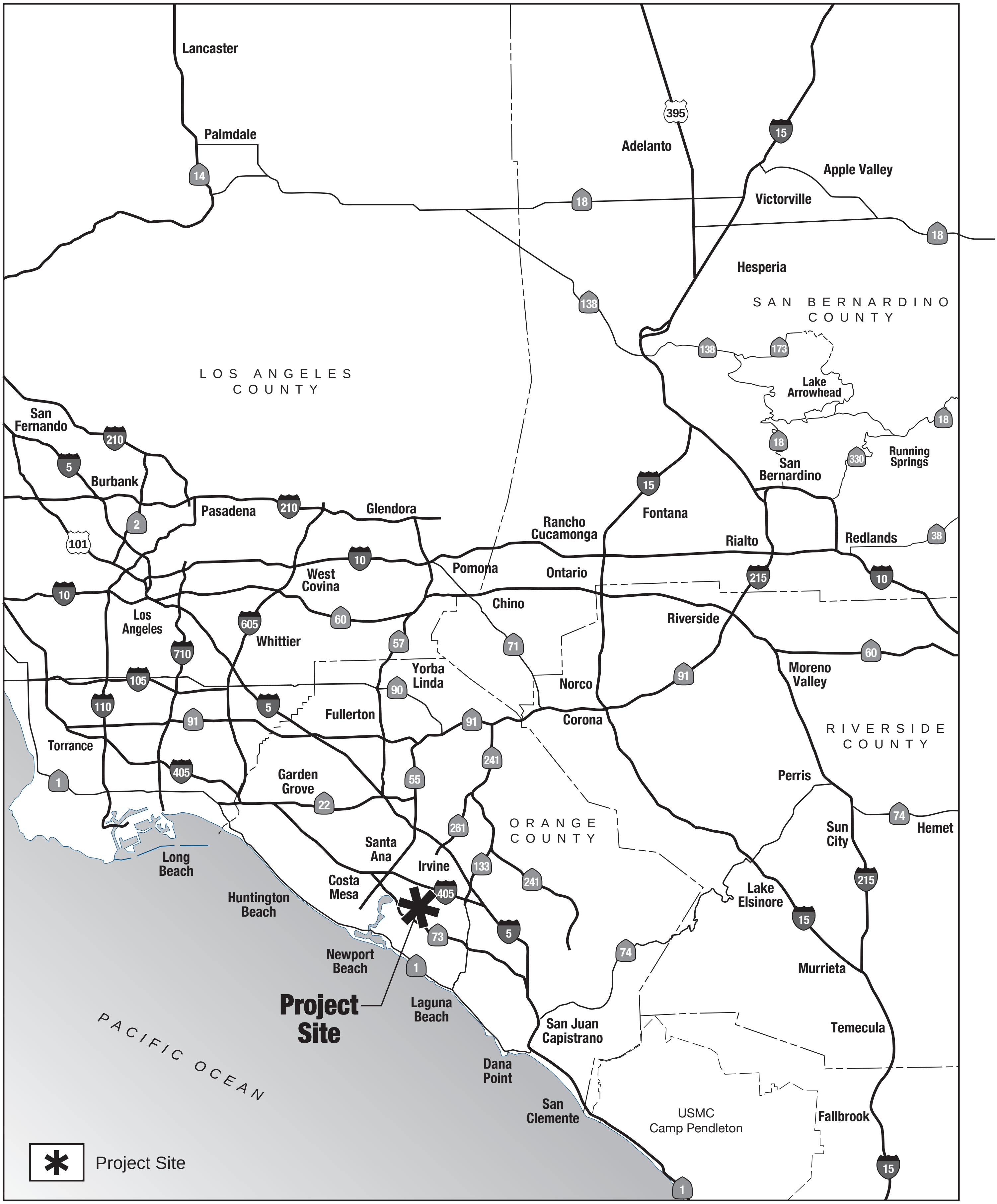
The north project site, which includes a portion of Phase 4a and all of Phase 4b, is located in the East Campus on the UCI campus. Off-campus residential, Cambridge Court, lies to the north across Campus Drive; open space and Vista del Campo Norte student housing lie to the east; Puerta del Sol student housing and the Early Childhood Education Center lie to the west across California Avenue; and Arroyo Vista student housing lies to the south across Arroyo Drive.

The south project site, which includes a portion of Phase 4a, is located directly south of the residential northern project site described above and within the East Campus. The Anteater Recreation Center and playfields lie to the north and northeast of the south project site, open space to the south and east, and Palo Verde student housing to the west across California Avenue; refer to Exhibit 2, *Site Vicinity.*

1.2 PROJECT DESCRIPTION

The project proposes two phases of construction (Phase 4a and Phase 4b) to develop two residential structures, a southern site surface parking lot, and a northern site parking structure with an associated maintenance shop. Phase 4a would demolish the existing 183-space AV-1 and 374-space CT parking lots to construct an approximately 600,000-gross-square-foot (GSF) residential structure with a community center, recreational facilities, circulation, and open space on the north project site. The structure would contain approximately 1,500 beds within 425 student apartments including bedrooms, kitchens, bathrooms, and living room space. A five-story parking structure with 550 spaces and a maintenance shop would be constructed to the east of the residential facility and long-term bicycle parking facility.

On the south project site, the existing nursery would be removed to construct a 250-space surface parking lot in order to replace those demolished at the north project site and extend the existing Arroyo Drive to a stop-controlled intersection at California Avenue. The 250 space parking lot and Arroyo Drive extension are optional elements of the project, but are included in this analysis. Phase 4b would construct an approximately 400,000-GSF residential structure with 950 beds in 250 apartment units, a community center, circulation, and open space east of the Phase 4a parking structure on the north project site; refer to Exhibit 3, *Conceptual Site Plan*.



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APPROXIMATE

Michael Baker INTERNATIONAL

03/07/17 JN 158401 mas

UCI EAST CAMPUS PHASE 4 PROJECT
GREENHOUSE GAS ASSESSMENT

Regional Vicinity

Exhibit 1

Source: Aerial - Google Earth Pro, March 2017

not to scale

Michael Baker INTERNATIONAL

03/07/17 JN 158401 mas

UCI EAST CAMPUS PHASE 4 PROJECT • GREENHOUSE GAS ASSESSMENT

Site Vicinity

Exhibit 2

Project Data

Site Area Information

Gross Site Area	± 13.3 AC
	± 9.2 AC (Phase 4A)
	± 4.1 AC (Phase 4B)
Dwelling Units	± 652 DU
Beds	± 2,351 Beds
Density	± 176.8 Beds/AC
	± 48.9 DU / AC

Combined Building A & B

Provided Beds: ±2,351 Beds
Provided Units: ±652 Units

Phase 4A

Provided Beds: ±1,441 Beds
Provided Units: ±410 Units

Phase 4B

Provided Beds: ±910 Beds
Provided Units: ±242 Units

Parking Summary

Total Parking Provided:	±494 spaces (0.76 *sp/unit*)
Total Parking Required:	±494 spaces *(0.76 sp/unit)*
target 55% (of total beds)	
- 500 spaces (for ECPS parking structure)	
- 300 spaces (excess in Norte parking lots)	

Bicycle Parking

Phase 4A:	±313 bicycles
Phase 4B:	±118 bicycles
Garage:	±750 bicycles
Total:	±1,181 bicycles (covered)

Project Totals

Community Center A	**±14,000 sf**
Community Center B	**±7,000 sf**
Maintenance Shop	**±3,000 sf**

Source: KTGY, January 2017

Michael Baker INTERNATIONAL

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UCI EAST CAMPUS PHASE 4 PROJECT • GREENHOUSE GAS ASSESSMENT

Conceptual Site Plan

Exhibit 3

2.0 ENVIRONMENTAL SETTING

The California Air Resources Board (CARB) divides the State into 15 air basins that share similar meteorological and topographical features. The project site lies within the northwestern portion of the South Coast Air Basin (Basin). The Basin is a 6,600-square mile area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties, in addition to the San Gorgonio Pass area in Riverside County. The Basin's terrain and geographical location (i.e., a coastal plain with connecting broad valleys and low hills) determine its distinctive climate.

The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. The climate is mild and tempered by cool sea breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The extent and severity of the air pollution problem in the Basin is a function of the area's natural physical characteristics (weather and topography), as well as man-made influences (development patterns and lifestyle). Factors such as wind, sunlight, temperature, humidity, rainfall, and topography all affect the accumulation and/or dispersion of pollutants throughout the Basin.

CLIMATE

The average annual temperature varies little throughout the Basin, averaging 75 degrees Fahrenheit (°F). However, with a less-pronounced oceanic influence, the eastern inland portions of the Basin show greater variability in annual minimum and maximum temperatures. All portions of the Basin have had recorded temperatures over 100°F in recent years.

Although the Basin has a semi-arid climate, the air near the surface is moist due to the presence of a shallow marine layer. Except for infrequent periods when dry, continental air is brought into the Basin by offshore winds, the ocean effect is dominant. Periods with heavy fog are frequent, and low stratus clouds, occasionally referred to as "high fog," are a characteristic climate feature. Annual average relative humidity is 70 percent at the coast and 57 percent in the eastern part of the Basin. Precipitation in the Basin is typically nine to 14 inches annually and is rarely in the form of snow or hail due to typically warm weather. The frequency and amount of rainfall is greater in the coastal areas of the Basin.

The height of the inversion is important in determining pollutant concentration. When the inversion is approximately 2,500 feet above sea level, the sea breezes carry the pollutants inland to escape over the mountain slopes or through the passes. At a height of 1,200 feet, the terrain prevents the pollutants from entering the upper atmosphere, resulting in a settlement in the foothill communities. Below 1,200 feet, the inversion puts a tight lid on pollutants, concentrating them in a shallow layer over the entire coastal basin. Usually, inversions are lower before sunrise than during the day. Mixing heights for inversions are lower in the summer and more persistent, being partly responsible for the high levels of ozone (O_3) observed during summer months in the

Basin. Smog in southern California is generally the result of these temperature inversions combining with coastal day winds and local mountains to contain the pollutants for long periods of time, allowing them to form secondary pollutants by reacting with sunlight. The Basin has a limited ability to disperse these pollutants due to typically low wind speeds.

The area in which the project is located offers clear skies and sunshine, yet is still susceptible to air inversions. These inversions trap a layer of stagnant air near the ground, where it is then further loaded with pollutants. These inversions cause haziness, which is caused by moisture, suspended dust, and a variety of chemical aerosols emitted by trucks, automobiles, furnaces, and other sources.

3.0 STATE AND FEDERAL GREENHOUSE GAS STANDARDS

3.1 GLOBAL CLIMATE CHANGE GASES

The natural process through which heat is retained in the troposphere is called the "greenhouse effect."[1] The greenhouse effect traps heat in the troposphere through a threefold process as follows: Short wave radiation emitted by the Sun is absorbed by the Earth; the Earth emits a portion of this energy in the form of long wave radiation; and GHGs in the upper atmosphere absorb this long wave radiation and emit this long wave radiation into space and toward the Earth. This "trapping" of the long wave (thermal) radiation emitted back toward the Earth is the underlying process of the greenhouse effect.

The most abundant GHGs are water vapor and carbon dioxide (CO_2). Many other trace gases have greater ability to absorb and re-radiate long wave radiation; however, these gases are not as plentiful. For this reason, and to gauge the potency of GHGs, scientists have established a Global Warming Potential (GWP) for each GHG based on its ability to absorb and re-radiate long wave radiation.

GHGs include, but are not limited to, the following:[2]

- *Water Vapor (H_2O)*. Although water vapor has not received the scrutiny of other GHGs, it is the primary contributor to the greenhouse effect. Natural processes, such as evaporation from oceans and rivers, and transpiration from plants, contribute 90 percent and 10 percent of the water vapor in our atmosphere, respectively.

  The primary human related source of water vapor comes from fuel combustion in motor vehicles; however, this is not believed to contribute a significant amount (less than one percent) to atmospheric concentrations of water vapor. The Intergovernmental Panel on Climate Change (IPCC) has not determined a GWP for water vapor.

- *Carbon Dioxide (CO_2)*. Carbon Dioxide is primarily generated by fossil fuel combustion in stationary and mobile sources. Due to the emergence of industrial facilities and mobile sources in the past 250 years, CO_2 emissions from fossil fuel combustion increased by a total of 7.4 percent between 1990 and 2014.[3] Carbon dioxide is the most widely emitted GHG and is the reference gas (GWP of 1) for determining GWPs for other GHGs.

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[1] The troposphere is the bottom layer of the atmosphere, which varies in height from the Earth's surface to 10 to 12 kilometers.

[2] All Global Warming Potentials are given as 100-year Global Warming Potential. Unless noted otherwise, all Global Warming Potentials were obtained from the IPCC. (Intergovernmental Panel on Climate Change, *Climate Change, Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007*).

[3] U.S. Environmental Protection Agency, *Inventory of United States Greenhouse Gas Emissions and Sinks 1990 to 2014*, April 2016.

- *Methane (CH_4)*. Methane is emitted from biogenic sources, incomplete combustion in forest fires, landfills, manure management, and leaks in natural gas pipelines. In the United States, the top three sources of methane are landfills, natural gas systems, and enteric fermentation (the digestive process in animals with a rumen, typically cattle, causing methane gas). Methane is the primary component of natural gas, which is used for space and water heating, steam production, and power generation. The GWP of methane is 25.

- *Nitrous Oxide (N_2O)*. Nitrous oxide is produced by both natural and human related sources. Primary human related sources include agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic acid production (for the industrial production of nylon), and nitric acid production (for rocket fuel, woodworking, and as a chemical reagent). The GWP of nitrous oxide is 298.

- *Hydrofluorocarbons (HFCs)*. HFCs are typically used as refrigerants, aerosol propellants, solvents and fire retardants. The major emissions source of HFCs is from their use as refrigerants in air conditioning systems in both vehicles and buildings. The use of HFCs for cooling and foam blowing is increasing, as the continued phase out of chlorofluorocarbons (CFCs) and HCFCs gains momentum. The 100-year GWP of HFCs range from 12 for HFC-161 to 14,800 for HFC-23.[4]

- *Perfluorocarbons (PFCs)*. PFCs are compounds consisting of carbon and fluorine, and are primarily created as a byproduct of aluminum production and semiconductor manufacturing. Perfluorocarbons are potent GHGs with a GWP several thousand times that of carbon dioxide, depending on the specific PFC. Another area of concern regarding PFCs is their long atmospheric lifetime (up to 50,000 years).[5] The GWP of PFCs range from 7,390 to 12,200.[6]

- *Sulfur hexafluoride (SF_6)*. SF_6 is a colorless, odorless, nontoxic, nonflammable gas. Sulfur hexafluoride is the most potent GHG that has been evaluated by the IPCC with a Global Warming Potential of 22,800.[7] However, its global warming contribution is not as high as the Global Warming Potential would indicate due to its low mixing ratio compared to carbon dioxide (4 parts per trillion [ppt] in 1990 versus 365 parts per million [ppm], respectively).[8]

[4] Ibid.

[5] U.S. Environmental Protection Agency, *Overview of Greenhouse Gas Emissions*, August 9, 2016, https://www.epa.gov/ghgemissions/overview-greenhouse-gases#f-gases, accessed on March 8, 2016.

[6] Ibid.

[7] Ibid.

[8] Ibid.

In addition to the six major GHGs discussed above (excluding water vapor), many other compounds have the potential to contribute to the greenhouse effect. Some of these substances were previously identified as stratospheric ozone (O_3) depletors; therefore, their gradual phase out is currently in effect. The following is a listing of these compounds:

- *Hydrochlorofluorocarbons (HCFCs)*. HCFCs are solvents, similar in use and chemical composition to CFCs. The main uses of HCFCs are for refrigerant products and air conditioning systems. As part of the Montreal Protocol, all developed countries that adhere to the Montreal Protocol are subject to a consumption cap and gradual phase out of HCFCs. The United States is scheduled to achieve a 100 percent reduction to the cap by 2030. The 100-year GWP of HCFCs range from 90 for HCFC-123 to 1,800 for HCFC-142b.[9]

- *1,1,1 trichloroethane*. 1,1,1 trichloroethane or methyl chloroform is a solvent and degreasing agent commonly used by manufacturers. The GWP of methyl chloroform is 146 times that of CO_2 (CO_2 has a GWP of 1).[10]

- *Chlorofluorocarbons (CFCs)*. CFCs are used as refrigerants, cleaning solvents, and aerosols spray propellants. CFCs were also part of the EPA's Final Rule (57 FR 3374) for the phase out of O_3 depleting substances. Currently, CFCs have been replaced by HFCs in cooling systems and a variety of alternatives for cleaning solvents. Nevertheless, CFCs remain suspended in the atmosphere contributing to the greenhouse effect. CFCs are potent GHGs with 100-year GWPs ranging from 3,800 for CFC 11 to 14,400 for CFC 13.[11]

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[9] Intergovernmental Panel on Climate Change, *Climate Change 2007: Working Group I: The Physical Science Basis, 2.10.2, Direct Global Warming Potentials*, 2007, https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html, accessed March 8, 2017.

[10] Ibid.

[11] Ibid.

4.0 REGULATORY SETTING

4.1 GLOBAL CLIMATE CHANGE REGULATORY PROGRAMS

FEDERAL

The Federal government is extensively engaged in international climate change activities in areas such as science, mitigation, and environmental monitoring. The EPA actively participates in multilateral and bilateral activities by establishing partnerships and providing leadership and technical expertise. Multilaterally, the United States is a strong supporter of activities under the United Nations Framework Convention on Climate Change (UNFCCC) and the IPCC.

In 1988, the United Nations and the World Meteorological Organization established the IPCC to assess the scientific, technical, and socioeconomic information relevant to understanding the scientific basis of human-induced climate change, its potential impacts, and options for adaptation and mitigation. The most recent reports of the IPCC have emphasized the scientific consensus around the evidence that real and measurable changes to the climate are occurring, that they are caused by human activity, and that significant adverse impacts on the environment, the economy, and human health and welfare are unavoidable.

In December 2007, Congress passed the first increase in corporate average fleet fuel economy (CAFE) standards. The new CAFE standards represent an increase to 35 miles per gallon (mpg) by 2020. In March 2009, the Obama Administration announced that for the 2011 model year, the standard for cars and light trucks will be 27.3 mpg, the standard for cars will be 30.2 mpg; and standard for trucks would be 24.1 mpg. Additionally, in May 2009 President Barack Obama announced plans for a national fuel-economy and GHG emissions standard that would significantly increase mileage requirements for cars and trucks by 2016. The new requirements represent an average standard of 39 mpg for cars and 30 mpg for trucks by 2016.

Currently, the EPA is moving forward with two key climate change regulatory proposals, one to establish a mandatory GHG reporting system. Under the Federal Clean Air Act (FCAA), the EPA is now obligated to issue rules regulating global warming pollution from all major sources. In April 2009, the EPA concluded that GHGs are a danger to public health and welfare, establishing the basis for GHG regulation. However, as of the date of this study there are no Federal regulations or policies regarding GHG emissions applicable to the proposed project.

STATE

Various statewide and local initiatives to reduce California's contribution to GHG emissions have raised awareness that, even though the various contributors to and consequences of global climate change are not yet fully understood, global climate change is occurring, and that there is a real potential for severe adverse environmental, social, and economic effects in the long term. Every nation emits GHGs and as a result makes an incremental cumulative contribution to global climate change; therefore, global cooperation will be required to reduce the rate of GHG emissions enough to slow or stop the human-caused increase in average global temperatures and associated changes in climatic conditions.

Executive Order S-1-07. Executive Order S-1-07 proclaims that the transportation sector is the main source of GHG emissions in California, generating more than 40 percent of statewide emissions. It establishes a goal to reduce the carbon intensity of transportation fuels sold in California by at least ten percent by 2020. This order also directs CARB to determine whether this Low Carbon Fuel Standard (LCFS) could be adopted as a discrete early-action measure as part of the effort to meet the mandates in AB 32.

Executive Order S-3-05. Executive Order S-3-05 set forth a series of target dates by which statewide emissions of GHGs would be progressively reduced, as follows:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

The Executive Order directed the secretary of the California Environmental Protection Agency (Cal/EPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The secretary will also submit biannual reports to the governor and California Legislature describing the progress made toward the emissions targets, the impacts of global climate change on California's resources, and mitigation and adaptation plans to combat these impacts. To comply with the executive order, the secretary of Cal/EPA created the California Climate Action Team (CAT), made up of members from various State agencies and commissions. The team released its first report in March 2006. The report proposed to achieve the targets by building on the voluntary actions of California businesses, local governments, and communities and through State incentive and regulatory programs.

Executive Order B-30-15. Executive Order B-30-15 added the interim target to reduce statewide GHG emissions 40 percent below 1990 levels by 2030.

Executive Order S-13-08. Executive Order S-13-08 seeks to enhance the State's management of climate impacts including sea level rise, increased temperatures, shifting precipitation, and extreme weather events by facilitating the development of State's first climate adaptation strategy. This will result in consistent guidance from experts on how to address climate change impacts in the State of California.

Executive Order S-14-08. Executive Order S-14-08 expands the State's Renewable Energy Standard to 33 percent renewable power by 2020. Additionally, Executive Order S-21-09 (signed on September 15, 2009) directs CARB to adopt regulations requiring 33 percent of electricity sold in the State come from renewable energy by 2020. CARB adopted the "Renewable Electricity

Standard" on September 23, 2010, which requires 33 percent renewable energy by 2020 for most publicly owned electricity retailers.

Executive Order S-20-04. Executive Order S-20-04, the California Green Building Initiative, (signed into law on December 14, 2004), establishes a goal of reducing energy use in State-owned buildings by 20 percent from a 2003 baseline by 2015. It also encourages the private commercial sector to set the same goal. The initiative places the California Energy Commission (CEC) in charge of developing a building efficiency benchmarking system, commissioning and retro-commissioning (commissioning for existing commercial buildings) guidelines, and developing and refining building energy efficiency standards under Title 24 to meet this goal.

Executive Order S-21-09. Executive Order S-21-09, 33 percent Renewable Energy for California, directs CARB to adopt regulations to increase California's Renewable Portfolio Standard (RPS) to 33 percent by 2020. This builds upon SB 1078 (2002) which established the California RPS program, requiring 20 percent renewable energy by 2017, and SB 107 (2006) which advanced the 20 percent deadline to 2010, a goal which was expanded to 33 percent by 2020 in the 2005 Energy Action Plan II.

Assembly Bill 32 (California Global Warming Solutions Act of 2006). California passed the California Global Warming Solutions Act of 2006 (AB 32; *California Health and Safety Code* Division 25.5, Sections 38500 - 38599). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and establishes a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

Assembly Bill 1493. AB 1493 (also known as the Pavley Bill) requires that CARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of GHG emitted by passenger vehicles and light-duty trucks and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the State."

To meet the requirements of AB 1493, CARB approved amendments to the California Code of Regulations (CCR) in 2004 by adding GHG emissions standards to California's existing standards for motor vehicle emissions. Amendments to CCR Title 13, Sections 1900 and 1961 and adoption of 13 CCR Section 1961.1 require automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty weight classes for passenger vehicles (i.e., any medium-duty vehicle with a gross vehicle weight rating less than 10,000 pounds that is designed primarily to transport people), beginning with the 2009 model year. Emissions limits are reduced further in each model year through 2016. When fully phased in, the near-term standards will result in a reduction of about 22 percent in GHG emissions compared to the emissions from the 2002 fleet, while the mid-term standards will result in a reduction of about 30 percent.

Assembly Bill 3018. AB 3018 established the Green Collar Jobs Council (GCJC) under the California Workforce Investment Board (CWIB). The GCJC will develop a comprehensive approach to address California's emerging workforce needs associated with the emerging green economy. This bill will ignite the development of job training programs in the clean and green technology sectors.

Senate Bill 97. SB 97, signed in August 2007 (Chapter 185, Statutes of 2007; PRC Sections 21083.05 and 21097), acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directs the Governor's Office of Planning and Research (OPR), which is part of the State Natural Resources Agency, to prepare, develop, and transmit to CARB guidelines for the feasible mitigation of GHG emissions (or the effects of GHG emissions), as required by CEQA.

OPR published a technical advisory recommending that CEQA lead agencies make a good-faith effort to estimate the quantity of GHG emissions that would be generated by a proposed project. Specifically, based on available information, CEQA lead agencies should estimate the emissions associated with project-related vehicular traffic, energy consumption, water usage, and construction activities to determine whether project-level or cumulative impacts could occur, and should mitigate the impacts where feasible. OPR requested CARB technical staff to recommend a method for setting CEQA thresholds of significance as described in CEQA Guidelines Section 15064.7 that will encourage consistency and uniformity in the CEQA analysis of GHG emissions throughout the State.

The Natural Resources Agency adopted the CEQA Guidelines Amendments prepared by OPR, as directed by SB 97. On February 16, 2010, the Office of Administration Law approved the CEQA Guidelines Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The CEQA Guidelines Amendments became effective on March 18, 2010.

Senate Bill 375. SB 375, signed in September 2008 (Chapter 728, Statutes of 2008), aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a sustainable communities strategy (SCS) or alternative planning strategy (APS) that will prescribe land use allocation in that MPOs regional transportation plan. CARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects may not be eligible for funding programmed after January 1, 2012.

Senate Bills 1078 and 107. SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010.

Senate Bill 1368. SB 1368 (Chapter 598, Statutes of 2006) is the companion bill of AB 32 and was signed into law in September 2006. SB 1368 required the California Public Utilities Commission (CPUC) to establish a performance standard for baseload generation of GHG emissions by investor-owned utilities by February 1, 2007. SB 1368 also required the California Energy Commission (CEC) to establish a similar standard for local publicly owned utilities by June 30, 2007. These standards could not exceed the GHG emissions rate from a baseload combined-cycle, natural gas fired plant. Furthermore, the legislation states that all electricity provided to California, including imported electricity, must be generated by plants that meet the standards set by CPUC and CEC.

Senate Bill 32 (SB 32). Signed into law in September 2016, SB 32 codifies the 2030 GHG reduction target in Executive Order B-30-15 (40 percent below 1990 levels by 2030). The bill authorizes CARB to adopt an interim GHG emissions level target to be achieved by 2030. CARB also must adopt rules and regulations in an open public process to achieve the maximum, technologically feasible, and cost-effective GHG reductions.

CARB Scoping Plan

On December 11, 2008, CARB adopted its Scoping Plan, which functions as a roadmap to achieve GHG reductions in California required by AB 32 through subsequently enacted regulations. CARB's Scoping Plan contains the main strategies California will implement to reduce CO_2eq[12] emissions by 174 million metric tons (MT), or approximately 30 percent, from the State's projected 2020 emissions level of 596 million MT CO_2eq under a business as usual (BAU)[13] scenario. This is a reduction of 42 million MT CO_2eq, or almost ten percent, from 2002 to 2004 average emissions, but requires the reductions in the face of population and economic growth through 2020.

CARB's Scoping Plan calculates 2020 BAU emissions as the emissions that would be expected to occur in the absence of any GHG reduction measures. The 2020 BAU emissions estimate was derived by projecting emissions from a past baseline year using growth factors specific to each of the different economic sectors (e.g., transportation, electrical power, commercial and residential, industrial, etc.). CARB used three-year average emissions, by sector, for 2002 to 2004 to forecast emissions to 2020. At the time CARB's Scoping Plan process was initiated, 2004 was the most

[12] Carbon Dioxide Equivalent (CO_2eq) - A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential.

[13] "Business as Usual" refers to emissions that would be expected to occur in the absence of GHG reductions. See https://www.arb.ca.gov/cc/inventory/data/bau.htm. Note that there is significant controversy as to what BAU means. In determining the GHG 2020 limit, CARB used the above as the "definition." It is broad enough to allow for design features to be counted as reductions.

recent year for which actual data was available. The measures described in CARB's Scoping Plan are intended to reduce the projected 2020 BAU to 1990 levels, as required by AB 32.

AB 32 requires CARB to update the Scoping Plan at least once every five years. CARB adopted the first major update to the Scoping Plan on May 22, 2014. The updated Scoping Plan summarizes the most recent science related to climate change, including anticipated impacts to California and the levels of GHG reduction necessary to likely avoid risking irreparable damage. It identifies the actions California has already taken to reduce GHG emissions and focuses on areas where further reductions could be achieved to help meet the 2020 target established by AB 32. The Scoping Plan update also looks beyond 2020 toward the 2050 goal established in Executive Order S-3-05, though not yet adopted as state law, and observes that "a mid-term statewide emission limit will ensure that the State stays on course to meet our long-term goal." The Scoping Plan update does not establish or propose any specific post-2020 goals, but identifies such goals adopted by other governments or recommended by various scientific and policy organizations.

University of California, Irvine

UC Irvine Climate Action Plan

The UCI Climate Action Plan (CAP) was initially adopted in 2007 (updated in 2016) and has guided an array of climate action protection strategies and projects to reduce UCI GHG emissions. The CAP provides a roadmap for UCI to achieve its institutional climate protection commitments in support of University of California sustainability policy and campus sustainability goals. These commitments include reduction of GHG emissions to 1990 levels by the year 2020 (a reduction of approximately 49 percent from projected emissions), climate neutrality by the year 2025 (for on-site combustion of fossil fuels and purchased electricity), and climate neutrality by the year 2050 (for UCI commuters and University funded air travel).

University of California Sustainable Practices Policy

The University of California Sustainable Practices Policy (Sustainable Practices Policy) establishes goals in nine areas of sustainable practices: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice, sustainable water systems.

5.0 POTENTIAL GREENHOUSE GAS IMPACTS

CEQA THRESHOLDS

The environmental analysis in this section is patterned after the Initial Study Checklist recommended by the State *CEQA Guidelines*, as amended. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this section. Accordingly, a project may create a significant environmental impact if it causes one or more of the following to occur:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment (refer to Impact Statement GHG-1); and

- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases (refer to Impact Statement GHG-2).

Based on these standards and thresholds, the effects of the proposed project have been categorized as either a "less than significant impact" or a "potentially significant impact." Mitigation measures are recommended for potentially significant impacts.

SCAQMD Greenhouse Gas Emissions Thresholds

At this time, there is no absolute consensus in the State of California among CEQA lead agencies regarding the analysis of global climate change and the selection of significance criteria. In fact, numerous organizations, both public and private, have released advisories and guidance with recommendations designed to assist decision-makers in the evaluation of GHG emissions given the current uncertainty regarding when emissions reach the point of significance. Lead agencies may elect to rely on thresholds of significance recommended or adopted by State or regional agencies with expertise in the field of global climate change. (See C*EQA Guidelines* Section 15064.7[c].)

The SCAQMD has formed a GHG CEQA Significance Threshold Working Group (Working Group) to provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents. As of the last Working Group meeting (Meeting No. 15) held in September 2010, the SCAQMD is proposing to adopt a tiered approach for evaluating GHG emissions for development projects where SCAQMD is not the lead agency.[14]

With the tiered approach, the project is compared with the requirements of each tier sequentially and would not result in a significant impact if it complies with any tier. Tier 1 excludes projects that are specifically exempt from SB 97 from resulting in a significant impact. Tier 2 excludes

[14] The most recent SCAQMD GHG CEQA Significance Threshold Working Group meeting was held on September 2010.

projects that are consistent with a GHG reduction plan that has a certified final CEQA document and complies with AB 32 GHG reduction goals. Tier 3 excludes projects with annual emissions lower than a screening threshold. For all non-industrial projects, the SCAQMD is proposing a screening threshold of 3,000 $MTCO_2eq$ per year. SCAQMD concluded that projects with emissions less than the screening threshold would not result in a significant cumulative impact.

Tier 4 consists of three options. Under the Tier 4 first option, the project would be excluded if design features and/or mitigation measures resulted in emissions 30 percent lower than business as usual emissions. However, the Working Group did not provide a recommendation for this approach. The Working Group folded the Tier 4 second option into the third Option. Under the Under the Tier 4 third option, the project would be excluded if it was below an efficiency-based threshold of 4.8 $MTCO_2eq$ per service population (SP) per year.[15] Tier 5 would exclude projects that implement offsite mitigation (GHG reduction projects) or purchase offsets to reduce GHG emission impacts to less than the proposed screening level.

GHG efficiency metrics are utilized as thresholds to assess the GHG efficiency of a project on a per capita basis or on a "service population" basis (the sum of the number of jobs and the number of residents provided by a project) such that the project would allow for consistency with the goals of AB 32 (i.e., 1990 GHG emissions levels by 2020 and 2035). GHG efficiency thresholds can be determined by dividing the GHG emissions inventory goal of the State, by the estimated 2035 population and employment. This method allows highly efficient projects with higher mass emissions to meet the overall reduction goals of AB 32, and is appropriate, because the threshold can be applied evenly to all project types (residential or commercial/retail only and mixed use).

As the project involves a student housing infill development for UCI students and staff, SCAQMD's 2035 3.0 $MTCO_2eq$ per SP per year efficiency-based threshold has been selected as the significance threshold, as it is most applicable to the proposed project. The 3.0 $MTCO_2eq$ per SP per year efficiency-based threshold is obtained by dividing the 2035 statewide reduction target GHG emissions by the 2035 service population/employment, as discussed above. It is noted that this threshold is based on the State's overall population and emissions goals and is supported by substantial evidence provided in the SCAQMD GHG CEQA Significance Threshold Stakeholder Working Group #15 meeting minutes (September 28, 2010). The 3.0 $MTCO_2eq$ per SP per year threshold is used in addition to the qualitative thresholds of significance set forth below from Section VII of Appendix G to the CEQA Guidelines.

[15] The project-level efficiency-based threshold of 4.8 $MTCO_2eq$ per SP per year is relative to the 2020 target date. The SCAQMD has also proposed efficiency-based thresholds relative to the 2035 target date to be consistent with the GHG reduction target date of SB 375. GHG reductions by the SB 375 target date of 2035 would be approximately 40 percent. Applying this 40 percent reduction to the 2020 targets results in an efficiency threshold for plans of 4.1 $MTCO_2eq$ per SP per year and an efficiency threshold at the project level of 3.0 $MTCO_2eq$/year.

PROJECT RELATED SOURCES OF GREENHOUSE GASES

GHG-1 GENERATE GREENHOUSE GAS EMISSIONS, EITHER DIRECTLY OR INDIRECTLY, THAT MAY HAVE A SIGNIFICANT IMPACT ON THE ENVIRONMENT?

Level of Significance Before Mitigation: *Less Than Significant Impact.*

Project-related GHG emissions would include emissions from direct and indirect sources. The proposed project would result in direct and indirect emissions of CO_2, N_2O, and CH_4, and would not result in other GHGs that would facilitate a meaningful analysis. Therefore, this analysis focuses on these three forms of GHG emissions. Direct project-related GHG emissions include emissions from construction activities, area sources, and mobile sources, while indirect sources include emissions from electricity consumption, water demand, and solid waste generation. Operational GHG estimations are based on energy emissions from natural gas usage and automobile emissions. Project GHG emissions were calculated using the California Emissions Estimator Model (CalEEMod) version 2016.3.1, which relies on trip generation data, and specific land use information to calculate emissions. As indicated in the *UCI East Campus Student Apartments Phase 4 Traffic Study* (Traffic Study) for the proposed project, prepared by Stantec Consulting Services (dated March 2017), the proposed project would result in approximately 2,310 new daily trips. Table 1, *Greenhouse Gas Emissions*, presents the estimated CO_2, N_2O, and CH_4 emissions of the proposed project without GHG-reducing design features and mitigation measures. The CalEEMod outputs are contained within the Appendix A, *Greenhouse Gas Emissions Data*.

As shown in Table 1, GHG emissions resulting from both construction and operation of the proposed project would result in approximately 7,290.42 $MTCO_2eq$/yr. The project proposes up to 1,500 beds in the 600,000 GSF building and up to 950 beds in the 400,000 GSF building, therefore the project service population is 2,450. Dividing the GHG emissions by the project's service population (2,450) would result in approximately 2.97 $MTCO_2eq$ per SP per year, which is below the 2020 and 2035 significance thresholds (4.8 $MTCO_2eq$ per SP per year, and 3.0 $MTCO_2eq$ per SP per year, respectively). Therefore, the project's contribution of GHG emissions would be less than significant.

Table 1
Greenhouse Gas Emissions

Source	CO_2	CH_4		N_2O		Total Metric Tons of CO_2eq
	Metric Tons/yr[1]	Metric Tons/yr[1]	Metric Tons of CO_2eq[2]	Metric Tons/yr[1]	Metric Tons of CO_2eq[2]	
Direct Emissions						
• Construction (total of 6,840.25 $MTCO_2eq$ amortized over 30 years)	228.01	0.02	0.48	0.00	0.00	228.49
• Area Source	41.29	0.04	1.02	0.00	0.00	42.31
• Mobile Source	1,427.60	0.07	1.83	0.00	0.00	1,429.42
Total Mitigated Direct Emissions[3]	1,696.90	0.13	3.32	0.00	0.00	1,700.22
Indirect Emissions						
• Energy	4,124.02	0.14	3.57	0.05	14.13	4,141.73
• Water Demand	1,107.95	5.14	128.48	0.13	38.56	1,274.97
• Solid Waste Generation	70.03	4.14	103.47	0.00	0.00	173.50
Total Mitigated Indirect Emissions[3]	5,302.00	9.42	235.51	0.18	52.69	5,590.20
Total Mitigated Project-Related Emissions[3]	*7,290.42 $MTCO_2eq/yr$*					
Total Service Population Emissions[4]	*2.97 $MTCO_2eq/yr$*[5]					
Year 2020 Threshold of Significance	*4.8 $MTCO_2eq$ per SP per year*					
Year 2035 Threshold of Significance	*3.0 $MTCO_2eq$ per SP per year*					
Mitigated GHG Emissions Exceed Threshold?	*No*					

Notes:
1. Emissions calculated using CalEEMod.
2. CO_2 Equivalent values calculated using the EPA Website, *Greenhouse Gas Equivalencies Calculator*, http://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator, accessed March 2017.
3. Totals may be slightly off due to rounding.
4. Service population emissions are based on a service population of 2,450 beds.
5. The project's total service population emissions were calculated by dividing the total proposed project-related emissions (7,290.42 $MTCO_2eq/yr$) by the service population (2,450); therefore, 7,290.42/2,450 = 2.97.

Refer to Appendix A, *Greenhouse Gas Emissions Data*, for detailed model input/output data.

Project Design Features

It is noted that Table 1 includes reduced emissions from the project's design features in compliance with the Sustainable Practices Policy. Such features include the use of water conservation measures, such as low-flow faucets, showers, toilets, water-efficient landscaping and irrigation systems, and use of reclaimed water and grey water. In addition, the project would meet or exceed the Leadership in Energy and Environmental Design (LEED) Silver or Gold rating (or an equivalent rating such as the Build it Green GreenPoint Rated program), utilize high-efficiency lighting and energy efficient appliances (i.e., Energy Star dishwashers), and exceed Title 24 standards by 20 percent.

Direct Project-Related Sources of Greenhouse Gases

- Construction Emissions. Construction GHG emissions are typically summed and amortized over the lifetime of the project (assumed to be 30 years), then added to the operational emissions.[16] As seen in Table 1, the proposed project would result in 6,840.25 $MTCO_2eq$/yr, which represents 228.49 $MTCO_2eq$/yr when amortized over 30 years.

- Area Source. Area source emissions occur from hearths, architectural coatings, landscaping equipment, and consumer products. The project proposes a student housing development and would not include hearths. Area source GHG emissions woud primarily occur from landscaping and consumer products. Area source emissions were calculated using CalEEMod and project-specific land use data. As noted in Table 1, the proposed project would result in 42.31 $MTCO_2eq$/year from area source GHG emissions.

- Mobile Source. The CalEEMod model relies upon trip generation data and project specific land use data to calculate mobile source emissions. The project would directly result in 1,429.42 $MTCO_2eq$/yr of mobile source-generated GHG emissions.

Indirect Project-Related Sources of Greenhouse Gases

- Energy Consumption. Energy consumption emissions were calculated using CalEEMod and project-specific land use data. Electricity would be provided to the project site via Southern California Edison (SCE). The project would indirectly result in 4,141.73 $MTCO_2eq$/year due to energy consumption.

- Water Demand. The project operations would result in a demand of approximately 272 million gallons of water per year. Emissions from indirect energy impacts due to water supply would result in 1,274.97 $MTCO_2eq$/year.

- Solid Waste. Solid waste associated with operations of the proposed project would result in 173.50 $MTCO_2eq$/year.

Level of Significance After Mitigation: *Less Than Significant Impact.*

GHG PLAN CONSISTENCY

GHG-2 CONFLICT WITH AN APPLICABLE PLAN, POLICY, OR REGULATION ADOPTED FOR THE PURPOSE OF REDUCING THE EMISSIONS OF GREENHOUSE GASES?

Level of Significance Before Mitigation: *Less Than Significant Impact.*

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[16] The project lifetime is based on the standard 30 year assumption of the South Coast Air Quality Management District, *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold*, October 2008.

As discussed above, UCI's Sustainable Practices Policy establishes goals and policies to reduce GHG emissions from various sources at the UCI campus. In addition, UCI adopted a Climate Action Plan (CAP) in 2007 (updated in 2016) in cooperation with AB 32, and has guided an array of climate action protection strategies and projects to reduce UCI GHG emissions. The purpose of this CAP is to identify UCI's long-term vision and commitment to reduce its GHG emissions in support of University of California Sustainability Practices Policy and campus sustainability goals. These commitments include reduction of GHG emissions to 1990 levels by the year 2020 (a reduction of approximately 49 percent from projected emissions), climate neutrality by the year 2025 (for on-site combustion of fossil fuels and purchased electricity), and climate neutrality by the year 2050 (for UCI commuters and University funded air travel). The CAP does not contain GHG thresholds.

As noted above, the project's GHG emissions would be below the 3.0 $MTCO_2eq$ per SP per year (year 2020), and 4.8 $MTCO_2eq$ per SP per year (year 2035) thresholds. In addition, the project would incorporate various sustainable project design features (e.g., water conservation measures, exceed LEED Silver rating, exceed Title 24 by 20 percent, and use energy efficient lighting, etc.) in compliance with the Sustainable Practices Policy. Therefore, the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. Thus, a less than significant impact would occur in this regard.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation: *Less Than Significant Impact.*

6.0 REFERENCES

6.1 LIST OF PREPARERS

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Faye Stroud, Graphics

6.2 DOCUMENTS

1. California Air Resources Board, *Climate Change Proposed Scoping Plan: A Framework for Change*, adopted December 2008.

2. California Office of the Attorney General, *Addressing Global Warming Impacts at the Project Level*, updated January 6, 2008.

3. California Environmental Protection Agency, *Climate Action Team, Climate Action Team Report to Governor Schwarzenegger and the Legislature (Executive Summary)*, March, 2006.

4. California Environmental Protection Agency, *AB 1493 Briefing Package*, 2008.

5. Intergovernmental Panel on Climate Change, *Climate Change, Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007.*

6. Stantec Consulting Services, *UCI East Campus Student Apartments Phase 4 Traffic Study*, March 2017.

7. United States Environmental Protection Agency, *Class I Ozone Depleting Substances*, August 19, 2010, http://www.epa.gov/ozone/science/ods/classone.html, accessed on March 8, 2017.

8. United States Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 to 2014*, April 2016.

9. EPA Website, *Greenhouse Gas Equivalencies Calculator*, http://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator, accessed March 2017.

10. U.S. Environmental Protection Agency, *Overview of Greenhouse Gas Emissions*, https://www.epa.gov/ghgemissions/overview-greenhouse-gases#f-gases, accessed on March 8, 2017.

11. U.S. Environmental Protection Agency, *Stratospheric Ozone Protection and Climate Change,* http://www.epa.gov/ozone/climate.html, accessed on March 8, 2017.

12. University of California, Irvine, *Climate Action Plan, 2016 Update*, http://sustainability.uci.edu/2017/01/19/ucis-2016-climate-action-plan-update/, accessed March 2017.

6.3 WEB SITES/PROGRAMS

Environ International Corporation and the South Coast Air Quality Management District, *California Emissions Estimator Model (CalEEMod) Version 2016.3.1*, 2016.

Google Earth, 2017.

APPENDIX A: GREENHOUSE GAS EMISSIONS DATA

UCI East Campus Phase 4 [Building A]

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking Structure	550.00	Space	4.95	220,000.00	0
Parking Lot	250.00	Space	2.25	100,000.00	0
Apartments High Rise	1,500.00	Dwelling Unit	24.19	600,000.00	4290

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Building sqft 600,000

Construction Phase - Anticipated schedule

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Trips and VMT - Exported soil would be moved to the south site.

Grading - Approximate site acreage

Architectural Coating -

Vehicle Trips - Per traffic study

Woodstoves - Project is student housing, no hearths

Area Coating -

Construction Off-road Equipment Mitigation - Per Rule 403

Mobile Land Use Mitigation -

Mobile Commute Mitigation -

Area Mitigation -

Energy Mitigation - LEED+2016 Title 24+RPS

Water Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Parking	19,200.00	17,856.00
tblArchitecturalCoating	ConstArea_Residential_Exterior	405,000.00	1,012,500.00
tblArchitecturalCoating	ConstArea_Residential_Interior	1,215,000.00	3,037,500.00
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	6
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	15
tblConstructionPhase	NumDays	35.00	190.00
tblConstructionPhase	NumDays	500.00	374.00
tblConstructionPhase	NumDays	30.00	22.00
tblConstructionPhase	NumDays	45.00	99.00
tblConstructionPhase	NumDays	35.00	22.00
tblFleetMix	FleetMixLandUseSubType	Enclosed Parking Structure	Apartments High Rise
tblFleetMix	FleetMixLandUseSubType	Parking Lot	Enclosed Parking Structure
tblFleetMix	FleetMixLandUseSubType	Apartments High Rise	Parking Lot
tblGrading	AcresOfGrading	247.50	11.00
tblGrading	MaterialExported	0.00	62,130.00
tblLandUse	BuildingSpaceSquareFeet	1,500,000.00	600,000.00

tblLandUse	LandUseSquareFeet	1,500,000.00	600,000.00
tblProjectCharacteristics	OperationalYear	2018	2019
tblTripsAndVMT	HaulingTripLength	20.00	0.10
tblTripsAndVMT	VendorTripNumber	213.00	209.00
tblTripsAndVMT	WorkerTripNumber	1,214.00	1,205.00
tblTripsAndVMT	WorkerTripNumber	243.00	241.00
tblVehicleTrips	ST_TR	4.98	0.94
tblVehicleTrips	SU_TR	3.65	0.94
tblVehicleTrips	WD_TR	4.20	0.94

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.3084	3.7743	2.0494	3.5500e-003	0.3192	0.1583	0.4775	0.1682	0.1460	0.3141	0.0000	330.6942	330.6942	0.0948	0.0000	333.0646
2018	1.1539	6.9991	8.8868	0.0270	2.1198	0.2368	2.3566	0.6501	0.2225	0.8725	0.0000	2,489.1873	2,489.1873	0.1818	0.0000	2,493.7321
2019	3.4456	3.3739	4.7739	0.0151	1.0666	0.1138	1.1804	0.2851	0.1073	0.3923	0.0000	1,381.5614	1,381.5614	0.0937	0.0000	1,383.9042
2020	1.9386	0.0890	0.3535	1.0700e-003	0.1005	4.8900e-003	0.1054	0.0267	4.8400e-003	0.0315	0.0000	96.7181	96.7181	2.7400e-003	0.0000	96.7865
Maximum	**3.4456**	**6.9991**	**8.8868**	**0.0270**	**2.1198**	**0.2368**	**2.3566**	**0.6501**	**0.2225**	**0.8725**	**0.0000**	**2,489.1873**	**2,489.1873**	**0.1818**	**0.0000**	**2,493.7321**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Year	tons/yr										MT/yr					
2017	0.3084	3.7743	2.0494	3.5500e-003	0.1432	0.1583	0.3015	0.0737	0.1460	0.2196	0.0000	330.6939	330.6939	0.0948	0.0000	333.0642
2018	1.1539	6.9990	8.8868	0.0270	1.9438	0.2368	2.1806	0.5556	0.2225	0.7781	0.0000	2,489.1869	2,489.1869	0.1818	0.0000	2,493.7317
2019	3.4456	3.3739	4.7739	0.0151	1.0666	0.1138	1.1804	0.2851	0.1073	0.3923	0.0000	1,381.5612	1,381.5612	0.0937	0.0000	1,383.9040
2020	1.9386	0.0890	0.3535	1.0700e-003	0.1005	4.8900e-003	0.1054	0.0267	4.8400e-003	0.0315	0.0000	96.7180	96.7180	2.7400e-003	0.0000	96.7865
Maximum	**3.4456**	**6.9990**	**8.8868**	**0.0270**	**1.9438**	**0.2368**	**2.1806**	**0.5556**	**0.2225**	**0.7781**	**0.0000**	**2,489.1869**	**2,489.1869**	**0.1818**	**0.0000**	**2,493.7317**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**9.76**	**0.00**	**8.54**	**16.72**	**0.00**	**11.73**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**8-1-2017**	**10-31-2017**	2.3177	2.3177
2	**11-1-2017**	**1-31-2018**	2.5285	2.5285
3	**2-1-2018**	**4-30-2018**	1.9598	1.9598
4	**5-1-2018**	**7-31-2018**	2.0014	2.0014
5	**8-1-2018**	**10-31-2018**	2.0138	2.0138
6	**11-1-2018**	**1-31-2019**	1.9846	1.9846
7	**2-1-2019**	**4-30-2019**	1.8066	1.8066
8	**5-1-2019**	**7-31-2019**	1.4211	1.4211
9	**8-1-2019**	**10-31-2019**	1.7627	1.7627
10	**11-1-2019**	**1-31-2020**	1.7632	1.7632
11	**2-1-2020**	**4-30-2020**	1.4307	1.4307
		Highest	2.5285	2.5285

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Area	7.7710	0.5692	25.0913	0.0251		1.5175	1.5175		1.5175	1.5175	159.3286	331.4630	490.7916	0.5000	0.0108	506.5144
Energy	0.1136	0.9708	0.4131	6.2000e-003		0.0785	0.0785		0.0785	0.0785	0.0000	3,633.3966	3,633.3966	0.1251	0.0420	3,649.0542
Mobile	0.4578	2.0736	6.3085	0.0216	1.8272	0.0246	1.8517	0.4893	0.0231	0.5124	0.0000	1,980.2391	1,980.2391	0.0881	0.0000	1,982.4404
Waste						0.0000	0.0000		0.0000	0.0000	140.0638	0.0000	140.0638	8.2775	0.0000	347.0021
Water						0.0000	0.0000		0.0000	0.0000	31.0056	623.5666	654.5721	3.2103	0.0805	758.8251
Total	**8.3424**	**3.6137**	**31.8129**	**0.0529**	**1.8272**	**1.6206**	**3.4477**	**0.4893**	**1.6191**	**2.1084**	**330.3979**	**6,568.6653**	**6,899.0632**	**12.2010**	**0.1334**	**7,243.8361**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.8578	0.1802	15.5559	8.2000e-004		0.0852	0.0852		0.0852	0.0852	0.0000	25.2882	25.2882	0.0249	0.0000	25.9096
Energy	0.0757	0.6466	0.2751	4.1300e-003		0.0523	0.0523		0.0523	0.0523	0.0000	2,575.2014	2,575.2014	0.0898	0.0293	2,586.1851
Mobile	0.3395	1.2230	3.2612	9.1800e-003	0.7383	0.0109	0.7492	0.1977	0.0103	0.2080	0.0000	843.7020	843.7020	0.0436	0.0000	844.7908
Waste						0.0000	0.0000		0.0000	0.0000	35.0159	0.0000	35.0159	2.0694	0.0000	86.7505
Water						0.0000	0.0000		0.0000	0.0000	24.8044	529.1696	553.9740	2.5695	0.0647	637.4849
Total	**3.2730**	**2.0497**	**19.0923**	**0.0141**	**0.7383**	**0.1484**	**0.8867**	**0.1977**	**0.1478**	**0.3455**	**59.8204**	**3,973.3612**	**4,033.1816**	**4.7970**	**0.0940**	**4,181.1209**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**60.77**	**43.28**	**39.99**	**73.28**	**59.59**	**90.84**	**74.28**	**59.59**	**90.87**	**83.61**	**81.89**	**39.51**	**41.54**	**60.68**	**29.51**	**42.28**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	8/1/2017	8/30/2017	5	22	
2	Grading	Grading	8/31/2017	1/16/2018	5	99	
3	Building Construction A	Building Construction	1/17/2018	6/24/2019	5	374	Building A
4	Paving	Paving	6/25/2019	7/24/2019	5	22	
5	Architectural Coating A	Architectural Coating	7/25/2019	4/15/2020	5	190	Building A

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 11

Acres of Paving: 7.2

Residential Indoor: 3,037,500; Residential Outdoor: 1,012,500; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction A	Cranes	1	7.00	231	0.29
Building Construction A	Forklifts	3	8.00	89	0.20
Building Construction A	Generator Sets	1	8.00	84	0.74
Building Construction A	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction A	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38

Architectural Coating A	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	7,766.00	14.70	6.90	0.10	LD_Mix	HDT_Mix	HHDT
Building Construction A	9	1,205.00	209.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating A	1	241.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0451	0.4702	0.2531	4.3000e-004		0.0241	0.0241		0.0225	0.0225	0.0000	39.1606	39.1606	0.0107	0.0000	39.4282
Total	**0.0451**	**0.4702**	**0.2531**	**4.3000e-004**		**0.0241**	**0.0241**		**0.0225**	**0.0225**	**0.0000**	**39.1606**	**39.1606**	**0.0107**	**0.0000**	**39.4282**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.3000e-004	6.5000e-004	6.9400e-003	2.0000e-005	1.8100e-003	1.0000e-005	1.8200e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.7137	1.7137	5.0000e-005	0.0000	1.7150
Total	**8.3000e-004**	**6.5000e-004**	**6.9400e-003**	**2.0000e-005**	**1.8100e-003**	**1.0000e-005**	**1.8200e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.7137**	**1.7137**	**5.0000e-005**	**0.0000**	**1.7150**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0451	0.4702	0.2531	4.3000e-004		0.0241	0.0241		0.0225	0.0225	0.0000	39.1605	39.1605	0.0107	0.0000	39.4282
Total	**0.0451**	**0.4702**	**0.2531**	**4.3000e-004**		**0.0241**	**0.0241**		**0.0225**	**0.0225**	**0.0000**	**39.1605**	**39.1605**	**0.0107**	**0.0000**	**39.4282**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.3000e-004	6.5000e-004	6.9400e-003	2.0000e-005	1.8100e-003	1.0000e-005	1.8200e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.7137	1.7137	5.0000e-005	0.0000	1.7150
Total	**8.3000e-004**	**6.5000e-004**	**6.9400e-003**	**2.0000e-005**	**1.8100e-003**	**1.0000e-005**	**1.8200e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.7137**	**1.7137**	**5.0000e-005**	**0.0000**	**1.7150**

3.3 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3074	0.0000	0.3074	0.1650	0.0000	0.1650	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2501	2.9554	1.6870	2.7000e-003		0.1337	0.1337		0.1230	0.1230	0.0000	250.3853	250.3853	0.0767	0.0000	252.3033
Total	**0.2501**	**2.9554**	**1.6870**	**2.7000e-003**	**0.3074**	**0.1337**	**0.4411**	**0.1650**	**0.1230**	**0.2880**	**0.0000**	**250.3853**	**250.3853**	**0.0767**	**0.0000**	**252.3033**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.9900e-003	0.3447	0.0657	3.0000e-004	3.9000e-004	4.6000e-004	8.6000e-004	1.1000e-004	4.4000e-004	5.6000e-004	0.0000	30.3987	30.3987	7.0800e-003	0.0000	30.5756
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.3800e-003	3.4100e-003	0.0366	1.0000e-004	9.5500e-003	6.0000e-005	9.6200e-003	2.5400e-003	6.0000e-005	2.6000e-003	0.0000	9.0359	9.0359	2.6000e-004	0.0000	9.0425
Total	**0.0124**	**0.3481**	**0.1023**	**4.0000e-004**	**9.9400e-003**	**5.2000e-004**	**0.0105**	**2.6500e-003**	**5.0000e-004**	**3.1600e-003**	**0.0000**	**39.4347**	**39.4347**	**7.3400e-003**	**0.0000**	**39.6182**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1314	0.0000	0.1314	0.0706	0.0000	0.0706	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2501	2.9554	1.6870	2.7000e-003		0.1337	0.1337		0.1230	0.1230	0.0000	250.3850	250.3850	0.0767	0.0000	252.3030
Total	**0.2501**	**2.9554**	**1.6870**	**2.7000e-003**	**0.1314**	**0.1337**	**0.2651**	**0.0706**	**0.1230**	**0.1935**	**0.0000**	**250.3850**	**250.3850**	**0.0767**	**0.0000**	**252.3030**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.9900e-003	0.3447	0.0657	3.0000e-004	3.9000e-004	4.6000e-004	8.6000e-004	1.1000e-004	4.4000e-004	5.6000e-004	0.0000	30.3987	30.3987	7.0800e-003	0.0000	30.5756
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.3800e-003	3.4100e-003	0.0366	1.0000e-004	9.5500e-003	6.0000e-005	9.6200e-003	2.5400e-003	6.0000e-005	2.6000e-003	0.0000	9.0359	9.0359	2.6000e-004	0.0000	9.0425
Total	**0.0124**	**0.3481**	**0.1023**	**4.0000e-004**	**9.9400e-003**	**5.2000e-004**	**0.0105**	**2.6500e-003**	**5.0000e-004**	**3.1600e-003**	**0.0000**	**39.4347**	**39.4347**	**7.3400e-003**	**0.0000**	**39.6182**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Fugitive Dust					0.3074	0.0000	0.3074	0.1650	0.0000	0.1650	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0305	0.3571	0.2105	3.7000e-004		0.0158	0.0158		0.0145	0.0145	0.0000	33.9891	33.9891	0.0106	0.0000	34.2536
Total	**0.0305**	**0.3571**	**0.2105**	**3.7000e-004**	**0.3074**	**0.0158**	**0.3232**	**0.1650**	**0.0145**	**0.1796**	**0.0000**	**33.9891**	**33.9891**	**0.0106**	**0.0000**	**34.2536**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.7000e-004	0.0462	8.2400e-003	4.0000e-005	2.7000e-004	5.0000e-005	3.2000e-004	7.0000e-005	5.0000e-005	1.1000e-004	0.0000	4.2592	4.2592	9.0000e-004	0.0000	4.2816
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.4000e-004	4.1000e-004	4.4800e-003	1.0000e-005	1.3200e-003	1.0000e-005	1.3300e-003	3.5000e-004	1.0000e-005	3.6000e-004	0.0000	1.2100	1.2100	3.0000e-005	0.0000	1.2108
Total	**1.5100e-003**	**0.0466**	**0.0127**	**5.0000e-005**	**1.5900e-003**	**6.0000e-005**	**1.6500e-003**	**4.2000e-004**	**6.0000e-005**	**4.7000e-004**	**0.0000**	**5.4692**	**5.4692**	**9.3000e-004**	**0.0000**	**5.4924**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1314	0.0000	0.1314	0.0706	0.0000	0.0706	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0305	0.3571	0.2105	3.7000e-004		0.0158	0.0158		0.0145	0.0145	0.0000	33.9891	33.9891	0.0106	0.0000	34.2536
Total	**0.0305**	**0.3571**	**0.2105**	**3.7000e-004**	**0.1314**	**0.0158**	**0.1472**	**0.0706**	**0.0145**	**0.0851**	**0.0000**	**33.9891**	**33.9891**	**0.0106**	**0.0000**	**34.2536**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.7000e-004	0.0462	8.2400e-003	4.0000e-005	2.7000e-004	5.0000e-005	3.2000e-004	7.0000e-005	5.0000e-005	1.1000e-004	0.0000	4.2592	4.2592	9.0000e-004	0.0000	4.2816
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.4000e-004	4.1000e-004	4.4800e-003	1.0000e-005	1.3200e-003	1.0000e-005	1.3300e-003	3.5000e-004	1.0000e-005	3.6000e-004	0.0000	1.2100	1.2100	3.0000e-005	0.0000	1.2108
Total	**1.5100e-003**	**0.0466**	**0.0127**	**5.0000e-005**	**1.5900e-003**	**6.0000e-005**	**1.6500e-003**	**4.2000e-004**	**6.0000e-005**	**4.7000e-004**	**0.0000**	**5.4692**	**5.4692**	**9.3000e-004**	**0.0000**	**5.4924**

3.4 Building Construction A - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3336	2.9121	2.1888	3.3500e-003		0.1867	0.1867		0.1755	0.1755	0.0000	296.0202	296.0202	0.0725	0.0000	297.8333
Total	**0.3336**	**2.9121**	**2.1888**	**3.3500e-003**		**0.1867**	**0.1867**		**0.1755**	**0.1755**	**0.0000**	**296.0202**	**296.0202**	**0.0725**	**0.0000**	**297.8333**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1074	3.1683	0.8743	6.5200e-003	0.1638	0.0231	0.1870	0.0473	0.0221	0.0694	0.0000	641.0063	641.0063	0.0576	0.0000	642.4455
Worker	0.6808	0.5150	5.6004	0.0167	1.6469	0.0111	1.6580	0.4374	0.0102	0.4476	0.0000	1,512.7025	1,512.7025	0.0402	0.0000	1,513.7072
Total	**0.7882**	**3.6833**	**6.4748**	**0.0233**	**1.8108**	**0.0342**	**1.8450**	**0.4846**	**0.0324**	**0.5170**	**0.0000**	**2,153.7088**	**2,153.7088**	**0.0978**	**0.0000**	**2,156.1527**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3336	2.9121	2.1888	3.3500e-003		0.1867	0.1867		0.1755	0.1755	0.0000	296.0199	296.0199	0.0725	0.0000	297.8330
Total	**0.3336**	**2.9121**	**2.1888**	**3.3500e-003**		**0.1867**	**0.1867**		**0.1755**	**0.1755**	**0.0000**	**296.0199**	**296.0199**	**0.0725**	**0.0000**	**297.8330**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1074	3.1683	0.8743	6.5200e-003	0.1638	0.0231	0.1870	0.0473	0.0221	0.0694	0.0000	641.0063	641.0063	0.0576	0.0000	642.4455
Worker	0.6808	0.5150	5.6004	0.0167	1.6469	0.0111	1.6580	0.4374	0.0102	0.4476	0.0000	1,512.7025	1,512.7025	0.0402	0.0000	1,513.7072

Total	0.7882	3.6833	6.4748	0.0233	1.8108	0.0342	1.8450	0.4846	0.0324	0.5170	0.0000	2,153.7088	2,153.7088	0.0978	0.0000	2,156.1527

3.4 Building Construction A - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1476	1.3174	1.0727	1.6800e-003		0.0806	0.0806		0.0758	0.0758	0.0000	146.9401	146.9401	0.0358	0.0000	147.8350
Total	**0.1476**	**1.3174**	**1.0727**	**1.6800e-003**		**0.0806**	**0.0806**		**0.0758**	**0.0758**	**0.0000**	**146.9401**	**146.9401**	**0.0358**	**0.0000**	**147.8350**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0499	1.5117	0.4113	3.2500e-003	0.0822	0.0101	0.0923	0.0237	9.6600e-003	0.0334	0.0000	320.1793	320.1793	0.0280	0.0000	320.8780
Worker	0.3146	0.2295	2.5477	8.1800e-003	0.8268	5.6200e-003	0.8324	0.2196	5.1800e-003	0.2247	0.0000	739.2815	739.2815	0.0182	0.0000	739.7367
Total	**0.3645**	**1.7413**	**2.9590**	**0.0114**	**0.9090**	**0.0157**	**0.9247**	**0.2433**	**0.0148**	**0.2581**	**0.0000**	**1,059.4607**	**1,059.4607**	**0.0462**	**0.0000**	**1,060.6147**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1476	1.3174	1.0727	1.6800e-003		0.0806	0.0806		0.0758	0.0758	0.0000	146.9400	146.9400	0.0358	0.0000	147.8349
Total	**0.1476**	**1.3174**	**1.0727**	**1.6800e-003**		**0.0806**	**0.0806**		**0.0758**	**0.0758**	**0.0000**	**146.9400**	**146.9400**	**0.0358**	**0.0000**	**147.8349**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0499	1.5117	0.4113	3.2500e-003	0.0822	0.0101	0.0923	0.0237	9.6600e-003	0.0334	0.0000	320.1793	320.1793	0.0280	0.0000	320.8780
Worker	0.3146	0.2295	2.5477	8.1800e-003	0.8268	5.6200e-003	0.8324	0.2196	5.1800e-003	0.2247	0.0000	739.2815	739.2815	0.0182	0.0000	739.7367
Total	**0.3645**	**1.7413**	**2.9590**	**0.0114**	**0.9090**	**0.0157**	**0.9247**	**0.2433**	**0.0148**	**0.2581**	**0.0000**	**1,059.4607**	**1,059.4607**	**0.0462**	**0.0000**	**1,060.6147**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0160	0.1677	0.1613	2.5000e-004		9.0700e-003	9.0700e-003		8.3400e-003	8.3400e-003	0.0000	22.5227	22.5227	7.1300e-003	0.0000	22.7009
Paving	2.9500e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Total	**0.0190**	**0.1677**	**0.1613**	**2.5000e-004**		**9.0700e-003**	**9.0700e-003**		**8.3400e-003**	**8.3400e-003**	**0.0000**	**22.5227**	**22.5227**	**7.1300e-003**	**0.0000**	**22.7009**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3800e-003	1.0100e-003	0.0112	4.0000e-005	6.7600e-003	2.0000e-005	6.7900e-003	1.7300e-003	2.0000e-005	1.7600e-003	0.0000	3.2393	3.2393	8.0000e-005	0.0000	3.2413
Total	**1.3800e-003**	**1.0100e-003**	**0.0112**	**4.0000e-005**	**6.7600e-003**	**2.0000e-005**	**6.7900e-003**	**1.7300e-003**	**2.0000e-005**	**1.7600e-003**	**0.0000**	**3.2393**	**3.2393**	**8.0000e-005**	**0.0000**	**3.2413**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0160	0.1677	0.1613	2.5000e-004		9.0700e-003	9.0700e-003		8.3400e-003	8.3400e-003	0.0000	22.5227	22.5227	7.1300e-003	0.0000	22.7008
Paving	2.9500e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0190**	**0.1677**	**0.1613**	**2.5000e-004**		**9.0700e-003**	**9.0700e-003**		**8.3400e-003**	**8.3400e-003**	**0.0000**	**22.5227**	**22.5227**	**7.1300e-003**	**0.0000**	**22.7008**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3800e-003	1.0100e-003	0.0112	4.0000e-005	6.7600e-003	2.0000e-005	6.7900e-003	1.7300e-003	2.0000e-005	1.7600e-003	0.0000	3.2393	3.2393	8.0000e-005	0.0000	3.2413
Total	**1.3800e-003**	**1.0100e-003**	**0.0112**	**4.0000e-005**	**6.7600e-003**	**2.0000e-005**	**6.7900e-003**	**1.7300e-003**	**2.0000e-005**	**1.7600e-003**	**0.0000**	**3.2393**	**3.2393**	**8.0000e-005**	**0.0000**	**3.2413**

3.6 Architectural Coating A - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.8406					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0152	0.1046	0.1050	1.7000e-004		7.3400e-003	7.3400e-003		7.3400e-003	7.3400e-003	0.0000	14.5536	14.5536	1.2300e-003	0.0000	14.5843
Total	**2.8558**	**0.1046**	**0.1050**	**1.7000e-004**		**7.3400e-003**	**7.3400e-003**		**7.3400e-003**	**7.3400e-003**	**0.0000**	**14.5536**	**14.5536**	**1.2300e-003**	**0.0000**	**14.5843**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	0.0574	0.0419	0.4647	1.4900e-003	0.1508	1.0300e-003	0.1518	0.0401	9.4000e-004	0.0410	0.0000	134.8449	134.8449	3.3200e-003	0.0000	134.9280
Total	**0.0574**	**0.0419**	**0.4647**	**1.4900e-003**	**0.1508**	**1.0300e-003**	**0.1518**	**0.0401**	**9.4000e-004**	**0.0410**	**0.0000**	**134.8449**	**134.8449**	**3.3200e-003**	**0.0000**	**134.9280**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.8406					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0152	0.1046	0.1050	1.7000e-004		7.3400e-003	7.3400e-003		7.3400e-003	7.3400e-003	0.0000	14.5535	14.5535	1.2300e-003	0.0000	14.5843
Total	**2.8558**	**0.1046**	**0.1050**	**1.7000e-004**		**7.3400e-003**	**7.3400e-003**		**7.3400e-003**	**7.3400e-003**	**0.0000**	**14.5535**	**14.5535**	**1.2300e-003**	**0.0000**	**14.5843**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0574	0.0419	0.4647	1.4900e-003	0.1508	1.0300e-003	0.1518	0.0401	9.4000e-004	0.0410	0.0000	134.8449	134.8449	3.3200e-003	0.0000	134.9280
Total	**0.0574**	**0.0419**	**0.4647**	**1.4900e-003**	**0.1508**	**1.0300e-003**	**0.1518**	**0.0401**	**9.4000e-004**	**0.0410**	**0.0000**	**134.8449**	**134.8449**	**3.3200e-003**	**0.0000**	**134.9280**

3.6 Architectural Coating A - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.8937					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.2000e-003	0.0640	0.0696	1.1000e-004		4.2200e-003	4.2200e-003		4.2200e-003	4.2200e-003	0.0000	9.7024	9.7024	7.5000e-004	0.0000	9.7211
Total	**1.9029**	**0.0640**	**0.0696**	**1.1000e-004**		**4.2200e-003**	**4.2200e-003**		**4.2200e-003**	**4.2200e-003**	**0.0000**	**9.7024**	**9.7024**	**7.5000e-004**	**0.0000**	**9.7211**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0357	0.0250	0.2839	9.6000e-004	0.1005	6.8000e-004	0.1012	0.0267	6.2000e-004	0.0273	0.0000	87.0157	87.0157	1.9900e-003	0.0000	87.0653
Total	**0.0357**	**0.0250**	**0.2839**	**9.6000e-004**	**0.1005**	**6.8000e-004**	**0.1012**	**0.0267**	**6.2000e-004**	**0.0273**	**0.0000**	**87.0157**	**87.0157**	**1.9900e-003**	**0.0000**	**87.0653**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.8937					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	9.2000e-003	0.0640	0.0696	1.1000e-004		4.2200e-003	4.2200e-003		4.2200e-003	4.2200e-003	0.0000	9.7024	9.7024	7.5000e-004	0.0000	9.7211
Total	**1.9029**	**0.0640**	**0.0696**	**1.1000e-004**		**4.2200e-003**	**4.2200e-003**		**4.2200e-003**	**4.2200e-003**	**0.0000**	**9.7024**	**9.7024**	**7.5000e-004**	**0.0000**	**9.7211**

<u>Mitigated Construction Off-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0357	0.0250	0.2839	9.6000e-004	0.1005	6.8000e-004	0.1012	0.0267	6.2000e-004	0.0273	0.0000	87.0157	87.0157	1.9900e-003	0.0000	87.0653
Total	**0.0357**	**0.0250**	**0.2839**	**9.6000e-004**	**0.1005**	**6.8000e-004**	**0.1012**	**0.0267**	**6.2000e-004**	**0.0273**	**0.0000**	**87.0157**	**87.0157**	**1.9900e-003**	**0.0000**	**87.0653**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Increase Diversity

Improve Destination Accessibility

Increase Transit Accessibility

Improve Pedestrian Network

Implement School Bus Program

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Mitigated	0.3395	1.2230	3.2612	9.1800e-003	0.7383	0.0109	0.7492	0.1977	0.0103	0.2080	0.0000	843.7020	843.7020	0.0436	0.0000	844.7908
Unmitigated	0.4578	2.0736	6.3085	0.0216	1.8272	0.0246	1.8517	0.4893	0.0231	0.5124	0.0000	1,980.2391	1,980.2391	0.0881	0.0000	1,982.4404

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	1,410.00	1,410.00	1410.00	4,818,184	1,946,973
Enclosed Parking Structure	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	1,410.00	1,410.00	1,410.00	4,818,184	1,946,973

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking Structure	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.552373	0.044229	0.211123	0.119112	0.017503	0.005797	0.024455	0.015685	0.001637	0.001633	0.004830	0.000583	0.001041
Enclosed Parking Structure	0.552373	0.044229	0.211123	0.119112	0.017503	0.005797	0.024455	0.015685	0.001637	0.001633	0.004830	0.000583	0.001041
Parking Lot	0.552373	0.044229	0.211123	0.119112	0.017503	0.005797	0.024455	0.015685	0.001637	0.001633	0.004830	0.000583	0.001041

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,826.404 8	1,826.404 8	0.0754	0.0156	1,832.938 8
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2,509.054 5	2,509.054 5	0.1036	0.0214	2,518.030 7
NaturalGas Mitigated	0.0757	0.6466	0.2751	4.1300e-003		0.0523	0.0523		0.0523	0.0523	0.0000	748.7966	748.7966	0.0144	0.0137	753.2464
NaturalGas Unmitigated	0.1136	0.9708	0.4131	6.2000e-003		0.0785	0.0785		0.0785	0.0785	0.0000	1,124.342 1	1,124.342 1	0.0216	0.0206	1,131.023 5

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments High Rise	2.10694e+007	0.1136	0.9708	0.4131	6.2000e-003		0.0785	0.0785		0.0785	0.0785	0.0000	1,124.342 1	1,124.342 1	0.0216	0.0206	1,131.023 5
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.1136**	**0.9708**	**0.4131**	**6.2000e-003**		**0.0785**	**0.0785**		**0.0785**	**0.0785**	**0.0000**	**1,124.342 1**	**1,124.342 1**	**0.0216**	**0.0206**	**1,131.023 5**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments High Rise	1.40319e+007	0.0757	0.6466	0.2751	4.1300e-003		0.0523	0.0523		0.0523	0.0523	0.0000	748.7966	748.7966	0.0144	0.0137	753.2464
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0757**	**0.6466**	**0.2751**	**4.1300e-003**		**0.0523**	**0.0523**		**0.0523**	**0.0523**	**0.0000**	**748.7966**	**748.7966**	**0.0144**	**0.0137**	**753.2464**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	6.34572e+006	2,021.8824	0.0835	0.0173	2,029.1157
Enclosed Parking Structure	1.441e+006	459.1335	0.0190	3.9200e-003	460.7760
Parking Lot	88000	28.0387	1.1600e-003	2.4000e-004	28.1390
Total		**2,509.0545**	**0.1036**	**0.0214**	**2,518.0307**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			

Apartments High Rise	5.17748e+006	1,649.6559	0.0681	0.0141	1,655.5576
Enclosed Parking Structure	532730	169.7392	7.0100e-003	1.4500e-003	170.3464
Parking Lot	22000	7.0097	2.9000e-004	6.0000e-005	7.0348
Total		**1,826.4048**	**0.0754**	**0.0156**	**1,832.9388**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.8578	0.1802	15.5559	8.2000e-004		0.0852	0.0852		0.0852	0.0852	0.0000	25.2882	25.2882	0.0249	0.0000	25.9096
Unmitigated	7.7710	0.5692	25.0913	0.0251		1.5175	1.5175		1.5175	1.5175	159.3286	331.4630	490.7916	0.5000	0.0108	506.5144

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1922					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.1888					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	4.9132	0.3890	9.5354	0.0243		1.4323	1.4323		1.4323	1.4323	159.3286	306.1749	465.5035	0.4752	0.0108	480.6048
Landscaping	0.4768	0.1802	15.5559	8.2000e-004		0.0852	0.0852		0.0852	0.0852	0.0000	25.2882	25.2882	0.0249	0.0000	25.9096
Total	**7.7710**	**0.5692**	**25.0913**	**0.0252**		**1.5175**	**1.5175**		**1.5175**	**1.5175**	**159.3286**	**331.4630**	**490.7916**	**0.5000**	**0.0108**	**506.5144**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1922					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.1888					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4768	0.1802	15.5559	8.2000e-004		0.0852	0.0852		0.0852	0.0852	0.0000	25.2882	25.2882	0.0249	0.0000	25.9096
Total	**2.8578**	**0.1802**	**15.5559**	**8.2000e-004**		**0.0852**	**0.0852**		**0.0852**	**0.0852**	**0.0000**	**25.2882**	**25.2882**	**0.0249**	**0.0000**	**25.9096**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Turf Reduction

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	553.9740	2.5695	0.0647	637.4849
Unmitigated	654.5721	3.2103	0.0805	758.8251

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	97.731 / 61.613	654.5721	3.2103	0.0805	758.8251
Enclosed Parking Structure	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**654.5721**	**3.2103**	**0.0805**	**758.8251**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e

Land Use	Mgal	MT/yr			
Apartments High Rise	78.1848 / 57.8547	553.9740	2.5695	0.0647	637.4849
Enclosed Parking Structure	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**553.9740**	**2.5695**	**0.0647**	**637.4849**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	35.0159	2.0694	0.0000	86.7505
Unmitigated	140.0638	8.2775	0.0000	347.0021

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			

Apartments High Rise	690	140.0638	8.2775	0.0000	347.0021
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**140.0638**	**8.2775**	**0.0000**	**347.0021**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	172.5	35.0159	2.0694	0.0000	86.7505
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**35.0159**	**2.0694**	**0.0000**	**86.7505**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

UCI East Campus Phase 4 [Building B]

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments High Rise	950.00	Dwelling Unit	15.32	400,000.00	2717

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Building sqft 600,000

Construction Phase - Anticipated schedule

Off-road Equipment -

Trips and VMT -

Grading - Approximate site acreage

Architectural Coating - Per site plan

Vehicle Trips - Per traffic study

Woodstoves - Project is student housing, no hearths

Construction Off-road Equipment Mitigation - Per Rule 403

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation - LEED+2016 Title 24+RPS

Water Mitigation -

Waste Mitigation -

Area Coating - Per site plan

Off-road Equipment -

Off-road Equipment -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	0	17856
tblAreaCoating	Area_Residential_Exterior	270000	400000
tblAreaCoating	Area_Residential_Interior	810000	1215000
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	6
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	15
tblConstructionPhase	NumDays	20.00	65.00
tblConstructionPhase	NumDays	300.00	440.00
tblConstructionPhase	PhaseEndDate	2/20/2020	3/31/2021
tblConstructionPhase	PhaseEndDate	6/24/2019	3/31/2021
tblConstructionPhase	PhaseStartDate	7/25/2019	12/31/2020
tblConstructionPhase	PhaseStartDate	1/17/2018	7/25/2019
tblFireplaces	NumberGas	807.50	1,275.00
tblFireplaces	NumberNoFireplace	95.00	150.00
tblFireplaces	NumberWood	47.50	75.00
tblLandUse	BuildingSpaceSquareFeet	950,000.00	400,000.00
tblLandUse	LandUseSquareFeet	950,000.00	400,000.00
tblProjectCharacteristics	OperationalYear	2018	2019
tblSolidWaste	SolidWasteGenerationRate	437.00	690.00
tblVehicleTrips	ST_TR	4.98	0.94
tblVehicleTrips	SU_TR	3.65	0.94
tblVehicleTrips	WD_TR	4.20	0.94
tblWater	IndoorWaterUseRate	61,896,324.34	97,731,038.43
tblWater	OutdoorWaterUseRate	39,021,595.78	61,613,045.97

tblWoodstoves	NumberCatalytic	47.50	75.00
tblWoodstoves	NumberNoncatalytic	47.50	75.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.3197	1.9932	2.4803	7.2100e-003	0.4646	0.0809	0.5455	0.1242	0.0761	0.2003	0.0000	659.2317	659.2317	0.0545	0.0000	660.5945
2020	0.6901	4.1762	5.3732	0.0162	1.0685	0.1603	1.2289	0.2857	0.1508	0.4364	0.0000	1,480.8344	1,480.8344	0.1207	0.0000	1,483.8505
2021	1.4052	0.9824	1.4305	4.4200e-003	0.3090	0.0362	0.3452	0.0825	0.0342	0.1167	0.0000	402.0280	402.0280	0.0300	0.0000	402.7775
Maximum	**1.4052**	**4.1762**	**5.3732**	**0.0162**	**1.0685**	**0.1603**	**1.2289**	**0.2857**	**0.1508**	**0.4364**	**0.0000**	**1,480.8344**	**1,480.8344**	**0.1207**	**0.0000**	**1,483.8505**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.3197	1.9932	2.4803	7.2100e-003	0.4646	0.0809	0.5455	0.1242	0.0761	0.2003	0.0000	659.2316	659.2316	0.0545	0.0000	660.5944
2020	0.6901	4.1762	5.3732	0.0162	1.0685	0.1603	1.2289	0.2857	0.1508	0.4364	0.0000	1,480.8340	1,480.8340	0.1207	0.0000	1,483.8501
2021	1.4052	0.9824	1.4305	4.4200e-003	0.3090	0.0362	0.3452	0.0825	0.0342	0.1167	0.0000	402.0279	402.0279	0.0300	0.0000	402.7774
Maximum	**1.4052**	**4.1762**	**5.3732**	**0.0162**	**1.0685**	**0.1603**	**1.2289**	**0.2857**	**0.1508**	**0.4364**	**0.0000**	**1,480.8340**	**1,480.8340**	**0.1207**	**0.0000**	**1,483.8501**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
8	**5-1-2019**	**7-31-2019**	0.1002	0.1002
9	**8-1-2019**	**10-31-2019**	1.3228	1.3228
10	**11-1-2019**	**1-31-2020**	1.2956	1.2956
11	**2-1-2020**	**4-30-2020**	1.1856	1.1856
12	**5-1-2020**	**7-31-2020**	1.2007	1.2007
13	**8-1-2020**	**10-31-2020**	1.2064	1.2064
14	**11-1-2020**	**1-31-2021**	1.6496	1.6496
15	**2-1-2021**	**4-30-2021**	1.5749	1.5749
		Highest	1.6496	1.6496

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	6.8512	0.5031	19.3809	0.0248		1.4862	1.4862		1.4862	1.4862	159.3286	322.1781	481.5067	0.4909	0.0108	497.0008
Energy	0.0720	0.6149	0.2617	3.9200e-003		0.0497	0.0497		0.0497	0.0497	0.0000	1,992.6088	1,992.6088	0.0665	0.0240	2,001.4215
Mobile	0.2899	1.3133	3.9954	0.0137	1.1572	0.0156	1.1728	0.3099	0.0146	0.3245	0.0000	1,254.1514	1,254.1514	0.0558	0.0000	1,255.5456
Waste						0.0000	0.0000		0.0000	0.0000	140.0638	0.0000	140.0638	8.2775	0.0000	347.0021
Water						0.0000	0.0000		0.0000	0.0000	31.0056	623.5666	654.5721	3.2103	0.0805	758.8251
Total	**7.2131**	**2.4312**	**23.6379**	**0.0424**	**1.1572**	**1.5515**	**2.7087**	**0.3099**	**1.5506**	**1.8605**	**330.3979**	**4,192.5049**	**4,522.9028**	**12.1010**	**0.1153**	**4,859.7950**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.9381	0.1140	9.8456	5.2000e-004		0.0540	0.0540		0.0540	0.0540	0.0000	16.0033	16.0033	0.0157	0.0000	16.3960
Energy	0.0505	0.4319	0.1838	2.7600e-003		0.0349	0.0349		0.0349	0.0349	0.0000	1,548.8166	1,548.8166	0.0529	0.0181	1,555.5404
Mobile	0.2202	0.8116	2.1983	6.3500e-003	0.5151	7.5000e-003	0.5226	0.1379	7.0500e-003	0.1450	0.0000	583.8956	583.8956	0.0295	0.0000	584.6337
Waste						0.0000	0.0000		0.0000	0.0000	35.0159	0.0000	35.0159	2.0694	0.0000	86.7505
Water						0.0000	0.0000		0.0000	0.0000	24.8044	529.1696	553.9740	2.5695	0.0647	637.4849
Total	**2.2088**	**1.3576**	**12.2276**	**9.6300e-003**	**0.5151**	**0.0964**	**0.6115**	**0.1379**	**0.0959**	**0.2339**	**59.8204**	**2,677.8850**	**2,737.7054**	**4.7370**	**0.0828**	**2,880.8055**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**69.38**	**44.16**	**48.27**	**77.29**	**55.49**	**93.79**	**77.43**	**55.49**	**93.81**	**87.43**	**81.89**	**36.13**	**39.47**	**60.85**	**28.19**	**40.72**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Building Construction B	Building Construction	7/25/2019	3/31/2021	5	440	Building B
2	Architectural Coating B	Architectural Coating	12/31/2020	3/31/2021	5	65	Building B

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 810,000; Residential Outdoor: 270,000; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor

Building Construction B	Cranes	1	7.00	231	0.29
Building Construction B	Forklifts	3	8.00	89	0.20
Building Construction B	Generator Sets	1	8.00	84	0.74
Building Construction B	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction B	Welders	1	8.00	46	0.45
Architectural Coating B	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating B	1	137.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction B	9	684.00	102.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Building Construction B - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1346	1.2015	0.9783	1.5300e-003		0.0735	0.0735		0.0691	0.0691	0.0000	134.0094	134.0094	0.0327	0.0000	134.8255
Total	**0.1346**	**1.2015**	**0.9783**	**1.5300e-003**		**0.0735**	**0.0735**		**0.0691**	**0.0691**	**0.0000**	**134.0094**	**134.0094**	**0.0327**	**0.0000**	**134.8255**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0222	0.6729	0.1831	1.4500e-003	0.0366	4.4900e-003	0.0411	0.0106	4.3000e-003	0.0149	0.0000	142.5089	142.5089	0.0124	0.0000	142.8199
Worker	0.1629	0.1188	1.3189	4.2300e-003	0.4280	2.9100e-003	0.4309	0.1137	2.6800e-003	0.1164	0.0000	382.7134	382.7134	9.4300e-003	0.0000	382.9491
Total	**0.1851**	**0.7917**	**1.5020**	**5.6800e-003**	**0.4646**	**7.4000e-003**	**0.4720**	**0.1242**	**6.9800e-003**	**0.1312**	**0.0000**	**525.2223**	**525.2223**	**0.0219**	**0.0000**	**525.7690**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1346	1.2015	0.9783	1.5300e-003		0.0735	0.0735		0.0691	0.0691	0.0000	134.0092	134.0092	0.0327	0.0000	134.8254
Total	**0.1346**	**1.2015**	**0.9783**	**1.5300e-003**		**0.0735**	**0.0735**		**0.0691**	**0.0691**	**0.0000**	**134.0092**	**134.0092**	**0.0327**	**0.0000**	**134.8254**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0222	0.6729	0.1831	1.4500e-003	0.0366	4.4900e-003	0.0411	0.0106	4.3000e-003	0.0149	0.0000	142.5089	142.5089	0.0124	0.0000	142.8199
Worker	0.1629	0.1188	1.3189	4.2300e-003	0.4280	2.9100e-003	0.4309	0.1137	2.6800e-003	0.1164	0.0000	382.7134	382.7134	9.4300e-003	0.0000	382.9491
Total	**0.1851**	**0.7917**	**1.5020**	**5.6800e-003**	**0.4646**	**7.4000e-003**	**0.4720**	**0.1242**	**6.9800e-003**	**0.1312**	**0.0000**	**525.2223**	**525.2223**	**0.0219**	**0.0000**	**525.7690**

3.2 Building Construction B - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2777	2.5134	2.2072	3.5300e-003		0.1463	0.1463		0.1376	0.1376	0.0000	303.4091	303.4091	0.0740	0.0000	305.2596
Total	**0.2777**	**2.5134**	**2.2072**	**3.5300e-003**		**0.1463**	**0.1463**		**0.1376**	**0.1376**	**0.0000**	**303.4091**	**303.4091**	**0.0740**	**0.0000**	**305.2596**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0435	1.4171	0.3854	3.2900e-003	0.0841	7.3200e-003	0.0914	0.0243	7.0000e-003	0.0313	0.0000	325.2650	325.2650	0.0272	0.0000	325.9444
Worker	0.3493	0.2447	2.7776	9.4100e-003	0.9837	6.6200e-003	0.9903	0.2612	6.1000e-003	0.2673	0.0000	851.3817	851.3817	0.0194	0.0000	851.8673

Total	**0.3928**	**1.6618**	**3.1630**	**0.0127**	**1.0678**	**0.0139**	**1.0817**	**0.2855**	**0.0131**	**0.2986**	**0.0000**	**1,176.6468**	**1,176.6468**	**0.0466**	**0.0000**	**1,177.8118**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2777	2.5134	2.2072	3.5300e-003		0.1463	0.1463		0.1376	0.1376	0.0000	303.4087	303.4087	0.0740	0.0000	305.2592
Total	**0.2777**	**2.5134**	**2.2072**	**3.5300e-003**		**0.1463**	**0.1463**		**0.1376**	**0.1376**	**0.0000**	**303.4087**	**303.4087**	**0.0740**	**0.0000**	**305.2592**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0435	1.4171	0.3854	3.2900e-003	0.0841	7.3200e-003	0.0914	0.0243	7.0000e-003	0.0313	0.0000	325.2650	325.2650	0.0272	0.0000	325.9444
Worker	0.3493	0.2447	2.7776	9.4100e-003	0.9837	6.6200e-003	0.9903	0.2612	6.1000e-003	0.2673	0.0000	851.3817	851.3817	0.0194	0.0000	851.8673
Total	**0.3928**	**1.6618**	**3.1630**	**0.0127**	**1.0678**	**0.0139**	**1.0817**	**0.2855**	**0.0131**	**0.2986**	**0.0000**	**1,176.6468**	**1,176.6468**	**0.0466**	**0.0000**	**1,177.8118**

3.2 Building Construction B - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0608	0.5578	0.5304	8.6000e-004		0.0307	0.0307		0.0288	0.0288	0.0000	74.1239	74.1239	0.0179	0.0000	74.5710
Total	**0.0608**	**0.5578**	**0.5304**	**8.6000e-004**		**0.0307**	**0.0307**		**0.0288**	**0.0288**	**0.0000**	**74.1239**	**74.1239**	**0.0179**	**0.0000**	**74.5710**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.9000e-003	0.3110	0.0872	8.0000e-004	0.0206	6.5000e-004	0.0212	5.9300e-003	6.2000e-004	6.5400e-003	0.0000	78.7696	78.7696	6.3800e-003	0.0000	78.9290
Worker	0.0802	0.0539	0.6288	2.2200e-003	0.2403	1.5800e-003	0.2419	0.0638	1.4600e-003	0.0653	0.0000	200.7544	200.7544	4.3000e-003	0.0000	200.8619
Total	**0.0891**	**0.3649**	**0.7160**	**3.0200e-003**	**0.2608**	**2.2300e-003**	**0.2631**	**0.0697**	**2.0800e-003**	**0.0718**	**0.0000**	**279.5241**	**279.5241**	**0.0107**	**0.0000**	**279.7909**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0608	0.5578	0.5304	8.6000e-004		0.0307	0.0307		0.0288	0.0288	0.0000	74.1238	74.1238	0.0179	0.0000	74.5709
Total	**0.0608**	**0.5578**	**0.5304**	**8.6000e-004**		**0.0307**	**0.0307**		**0.0288**	**0.0288**	**0.0000**	**74.1238**	**74.1238**	**0.0179**	**0.0000**	**74.5709**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.9000e-003	0.3110	0.0872	8.0000e-004	0.0206	6.5000e-004	0.0212	5.9300e-003	6.2000e-004	6.5400e-003	0.0000	78.7696	78.7696	6.3800e-003	0.0000	78.9290
Worker	0.0802	0.0539	0.6288	2.2200e-003	0.2403	1.5800e-003	0.2419	0.0638	1.4600e-003	0.0653	0.0000	200.7544	200.7544	4.3000e-003	0.0000	200.8619
Total	**0.0891**	**0.3649**	**0.7160**	**3.0200e-003**	**0.2608**	**2.2300e-003**	**0.2631**	**0.0697**	**2.0800e-003**	**0.0718**	**0.0000**	**279.5241**	**279.5241**	**0.0107**	**0.0000**	**279.7909**

3.3 Architectural Coating B - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0193					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.2000e-004	8.4000e-004	9.2000e-004	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.1277	0.1277	1.0000e-005	0.0000	0.1279
Total	**0.0194**	**8.4000e-004**	**9.2000e-004**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.1277**	**0.1277**	**1.0000e-005**	**0.0000**	**0.1279**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.7000e-004	1.9000e-004	2.1200e-003	1.0000e-005	7.5000e-004	1.0000e-005	7.6000e-004	2.0000e-004	0.0000	2.0000e-004	0.0000	0.6509	0.6509	1.0000e-005	0.0000	0.6512
Total	**2.7000e-004**	**1.9000e-004**	**2.1200e-003**	**1.0000e-005**	**7.5000e-004**	**1.0000e-005**	**7.6000e-004**	**2.0000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.6509**	**0.6509**	**1.0000e-005**	**0.0000**	**0.6512**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Archit. Coating	0.0193					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.2000e-004	8.4000e-004	9.2000e-004	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.1277	0.1277	1.0000e-005	0.0000	0.1279
Total	**0.0194**	**8.4000e-004**	**9.2000e-004**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.1277**	**0.1277**	**1.0000e-005**	**0.0000**	**0.1279**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	2.7000e-004	1.9000e-004	2.1200e-003	1.0000e-005	7.5000e-004	1.0000e-005	7.6000e-004	2.0000e-004	0.0000	2.0000e-004	0.0000	0.6509	0.6509	1.0000e-005	0.0000	0.6512
Total	**2.7000e-004**	**1.9000e-004**	**2.1200e-003**	**1.0000e-005**	**7.5000e-004**	**1.0000e-005**	**7.6000e-004**	**2.0000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.6509**	**0.6509**	**1.0000e-005**	**0.0000**	**0.6512**

3.3 Architectural Coating B - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.2322					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.0000e-003	0.0489	0.0582	1.0000e-004		3.0100e-003	3.0100e-003		3.0100e-003	3.0100e-003	0.0000	8.1704	8.1704	5.6000e-004	0.0000	8.1844
Total	**1.2392**	**0.0489**	**0.0582**	**1.0000e-004**		**3.0100e-003**	**3.0100e-003**		**3.0100e-003**	**3.0100e-003**	**0.0000**	**8.1704**	**8.1704**	**5.6000e-004**	**0.0000**	**8.1844**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0161	0.0108	0.1259	4.4000e-004	0.0481	3.2000e-004	0.0484	0.0128	2.9000e-004	0.0131	0.0000	40.2096	40.2096	8.6000e-004	0.0000	40.2311
Total	**0.0161**	**0.0108**	**0.1259**	**4.4000e-004**	**0.0481**	**3.2000e-004**	**0.0484**	**0.0128**	**2.9000e-004**	**0.0131**	**0.0000**	**40.2096**	**40.2096**	**8.6000e-004**	**0.0000**	**40.2311**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Archit. Coating	1.2322					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.0000e-003	0.0489	0.0582	1.0000e-004		3.0100e-003	3.0100e-003		3.0100e-003	3.0100e-003	0.0000	8.1704	8.1704	5.6000e-004	0.0000	8.1844
Total	**1.2392**	**0.0489**	**0.0582**	**1.0000e-004**		**3.0100e-003**	**3.0100e-003**		**3.0100e-003**	**3.0100e-003**	**0.0000**	**8.1704**	**8.1704**	**5.6000e-004**	**0.0000**	**8.1844**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0161	0.0108	0.1259	4.4000e-004	0.0481	3.2000e-004	0.0484	0.0128	2.9000e-004	0.0131	0.0000	40.2096	40.2096	8.6000e-004	0.0000	40.2311
Total	**0.0161**	**0.0108**	**0.1259**	**4.4000e-004**	**0.0481**	**3.2000e-004**	**0.0484**	**0.0128**	**2.9000e-004**	**0.0131**	**0.0000**	**40.2096**	**40.2096**	**8.6000e-004**	**0.0000**	**40.2311**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Increase Diversity

Improve Destination Accessibility

Increase Transit Accessibility

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2202	0.8116	2.1983	6.3500e-003	0.5151	7.5000e-003	0.5226	0.1379	7.0500e-003	0.1450	0.0000	583.8956	583.8956	0.0295	0.0000	584.6337
Unmitigated	0.2899	1.3133	3.9954	0.0137	1.1572	0.0156	1.1728	0.3099	0.0146	0.3245	0.0000	1,254.1514	1,254.1514	0.0558	0.0000	1,255.5456

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	893.00	893.00	893.00	3,051,517	1,358,263
Total	893.00	893.00	893.00	3,051,517	1,358,263

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.552373	0.044229	0.211123	0.119112	0.017503	0.005797	0.024455	0.015685	0.001637	0.001633	0.004830	0.000583	0.001041

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,048.631 9	1,048.631 9	0.0433	8.9600e-003	1,052.383 4
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,280.525 5	1,280.525 5	0.0529	0.0109	1,285.106 6
NaturalGas Mitigated	0.0505	0.4319	0.1838	2.7600e-003		0.0349	0.0349		0.0349	0.0349	0.0000	500.1846	500.1846	9.5900e-003	9.1700e-003	503.1570
NaturalGas Unmitigated	0.0720	0.6149	0.2617	3.9200e-003		0.0497	0.0497		0.0497	0.0497	0.0000	712.0833	712.0833	0.0137	0.0131	716.3149

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments High Rise	1.33439e+007	0.0720	0.6149	0.2617	3.9200e-003		0.0497	0.0497		0.0497	0.0497	0.0000	712.0833	712.0833	0.0137	0.0131	716.3149
Total		**0.0720**	**0.6149**	**0.2617**	**3.9200e-003**		**0.0497**	**0.0497**		**0.0497**	**0.0497**	**0.0000**	**712.0833**	**712.0833**	**0.0137**	**0.0131**	**716.3149**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments High Rise	9.37311e+006	0.0505	0.4319	0.1838	2.7600e-003		0.0349	0.0349		0.0349	0.0349	0.0000	500.1846	500.1846	9.5900e-003	9.1700e-003	503.1570
Total		**0.0505**	**0.4319**	**0.1838**	**2.7600e-003**		**0.0349**	**0.0349**		**0.0349**	**0.0349**	**0.0000**	**500.1846**	**500.1846**	**9.5900e-003**	**9.1700e-003**	**503.1570**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	4.01896e+006	1,280.5255	0.0529	0.0109	1,285.1066
Total		**1,280.5255**	**0.0529**	**0.0109**	**1,285.1066**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	3.29115e+006	1,048.6319	0.0433	8.9600e-003	1,052.3834
Total		**1,048.6319**	**0.0433**	**8.9600e-003**	**1,052.3834**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.9381	0.1140	9.8456	5.2000e-004		0.0540	0.0540		0.0540	0.0540	0.0000	16.0033	16.0033	0.0157	0.0000	16.3960
Unmitigated	6.8512	0.5031	19.3809	0.0248		1.4862	1.4862		1.4862	1.4862	159.3286	322.1781	481.5067	0.4909	0.0108	497.0008

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1913					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.4454					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	4.9132	0.3890	9.5354	0.0243		1.4323	1.4323		1.4323	1.4323	159.3286	306.1749	465.5035	0.4752	0.0108	480.6048
Landscaping	0.3014	0.1140	9.8456	5.2000e-004		0.0540	0.0540		0.0540	0.0540	0.0000	16.0033	16.0033	0.0157	0.0000	16.3960
Total	**6.8512**	**0.5031**	**19.3809**	**0.0249**		**1.4862**	**1.4862**		**1.4862**	**1.4862**	**159.3286**	**322.1781**	**481.5067**	**0.4909**	**0.0108**	**497.0008**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1913					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.4454					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.3014	0.1140	9.8456	5.2000e-004		0.0540	0.0540		0.0540	0.0540	0.0000	16.0033	16.0033	0.0157	0.0000	16.3960
Total	**1.9381**	**0.1140**	**9.8456**	**5.2000e-004**		**0.0540**	**0.0540**		**0.0540**	**0.0540**	**0.0000**	**16.0033**	**16.0033**	**0.0157**	**0.0000**	**16.3960**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Turf Reduction

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	553.9740	2.5695	0.0647	637.4849

Unmitigated	654.5721	3.2103	0.0805	758.8251

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	97.731 / 61.613	654.5721	3.2103	0.0805	758.8251
Total		**654.5721**	**3.2103**	**0.0805**	**758.8251**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	78.1848 / 57.8547	553.9740	2.5695	0.0647	637.4849
Total		**553.9740**	**2.5695**	**0.0647**	**637.4849**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	35.0159	2.0694	0.0000	86.7505
Unmitigated	140.0638	8.2775	0.0000	347.0021

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	690	140.0638	8.2775	0.0000	347.0021
Total		**140.0638**	**8.2775**	**0.0000**	**347.0021**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			

Apartments High Rise	172.5	35.0159	2.0694	0.0000	86.7505
Total		**35.0159**	**2.0694**	**0.0000**	**86.7505**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX C

Phase II Environmental Site Assessment

STONEY-MILLER CONSULTANTS, INC
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

March 10, 2017

American Campus Communities
12700 Hill Country Boulevard, Suite T-200
Austin, TX 78738

Project No: 14013-02
Report No: 17-14059

Attention: Mr. Clint Braun

Subject: Results of Phase II Environmental Site Assessment
University of California, Irvine – Site 2
Irvine, California

Dear Mr. Braun:

A Phase II Environmental Site Assessment (ESA) was conducted at Site 2 located at the University of Irvine California in Irvine (UCI), southeast of California Avenue and Campus Drive (the Site). The purpose of the Phase II ESA was to evaluate the recognized environmental conditions (RECs) at the Site that were identified in the Phase I ESA performed by Stoney-Miller Consultants, Inc. (SMC) in 2016. A brief summary of the environmental conditions identified in the Phase I ESA is presented below.

PHASE I ESA SUMMARY

Site RECs Associated with Adjacent Properties: A REC was identified for the Site stemming from past environmental conditions associated with a Gasoline Service Station located adjacent to the Site across Campus Drive. This property (USA Service Station No. 44 located at 4601 Campus Drive, Irvine, California 92612) is approximately 125 feet north of the Site and has a REC associated with petroleum leaking from leaky underground storage tanks (LUSTs). The Service Station received regulatory closure from the Orange County Environmental Health Care Agency (OCHCA) in 2011 based on groundwater concentrations. Typically, this type of concern would be considered a historical REC (HREC) for the Site given that closure had been granted; however, it is not certain if the closure adequately considered the risk to human health associated with vapor intrusion to indoor air. Since this closure is suspect, a REC vs. a HREC was identified at this property.

Based on the material review during the Phase I ESA, no soil vapor testing was conducted as part of the case closure activities for the Service Station. An evaluation of risk to human health was not performed for the property as part of the closure activity which concluded the following:

> *"In general, for a commercial property, the primary means of impacting human health include inhalation of soil vapor and ingestion of contaminants through drinking water sources. Taking into consideration the location, depth, and extent of possible residual*

> *hydrocarbon impacted soil at this site, Stratus believes that exposure to soil vapors will pose minimal risk to onsite workers and/or the community."*

Based on the above, it appears that the criteria used to close the environmental issues associated with this property did not account for risk to human health associated with vapor intrusion to indoor air.

As part of the regulatory investigation conducted at the Service Station, a four-inch diameter groundwater monitoring well (Well OSB-3) was installed in March 1991 in the northwest corner of the Site. The well has been periodically sampled since February 1994 for laboratory testing for petroleum hydrocarbons and other compounds associated with gasoline as part of the groundwater monitoring program conducted for the Service Station. Maximum detections of petroleum compounds in groundwater samples collected since 1994 from OSB-3 are as follows:

- Total petroleum hydrocarbon – gasoline range (TPH-gas) = 1,550 micrograms per liter (µg/l);
- Benzene (B) = 190 µg/l
- Toluene (T) = 2 µg/l;
- Ethylbenzene (E) = 220 µg/l;
- Total Xylenes (X) = 970 µg/l and
- MTBE = 5 µg/l.

California's current maximum contaminant levels (MCLs) for drinking water for BTEX and MTBE are 1, 150, 300, 1750, and 13 µg/l. A MCL for TPH-gas is not available. Since July 2005, no petroleum hydrocarbons or gasoline compounds (i.e., BTEX and MTBE) have been detected over the laboratory reporting levels for 12 consecutive sampling events of this well.

An observation well (Well OSB-2) located across California Avenue just west of the Site was also installed in 1991 as part of the investigation done for the Service Station. This well was sampled in March 2012 (prior to regulatory closure in 2014) and detected total petroleum hydrocarbons – gasoline range compounds (TPG-gasoline) at a concentration of 244 µg/l. This concentration was the highest detected TPH-gasoline concentration detected in groundwater for any well associated with the Service Station for the last round of sampling performed at this property, and indicates that the remedial effort did not impact off-property water quality and/or that the contamination has moved off the property and down-gradient. BTEX and MTBE were not detected above laboratory reporting limits.

The depth to groundwater at this location was measured on a quarterly basis between February 1994 and April 2011. Over this time, the depth to groundwater averaged 22.44 feet below ground surface (bgs), ranging from 16.60 to 29.42 feet bgs. Assuming a surface elevation of 97 feet navd88 for monitoring well OBS-3, soil types encountered at SMC's boring B3 located on the upper adjacent parking lot (surface elevation of approximately 111 feet navd88) at this elevation, indicate that the upper 10-15 feet of soil at OBS-3 is clayey silt in nature.

Wells OSB-2 and OBS-3 were not found during the Site reconnaissance effort by Stoney-Miller Consultants, Inc., confirming their destruction in late 2013.

Based on the information reviewed for the Service Station, groundwater contamination at the Site from the Service Station appears to be below the current California MCLs and likely below laboratory reporting limits for BTEX and MTBE. Impacted soil and groundwater associated with the Service Station, however, may represent a vapor encroachment condition in accordance with the Vapor Encroachment Screening Standard (ASTM E2600-10). Under this condition, it is likely that vapors associated with the Service Station may still be present in the subsurface at that property and possibly at the Site. Therefore, a REC associated with the Service Stations was recognized for the Site.

<u>RECs at the Site</u>: Two RECs were identified at the Site based on a Site reconnaissance performed by Stoney-Miller Consultants, Inc., on September 19 and 22, 2016. During the reconnaissance, a large surface spill of an unknown liquid was observed in the area west of the current work yard/staging area located in the eastern portion of the Site. The chemical composition of this spill material is unknown; however, the liquid looks like paint. Surface spills of this nature are considered a REC for the Site.

In addition to the surface spill, a large earth mover was observed inside the work yard/staging area moving and sorting soil and construction waste (asphalt and concrete) into piles. The bases of the stockpiles were unlined. While no direct evidence that this stockpiled material is contaminated, the nature of this material with respect to possible hydrocarbon and other contamination is unknown. No erosion control efforts were observed at the Site (i.e., sand bags, plastic liners, straw rolls). While it is unlikely that underlying soils are impacted, these types of operations where waste material is directly piled onto the surface underlying soil without any barrier or erosional controls can lead to environmental impacts.

Based on aerial photographs, this type of operation appears to have been a common occurrence in this portion of the Site with multiple grading events occurring over time. The historical use of the eastern portion of the Site as a work yard/staging area is therefore considered a REC for the Site. Based on this, during future operations and construction activities of the Site, any surface staining or discolored or odorous soil should be delineated, isolated, and properly characterized for disposal. Upon discovery, possible impacts to underlying soil should be verified as deemed necessary to confirm the existence or absence of an environmental concern.

All waste piles and refueling operations of equipment should be occurring on impermeable barriers (i.e., plastic liners) to prevent underlying soils from being impacted if spills occur. Erosion control features should be added to all soil and waste piles to prevent erosion during storm events and to protect underlying soil from possible impacts.

It was recommended that an environmental investigation to verify existing soil quality in the historical areas used as a work yard/staging area be considered.

<u>PHASE II ESA RESULTS</u>

To evaluate if the RECs identified for the Site from the Phase I ESA pose any environmental concerns, a limited soil gas survey for volatile organic compounds (VOCs) was conducted at the Site. In addition, soil samples were collected for laboratory analyses for inorganic compounds (i.e., metals) at two locations where the surface staining was observed during the Phase I ESA. The results of the Phase II ESA are presented below. Conclusions based on the results of this work are provided.

Soil Gas Survey – VOCs

Representative soil gas samples were collected at a total of six locations as indicated on Figure 1. At each location, a representative soil gas sample was collected at approximately 5 and 10 feet bgs, and analyzed for volatile organic compounds (VOCs) by H&P Mobile Geochemistry using a mobile laboratory certified by the State of California. All work was performed using a dedicated field chemist who collected and analyzed the samples in accordance with guidelines outlined by the California Environmental Protection Agency – Department of Toxic Substance Control (DTSC) in their July 2015 Advisory "Active Soil Gas Investigations (ASGI) DTSC Guidelines".

At each sampling location, a minimum of three pore volumes were purged from the soil gas probe prior to collecting a representative sample in accordance with sampling guidelines and protocols. Prior to sampling, a "shut in" test was performed to ensure the probe was not leaking. For each sample, the vacuum at the probe was monitored during purging and a flow rate of 100-200 milliliters per minute (mL/min) was maintained and recorded during purging and sampling.

Laboratory results for the soil gas sample are presented in the attached laboratory report which includes a copy of the chain of custody for the samples collected. As indicated on the attached laboratory report, only one volatile organic compound (benzene) was detected above the laboratory reporting limit at 0.10 µg/l in one soil gas sample (SVI at 10 feet bgs). All other locations and depths (i.e., at both 5 and 10 feet bgs) did not detect any VOCs above laboratory reporting limits. In addition, no VOCs were detected above the laboratory reporting limits in the equipment blank or in ambient air. A duplicate sample from SV2 at 10 feet was collected and submitted for analyses. VOCs were not detected in the duplicate sample above laboratory reporting levels.

Assessment of Indoor Air Risk

In accordance with DTSC guidelines, the detection of benzene at the reporting limit (i.e. 0.10 µg/l or 100 micrograms per cubic meter ($\mu g/m^3$) benzene) at SV1 at 10 feet bgs was evaluated in terms of a residential risk scenario (risk factor less than 1E-06) associated with vapor intrusion of soil gas into indoor air. This evaluation was performed using the following methods:

<u>Method 1</u>: In accordance with the DTSC's *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance)* dated October 2011, the

detection of benzene at 0.10 µg/l (100 µg/m^3) was compared to benzene screening values presented in the California State Water Resources Control Board's *Leaking Underground Fuel Tank Guidance Manual* (LUFT Manual) dated September 2012. Soil gas criteria for benzene provided in the Manual provides a 1000-fold bio-attenuation factor for benzene for a residential scenario (1E-06 risk level), and presents a soil gas criteria (i.e. screen level) for benzene up to 85,000 µg/m^3. This screening level is significantly greater than the concentration of benzene detected in soil gas at the Site at 10 feet bgs indicating that no risk to indoor air via vapor intrusion exists at the Site.

Furthermore, as presented in the LUFT Manual and in accordance with California State Water Resources Control Board's *Low-Threat Underground Storage Tank Case Closure Policy*, modeling results from Abreu (2009) indicate that a soil gas source of benzene of less than 10,000 µg/l will be completely attenuated (attenuation factor of approximately 1E-07) within 2 meters (approximately 6.6 feet) of a soil gas source using reasonable degradation rates (i.e. assuming sufficient oxygen is present to create a bio-attenuation zone) in a sand unsaturated zone. Even greater hydrocarbon attenuation (lesser exclusion distances) is predicted for dissolved-phase sources in less permeable (e.g., silty clay) unsaturated zone systems (Abreu et al, 2009).

Based on the LUFT Manual, and that the soils at 10 feet bgs at the Site in the vicinity of the SV1 are clayey silt in nature, the 1,000-fold additional bio-attenuation factor for benzene in soil gas is deemed conservative for the Site. Given this, a benzene screen level of up to 85,000 µg/m^3 within 5 vertical feet of a building's foundation is reasonable for the Site. This screening level is significantly greater than the concentration of benzene detected in soil gas at the Site at 10 feet bgs indicating that no risk to indoor air via vapor intrusion exists at the Site.

<u>Method 2</u>: To further assure that the detection of benzene at SV1 at 10 feet bgs did not pose a risk to human health via vapor intrusion to indoor air under a residential setting (i.e., risk factor less than 1E-06) without assuming bio-attenuation (i.e. regardless of the oxygen content in the subsurface), a Site specific screen level was estimated using a site specific attenuation factor determined using the DTSC's version of the Johnson and Ettinger Model (1991) which predicts indoor air concentrations resulting from subsurface vapor migration into indoor air. The DTSC's Human and Ecological Risk Office (HERO) Model produces an attenuation factor "alpha" that represents the ratio of the indoor air concentration to the subsurface concentration. The HERO Model is a new screening level model similar to the J&E Model and is used to provide an additional line of evidence for evaluating vapor intrusion at a site.

For this exercise, default parameters in the HERO model were used assuming an equivalent clayey silt for a source at approximately 10 feet bgs. As indicated by the HERO Model (see attached model output), an attenuation factor of 4.8E-04 was estimated for the Site yielding an indoor air concertation of (0.048 µg/m^3) which is under the California indoor air criteria of 0.097 µg/m^3.

The results indicate that no risk to human health (residential setting) is associated with the detection of benzene at 0.10 µg/l at 10 feet bgs. The estimated risk at 4.9E-07 (i.e., 5E-07) is deem conservative given the depth to groundwater at the Site (i.e., depth to potential source) is significantly greater than 10 feet and that no petroleum hydrocarbons or gasoline compounds were detected over the laboratory reporting levels for 12 consecutive groundwater sampling events at the on-Site monitoring well (OBS-3) prior to regulatory closure in 2005. These results were not dependent on soil type with sand soils also yielding a health risk less than 1E-06 using the HERO Model.

Laboratory Analyses – Soil Samples – Metals

In addition to collecting soil gas samples in the work yard area where discolored soils were observed during the Phase I ESA Site reconnaissance, soil samples were collected at approximately 5 and 10 feet bgs at one location (SV5) for the following testing:

- California Code of Regulations (California Administrative Manual) Title 22 Metals.

Laboratory results are summarized in Table 1 (attached). A copy of the laboratory report is attached.

As indicated on Table1, all metals detected above laboratory reporting limits are under the residential environmental soil Tier 1 screening levels (Tier 1 ESLs; February 2016) for direct exposure which are provided by Californian State Water Resources Board (Regional Water Quality Control Board – San Francisco Bay). As indicated on Table 1, the laboratory reporting limits for two metals (arsenic and thallium) exceeded the threshold ESL. The laboratory reporting limits for these metals is typical of the average concentration of these metals in California soils (i.e., background arsenic = 3.5 mg/kg and background thallium = 0.56 mg/kg; Kearney Foundation Special Report - Background Concentrations of Trace and Major Elements in California Soils, March 1996) and therefore these metals are not considered an environmental risk.

CONCLUSIONS

Soil gas samples were collected at six locations at the Site at 5 and 10 feet bgs. These samples were collected and analyzed for VOCs in accordance with DTSC guidelines by a certified analytical laboratory. No compounds were detected in the 5 foot samples above laboratory reporting limits, indicating that shallow soils at the Site have not been impacted by VOCs. Only one VOC was detected above the reporting limits (benzene at 0.10 µg/l) in the 10 foot bgs samples. The location of this sample (SV1 at 10 feet) is in close proximity to the groundwater plume associated with the adjacent gasoline service station which had a leaky underground storage tank. The environmental case for that leak was closed by the OCHCA in 2014.

Based on the results of the Phase II ESA, no risk to human health associated with the vapor intrusion into indoor air from possible groundwater contamination (i.e., benzene) associated with the adjacent gasoline Service Station was identified at the Site. Any petroleum hydrocarbons in soil gas and possibly off-gassing from impacted groundwater is sufficiently attenuated and does not pose a health risk with respect to vapor intrusion to indoor air.

Soil gas results for VOCs and laboratory results for metals for soil at 5 and 10 feet bgs in the open area adjacent to the current work yard did not identify any risk associated with the surface staining observed during the Site reconnaissance conducted as part of the Phase I ESA.

Respectfully submitted,

STONEY-MILLER CONSULTANTS, INC.

Ian K. Goltz, P.G. 7446, C.Hg. 785
Associate Hydrogeologist
Registration Expires 8-31-17

IKG:fp

Distribution: Addressee via email: Clint Braun (cbraun@americancampus.com)
Charlies MacDonald (CmacDonald@americancampus.com)

Attachments: Table 1 – Soil Quality Data - Metals
Figure 1 – Soil Gas Test Locations
DTSC HERO Model Output – Benzene at 10 feet bgs
Laboratory Reports – Soil Gas (H&P Mobile Geochemistry)
Metals (Sunstar Laboratory)

TABLE 1

SOIL QUALITY DATA - METALS IN SOIL

Site 2 (Campus and California)

Project No: 14013-02

Metal	**Analytical Method**	**SV5-5**	**SV5-10**	**Residential Soil ESLs (Tier 1)** (Direct Exposure)
		5 feet bgs	10 feet bgs	
		mg/kg	mg/kg	mg/kg
Antimony	EPA 6010B	**3.8**	<2.5	31
Silver	EPA 6010B	<2.0	<1.7	390
Arsenic	EPA 6010B	<5.0	<4.2	0.067
Barium	EPA 6010B	**76**	**39**	3,000
Beryllium	EPA 6010B	<1.0	<0.83	42
Cadmium	EPA 6010B	**3.4**	<1.7	39
Chromium	EPA 6010B	**36**	**68**	120,000
Cobalt	EPA 6010B	**20**	**9.2**	23
Copper	EPA 6010B	**42**	**36**	3,100
Lead	EPA 6010B	<3.0	<2.5	80
Molybdenum	EPA 6010B	**11**	**8.1**	390
Nickel	EPA 6010B	**48**	**65**	86
Selenium	EPA 6010B	<5.0	<4.2	390
Thallium	EPA 6010B	<2.0	<1.7	0.78
Vanadium	EPA 6010B	**46**	**37**	390
Zinc	EPA 6010B	**40**	**74**	23,000
Mercury	EPA 7471A	<0.10	<0.10	80

1 Residential Soil ESLs (Tier 1) denotes residential environmental soil Tier 1 screening levels (Tier 1 ESLs; February 2016) for direct exposure which are provided by Californian State Water Resources Board (Regional Water Quality Control Board – San Francisco Bay).

2 < denotes less than laboratory reporting limit.

3 Highlighted values indicate reporting limits are greater than ESLs. Average concentration of these metals in California soils are: arsenic = 3.5 mg/kg and thallium = 0.56 mg/kg (Kearney Foundation Special Report - Background Concentrations of Trace and Major Elements in California Soils, March 1996).

EXPLANATION

OBS-3 APPROXIMATE LOCATION OF FORMER GROUNDWATER MONITORING WELL

SV-6 APPROXIMATE LOCATION OF SOIL VAPOR SAMPLING

SOURCE: "CASE CLOSURE REPORT," BY STRATUS ENVIRONMENTAL, INC., DATED 12/9/2011

SOIL GAS TEST LOCATIONS
UNIVERSITY OF CALIFORNIA, IRVINE - SITE 2
IRVINE, CALIFORNIA

SMC STONEY-MILLER CONSULTANTS, INC.

JOB NO.:	DATE:	FIGURE:
14013-02	MARCH 2017	1

USEPA SG-SCREEN Version 2.0, 04/2003
DTSC Modification December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Soil Gas

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **Benzene**

Results Summary

Soil Gas Conc. (μg/m^3)	Attenuation Factor (unitless)	Indoor Air Conc. (μg/m^3)	Cancer Risk	Noncancer Hazard
1.00E+02	4.8E-04	4.8E-02	4.9E-07	1.5E-02

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71432	1.00E+02			Benzene

MESSAGE: See VLOOKUP table comments on chemical properties and/or toxicity criteria for this chemical.

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	304	24	SICL		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SICL	1.37	0.482	0.198	5

Lookup Soil Parameters

MORE ↓

Lookup Receptor Parameters

	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH (hour)$^{-1}$
NEW=> Residential	70	26	26	350	24	0.5
					(NEW)	(NEW)

END

H&P Mobile Geochemistry Inc.

03 March 2017

Mr. Ian Goltz
Stoney-Miller Consultants, Inc.
14 Hughes, Suite B101
Irvine, CA 92618

H&P Project: MC022417-SB2
Client Project: 14013-02 Site 2 ESA /California Ave

Dear Mr. Ian Goltz:

Enclosed is the analytical report for the above referenced project. The data herein applies to samples as received by H&P Mobile Geochemistry, Inc. on 24-Feb-17 which were analyzed in accordance with the attached Chain of Custody record(s).

The results for all sample analyses and required QA/QC analyses are presented in the following sections and summarized in the documents:

- Sample Summary
- Case Narrative (if applicable)
- Sample Results
- Quality Control Summary
- Notes and Definitions / Appendix
- Chain of Custody
- Sampling Logs (if applicable)

Unless otherwise noted, I certify that all analyses were performed and reviewed in compliance with our Quality Systems Manual and Standard Operating Procedures. This report shall not be reproduced, except in full, without the written approval of H&P Mobile Geochemistry, Inc.

We at H&P Mobile Geochemistry, Inc. sincerely appreciate the opportunity to provide analytical services to you on this project. If you have any questions or concerns regarding this analytical report, please contact me at your convenience at 760-804-9678.

Sincerely,

Janis La Roux

Janis La Roux
Laboratory Director

H&P Mobile Geochemistry, Inc. is certified under the California ELAP, the National Environmental Laboratory Accreditation Conference (NELAC) and the Department of Defense Accreditation Programs.

H&P Mobile
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Stoney-Miller Consultants, Inc. 14 Hughes, Suite B101 Irvine, CA 92618	Project: MC022417-SB2 Project Number: 14013-02 Site 2 ESA /California Ave Project Manager: Mr. Ian Goltz	Reported: 03-Mar-17 13:00

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Ambient Air Background	E702126-01	Vapor	24-Feb-17	24-Feb-17
Equipment Blank	E702126-02	Vapor	24-Feb-17	24-Feb-17
SV1-5	E702126-03	Vapor	24-Feb-17	24-Feb-17
SV1-10	E702126-04	Vapor	24-Feb-17	24-Feb-17
SV2-5	E702126-05	Vapor	24-Feb-17	24-Feb-17
SV2-10	E702126-06	Vapor	24-Feb-17	24-Feb-17
SV2-10 REP	E702126-07	Vapor	24-Feb-17	24-Feb-17
SV3-5	E702126-08	Vapor	24-Feb-17	24-Feb-17
SV3-10	E702126-09	Vapor	24-Feb-17	24-Feb-17
SV4-5	E702126-10	Vapor	24-Feb-17	24-Feb-17
SV4-10	E702126-11	Vapor	24-Feb-17	24-Feb-17
SV5-5	E702126-12	Vapor	24-Feb-17	24-Feb-17
SV5-10	E702126-13	Vapor	24-Feb-17	24-Feb-17
SV6-5	E702126-14	Vapor	24-Feb-17	24-Feb-17
SV6-10	E702126-15	Vapor	24-Feb-17	24-Feb-17

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Stoney-Miller Consultants, Inc. 14 Hughes, Suite B101 Irvine, CA 92618	Project: MC022417-SB2 Project Number: 14013-02 Site 2 ESA /California Ave Project Manager: Mr. Ian Goltz	Reported: 03-Mar-17 13:00

DETECTIONS SUMMARY

Sample ID: **Ambient Air Background** Laboratory ID: **E702126-01**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

Sample ID: **Equipment Blank** Laboratory ID: **E702126-02**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

Sample ID: **SV1-5** Laboratory ID: **E702126-03**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

Sample ID: **SV1-10** Laboratory ID: **E702126-04**

Analyte	Result	Reporting Limit	Units	Method	Notes
Benzene	**0.10**	0.10	ug/l	H&P 8260SV	

Sample ID: **SV2-5** Laboratory ID: **E702126-05**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

Sample ID: **SV2-10** Laboratory ID: **E702126-06**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

Sample ID: **SV2-10 REP** Laboratory ID: **E702126-07**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

Sample ID: **SV3-5** Laboratory ID: **E702126-08**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

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Stoney-Miller Consultants, Inc. 14 Hughes, Suite B101 Irvine, CA 92618	Project: MC022417-SB2 Project Number: 14013-02 Site 2 ESA /California Ave Project Manager: Mr. Ian Goltz	Reported: 03-Mar-17 13:00

Sample ID: **SV3-10** Laboratory ID: **E702126-09**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

Sample ID: **SV4-5** Laboratory ID: **E702126-10**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

Sample ID: **SV4-10** Laboratory ID: **E702126-11**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

Sample ID: **SV5-5** Laboratory ID: **E702126-12**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

Sample ID: **SV5-10** Laboratory ID: **E702126-13**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

Sample ID: **SV6-5** Laboratory ID: **E702126-14**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

Sample ID: **SV6-10** Laboratory ID: **E702126-15**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

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Stoney-Miller Consultants, Inc.	Project: MC022417-SB2	
14 Hughes, Suite B101	Project Number: 14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager: Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
Ambient Air Background (E702126-01) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
1,1-Difluoroethane (LCC)	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
Dichlorodifluoromethane (F12)	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.05	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	ND	0.50	"	"	"	"	"	"	
1,1,2 Trichlorotrifluoroethane (F113)	ND	0.50	"	"	"	"	"	"	
Methyl tertiary-butyl ether (MTBE)	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Diisopropyl ether (DIPE)	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Ethyl tert-butyl ether (ETBE)	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.10	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.10	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.10	"	"	"	"	"	"	
Tertiary-amyl methyl ether (TAME)	ND	1.0	"	"	"	"	"	"	
Benzene	ND	0.10	"	"	"	"	"	"	
Trichloroethene	ND	0.10	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.10	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.10	"	"	"	"	"	"	

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Stoney-Miller Consultants, Inc.	Project: MC022417-SB2	
14 Hughes, Suite B101	Project Number: 14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager: Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
Ambient Air Background (E702126-01) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
Ethylbenzene	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene (Cumene)	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Tertiary-butyl alcohol (TBA)	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*115 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 1,2-Dichloroethane-d4		*108 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: Toluene-d8		*106 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene		*105 %*	*75-125*		*"*	*"*	*"*	*"*	

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Stoney-Miller Consultants, Inc. 14 Hughes, Suite B101 Irvine, CA 92618	Project: MC022417-SB2 Project Number: 14013-02 Site 2 ESA /California Ave Project Manager: Mr. Ian Goltz	Reported: 03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
Equipment Blank (E702126-02) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
1,1-Difluoroethane (LCC)	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
Dichlorodifluoromethane (F12)	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.05	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	ND	0.50	"	"	"	"	"	"	
1,1,2 Trichlorotrifluoroethane (F113)	ND	0.50	"	"	"	"	"	"	
Methyl tertiary-butyl ether (MTBE)	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Diisopropyl ether (DIPE)	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Ethyl tert-butyl ether (ETBE)	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.10	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.10	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.10	"	"	"	"	"	"	
Tertiary-amyl methyl ether (TAME)	ND	1.0	"	"	"	"	"	"	
Benzene	ND	0.10	"	"	"	"	"	"	
Trichloroethene	ND	0.10	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.10	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.10	"	"	"	"	"	"	

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Stoney-Miller Consultants, Inc.	Project:	MC022417-SB2	
14 Hughes, Suite B101	Project Number:	14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager:	Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
Equipment Blank (E702126-02) Vapor	**Sampled: 24-Feb-17**	**Received: 24-Feb-17**							
Ethylbenzene	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene (Cumene)	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Tertiary-butyl alcohol (TBA)	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*107 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 1,2-Dichloroethane-d4		*111 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: Toluene-d8		*105 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene		*101 %*	*75-125*		*"*	*"*	*"*	*"*	

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Stoney-Miller Consultants, Inc.	Project: MC022417-SB2	
14 Hughes, Suite B101	Project Number: 14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager: Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV1-5 (E702126-03) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
1,1-Difluoroethane (LCC)	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
Dichlorodifluoromethane (F12)	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.05	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	ND	0.50	"	"	"	"	"	"	
1,1,2 Trichlorotrifluoroethane (F113)	ND	0.50	"	"	"	"	"	"	
Methyl tertiary-butyl ether (MTBE)	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Diisopropyl ether (DIPE)	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Ethyl tert-butyl ether (ETBE)	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.10	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.10	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.10	"	"	"	"	"	"	
Tertiary-amyl methyl ether (TAME)	ND	1.0	"	"	"	"	"	"	
Benzene	ND	0.10	"	"	"	"	"	"	
Trichloroethene	ND	0.10	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.10	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.10	"	"	"	"	"	"	

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Stoney-Miller Consultants, Inc.	Project: MC022417-SB2	
14 Hughes, Suite B101	Project Number: 14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager: Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV1-5 (E702126-03) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
Ethylbenzene	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene (Cumene)	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Tertiary-butyl alcohol (TBA)	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*105 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 1,2-Dichloroethane-d4		*105 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: Toluene-d8		*103 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene		*99.2 %*	*75-125*		*"*	*"*	*"*	*"*	

H&P Mobile
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Stoney-Miller Consultants, Inc. 14 Hughes, Suite B101 Irvine, CA 92618	Project: MC022417-SB2 Project Number: 14013-02 Site 2 ESA /California Ave Project Manager: Mr. Ian Goltz	Reported: 03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV1-10 (E702126-04) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
1,1-Difluoroethane (LCC)	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
Dichlorodifluoromethane (F12)	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.05	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	ND	0.50	"	"	"	"	"	"	
1,1,2 Trichlorotrifluoroethane (F113)	ND	0.50	"	"	"	"	"	"	
Methyl tertiary-butyl ether (MTBE)	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Diisopropyl ether (DIPE)	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Ethyl tert-butyl ether (ETBE)	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.10	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.10	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.10	"	"	"	"	"	"	
Tertiary-amyl methyl ether (TAME)	ND	1.0	"	"	"	"	"	"	
Benzene	**0.10**	0.10	"	"	"	"	"	"	
Trichloroethene	ND	0.10	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.10	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.10	"	"	"	"	"	"	

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Stoney-Miller Consultants, Inc.	Project:	MC022417-SB2	
14 Hughes, Suite B101	Project Number:	14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager:	Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV1-10 (E702126-04) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
Ethylbenzene	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene (Cumene)	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Tertiary-butyl alcohol (TBA)	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*107 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 1,2-Dichloroethane-d4		*110 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: Toluene-d8		*104 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene		*99.0 %*	*75-125*		*"*	*"*	*"*	*"*	

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Stoney-Miller Consultants, Inc.	Project:	MC022417-SB2	
14 Hughes, Suite B101	Project Number:	14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager:	Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV2-5 (E702126-05) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
1,1-Difluoroethane (LCC)	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
Dichlorodifluoromethane (F12)	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.05	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	ND	0.50	"	"	"	"	"	"	
1,1,2 Trichlorotrifluoroethane (F113)	ND	0.50	"	"	"	"	"	"	
Methyl tertiary-butyl ether (MTBE)	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Diisopropyl ether (DIPE)	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Ethyl tert-butyl ether (ETBE)	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.10	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.10	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.10	"	"	"	"	"	"	
Tertiary-amyl methyl ether (TAME)	ND	1.0	"	"	"	"	"	"	
Benzene	ND	0.10	"	"	"	"	"	"	
Trichloroethene	ND	0.10	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.10	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.10	"	"	"	"	"	"	

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Stoney-Miller Consultants, Inc.	Project: MC022417-SB2	
14 Hughes, Suite B101	Project Number: 14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager: Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV2-5 (E702126-05) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
Ethylbenzene	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene (Cumene)	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Tertiary-butyl alcohol (TBA)	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*106 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 1,2-Dichloroethane-d4		*107 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: Toluene-d8		*104 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene		*101 %*	*75-125*		*"*	*"*	*"*	*"*	

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Stoney-Miller Consultants, Inc.	Project:	MC022417-SB2	
14 Hughes, Suite B101	Project Number:	14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager:	Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV2-10 (E702126-06) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
1,1-Difluoroethane (LCC)	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
Dichlorodifluoromethane (F12)	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.05	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	ND	0.50	"	"	"	"	"	"	
1,1,2 Trichlorotrifluoroethane (F113)	ND	0.50	"	"	"	"	"	"	
Methyl tertiary-butyl ether (MTBE)	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Diisopropyl ether (DIPE)	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Ethyl tert-butyl ether (ETBE)	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.10	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.10	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.10	"	"	"	"	"	"	
Tertiary-amyl methyl ether (TAME)	ND	1.0	"	"	"	"	"	"	
Benzene	ND	0.10	"	"	"	"	"	"	
Trichloroethene	ND	0.10	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.10	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.10	"	"	"	"	"	"	

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Stoney-Miller Consultants, Inc.	Project: MC022417-SB2	
14 Hughes, Suite B101	Project Number: 14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager: Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV2-10 (E702126-06) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
Ethylbenzene	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene (Cumene)	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Tertiary-butyl alcohol (TBA)	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*104 %*		*75-125*	*"*	*"*	*"*	*"*	
Surrogate: 1,2-Dichloroethane-d4		*104 %*		*75-125*	*"*	*"*	*"*	*"*	
Surrogate: Toluene-d8		*101 %*		*75-125*	*"*	*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene		*104 %*		*75-125*	*"*	*"*	*"*	*"*	

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Stoney-Miller Consultants, Inc. 14 Hughes, Suite B101 Irvine, CA 92618	Project: MC022417-SB2 Project Number: 14013-02 Site 2 ESA /California Ave Project Manager: Mr. Ian Goltz	Reported: 03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV2-10 REP (E702126-07) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
1,1-Difluoroethane (LCC)	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
Dichlorodifluoromethane (F12)	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.05	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	ND	0.50	"	"	"	"	"	"	
1,1,2 Trichlorotrifluoroethane (F113)	ND	0.50	"	"	"	"	"	"	
Methyl tertiary-butyl ether (MTBE)	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Diisopropyl ether (DIPE)	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Ethyl tert-butyl ether (ETBE)	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.10	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.10	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.10	"	"	"	"	"	"	
Tertiary-amyl methyl ether (TAME)	ND	1.0	"	"	"	"	"	"	
Benzene	ND	0.10	"	"	"	"	"	"	
Trichloroethene	ND	0.10	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.10	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.10	"	"	"	"	"	"	

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Stoney-Miller Consultants, Inc.	Project: MC022417-SB2	
14 Hughes, Suite B101	Project Number: 14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager: Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV2-10 REP (E702126-07) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
Ethylbenzene	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene (Cumene)	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Tertiary-butyl alcohol (TBA)	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*105 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 1,2-Dichloroethane-d4		*99.7 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: Toluene-d8		*101 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene		*104 %*	*75-125*		*"*	*"*	*"*	*"*	

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Stoney-Miller Consultants, Inc. 14 Hughes, Suite B101 Irvine, CA 92618	Project: MC022417-SB2 Project Number: 14013-02 Site 2 ESA /California Ave Project Manager: Mr. Ian Goltz	Reported: 03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV3-5 (E702126-08) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
1,1-Difluoroethane (LCC)	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
Dichlorodifluoromethane (F12)	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.05	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	ND	0.50	"	"	"	"	"	"	
1,1,2 Trichlorotrifluoroethane (F113)	ND	0.50	"	"	"	"	"	"	
Methyl tertiary-butyl ether (MTBE)	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Diisopropyl ether (DIPE)	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Ethyl tert-butyl ether (ETBE)	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.10	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.10	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.10	"	"	"	"	"	"	
Tertiary-amyl methyl ether (TAME)	ND	1.0	"	"	"	"	"	"	
Benzene	ND	0.10	"	"	"	"	"	"	
Trichloroethene	ND	0.10	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.10	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.10	"	"	"	"	"	"	

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Stoney-Miller Consultants, Inc.	Project:	MC022417-SB2	
14 Hughes, Suite B101	Project Number:	14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager:	Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV3-5 (E702126-08) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
Ethylbenzene	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene (Cumene)	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Tertiary-butyl alcohol (TBA)	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*108 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 1,2-Dichloroethane-d4		*110 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: Toluene-d8		*104 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene		*104 %*	*75-125*		*"*	*"*	*"*	*"*	

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Stoney-Miller Consultants, Inc.	Project:	MC022417-SB2	
14 Hughes, Suite B101	Project Number:	14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager:	Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV3-10 (E702126-09) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
1,1-Difluoroethane (LCC)	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
Dichlorodifluoromethane (F12)	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.05	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	ND	0.50	"	"	"	"	"	"	
1,1,2 Trichlorotrifluoroethane (F113)	ND	0.50	"	"	"	"	"	"	
Methyl tertiary-butyl ether (MTBE)	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Diisopropyl ether (DIPE)	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Ethyl tert-butyl ether (ETBE)	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.10	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.10	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.10	"	"	"	"	"	"	
Tertiary-amyl methyl ether (TAME)	ND	1.0	"	"	"	"	"	"	
Benzene	ND	0.10	"	"	"	"	"	"	
Trichloroethene	ND	0.10	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.10	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.10	"	"	"	"	"	"	

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Stoney-Miller Consultants, Inc. 14 Hughes, Suite B101 Irvine, CA 92618	Project: MC022417-SB2 Project Number: 14013-02 Site 2 ESA /California Ave Project Manager: Mr. Ian Goltz	Reported: 03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV3-10 (E702126-09) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
Ethylbenzene	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene (Cumene)	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Tertiary-butyl alcohol (TBA)	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*106 %*	*75-125*		"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*101 %*	*75-125*		"	"	"	"	
Surrogate: Toluene-d8		*102 %*	*75-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*107 %*	*75-125*		"	"	"	"	

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Stoney-Miller Consultants, Inc.	Project:	MC022417-SB2	
14 Hughes, Suite B101	Project Number:	14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager:	Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV4-5 (E702126-10) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
1,1-Difluoroethane (LCC)	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
Dichlorodifluoromethane (F12)	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.05	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	ND	0.50	"	"	"	"	"	"	
1,1,2 Trichlorotrifluoroethane (F113)	ND	0.50	"	"	"	"	"	"	
Methyl tertiary-butyl ether (MTBE)	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Diisopropyl ether (DIPE)	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Ethyl tert-butyl ether (ETBE)	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.10	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.10	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.10	"	"	"	"	"	"	
Tertiary-amyl methyl ether (TAME)	ND	1.0	"	"	"	"	"	"	
Benzene	ND	0.10	"	"	"	"	"	"	
Trichloroethene	ND	0.10	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.10	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.10	"	"	"	"	"	"	

H&P Mobile
Geochemistry Inc.

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Stoney-Miller Consultants, Inc.	Project: MC022417-SB2	
14 Hughes, Suite B101	Project Number: 14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager: Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV4-5 (E702126-10) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
Ethylbenzene	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene (Cumene)	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Tertiary-butyl alcohol (TBA)	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*102 %*		*75-125*	*"*	*"*	*"*	*"*	
Surrogate: 1,2-Dichloroethane-d4		*106 %*		*75-125*	*"*	*"*	*"*	*"*	
Surrogate: Toluene-d8		*101 %*		*75-125*	*"*	*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene		*100 %*		*75-125*	*"*	*"*	*"*	*"*	

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Stoney-Miller Consultants, Inc.	Project:	MC022417-SB2	
14 Hughes, Suite B101	Project Number:	14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager:	Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV4-10 (E702126-11) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
1,1-Difluoroethane (LCC)	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
Dichlorodifluoromethane (F12)	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.05	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	ND	0.50	"	"	"	"	"	"	
1,1,2 Trichlorotrifluoroethane (F113)	ND	0.50	"	"	"	"	"	"	
Methyl tertiary-butyl ether (MTBE)	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Diisopropyl ether (DIPE)	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Ethyl tert-butyl ether (ETBE)	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.10	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.10	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.10	"	"	"	"	"	"	
Tertiary-amyl methyl ether (TAME)	ND	1.0	"	"	"	"	"	"	
Benzene	ND	0.10	"	"	"	"	"	"	
Trichloroethene	ND	0.10	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.10	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.10	"	"	"	"	"	"	

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Stoney-Miller Consultants, Inc.	Project:	MC022417-SB2	
14 Hughes, Suite B101	Project Number:	14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager:	Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV4-10 (E702126-11) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
Ethylbenzene	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene (Cumene)	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Tertiary-butyl alcohol (TBA)	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*108 %*	*75-125*		"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*107 %*	*75-125*		"	"	"	"	
Surrogate: Toluene-d8		*103 %*	*75-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*101 %*	*75-125*		"	"	"	"	

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Stoney-Miller Consultants, Inc.	Project:	MC022417-SB2	
14 Hughes, Suite B101	Project Number:	14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager:	Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV5-5 (E702126-12) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
1,1-Difluoroethane (LCC)	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
Dichlorodifluoromethane (F12)	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.05	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	ND	0.50	"	"	"	"	"	"	
1,1,2 Trichlorotrifluoroethane (F113)	ND	0.50	"	"	"	"	"	"	
Methyl tertiary-butyl ether (MTBE)	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Diisopropyl ether (DIPE)	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Ethyl tert-butyl ether (ETBE)	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.10	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.10	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.10	"	"	"	"	"	"	
Tertiary-amyl methyl ether (TAME)	ND	1.0	"	"	"	"	"	"	
Benzene	ND	0.10	"	"	"	"	"	"	
Trichloroethene	ND	0.10	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.10	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.10	"	"	"	"	"	"	

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Stoney-Miller Consultants, Inc.	Project: MC022417-SB2	
14 Hughes, Suite B101	Project Number: 14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager: Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV5-5 (E702126-12) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
Ethylbenzene	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene (Cumene)	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Tertiary-butyl alcohol (TBA)	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*108 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 1,2-Dichloroethane-d4		*114 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: Toluene-d8		*106 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene		*99.7 %*	*75-125*		*"*	*"*	*"*	*"*	

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Stoney-Miller Consultants, Inc.	Project: MC022417-SB2	
14 Hughes, Suite B101	Project Number: 14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager: Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV5-10 (E702126-13) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
1,1-Difluoroethane (LCC)	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
Dichlorodifluoromethane (F12)	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.05	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	ND	0.50	"	"	"	"	"	"	
1,1,2 Trichlorotrifluoroethane (F113)	ND	0.50	"	"	"	"	"	"	
Methyl tertiary-butyl ether (MTBE)	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Diisopropyl ether (DIPE)	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Ethyl tert-butyl ether (ETBE)	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.10	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.10	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.10	"	"	"	"	"	"	
Tertiary-amyl methyl ether (TAME)	ND	1.0	"	"	"	"	"	"	
Benzene	ND	0.10	"	"	"	"	"	"	
Trichloroethene	ND	0.10	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.10	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.10	"	"	"	"	"	"	

H&P Mobile
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Stoney-Miller Consultants, Inc.	Project: MC022417-SB2	
14 Hughes, Suite B101	Project Number: 14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager: Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV5-10 (E702126-13) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
Ethylbenzene	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene (Cumene)	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Tertiary-butyl alcohol (TBA)	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*106 %*	*75-125*		"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*105 %*	*75-125*		"	"	"	"	
Surrogate: Toluene-d8		*101 %*	*75-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*103 %*	*75-125*		"	"	"	"	

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Stoney-Miller Consultants, Inc. 14 Hughes, Suite B101 Irvine, CA 92618	Project: MC022417-SB2 Project Number: 14013-02 Site 2 ESA /California Ave Project Manager: Mr. Ian Goltz	Reported: 03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV6-5 (E702126-14) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
1,1-Difluoroethane (LCC)	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
Dichlorodifluoromethane (F12)	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.05	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	ND	0.50	"	"	"	"	"	"	
1,1,2 Trichlorotrifluoroethane (F113)	ND	0.50	"	"	"	"	"	"	
Methyl tertiary-butyl ether (MTBE)	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Diisopropyl ether (DIPE)	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Ethyl tert-butyl ether (ETBE)	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.10	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.10	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.10	"	"	"	"	"	"	
Tertiary-amyl methyl ether (TAME)	ND	1.0	"	"	"	"	"	"	
Benzene	ND	0.10	"	"	"	"	"	"	
Trichloroethene	ND	0.10	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.10	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.10	"	"	"	"	"	"	

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Stoney-Miller Consultants, Inc.	Project: MC022417-SB2	
14 Hughes, Suite B101	Project Number: 14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager: Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV6-5 (E702126-14) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
Ethylbenzene	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene (Cumene)	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Tertiary-butyl alcohol (TBA)	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*103 %*		*75-125*	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*109 %*		*75-125*	"	"	"	"	
Surrogate: Toluene-d8		*100 %*		*75-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*99.1 %*		*75-125*	"	"	"	"	

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Stoney-Miller Consultants, Inc.	Project:	MC022417-SB2	
14 Hughes, Suite B101	Project Number:	14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager:	Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV6-10 (E702126-15) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
1,1-Difluoroethane (LCC)	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
Dichlorodifluoromethane (F12)	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.05	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane (F11)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride (Dichloromethane)	ND	0.50	"	"	"	"	"	"	
1,1,2 Trichlorotrifluoroethane (F113)	ND	0.50	"	"	"	"	"	"	
Methyl tertiary-butyl ether (MTBE)	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Diisopropyl ether (DIPE)	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Ethyl tert-butyl ether (ETBE)	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.10	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.10	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.10	"	"	"	"	"	"	
Tertiary-amyl methyl ether (TAME)	ND	1.0	"	"	"	"	"	"	
Benzene	ND	0.10	"	"	"	"	"	"	
Trichloroethene	ND	0.10	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.10	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.10	"	"	"	"	"	"	

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Stoney-Miller Consultants, Inc.	Project:	MC022417-SB2	
14 Hughes, Suite B101	Project Number:	14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager:	Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SV6-10 (E702126-15) Vapor Sampled: 24-Feb-17 Received: 24-Feb-17									
Ethylbenzene	ND	0.50	ug/l	0.05	EB72404	24-Feb-17	24-Feb-17	H&P 8260SV	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene (Cumene)	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Tertiary-butyl alcohol (TBA)	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*107 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 1,2-Dichloroethane-d4		*106 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: Toluene-d8		*102 %*	*75-125*		*"*	*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene		*100 %*	*75-125*		*"*	*"*	*"*	*"*	

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Stoney-Miller Consultants, Inc.	Project:	MC022417-SB2	
14 Hughes, Suite B101	Project Number:	14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager:	Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV - Quality Control
H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EB72404 - EPA 5030										
Blank (EB72404-BLK1)				Prepared & Analyzed: 24-Feb-17						
1,1-Difluoroethane (LCC)	ND	0.50	ug/l							
Dichlorodifluoromethane (F12)	ND	0.50	"							
Chloromethane	ND	0.50	"							
Vinyl chloride	ND	0.05	"							
Bromomethane	ND	0.50	"							
Chloroethane	ND	0.50	"							
Trichlorofluoromethane (F11)	ND	0.50	"							
1,1-Dichloroethene	ND	0.50	"							
Methylene chloride (Dichloromethane)	ND	0.50	"							
1,1,2 Trichlorotrifluoroethane (F113)	ND	0.50	"							
Methyl tertiary-butyl ether (MTBE)	ND	0.50	"							
trans-1,2-Dichloroethene	ND	0.50	"							
Diisopropyl ether (DIPE)	ND	1.0	"							
1,1-Dichloroethane	ND	0.50	"							
Ethyl tert-butyl ether (ETBE)	ND	1.0	"							
2,2-Dichloropropane	ND	0.50	"							
cis-1,2-Dichloroethene	ND	0.50	"							
Chloroform	ND	0.10	"							
Bromochloromethane	ND	0.50	"							
1,1,1-Trichloroethane	ND	0.50	"							
1,1-Dichloropropene	ND	0.50	"							
Carbon tetrachloride	ND	0.10	"							
1,2-Dichloroethane (EDC)	ND	0.10	"							
Tertiary-amyl methyl ether (TAME)	ND	1.0	"							
Benzene	ND	0.10	"							
Trichloroethene	ND	0.10	"							
1,2-Dichloropropane	ND	0.50	"							
Bromodichloromethane	ND	0.50	"							
Dibromomethane	ND	0.50	"							
cis-1,3-Dichloropropene	ND	0.50	"							
Toluene	ND	1.0	"							
trans-1,3-Dichloropropene	ND	0.50	"							
1,1,2-Trichloroethane	ND	0.50	"							
1,2-Dibromoethane (EDB)	ND	0.50	"							

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Stoney-Miller Consultants, Inc.	Project:	MC022417-SB2	
14 Hughes, Suite B101	Project Number:	14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager:	Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV - Quality Control

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EB72404 - EPA 5030										
Blank (EB72404-BLK1)				Prepared & Analyzed: 24-Feb-17						
1,3-Dichloropropane	ND	0.50	ug/l							
Tetrachloroethene	ND	0.10	"							
Dibromochloromethane	ND	0.50	"							
Chlorobenzene	ND	0.10	"							
Ethylbenzene	ND	0.50	"							
1,1,1,2-Tetrachloroethane	ND	0.50	"							
m,p-Xylene	ND	0.50	"							
o-Xylene	ND	0.50	"							
Styrene	ND	0.50	"							
Bromoform	ND	0.50	"							
Isopropylbenzene (Cumene)	ND	0.50	"							
1,1,2,2-Tetrachloroethane	ND	0.50	"							
1,2,3-Trichloropropane	ND	0.50	"							
n-Propylbenzene	ND	0.50	"							
Bromobenzene	ND	0.50	"							
1,3,5-Trimethylbenzene	ND	0.50	"							
2-Chlorotoluene	ND	0.50	"							
4-Chlorotoluene	ND	0.50	"							
tert-Butylbenzene	ND	0.50	"							
1,2,4-Trimethylbenzene	ND	0.50	"							
sec-Butylbenzene	ND	0.50	"							
p-Isopropyltoluene	ND	0.50	"							
1,3-Dichlorobenzene	ND	0.50	"							
1,4-Dichlorobenzene	ND	0.50	"							
n-Butylbenzene	ND	0.50	"							
1,2-Dichlorobenzene	ND	0.50	"							
1,2-Dibromo-3-chloropropane	ND	5.0	"							
1,2,4-Trichlorobenzene	ND	0.50	"							
Hexachlorobutadiene	ND	0.50	"							
Naphthalene	ND	0.10	"							
1,2,3-Trichlorobenzene	ND	0.50	"							
Tertiary-butyl alcohol (TBA)	ND	5.0	"							
Surrogate: Dibromofluoromethane	*2.62*		*"*	*2.50*		*105*	*75-125*			

H&P Mobile
Geochemistry Inc.

2470 Impala Drive
Carlsbad, CA 92010
760-804-9678 Phone
760-804-9159 Fax

Stoney-Miller Consultants, Inc. 14 Hughes, Suite B101 Irvine, CA 92618	Project: MC022417-SB2 Project Number: 14013-02 Site 2 ESA /California Ave Project Manager: Mr. Ian Goltz	Reported: 03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV - Quality Control
H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EB72404 - EPA 5030										
Blank (EB72404-BLK1)				Prepared & Analyzed: 24-Feb-17						
Surrogate: 1,2-Dichloroethane-d4	*2.72*		*ug/l*	*2.50*		*109*	*75-125*			
Surrogate: Toluene-d8	*2.56*		*"*	*2.50*		*102*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*2.57*		*"*	*2.50*		*103*	*75-125*			
LCS (EB72404-BS1)				Prepared & Analyzed: 24-Feb-17						
Dichlorodifluoromethane (F12)	4.17	0.50	ug/l	5.00		83.5	70-130			
Vinyl chloride	4.63	0.05	"	5.00		92.6	70-130			
Chloroethane	5.04	0.50	"	5.00		101	70-130			
Trichlorofluoromethane (F11)	4.84	0.50	"	5.00		96.7	70-130			
1,1-Dichloroethene	4.85	0.50	"	5.00		97.0	70-130			
Methylene chloride (Dichloromethane)	4.67	0.50	"	5.00		93.4	70-130			
1,1,2 Trichlorotrifluoroethane (F113)	5.38	0.50	"	5.00		108	70-130			
trans-1,2-Dichloroethene	5.08	0.50	"	5.00		102	70-130			
1,1-Dichloroethane	4.84	0.50	"	5.00		96.8	70-130			
cis-1,2-Dichloroethene	5.21	0.50	"	5.00		104	70-130			
Chloroform	5.26	0.10	"	5.00		105	70-130			
1,1,1-Trichloroethane	5.33	0.50	"	5.00		107	70-130			
Carbon tetrachloride	5.61	0.10	"	5.00		112	70-130			
1,2-Dichloroethane (EDC)	5.48	0.10	"	5.00		110	70-130			
Benzene	4.81	0.10	"	5.00		96.2	70-130			
Trichloroethene	5.46	0.10	"	5.00		109	70-130			
Toluene	4.73	1.0	"	5.00		94.6	70-130			
1,1,2-Trichloroethane	4.45	0.50	"	5.00		89.0	70-130			
Tetrachloroethene	5.24	0.10	"	5.00		105	70-130			
Ethylbenzene	5.18	0.50	"	5.00		104	70-130			
1,1,1,2-Tetrachloroethane	5.49	0.50	"	5.00		110	70-130			
m,p-Xylene	10.5	0.50	"	10.0		105	70-130			
o-Xylene	5.15	0.50	"	5.00		103	70-130			
1,1,2,2-Tetrachloroethane	4.36	0.50	"	5.00		87.3	70-130			
Surrogate: Dibromofluoromethane	*2.56*		*"*	*2.50*		*103*	*75-125*			
Surrogate: 1,2-Dichloroethane-d4	*2.43*		*"*	*2.50*		*97.1*	*75-125*			
Surrogate: Toluene-d8	*2.61*		*"*	*2.50*		*105*	*75-125*			

H&P Mobile
Geochemistry Inc.

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Carlsbad, CA 92010
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Stoney-Miller Consultants, Inc.	Project: MC022417-SB2	
14 Hughes, Suite B101	Project Number: 14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager: Mr. Ian Goltz	03-Mar-17 13:00

Volatile Organic Compounds by H&P 8260SV - Quality Control

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EB72404 - EPA 5030										
LCS (EB72404-BS1)				Prepared & Analyzed: 24-Feb-17						
Surrogate: 4-Bromofluorobenzene	*2.64*		*ug/l*	*2.50*		*105*	*75-125*			

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Stoney-Miller Consultants, Inc.	Project:	MC022417-SB2	
14 Hughes, Suite B101	Project Number:	14013-02 Site 2 ESA /California Ave	Reported:
Irvine, CA 92618	Project Manager:	Mr. Ian Goltz	03-Mar-17 13:00

Notes and Definitions

LCC	Leak Check Compound
ND	Analyte NOT DETECTED at or above the reporting limit
MDL	Method Detection Limit
%REC	Percent Recovery
RPD	Relative Percent Difference

Appendix

H&P Mobile Geochemistry, Inc. is approved as an Environmental Testing Laboratory and Mobile Laboratory in accordance with the DoD-ELAP and the ISO 17025 programs, certification number L15-279-R1

H&P is approved by the State of Arizona as an Environmental Testing Laboratory and Mobile Laboratory, certification numbers AZM758 and AZ0779.

H&P is approved by the State of California as an Environmental Laboratory and Mobile Laboratory in conformance with the Environmental Laboratory Accreditation Program (ELAP) for the category of Volatile and Semi-Volatile Organic Chemistry of Hazardous Waste, certification numbers 2740, 2741, 2743, 2744, 2745, 2754 & 2930.

H&P is approved by the State of Florida Department of Health under the National Environmental Laboratory Accreditation Conference (NELAC) certification number E871100.

The complete list of stationary and mobile laboratory certifications along with the fields of testing (FOTs) and analyte lists are available at www.handpmg.com/about/certifications.

H&P Mobile Geochemistry, Inc.

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& Field Office - Signal Hill, CA
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VAPOR / AIR Chain of Custody

DATE: 2/24/17
Page 1 of 2

Lab Client and Project Information

Lab Client/Consultant: Stoney-Miller Consultants, Inc	Project Name / #: 14013-02 Site 2 ESA
Lab Client Project Manager: Ian Goltz	Project Location: 206 California Ave Irvine
Lab Client Address: 14 Hughes, Suite B101	Report E-Mail(s): igoltz@stoneymiller.com
Lab Client City, State, Zip: Irvine, CA 92618	
Phone Number: 949-380-4886	

Sample Receipt (Lab Use Only)

Date Rec'd: 2/24/17	Control #: 170185.01
H&P Project # MC022417-SB2	
Lab Work Order # E702126/EB72404	
Sample Intact: ☒ Yes ☐ No ☐ See Notes Below	
Receipt Gauge ID:	Temp:
Outside Lab:	
Receipt Notes/Tracking #:	
	Lab PM Initials:

Reporting Requirements

☒ Standard Report ☐ Level III ☐ Level IV
☐ Excel EDD ☐ Other EDD:
☐ CA Geotracker Global ID:

Turnaround Time

☐ 5-7 day Stnd ☐ 24-Hr Rush
☐ 3-day Rush ☒ Mobile Lab
☐ 48-Hr Rush ☐ Other:

Sampler Information

Sampler(s): D. Do
Signature: [signature]
Date: 2/24/17

Additional Instructions to Laboratory:

*** Preferred VOC units (please choose one):**
☒ µg/L ☐ µg/m³ ☐ ppbv ☐ ppmv

	SAMPLE NAME	FIELD POINT NAME (if applicable)	DATE mm/dd/yy	TIME 24hr clock	SAMPLE TYPE Indoor Air (IA), Ambient Air (AA), Subslab (SS), Soil Vapor (SV)	CONTAINER SIZE & TYPE 400mL/1L/6L Summa, Tedlar, Tube, etc.	CONTAINER ID (###)	Lab use only: Receipt Vac	VOCs Standard Full List ☒ 8260SV ☐ TO-15	VOCs Short List / Project List ☐ 8260SV ☐ TO-15	Oxygenates ☒ 8260SV ☐ TO-15	Naphthalene ☐ 8260SV ☐ TO-15	TPHv as Gas ☐ 8260SVm ☐ TO-15m	Aromatic/Aliphatic Fractions ☐ 8260SVm ☐ TO-15m	Leak Check Compound ☒ DFA ☐ IPA ☐ He	Methane by EPA 8015m	Fixed Gases by ASTM D1945 ☐ CO2 ☐ O2 ☐ N2				
1	Ambient Air Background		2/24/17	0915	SV	Glass Syringe	203		X		X				X						
2	Equipment Blank		↓	0920	↓	↓	253		X		X				X						
3	SV1-5			0950			254		X		X				X						
4	SV1-10			1005			253		X		X				X						
5	SV2-5			1017			EA287		X		X				X						
6	SV2-10			1032			209		X		X				X						
7	SV2-10 REP			1033			204		X		X				X						
8	SV3-5			1050			149		X		X				X						
9	SV3-10			1100			203		X		X				X						
10	SV4-5			1143			87		X		X				X						

Approved/Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
[signature]	Stoney Miller	2-24-17	13:58	[signature]	H+P	2/24/17	1355

*Approval constitutes as authorization to proceed with analysis and acceptance of conditions on back

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VAPOR / AIR Chain of Custody

DATE: 2/24/17

Lab Client and Project Information	
Lab Client/Consultant: Stoney-Miller Consultants, Inc	Project Name / #: 14013-02 Site 2ESA
Lab Client Project Manager: Jon Goltz	Project Location: 206 California Ave Irvine
Lab Client Address: 14 Hughes Suite B101	Report E-Mail(s): jgoltz@stoneymiller.com
Lab Client City, State, Zip: Irvine, CA 92618	
Phone Number: 949-380-4886	

Sample Receipt (Lab Use Only)	
Date Rec'd: 2/24/17	Control #: 170185.01
H&P Project # MC022417-SB2	
Lab Work Order # E702126 / E1572401	
Sample Intact: ☒ Yes ☐ No ☐ See Notes Below	
Receipt Gauge ID:	Temp:
Outside Lab:	
Receipt Notes/Tracking #:	
	Lab PM Initials:

Reporting Requirements	Turnaround Time	Sampler Information
☒ Standard Report ☐ Level III ☐ Level IV	☐ 5-7 day Stnd ☐ 24-Hr Rush	Sampler(s): D. Do
☐ Excel EDD ☐ Other EDD:	☐ 3-day Rush ☒ Mobile Lab	Signature: [signature]
☐ CA Geotracker Global ID:	☐ 48-Hr Rush ☐ Other:	Date: 2/24/17

Additional Instructions to Laboratory:

*** Preferred VOC units (please choose one):**
☒ µg/L ☐ µg/m³ ☐ ppbv ☐ ppmv

	SAMPLE NAME	FIELD POINT NAME (if applicable)	DATE mm/dd/yy	TIME 24hr clock	SAMPLE TYPE Indoor Air (IA), Ambient Air (AA), Subslab (SS), Soil Vapor (SV)	CONTAINER SIZE & TYPE 400mL/1L/6L Summa, Tedlar, Tube, etc.	CONTAINER ID (###)	Lab use only: Receipt Vac	VOCs Standard Full List ☒ 8260SV ☐ TO-15	VOCs Short List / Project List ☐ 8260SV ☐ TO-15	Oxygenates ☒ 8260SV ☐ TO-15	Naphthalene ☐ 8260SV ☐ TO-15	TPHv as Gas ☐ 8260SVm ☐ TO-15m	Aromatic/Aliphatic Fractions ☐ 8260SVm ☐ TO-15m	Leak Check Compound ☒ DFA ☐ IPA ☐ He	Methane by EPA 8015m	Fixed Gases by ASTM D1945 ☐ CO2 ☐ O2 ☐ N2				
11	SV4-10		2/24/17	1150	SV	Glass syringe	DA287		X		X				X						
12	SV5-5		↓	1202	↓	↓	254		X		X				X						
13	SV5-10			1220			253		X		X				X						
14	SV6-5			1230			209		X		X				X						
15	SV6-10			1245			211		X		X				X						

Approved/Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
[signature]	Stoney Miller	2-24-17	13:55	[signature]	H+P	2/24/17	1355

*Approval constitutes as authorization to proceed with analysis and acceptance of conditions on back

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

03 March 2017

Ian Goltz
Stoney-Miller Consultants
14 Hughes B101
Irvine, CA 92618

RE: ACC-14003-01

Enclosed are the results of analyses for samples received by the laboratory on 02/24/17 15:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rose Fasheh

Rose Fasheh
Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Lake Forest, California 92630
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Stoney-Miller Consultants	Project: ACC-14003-01	
14 Hughes B101	Project Number: 14003-01	**Reported:**
Irvine CA, 92618	Project Manager: Ian Goltz	03/03/17 08:37

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SV5-5	T170469-01	Soil	02/24/17 09:03	02/24/17 15:15
SV5-10	T170469-02	Soil	02/24/17 09:10	02/24/17 15:15

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
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Stoney-Miller Consultants	Project: ACC-14003-01	
14 Hughes B101	Project Number: 14003-01	**Reported:**
Irvine CA, 92618	Project Manager: Ian Goltz	03/03/17 08:37

DETECTIONS SUMMARY

Sample ID: SV5-5 **Laboratory ID:** T170469-01

Analyte	Result	Reporting Limit	Units	Method	Notes
Antimony	**3.8**	3.0	mg/kg	EPA 6010B	
Barium	**76**	1.0	mg/kg	EPA 6010B	
Cadmium	**3.4**	2.0	mg/kg	EPA 6010B	
Chromium	**36**	2.0	mg/kg	EPA 6010B	
Cobalt	**20**	2.0	mg/kg	EPA 6010B	
Copper	**42**	1.0	mg/kg	EPA 6010B	
Molybdenum	**11**	5.0	mg/kg	EPA 6010B	
Nickel	**48**	2.0	mg/kg	EPA 6010B	
Vanadium	**46**	5.0	mg/kg	EPA 6010B	
Zinc	**40**	1.0	mg/kg	EPA 6010B	

Sample ID: SV5-10 **Laboratory ID:** T170469-02

Analyte	Result	Reporting Limit	Units	Method	Notes
Barium	**39**	0.83	mg/kg	EPA 6010B	
Chromium	**68**	1.7	mg/kg	EPA 6010B	
Cobalt	**9.2**	1.7	mg/kg	EPA 6010B	
Copper	**36**	0.83	mg/kg	EPA 6010B	
Molybdenum	**8.1**	4.2	mg/kg	EPA 6010B	
Nickel	**65**	1.7	mg/kg	EPA 6010B	
Vanadium	**37**	4.2	mg/kg	EPA 6010B	
Zinc	**74**	0.83	mg/kg	EPA 6010B	

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Rose Fasheh

Rose Fasheh, Project Manager

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Stoney-Miller Consultants	Project: ACC-14003-01	
14 Hughes B101	Project Number: 14003-01	**Reported:**
Irvine CA, 92618	Project Manager: Ian Goltz	03/03/17 08:37

SV5-5

T170469-01 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Metals by EPA 6010B									
Antimony	**3.8**	3.0	mg/kg	1	7022720	02/27/17	02/28/17	EPA 6010B	
Silver	ND	2.0	"	"	"	"	"	"	
Arsenic	ND	5.0	"	"	"	"	"	"	
Barium	**76**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	**3.4**	2.0	"	"	"	"	"	"	
Chromium	**36**	2.0	"	"	"	"	"	"	
Cobalt	**20**	2.0	"	"	"	"	"	"	
Copper	**42**	1.0	"	"	"	"	"	"	
Lead	ND	3.0	"	"	"	"	"	"	
Molybdenum	**11**	5.0	"	"	"	"	"	"	
Nickel	**48**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	2.0	"	"	"	"	"	"	
Vanadium	**46**	5.0	"	"	"	"	"	"	
Zinc	**40**	1.0	"	"	"	"	"	"	
Cold Vapor Extraction EPA 7470/7471									
Mercury	ND	0.10	mg/kg	1	7022721	02/27/17	03/01/17	EPA 7471A Soil	

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
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Stoney-Miller Consultants	Project: ACC-14003-01	
14 Hughes B101	Project Number: 14003-01	**Reported:**
Irvine CA, 92618	Project Manager: Ian Goltz	03/03/17 08:37

SV5-10

T170469-02 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes

SunStar Laboratories, Inc.

Metals by EPA 6010B

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Antimony	ND	2.5	mg/kg	1	7022720	02/27/17	02/28/17	EPA 6010B	
Silver	ND	1.7	"	"	"	"	"	"	
Arsenic	ND	4.2	"	"	"	"	"	"	
Barium	**39**	0.83	"	"	"	"	"	"	
Beryllium	ND	0.83	"	"	"	"	"	"	
Cadmium	ND	1.7	"	"	"	"	"	"	
Chromium	**68**	1.7	"	"	"	"	"	"	
Cobalt	**9.2**	1.7	"	"	"	"	"	"	
Copper	**36**	0.83	"	"	"	"	"	"	
Lead	ND	2.5	"	"	"	"	"	"	
Molybdenum	**8.1**	4.2	"	"	"	"	"	"	
Nickel	**65**	1.7	"	"	"	"	"	"	
Selenium	ND	4.2	"	"	"	"	"	"	
Thallium	ND	1.7	"	"	"	"	"	"	
Vanadium	**37**	4.2	"	"	"	"	"	"	
Zinc	**74**	0.83	"	"	"	"	"	"	

Cold Vapor Extraction EPA 7470/7471

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Mercury	ND	0.10	mg/kg	1	7022721	02/27/17	03/01/17	EPA 7471A Soil	

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
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Stoney-Miller Consultants	Project: ACC-14003-01	
14 Hughes B101	Project Number: 14003-01	**Reported:**
Irvine CA, 92618	Project Manager: Ian Goltz	03/03/17 08:37

Metals by EPA 6010B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7022720 - EPA 3051										
Blank (7022720-BLK1)				Prepared: 02/27/17 Analyzed: 02/28/17						
Antimony	ND	3.0	mg/kg							
Silver	ND	2.0	"							
Arsenic	ND	5.0	"							
Barium	ND	1.0	"							
Beryllium	ND	1.0	"							
Cadmium	ND	2.0	"							
Chromium	ND	2.0	"							
Cobalt	ND	2.0	"							
Copper	ND	1.0	"							
Lead	ND	3.0	"							
Molybdenum	ND	5.0	"							
Nickel	ND	2.0	"							
Selenium	ND	5.0	"							
Thallium	ND	2.0	"							
Vanadium	ND	5.0	"							
Zinc	ND	1.0	"							
LCS (7022720-BS1)				Prepared: 02/27/17 Analyzed: 02/28/17						
Arsenic	106	5.0	mg/kg	100		106	75-125			
Barium	111	1.0	"	100		111	75-125			
Cadmium	111	2.0	"	100		111	75-125			
Chromium	111	2.0	"	100		111	75-125			
Lead	110	3.0	"	100		110	75-125			
Matrix Spike (7022720-MS1)		**Source: T170467-01**		Prepared: 02/27/17 Analyzed: 02/28/17						
Arsenic	58.5	5.0	mg/kg	97.1	ND	60.3	75-125			QM-05
Barium	73.9	1.0	"	97.1	12.0	63.7	75-125			QM-05
Cadmium	63.7	2.0	"	97.1	0.226	65.4	75-125			QM-05
Chromium	67.4	2.0	"	97.1	3.94	65.4	75-125			QM-05
Lead	67.8	3.0	"	97.1	ND	69.8	75-125			QM-05

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Rose Fasheh

Rose Fasheh, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Stoney-Miller Consultants	Project: ACC-14003-01	
14 Hughes B101	Project Number: 14003-01	**Reported:**
Irvine CA, 92618	Project Manager: Ian Goltz	03/03/17 08:37

Metals by EPA 6010B - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7022720 - EPA 3051										
Matrix Spike Dup (7022720-MSD1)		**Source: T170467-01**		Prepared: 02/27/17 Analyzed: 02/28/17						
Arsenic	58.9	5.0	mg/kg	98.0	ND	60.1	75-125	0.704	20	QM-05
Barium	67.8	1.0	"	98.0	12.0	57.0	75-125	8.52	20	QM-05
Cadmium	61.3	2.0	"	98.0	0.226	62.3	75-125	3.96	20	QM-05
Chromium	65.1	2.0	"	98.0	3.94	62.4	75-125	3.49	20	QM-05
Lead	66.1	3.0	"	98.0	ND	67.5	75-125	2.47	20	QM-05

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25712 Commercentre Drive
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Stoney-Miller Consultants	Project: ACC-14003-01	
14 Hughes B101	Project Number: 14003-01	**Reported:**
Irvine CA, 92618	Project Manager: Ian Goltz	03/03/17 08:37

Cold Vapor Extraction EPA 7470/7471 - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7022721 - EPA 7471A Soil										
Blank (7022721-BLK1)				Prepared: 02/27/17 Analyzed: 03/01/17						
Mercury	ND	0.10	mg/kg							
LCS (7022721-BS1)				Prepared: 02/27/17 Analyzed: 03/01/17						
Mercury	0.381	0.10	mg/kg	0.410		93.0	75-125			
Matrix Spike (7022721-MS1)	**Source: T170467-01**			Prepared: 02/27/17 Analyzed: 03/01/17						
Mercury	0.251	0.10	mg/kg	0.391	ND	64.2	75-125			QM-05
Matrix Spike Dup (7022721-MSD1)	**Source: T170467-01**			Prepared: 02/27/17 Analyzed: 03/01/17						
Mercury	0.245	0.10	mg/kg	0.391	ND	62.8	75-125	2.19	20	QM-05

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Stoney-Miller Consultants	Project: ACC-14003-01	
14 Hughes B101	Project Number: 14003-01	**Reported:**
Irvine CA, 92618	Project Manager: Ian Goltz	03/03/17 08:37

Notes and Definitions

QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to possible matrix interference. The LCS was within acceptance criteria. The data is acceptable as no negative impact on data is expected.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE
25712 Commercentre Drive, Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Stoney Miller
Address: 14 Hughes, B101, Irvine CA
Phone: 949-275-6975 Fax:
Project Manager: IAN GOLTZ

Date: 2-24-17 Page: 1 Of 1
Project Name: ACC - 14003-01
Collector: TRG Client Project #: 14003-01
Batch #: EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	6020 ICP-MS Metals				Laboratory ID #	Comments/Preservative	Total # of containers
SVS-5	2-24-17	903	S										X					01		
SVS-10	2-24-17	910	S										X					02		

Relinquished by: (signature) Date / Time 2-24-17 3:15
Received by: (signature) Date / Time 2/24/17 15:15

Relinquished by: (signature) Date / Time
Received by: (signature) Date / Time

Relinquished by: (signature) Date / Time
Received by: (signature) Date / Time

Total # of containers 2
Chain of Custody seals Y/N/NA NA
Seals intact? Y/N/NA NA
Received good condition/cold 5.4

Turn around time: STD

Notes

Sample disposal Instructions: Disposal @ $2.00 each ____ Return to client ____ Pickup ____

COC 162394

SunStar Laboratories
Celebrating 20 Years!

SAMPLE RECEIVING REVIEW SHEET

Batch/Work Order #: T170469

Client Name: STONEY MILLER   Project: ACC-19003-01

Delivered by: [X] Client [ ] SunStar Courier [ ] GSO [ ] FedEx [ ] Other

If Courier, Received by: ____   Date/Time Courier Received: ____

Lab Received by: BRIAN   Date/Time Lab Received: 2/24/17 15:15

Total number of coolers received:

Temperature:	Cooler #1 5.6	°C +/- the CF (- 0.2°C) = 5.4	°C corrected temperature	
Temperature:	Cooler #2	°C +/- the CF (- 0.2°C) =	°C corrected temperature	
Temperature:	Cooler #3	°C +/- the CF (- 0.2°C) =	°C corrected temperature	
Temperature criteria = ≤ 6°C (no frozen containers)		Within criteria?	[X] **Yes**	[ ] **No**
If NO:				
Samples received on ice?		[ ] Yes	[ ] **No →** **Complete Non-Conformance Sheet**	
If on ice, samples received same day collected?		[ ] Yes → Acceptable	[ ] **No →** **Complete Non-Conformance Sheet**	

Custody seals intact on cooler/sample	[ ] Yes	[ ] No*	[X] N/A
Sample containers intact	[X] Yes	[ ] No*	
Sample labels match Chain of Custody IDs	[X] Yes	[ ] No*	
Total number of containers received match COC	[X] Yes	[ ] No*	
Proper containers received for analyses requested on COC	[X] Yes	[ ] No*	
Proper preservative indicated on COC/containers for analyses requested	[ ] Yes	[ ] No*	[X] N/A
Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times	[X] **Yes**	[ ] **No***	

* Complete Non-Conformance Receiving Sheet if checked   Cooler/Sample Review - Initials and date: BC 2/24/17

Comments:

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

WORK ORDER

T170469

Client: **Stoney-Miller Consultants** **Project Manager:** **Rose Fasheh**
Project: **ACC-14003-01** **Project Number:** **14003-01**

Report To:
Stoney-Miller Consultants
Ian Goltz
14 Hughes B101
Irvine, CA 92618

Date Due: 03/03/17 17:00 (5 day TAT)
Received By: Brian Charon Date Received: 02/24/17 15:15
Logged In By: Brian Charon Date Logged In: 02/24/17 15:18

Samples Received at: **5.4°C**
Custody Seals No Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confir No

Analysis	Due	TAT	Expires	Comments
T170469-01 SV5-5 [Soil] Sampled 02/24/17 09:03 (GMT-08:00) Pacific Time (US &				
6010 Title 22	03/03/17 15:00	5	08/23/17 09:03	
T170469-02 SV5-10 [Soil] Sampled 02/24/17 09:10 (GMT-08:00) Pacific Time (US &				
6010 Title 22	03/03/17 15:00	5	08/23/17 09:10	

Analysis groups included in this work order

6010 Title 22

subgroup 6010B T22 7470/71 Hg

Reviewed By Date

APPENDIX D

Acoustical Assessment

Michael Baker
INTERNATIONAL

ACOUSTICAL ASSESSMENT
for the
UCI East Campus Phase 4 Project
University of California, Irvine

Consultant:

MICHAEL BAKER INTERNATIONAL, INC.
14725 Alton Parkway
Irvine, CA 92618
Contact: Mr. Achilles Malisos
Manager of Air and Noise Studies
949.330.4104

March 21, 2017

JN 158401

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LIST OF EXHIBITS

LIST OF TABLES

DEFINITIONS OF COMMONLY USED TERMS IN NOISE CONTROL

The definitions that follow are in general agreement with those contained in publications of various professional organizations, including the American National Standards Institute (ANSI); the American Society for Testing and Materials (ASTM); the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE); the International Organization for Standardization (ISO); and the International Electrotechnical Commission (IEC).

TERMINOLOGY

acoustic; acoustical: *Acoustic* is usually used when the term being qualified designates something that has the properties, dimensions, or physical characteristics associated with sound waves (e.g., acoustic power); *acoustical* is usually used when the term which it modifies does not explicitly designate something that has the properties, dimensions, or physical characteristics of sound (e.g., acoustical material).

ambient noise: The all-encompassing noise associated with a given environment at a specified time, usually being a composite of sound from many sources arriving from many directions, near and far; no particular sound is dominant.

attenuation: The decrease in level of sound, usually from absorption, divergence, scattering, or the cancellation of the sound waves.

average sound level (L_{eq}): The level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.
Unit: decibel.

A-weighted sound level (L_A): The sound level measured with a sound-level meter using A-weighting. *Unit*: decibel (dBA).

background noise: The total noise from all sources other than a particular sound that is of interest (e.g., other than the noise being measured or other than the speech or music being listened to).

decibel (dB): A unit of level which denotes the ratio between two quantities that are proportional to power; the number of decibels correspond to the logarithm (to the base 10) of this ratio. [In many sound fields, the sound pressure ratios are not proportional to the corresponding power ratios, but it is common practice to extend the use of the decibel to such cases. One decibel equals one-tenth of a *bel*.]

equivalent continuous sound level (average sound level) (L_{eq}): The level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound. *Unit*: decibel (dBA).

frequency (f): Of a periodic function, the number of times that a quantity repeats itself in one second, i.e., the number of cycles per second. *Unit*: hertz (Hz).

noise: Any disagreeable or undesired sound, i.e., unwanted sound.

noise level: Same as sound level. Usually used to describe the sound level of an unwanted sound.

noise reduction (NR): The difference in sound pressure level between any two points along a path of sound propagation.

sound: (1) A change in air pressure that is capable of being detected by the human ear.
(2) The hearing sensation excited by a change in air pressure.

sound level: Ten times the logarithm to the base 10 of the square of the ratio of the frequency-weighted (and time-averaged) sound pressure to the reference sound pressure of 20 micropascals. The frequency-weightings and time-weighting employed should be specified; if they are not specified, it is understood that A-frequency-weighting is used and that an averaging time of 0.125 is used. *Unit*: decibel (dBA).

SYMBOLS, ABBREVIATIONS, AND ACRONYMS

ADT	Average Daily Traffic
ANSI	American National Standards Institute
AM	Ante Meridiem
APN	Assessor's Parcel Number
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
EPA	United States Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GSF	gross square foot
INCE	Institute of Noise Control Engineering
HVAC	heating, ventilation, and air conditioning
in/sec	inches per second
Ldn	average day/night sound level
Leq	equivalent sound level
Lmax	maximum noise level
Lmin	minimum noise level
Ln	exceedance level
MPH	miles per hour
PM	Post Meridiem
PPV	peak particle velocity
STC	sound transmission class
VdB	velocity decibels

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EXECUTIVE SUMMARY

The purpose of this Acoustical Assessment is to evaluate potential short- and long-term noise impacts resulting from implementation of the proposed East Campus Phase 4 Project ("project" or "proposed project") on the University of California, Irvine (UCI) campus. The project is located at the southeast corner of the Campus Drive and California Avenue intersection, on the UCI campus.

The project proposes two phases of construction (Phase 4a and Phase 4b) to develop two residential structures, a southern project site surface parking lot, and a northern project site parking structure with an associated maintenance shop. Phase 4a would demolish the existing 183-space Arroyo Vista 1 (AV-1) and 374-space California Temporary (CT) parking lots to construct an approximately 600,000-gross-square-foot (GSF) residential structure with a community center, recreational facilities, circulation, and open space on the north project site. The structure would contain approximately 1,500 beds within 425 student apartments including bedrooms, kitchens, bathrooms, and living room space. A five-story parking structure with 550 spaces and a maintenance shop would be constructed to the east of the residential facility and long-term bicycle parking facility.

On the south project site, the existing nursery would be removed to construct a 250-space surface parking lot in order to replace those demolished at the north project site and extend the existing Arroyo Drive to California Avenue. The 250 space surface parking lot and Arroyo Drive extension are optional elements of the project, but are included in this analysis.

Phase 4b would construct an approximately 400,000-GSF residential structure with 950 beds in 250 apartment units, a community center, circulation, and open space east of the Phase 4a parking structure on the north project site.

<u>Temporary Impacts</u>. Based upon the results of the analysis, noise from construction activities would not exceed the noise standards of the City of Irvine's *Municipal Code* at nearby residential uses with compliance with the recommended mitigation measures. Additionally, short-term vibration impacts from construction would be less than significant.

<u>Long-Term Impacts</u>. The analysis has concluded that implementation of the proposed project would result in less than significant impacts with regard to mobile noise sources from project operations. Less than significant impacts have been identified in regard to stationary sources.

1.0 INTRODUCTION

The purpose of this Acoustical Assessment is to evaluate potential short- and long-term noise impacts resulting from implementation of the proposed East Campus Phase 4 Project ("project" or "proposed project") on the University of California, Irvine (UCI) campus.

1.1 PROJECT LOCATION

The project site is located 1.5 miles south of Interstate 405 (I-405), and 1.4 miles north of State Route 73 (SR-73); refer to Exhibit 1, *Regional Vicinity* Locally, the project is located at the southeast corner of the Campus Drive and California Avenue intersection, on the UCI campus.

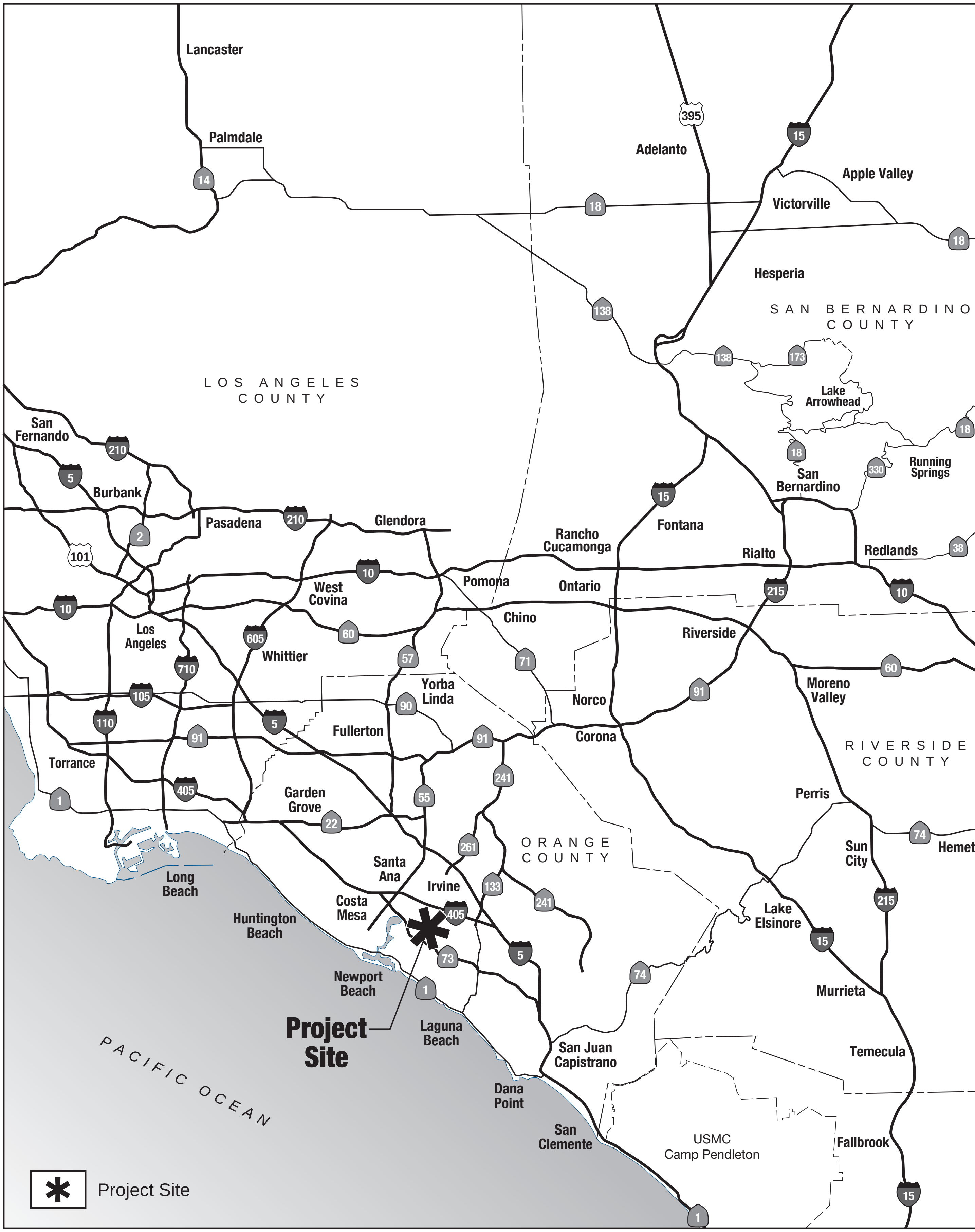
The north project site, which includes a portion of Phase 4a and all of Phase 4b, is located in the East Campus on the UCI campus. Off-campus residential, Cambridge Court, lies to the north across Campus Drive; open space and Vista del Campo Norte student housing lie to the east; Puerta del Sol student housing and the Early Childhood Education Center lie to the west across California Avenue; and Arroyo Vista student housing lies to the south across Arroyo Drive.

The south project site, which includes a portion of Phase 4a, is located directly south of the residential northern project site described above and within the East Campus. The Anteater Recreation Center and playfields lie to the north and northeast of the south project site, open space to the south and east, and Palo Verde student housing to the west across California Avenue; refer to Exhibit 2, *Site Vicinity*.

1.2 PROJECT DESCRIPTION

The project proposes two phases of construction (Phase 4a and Phase 4b) to develop two residential structures, a southern site surface parking lot, and a northern site parking structure with an associated maintenance shop. Phase 4a would demolish the existing 183-space AV-1 and 374-space CT parking lots to construct an approximately 600,000-gross-square-foot (GSF) residential structure with a community center, recreational facilities, circulation, and open space on the north project site. The structure would contain approximately 1,500 beds within 425 student apartments including bedrooms, kitchens, bathrooms, and living room space. A five-story parking structure with 550 spaces and a maintenance shop would be constructed to the east of the residential facility and long-term bicycle parking facility.

On the south project site, the existing nursery would be removed to construct a 250-space surface parking lot in order to replace those demolished at the north project site and extend the existing Arroyo Drive to a stop-controlled intersection at California Avenue. The 250 space parking lot and Arroyo Drive extension are optional elements of the project, but are included in this analysis. Phase 4b would construct an approximately 400,000-GSF residential structure with 950 beds in 250 apartment units, a community center, circulation, and open space east of the Phase 4a parking structure on the north project site; refer to Exhibit 3, *Conceptual Site Plan*.



0 5 11 miles
APPROXIMATE

03/07/17 JN 158401 mas

Michael Baker INTERNATIONAL

UCI EAST CAMPUS PHASE 4 PROJECT
ACOUSTICAL ASSESSMENT

Regional Vicinity

Exhibit 1

Source: Aerial - Google Earth Pro, March 2017

Michael Baker INTERNATIONAL

not to scale

03/07/17 JN 158401 mas

UCI EAST CAMPUS PHASE 4 PROJECT • ACOUSTICAL ASSESSMENT

Site Vicinity

Exhibit 2

Source: KTGY, January 2017

Michael Baker INTERNATIONAL

0 25 50 100

03/07/17 JN 158401 mas

UCI EAST CAMPUS PHASE 4 PROJECT • ACOUSTICAL ASSESSMENT

Conceptual Site Plan

Exhibit 3

2.0 DESCRIPTION OF NOISE METRICS

2.1 STANDARD UNIT OF MEASUREMENT

Sound is described in terms of the loudness (amplitude) of the sound and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by differentiating among frequencies in a manner approximating the sensitivity of the human ear.

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is perceived to be twice as loud and 20 dBA higher is perceived to be four times as loud, and so forth. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Examples of various sound levels in different environments are illustrated on Exhibit 4, *Common Environmental Noise Levels*.

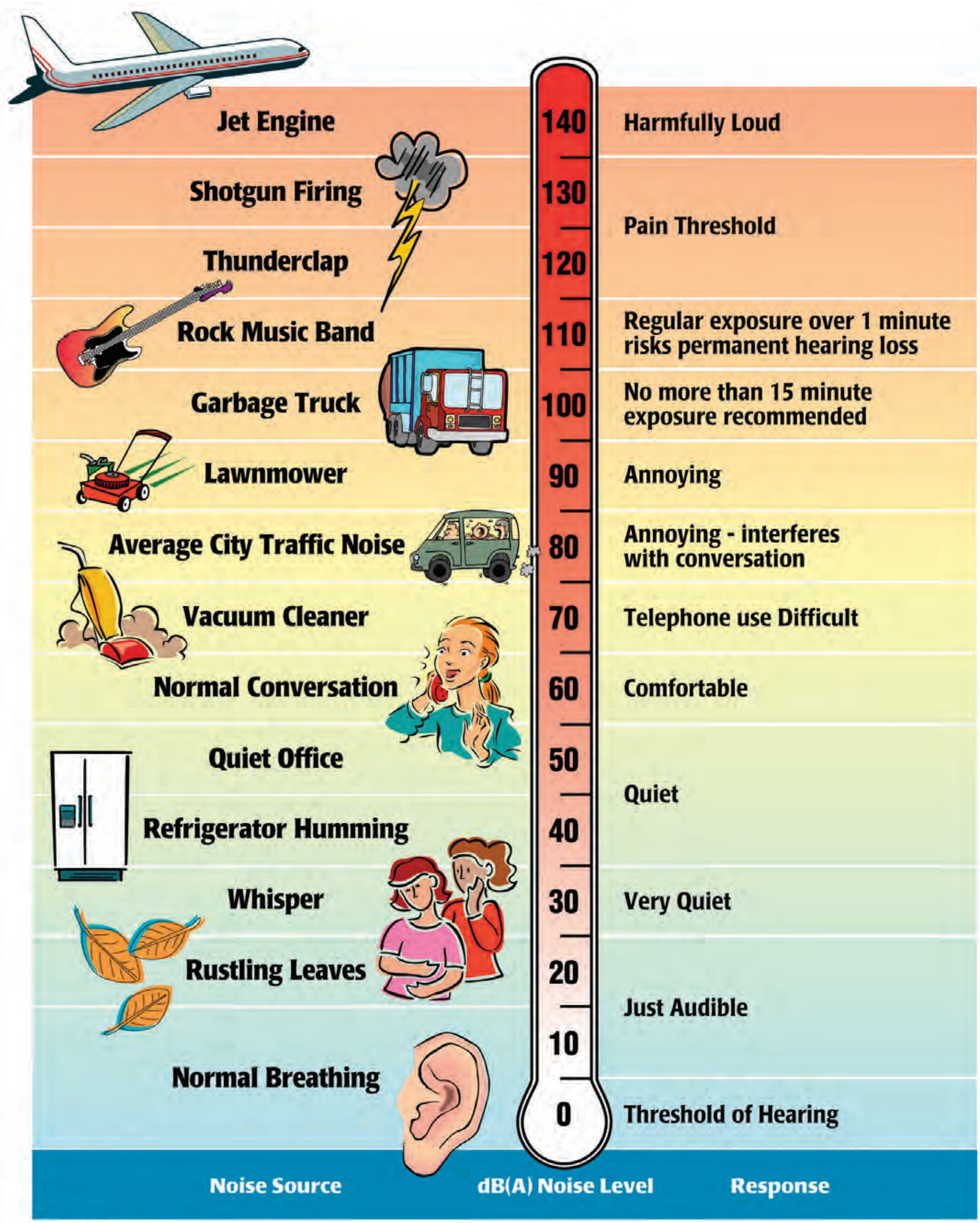
Many methods have been developed for evaluating community noise to account for, among other things:

- The variation of noise levels over time;
- The influence of periodic individual loud events; and
- The community response to changes in the community noise environment.

Table 1, *Noise Descriptors*, provides a listing of methods to measure sound over a period of time.

2.2 HEALTH EFFECTS OF NOISE

Human response to sound is highly individualized. Annoyance is the most common issue regarding community noise. The percentage of people claiming to be annoyed by noise generally increases with the environmental sound level. However, many factors also influence people's response to noise. The factors can include the character of the noise, the variability of the sound level, the presence of tones or impulses, and the time of day of the occurrence. Additionally, non-acoustical factors, such as the person's opinion of the noise source, the ability to adapt to the noise, the attitude towards the source and those associated with it, and the predictability of the noise, all influence people's response. As such, response to noise varies widely from one person to another and with any particular noise, individual responses would range from "not annoyed" to "highly annoyed."



Source:

Environmental Protection Agency, *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.

Table 1
Noise Descriptors

Term	Definition
Decibel (dB)	The unit for measuring the volume of sound equal to 10 times the logarithm (base 10) of the ratio of the pressure of a measured sound to a reference pressure (20 micropascals).
A-Weighted Decibel (dBA)	A sound measurement scale that adjusts the pressure of individual frequencies according to human sensitivities. The scale accounts for the fact that the region of highest sensitivity for the human ear is between 2,000 and 4,000 cycles per second (hertz).
Equivalent Sound Level (L_{eq})	The sound level containing the same total energy as a time varying signal over a given time period. The L_{eq} is the value that expresses the time averaged total energy of a fluctuating sound level.
Maximum Sound Level (L_{max})	The highest individual sound level (dBA) occurring over a given time period.
Minimum Sound Level (L_{min})	The lowest individual sound level (dBA) occurring over a given time period.
Community Noise Equivalent Level (CNEL)	A rating of community noise exposure to all sources of sound that differentiates between daytime, evening, and nighttime noise exposure. These adjustments are +5 dBA for the evening, 7:00 PM to 10:00 PM, and +10 dBA for the night, 10:00 PM to 7:00 AM.
Day/Night Average (L_{dn})	The L_{dn} is a measure of the 24-hour average noise level at a given location. It was adopted by the U.S. Environmental Protection Agency for developing criteria for the evaluation of community noise exposure. It is based on a measure of the average noise level over a given time period called the L_{eq}. The L_{dn} is calculated by averaging the L_{eq}'s for each hour of the day at a given location after penalizing the "sleeping hours" (defined as 10:00 PM to 7:00 AM) by 10 dBA to account for the increased sensitivity of people to noises that occur at night.
Exceedance Level (L_n)	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% (L_{01}, L_{10}, L_{50}, L_{90}, respectively) of the time during the measurement period.

Source: Cyril M. Harris, *Handbook of Noise Control*, 1979.

When the noise level of an activity rises above 70 dBA, the chance of receiving a complaint is possible, and as the noise level rises, dissatisfaction among the public steadily increases. However, an individual's reaction to a particular noise depends on many factors, such as the source of the sound, its loudness relative to the background noise, and the time of day. The reaction to noise can also be highly subjective; the perceived effect of a particular noise can vary widely among individuals in a community.

The effects of noise are often only transitory, but adverse effects can be cumulative with prolonged or repeated exposure. The effects of noise on the community can be organized into six broad categories:

- Noise-Induced Hearing Loss;
- Interference with Communication;
- Effects of Noise on Sleep;
- Effects on Performance and Behavior;
- Extra-Auditory Health Effects; and
- Annoyance.

Although it often causes discomfort and sometimes pain, noise-induced hearing loss usually takes years to develop. Noise-induced hearing loss can impair the quality of life through a reduction in the ability to hear important sounds and to communicate with family and friends. Hearing loss is one of the most obvious and easily quantified effects of excessive exposure to noise. While the loss may be temporary at first, it could become permanent after continued exposure. When combined with hearing loss associated with aging, the amount of hearing loss directly caused by the environment is difficult to quantify. Although the major cause of noise-induced hearing loss is occupational, substantial damage can be caused by non-occupational sources.

According to the United States Public Health Service, nearly ten million of the estimated 21 million Americans with hearing impairments owe their losses to noise exposure. Noise can mask important sounds and disrupt communication between individuals in a variety of settings. This process can cause anything from a slight irritation to a serious safety hazard, depending on the circumstance. Noise can disrupt face-to-face communication and telephone communication, and the enjoyment of music and television in the home. It can also disrupt effective communication between teachers and pupils in schools, and can cause fatigue and vocal strain in those who need to communicate in spite of the noise.

Interference with communication has proven to be one of the most important components of noise-related annoyance. Noise-induced sleep interference is one of the critical components of community annoyance. Sound level, frequency distribution, duration, repetition, and variability can make it difficult to fall asleep and may cause momentary shifts in the natural sleep pattern, or level of sleep. It can produce short-term adverse effects on mood changes and job performance, with the possibility of more serious effects on health if it continues over long periods. Noise can cause adverse effects on task performance and behavior at work, and non-occupational and social settings. These effects are the subject of some controversy, since the presence and degree of effects depends on a variety of intervening variables. Most research in this area has focused mainly on occupational settings, where noise levels must be sufficiently high and the task sufficiently complex for effects on performance to occur.

Recent research indicates that more moderate noise levels can produce disruptive after-effects, commonly manifested as a reduced tolerance for frustration, increased anxiety, decreased incidence of “helping” behavior, and increased incidence of “hostile” behavior. Noise has been implicated in the development or exacerbation of a variety of health problems, ranging from hypertension to psychosis. As with other categories, quantifying these effects is difficult due to the amount of variables that need to be considered in each situation. As a biological stressor, noise can influence the entire physiological system. Most effects seem to be transitory, but with continued exposure some effects have been shown to be chronic in laboratory animals.

Annoyance can be viewed as the expression of negative feelings resulting from interference with activities, as well as the disruption of one's peace of mind and the enjoyment of one's environment. Field evaluations of community annoyance are useful for predicting the consequences of planned actions involving highways, airports, road traffic, railroads, or other noise sources. The consequences of noise-induced annoyance are privately held dissatisfaction, publicly expressed complaints to authorities, and potential adverse health effects, as discussed above. In a study conducted by the United States Department of Transportation, the relationship between the effects of annoyance and the community were quantified. In areas where exterior noise levels were consistently above 60 dBA Community Noise Equivalent Level (CNEL), approximately nine percent of the community is highly annoyed. When levels exceed 65 dBA CNEL, that percentage rises to 15 percent. Although evidence for the various effects of noise have differing levels of certainty, it is clear that noise can affect human health. Most of the effects are, to a varying degree, stress related.

3.0 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Land uses deemed sensitive by the State of California (State) within the vicinity of the project site include schools. Many jurisdictions also consider single- and multi-family residential uses particularly noise-sensitive because families and individuals expect to use time in the home for rest and relaxation, and noise can interfere with those activities. Some jurisdictions may also identify other noise-sensitive uses such as churches. Land uses that are relatively insensitive to noise include office, commercial, and retail developments. There is a range of insensitive noise receptors that include uses that generate significant noise levels and that typically have a low level of human occupancy.

This noise analysis was conducted in accordance with Federal, State, and local criteria described in the following sections.

3.1 U.S. ENVIRONMENTAL PROTECTION AGENCY

The U.S. Environmental Protection Agency (EPA) offers guidelines for community noise exposure in the publication *Noise Effects Handbook – A Desk Reference to Health and Welfare Effects of Noise*. These guidelines consider occupational noise exposure as well as noise exposure in homes. The EPA recognizes an exterior noise level of 55 decibels day-night level (dB L_{dn}) as a general goal to protect the public from hearing loss, activity interference, sleep disturbance, and annoyance. The EPA and other Federal agencies have adopted suggested land use compatibility guidelines that indicate that residential noise exposures of 55 to 65 dB L_{dn} are acceptable. However, the EPA notes that these levels are not regulatory goals, but are levels defined by a negotiated scientific consensus, without concern for economic and technological feasibility or the needs and desires of any particular community.

3.2 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA) was enacted in 1970 and requires that all known environmental effects of a project be analyzed, including environmental noise impacts. Under CEQA, a project has a potentially significant impact if the project exposes people to noise levels in excess of standards established in the local general plan or noise ordinance. Additionally, under CEQA, a project has a potentially significant impact if the project creates a substantial increase in the ambient noise levels in the project vicinity above levels existing without the project. If a project has a potentially significant impact, mitigation measures must be considered. If mitigation measures to reduce the impact to less than significant are not feasible due to economic, social, environmental, legal, or other conditions, the most feasible mitigation measures must be considered.

3.3 CALIFORNIA GOVERNMENT CODE

California Government Code Section 65302 (f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services.

The guidelines rank noise land use compatibility in terms of "normally acceptable", "conditionally acceptable", "normally unacceptable", and "clearly unacceptable" noise levels for various land use types. Single-family homes are "normally acceptable" in exterior noise environments up to 60 CNEL and "conditionally acceptable" up to 70 CNEL. Multiple-family residential uses are "normally acceptable" up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

3.4 LOCAL JURISDICTION

Although UCI is not subject to municipal regulations, the City of Irvine's noise standards are relevant to UCI to establish guidelines and evaluating noise impacts. City regulations are relevant for addressing UCI development projects that would affect adjacent noise-sensitive land uses in the City of Irvine.

CITY OF IRVINE LAND USE COMPATIBILITY CRITERIA

Since the campus is located in the City of Irvine, the City's land use compatibility noise standards are relevant to UCI in establishing guidelines and evaluating impacts. UCI typically pursues consistency with local plans and policies where feasible. The *City of Irvine General Plan Noise Element* (Noise Element) sets forth general community noise and land use compatibility guidelines, as shown in Table 2, *City of Irvine Land Use Compatibility*. These guidelines are based primarily on noise/land use recommendations from a United States Department of Housing and Urban Development (HUD) document entitled *Planning Guidelines for Local Agencies*. Sound levels up to 65 dBA CNEL are normally compatible for single-family residential, transient lodging, and park uses. Sound levels up to 60 dBA CNEL are normally compatible for institutional uses such as hospitals, churches, libraries, and schools.

CITY OF IRVINE NOISE ORDINANCE

The City of Irvine Noise Ordinance (Noise Ordinance, Chapter 2 of the City's *Municipal Code*) regulates noise from construction. Section 6-8-205(A) indicates that construction activities may occur between 7:00 a.m. and 7:00 p.m. Mondays through Fridays, and 9:00 a.m. and 6:00 p.m. on Saturdays. No construction activities shall be permitted outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Chief Building Official or his or her authorized representative. Trucks, vehicles, and equipment that are making, or are involved with, material deliveries, loading, transfer of materials, equipment service, maintenance of any devices or appurtenances for (or within) any construction project in the City, shall not be operated or driven on City streets outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the City. Any waiver granted shall take into consideration the potential impact upon the community. No construction activity would be permitted outside of these hours, except in emergencies including maintenance work on the City rights-of-way that might be required.

Table 2
City of Irvine Land Use Compatibility

Land Use Category	Uses	Energy Average (CNEL)						
		≤	55	60	65	70	75	80 ≥
Residential	Single-Family, Multiple-Family	A	A	B	B	C	D	D
	Mobile Home	A	A	B	C	C	D	D
Commercial Regional Family	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
Commercial Regional Community	Commercial retail, Bank, Restaurant, Movie theater	A	A	A	A	B	B	C
Commercial Community Industrial & Institutional	Office building, Research & development Professional office, City office building	A	A	A	B	B	C	D
Commercial Recreation Institutional General	Amphitheater, Concert Hall, Auditorium, Meeting Hall	B	B	C	C	D	D	D
Commercial Recreation	Children's amusement park, Miniature golf, Go-cart track, Health club, Equestrian center	A	A	A	B	B	D	D
Commercial Community Industrial General	Automobile Service station, Auto dealer, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
Institutional General	Hospital, Church, Library, School classrooms	A	A	B	C	C	D	D
Open Space	Parks	A	A	A	B	C	D	D
	Golf courses, Nature centers, Cemeteries, Wildlife reserves, Wildlife habitat	A	A	A	A	B	C	C
Agricultural	Agriculture	A	A	A	A	A	A	A

Notes:
Zone A: Clearly Compatible: Specified land use is satisfactory based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
Zone B: Normally Compatible: New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.
Zone C: Normally Incompatible: New construction or development should normally be discouraged. If new construction or development does proceed, a detailed analysis or noise reduction requirements must be made and needed noise insulation features must be included in the design.
Zone D: Clearly Incompatible. New construction or development should generally not be undertaken.

Source: City of Irvine, *City of Irvine General Plan*, Supp. No. 9, July 2015.

The noise Ordinance also provides exterior and interior noise limit thresholds for certain periods of time. Table 3, *City of Irvine Noise Ordinance Limits*, presents noise standards published in Section 6-8-204 of the City's Noise Ordinance.

Table 3
City of Irvine Noise Ordinance Limits

Noise Zone	Exterior or Interior?	Time Period	Noise Levels (dBA) for a Period Not Exceeding				
			30 min	15 min	5 min	1 min	0 (anytime)
I: All hospitals, libraries, churches, schools, and residential properties	Exterior	7:00 a.m. – 10:00 p.m.	55	60	65[1]	70	75
		10:00 a.m. – 7:00 a.m.	50	55	60	65[1]	70
	Interior	7:00 a.m. – 10:00 p.m.	-	-	55	60	65
		10:00 a.m. – 7:00 a.m.	-	-	45	50	55
II: All professional office and public institutional properties.	Exterior	Any time	55	60	65	70	75
	Interior	Any time	-	-	55	60	65
III: All commercial properties excluding professional office properties.	Exterior	Any time	60	65	70	75	80
	Interior	Any time	-	-	55	60	65
IV: All industrial properties.	Exterior	Any time	70	75	80	85	90
	Interior	Any time	-	-	55	60	65

Notes:
1. This standard does not apply to multi-family residence private balconies. Multi-family developments with balconies that do not meet the 65 CNEL are required to provide occupancy disclosure notice to all future tenants regarding potential noise impacts.
2. It shall be unlawful for any person at any location within the City to create any noise or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person which causes the noise level when measured on any property within designated noise zones either within or without the City to exceed the applicable noise standard.
3. Each of the noise standards specified above shall be reduced by five dBA for impact, or predominant tone noise or for noises consisting of speech or music.
4. In the event that the noise source and the affected property are within different noise zones, the noise standards of the affected property shall apply.

Source: City of Irvine, *Municipal Code*, Title 6, Division 8, Chapter 2, Section 6-8-204.

4.0 EXISTING CONDITIONS

4.1 NOISE MEASUREMENTS

In order to quantify existing ambient noise levels in the project area, noise measurements were conducted on February 23, 2017; refer to Table 4, *Noise Measurements*. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the project site. Ten-minute measurements were taken, between 10:30 a.m. and 11:30 a.m., at each site during the day. Short-term (L_{eq}) measurements are considered representative of the noise levels in the project vicinity.

Table 4
Noise Measurements

Site No.	Location	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Peak (dBA)	Time
1	Approximately 38 feet west of California Avenue and 432 feet southwest of Arroyo Drive	57.2	43.9	77.4	90.0	10:46 a.m.
2	Approximately 644 feet east of California Avenue and 141 feet south of Campus Drive	56.8	45.0	67.8	89.5	11:08 a.m.
3	Approximately 468 feet west of Culver Drive and 204 feet south of Campus Drive	57.7	47.7	72.7	88.6	11:25 a.m.
Source: Michael Baker International, Inc., February 23, 2017.						

Meteorological conditions were clear skies, cool temperatures, with light wind speeds (0 to 12 miles per hour), and low humidity. Measured noise levels during the daytime measurements ranged from 56.8 to 57.7 dBA L_{eq}. Noise monitoring equipment used for the ambient noise survey consisted of a Larson Davis Hand-held Analyzer Model 820 equipped with a Model 2561 pre-polarized microphone. The monitoring equipment complies with applicable requirements of the American National Standards Institute (ANSI) for Type I (precision) sound level meters. The results of the field measurements are included in Appendix A, *Noise Measurement and Modeling Data*. Refer to Exhibit 5, *Noise Measurement Locations*, for the noise measurement sites.

4.2 SENSITIVE RECEPTORS

Certain land uses are particularly sensitive to noise, including schools, hospitals, rest homes, long-term medical and mental care facilities, and parks and recreation areas. Residential areas are also considered noise sensitive, especially during the nighttime hours. Existing sensitive receptors located in the project vicinity include residential uses, schools, hospitals, places of worship, parks, recreational areas, retirement homes, and rehabilitation centers. Sensitive receptors are listed in Table 5, *Sensitive Receptors*.

Source: Aerial - Google Earth Pro, March 2017

Michael Baker INTERNATIONAL

not to scale

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UCI EAST CAMPUS PHASE 4 PROJECT • ACOUSTICAL ASSESSMENT

Noise Measurement Locations

Exhibit 5

Table 5
Sensitive Receptors

Type	Name	Distance from Project Site (feet)[1]	Direction from Project Site	Location
Residential	Residential Uses	130 feet	North	North of Campus Drive
		117 feet	East	Southwest corner of Campus Drive and Culver Drive.
		110 feet	South	South of Arroyo Drive.
		330 feet	West	South of Campus Drive.
Schools	University High School	1,100 feet	Northeast	4771 Campus Drive
	Turtle Rock Elementary School	3,100 feet	Southeast	5151 Amalfi Drive
	Turtle Rock Preschool	3,050 feet	East	1 Concordia
	Montessori Schools of Irvine	3,250 feet	Southwest	101 Russell Place
	Tarbut V'Torah Community Day School	5,250 feet	South	5200 Bonita Canyon Drive
Places of Worship	Bethel Korean Church	4,600 feet	Northwest	18700 Harvard Avenue
	St. Elizabeth Ann Seton Church	2,260 feet	Northeast	9 Hillgate
	Good Shepherd Chapel	4,240 feet	Northeast	1530 Concordia
	Light of Christ Lutheran Church	4,740 feet	North	18182 Culver Drive
	University United Methodist Church	3,070 feet	North	18422 Culver Drive
Parks/Recreational Areas	William R Mason Regional Park	3,450 feet	Northwest	18712 University Drive
	University Community Park	4,300 feet	Northeast	1 Beech Tree Lane
	Aldrich Park	4,060 feet	Southwest	Near Ring Road
	Stanford Park	4,400 feet	Northwest	North of Campus Drive
	Anteater Recreation Center	1,360 feet	South	East of California Avenue

Note:
1. Distances are measured from the exterior project boundary only and not from individual construction areas within the interior of the project site.

Source: Google Earth, 2017.

4.3 EXISTING NOISE LEVELS

MOBILE SOURCES

The majority of the existing noise in the project area is generated from vehicles traveling along Campus Drive, California Avenue, and Culver Drive. Noise models were run using the Federal Highway Administration's Highway Noise Prediction Model (FHWA RD-77-108) together with several roadway and site parameters. These parameters determine the projected impact of vehicular traffic noise and include the roadway cross-section (such as the number of lanes), roadway width, average daily traffic (ADT), vehicle travel speed, percentages of auto and truck traffic, roadway grade, angle-of-view, and site conditions ("hard" or "soft"). The model does not account for ambient noise levels (i.e., noise from adjacent land uses) or topographical differences between the roadway and adjacent land uses. Noise projections are based on modeled vehicular average daily traffic (ADT) estimates derived from the UCI East *Campus Student Apartments Phase 4 Traffic Study* (*Traffic Study*), prepared by Stantec Consulting Services, dated March 1, 2017. Table 6, *Existing Traffic Noise Levels*, depict the existing traffic noise levels in the vicinity of the project site. A 25- to 50-mile per hour (mph) average vehicle speed was assumed for existing conditions based on empirical observations and posted maximum speeds along the adjacent roadways. The ADT estimates were obtained from the project's *Traffic Study*; refer to Appendix A. As shown in Table 6, noise within the area from mobile noise ranges from 55.4 dBA to 68.9 dBA.

Table 6
Existing Traffic Noise Levels

Roadway Segment	Existing Conditions				
	ADT	dBA @ 100 Feet from Roadway Segment	60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Campus Drive					
California Avenue to Culver Drive	15,200	65.7	473	150	47
California Avenue					
Campus Drive to Arroyo Drive	13,300	64.0	312	99	31
Culver Drive					
Campus Drive to Vista del Campo Road	23,400	68.9	944	299	94
Arroyo Drive					
California Avenue to Project Access	8,300	57.8	71	23	7
Vista del Campo Road					
Arroyo Drive to Culver Drive	3,300	55.4	41	13	4
Note: Distances are measured from the exterior project boundary only and not from individual construction areas within the interior of the project site.					

STATIONARY SOURCES

The primary sources of stationary noise in the project vicinity are those associated with the operations of adjacent residential uses to the north, east, and south, and commercial uses to the west and northwest. The noise associated with these sources may represent a single-event noise occurrence, short-term, or long-term/continuous noise.

5.0 POTENTIAL ACOUSTICAL IMPACTS

CEQA THRESHOLDS

Appendix G of the State *CEQA Guidelines* contains analysis guidelines related to the assessment of noise impacts. These guidelines have been used to develop thresholds of significance for this analysis. As stated in Appendix G, a project would create a significant environmental impact if it would:

- Expose persons to, or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (refer to Impact Statement NOI-1);

- Expose persons to or generate excessive ground borne vibration or ground borne noise levels (refer to Impact Statement NOI-2);

- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project (refer to Impact Statement NOI-1);

- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project (refer to Impact Statement NOI-1);

- 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, expose people residing or working in the project area to excessive noise levels (refer to Impact Statement NOI-3); and

- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels (refer to Impact Statement NOI-3).

Based on these standards and thresholds, the effects of the proposed project have been categorized as either a "less than significant impact" or a "potentially significant impact." Mitigation measures are provided for all potentially significant impacts.

SIGNIFICANCE OF CHANGES IN TRAFFIC NOISE LEVELS

An off-site traffic noise impact typically occurs when there is a discernable increase in traffic and the resulting noise level exceeds an established noise standard. In community noise considerations, changes in noise levels greater than 3 dB are often identified as substantial, while changes less than 1 dB will not be discernible to local residents. In the range of 1 to 3 dB, residents who are very sensitive to noise may perceive a slight change. In laboratory testing situations, humans are able to detect noise level changes of slightly less than 1 dB. However, this is based on a direct, immediate comparison of two sound levels. Community noise exposures occur over a long period of time and changes in noise levels occur over years (rather than the immediate comparison made in a laboratory situation). Therefore, the level at which changes in community noise levels become discernible is likely to be some value greater than 1 dB, and 3 dB is the most commonly accepted discernable difference. A 5 dB change is generally recognized as a clearly discernable difference.

As traffic noise levels at sensitive uses likely approach or exceed the applicable land use compatibility standard (refer to Table 2), a 3 dB increase as a result of the project is used as the increase threshold for the project. Thus, a project would result in a significant noise impact when a permanent increase in ambient noise levels of 3 dB occur upon project implementation and the resulting noise level exceeds the applicable exterior standard at a noise sensitive use.

NOI-1

- ***EXPOSE PERSONS TO, OR GENERATE NOISE LEVELS IN EXCESS OF STANDARDS ESTABLISHED IN THE LOCAL GENERAL PLAN OR NOISE ORDINANCE, OR APPLICABLE STANDARDS OF OTHER AGENCIES?***

- ***A SUBSTANTIAL PERMANENT INCREASE IN AMBIENT NOISE LEVELS IN THE PROJECT VICINITY ABOVE LEVELS EXISTING WITHOUT THE PROJECT?***

- ***A SUBSTANTIAL TEMPORARY OR PERIODIC INCREASE IN AMBIENT NOISE LEVELS IN THE PROJECT VICINITY ABOVE LEVELS EXISTING WITHOUT THE PROJECT?***

Level of Significance Before Mitigation: *Potentially Significant Impact.*

SHORT-TERM CONSTRUCTION

Construction Phase 4A proposes to develop a 600,000 GSF residential structure; a northern site 550-space parking structure and adjoining maintenance shop; and a southern site 250-space surface parking lot with an adjoining Arroyo Drive roadway extension. Phase 4B of construction would consist of the development of a 400,000 GSF residential structure. Construction activities would include site preparation, grading, paving, building construction, and architectural coating. Ground-borne noise and other types of construction-related noise impacts would typically occur during excavation activities of the grading phase. This phase of construction has the potential to create the highest levels of noise. Typical noise levels generated by construction equipment are shown in Table 7, *Maximum Noise Levels Generated by Construction Equipment*. It should be noted that the noise levels identified in Table 7 are maximum sound levels (L_{max}), which are the highest individual sound occurring at an individual time period. Operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be due to random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts).

Table 7
Maximum Noise Levels Generated by Construction Equipment

Type of Equipment	Acoustical Use Factor[1]	L_{max} at 50 Feet (dBA)
Concrete Saw	20	90
Crane	16	81
Concrete Mixer Truck	40	79
Backhoe	40	78
Dozer	40	82
Excavator	40	81
Forklift	40	78
Paver	50	77
Roller	20	80
Tractor	40	84
Water Truck	40	80
Grader	40	85
General Industrial Equipment	50	85

Note:
1. Acoustical Use Factor (percent): Estimates the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

Source: Federal Highway Administration, *Roadway Construction Noise Model (FHWA-HEP-05-054)*, January 2006.

Pursuant to *Municipal Code* Section 6-8-205(A), construction activities may occur between the hours of 7:00 a.m. and 7:00 p.m. on weekdays, and 9:00 a.m. and 6:00 p.m. on Saturdays. No construction activities shall be permitted outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Chief Building Official or his or her authorized representative. These permitted hours of construction are included in the code in recognition that construction activities undertaken during daytime hours are a typical part of living in an urban environment and do not cause a significant disruption. It should be noted that the noise levels depicted in Table 7 are maximum noise levels, which would occur sporadically when construction equipment is operated in proximity to sensitive receptors. With implementation of time limits specified in the City's Noise Ordinance, noise impacts would be reduced to a less than significant level. Additionally, to further reduce the potential for nuisance noise impacts, Mitigation Measure NOI-1 would be implemented to incorporate best management practices during construction and to ensure nuisances do not occur. Implementation of Mitigation Measure NOI-1 would further minimize impacts from construction noise as it requires construction equipment to be equipped with properly operating and maintained mufflers and other state required noise attenuation devices. Thus, with mitigation, a less than significant noise impact would result from construction activities.

LONG-TERM OPERATIONAL IMPACTS

Off-Site Mobile Noise

Existing Plus Project Conditions

Future development generated by the proposed project would result in additional traffic on adjacent roadways, thereby increasing vehicular noise in the vicinity of existing and proposed land uses. Based on the *Traffic Study*, the proposed project would result in approximately 2,310 daily trips. The "Existing Without Project" and "Existing Plus Project" scenarios are compared in Table 8, *Existing Plus Project Traffic Noise Levels*. As depicted in Table 8, under the "Existing Without Project" scenario, noise levels would range from approximately 55.4 dBA to 68.9 dBA, with the highest noise levels occurring along Culver Drive (between Campus Drive and Vista del Campo Road). The "Existing Plus Project" scenario noise levels would range from approximately 55.9 dBA to 68.9 dBA with the highest noise levels also occurring along Culver Drive (between Campus Drive and Vista del Campo Road). The noise levels would result in a maximum increase of 0.9 dBA as a result of the proposed project. This increase would occur along Arroyo Drive (California Avenue to Project Access).

Table 8
Existing Plus Project Traffic Noise Levels

Roadway Segment	Existing Without Project					Existing Plus Project					Difference In dBA @ 100 Feet from Roadway
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour	
Campus Drive											
California Avenue to Culver Drive	15,200	65.7	473	150	47	15,700	65.8	488	154	49	0.1
California Avenue											
Campus Drive to Arroyo Drive	13,300	64.0	312	99	31	14,600	64.4	342	108	34	0.4
Culver Drive											
Campus Drive to Vista del Campo Road	23,400	68.9	944	299	94	23,400	68.9	944	299	94	0.0
Arroyo Drive											
California Avenue to Project Access	8,300	57.8	71	23	7	10,200	58.7	88	28	9	0.9
Vista del Campo Road											
Arroyo Drive to Culver Drive	3,300	55.4	41	13	4	3,700	55.9	46	14	5	0.5

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level

Source: Noise modeling is based on traffic data within the *UCI East Campus Student Apartments Phase 4 Traffic Study*, prepared by Stantec Consulting Services, Inc. (March 2017).

It is noted that traffic noise levels would exceed the State of California "normally acceptable" limit of 65 dBA for multi-family residential land uses along Culver Drive and Campus Drive. However, under Existing Plus Project conditions, traffic noise along these roadways would also exceed 65 dBA under existing conditions, and the project's contribution to traffic noise levels would not be perceivable (i.e., increases would be less than 3 dB). Therefore, the proposed project would not significantly increase noise levels along the roadway segments analyzed, and a less than significant impact would occur.

Year 2035 With Project Conditions

The "Year 2035 Without Project" and "Year 2035 With Project" scenarios are compared in Table 9, *Year 2035 Project Traffic Noise Levels*. As depicted in Table 9, under the "Year 2035 Without Project" scenario, noise levels would range from approximately 58.0 dBA to 69.2 dBA, with the highest noise levels occurring along Culver Drive (between Campus Drive and Vista del Campo Road). The "Year 2035 With Project" scenario noise levels would range from approximately 58.3 dBA to 69.2 dBA with the highest noise levels also occurring along Culver Drive (between Campus Drive and Vista del Campo Road). The noise levels would result in a maximum increase of 0.8 dBA as a result of the proposed project. This increase in noise would occur along Arroyo Drive (between California Avenue and Project Access). Since the proposed project would not significantly increase noise levels along the roadway segments analyzed, a less than significant impact would occur.

Table 9
Year 2035 Project Traffic Noise Levels

Roadway Segment	Year 2035 Without Project					Year 2035 With Project					Difference In dBA @ 100 Feet from Roadway
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet) 60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet) 60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour	
Campus Drive											
California Avenue to Culver Drive	18,000	66.4	559	177	56	18,500	66.6	575	182	58	0.2
California Avenue											
Campus Drive to Arroyo Drive	20,000	65.7	468	148	47	21,300	66.0	500	158	50	0.3
Culver Drive											
Campus Drive to Vista del Campo Road	25,000	69.2	1,009	319	101	25,000	69.2	1,009	319	101	0.0
Arroyo Drive											
California Avenue to Project Access	9,000	58.2	77	24	8	10,900	59.0	94	30	9	0.8
Vista del Campo Road											
Arroyo Drive to Culver Drive	6,000	58.0	74	23	7	6,400	58.3	79	25	8	0.3

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level

Source: Noise modeling is based on traffic data within the *UCI East Campus Student Apartments Phase 4 Traffic Study*, prepared by Stantec Consulting Services, Inc. (March 2017).

Cumulative Mobile Source Impacts

A project's contribution to a cumulative traffic noise increase would be considered significant when the combined effect exceeds perception level (i.e., auditory level increase) threshold. The combined effect compares the "cumulative with project" condition to "existing" conditions. This comparison accounts for the traffic noise increase generated by a project combined with the traffic noise increase generated by projects in the cumulative project list. The following criteria have been utilized to evaluate the combined effect of the cumulative noise increase.

Combined Effect. The cumulative with project noise level ("Year 2035 With Project") would cause a significant cumulative impact if a 3.0 dB increase over existing conditions occurs and the resulting noise level exceeds the applicable exterior standard at a sensitive use.

Although there may be a significant noise increase due to the proposed project in combination with other related projects (combined effects), it must also be demonstrated that the project has an incremental effect. In other words, a significant portion of the noise increase must be due to the proposed project. The following criteria have been utilized to evaluate the incremental effect of the cumulative noise increase.

Incremental Effects. The "Year 2035 With Project" causes a 1.0 dBA increase in noise over the "Future Without Project" noise level.

A significant impact would result only if both the combined and incremental effects criteria have been exceeded. Noise by definition is a localized phenomenon, and reduces as distance from the source increases. Consequently, only the proposed project and growth due to occur in the project site's general vicinity would contribute to cumulative noise impacts. Table 10, *Cumulative Noise Scenario*, lists the traffic noise effects along roadway segments in the project vicinity for "Existing," "Year 2035 Without Project," and "Year 2035 With Project," conditions, including incremental and net cumulative impacts.

Table 10
Cumulative Noise Scenario

Roadway Segment	Existing	Future Without Project	Future With Project	Combined Effects	Incremental Effects	Cumulatively Significant Impact?
	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	Difference in dBA Between Existing and Future With Project	Difference in dBA Between Future Without Project and Future With Project	
Campus Drive						
California Avenue to Culver Drive	65.7	66.4	66.6	0.9	0.2	No
California Avenue						
Campus Drive to Arroyo Drive	64.0	65.7	66.0	2.0	0.3	No
Culver Drive						
Campus Drive to Vista del Campo Road	68.9	69.2	69.2	0.3	0.0	No
Arroyo Drive						
California Avenue to Project Access	57.8	58.2	59.0	1.2	0.8	No
Vista del Campo Road						
Arroyo Drive to Culver Drive	55.4	58.0	58.3	2.9	0.3	No
Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level						
Source: Noise modeling is based on traffic data within the *UCI East Campus Student Apartments Phase 4 Traffic Study*, prepared by Stantec Consulting Services, Inc. (March 2017).						

As indicated in Table 10, the *Combined Effects* and *Incremental Effects* are not exceeded, separately or jointly, along any roadway segments. As such, none of the roadway segments would exceed both the *Incremental Effects* and *Combined Effects* criteria; thus, none of the roadway segments would be significantly impacted. Therefore, the proposed project, in combination with cumulative background traffic noise levels, would result in less than significant impacts.

On-Site Impacts from Roadway Noise

The proposed project includes the construction of two residential structures for campus housing approximately 100 feet from the Campus Drive centerline and 85 fee from the California Avenue centerline. Based on the modeled noise levels in Table 9, the loudest exterior noise levels would be approximately 66.6 dBA at 100 feet from the centerline of Campus Drive and 66.0 dBA at 100 feet from the centerline of California Avenue, which would exceed the state's noise standards of 65 dBA CNEL (multi-family campus housing, dormitories, lodging). It was previously determined in the UCI *2007 Long Range Development Flan Final Environmental Impact Report* (2007 LRPD EIR, prepared by ATKINS, November 2007) that future residents would be exposed to noise levels above the state noise standards at buildout of the LRDP. Thus, the project would be required to utilize window treatments (minimum Sound Transmission Class rating of 32) to attenuate interior traffic noise levels to below 45 dBA CNEL in compliance with LRDP EIR Mitigation Measure Noi-1A; refer to Mitigation Measure NOI-2. It is noted that exterior areas of frequent human use are set back further from the roadways and would not be within the 65 dBA noise contour. As such, traffic noise would not create an impact at the project site. A less than significant impact would occur in this regard.

STATIONARY NOISE IMPACTS

Mechanical Equipment

The primary stationary noise source associated with the proposed residential development would be heating, ventilation, and air conditioning (HVAC) units. HVAC units would be positioned on or adjacent to the proposed structures. HVAC systems typically result in noise levels that average between 40 and 50 dBA Leq at 50 feet from the equipment. Based on the building location and proposed setbacks the HVAC units would be located more than 100 feet from any sensitive receptor. At this distance, noise levels form HVAC units would be approximately 44 dBA, which is below the State of California "normally acceptable" limit of 65 dBA for multi-family residential land uses, and 60 dBA for single-family residential uses. Therefore, noise from the HVAC units would not be perceptible from adjoining residences on the project site. Impacts from mechanical equipment would be less than significant.

Mitigation Measures:

NOI-1 The Project Applicant and/or Contractor shall implement the following noise-attenuating measures during construction of the proposed project:

- Construction contracts specify that all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers and other state required noise attenuation devices.

- Construction noise reduction methods shall be used where feasible. These reduction methods include shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources, maximizing the distance between construction equipment staging areas and occupied residential areas, and electric air compressors and similar power tools.

- Construction haul routes shall be designed to avoid noise sensitive uses (e.g., residences, convalescent homes, etc.), to the extent feasible.

- During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers.

- Construction activities shall not take place outside of the allowable hours specified by the City's *Municipal Code* Section 6-8-205(A) (7:00 a.m. and 7:00 p.m. on weekdays, and 9:00 a.m. and 6:00 p.m. on Saturdays; construction activities are not permitted on Sundays or legal holidays).

(Mitigation Measure NOI-1 correlates with Mitigation Measure Noi-2A in the 2007 LRDP EIR. This mitigation measure includes updates specific to the proposed project and to reflect the latest practices and recommendations).

NOI-2 During project plan review and prior to construction, UCI shall ensure that the project design includes the following project design features:

i. Specific window treatments, such as dual glazing (a minimum Sound Transmission Class rating of 32) and mechanical ventilation shall be utilized in residential units immediately along California Avenue and Campus Drive.

(Mitigation Measure NOI-2 correlates with Mitigation Measure Noi-1A in the 2007 LRDP EIR. This mitigation measure includes updates specific to the proposed project and to reflect the latest practices and recommendations).

Level of Significance After Mitigation: *Less Than Significant Impact.*

NOI-2 EXPOSURE OF PERSONS TO OR GENERATION OF EXCESSIVE GROUNDBORNE VIBRATION OR GROUNDBORNE NOISE LEVELS?

Level of Significance Before Mitigation: *Less Than Significant Impact.*

SHORT-TERM CONSTRUCTION

Project construction can generate varying degrees of groundborne vibration, depending on the construction procedure and the construction equipment used. Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Groundborne vibrations from construction activities rarely reach levels that damage structures.

The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations. In general, the FTA architectural damage criterion for continuous vibrations (i.e., 0.2 inch/second) appears to be conservative. The types of construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. For example, for a building that is constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.20 inch per second (in/sec) is considered safe and would not result in any construction vibration damage. The vibration produced by construction equipment, is illustrated in Table 11, *Typical Vibration Levels for Construction Equipment*.

Groundborne vibration decreases rapidly with distance. As indicated in Table 11, based on the Federal Transit Administration (FTA) data, vibration velocities from typical heavy construction equipment operation that would be used during project construction range from 0.003 to 0.089 in/sec peak particle velocity (PPV) at 25 feet from the source of activity. The closest sensitive receptors would be located approximately 110 feet south of the project site. At this distance, vibration velocities from construction equipment would not exceed 0.010 in/sec PPV, which is below the FTA's 0.20 PPV threshold. Therefore, vibration impacts associated with the proposed project would be less than significant.

Table 11
Typical Vibration Levels for Construction Equipment

Equipment	Approximate peak particle velocity at 25 feet (inches/second)[1]	Approximate peak particle velocity at 110 feet (inches/second)[2]
Large bulldozer	0.089	0.010
Loaded trucks	0.076	0.008
Small bulldozer	0.003	0.000

Notes:
1 – Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Guidelines*, May 2006. Table 12-2.
2 – Calculated using the following formula:

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

where: PPV (equip) = the peak particle velocity in in/sec of the equipment adjusted for the distance
PPV (ref) = the reference vibration level in in/sec from Table 12-2 of the FTA *Transit Noise and Vibration Impact Assessment Guidelines*
D = the distance from the equipment to the receiver

LONG-TERM OPERATIONAL IMPACTS

The project proposes two residential structures that would not generate ground-borne vibration that could be felt at surrounding uses. The proposed project would not involve railroads or substantial heavy truck operations, and therefore would not result in vibration impacts at surrounding uses. No impact would occur in this regard.

***Mitigation Measures*:** No mitigation measures are required.

Level of Significance After Mitigation: *No Impact.*

NOI-3

- ***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, EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS?***

- ***FOR A PROJECT WITHIN THE VICINITY OF A PRIVATE AIRSTRIP, EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS?***

Level of Significance Before Mitigation: *Less Than Significant.*

According to the *Land Use Plan for John Wayne Airport*, the project is not located within any impact zone(s), and is outside the 60 dBA CNEL contour.[1] As such, the project would not be exposed to noise levels that would exceed the State of California "normally acceptable" limit of 65 dBA for multi-family residential land uses. A less than significant impact would occur in this regard.

***Mitigation Measures*:** No mitigation measures are required.

Level of Significance After Mitigation: *Less Than Significant.*

1 Airport Land Use Commission, *Land Use Plan for John Wayne Airport*, April 17, 2008.

6.0 REFERENCES

6.1 LIST OF PREPARERS

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Eddie Torres, INCE, Environmental Sciences Manager
Achilles Malisos, Manager of Air and Noise Studies
Danielle Regimbal, Environmental Analyst
Faye Stroud, Graphics

6.2 DOCUMENTS

1. ATKINS, *University of California, Irvine, 2007 Long Range Development Plan Environmental Impact Report*, November 2007.

2. California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol,* September 2013.

3. City of Irvine, *City of Irvine General Plan*, Supp. No. 9, July 2015.

4. City of Irvine, *Municipal Code*, codified through Ordinance No. 15-02, adopted April 28, 2015.

5. City of Irvine, *CEQA Manual*, May 2012.

6. Federal Highway Administration, *Effective Noise Control During Nighttime Construction*, https://ops.fhwa.dot.gov/wz/workshops/accessible/Schexnayder_paper.htm, accessed March 8, 2017.

7. Federal Highway Administration, *Roadway Construction Noise Model (FHWA-HEP-05-054),* January 2006.

8. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Guidelines*, May 2006.

9. Harris, Cyril, *Handbook of Noise Control,* 1979.

10. KTGY, *UCI Phase 4 Conceptual Design Site Plan Study*, January 27, 2017.

11. Office of Planning and Research, California, *General Plan Guidelines*, October 2003.

12. Stantec Consulting Services, *UCI East Campus Student Apartments Phase 4 Traffic Study*, March 2017.

13. State of California, Governor's Office of Planning and Research, *General Plan Guidelines,* October 2003.

14. University of California, Irvine, *2007 Long Range Development Plan*, November 2007.

15. U.S. Department of Housing and Urban Development, *The Noise Guidebook*, March 2009.

16. U.S. Environmental Protection Agency, *Noise Effects Handbook – A Desk Reference to Health and Welfare Effects of Noise*, October 1979 (revised July 1981).

17. U.S. Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, November 1979.

6.3 SOFTWARE/WEBSITES

Federal High Administration, *Highway Traffic Noise Prediction Model (FHWA-RD-77-108)*.

Google Earth, 2017.

APPENDIX A: NOISE MEASUREMENT AND MODELING DATA

NOISE MEASUREMENT DATA

Site Number: 1
Recorded By: Jessica Ditto
Job Number: 158401
Date: 2/23/17
Time: 10:46 AM
Location: Approximately 38 feet west of California Ave. & 432 feet southwest of Arroyo Drive
Source of Peak Noise: Traffic along California Ave.

Noise Data			
Leq (dB)	Lmin (dB)	Lmax (dB)	Peak (dB)
57.2	43.9	77.4	90.0

Equipment						
Category	Type	Vendor	Model	Serial No.	Cert. Date	Note
Sound	Sound Level Meter	Larson Davis	820	1428	1/4/2016	
	Microphone	Larson Davis	2561	1012	1/4/2016	
	Preamp	Larson Davis	PRM828	2533	1/4/2016	
	Calibrator	Larson Davis	CA250	0216	1/4/2016	

Weather Data			
Est.	Duration: 10 minutes		Sky: Clear
	Note: dBA Offset = 0.00		Sensor Height (ft): 5 ft
	Wind Ave Speed (mph / m/s)	Temperature (degrees Fahrenheit)	Barometer Pressure (in)
	<5	57°	30.08 in

Photo of Measurement Location

Site Number: 2
Recorded By: Danielle Regimbal
Job Number: 158401
Date: 2/23/17
Time: 11:08 AM
Location: Approximately 644 feet east of California Ave. & 141 feet south of Campus Drive
Source of Peak Noise: Traffic along Arroyo Drive. Street cleaner truck in parking lot.

Noise Data			
Leq (dB)	Lmin (dB)	Lmax (dB)	Peak (dB)
56.8	45.0	67.8	89.5

Equipment						
Category	Type	Vendor	Model	Serial No.	Cert. Date	Note
Sound	Sound Level Meter	Larson Davis	820	1428	1/4/2016	
	Microphone	Larson Davis	2561	1012	1/4/2016	
	Preamp	Larson Davis	PRM828	2533	1/4/2016	
	Calibrator	Larson Davis	CA250	0216	1/4/2016	

Weather Data			
Est.	Duration: 10 minutes		Sky: Clear
	Note: dBA Offset = 0.00		Sensor Height (ft): 5 ft
	Wind Ave Speed (mph / m/s)	Temperature (degrees Fahrenheit)	Barometer Pressure (in)
	<5	57°	30.08 in

Photo of Measurement Location

Site Number: 3			
Recorded By: Danielle Regimbal			
Job Number: 158401			
Date: 2/23/17			
Time: 11:25 AM			
Location: Approximately 468 feet west of Culver Drive & 204 feet south of Campus Drive			
Source of Peak Noise: Traffic along Campus Drive & parking lot traffic			
Noise Data			
Leq (dB)	Lmin (dB)	Lmax (dB)	Peak (dB)
57.7	47.7	72.7	88.6

Equipment						
Category	Type	Vendor	Model	Serial No.	Cert. Date	Note
Sound	Sound Level Meter	Larson Davis	820	1428	1/4/2016	
	Microphone	Larson Davis	2561	1012	1/4/2016	
	Preamp	Larson Davis	PRM828	2533	1/4/2016	
	Calibrator	Larson Davis	CA250	0216	1/4/2016	

Weather Data			
Est.	Duration: 10 minutes		Sky: Clear
	Note: dBA Offset = 0.00		Sensor Height (ft): 5 ft
	Wind Ave Speed (mph / m/s)	Temperature (degrees Fahrenheit)	Barometer Pressure (in)
	<5	57°	30.08 in

Photo of Measurement Location

NOISE MODELING DATA

Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Existing
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	Campus Drive		
Road Segment:	California Avenue to Culver Drive		

PROJECT DATA

Centerline Dist to Barrier			**0**
Barrier (0=wall, 1= berm):			**0**
Receiver Barrier Dist:			**0**
Centerline Dist. To Observer:			**100**
Barrier Near Lane CL Dist:			**0**
Barrier Far lane CL Dist:			**0**
Pad Elevation:			**0.5**
Road Elevation:			**0**
Observer Height (above grade):			**0**
Barrier Height:			**0**
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	15,200
Peak Hour Traffic:	**1520**
Vehicle Speed:	45
Centerline Separation:	62

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

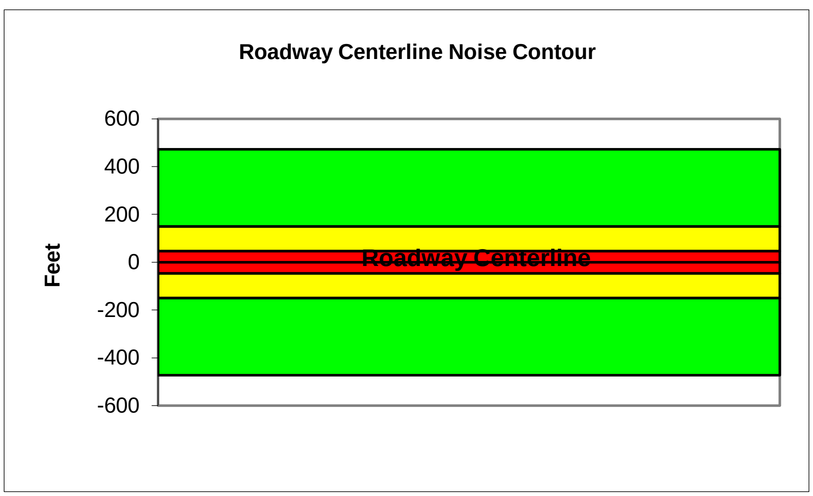
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	54.4	63.2	61.4	55.3	64.0	64.6
Medium Trucks:	62.7	54.6	48.2	46.7	55.1	55.4
Heavy Trucks:	67.2	55.3	46.2	47.4	57.0	57.1
Vehicle Noise:	**69.5**	**64.5**	**61.8**	**56.6**	**65.2**	**65.7**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	473
65 dBA	150
70 dBA	47
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Existing
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	California Avenue		
Road Segment:	Campus Drive to Arroyo Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	13,300
Peak Hour Traffic:	**1330**
Vehicle Speed:	40
Centerline Separation:	56

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

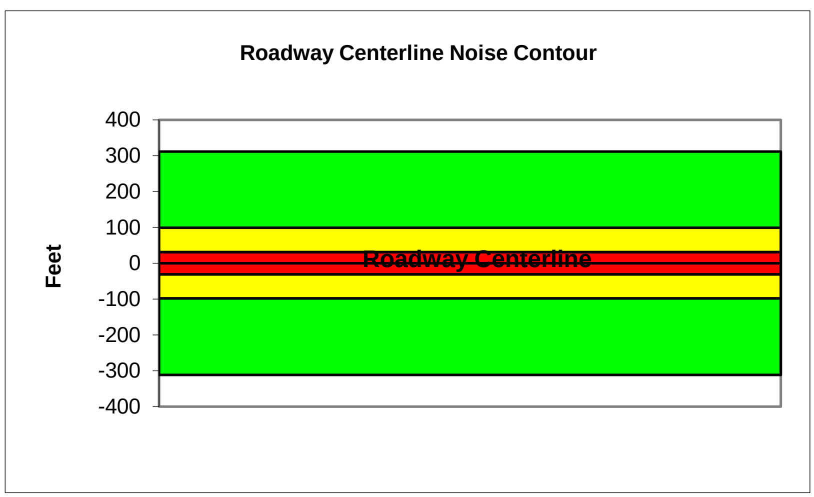
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	52.4	61.2	59.4	53.3	62.0	62.6
Medium Trucks:	61.4	53.3	46.9	45.4	53.8	54.1
Heavy Trucks:	66.2	54.3	45.2	46.5	56.2	56.3
Vehicle Noise:	**68.6**	**62.8**	**59.9**	**54.9**	**63.5**	**64.0**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	312
65 dBA	99
70 dBA	31
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Existing
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	Culver Drive		
Road Segment:	Campus Drive to Vista del Campo Road		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	23,400
Peak Hour Traffic:	**2340**
Vehicle Speed:	50
Centerline Separation:	50

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

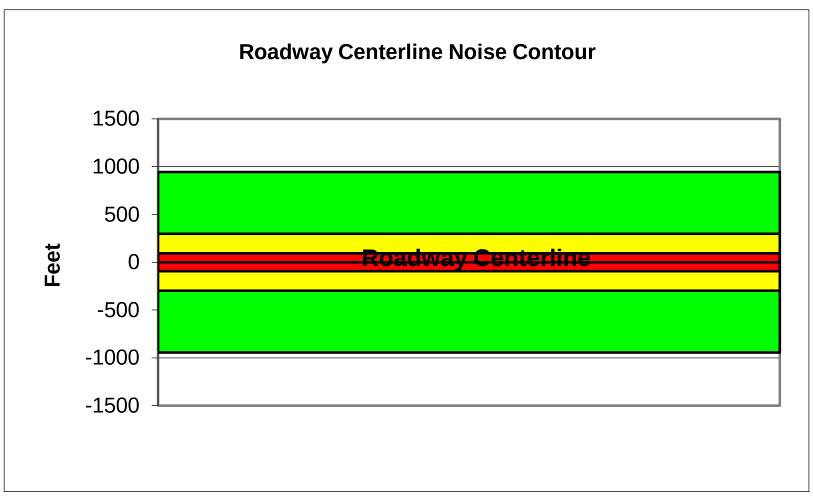
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.8	66.5	64.7	58.7	67.3	67.9
Medium Trucks:	65.4	57.4	51.0	49.4	57.9	58.1
Heavy Trucks:	69.7	57.7	48.7	49.9	59.3	59.4
Vehicle Noise:	**72.0**	**67.6**	**65.1**	**59.8**	**68.4**	**68.9**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	944
65 dBA	299
70 dBA	94
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Existing
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	Arroyo Drive		
Road Segment:	California Avenue to Project Access		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	8,300
Peak Hour Traffic:	**830**
Vehicle Speed:	25
Centerline Separation:	37

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

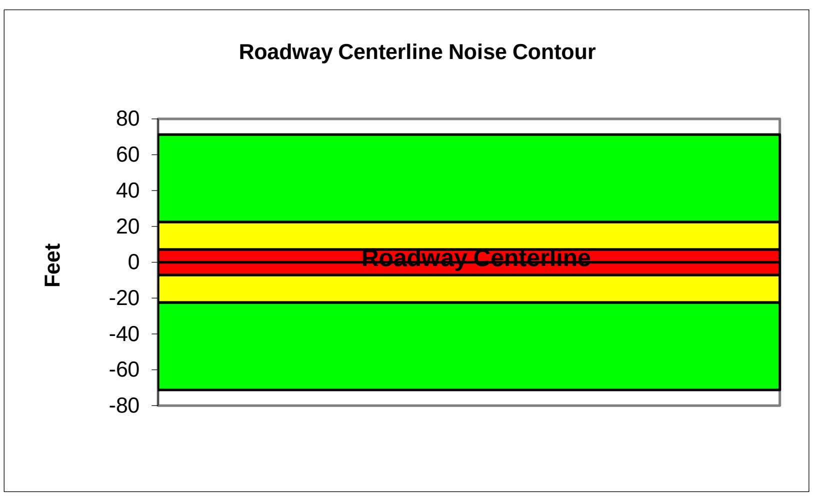
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	44.8	53.6	51.8	45.7	54.3	54.9
Medium Trucks:	56.4	48.4	42.0	40.4	48.9	49.1
Heavy Trucks:	62.6	50.6	41.6	42.8	53.2	53.3
Vehicle Noise:	**65.2**	**56.8**	**52.8**	**48.9**	**57.5**	**57.8**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	71
65 dBA	23
70 dBA	7
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Existing
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	Vista del Campo Road		
Road Segment:	Arroyo Drive to Culver Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	3,300
Peak Hour Traffic:	**330**
Vehicle Speed:	30
Centerline Separation:	36

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

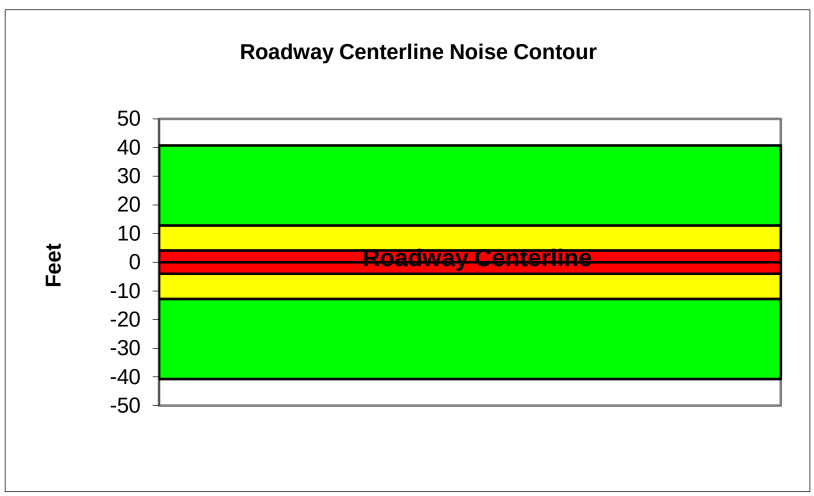
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	43.1	51.9	50.1	44.0	52.6	53.2
Medium Trucks:	53.7	45.6	39.2	37.7	46.1	46.4
Heavy Trucks:	59.3	47.4	38.3	39.5	49.7	49.8
Vehicle Noise:	**61.9**	**54.3**	**50.8**	**46.5**	**55.0**	**55.4**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	41
65 dBA	13
70 dBA	4
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Existing Plus Project
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	Campus Drive		
Road Segment:	California Avenue to Culver Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	15,700
Peak Hour Traffic:	**1570**
Vehicle Speed:	45
Centerline Separation:	62

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

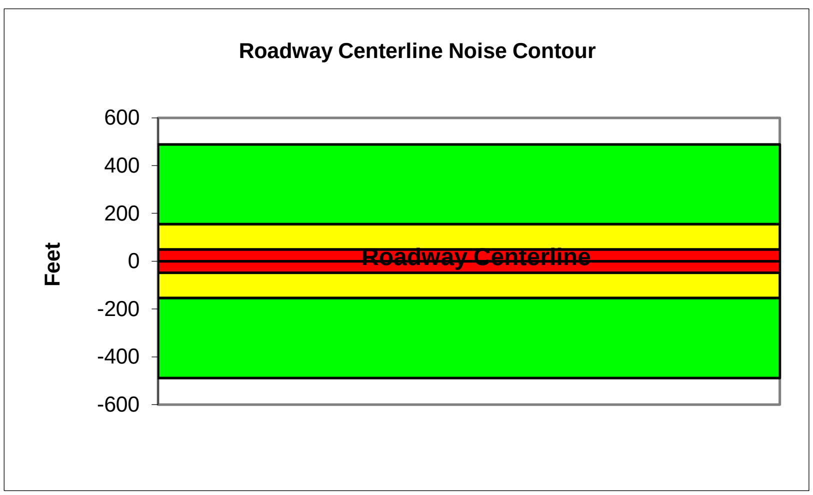
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	54.5	63.3	61.5	55.4	64.1	64.7
Medium Trucks:	62.8	54.7	48.4	46.8	55.3	55.5
Heavy Trucks:	67.3	55.4	46.3	47.6	57.1	57.2
Vehicle Noise:	**69.7**	**64.6**	**61.9**	**56.7**	**65.3**	**65.8**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	488
65 dBA	154
70 dBA	49
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Existing Plus Project
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	California Avenue		
Road Segment:	Campus Drive to Arroyo Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	14,600
Peak Hour Traffic:	**1460**
Vehicle Speed:	40
Centerline Separation:	56

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

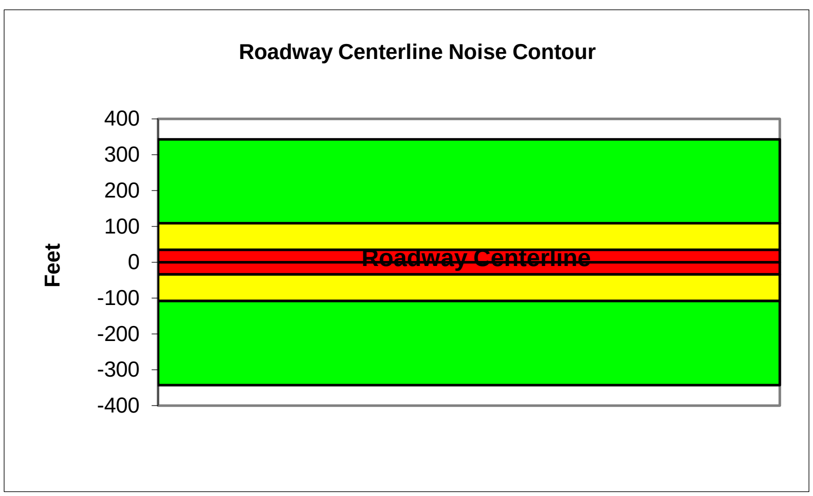
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	52.8	61.6	59.8	53.7	62.4	63.0
Medium Trucks:	61.8	53.7	47.3	45.8	54.3	54.5
Heavy Trucks:	66.6	54.7	45.6	46.9	56.6	56.7
Vehicle Noise:	**69.0**	**63.2**	**60.3**	**55.3**	**63.9**	**64.4**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	342
65 dBA	108
70 dBA	34
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Existing Plus Project
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	Culver Drive		
Road Segment:	Campus Drive to Vista del Campo Road		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	23,400
Peak Hour Traffic:	**2340**
Vehicle Speed:	50
Centerline Separation:	50

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

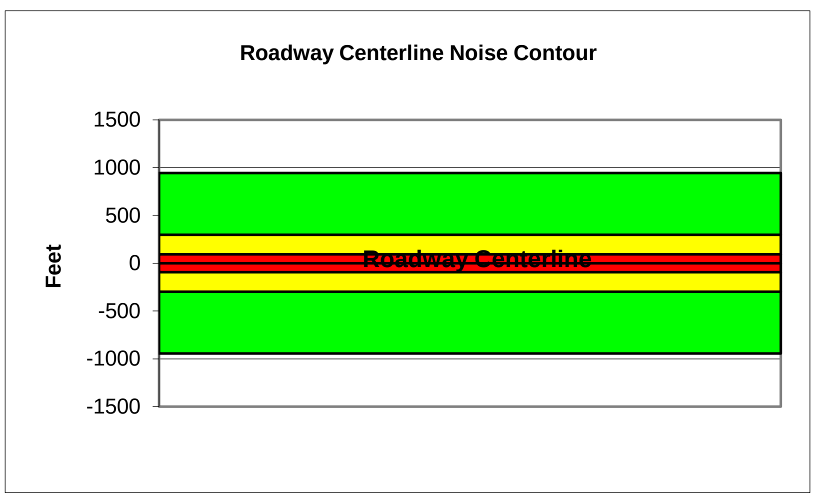
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.8	66.5	64.7	58.7	67.3	67.9
Medium Trucks:	65.4	57.4	51.0	49.4	57.9	58.1
Heavy Trucks:	69.7	57.7	48.7	49.9	59.3	59.4
Vehicle Noise:	**72.0**	**67.6**	**65.1**	**59.8**	**68.4**	**68.9**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	944
65 dBA	299
70 dBA	94
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Existing Plus Project
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	Arroyo Drive		
Road Segment:	California Avenue to Project Access		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	10,200
Peak Hour Traffic:	**1020**
Vehicle Speed:	25
Centerline Separation:	37

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

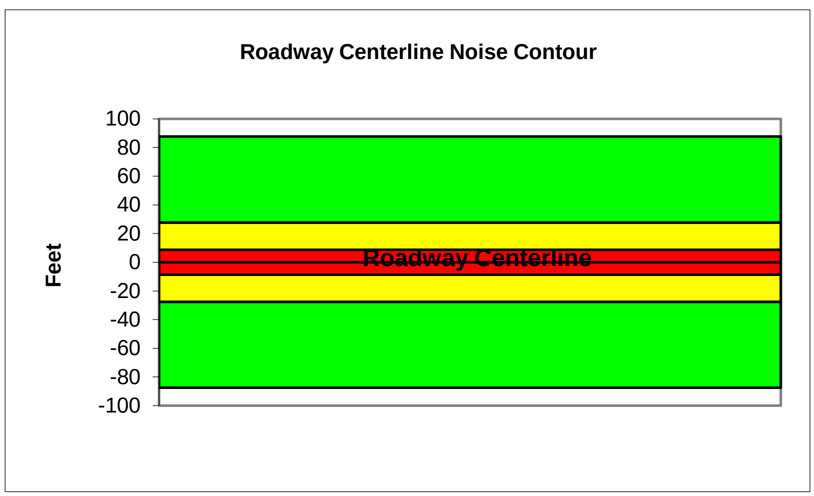
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	45.7	54.5	52.7	46.6	55.2	55.8
Medium Trucks:	57.3	49.3	42.9	41.3	49.8	50.0
Heavy Trucks:	63.5	51.5	42.5	43.7	54.1	54.2
Vehicle Noise:	**66.1**	**57.7**	**53.7**	**49.8**	**58.4**	**58.7**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	88
65 dBA	28
70 dBA	9
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Existing Plus Project
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	Vista del Campo Road		
Road Segment:	Arroyo Drive to Culver Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	3,700
Peak Hour Traffic:	**370**
Vehicle Speed:	30
Centerline Separation:	36

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

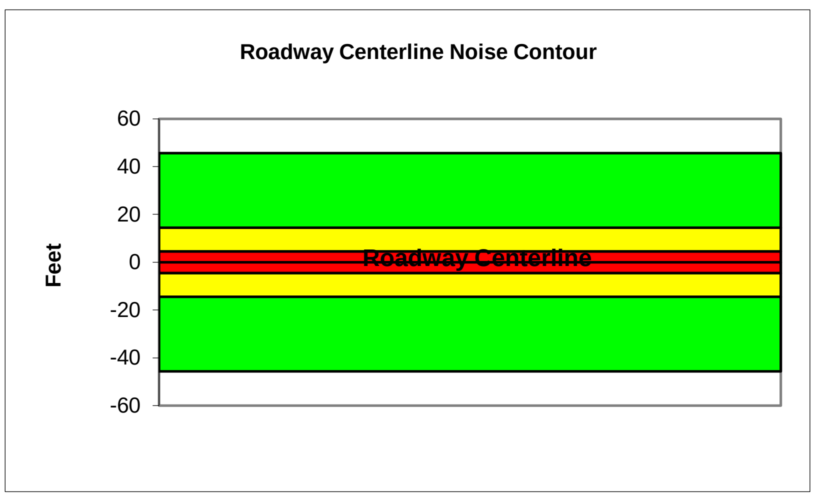
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	43.6	52.4	50.6	44.5	53.1	53.7
Medium Trucks:	54.2	46.1	39.7	38.1	46.6	46.9
Heavy Trucks:	59.8	47.9	38.8	40.0	50.2	50.3
Vehicle Noise:	**62.3**	**54.8**	**51.3**	**47.0**	**55.5**	**55.9**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	46
65 dBA	14
70 dBA	5
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Future
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	Campus Drive		
Road Segment:	California Avenue to Culver Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90** Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	18,000
Peak Hour Traffic:	**1800**
Vehicle Speed:	45
Centerline Separation:	62

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

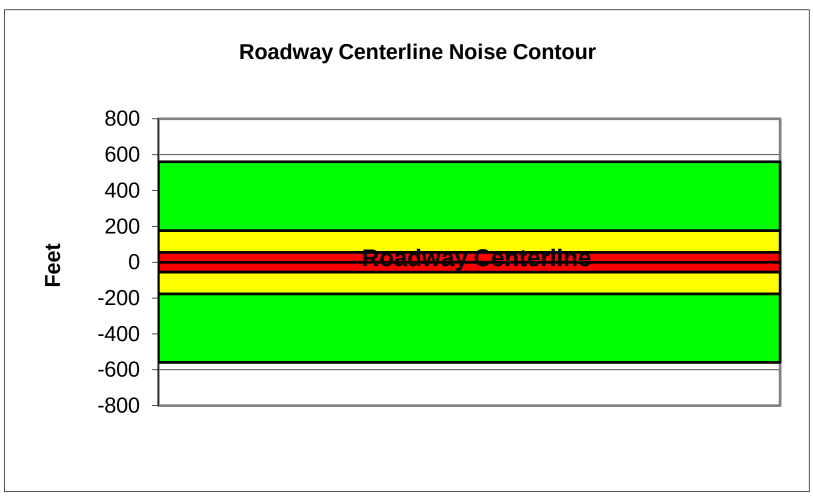
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	55.1	63.9	62.1	56.0	64.7	65.3
Medium Trucks:	63.4	55.3	49.0	47.4	55.9	56.1
Heavy Trucks:	67.9	56.0	46.9	48.2	57.7	57.8
Vehicle Noise:	**70.3**	**65.2**	**62.5**	**57.3**	**65.9**	**66.4**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	559
65 dBA	177
70 dBA	56
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Future
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	California Avenue		
Road Segment:	Campus Drive to Arroyo Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	20,000
Peak Hour Traffic:	**2000**
Vehicle Speed:	40
Centerline Separation:	56

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

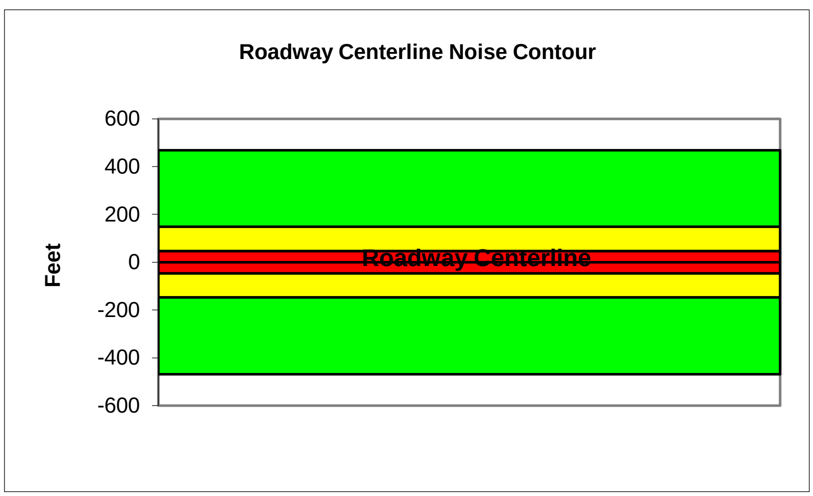
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	54.2	63.0	61.2	55.1	63.8	64.4
Medium Trucks:	63.2	55.1	48.7	47.1	55.6	55.8
Heavy Trucks:	68.0	56.1	47.0	48.2	57.9	58.1
Vehicle Noise:	**70.4**	**64.6**	**61.6**	**56.7**	**65.3**	**65.7**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	468
65 dBA	148
70 dBA	47
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Future
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	Culver Drive		
Road Segment:	Campus Drive to Vista del Campo Road		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	25,000
Peak Hour Traffic:	**2500**
Vehicle Speed:	50
Centerline Separation:	50

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

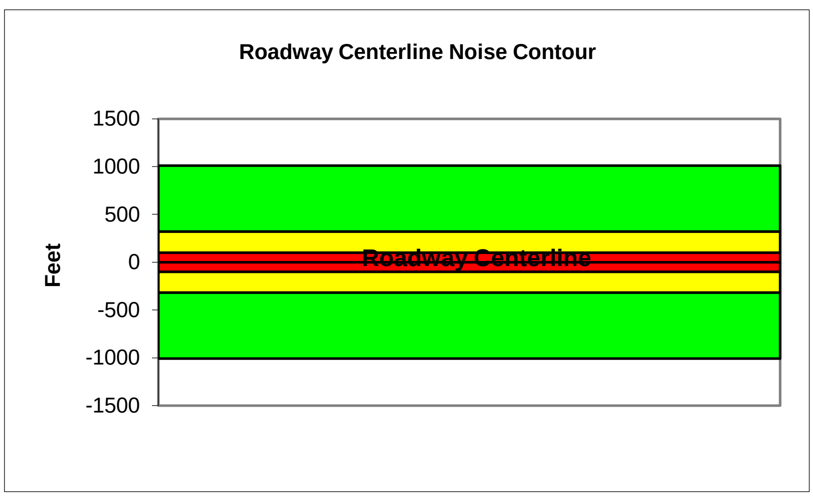
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.0	66.8	65.0	59.0	67.6	68.2
Medium Trucks:	65.7	57.7	51.3	49.7	58.2	58.4
Heavy Trucks:	69.9	58.0	49.0	50.2	59.6	59.7
Vehicle Noise:	**72.3**	**67.9**	**65.3**	**60.0**	**68.6**	**69.2**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	1009
65 dBA	319
70 dBA	101
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Future
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	Arroyo Drive		
Road Segment:	California Avenue to Project Access		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	9,000
Peak Hour Traffic:	**900**
Vehicle Speed:	25
Centerline Separation:	37

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

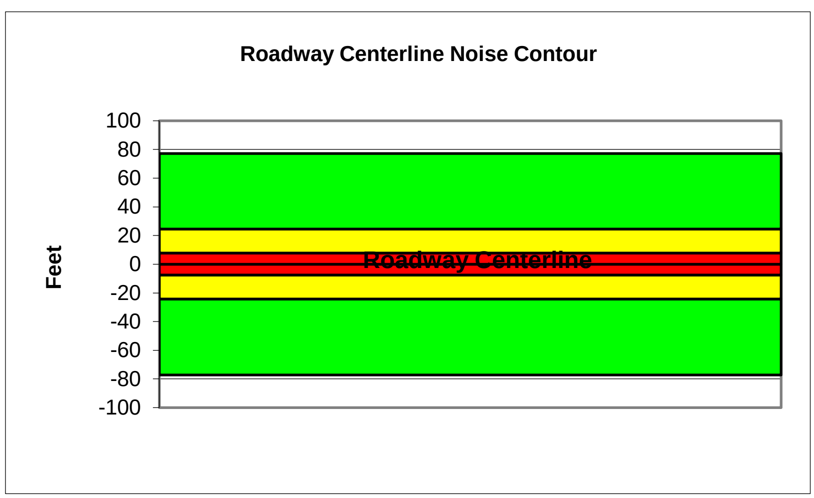
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	45.1	53.9	52.1	46.0	54.7	55.3
Medium Trucks:	56.8	48.7	42.3	40.8	49.2	49.5
Heavy Trucks:	62.9	51.0	41.9	43.2	53.5	53.7
Vehicle Noise:	**65.6**	**57.2**	**53.1**	**49.3**	**57.8**	**58.2**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	77
65 dBA	24
70 dBA	8
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Future
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	Vista del Campo Road		
Road Segment:	Arroyo Drive to Culver Drive		

PROJECT DATA

Centerline Dist to Barrier	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	0.5
Road Elevation:	0
Observer Height (above grade):	0
Barrier Height:	0
Rt View: 90	Lft View: -90

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	2.3
Heavy Trucks:	8

SITE DATA

Road Grade:	0
Average Daily Traffic:	6,000
Peak Hour Traffic:	600
Vehicle Speed:	30
Centerline Separation:	36

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

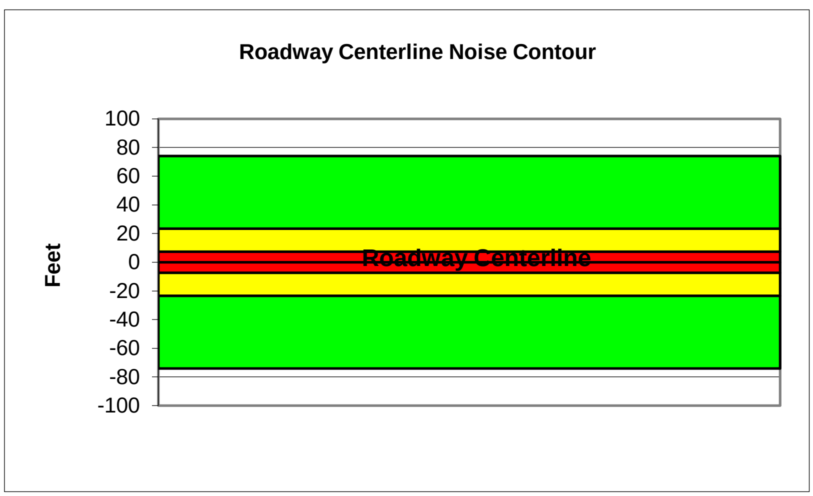
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	45.7	54.4	52.7	46.6	55.2	55.8
Medium Trucks:	56.3	48.2	41.8	40.2	48.7	49.0
Heavy Trucks:	61.9	50.0	40.9	42.1	52.3	52.4
Vehicle Noise:	**64.4**	**56.9**	**53.4**	**49.1**	**57.6**	**58.0**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	74
65 dBA	23
70 dBA	7
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Future Plus Project
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	Campus Drive		
Road Segment:	California Avenue to Culver Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	18,500
Peak Hour Traffic:	**1850**
Vehicle Speed:	45
Centerline Separation:	62

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

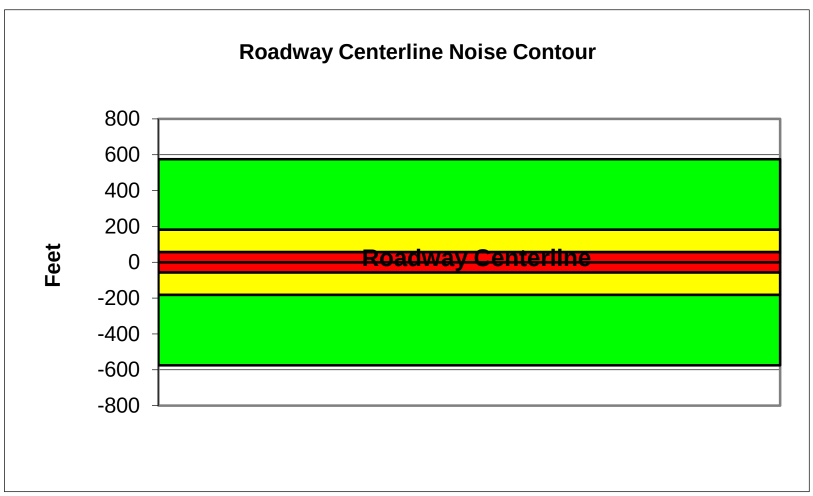
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	55.3	64.0	62.2	56.2	64.8	65.4
Medium Trucks:	63.5	55.5	49.1	47.5	56.0	56.2
Heavy Trucks:	68.0	56.1	47.1	48.3	57.8	57.9
Vehicle Noise:	**70.4**	**65.3**	**62.6**	**57.5**	**66.1**	**66.6**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	575
65 dBA	182
70 dBA	58
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Future Plus Project
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	California Avenue		
Road Segment:	Campus Drive to Arroyo Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	21,300
Peak Hour Traffic:	**2130**
Vehicle Speed:	40
Centerline Separation:	56

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

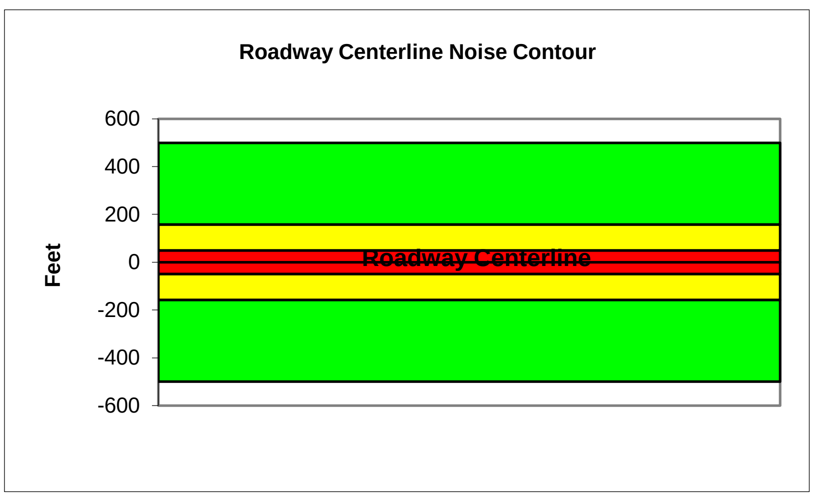
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	54.5	63.3	61.5	55.4	64.0	64.6
Medium Trucks:	63.4	55.4	49.0	47.4	55.9	56.1
Heavy Trucks:	68.3	56.3	47.3	48.5	58.2	58.3
Vehicle Noise:	**70.6**	**64.8**	**61.9**	**57.0**	**65.5**	**66.0**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	500
65 dBA	158
70 dBA	50
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Future Plus Project
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	Culver Drive		
Road Segment:	Campus Drive to Vista del Campo Road		

PROJECT DATA	
Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90** Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)	
Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA	
Road Grade:	0
Average Daily Traffic:	25,000
Peak Hour Traffic:	**2500**
Vehicle Speed:	50
Centerline Separation:	50

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

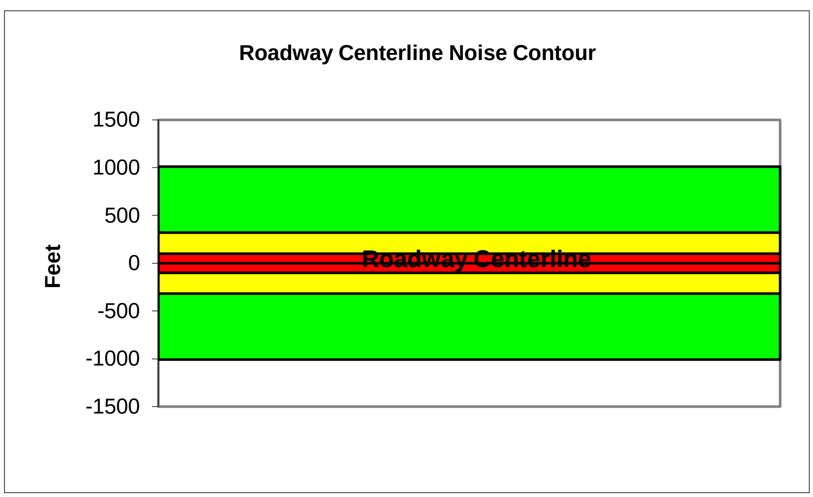
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.0	66.8	65.0	59.0	67.6	68.2
Medium Trucks:	65.7	57.7	51.3	49.7	58.2	58.4
Heavy Trucks:	69.9	58.0	49.0	50.2	59.6	59.7
Vehicle Noise:	**72.3**	**67.9**	**65.3**	**60.0**	**68.6**	**69.2**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	1009
65 dBA	319
70 dBA	101
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Future Plus Project
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	Arroyo Drive		
Road Segment:	California Avenue to Project Access		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	10,900
Peak Hour Traffic:	**1090**
Vehicle Speed:	25
Centerline Separation:	37

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

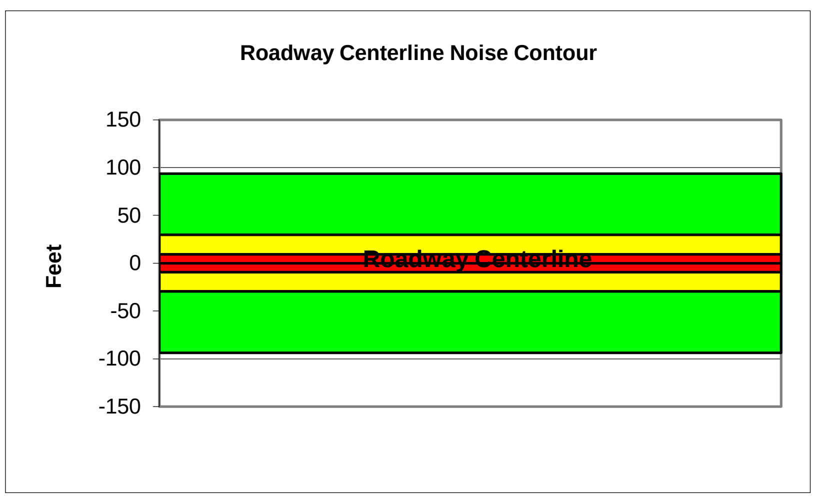
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	46.0	54.7	53.0	46.9	55.5	56.1
Medium Trucks:	57.6	49.5	43.2	41.6	50.1	50.3
Heavy Trucks:	63.8	51.8	42.8	44.0	54.4	54.5
Vehicle Noise:	**66.4**	**58.0**	**54.0**	**50.1**	**58.7**	**59.0**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	94
65 dBA	30
70 dBA	9
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI East Campus Phase 4 Project	Scenario:	Future Plus Project
Analyst:	Danielle Regimbal	Job #:	158401
Roadway:	Vista del Campo Road		
Road Segment:	Arroyo Drive to Culver Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	6,400
Peak Hour Traffic:	**640**
Vehicle Speed:	30
Centerline Separation:	36

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

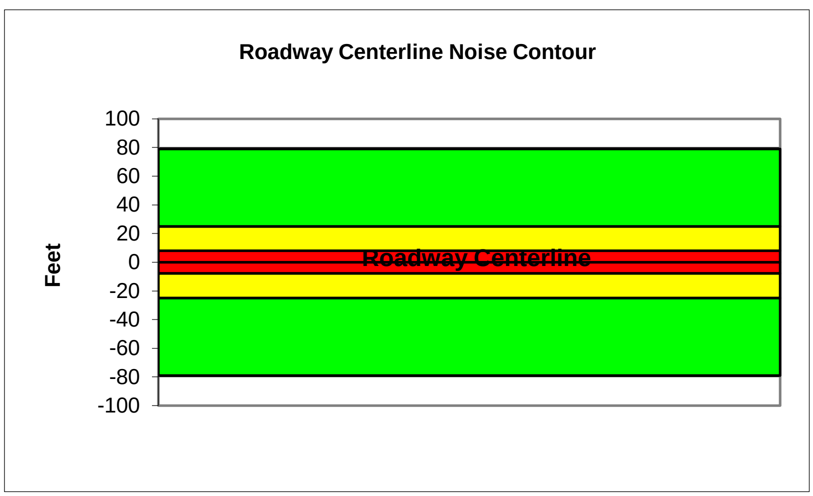
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	46.0	54.7	52.9	46.9	55.5	56.1
Medium Trucks:	56.6	48.5	42.1	40.5	49.0	49.3
Heavy Trucks:	62.2	50.3	41.2	42.4	52.6	52.7
Vehicle Noise:	**64.7**	**57.2**	**53.7**	**49.3**	**57.9**	**58.3**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	79
65 dBA	25
70 dBA	8
Mitigated	
60 dBA	
65 dBA	
70 dBA	



APPENDIX E

Traffic Study

UCI East Campus Student Apartments Phase 4 Traffic Study

University of California, Irvine

Prepared for:
UC Irvine Environmental Planning and Sustainability

Prepared by:
Stantec Consulting Services Inc.

March 20, 2017

Sign-off Sheet

This document entitled UCI East Campus Student Apartments Phase 4 Traffic Study was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of UC Irvine Design & Construction Services (the "Client").

Prepared by ______________________________
(signature)

Cathy Lawrence, PE
(949) 923-6064

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(949) 923-6058

Reviewed by ______________________________
(signature)

Melissa Dugan, AICP, PTP
(949) 923-6216

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Glossary

ADT	**Average Daily Traffic.** Generally used to measure the total two-directional traffic volumes passing a given point on a roadway.
DU	**Dwelling Unit.** Used in quantifying residential land use.
ICU	**Intersection Capacity Utilization.** A measure of the volume-to-capacity ratio for an intersection. Typically used to determine the peak hour level of service for a given set of intersection volumes.
LOS	**Level of Service.** A scale used to evaluate circulation system performance based on ICU values at intersections or volume-to-capacity ratios of arterial segments.
Peak Hour	This refers to the hour during the AM peak period (typically 7 AM to 9 AM) or the PM peak period (typically 4 PM to 6 PM) in which the greatest number of vehicle trips are generated by a given land use or are travelling on a given roadway.
V/C	**Volume-to-Capacity Ratio.** This is typically used to describe the percentage of capacity utilized by existing or projected traffic on a segment of an arterial or intersection.

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has performed a traffic impact analysis for a proposed student housing project adjacent to the existing Vista Del Campo Norte and Arroyo Vista student apartments in the East Campus area of UC Irvine. The purpose of this study is to determine the amount of traffic generated by the proposed East Campus Student Apartments Phase 4 project and to analyze the impacts of the project on the affected portions of the circulation system.

1.1 BACKGROUND AND SCOPE

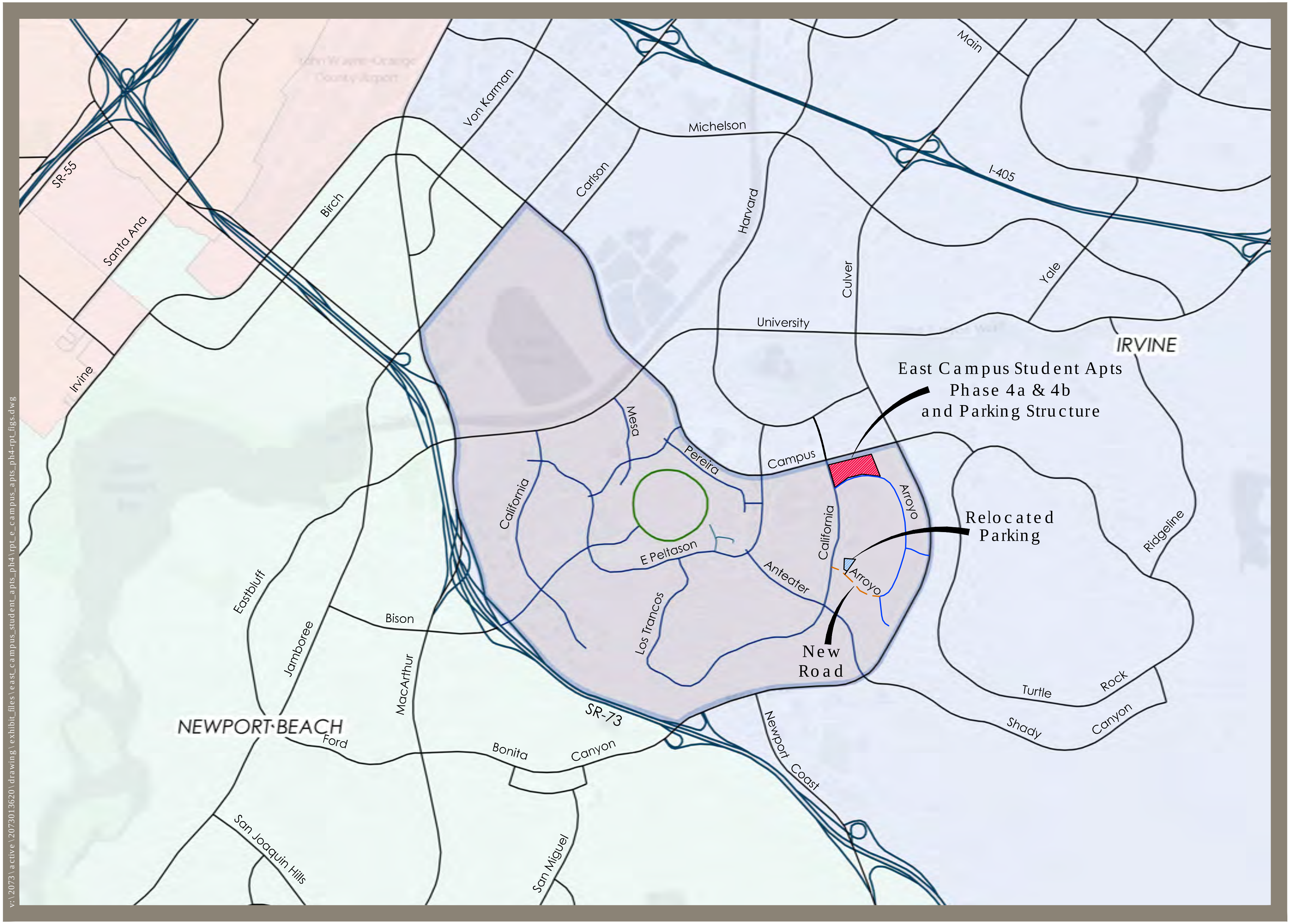
The project site is located on the east side of California Avenue between Campus Drive and Arroyo Drive as shown in **Figure 1-1**. The proposed project consists of approximately 2,450-bed student apartments, residential amenities such as community centers, a pool and maintenance storage, and a parking structure. Approximately 19 full-time employees (FTE) are expected with the project. The project will be developed in two phases. The first phase (Phase 4a) consists of approximately 1,500 beds, the parking structure, and (optionally) an extension of Arroyo Drive. The second phase (Phase 4b) consists of approximately 950 beds. With the addition of the proposed project, the campus remains within the total number of beds identified in the campus 2007 Long Range Development Plan (LRDP).

Residents of the proposed apartments will primarily be sophomore, junior, and senior undergraduate students, and will include some graduate students. The expected on-campus vehicle ownership rate of the student residents is 0.55 vehicles per bed based on information provided by American Campus Communities (ACC).

The proposed parking structure is anticipated to connect to both Campus Drive and Arroyo Drive. Parking will be provided at a rate of 0.55 spaces per bed. The structure is for residents only, and will consist of approximately 550 spaces. Additional parking for residents will be provided in the existing East Campus Parking Structure (approximately 500 spaces) or Vista Del Campo Norte surface lots (approximately 300 spaces). Covered and uncovered bicycle spaces will be provided at a rate of 0.75 spaces per bed.

The project is located on the site of two existing surface parking lots. The impact analysis includes the relocation of the existing parking to a site south of the Anteater Recreation Center (ARC). This relocated parking lot will not be used by the residents of the proposed apartments. Access to the relocated parking lot will be provided by the existing service road south of the ARC.

The extension of the southern terminus of Arroyo Drive west to connect with California Avenue opposite Palo Verde Road is being considered as an option for Phase 4a of the project. If the extension of Arroyo Drive is completed with Phase 4a, then access to the relocated parking lot south of the ARC would be provided by Arroyo Drive.



Stantec

Figure 1-1

Project Location

The current UCI Long Range Development Plan (LRDP) was adopted in 2007, and established a land use plan and physical planning framework to accommodate projected enrollment levels, additional academic facilities and housing, and the on-campus circulation system through the 2025-2026 horizon year. The project site is designated in the LRDP land use as Mixed Use - Student Housing and Support Facilities.

The total number of beds exceeds the number analyzed for the project site traffic analysis zone (TAZ) in the 2007 LRDP Environmental Impact Report (EIR) Traffic Study by approximately 2,016 beds. However, with this project, the number of beds provided by the UCI campus is still under the total number of beds analyzed in the LRDP EIR overall. Therefore, the project is consistent with the overall LRDP student bed count, but with this project the number of beds analyzed in the LRDP EIR Traffic Study is shifted from another area of the campus to the East Campus area.

This traffic study provides near term and long-range traffic conditions as required by the California Environmental Quality Act (CEQA). These scenarios include existing conditions and long-range cumulative conditions (2035 and beyond). The long-range analysis examines the project in a LRDP buildout context. The study area includes intersections located in the City of Irvine, as well as intersections and mid-block segments on the UCI main campus.

Chapter 2.0 of this report provides the transportation setting for the impact analysis, and Chapter 3.0 provides a detailed project description. Chapter 4.0 focuses on the potential traffic impacts of the project.

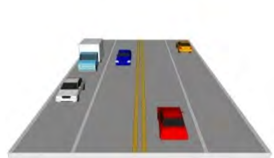
1.2 METHODOLOGY

Existing volumes were counted in the field in February 2017. The traffic forecasts for the study area circulation system were generated using a combination of data from the UCI Main Campus Traffic Model (MCTM) and the City of Irvine Traffic Analysis Model (ITAM) for the long-range analysis. Project-generated traffic volumes are estimated using the MCTM and the overall distribution of project traffic is based on the project trip distribution derived from the ITAM. The ITAM can provide off-campus trip distribution patterns whereas the UCI MCTM is limited to on-campus traffic patterns. The project volumes were then added to the no-project volumes, resulting in with-project volumes. The analysis compares with-project volumes with no-project volumes to identify project impacts.

1.3 PERFORMANCE CRITERIA

The traffic analysis uses a set of performance criteria for evaluating intersection capacity to determine potential project impacts. In traffic impact studies, impact criteria are based on two primary measures. The first is "capacity," which establishes the vehicle carrying ability of a road segment, and the second is "volume." The volume-to-capacity (V/C) ratio corresponds with a level of service (LOS). Traffic LOS is designated A through F, with LOS A representing free flow conditions, and LOS F representing severe traffic congestion. Traffic flow quality for the different LOS is described in **Table 1-1**.

Table 1-1 Level of Service Descriptions – Arterial Streets and Intersections

Level of Service (LOS)		Description
A		LOS A describes primarily free-flow operations. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at the intersections is minimal. The travel speed exceeds 85% of the base free-flow speed.
B		LOS B describes reasonably unimpeded operation. The ability to maneuver within the traffic stream is only slightly restricted, and control delay at the intersections is not significant. The travel speed is between 67% and 85% of the base free-flow speed.
C		LOS C describes stable operation. The ability to maneuver and change lanes at midsegment locations may be more restricted than at LOS B. Longer queues at the intersections may contribute to lower travel speeds. The travel speed is between 50% and 67% of the base free-flow speed.
D		LOS D indicates a less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed. This operation may be due to adverse signal progression, high volume, or inappropriate signal timing at the intersections. The travel speed is between 40% and 50% of the base free-flow speed.
E		LOS E is characterized by unstable operation and significant delay. Such operations may be due to some combination of adverse progression, high volume, and inappropriate signal timing at the intersections. The travel speed is between 30% and 40% of the base free-flow speed.
F		LOS F is characterized by flow at extremely low speed. Congestion is likely occurring at the intersections, as indicated by high delay and extensive queuing. The travel speed is 30% or less of the base free-flow speed.
Source: Highway Capacity Manual 2010, Transportation Research Board, National Research Council		

Average daily traffic (ADT) volumes are presented for roadway links in the study area. The traffic analysis also analyzes the AM and PM peak hour volumes for study area intersections. Peak hour volumes and capacities are compared by means of intersection capacity utilization (ICU) values for signalized intersections.

For the stop-controlled study intersection, the Highway Capacity Manual (HCM) methodology for estimating intersection delay is used to determine the intersection peak hour LOS. The ICU values and vehicle delay ranges that correspond to LOS A through F are summarized in **Table 1-2.**

Both the V/C and LOS are used in identifying impacts. Certain LOS values are deemed acceptable by the various governing jurisdictions within the traffic analysis study area, and increases in the V/C ratio which cause or contribute to the LOS being unacceptable are defined as an adverse impact. LOS D is the performance standard applied in this study for the intersections in the study area.

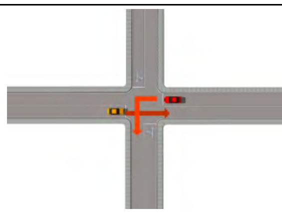
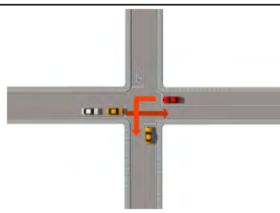
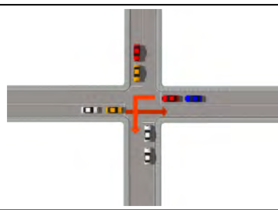
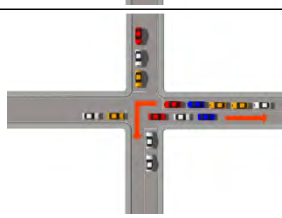
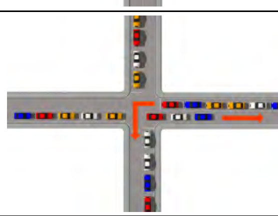
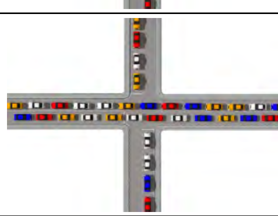
Significant impacts are defined for this analysis as an increase of 0.02 or more in the ICU value, which is consistent with the City of Irvine Traffic Impact Analysis Guidelines. This increase at a signalized intersection operating at LOS D or better is not considered a significant impact. Since UCI does not have an adopted performance criteria for intersections, the City of Irvine's performance criteria were used in the analysis to identify project impacts at on-campus signalized intersection locations. For the stop-controlled study intersections, if the LOS reaches E or F, the intersection is evaluated further for possible improvement with a traffic signal.

The performance criteria adopted by the City of Irvine, and applied for this analysis, are summarized in **Table 1-3.**

1.4 STUDY AREA

The study area encompasses seven existing and two future intersections in and around the UCI campus. The study area was defined by identifying how project trips would distribute to the adjacent roads and determining the limits of where project peak hour impacts become insignificant. Key intersections within the study area were selected for peak hour analysis. Five of the intersections are located within the UCI campus, and four are located in the City of Irvine. There are no Orange County Congestion Management Program (CMP) monitoring intersections within the study area. **Figure 1-2** illustrates the study area for the project.

Table 1-2 Intersection Level of Service Ranges (ICU and HCM Delay)

Level of Service (LOS)		Intersection Capacity Utilization (ICU)	Highway Capacity Manual (HCM) Average Delay*
A		0.00 – 0.60	0.00 – 10.0 seconds
B		0.61 – 0.70	10.1 – 15.0 seconds
C		0.71 – 0.80	15.1 – 25.0 seconds
D		0.81 – 0.90	25.1 – 35.0 seconds
E		0.91 – 1.00	35.1 – 50.0 seconds
F		Above 1.00	Above 50.0 seconds

* Stop-controlled intersections
Sources: Highway Capacity Manual 2010, Transportation Research Board, National Research Council
Orange County Congestion Management Program

Table 1-3 Performance Criteria for Locations Analyzed within the Study Area

Intersections

V/C Calculation Methodology

Level of service based on peak hour intersection capacity utilization (ICU) values and calculated using the following assumptions:

City of Irvine & UCI
Saturation Flow Rate: 1,700 vehicles/hour/lane
Clearance Interval: .05
Right-Turn-On-Red Utilization Factor*: .75
* "De-facto" right-turn lane is assumed in the ICU calculation if 19 feet from edge to outside of through-lane exists and parking is prohibited during peak periods.

HCM Delay Methodology

Level of service based on peak hour average intersection delay and calculated using the following assumptions:

Ideal Flow Rate: 1,900 vehicles/hour/lane
Peak Hour Factor: measured PHF at stop-controlled intersections
Percent Heavy Vehicles: 2%

Performance Standard

Level of service D

Mitigation Requirement

For stop-controlled intersections operating greater than the performance standard, the intersection is evaluated further for possible improvement with a traffic signal, or geometric improvements to improve operations.

For signalized intersections operating greater than the performance standard, the intersection is evaluated further for possible improvements to improve operations.

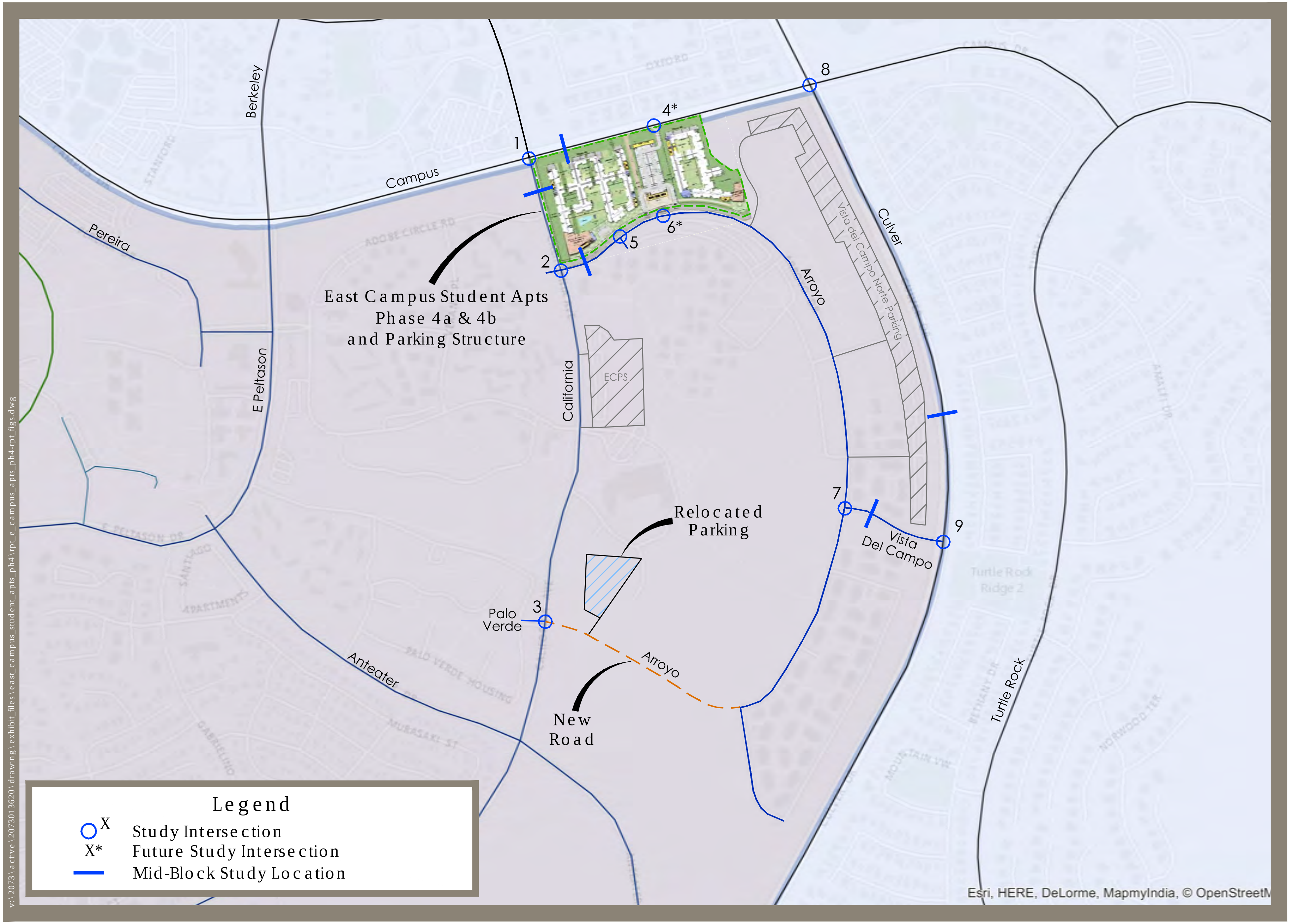


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Figure 1-2

Study Locations

1.5 REFERENCES

1. *Highway Capacity Manual 2010*, Transportation Research Board, 2010.

2. *University of California Irvine Long Range Development Plan 2007 Update Traffic Study*, Austin-Foust Associates, Inc., May 2007.

3. *Mesa Court Expansion Project Traffic Study,* Stantec Consulting Services Inc., October 2013.

2.0 TRANSPORTATION SETTING

This chapter describes the transportation setting for the proposed project. Existing and opening year traffic conditions in the traffic analysis study area are summarized, and the future circulation system planned for the UCI LRDP buildout is described.

2.1 EXISTING ROADWAY SYSTEM

The study area encompasses four existing intersections and one future intersection within the UCI campus and three existing intersections and one future intersection along the perimeter of the campus in the surrounding City of Irvine. The three existing off-campus intersections are located along Campus Drive and Culver Drive and are all signalized. The existing and future on-campus intersections and the future off-campus intersection are stop-controlled. Intersection lane configurations and intersection controls are illustrated in **Figure 2-1**.

Campus Drive is designated as a Primary Arterial on the City of Irvine and the Orange County Master Plan of Arterial Highways (MPAH). Campus Drive begins at Bristol Street and runs in a generally northeast direction until reaching MacArthur Boulevard where it continues in a southeast direction to east of Culver Drive. Campus Drive provides four travel lanes with a raised median through the study area and represents the northeast boundary of the UCI main campus. The speed limit is 45 mph in the vicinity of the project. On-street parking is not allowed, and a striped bike lane is provided.

Culver Drive runs generally northeast to southwest from Portola Parkway in northeast Irvine to Michelson Drive where it curves toward the south between Michelson Drive and University Drive. South of University Drive, it curves southeast and then west around the eastern and southern boundary of the UCI campus, at which point Culver Drive becomes Bonita Canyon Drive west of Shady Canyon Drive/Anteater Drive. Bonita Canyon Drive continues west into the City of Newport Beach and becomes Ford Road west of MacArthur Boulevard. Bonita Canyon Drive provides full access to SR-73 just west of the project site. Culver Drive is a Major Arterial north of Campus Drive and a Primary Arterial south of Campus Drive through the study area. Bonita Canyon Drive is designated as a Primary Arterial. Culver Drive/Bonita Canyon Drive provides four lanes with a raised median through the study area, except for a short section near the SR-73 Toll Road where the roadway varies from five to six lanes. On-street parking is prohibited and a striped bike lane is provided. The speed limit on Culver Drive is 50 mph north of Campus Drive and 55 mph south of Campus Drive, and the speed limit on Bonita Canyon Drive is 50 mph.

California Avenue begins on-campus at the end of Los Trancos Drive southwest of the project site, and continues in a generally northeast direction until Anteater Drive where it turns toward the north and terminates north of the UCI campus at Harvard Avenue. California Avenue is designated as a Primary Arterial. It is a two-lane road between Los Trancos Drive and Adobe Circle, and a four-lane road north of Adobe Circle. On-street parking is prohibited, and a striped bike lane is provided. The speed limit is 35 mph south and 40 mph north of Adobe Circle South.

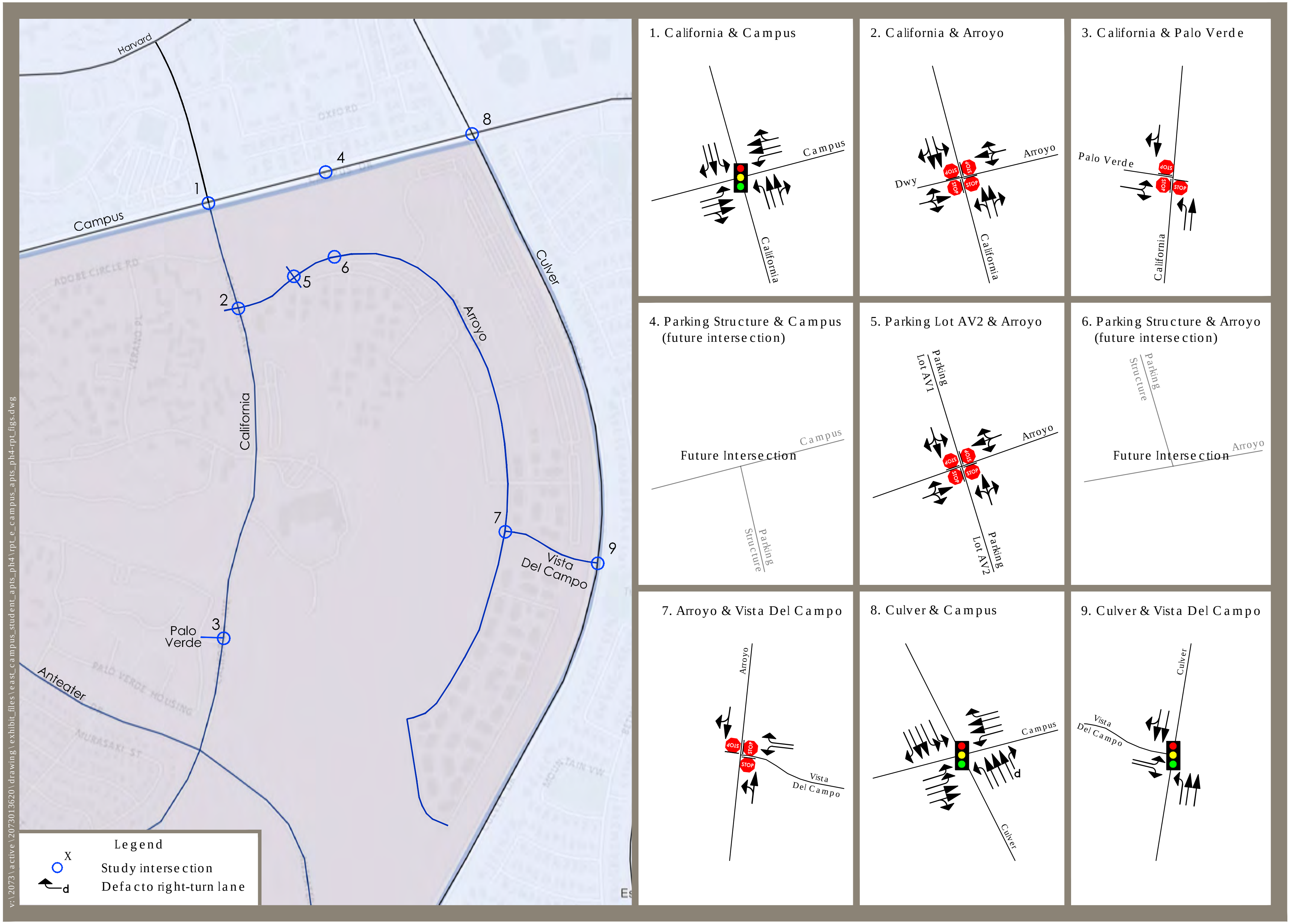

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Figure 2-1

Existing Intersection Lane Configurations and Traffic Control

Arroyo Drive is located entirely on-campus. The road begins at California Avenue south of Campus Drive and heads generally east then turns south, and currently terminates south of Vista Del Campo Road. Arroyo Drive provides access to the East Campus apartment developments. The roadway has one lane in each direction and provides on-street bike lanes for most of its length. The proposed project will complete the missing south segment of the loop road, connecting the southern terminus back to California Avenue, opposite of Palo Verde Road.

2.2 EXISTING VOLUMES

Existing ADT and peak hour volumes were counted in February 2017 while classes were in session. ADT volumes were counted for key roadway segments on campus and along Campus Drive and Culver Drive, and existing peak hour turning movement volumes were collected at the existing study intersections. **Figure 2-2** illustrates the existing study area ADT and AM peak hour volumes. **Figure 2-3** illustrates the existing PM peak hour volumes. Actual count data is included in **Appendix A**.

2.3 EXISTING INTERSECTION LEVELS OF SERVICE

Existing ICU values were calculated for the signalized study intersections based on the AM and PM peak hour turning movement counts presented above and the existing lane configurations.

For the stop-controlled study intersections, the HCM delay methodology was used. The average delay is rounded to the nearest second to allow for minor fluctuations in daily traffic volumes, which is appropriate for planning purposes.

Existing AM and PM peak hour ICU and delay values are summarized in **Table 2-1** (actual ICU calculation worksheets are included in **Appendix B,** and delay calculations are included in **Appendix C**). As this table shows, the signalized study intersections currently operate at LOS A during the AM and PM peak hours based on the ICU methodology. The stop-controlled study intersections are currently operating at LOS C or better during the AM and PM peak hour.

Table 2-1 Existing Intersection LOS Summary

		AM Peak Hour		PM Peak Hour	
Intersection	**Jurisdiction**	**ICU/Delay**	**LOS**	**ICU/Delay**	**LOS**
ICU Methodology – Signalized Intersections					
1. California & Campus	Irvine	.39	A	.60	A
8. Culver & Campus	Irvine	.51	A	.55	A
9. Culver & Vista Del Campo	Irvine	.37	A	.39	A
HCM Delay Methodology – Stop-Controlled Intersections					
2. California & Arroyo	UCI	10 sec	A	16 sec	C
3. California & Palo Verde	UCI	11 sec	B	11 sec	B
5. Parking Lot AV2 & Arroyo	UCI	8 sec	A	9 sec	A
7. Arroyo & Vista Del Campo	UCI	7 sec	A	8 sec	A

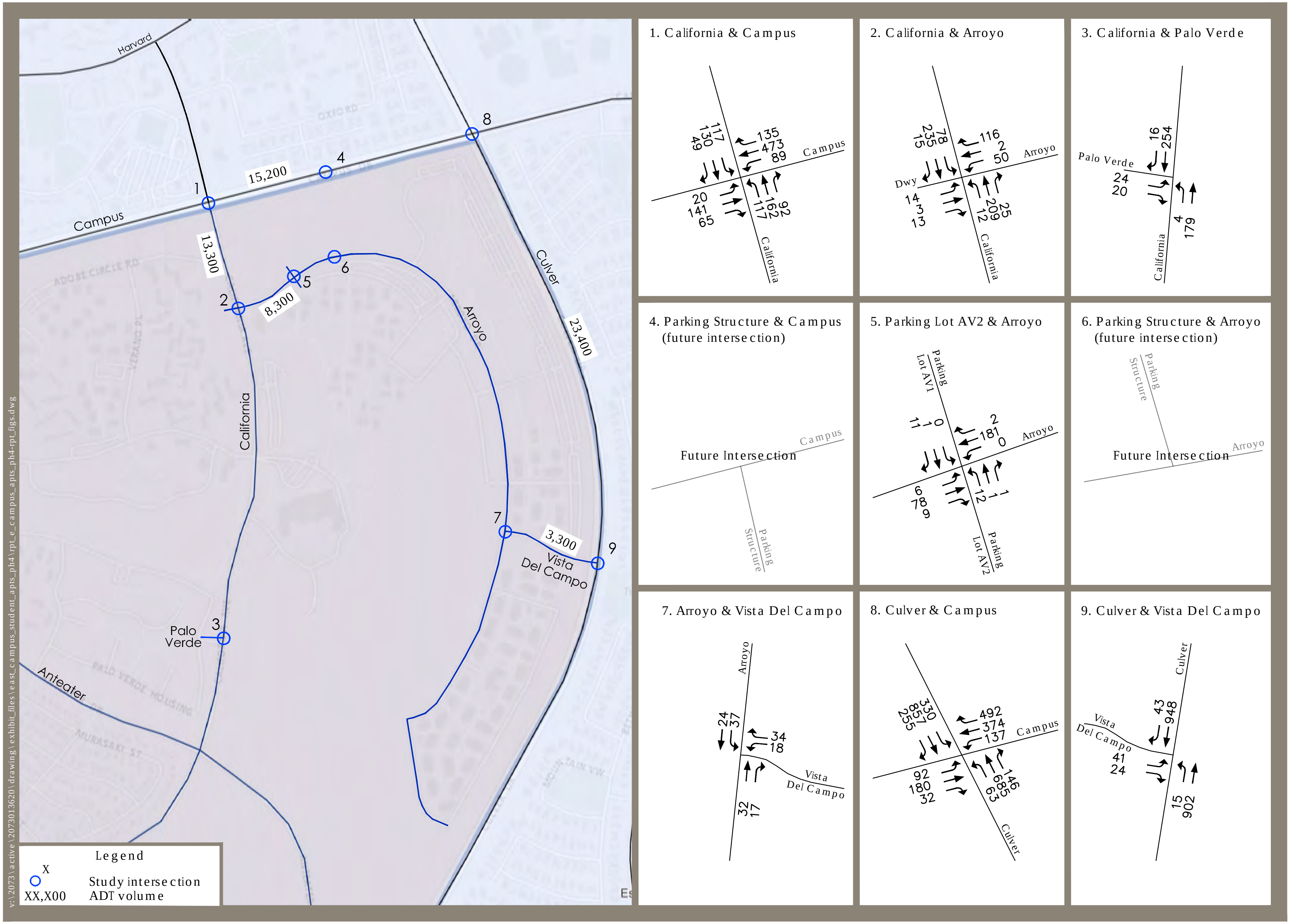

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Figure 2-2

Existing ADT and AM Peak Hour Volumes

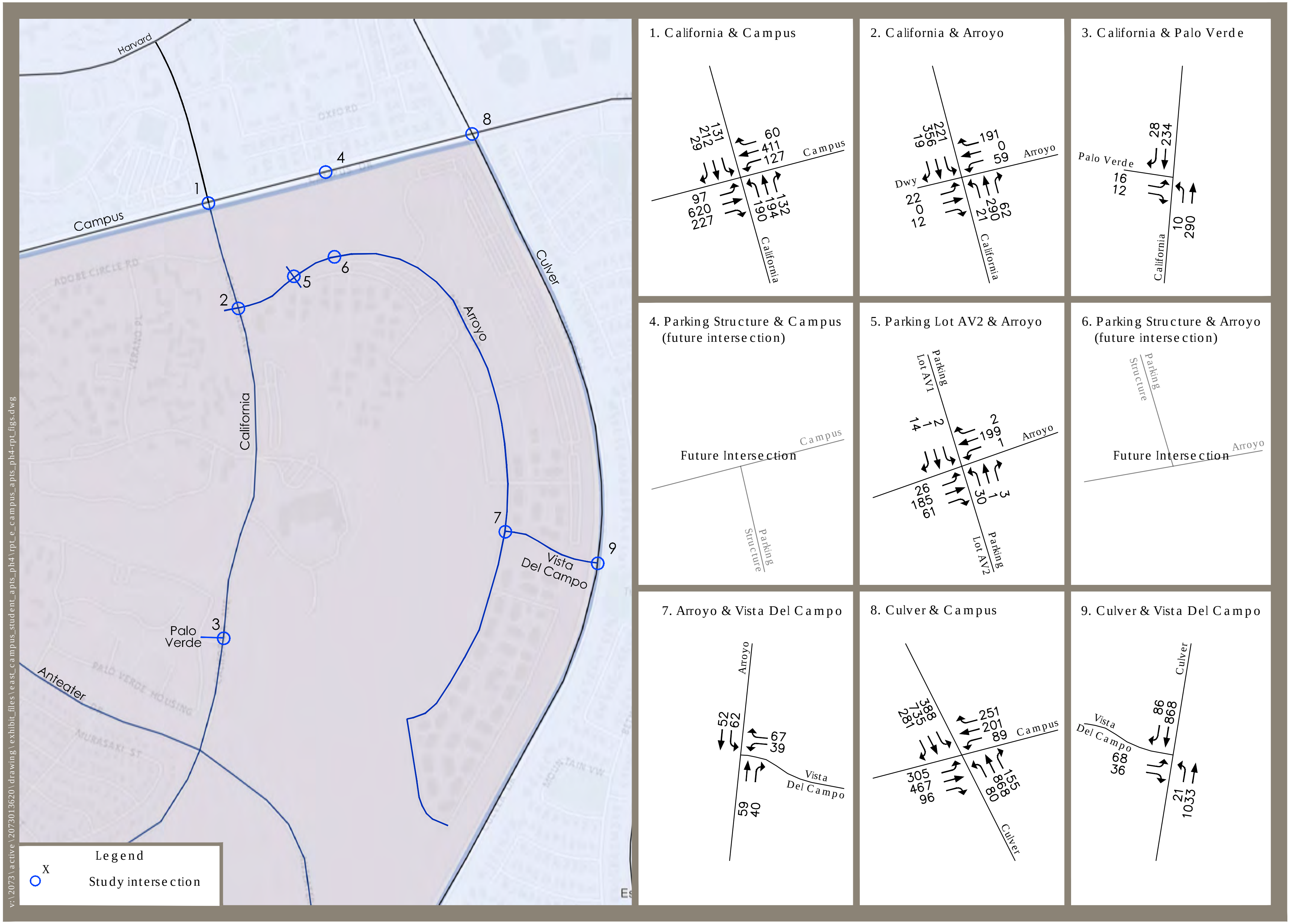

Figure 2-3

Existing PM Peak Hour Volumes

2.4 BUILDOUT TRAFFIC FORECAST VOLUMES

Although the proposed project does not increase the overall number of student beds within the UCI campus identified in the LRDP, the proposed project represents an increase in daily trips within the East Campus TAZ as analyzed in the 2007 LRDP EIR and LRDP EIR Traffic Study. In the UCI MCTM used for analysis of the LRDP EIR Traffic Study, the area that comprises the project site includes 434 student beds (TAZ 63) and 27,000 square feet of support facilities (TAZ 87). Localized impacts from increasing the number of student beds and eliminating the support facilities in the East Campus Student Apartments Phase 4 area are examined here under buildout conditions. This would represent the buildout of the area, which is assumed to be 2035 and beyond.

The baseline long-range volumes for this analysis were obtained from the UCI MCTM and ITAM. Buildout volumes for on-campus intersections came from the LRDP EIR Traffic Study, and volumes for off-campus intersections were obtained from ITAM 12.4 Post-2035 Cumulative Condition (February 2015) with UCI North Campus and Main Campus zones factored to 2007 LRDP trips.

Figure 2-4 illustrates 2035 ADT volumes on mid-block links in the study area and 2035 AM peak hour intersection volumes based on the LRDP EIR Traffic Study land use assumptions. **Figure 2-5** illustrates 2035 PM peak hour intersection volumes.

Table 2-2 summarizes the 2035 LOS at the study intersections. The intersections of California Avenue at Arroyo Drive and California Avenue at Palo Verde/Arroyo Drive are identified as signalized in the LRDP. The intersection of Parking Lot AV2 at Arroyo Drive and the intersection of Arroyo Drive at Vista Del Campo are assumed to remain stop-controlled under LRDP buildout conditions. The LRDP also assumes that California Avenue has two lanes in each direction north of Anteater Drive (it currently has one lane in each direction). Under 2035 conditions, with the above assumptions, all study intersections will operate at LOS C or better during the AM and PM peak hours based on the LRDP EIR Traffic Study.

Table 2-2 2035 No-Project Intersection LOS Summary

Intersection	Jurisdiction	AM Peak Hour		PM Peak Hour	
		ICU/Delay	LOS	ICU/Delay	LOS
ICU Methodology – Signalized Intersections					
1. California & Campus	Irvine	.52	A	.80	C
2. California & Arroyo (future signal)	UCI	.32	A	.55	A
3. California & Palo Verde/Arroyo (future signal)	UCI	.28	A	.26	A
8. Culver & Campus	Irvine	.60	A	.62	B
9. Culver & Vista Del Campo	Irvine	.46	A	.45	A
HCM Delay Methodology – Stop-Controlled Intersections					
5. Parking Lot AV2 & Arroyo	UCI	8 sec	A	10 sec	A
7. Arroyo & Vista Del Campo	UCI	8 sec	A	9 sec	A

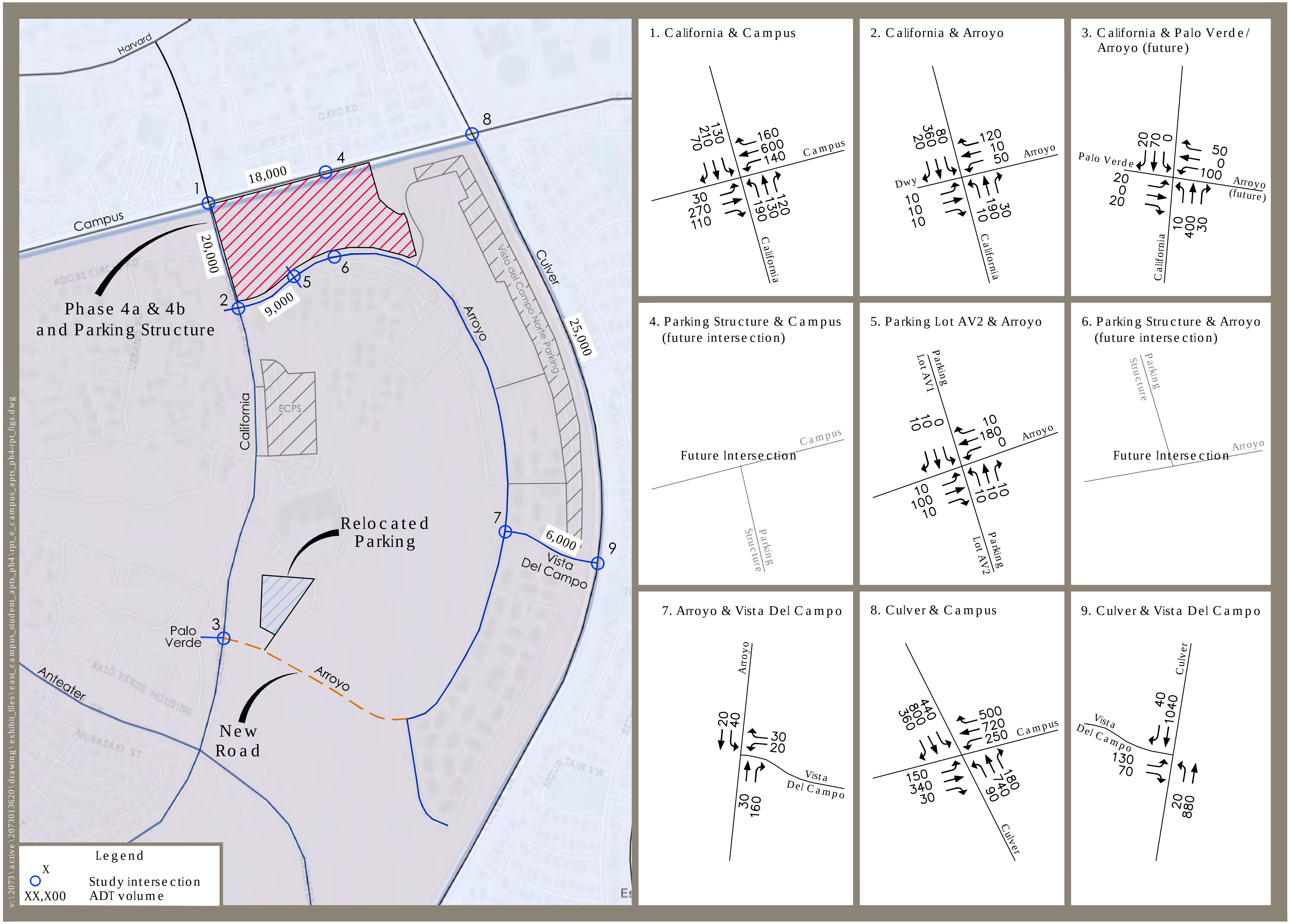

Figure 2-4

2035 No-Project ADT and AM Peak Hour Volumes

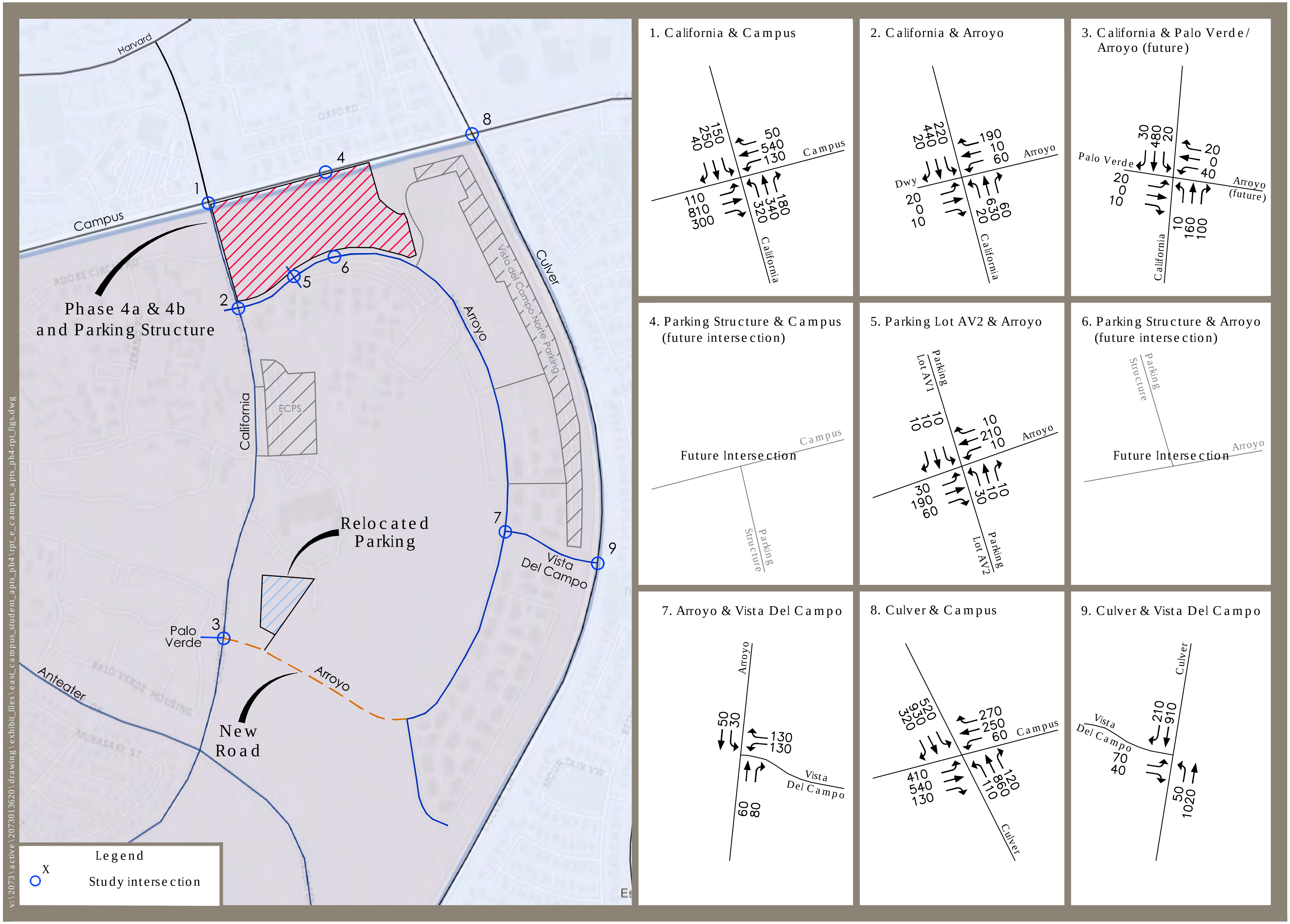

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Figure 2-5

2035 No-Project PM Peak Hour Volumes

3.0 PROJECT DESCRIPTION

This chapter describes the traffic characteristics of the proposed project. Trip generation for the project is summarized, and the distribution of project trips on the study area circulation system is presented.

3.1 PROJECT DESCRIPTION

The proposed project is located northeast of the intersection of California Avenue and Arroyo Drive, between Campus Drive and Arroyo Drive in the East Campus area of the UCI campus. The project will be developed in two phases. The first phase (Phase 4a) consists of approximately 1,500 beds, residential support amenities, and a parking structure. The second phase (Phase 4b) consists of approximately 950 beds. An increase of approximately 19 staff is expected with the proposed project. Parking will be provided in a new parking structure on the site with access to Campus Drive and Arroyo Drive, the existing East Campus Parking Structure, and Vista del Campo Norte surface lot.

The residents will consist of sophomore, junior, and senior undergraduate students and graduate students. It is expected that approximately 55 percent of the student residents of the proposed project would own a vehicle on campus.

The project will displace a surface parking lot which will be relocated south of the ARC. The relocated parking lot will be constructed as part of Phase 4a. Access to the relocated parking lot will be provided by the existing service road south of the ARC, unless the optional extension of Arroyo Drive is completed as part of Phase 4a. With the extension of Arroyo Drive, access to the relocated parking lot will be provided by Arroyo Drive.

The proposed student apartment conceptual design plan is illustrated in **Figure 3-1**.

The development of the proposed project would exceed the number of beds analyzed in the LRDP EIR Traffic Study for this specific area. However, as noted previously, the number of beds provided on the UCI campus is still under the total number of beds analyzed in the LRDP EIR overall. Therefore, the project is consistent with the overall LRDP student bed count, but with this project a certain number of beds as analyzed in the LRDP EIR Traffic Study are shifted from another area of the campus to the East Campus.

3.2 TRIP GENERATION

Trip generation rates for the project were derived from the 2013 UCI Mesa Court Expansion Project Traffic Study trip rates, and are based a 55 percent vehicle ownership factor by students (derivation of the trip rates is included in **Appendix D**). **Table 3-1** summarizes the trip generation rates per bed and the resulting total trip generation for Phase 4a and Phase 4b of the proposed residential project.

Source: ktgy Architecture + Planning

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Figure 3-1

Project Conceptual Design

Table 3-1 Proposed Project Trip Generation Summary

Land Use	Amount	AM Peak Hour			PM Peak Hour			ADT
		In	Out	Total	In	Out	Total	
Trip Generation								
Phase 4a								
Student Housing	1,500 Bed	7	74	81	65	39	104	1,403
Staff	19	2	Negl.	2	1	2	3	19
Total Phase 4a		9	74	83	66	41	107	1,422
Phase 4b								
Student Housing	950 Bed	4	47	51	40	24	64	888
Total Phase 4a + 4b								
Total		13	121	134	106	65	171	2,310
Trip Rates (MCTM)								
Student Housing	Bed	0.005	0.050	0.055	0.043	0.026	0.069	0.935
Staff	Person	0.105	0.024	0.105	0.053	0.105	0.158	1.00
LRDP Adjustment								
Graduate Housing	434 Bed	2	25	27	22	14	36	477
Support	27 TSF	21	5	26	10	21	31	324
Total LRDP Adjustment		-10	91	81	74	30	104	1,509

Source: *UCI Main Campus Traffic Model (MCTM)*

ADT = average daily trips
LRDP = Long-Range Development Plan
Negl. = Negligible

The 19 full-time staff would generate approximately 19 ADT trips which is negligible and would generate a minimal number of trips during the AM (7 AM – 9 AM) and PM (4 PM – 6 PM) peak hours.[1] These trips were included in Phase 4a of the project. As this table shows, Phase 4a of the project would generate a total of 1,422 daily vehicle trips, of which 83 would occur during the AM peak hour and 107 would occur during the PM peak hour. Phase 4b would generate an additional 888 daily trips, 51 additional AM peak hour and 64 additional PM peak hour trips, for a total of 2,310 daily trips, 134 AM peak hour trips, and 171 PM peak hour trips.

The project site consists of graduate student housing and support facilities in the 2007 LRDP land use. Compared with the land use assumptions in the LRDP for the project site, the proposed project would add 1,509 daily trips above the level of daily trips analyzed in the project site TAZ in the 2007 LRDP EIR Traffic Study. This increases the peak hour trips analyzed for the project site in the LRDP EIR Traffic Study by 81 AM peak hour trips, and 104 PM peak hour trips.

The trips originating from the existing surface parking lot on the project site were redistributed to the new parking location south of the ARC.

3.3 TRIP DISTRIBUTION

The trips generated by the project will use Campus Drive and Arroyo Drive to access the surrounding streets.

Project trip distribution was determined based on ADT volume forecasts from ITAM. Approximately 56 percent of project trips are oriented toward Campus Drive to the west and California Avenue and Culver Drive to the north, 8 percent of project trips are oriented west on Anteater Drive towards Bison Avenue, and 36 percent of project trips are oriented toward Culver Drive/Bonita Canyon Drive to the south via Vista Del Campo or Anteater Drive. From there, project trips will disperse along Campus Drive, Culver Drive, Bonita Canyon Drive, Newport Coast Drive, Shady Canyon Drive, and SR-73.

Figure 3-2 illustrates the general distribution for the proposed project. **Figures 3-3 and 3-4** illustrate the Phase 4a AM and PM peak hour project-generated trips, respectively, based on the distribution presented here. Approximately 825 parking spaces would be required for Phase 4a (55 percent student vehicle ownership). The new parking structure is assumed to be completed with construction of Phase 4a (approximately 550 spaces). The remaining 275 vehicles were assumed to park in the Vista del Campo Norte parking lot.

Figures 3-5 and 3-6 illustrate the total Phase 4a + 4b AM and PM peak hour project-generated trips, respectively. Approximately 1,350 parking spaces would be required for Phase 4a + 4b of the project. Parking will be provided in the new parking structure (550 spaces), ECPS (500 spaces), and Vista del Campo Norte parking lot (300 spaces).

[1] The ADT trip rate for UCI staff category in the LRDP is 1.0 per person.

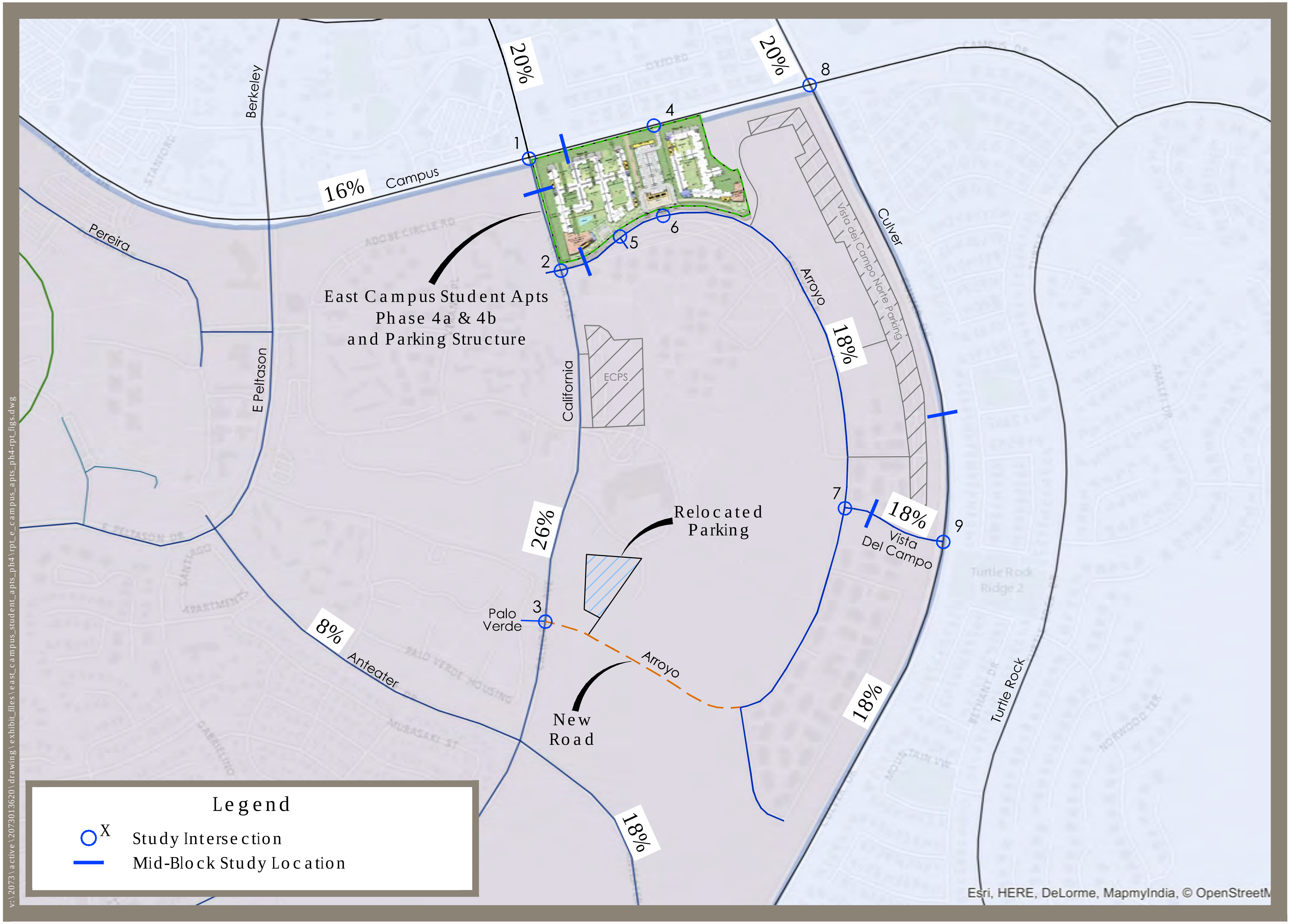

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Figure 3-2

General Project Distribution

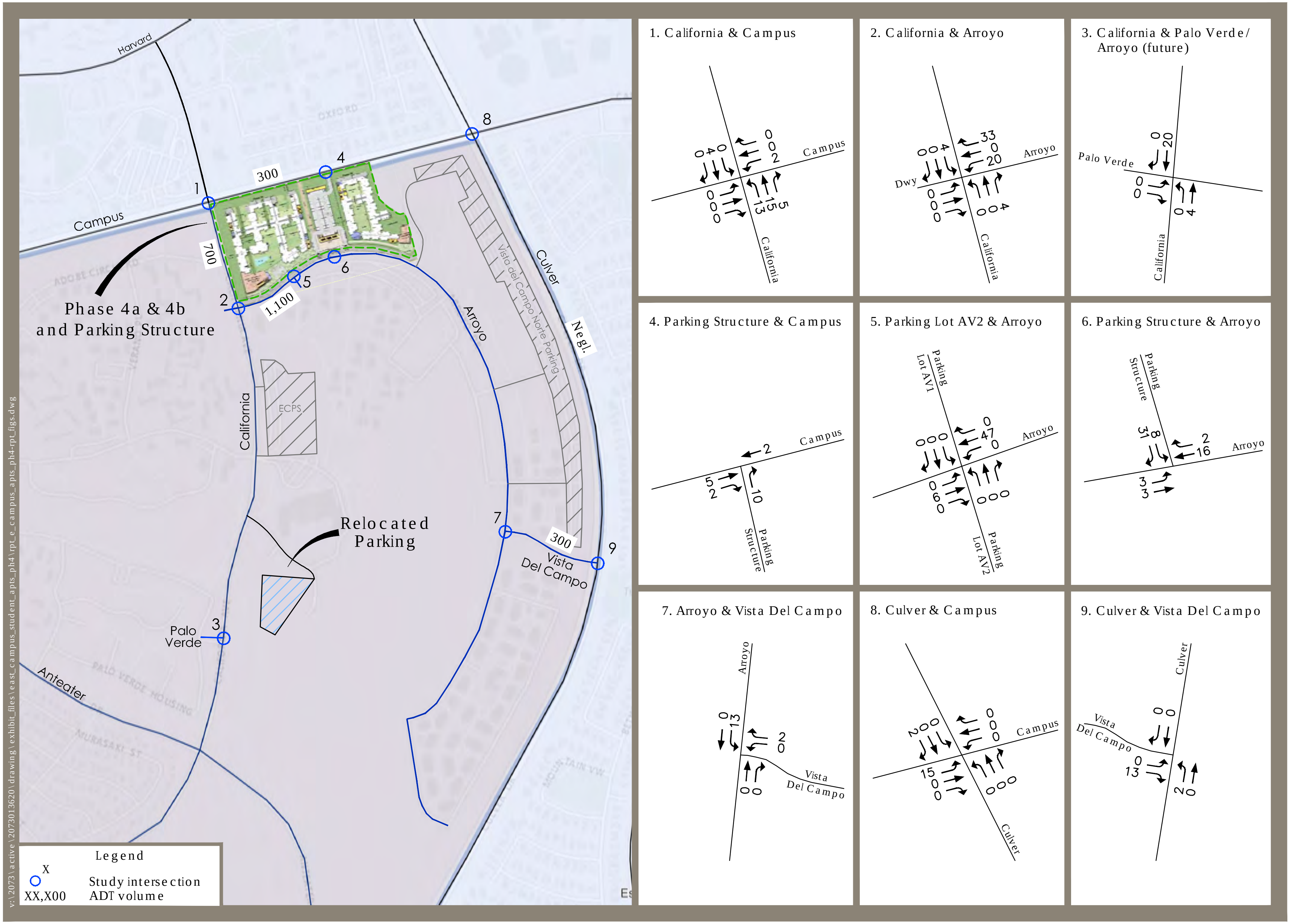

Figure 3-3

Phase 4a Project-Generated ADT and AM Peak Hour Trips

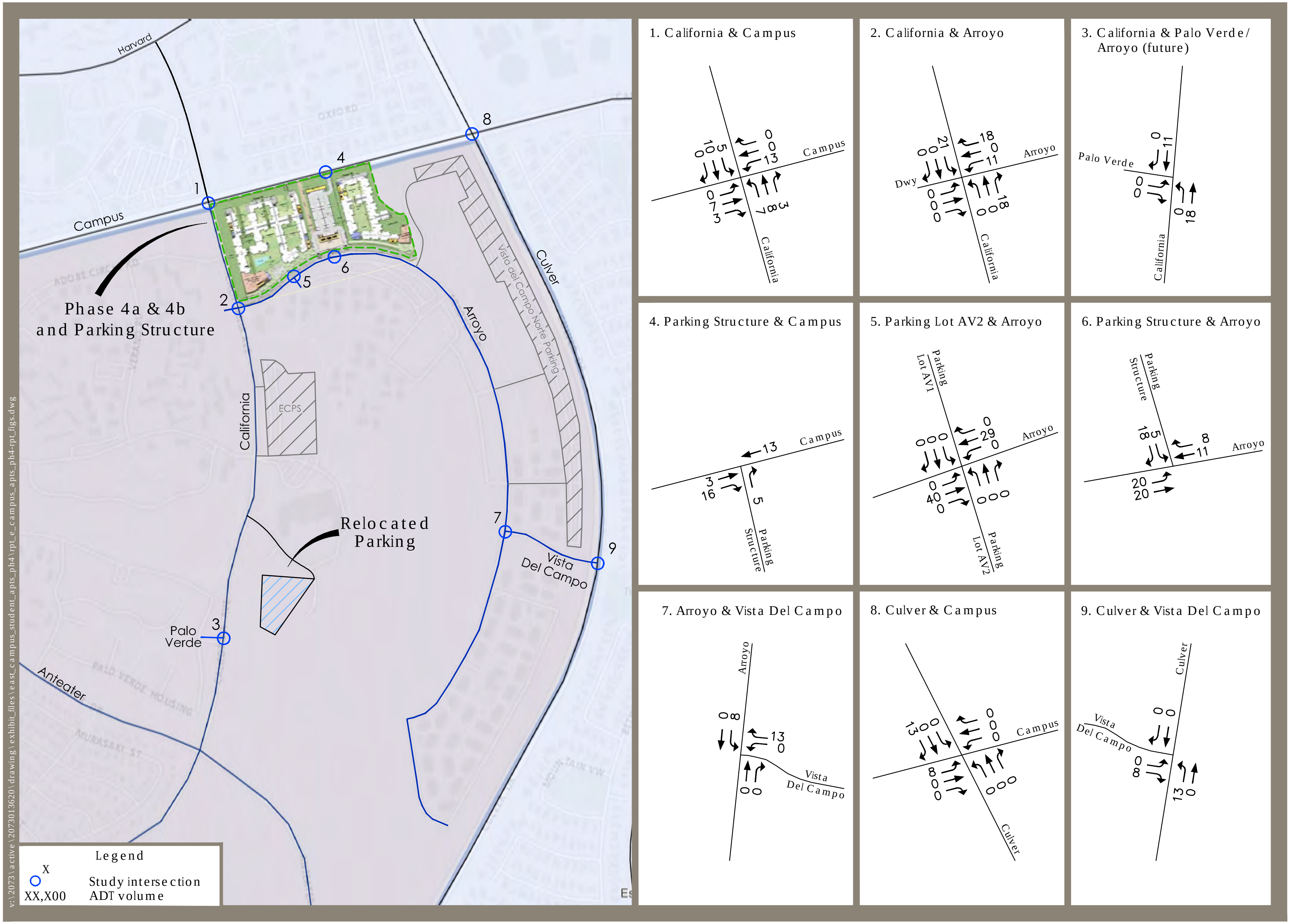

Figure 3-4

Phase 4a Project-Generated PM Peak Hour Trips

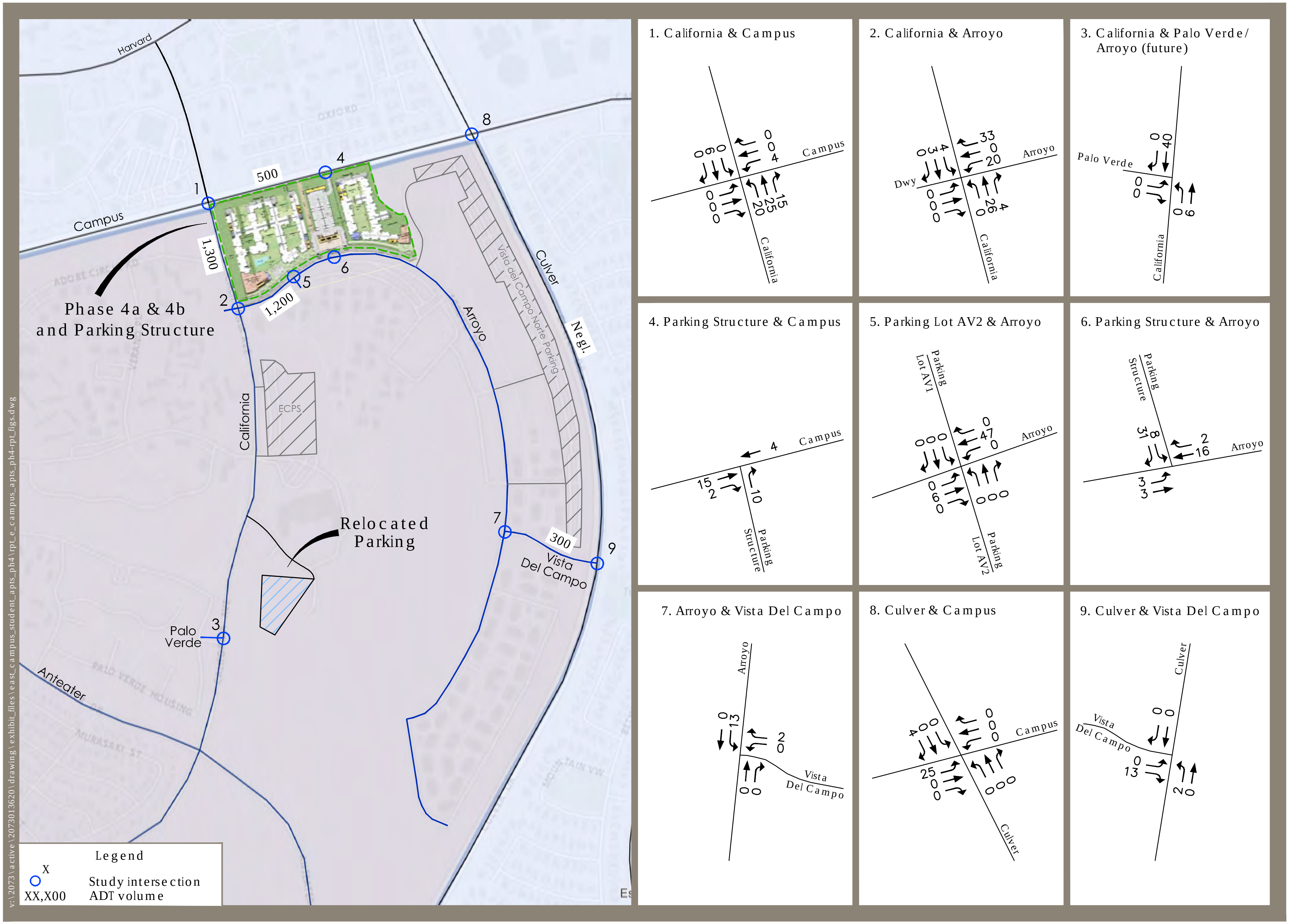

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Figure 3-5

Phase 4a + 4b Project-Generated ADT and AM Peak Hour Trips

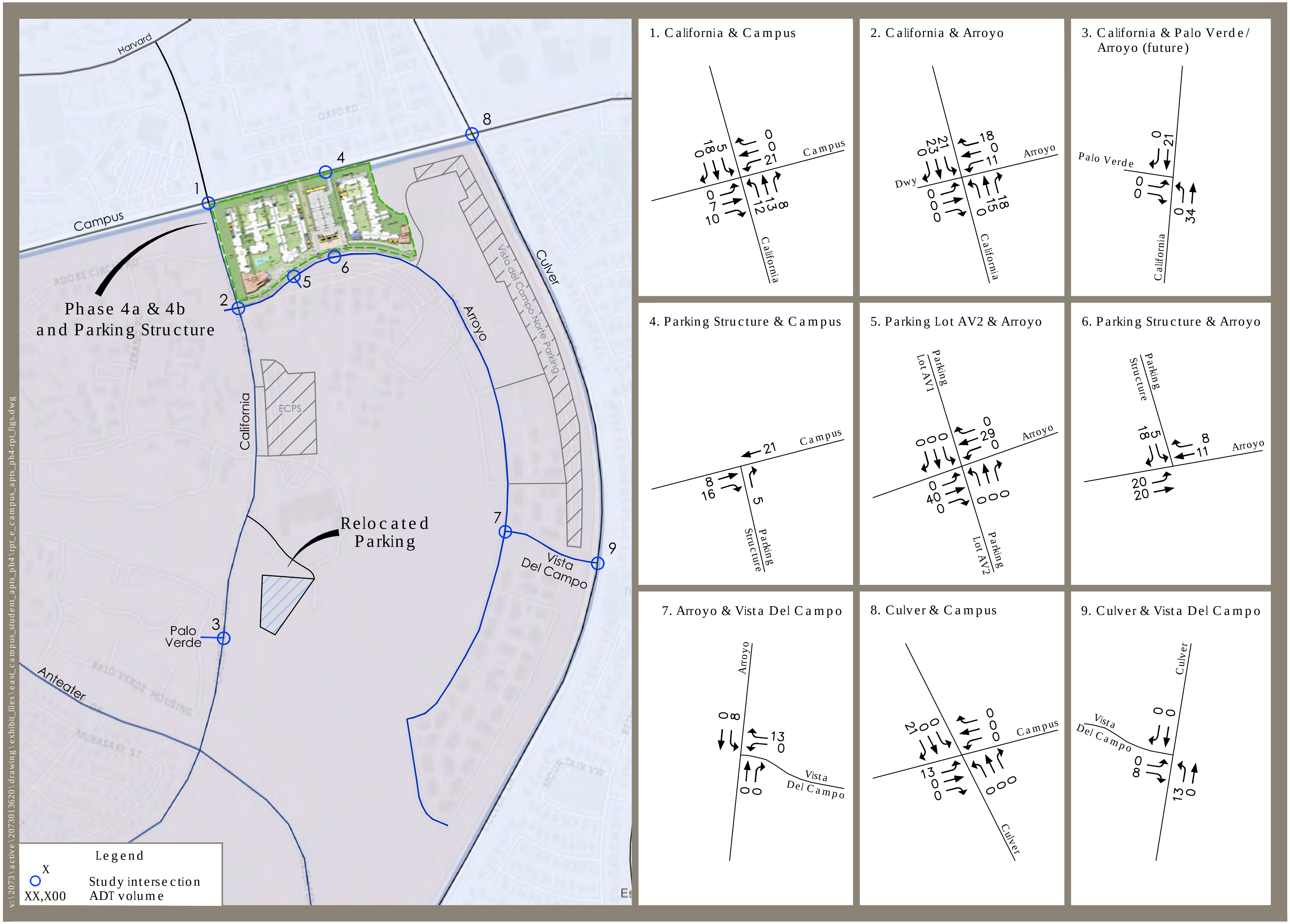

Figure 3-6

Phase 4a + 4b Project-Generated PM Peak Hour Trips

4.0 IMPACT ANALYSIS

This chapter presents the with-project intersection volumes, and evaluates the project impacts on the study intersections. Project increases resulting in significant impacts, if any, are discussed and mitigation measures are identified if necessary.

4.1 EXISTING PLUS PROJECT CONDITIONS

Impacts from Phase 4a and Phase 4b of the project are analyzed under existing conditions. Existing-plus-project peak hour volumes were obtained by adding the project-generated peak hour trips, presented in **Section 3.3**, to the existing intersection turning movement volumes at the study intersections. The existing-plus-project volumes were adjusted to account for the relocation of the surface parking lot from the project site to the location south of the ARC as part of Phase 4a. These existing-plus-project volumes do not assume the optional extension of Arroyo Drive. Impacts from the optional extension of Arroyo Drive are presented later in this chapter.

Project Phase 4a

Figures 4-1 and 4-2 illustrate the existing-plus-Phase 4a AM and PM peak hour volumes, respectively, at the study intersections. The existing and existing-plus-Phase 4a LOS at the study intersections based on existing lane configurations are summarized in **Table 4-1** (the ICU calculation worksheets are included in **Appendix B**, and HCM delay calculation worksheets are included in **Appendix C**).

Table 4-1 Existing-Plus-Phase 4a Intersection LOS Summary

	Existing				Existing + Project Phase 4a			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Intersection	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS
ICU Methodology – Signalized Intersections								
1. California & Campus	.39	A	.60	A	.40	A	.63	B
8. Culver & Campus	.51	A	.55	A	.51	A	.55	A
9. Culver & Vista Del Campo	.37	A	.39	A	.37	A	.39	A
HCM Delay Methodology – Stop-Controlled Intersections								
2. California & Arroyo	10 sec	A	16 sec	C	11 sec	B	18 sec	C
3. California & Palo Verde/Arroyo (future)	11 sec	B	11 sec	B	11 sec	B	11 sec	B
4. Parking Structure (future) & Campus	N/A	--	N/A	--	9 sec	A	12 sec	B
5. Parking Lot AV2 & Arroyo	8 sec	A	9 sec	A	9 sec	A	9 sec	A
6. Parking Structure (future) & Arroyo	N/A	--	N/A	--	8 sec	A	9 sec	A
7. Arroyo & Vista Del Campo	7 sec	A	8 sec	A	8 sec	A	8 sec	A

As this table shows, the signalized study intersections continue to operate at LOS B or better with the addition of project Phase 4a traffic, and the stop-controlled intersections operate at LOS C

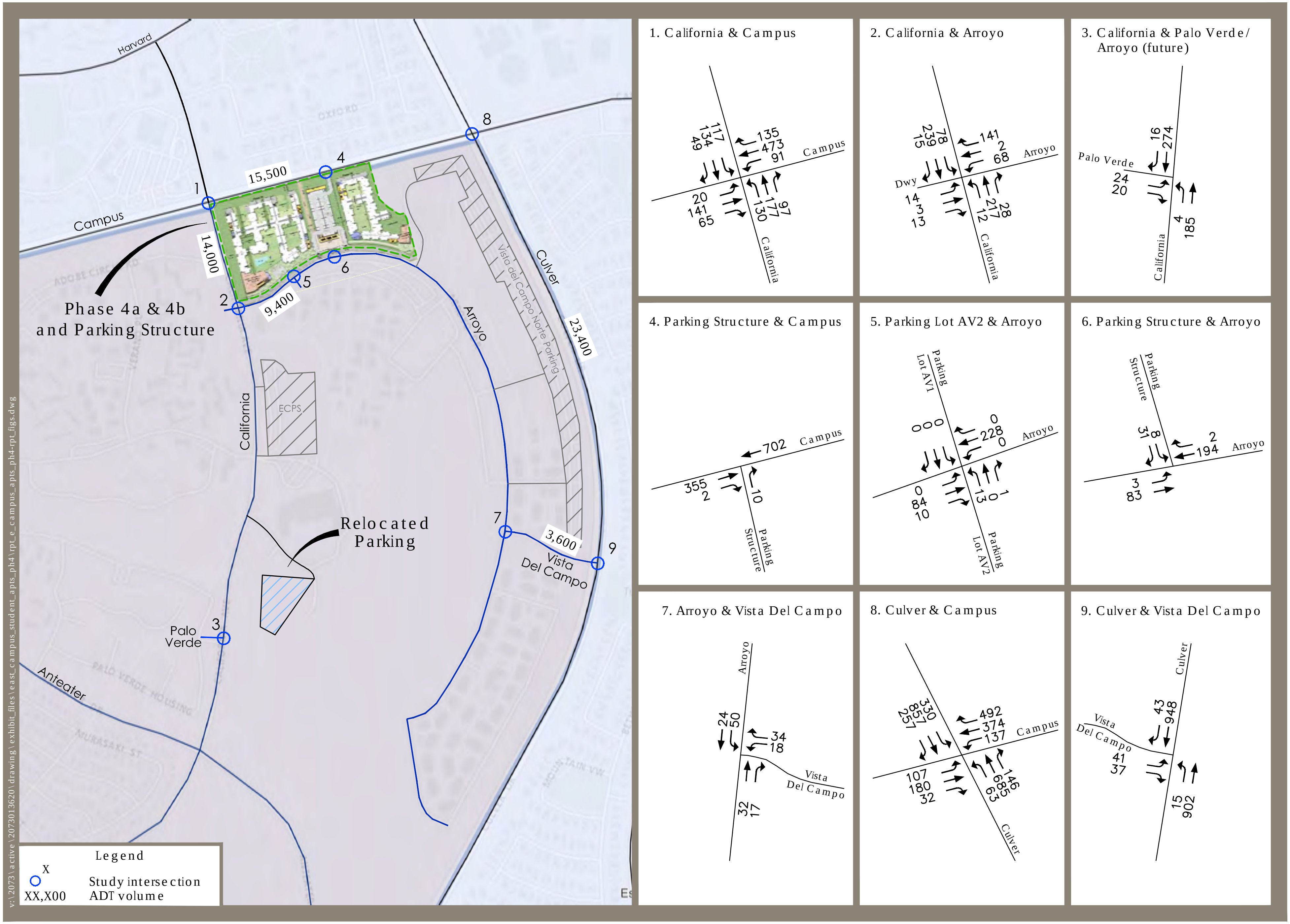

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Figure 4-1

Existing-Plus-Phase 4a ADT and AM Peak Hour Volumes

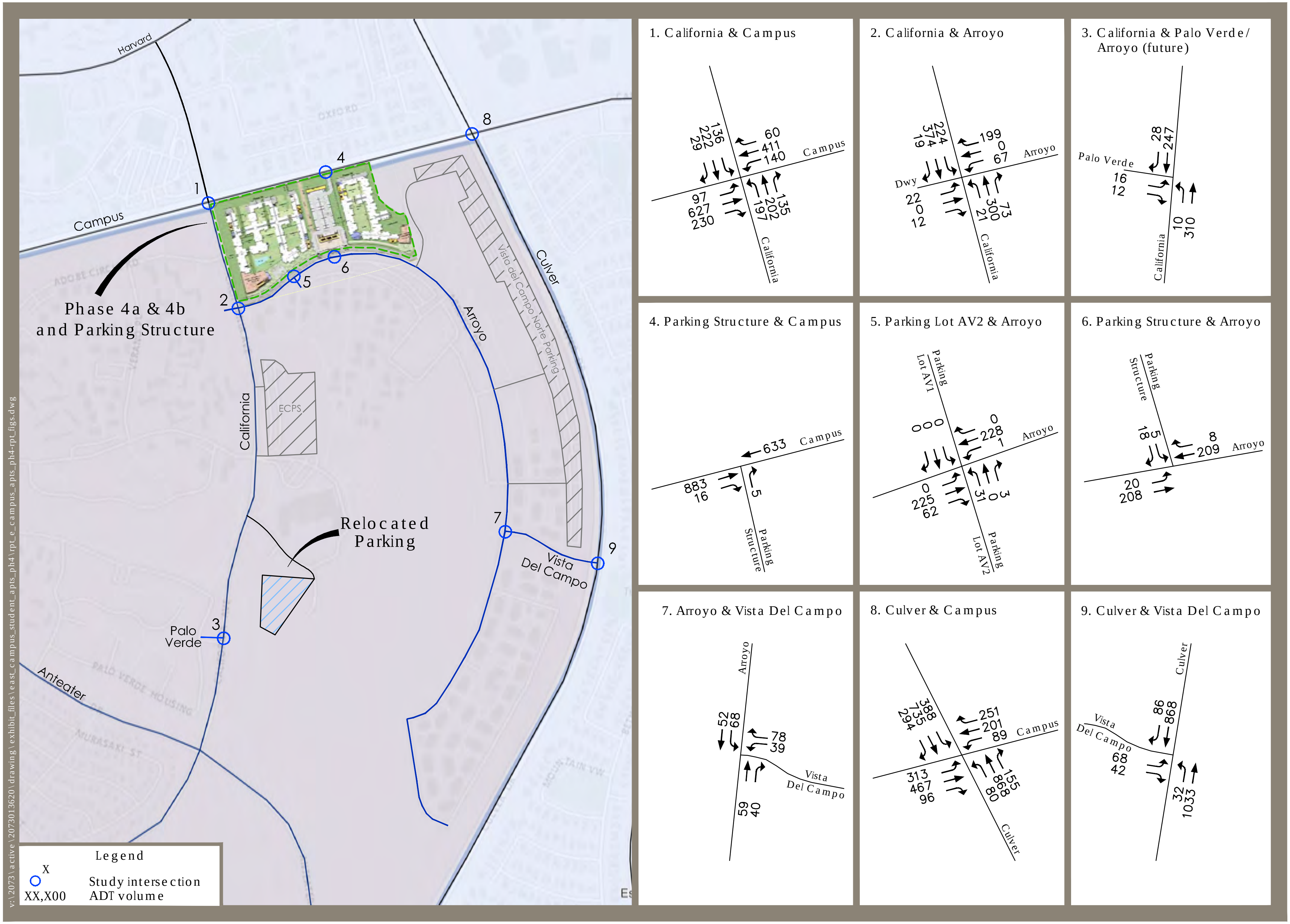

Figure 4-2

Existing-Plus-Phase 4a PM Peak Hour Volumes or better during the AM and PM peak hours. Therefore, Phase 4a has a less than significant impact on the on-campus and off-campus study intersections, and no mitigation is necessary.

Project Phase 4a + 4b

Project Phase 4b traffic was added to the existing-plus-Phase 4a volumes presented above. **Figures 4-3 and 4-4** illustrate these AM and PM peak hour volumes, respectively.

Table 4-2 summarizes the existing and existing-plus-Phase 4a + 4b LOS based on existing lane configurations (the ICU calculation worksheets are included in **Appendix B**, and HCM delay calculation worksheets are included in **Appendix C**).

Table 4-2 Existing-Plus-Phase 4a + 4b Intersection LOS Summary

	Existing				Existing + Project Phase 4a + 4b			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Intersection	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS
ICU Methodology – Signalized Intersections								
1. California & Campus	.39	A	.60	A	.40	A	.65	B
8. Culver & Campus	.51	A	.55	A	.51	A	.55	A
9. Culver & Vista Del Campo	.37	A	.39	A	.37	A	.39	A
HCM Delay Methodology – Stop-Controlled Intersections								
2. California & Arroyo	10 sec	A	16 sec	C	11 sec	B	19 sec	C
3. California & Palo Verde/Arroyo (future)	11 sec	B	11 sec	B	11 sec	B	11 sec	B
4. Parking Structure (future) & Campus	N/A	--	N/A	--	10 sec	A	12 sec	B
5. Parking Lot AV2 & Arroyo	8 sec	A	9 sec	A	9 sec	A	9 sec	A
6. Parking Structure (future) & Arroyo	N/A	--	N/A	--	8 sec	A	9 sec	A
7. Arroyo & Vista Del Campo	7 sec	A	8 sec	A	8 sec	A	8 sec	A

The signalized study intersections would continue to operate at acceptable LOS B or better during the AM and PM peak hours with the addition of project traffic, and the stop-controlled intersections would continue to operate at LOS C or better. Phase 4a + 4b would have no significant impact on the on-campus or off-campus study intersections, and no mitigation is required.

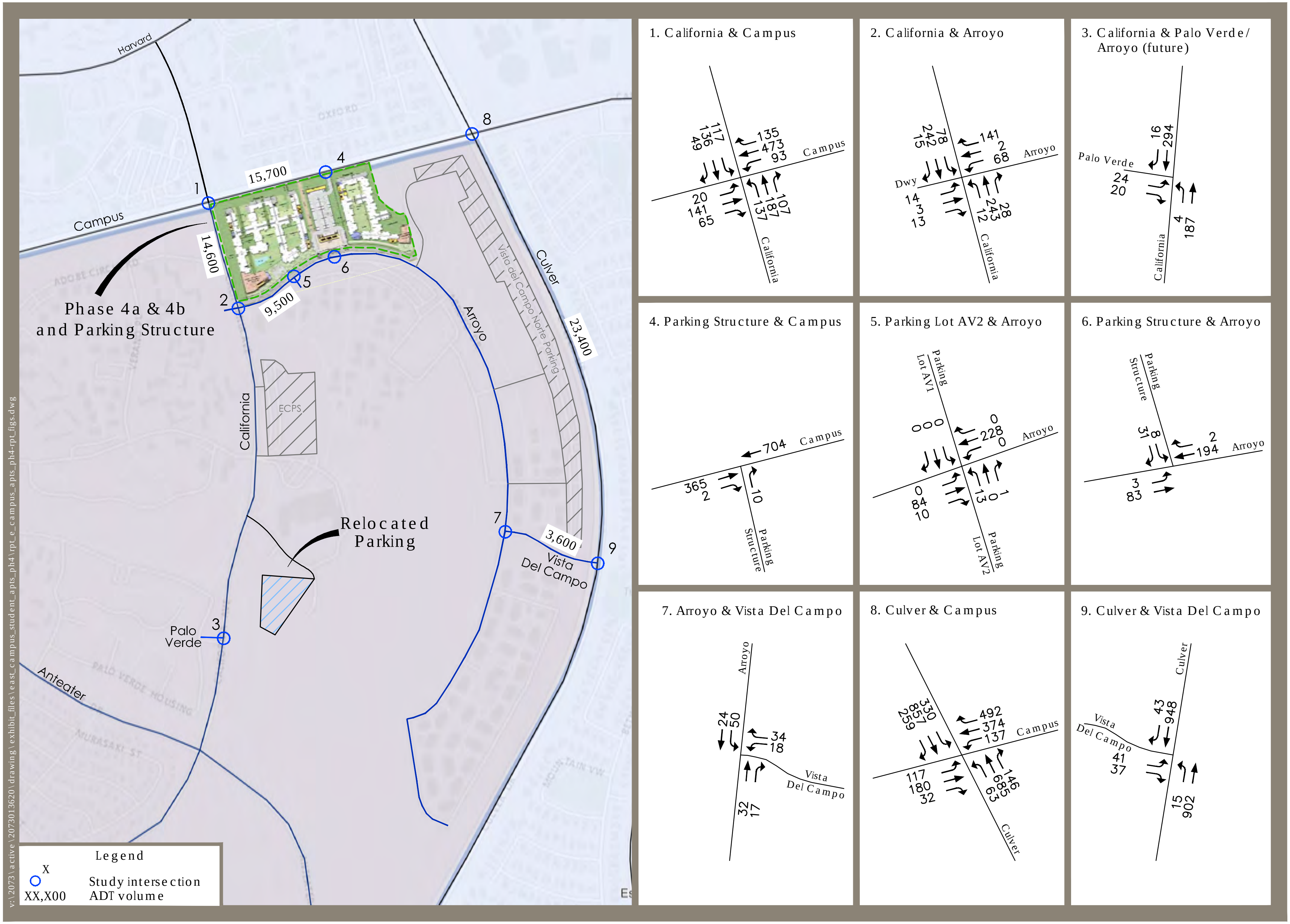

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Figure 4-3

Existing-Plus-Phase 4a + 4b ADT and AM Peak Hour Volumes

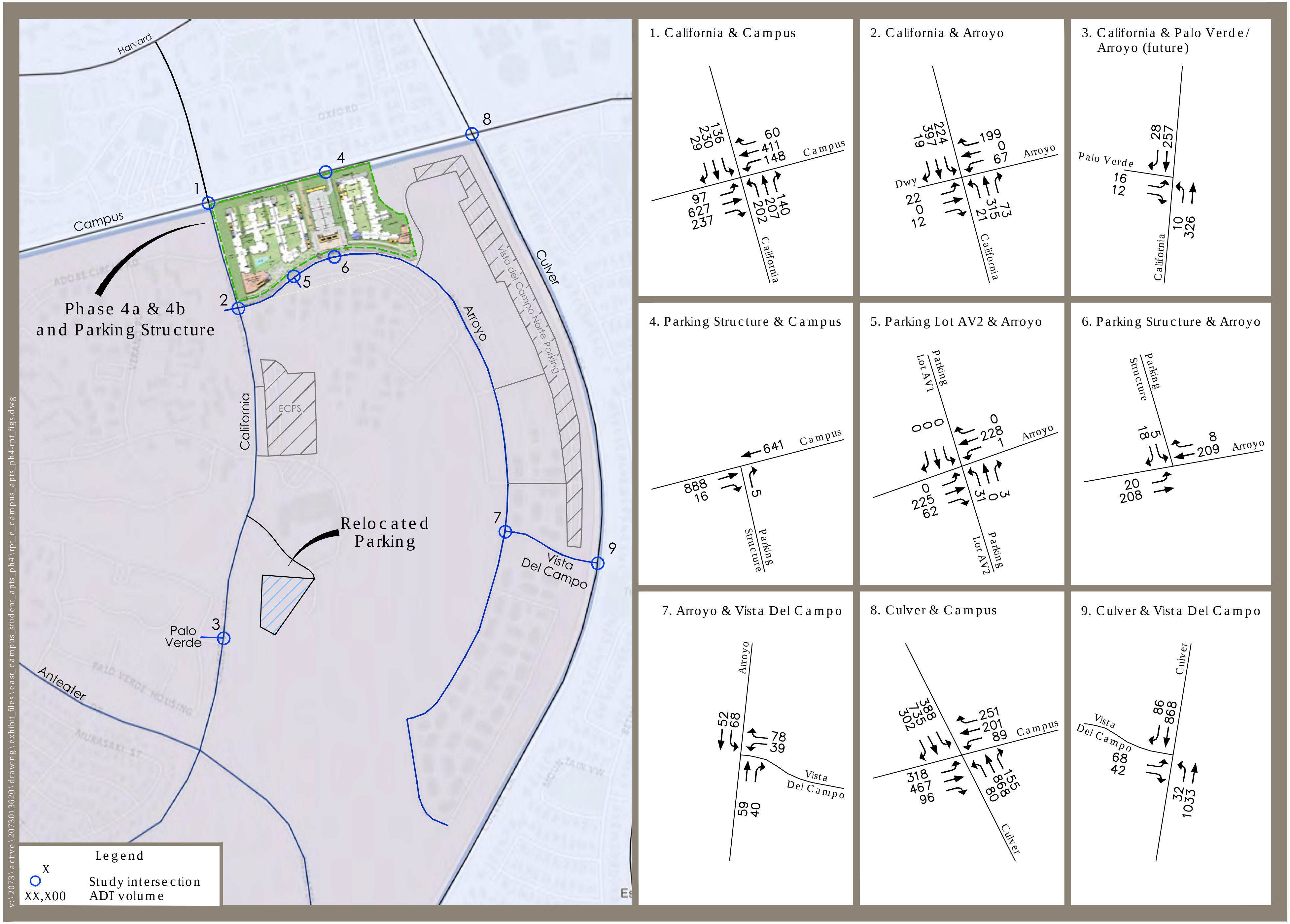

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Figure 4-4

Existing-Plus-Phase 4a + 4b PM Peak Hour Volumes

4.1.1 Arroyo Drive Extension Impacts

The extension of Arroyo Drive is an optional component of the project, and could be constructed with Phase 4a of the project. With the extension of Arroyo Drive, the relocated parking lot would take access from the new roadway, and Vista del Campo and Vista del Campo Norte could use the extension for more direct access to California Avenue. The impact of the Arroyo Drive extension are summarized in this section.

Project Phase 4a

The existing and existing-plus-Phase 4a with Arroyo Drive extension LOS at the study intersections based on existing lane configurations (except at the Arroyo Drive intersection where a fourth leg is added) are summarized in **Table 4-3** (the ICU calculation worksheets are included in **Appendix B**, and HCM delay calculation worksheets are included in **Appendix C**).

Table 4-3 Existing-Plus-Phase 4a with Arroyo Drive Extension Intersection LOS Summary

	Existing				Existing + Project Phase 4a With Extension			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Intersection	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS
ICU Methodology – Signalized Intersections								
1. California & Campus	.39	A	.60	A	.40	A	.63	B
8. Culver & Campus	.51	A	.55	A	.51	A	.55	A
9. Culver & Vista Del Campo	.37	A	.39	A	.37	A	.39	A
HCM Delay Methodology – Stop-Controlled Intersections								
2. California & Arroyo	10 sec	A	16 sec	C	10 sec	B	16 sec	C
3. California & Palo Verde/Arroyo (future)	11 sec	B	11 sec	B	10 sec	B	12 sec	B
4. Parking Structure (future) & Campus	N/A	--	N/A	--	9 sec	A	12 sec	B
5. Parking Lot AV2 & Arroyo	8 sec	A	9 sec	A	8 sec	A	9 sec	A
6. Parking Structure (future) & Arroyo	N/A	--	N/A	--	8 sec	A	8 sec	A
7. Arroyo & Vista Del Campo	7 sec	A	8 sec	A	7 sec	A	8 sec	A

As this table shows, with the optional extension of Arroyo Drive, the study intersections would continue to operate at acceptable LOS C or better during the AM and PM peak hours, and Phase 4a of the project has no significant impact on the on-campus or off-campus study intersections. Therefore, no mitigation is necessary.

Project Phase 4a + 4b

Table 4-4 summarizes the existing and existing-plus-Phase 4a + 4b LOS (the ICU calculation worksheets are included in **Appendix B**, and HCM delay calculation worksheets are included in **Appendix C**).

Table 4-4 Existing-Plus-Phase 4a + 4b with Arroyo Drive Extension Intersection LOS Summary

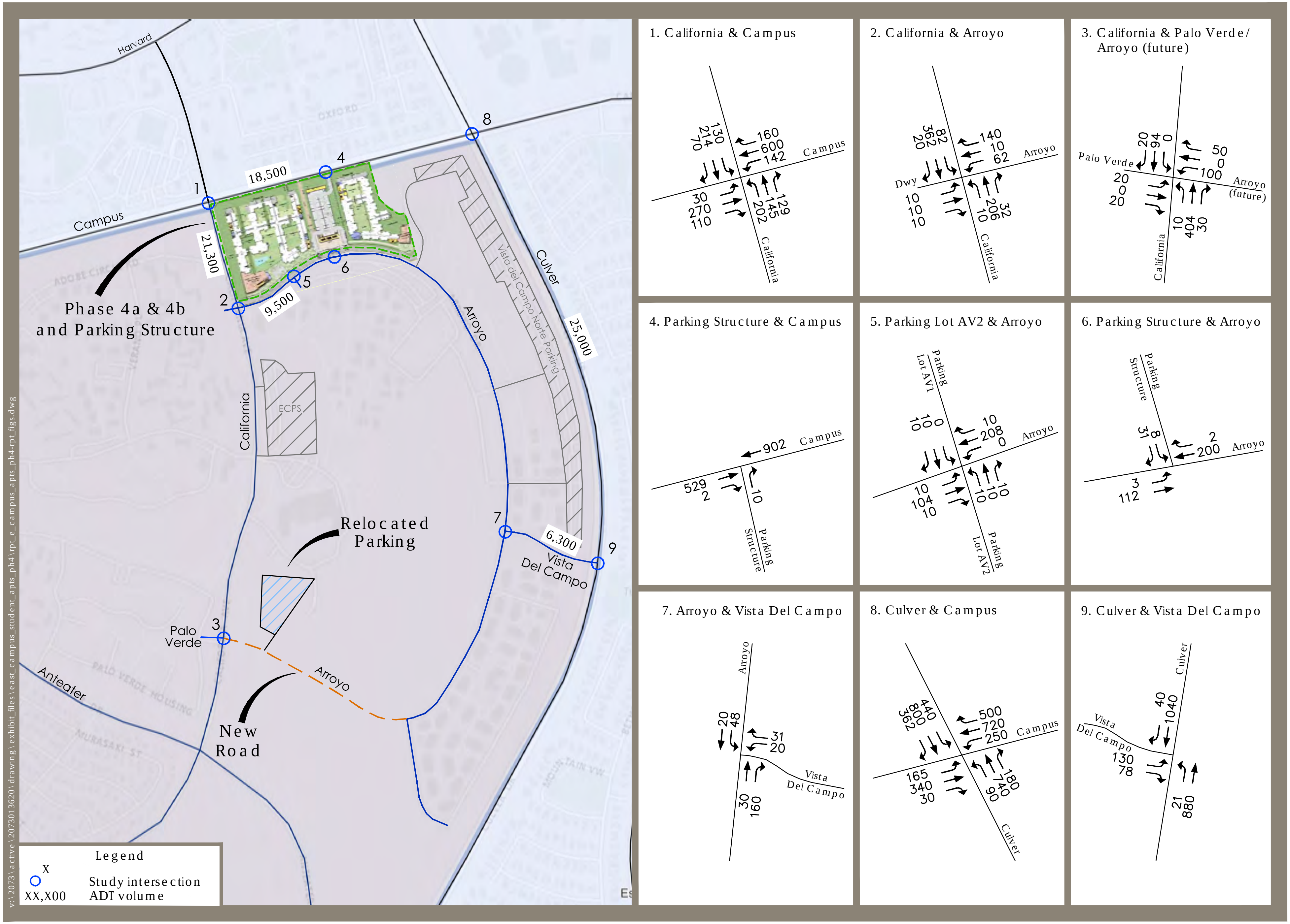
Intersection	Existing				Existing + Project Phase 4a + 4b With Arroyo Drive			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS
ICU Methodology – Signalized Intersections								
1. California & Campus	.39	A	.60	A	.40	A	.65	B
8. Culver & Campus	.51	A	.55	A	.51	A	.55	A
9. Culver & Vista Del Campo	.37	A	.39	A	.37	A	.39	A
HCM Delay Methodology – Stop-Controlled Intersections								
2. California & Arroyo	10 sec	A	16 sec	C	11 sec	B	17 sec	C
3. California & Palo Verde/Arroyo (future)	11 sec	B	11 sec	B	12 sec	B	12 sec	B
4. Parking Structure (future) & Campus	N/A	--	N/A	--	10 sec	A	12 sec	B
5. Parking Lot AV2 & Arroyo	8 sec	A	9 sec	A	8 sec	A	9 sec	A
6. Parking Structure (future) & Arroyo	N/A	--	N/A	--	8 sec	A	8 sec	A
7. Arroyo & Vista Del Campo	7 sec	A	8 sec	A	7 sec	A	8 sec	A

The intersections would continue to operate at acceptable LOS C or better with the optional Arroyo Drive extension during the AM and PM peak hours. Phase 4a + 4b would have no significant impact on the on-campus or off-campus study intersections, and no mitigation is required.

4.2 LONG-RANGE ANALYSIS

As discussed in **Section 3.3**, the proposed project would add 81 AM and 104 PM peak hour trips above the level of trips analyzed in the 2007 LRDP EIR Traffic Study. **Figure 4-5** illustrates the 2035 with-Project ADT and AM peak hour volumes, and **Figure 4-6** illustrates the 2035 with-Project PM peak hour volumes.

Table 4-5 summarizes the 2035 with-Project LOS for the study intersections (the ICU calculation worksheets are included in **Appendix B**, and HCM delay calculation worksheets are included in **Appendix C**).



Stantec

Figure 4-5

2035 With-Project ADT and AM Peak Hour Volumes

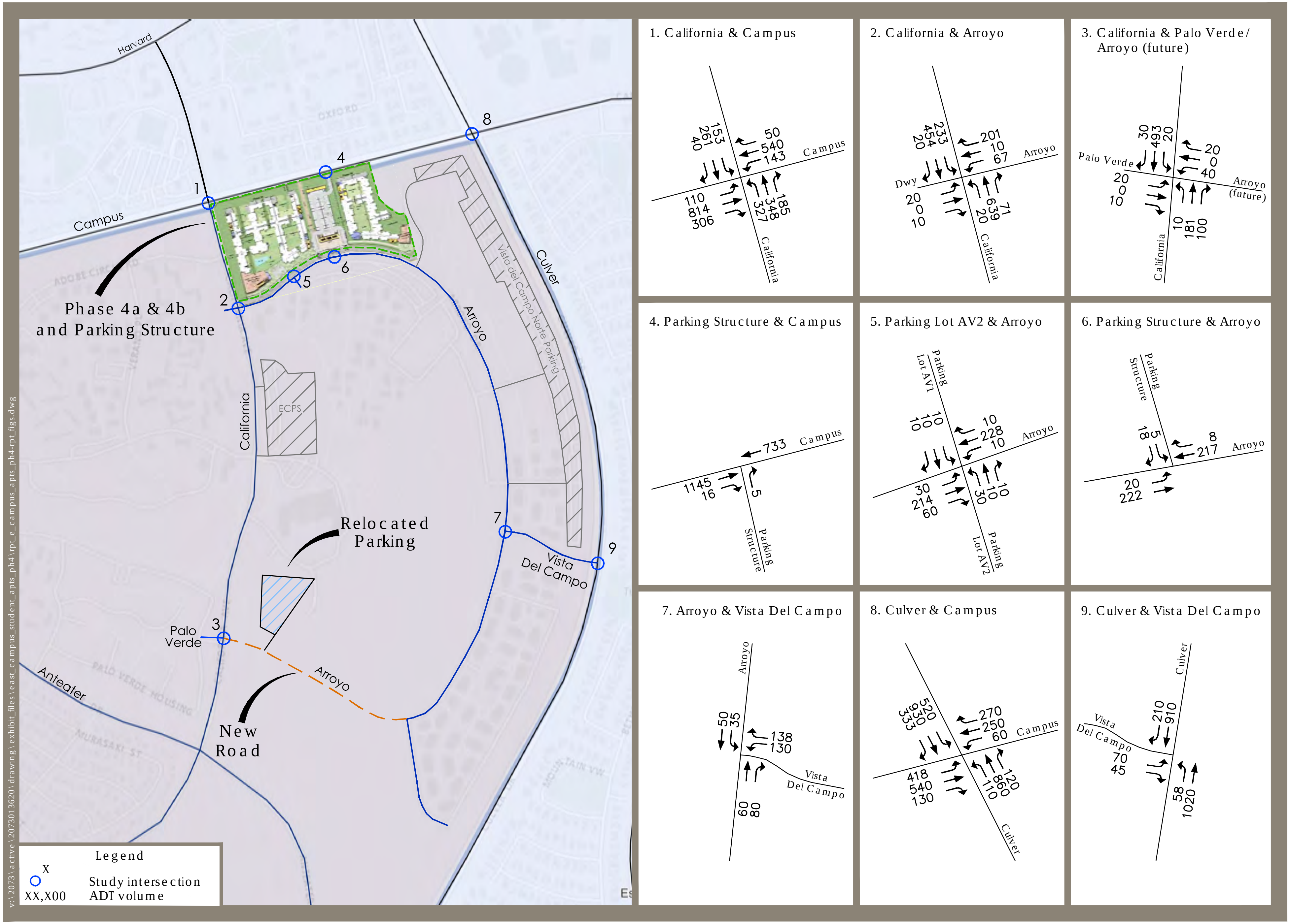


Figure 4-6

2035 With-Project PM Peak Hour Volumes

Table 4-5 2035 with-Project Intersection LOS Summary

Intersection	2035 No-Project				2035 with-Project			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS
ICU Methodology – Signalized Intersections								
1. California & Campus	.52	A	.80	C	.54	A	.80	C
2. California & Arroyo (future signal)	.32	A	.55	A	.33	A	.57	A
3. California & Palo Verde/Arroyo (future signal)	.28	A	.26	A	.28	A	.26	A
8. Culver & Campus	.60	A	.62	B	.60	A	.62	B
9. Culver & Vista Del Campo	.46	A	.45	A	.46	A	.45	A
HCM Delay Methodology – Stop-Controlled Intersections								
4. Parking Structure (future) & Campus	N/A	--	N/A	--	10 sec	B	14 sec	B
5. Parking Lot AV2 & Arroyo	8 sec	A	10 sec	A	9 sec	A	10 sec	A
6. Parking Structure (future) & Arroyo	N/A	--	N/A	--	9 sec	A	9 sec	A
7. Arroyo & Vista Del Campo	8 sec	A	9 sec	A	8 sec	A	9 sec	A

The intersection of California Avenue and Campus Drive will operate at LOS C during the AM and PM peak hour with buildout of the proposed project. All other study intersections will operate at LOS B or better during the AM and PM peak hours under buildout conditions with the addition of the proposed project.

The study intersections will operate at acceptable LOS under long-range conditions. Buildout of the project has no significant impact on the study intersections under LRDP buildout conditions; therefore, no mitigation is necessary.

4.3 CONCLUSIONS

The proposed East Campus Student Apartments Phase 4 will be developed in two phases. Phase 4a of the project consists of approximately 1,500 beds, 19 staff, residential amenities and a parking structure, and would generate approximately 1,422 daily trips, 83 trips during the AM peak hour, and 107 trips during the PM peak hour. Phase 4a would have no significant impact on the study area intersections under existing conditions.

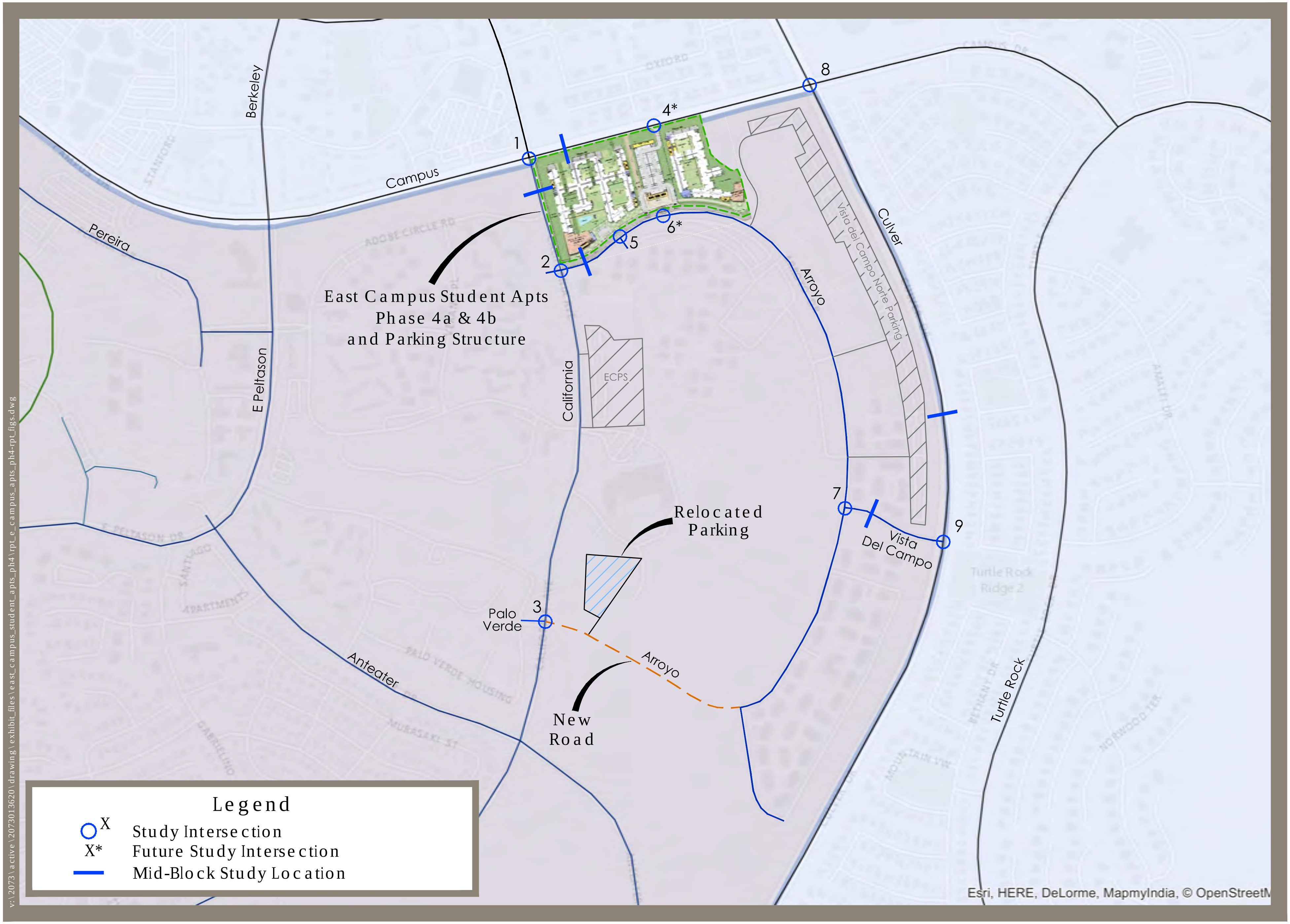
Phase 4b of the project would add 950 beds. The total of Phase 4a and 4b of the project would generate approximately 2,310 daily trips, 134 AM peak hour trips, and 171 PM peak hour trips. The total project would have no significant impact on the study area intersections under existing conditions.

The extension of Arroyo Drive is an optional component of Phase 4a of the project. Phase 4a and Phase 4b of the project would have no significant impact on the study intersections during the AM and PM peak hours with the extension of Arroyo Drive.

With this project, the UCI campus remains under the total number of beds analyzed in the LRDP EIR Traffic Study overall. Therefore, the project is consistent with the overall LRDP student bed count. The study intersections would operate at acceptable LOS C or better with the proposed project. Therefore, the proposed project would have no significant impact on the long-range circulation system.

In conclusion, the project has no significant impact on the surrounding circulation system under existing or long-range conditions; therefore, no mitigation is necessary.

Appendix A COUNT DATA



Stantec

Figure A-1

Study Locations

Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City: IRVINE
N-S Direction: CALIFORNIA AVENUE
E-W Direction: CAMPUS DRIVE

File Name : H1702101
Site Code : 00000000
Start Date : 2/16/2017
Page No : 1

Groups Printed- Turning Movements

	CALIFORNIA AVENUE Southbound			CAMPUS DRIVE Westbound				CALIFORNIA AVENUE Northbound			CAMPUS DRIVE Eastbound				
Start Time	Right	Thru	Left	Right	Thru	Left	U-Turn	Right	Thru	Left	Right	Thru	Left	U-Turn	Int. Total
07:00	2	11	8	12	44	10	0	3	18	14	14	18	1	0	155
07:15	2	13	21	12	65	12	0	14	26	18	12	27	4	0	226
07:30	14	18	40	18	112	18	4	46	41	35	14	46	9	0	415
07:45	14	34	17	28	133	26	2	12	37	31	14	29	4	0	381
Total	32	76	86	70	354	66	6	75	122	98	54	120	18	0	1177
08:00	11	45	27	38	97	17	1	12	48	25	19	31	5	0	376
08:15	10	33	33	51	131	20	1	22	36	26	18	35	2	0	418
08:30	10	32	22	23	146	17	3	12	35	28	18	38	10	0	394
08:45	8	31	16	13	116	19	4	5	32	40	21	37	7	0	349
Total	39	141	98	125	490	73	9	51	151	119	76	141	24	0	1537
*** BREAK ***															
16:00	10	40	24	8	98	26	0	5	46	46	34	74	18	2	431
16:15	6	40	28	7	85	20	2	10	47	37	48	88	20	0	438
16:30	8	42	24	19	89	32	0	7	51	53	40	85	20	1	471
16:45	6	49	36	12	106	23	5	12	42	48	62	124	21	3	549
Total	30	171	112	46	378	101	7	34	186	184	184	371	79	6	1889
17:00	3	58	38	19	97	28	1	25	48	45	62	167	21	4	616
17:15	8	44	33	13	118	30	3	23	55	42	65	147	27	1	609
17:30	7	57	23	16	88	21	4	35	43	49	45	139	18	1	546
17:45	11	53	37	12	108	35	5	49	48	54	55	167	24	1	659
Total	29	212	131	60	411	114	13	132	194	190	227	620	90	7	2430
Grand Total	130	600	427	301	1633	354	35	292	653	591	541	1252	211	13	7033
Apprch %	11.2	51.9	36.9	13	70.3	15.2	1.5	19	42.5	38.5	26.8	62.1	10.5	0.6	
Total %	1.8	8.5	6.1	4.3	23.2	5	0.5	4.2	9.3	8.4	7.7	17.8	3	0.2	

Transportation Studies, Inc.
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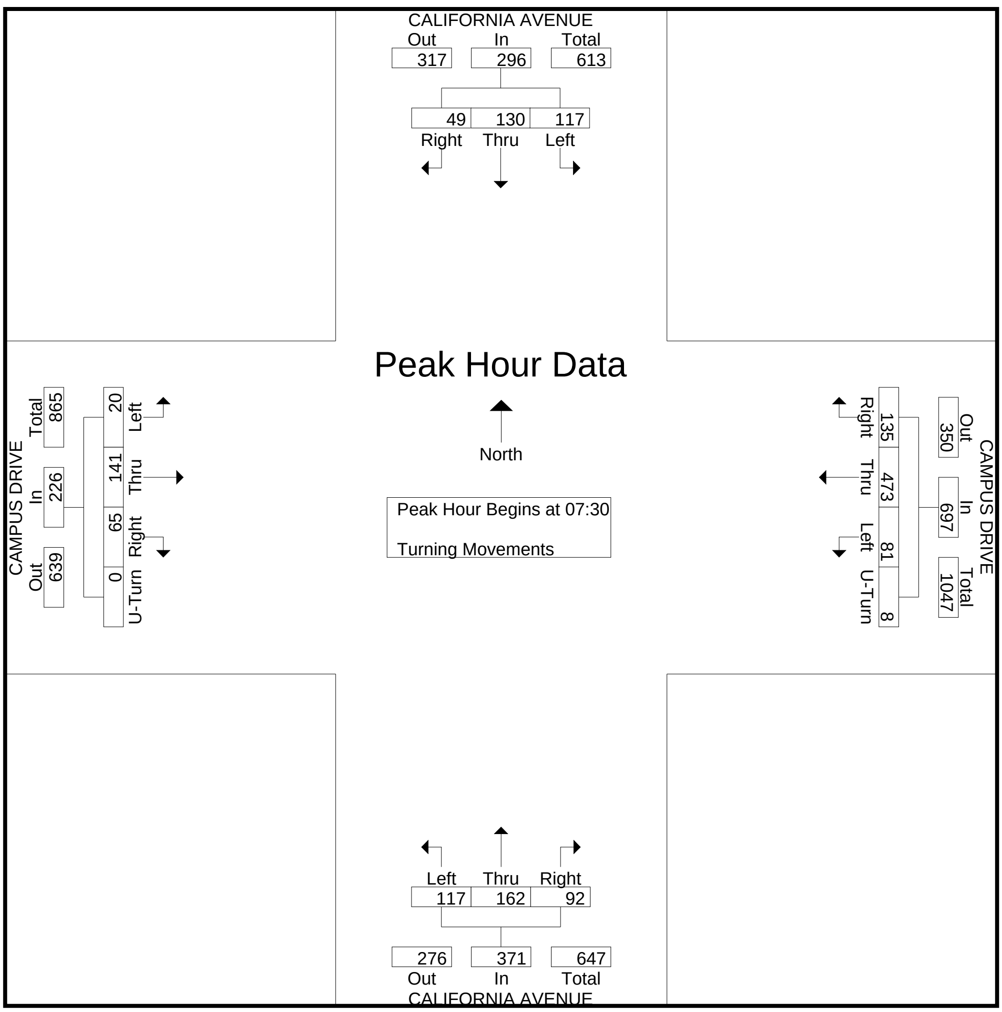
Tustin, CA. 92780

City: IRVINE
N-S Direction: CALIFORNIA AVENUE
E-W Direction: CAMPUS DRIVE

File Name : H1702101
Site Code : 00000000
Start Date : 2/16/2017

	CALIFORNIA AVENUE Southbound				CAMPUS DRIVE Westbound					CALIFORNIA AVENUE Northbound				CAMPUS DRIVE Eastbound					
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 07:30																			
07:30	14	18	40	72	18	112	18	4	152	46	41	**35**	**122**	14	**46**	**9**	0	**69**	
07:45	**14**	**34**	**17**	**65**	**28**	**133**	**26**	2	189	12	37	31	80	14	29	4	0	47	381
08:00	11	**45**	27	**83**							**48**	25	85	**19**	31	5	0	55	376
08:15	10	33	33	76	**51**	131	20	1	**203**										**418**
Total Volume	49	130	117	296	135	473	81	8	697	92	162	117	371	65	141	20	0	226	1590
% App. Total	16.6	43.9	39.5		19.4	67.9	11.6	1.1		24.8	43.7	31.5		28.8	62.4	8.8	0		
PHF	.875	.722	.731	.892	.662	.889	.779	.500	.858	.500	.844	.836	.760	.855	.766	.556	.000	.819	.951

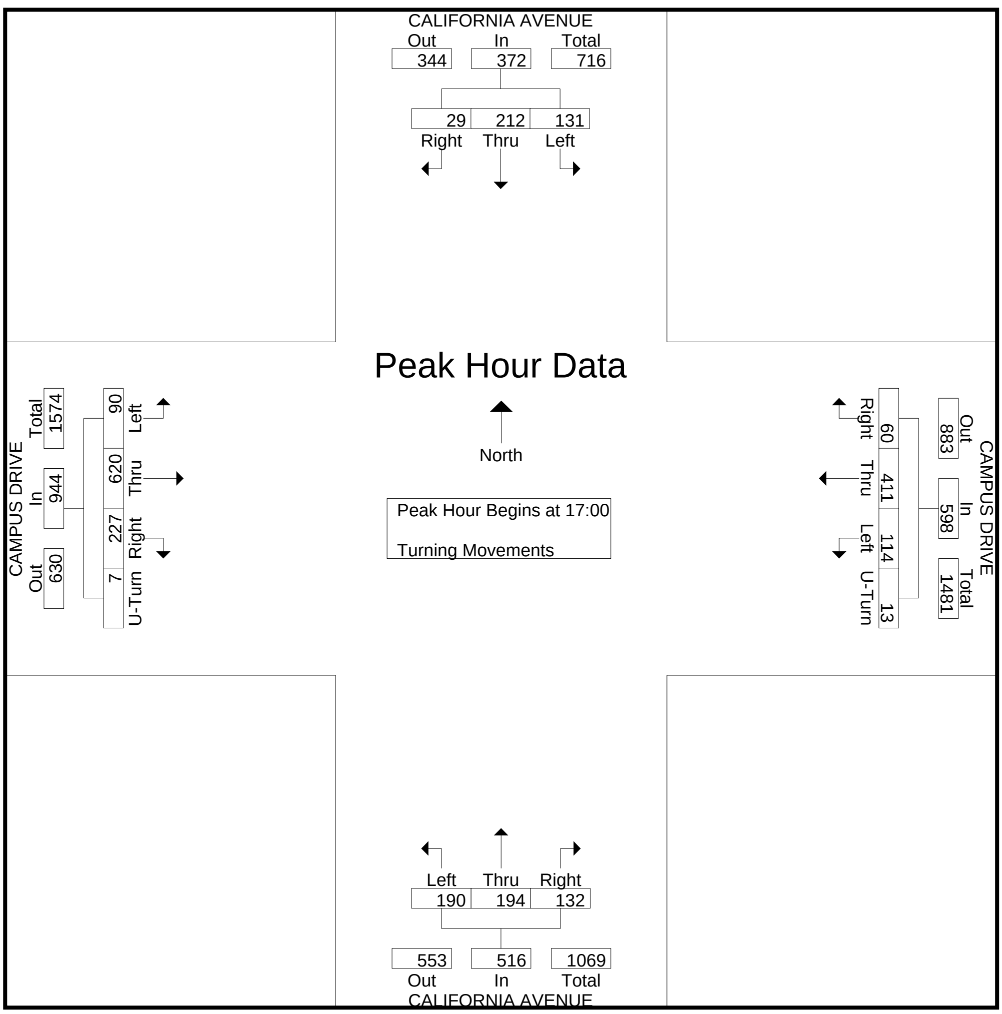


Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City: IRVINE
N-S Direction: CALIFORNIA AVENUE
E-W Direction: CAMPUS DRIVE

File Name : H1702101
Site Code : 00000000
Start Date : 2/16/2017

	CALIFORNIA AVENUE Southbound				CAMPUS DRIVE Westbound					CALIFORNIA AVENUE Northbound				CAMPUS DRIVE Eastbound					
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 17:00																			
17:00	3	58	38	99	19	97	28	1	145	25	48	45	118	62	167	21	**4**	**254**	
17:15	**8**	**44**	**33**	**85**	**13**	**118**	**30**	**3**	**164**	**23**	**55**	42	120	**65**	147	**27**	1	240	609
17:30	7	57	23	87	16	88	21	4	129	35	43	49	127	45	139	18	1	203	546
17:45	**11**	53	37	**101**			**35**	**5**		**49**	48	**54**	**151**	55	167	24	1	247	**659**
Total Volume	29	212	131	372	60	411	114	13	598	132	194	190	516	227	620	90	7	944	2430
% App. Total	7.8	57	35.2		10	68.7	19.1	2.2		25.6	37.6	36.8		24	65.7	9.5	0.7		
PHF	.659	.914	.862	.921	.789	.871	.814	.650	.912	.673	.882	.880	.854	.873	.928	.833	.438	.929	.922



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Tustin, CA. 92780

City: IRVINE
N-S Direction: CALIFORNIA AVENUE
E-W Direction: ARROYO DRIVE

File Name : H1702102
Site Code : 00000000
Start Date : 2/15/2017

Groups Printed- Turning Movements

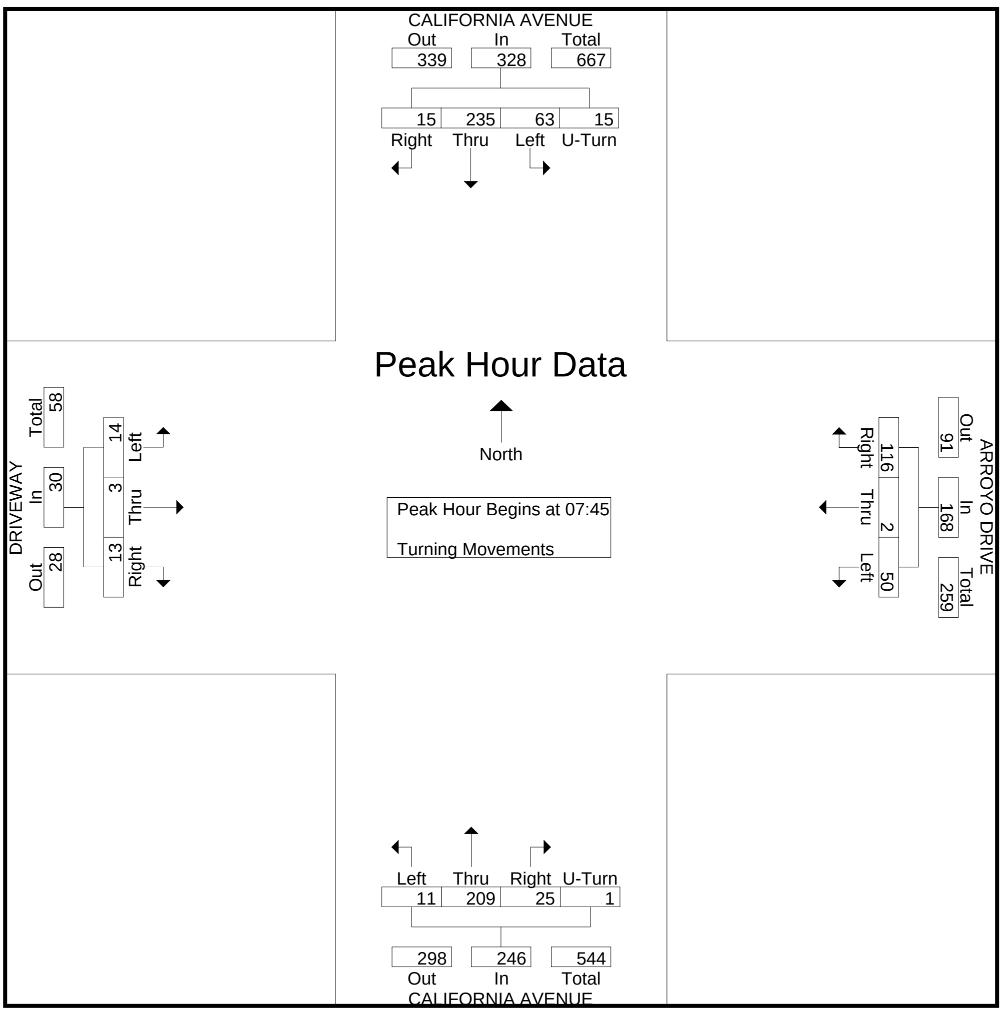
	CALIFORNIA AVENUE Southbound				ARROYO DRIVE Westbound			CALIFORNIA AVENUE Northbound				DRIVEWAY Eastbound			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	Right	Thru	Left	U-Turn	Right	Thru	Left	Int. Total
07:00	0	17	5	1	12	0	4	1	27	0	0	0	0	0	67
07:15	1	25	10	5	17	0	9	7	22	2	0	0	0	1	99
07:30	3	28	10	3	33	0	10	5	85	4	0	1	0	2	184
07:45	7	65	11	3	31	0	16	7	60	3	1	5	0	4	213
Total	11	135	36	12	93	0	39	20	194	9	1	6	0	7	563
08:00	2	81	15	5	26	0	8	6	48	4	0	2	1	4	202
08:15	4	36	19	2	23	1	7	6	47	4	0	3	1	2	155
08:30	2	53	18	5	36	1	19	6	54	0	0	3	1	4	202
08:45	2	47	16	2	38	0	12	4	37	2	0	1	0	1	162
Total	10	217	68	14	123	2	46	22	186	10	0	9	3	11	721
*** BREAK ***															
16:00	3	62	54	2	44	0	10	18	54	0	0	0	0	2	249
16:15	2	62	40	3	34	0	8	11	52	0	0	1	0	2	215
16:30	3	70	36	7	51	0	12	10	71	2	0	2	0	2	266
16:45	0	72	47	11	43	0	15	12	60	2	0	1	0	2	265
Total	8	266	177	23	172	0	45	51	237	4	0	4	0	8	995
17:00	7	85	58	9	46	0	11	17	75	3	1	2	0	5	319
17:15	5	90	45	12	38	0	10	9	73	6	0	3	0	4	295
17:30	4	98	43	6	56	0	19	17	68	5	3	3	0	5	327
17:45	3	83	37	11	51	0	19	19	74	1	2	4	0	8	312
Total	19	356	183	38	191	0	59	62	290	15	6	12	0	22	1253
Grand Total	48	974	464	87	579	2	189	155	907	38	7	31	3	48	3532
Apprch %	3.1	61.9	29.5	5.5	75.2	0.3	24.5	14	81.9	3.4	0.6	37.8	3.7	58.5	
Total %	1.4	27.6	13.1	2.5	16.4	0.1	5.4	4.4	25.7	1.1	0.2	0.9	0.1	1.4	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City: IRVINE
N-S Direction: CALIFORNIA AVENUE
E-W Direction: ARROYO DRIVE

File Name : H1702102
Site Code : 00000000
Start Date : 2/15/2017
Page No : 2

	CALIFORNIA AVENUE Southbound					ARROYO DRIVE Westbound				CALIFORNIA AVENUE Northbound					DRIVEWAY Eastbound				
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 07:45																			
07:45	7	65	11	3	86	31	0	16	47	7	60	3	1	**71**	**5**	0	**4**	**9**	**213**
08:00	**2**	**81**	15	**5**	**103**	26	0	8	34	6	48	**4**	0	58	2	**1**	4	7	202
08:15	4	36	**19**	2	61	23	**1**	7	31	6	47	4	0	57	3	1	2	6	155
08:30	2	53	18	5	78	**36**		**19**	**56**										
Total Volume	15	235	63	15	328	116	2	50	168	25	209	11	1	246	13	3	14	30	772
% App. Total	4.6	71.6	19.2	4.6		69	1.2	29.8		10.2	85	4.5	0.4		43.3	10	46.7		
PHF	.536	.725	.829	.750	.796	.806	.500	.658	.750	.893	.871	.688	.250	.866	.650	.750	.875	.833	.906

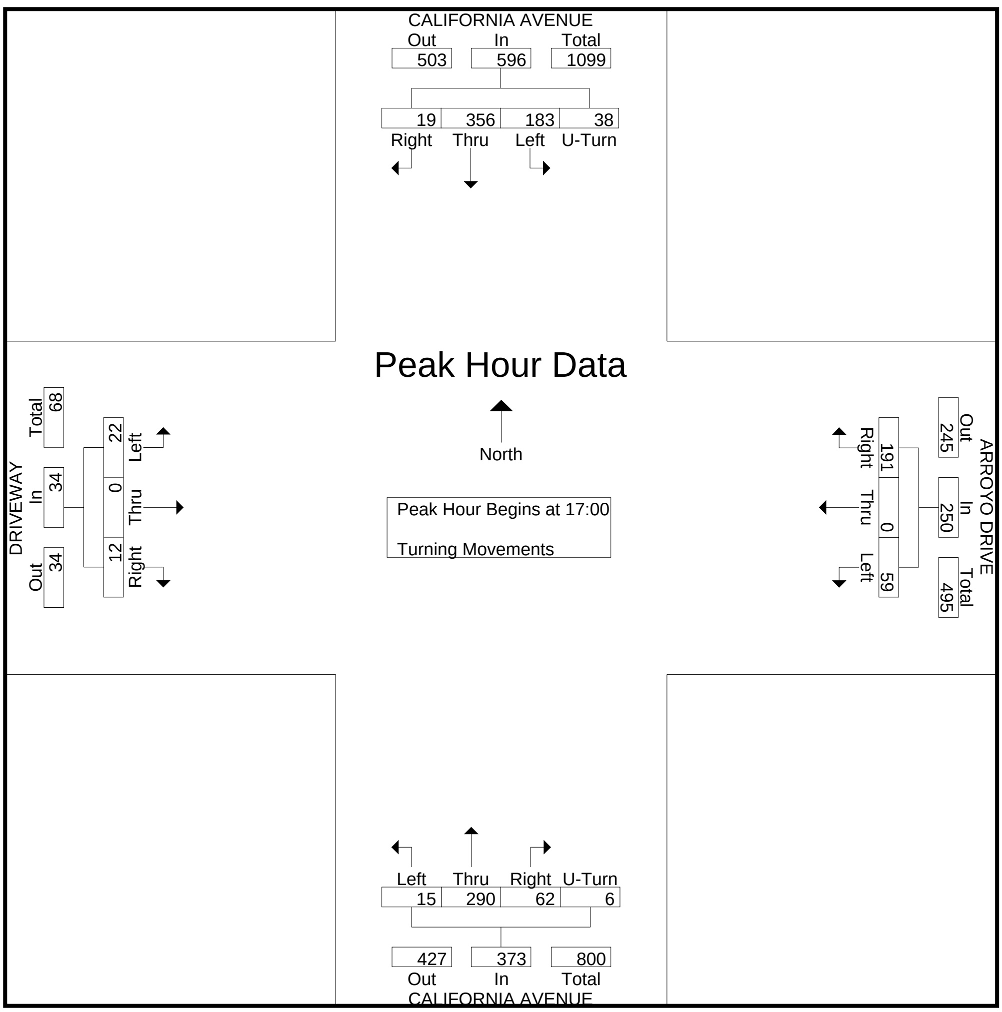


Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City: IRVINE
N-S Direction: CALIFORNIA AVENUE
E-W Direction: ARROYO DRIVE

File Name : H1702102
Site Code : 00000000
Start Date : 2/15/2017
Page No : 3

	CALIFORNIA AVENUE Southbound					ARROYO DRIVE Westbound				CALIFORNIA AVENUE Northbound					DRIVEWAY Eastbound				
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 17:00																			
17:00	**7**		**58**		**159**						**75**			**96**					
17:15	5	90	45	**12**	152	38	0	10	48	9	73	**6**	0	88	3	0	4	7	295
17:30	4	**98**	43	6	151	**56**		**19**	**75**				**3**	93	3	0	5	8	**327**
17:45	**3**	**83**	**37**	**11**	**134**	**51**	**0**	**19**	**70**	**19**	74	1	2	96	**4**	0	**8**	**12**	**312**
Total Volume	19	356	183	38	596	191	0	59	250	62	290	15	6	373	12	0	22	34	1253
% App. Total	3.2	59.7	30.7	6.4		76.4	0	23.6		16.6	77.7	4	1.6		35.3	0	64.7		
PHF	.679	.908	.789	.792	.937	.853	.000	.776	.833	.816	.967	.625	.500	.971	.750	.000	.688	.708	.958



Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City: IRVINE
N-S Direction: CALIFORNIA AVENUE
E-W Direction: PALO VERDE ROAD

File Name : H1702107
Site Code : 00005701
Start Date : 2/23/2017
Page No : 1

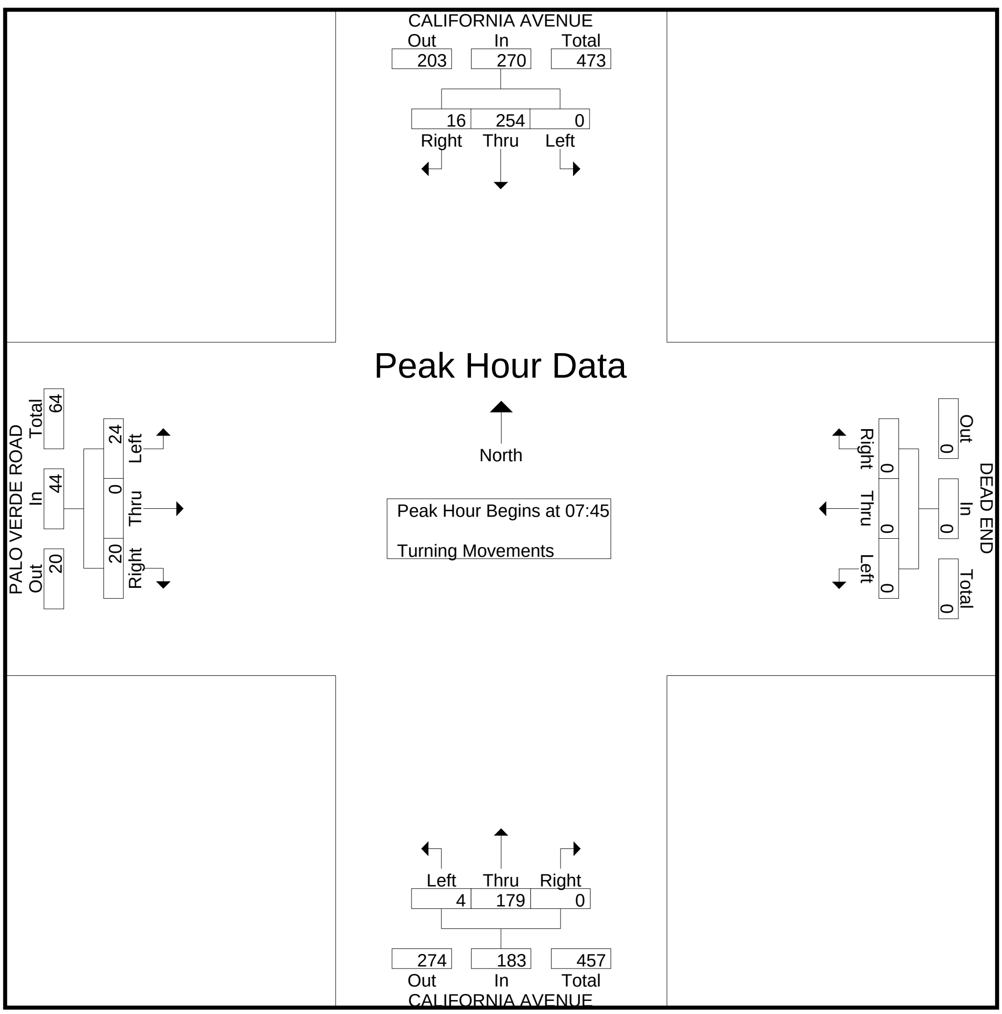
Groups Printed- Turning Movements

	CALIFORNIA AVENUE Southbound			DEAD END Westbound			CALIFORNIA AVENUE Northbound			PALO VERDE ROAD Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	0	21	0	0	0	0	0	14	0	2	0	4	41
07:15	1	18	0	0	0	0	0	18	1	1	0	5	44
07:30	4	44	0	0	0	0	0	34	1	7	0	9	99
07:45	5	92	0	0	0	0	0	43	0	8	0	13	161
Total	10	175	0	0	0	0	0	109	2	18	0	31	345
08:00	3	57	0	0	0	0	0	40	2	8	0	6	116
08:15	4	49	0	0	0	0	0	53	1	1	0	4	112
08:30	4	56	0	0	0	0	0	43	1	3	0	1	108
08:45	10	37	0	0	0	0	0	50	0	5	0	5	107
Total	21	199	0	0	0	0	0	186	4	17	0	16	443
16:00	11	38	0	0	0	0	0	30	1	0	0	5	85
16:15	6	40	0	0	0	0	0	44	1	2	0	1	94
16:30	6	46	0	0	0	0	0	38	1	3	0	5	99
16:45	4	62	0	0	0	0	0	29	2	0	0	3	100
Total	27	186	0	0	0	0	0	141	5	5	0	14	378
17:00	8	56	0	0	0	0	0	63	0	4	0	2	133
17:15	6	48	0	0	0	0	0	95	2	2	0	4	157
17:30	5	55	0	0	0	0	0	57	6	5	0	3	131
17:45	9	75	0	0	0	0	0	75	2	1	0	7	169
Total	28	234	0	0	0	0	0	290	10	12	0	16	590
Grand Total	86	794	0	0	0	0	0	726	21	52	0	77	1756
Apprch %	9.8	90.2	0	0	0	0	0	97.2	2.8	40.3	0	59.7	
Total %	4.9	45.2	0	0	0	0	0	41.3	1.2	3	0	4.4	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

File Name : H1702107
Site Code : 00005701
Start Date : 2/23/2017
Page No : 2

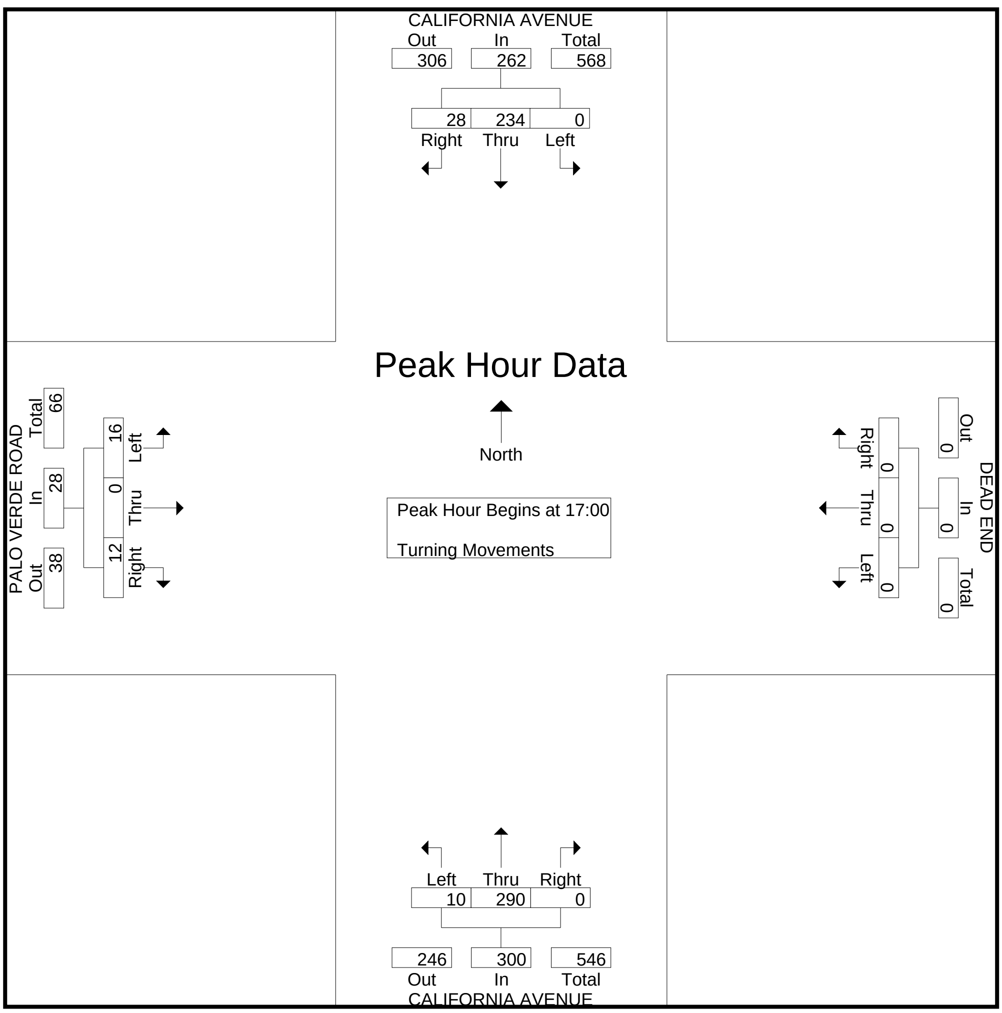
	CALIFORNIA AVENUE Southbound				DEAD END Westbound				CALIFORNIA AVENUE Northbound				PALO VERDE ROAD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45																	
07:45	**5**	**92**	0	**97**	0	0	0	0	0	43	0	43	**8**	0	**13**	**21**	**161**
08:00	3	57	0	60	0	0	0	0	0	40	**2**	42	8	0	6	14	116
08:15	4	49	0	53	0	0	0	0	0	**53**	1	**54**	1	0	4	5	112
08:30	4	56	0	60	0	0	0	0	0	43	1	44	3	0	1	4	108
Total Volume	16	254	0	270	0	0	0	0	0	179	4	183	20	0	24	44	497
% App. Total	5.9	94.1	0		0	0	0		0	97.8	2.2		45.5	0	54.5		
PHF	.800	.690	.000	.696	.000	.000	.000	.000	.000	.844	.500	.847	.625	.000	.462	.524	.772



Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

File Name : H1702107
Site Code : 00005701
Start Date : 2/23/2017
Page No : 3

	CALIFORNIA AVENUE Southbound				DEAD END Westbound				CALIFORNIA AVENUE Northbound				PALO VERDE ROAD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 17:00																	
17:00	8	56	0	64	0	0	0	0	0	63	0	63	4	0	2	6	133
17:15	6	48	0	54	0	0	0	0	0	**95**	2	**97**	2	0	4	6	157
17:30	5	55	0	60	0	0	0	0	0	57	**6**	63	**5**	0	3	**8**	131
17:45	**9**	**75**	0	**84**	0	0	0	0	0	75	2	77	1	0	**7**	8	**169**
Total Volume	28	234	0	262	0	0	0	0	0	290	10	300	12	0	16	28	590
% App. Total	10.7	89.3	0		0	0	0		0	96.7	3.3		42.9	0	57.1		
PHF	.778	.780	.000	.780	.000	.000	.000	.000	.000	.763	.417	.773	.600	.000	.571	.875	.873



Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City: IRVINE
N-S Direction: PARKING LOT
E-W Direction: ARROYO DRIVE

File Name : h1702103
Site Code : 00000000
Start Date : 2/16/2017
Page No : 1

Groups Printed- Turning Movements

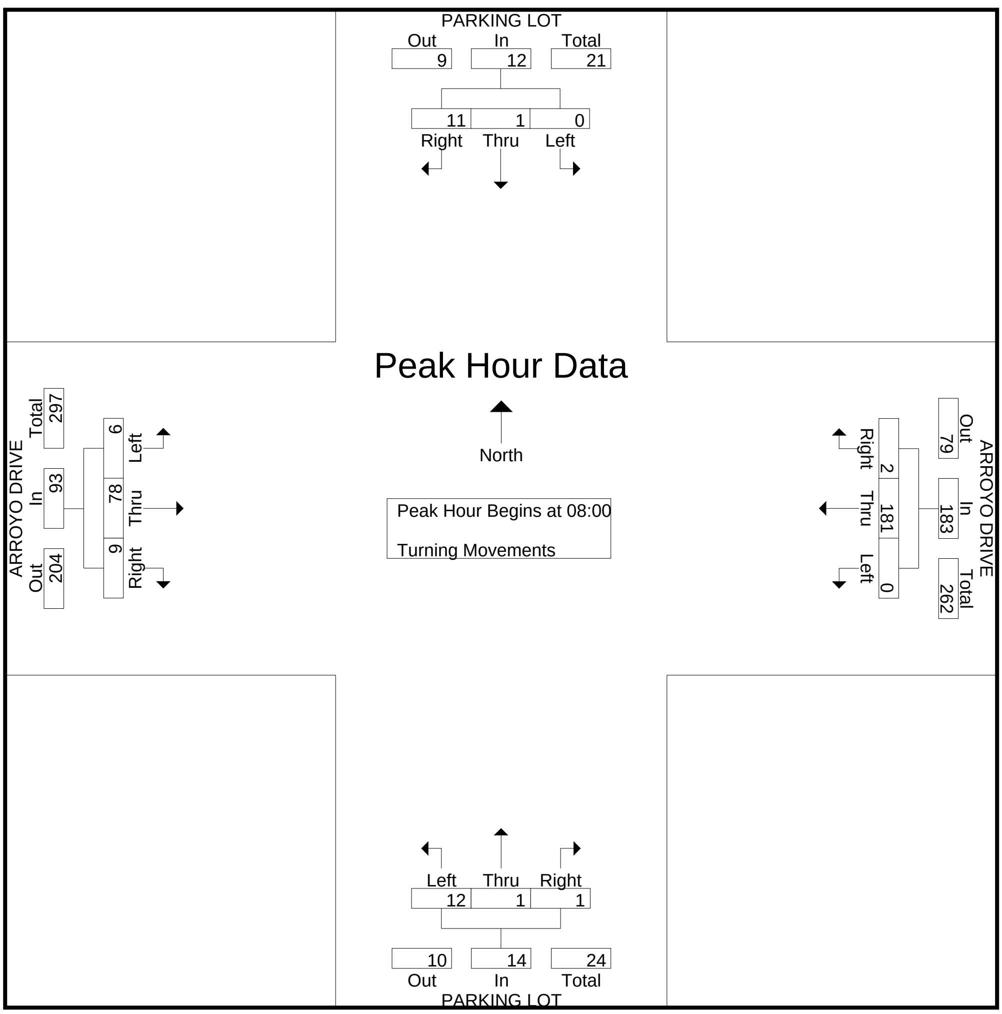
	PARKING LOT Southbound			ARROYO DRIVE Westbound			PARKING LOT Northbound			ARROYO DRIVE Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	0	0	0	0	18	0	0	0	2	1	5	6	32
07:15	7	0	4	0	21	0	0	0	3	0	10	2	47
07:30	5	0	2	0	20	0	0	1	8	5	13	1	55
07:45	5	0	0	0	40	1	0	0	5	2	11	2	66
Total	17	0	6	0	99	1	0	1	18	8	39	11	200
08:00	5	1	0	0	53	0	0	1	1	3	25	1	90
08:15	0	0	0	0	40	0	0	0	2	1	14	1	58
08:30	3	0	0	1	47	0	1	0	2	2	20	2	78
08:45	3	0	0	1	41	0	0	0	7	3	19	2	76
Total	11	1	0	2	181	0	1	1	12	9	78	6	302
*** BREAK ***													
16:00	5	0	0	0	34	1	0	1	7	4	43	3	98
16:15	0	0	0	0	37	0	0	0	4	9	48	2	100
16:30	0	0	0	0	52	0	0	0	7	6	41	5	111
16:45	4	0	0	0	58	0	0	1	9	20	44	5	141
Total	9	0	0	0	181	1	0	2	27	39	176	15	450
17:00	5	0	1	1	43	1	1	0	6	19	56	8	141
17:15	5	1	1	1	46	0	2	0	8	16	44	8	132
17:30	0	0	0	2	42	0	1	0	10	10	35	2	102
17:45	4	0	0	1	53	0	0	0	13	7	36	3	117
Total	14	1	2	5	184	1	4	0	37	52	171	21	492
Grand Total	51	2	8	7	645	3	5	4	94	108	464	53	1444
Apprch %	83.6	3.3	13.1	1.1	98.5	0.5	4.9	3.9	91.3	17.3	74.2	8.5	
Total %	3.5	0.1	0.6	0.5	44.7	0.2	0.3	0.3	6.5	7.5	32.1	3.7	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City: IRVINE
N-S Direction: PARKING LOT
E-W Direction: ARROYO DRIVE

File Name : h1702103
Site Code : 00000000
Start Date : 2/16/2017
Page No : 2

	PARKING LOT Southbound				ARROYO DRIVE Westbound				PARKING LOT Northbound				ARROYO DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00																	
08:00	**5**	**1**	0	**6**	0	**53**	0	**53**	0	**1**	1	2	**3**	**25**	1	**29**	**90**
08:15	0	0	0	0	0	40	0	40	0	0	2	2	1	14	1	16	58
08:30	3	0	0	3	**1**	47	0	48	**1**	0	2	3	2	20	**2**	24	78
08:45	3	0	0	3	1	41	0	42	0	0	**7**	**7**	3	19	2	24	76
Total Volume	11	1	0	12	2	181	0	183	1	1	12	14	9	78	6	93	302
% App. Total	91.7	8.3	0		1.1	98.9	0		7.1	7.1	85.7		9.7	83.9	6.5		
PHF	.550	.250	.000	.500	.500	.854	.000	.863	.250	.250	.429	.500	.750	.780	.750	.802	.839

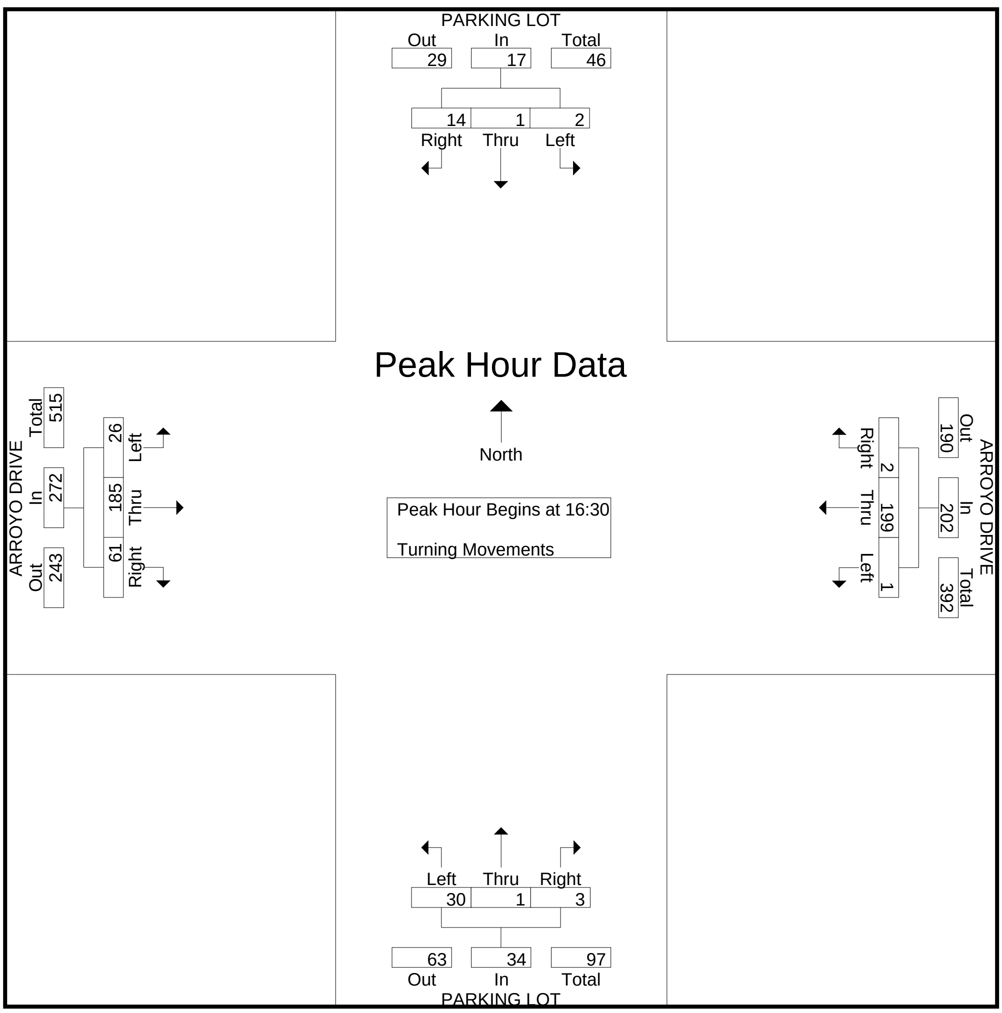


Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City: IRVINE
N-S Direction: PARKING LOT
E-W Direction: ARROYO DRIVE

File Name : h1702103
Site Code : 00000000
Start Date : 2/16/2017
Page No : 3

	PARKING LOT Southbound				ARROYO DRIVE Westbound				PARKING LOT Northbound				ARROYO DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:30																	
16:30	0	0	0	0	0	52	0	52	0	0	7	7	6	41	5	52	111
16:45	4	0	0	4	0	**58**	0	**58**	0	**1**	**9**	**10**	**20**	44	5	69	**141**
17:00	**5**	0	**1**	6	**1**	43	**1**	45	1	0	6	7	19	**56**	**8**	**83**	141
17:15	5	**1**	1	**7**	1	46	0	47	**2**	0	8	10	16	44	8	68	132
Total Volume	14	1	2	17	2	199	1	202	3	1	30	34	61	185	26	272	525
% App. Total	82.4	5.9	11.8		1	98.5	0.5		8.8	2.9	88.2		22.4	68	9.6		
PHF	.700	.250	.500	.607	.500	.858	.250	.871	.375	.250	.833	.850	.763	.826	.813	.819	.931



Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City: IRVINE
N-S Direction: ARROYO DRIVE
E-W Direction: VISTA DEL CAMPO

File Name : H1702105
Site Code : 00001944
Start Date : 2/14/2017
Page No : 1

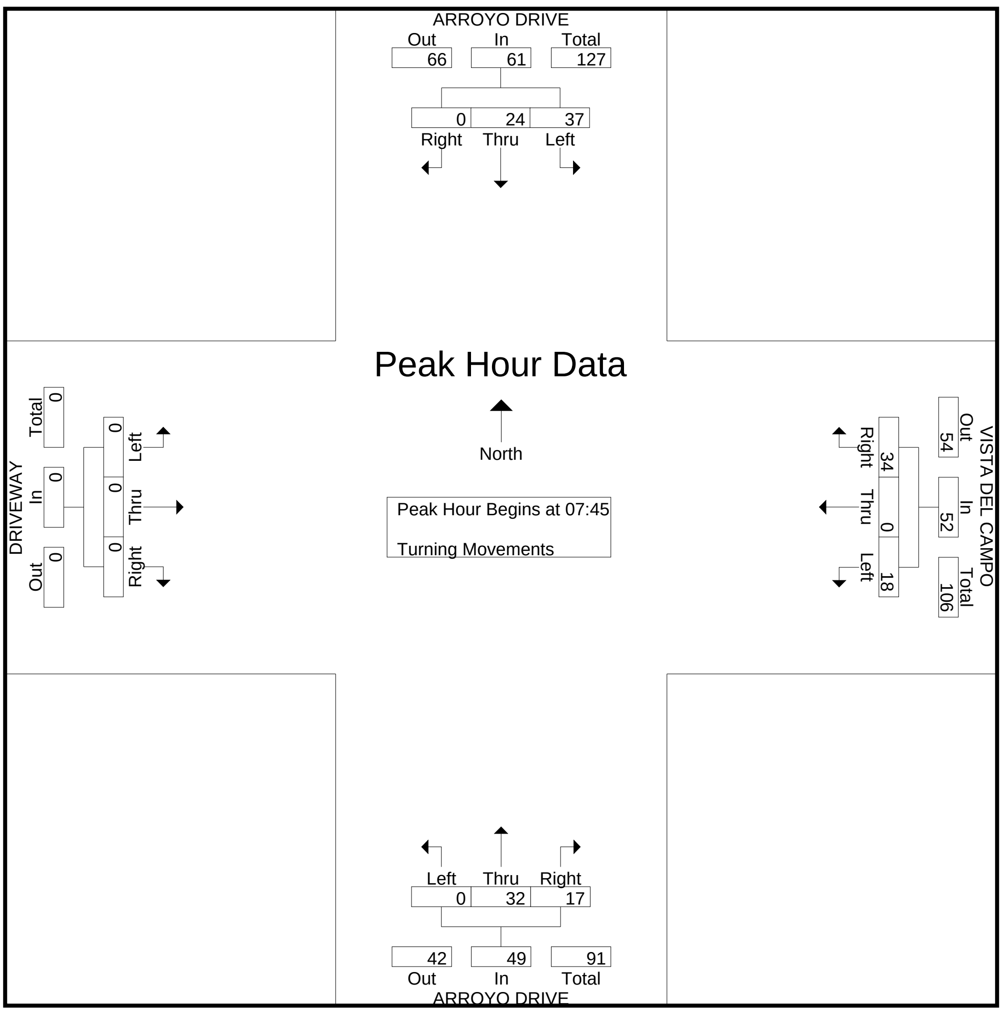
Groups Printed- Turning Movements

	ARROYO DRIVE Southbound			VISTA DEL CAMPO Westbound			ARROYO DRIVE Northbound			DRIVEWAY Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	0	1	5	4	0	0	3	2	0	0	0	0	15
07:15	0	3	5	5	0	2	6	6	0	0	0	0	27
07:30	0	7	10	4	0	3	8	14	0	0	0	0	46
07:45	0	4	8	8	0	5	6	13	0	0	0	0	44
Total	0	15	28	21	0	10	23	35	0	0	0	0	132
08:00	0	9	7	9	0	3	3	5	0	0	0	0	36
08:15	0	7	8	9	0	3	4	4	0	0	0	0	35
08:30	0	4	14	8	0	7	4	10	0	0	0	0	47
08:45	0	4	10	5	0	2	7	11	0	0	0	0	39
Total	0	24	39	31	0	15	18	30	0	0	0	0	157
16:00	0	13	14	10	0	9	17	13	0	0	0	0	76
16:15	0	16	13	11	0	13	9	14	0	0	0	0	76
16:30	0	12	14	16	0	7	8	14	0	0	0	0	71
16:45	0	14	13	16	0	7	9	18	0	0	0	0	77
Total	0	55	54	53	0	36	43	59	0	0	0	0	300
17:00	0	18	12	13	0	12	10	10	0	0	0	0	75
17:15	0	8	18	22	0	10	7	20	0	0	0	0	85
17:30	0	12	15	15	0	8	14	8	0	0	0	0	72
17:45	0	14	17	17	0	9	9	21	0	0	0	0	87
Total	0	52	62	67	0	39	40	59	0	0	0	0	319
Grand Total	0	146	183	172	0	100	124	183	0	0	0	0	908
Apprch %	0	44.4	55.6	63.2	0	36.8	40.4	59.6	0	0	0	0	
Total %	0	16.1	20.2	18.9	0	11	13.7	20.2	0	0	0	0	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

File Name : H1702105
Site Code : 00001944
Start Date : 2/14/2017
Page No : 2

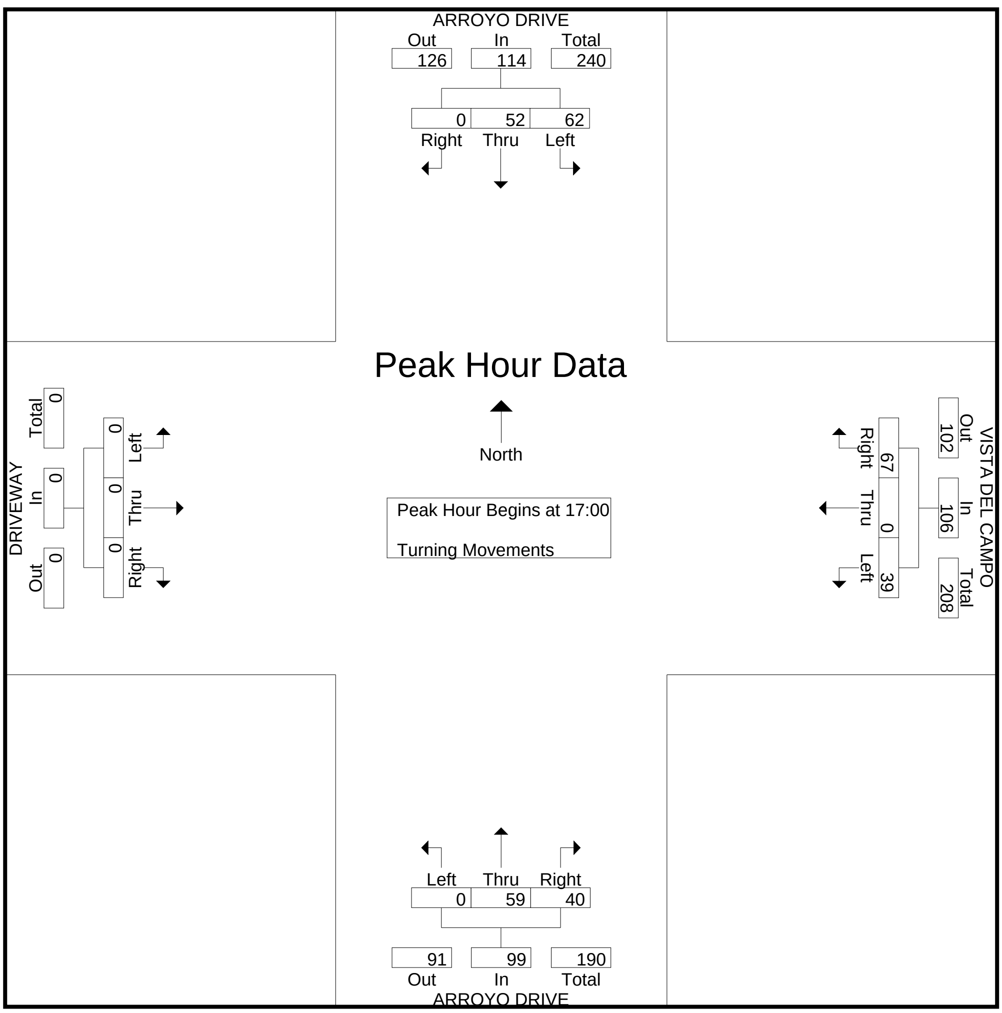
	ARROYO DRIVE Southbound				VISTA DEL CAMPO Westbound				ARROYO DRIVE Northbound				DRIVEWAY Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45																	
07:45	0	4	8	12	8	0	5	13	**6**	**13**	0	**19**	0	0	0	0	44
08:00	0	**9**	7	16	**9**	0	3	12	3	5	0	8	0	0	0	0	36
08:15	0	7	8	15	9	0	3	12	4	4	0	8	0	0	0	0	35
08:30	0	4	**14**	**18**	8	0	**7**	**15**	4	10	0	14	0	0	0	0	**47**
Total Volume	0	24	37	61	34	0	18	52	17	32	0	49	0	0	0	0	162
% App. Total	0	39.3	60.7		65.4	0	34.6		34.7	65.3	0		0	0	0		
PHF	.000	.667	.661	.847	.944	.000	.643	.867	.708	.615	.000	.645	.000	.000	.000	.000	.862



Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

File Name : H1702105
Site Code : 00001944
Start Date : 2/14/2017
Page No : 3

	ARROYO DRIVE Southbound				VISTA DEL CAMPO Westbound				ARROYO DRIVE Northbound				DRIVEWAY Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 17:00																	
17:00	0	**18**	12	30	13	0	**12**	25	10	10	0	20	0	0	0	0	75
17:15	0	8	**18**	26	**22**	0	10	**32**	7	20	0	27	0	0	0	0	85
17:30	0	12	15	27	15	0	8	23	**14**	8	0	22	0	0	0	0	72
17:45	0	14	17	**31**	17	0	9	26	9	**21**	0	**30**	0	0	0	0	**87**
Total Volume	0	52	62	114	67	0	39	106	40	59	0	99	0	0	0	0	319
% App. Total	0	45.6	54.4		63.2	0	36.8		40.4	59.6	0		0	0	0		
PHF	.000	.722	.861	.919	.761	.000	.813	.828	.714	.702	.000	.825	.000	.000	.000	.000	.917



City: IRVINE
N-S Direction: CULVER DRIVE
E-W Direction: CAMPUS DRIVE

File Name : H1702104
Site Code : 00000000
Start Date : 2/16/2017
Page No : 1

Groups Printed- Turning Movements

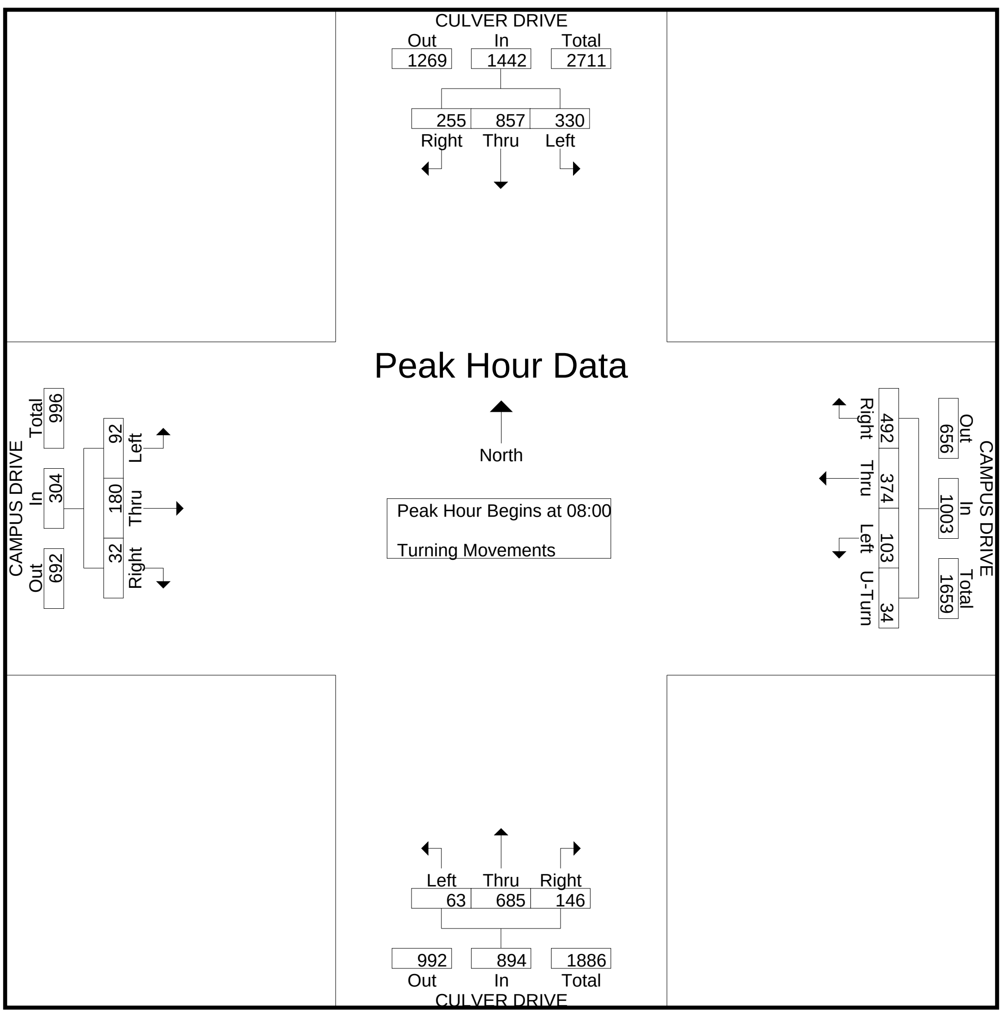
	CULVER DRIVE Southbound			CAMPUS DRIVE Westbound				CULVER DRIVE Northbound			CAMPUS DRIVE Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	U-Turn	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	24	57	39	62	36	13	3	9	88	3	3	15	11	363
07:15	34	128	43	60	74	19	0	19	108	8	3	46	11	553
07:30	63	166	87	100	74	21	0	36	130	18	11	96	15	817
07:45	56	159	52	104	107	35	2	38	138	16	9	41	19	776
Total	177	510	221	326	291	88	5	102	464	45	26	198	56	2509
08:00	52	191	89	122	90	27	6	48	182	15	4	43	23	892
08:15	83	206	121	131	97	26	10	43	180	17	4	57	26	1001
08:30	49	229	67	148	122	31	15	30	169	18	14	41	29	962
08:45	71	231	53	91	65	19	3	25	154	13	10	39	14	788
Total	255	857	330	492	374	103	34	146	685	63	32	180	92	3643
*** BREAK ***														
16:00	63	187	57	71	51	21	3	20	186	17	15	58	35	784
16:15	58	191	75	65	45	19	0	31	195	12	19	71	36	817
16:30	70	182	88	65	49	15	0	26	209	16	13	54	44	831
16:45	70	172	60	55	47	14	0	37	217	13	13	91	58	847
Total	261	732	280	256	192	69	3	114	807	58	60	274	173	3279
17:00	65	159	87	65	48	25	0	36	245	19	23	102	94	968
17:15	69	168	79	65	63	23	0	31	185	22	28	117	95	945
17:30	63	203	96	57	42	21	0	32	235	22	24	100	64	959
17:45	84	205	126	64	48	20	0	56	203	17	21	148	52	1044
Total	281	735	388	251	201	89	0	155	868	80	96	467	305	3916
Grand Total	974	2834	1219	1325	1058	349	42	517	2824	246	214	1119	626	13347
Apprch %	19.4	56.4	24.2	47.8	38.1	12.6	1.5	14.4	78.7	6.9	10.9	57.1	32	
Total %	7.3	21.2	9.1	9.9	7.9	2.6	0.3	3.9	21.2	1.8	1.6	8.4	4.7	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City: IRVINE
N-S Direction: CULVER DRIVE
E-W Direction: CAMPUS DRIVE

File Name : H1702104
Site Code : 00000000
Start Date : 2/16/2017
Page No : 2

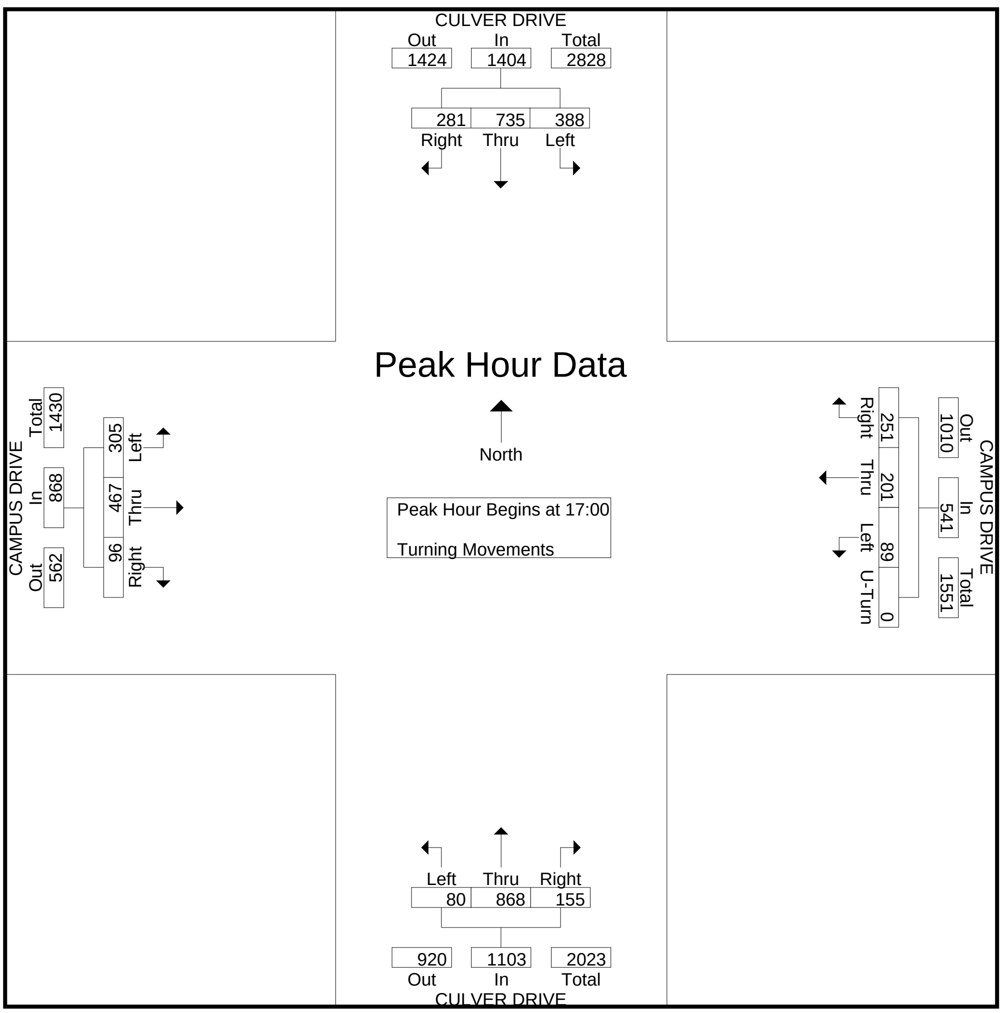
	CULVER DRIVE Southbound				CAMPUS DRIVE Westbound					CULVER DRIVE Northbound				CAMPUS DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 08:00																		
08:00	52	191	89	332	122	90	27	6	245	**48**	**182**	15	**245**	4	43	23	70	892
08:15	**83**	206	**121**	**410**	131	97	26	10	264	43	180	17	240	4	**57**	26	**87**	**1001**
08:30	49	229	67	345	**148**	**122**	**31**	**15**	**316**	30	169	**18**		**14**	41	**29**	84	962
08:45	71	**231**	53	355	91	65	19	3	178	25	154	13	192	10	39	14	63	788
Total Volume	255	857	330	1442	492	374	103	34	1003	146	685	63	894	32	180	92	304	3643
% App. Total	17.7	59.4	22.9		49.1	37.3	10.3	3.4		16.3	76.6	7		10.5	59.2	30.3		
PHF	.768	.927	.682	.879	.831	.766	.831	.567	.794	.760	.941	.875	.912	.571	.789	.793	.874	.910



City: IRVINE
N-S Direction: CULVER DRIVE
E-W Direction: CAMPUS DRIVE

File Name : H1702104
Site Code : 00000000
Start Date : 2/16/2017
Page No : 3

	CULVER DRIVE Southbound				CAMPUS DRIVE Westbound					CULVER DRIVE Northbound				CAMPUS DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 17:00																		
17:00	65	159	87	311	**65**	48	**25**	0	138	36	**245**	19	**300**	23	102	94	219	968
17:15	69	168	79	316	65	**63**	23	0	**151**	31	185	**22**		**28**	117	**95**	**240**	945
17:30	63	203	96	362	57	42	21	0	120	32	235	22	289	24	100	64	188	959
17:45	**84**	**205**	**126**	**415**	64	48	20	0	132	**56**					**148**	52	221	**1044**
Total Volume	281	735	388	1404	251	201	89	0	541	155	868	80	1103	96	467	305	868	3916
% App. Total	20	52.4	27.6		46.4	37.2	16.5	0		14.1	78.7	7.3		11.1	53.8	35.1		
PHF	.836	.896	.770	.846	.965	.798	.890	.000	.896	.692	.886	.909	.919	.857	.789	.803	.904	.938



Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City: IRVINE
N-S Direction: CULVER DRIVE
E-W Direction: VISTA DEL CAMPO

File Name : H1702106
Site Code : 00001944
Start Date : 2/15/2017
Page No : 1

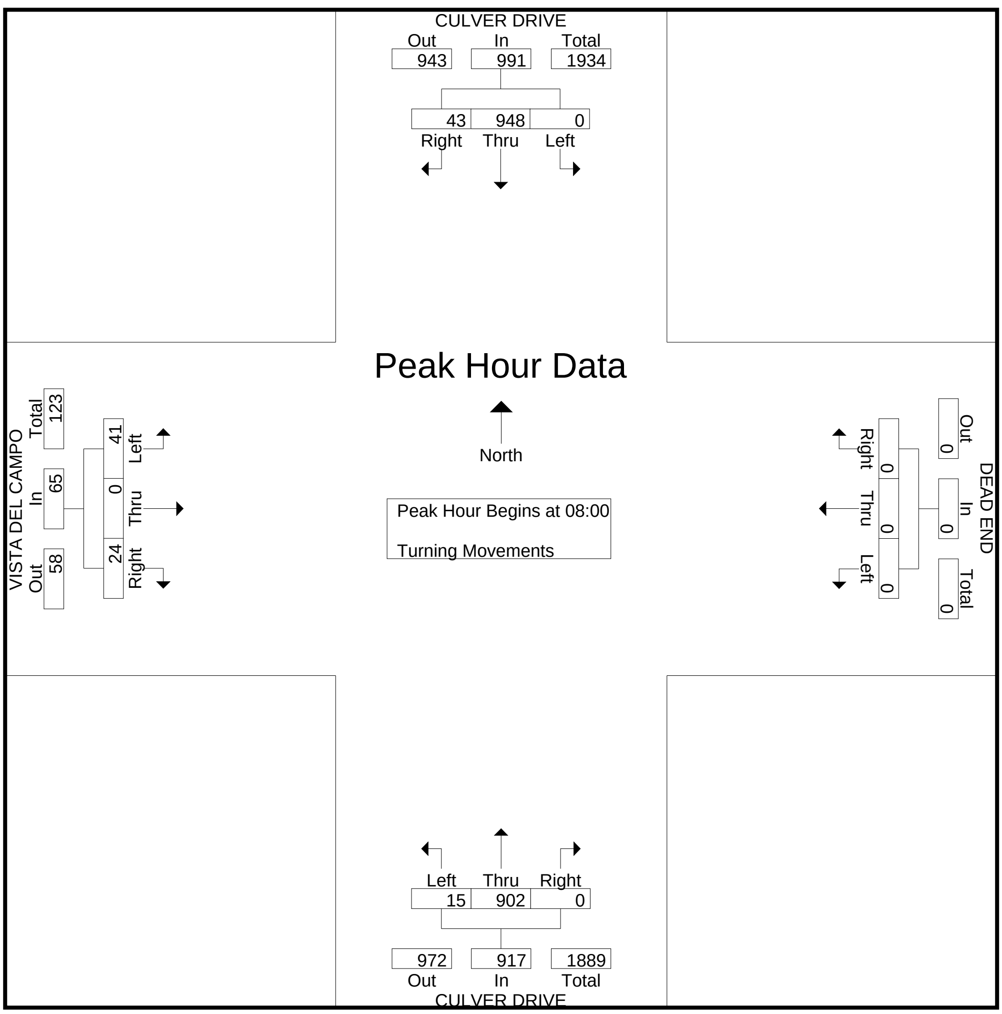
Groups Printed- Turning Movements

	CULVER DRIVE Southbound			DEAD END Westbound			CULVER DRIVE Northbound			VISTA DEL CAMPO Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	1	121	0	0	0	0	0	87	0	1	0	2	212
07:15	5	145	0	0	0	0	0	122	1	4	0	9	286
07:30	12	164	0	0	0	0	0	199	5	5	0	10	395
07:45	2	174	0	0	0	0	0	225	3	7	0	10	421
Total	20	604	0	0	0	0	0	633	9	17	0	31	1314
08:00	10	280	0	0	0	0	0	203	2	3	0	9	507
08:15	9	243	0	0	0	0	0	206	6	7	0	6	477
08:30	15	204	0	0	0	0	0	278	6	3	0	14	520
08:45	9	221	0	0	0	0	0	215	1	11	0	12	469
Total	43	948	0	0	0	0	0	902	15	24	0	41	1973
16:00	20	170	0	0	0	0	0	236	2	5	0	14	447
16:15	17	182	0	0	0	0	0	220	3	6	0	24	452
16:30	27	196	0	0	0	0	0	233	3	4	0	18	481
16:45	18	218	0	0	0	0	0	227	6	7	0	15	491
Total	82	766	0	0	0	0	0	916	14	22	0	71	1871
17:00	18	185	0	0	0	0	0	266	9	6	0	14	498
17:15	24	228	0	0	0	0	0	254	1	10	0	23	540
17:30	22	220	0	0	0	0	0	277	6	11	0	11	547
17:45	22	235	0	0	0	0	0	236	5	9	0	20	527
Total	86	868	0	0	0	0	0	1033	21	36	0	68	2112
Grand Total	231	3186	0	0	0	0	0	3484	59	99	0	211	7270
Apprch %	6.8	93.2	0	0	0	0	0	98.3	1.7	31.9	0	68.1	
Total %	3.2	43.8	0	0	0	0	0	47.9	0.8	1.4	0	2.9	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

File Name : H1702106
Site Code : 00001944
Start Date : 2/15/2017
Page No : 2

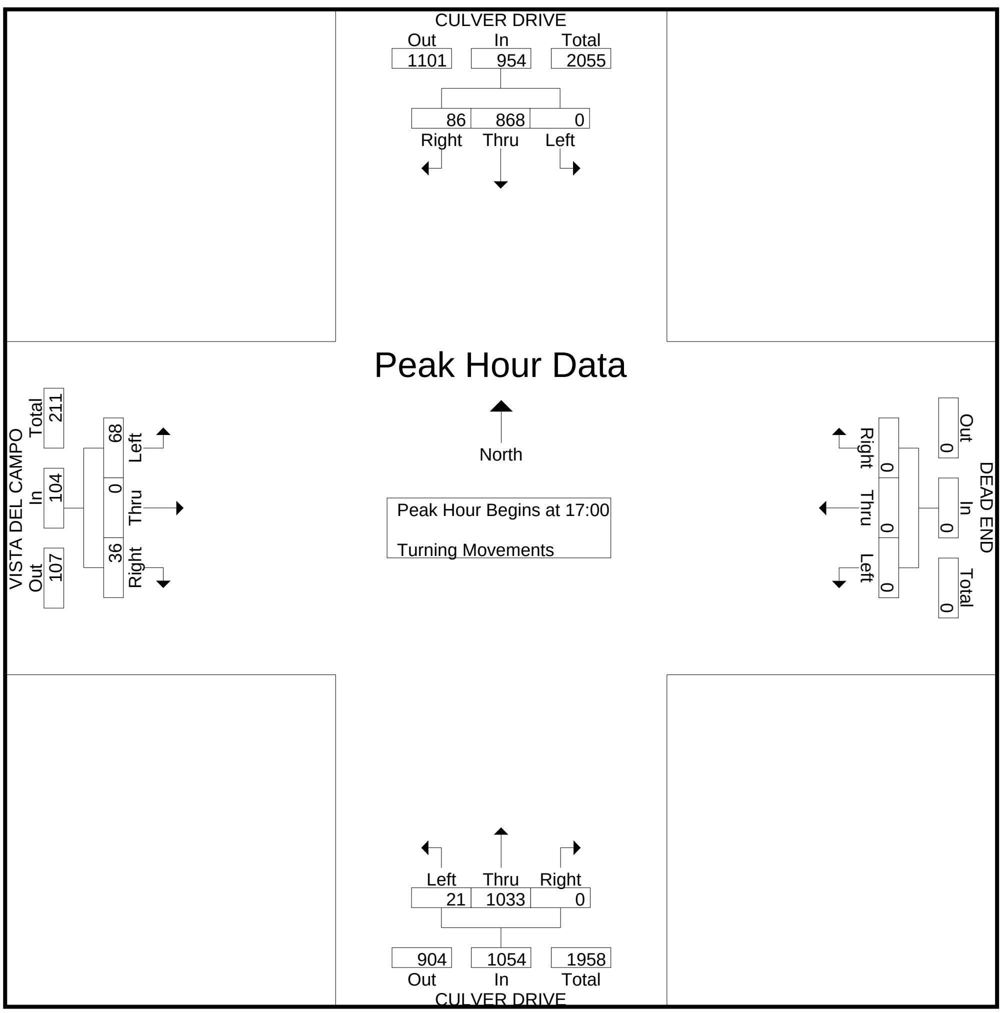
	CULVER DRIVE Southbound				DEAD END Westbound				CULVER DRIVE Northbound				VISTA DEL CAMPO Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00																	
08:00	10	**280**	0	**290**	0	0	0	0	0	203	2	205	3	0	9	12	507
08:15	9	243	0	252	0	0	0	0	0	206	**6**	212	7	0	6	13	477
08:30	**15**	204	0	219	0	0	0	0	0	**278**	6	**284**	3	0	**14**	17	**520**
08:45	9	221	0	230	0	0	0	0	0	215	1	216	**11**	0	12	**23**	469
Total Volume	43	948	0	991	0	0	0	0	0	902	15	917	24	0	41	65	1973
% App. Total	4.3	95.7	0		0	0	0		0	98.4	1.6		36.9	0	63.1		
PHF	.717	.846	.000	.854	.000	.000	.000	.000	.000	.811	.625	.807	.545	.000	.732	.707	.949



Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

File Name : H1702106
Site Code : 00001944
Start Date : 2/15/2017
Page No : 3

	CULVER DRIVE Southbound				DEAD END Westbound				CULVER DRIVE Northbound				VISTA DEL CAMPO Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 17:00																	
17:00	18	185	0	203	0	0	0	0	0	266	**9**	275	6	0	14	20	498
17:15	**24**	228	0	252	0	0	0	0	0	254	1	255	10	0	**23**	**33**	540
17:30	22	220	0	242	0	0	0	0	0	**277**	6	**283**	**11**	0	11	22	**547**
17:45	22	**235**	0	**257**	0	0	0	0	0	236	5	241	9	0	20	29	527
Total Volume	86	868	0	954	0	0	0	0	0	1033	21	1054	36	0	68	104	2112
% App. Total	9	91	0		0	0	0		0	98	2		34.6	0	65.4		
PHF	.896	.923	.000	.928	.000	.000	.000	.000	.000	.932	.583	.931	.818	.000	.739	.788	.965



Transportation Studies, Inc.

2640 Walnut Avenue, Suite L
Tustin, CA. 92780

Location : CAMPUS DRIVE
Segment : E/O CALIFORNIA AVENUE
Client : STANTEC

Site: IRVINE
Date: 02/15/17
Day: Wednesday

Interval	EB				WB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	30	109	132	535	18	66	117	525	48	175	249	1,060
12:15	34		121		19		166		53		287	
12:30	23		147		16		122		39		269	
12:45	22		135		13		120		35		255	
01:00	17	51	158	461	15	47	106	501	32	98	264	962
01:15	18		117		10		104		28		221	
01:30	6		94		15		165		21		259	
01:45	10		92		7		126		17		218	
02:00	8	27	136	531	4	22	98	606	12	49	234	1,137
02:15	6		138		5		116		11		254	
02:30	7		141		7		237		14		378	
02:45	6		116		6		155		12		271	
03:00	5	14	128	490	5	14	122	478	10	28	250	968
03:15	1		135		4		112		5		247	
03:30	6		104		4		116		10		220	
03:45	2		123		1		128		3		251	
04:00	2	6	130	524	5	21	136	524	7	27	266	1,048
04:15	0		124		5		118		5		242	
04:30	0		134		3		136		3		270	
04:45	4		136		8		134		12		270	
05:00	2	23	166	721	8	52	123	541	10	75	289	1,262
05:15	8		202		6		134		14		336	
05:30	5		170		14		136		19		306	
05:45	8		183		24		148		32		331	
06:00	12	78	204	663	24	141	146	502	36	219	350	1,165
06:15	18		188		34		134		52		322	
06:30	20		142		34		105		54		247	
06:45	28		129		49		117		77		246	
07:00	39	377	134	460	50	580	90	384	89	957	224	844
07:15	64		100		80		112		144		212	
07:30	153		96		160		96		313		192	
07:45	121		130		290		86		411		216	
08:00	58	199	118	381	282	752	79	308	340	951	197	689
08:15	52		94		127		78		179		172	
08:30	42		77		164		67		206		144	
08:45	47		92		179		84		226		176	
09:00	52	223	83	312	127	532	66	256	179	755	149	568
09:15	45		90		141		80		186		170	
09:30	63		75		137		60		200		135	
09:45	63		64		127		50		190		114	
10:00	64	255	76	247	108	437	58	174	172	692	134	421
10:15	66		64		91		45		157		109	
10:30	67		56		130		41		197		97	
10:45	58		51		108		30		166		81	
11:00	104	342	27	116	88	500	42	106	192	842	69	222
11:15	86		34		151		26		237		60	
11:30	68		33		135		13		203		46	
11:45	84		22		126		25		210		47	
Totals	1,704		5,441		3,164		4,905		4,868		10,346	
Split%	35.0		52.6		65.0		47.4					
Day Totals		7,145				8,069				15,214		
Day Splits		47.0				53.0						
Peak Hour	07:15		05:15		07:45		02:15		07:30		05:15	
Volume	396		759		863		630		1,243		1,323	
Factor	0.65		0.93		0.74		0.66		0.76		0.94	

Data File : D1702014

Transportation Studies, Inc.

2640 Walnut Avenue, Suite L
Tustin, CA. 92780

Location : CALIFORNIA AVENUE
Segment : S/O CAMPUS DRIVE
Client : STANTEC

Site: IRVINE
Date: 02/15/17
Day: Wednesday

Interval	NB				SB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	44	162	98	366	41	202	78	313	85	364	176	679
12:15	41		72		63		82		104		154	
12:30	36		102		67		75		103		177	
12:45	41		94		31		78		72		172	
01:00	28	76	105	357	28	83	81	310	56	159	186	667
01:15	21		78		35		74		56		152	
01:30	17		84		11		87		28		171	
01:45	10		90		9		68		19		158	
02:00	11	37	78	362	15	47	76	299	26	84	154	661
02:15	5		105		15		74		20		179	
02:30	11		101		12		77		23		178	
02:45	10		78		5		72		15		150	
03:00	7	20	81	416	11	29	78	324	18	49	159	740
03:15	6		113		7		86		13		199	
03:30	6		121		4		69		10		190	
03:45	1		101		7		91		8		192	
04:00	2	14	103	426	1	10	109	407	3	24	212	833
04:15	2		87		2		86		4		173	
04:30	2		126		3		106		5		232	
04:45	8		110		4		106		12		216	
05:00	10	31	133	577	2	28	145	486	12	59	278	1,063
05:15	7		143		5		125		12		268	
05:30	5		146		5		111		10		257	
05:45	9		155		16		105		25		260	
06:00	8	71	162	594	17	108	148	533	25	179	310	1,127
06:15	26		130		33		141		59		271	
06:30	20		156		22		121		42		277	
06:45	17		146		36		123		53		269	
07:00	37	294	133	431	23	186	112	477	60	480	245	908
07:15	41		97		26		136		67		233	
07:30	124		92		50		107		174		199	
07:45	92		109		87		122		179		231	
08:00	85	334	121	472	99	297	104	487	184	631	225	959
08:15	74		106		61		124		135		230	
08:30	101		123		74		134		175		257	
08:45	74		122		63		125		137		247	
09:00	79	304	87	363	63	248	115	433	142	552	202	796
09:15	68		85		73		118		141		203	
09:30	81		110		51		105		132		215	
09:45	76		81		61		95		137		176	
10:00	64	309	120	361	47	232	92	358	111	541	212	719
10:15	52		84		53		95		105		179	
10:30	98		79		60		94		158		173	
10:45	95		78		72		77		167		155	
11:00	82	300	63	209	73	272	75	207	155	572	138	416
11:15	66		57		67		52		133		109	
11:30	73		34		68		35		141		69	
11:45	79		55		64		45		143		100	
Totals	1,952		4,934		1,742		4,634		3,694		9,568	
Split%	52.8		51.6		47.2		48.4					
Day Totals		6,886				6,376				13,262		
Day Splits		51.9				48.1						
Peak Hour	07:30		05:15		07:45		06:00		07:45		06:00	
Volume	375		606		321		533		673		1,127	
Factor	0.76		0.94		0.81		0.90		0.91		0.91	

* Data File : D1702015

Transportation Studies, Inc.

2640 Walnut Avenue, Suite L
Tustin, CA. 92780

Location : ARROYO DRIVE — Site: IRVINE
Segment : E/O CALIFORNIA AVENUE — Date: 02/15/17
Client : STANTEC

Interval Begin	EB AM		EB PM		WB AM		WB PM		Combined AM		Combined PM		Day: Wednesday
12:00	38	139	51	186	51	172	48	201	89	311	99	387	
12:15	36		54		42		43		78		97		
12:30	39		43		44		58		83		101		
12:45	26		38		35		52		61		90		
01:00	42	94	49	159	30	90	44	182	72	184	93	341	
01:15	28		38		24		50		52		88		
01:30	12		30		22		50		34		80		
01:45	12		42		14		38		26		80		
02:00	11	44	74	202	10	42	44	189	21	86	118	391	
02:15	14		40		12		44		26		84		
02:30	13		46		10		60		23		106		
02:45	6		42		10		41		16		83		
03:00	8	26	46	202	12	24	46	244	20	50	92	446	
03:15	10		45		9		59		19		104		
03:30	5		48		2		74		7		122		
03:45	3		63		1		65		4		128		
04:00	2	11	75	235	2	14	58	233	4	25	133	468	
04:15	2		53		4		47		6		100		
04:30	4		46		4		66		8		112		
04:45	3		61		4		62		7		123		
05:00	5	20	80	250	10	28	52	265	15	48	132	515	
05:15	2		54		4		58		6		112		
05:30	6		60		4		81		10		141		
05:45	7		56		10		74		17		130		
06:00	10	47	60	281	12	64	75	352	22	111	135	633	
06:15	8		72		20		90		28		162		
06:30	9		61		12		86		21		147		
06:45	20		88		20		101		40		189		
07:00	6	57	79	299	19	147	73	282	25	204	152	581	
07:15	16		64		26		62		42		126		
07:30	18		74		49		66		67		140		
07:45	17		82		53		81		70		163		
08:00	26	98	73	341	37	196	70	298	63	294	143	639	
08:15	26		87		38		60		64		147		
08:30	26		93		66		86		92		179		
08:45	20		88		55		82		75		170		
09:00	20	113	81	326	42	193	72	322	62	306	153	648	
09:15	19		95		36		74		55		169		
09:30	32		75		61		92		93		167		
09:45	42		75		54		84		96		159		
10:00	36	133	62	276	41	207	90	306	77	340	152	582	
10:15	26		73		40		72		66		145		
10:30	28		72		76		68		104		140		
10:45	43		69		50		76		93		145		
11:00	46	155	62	189	48	189	64	208	94	344	126	397	
11:15	41		54		45		53		86		107		
11:30	36		37		40		42		76		79		
11:45	32		36		56		49		88		85		
Totals	937		2,946		1,366		3,082		2,303		6,028		
Split%	40.7		48.9		59.3		51.1						
Day Totals		3,883				4,448				8,331			
Day Splits		46.6				53.4							
Peak Hour	10:45		08:30		10:30		06:00		10:30		08:30		
Volume	166		357		219		352		377		671		
Factor	0.90		0.94		0.72		0.87		0.91		0.94		

Data File : D1702016

Transportation Studies, Inc.

2640 Walnut Avenue, Suite L
Tustin, CA. 92780

Location : VISTA DEL CAMPO
Segment : E/O ARROYO DRIVE
Client : STANTEC

Site: IRVINE
Date: 02/15/17
Day: Wednesday

Interval Begin	EB AM		EB PM		WB AM		WB PM		Combined AM		Combined PM	
12:00	9	51	21	80	26	89	22	77	35	140	43	157
12:15	14		21		17		20		31		41	
12:30	17		22		28		16		45		38	
12:45	11		16		18		19		29		35	
01:00	8	38	17	83	17	51	22	78	25	89	39	161
01:15	11		15		11		20		22		35	
01:30	11		25		15		14		26		39	
01:45	8		26		8		22		16		48	
02:00	9	26	15	82	6	15	22	71	15	41	37	153
02:15	6		23		2		14		8		37	
02:30	5		18		3		18		8		36	
02:45	6		26		4		17		10		43	
03:00	2	12	19	82	7	14	32	95	9	26	51	177
03:15	5		24		4		20		9		44	
03:30	3		16		1		20		4		36	
03:45	2		23		2		23		4		46	
04:00	2	14	21	94	3	10	24	100	5	24	45	194
04:15	3		28		1		18		4		46	
04:30	4		22		2		30		6		52	
04:45	5		23		4		28		9		51	
05:00	3	10	22	105	1	8	25	106	4	18	47	211
05:15	4		32		0		22		4		54	
05:30	0		24		3		32		3		56	
05:45	3		27		4		27		7		54	
06:00	3	27	22	107	5	17	32	133	8	44	54	240
06:15	9		22		5		29		14		51	
06:30	5		33		2		30		7		63	
06:45	10		30		5		42		15		72	
07:00	3	49	16	96	2	33	40	123	5	82	56	219
07:15	14		28		6		20		20		48	
07:30	16		30		20		33		36		63	
07:45	16		22		5		30		21		52	
08:00	12	62	22	89	12	60	31	134	24	122	53	223
08:15	11		22		15		39		26		61	
08:30	17		16		21		27		38		43	
08:45	22		29		12		37		34		66	
09:00	13	53	21	81	8	37	40	125	21	90	61	206
09:15	13		16		12		14		25		30	
09:30	13		16		10		37		23		53	
09:45	14		28		7		34		21		62	
10:00	20	61	25	93	16	60	31	130	36	121	56	223
10:15	14		28		17		29		31		57	
10:30	14		21		18		32		32		53	
10:45	13		19		9		38		22		57	
11:00	14	83	21	70	14	64	22	85	28	147	43	155
11:15	25		21		14		24		39		45	
11:30	21		14		18		16		39		30	
11:45	23		14		18		23		41		37	
Totals	486		1,062		458		1,257		944		2,319	
Split%	51.5		45.8		48.5		54.2					

	EB		WB		Combined	
Day Totals	1,548		1,715		3,263	
Day Splits	47.4		52.6			

	EB AM	EB PM	WB AM	WB PM	Combined AM	Combined PM
Peak Hour	11:00	06:00	12:00	08:15	11:00	06:15
Volume	83	107	89	143	147	242
Factor	0.83	0.81	0.79	0.89	0.90	0.84

Data File : D1702018

Transportation Studies, Inc.

2640 Walnut Avenue, Suite L
Tustin, CA. 92780

Location	: CULVER DRIVE	Site:	IRVINE
Segment	: N/O VISTA DEL CAMPO	Date:	02/15/17
Client	: STANTEC		

Interval	NB				SB				Combined				Day:	Wednesday
Begin	AM		PM		AM		PM		AM		PM			
12:00	15	95	177	648	36	115	168	646	51	210	345	1,294		
12:15	31		136		28		143		59		279			
12:30	36		173		32		150		68		323			
12:45	13		162		19		185		32		347			
01:00	10	57	190	753	17	65	169	792	27	122	359	1,545		
01:15	22		162		17		210		39		372			
01:30	17		198		19		191		36		389			
01:45	8		203		12		222		20		425			
02:00	12	38	184	790	6	21	161	731	18	59	345	1,521		
02:15	9		198		1		172		10		370			
02:30	10		218		5		196		15		414			
02:45	7		190		9		202		16		392			
03:00	1	16	191	893	9	23	184	759	10	39	375	1,652		
03:15	10		240		6		196		16		436			
03:30	3		244		3		197		6		441			
03:45	2		218		5		182		7		400			
04:00	5	28	259	987	5	35	194	828	10	63	453	1,815		
04:15	2		243		5		210		7		453			
04:30	10		242		10		206		20		448			
04:45	11		243		15		218		26		461			
05:00	8	85	272	1,092	18	126	204	942	26	211	476	2,034		
05:15	22		286		24		248		46		534			
05:30	29		274		38		244		67		518			
05:45	26		260		46		246		72		506			
06:00	35	196	246	845	42	291	234	916	77	487	480	1,761		
06:15	48		219		70		272		118		491			
06:30	48		224		84		228		132		452			
06:45	65		156		95		182		160		338			
07:00	96	666	156	573	127	615	164	569	223	1,281	320	1,142		
07:15	134		143		154		163		288		306			
07:30	210		130		162		134		372		264			
07:45	226		144		172		108		398		252			
08:00	200	911	122	609	284	969	108	421	484	1,880	230	1,030		
08:15	216		140		254		105		470		245			
08:30	289		191		200		112		489		303			
08:45	206		156		231		96		437		252			
09:00	178	691	100	361	199	758	118	367	377	1,449	218	728		
09:15	188		92		205		95		393		187			
09:30	181		83		172		82		353		165			
09:45	144		86		182		72		326		158			
10:00	155	564	76	212	146	578	62	246	301	1,142	138	458		
10:15	129		54		152		68		281		122			
10:30	144		48		142		50		286		98			
10:45	136		34		138		66		274		100			
11:00	152	656	35	113	134	591	34	120	286	1,247	69	233		
11:15	147		34		142		37		289		71			
11:30	188		21		151		28		339		49			
11:45	169		23		164		21		333		44			
Totals	4,003		7,876		4,187		7,337		8,190		15,213			
Split%	48.9		51.8		51.1		48.2							
Day Totals		11,879				11,524				23,403				
Day Splits		50.8				49.2								
Peak Hour	07:45		05:00		08:00		05:30		08:00		05:15			
Volume	931		1,092		969		996		1,880		2,038			
Factor	0.81		0.95		0.85		0.92		0.96		0.95			

Data File : D1702017

Appendix B ICU CALCULATION WORKSHEETS

Peak hour intersection volume/capacity ratios at the signalized study intersections are calculated by means of intersection capacity utilization (ICU) values.

The procedure is based on the critical movement methodology, and shows the amount of capacity utilized by each critical move. A capacity of 1,700 vehicles per hour (VPH) per lane is assumed together with a .05 clearance interval. A "de-facto" right-turn lane is used in the ICU calculation for cases where a curb lane is wide enough to separately serve both through and right-turn traffic (typically with a width of 19 feet from curb to outside of through-lane with parking prohibited during peak periods). Such lanes are treated the same as striped right-turn lanes during the ICU calculations, but they are denoted on the ICU calculation worksheets using the letter "d" in place of a numerical entry for right-turn lanes.

The methodology also incorporates a check for right-turn capacity utilization. Both right-turn-on-green (RTOG) and right-turn-on-red (RTOR) capacity availability are calculated and checked against the total right-turn capacity need. If insufficient capacity is available, then an adjustment is made to the total capacity utilization value. The following example shows how this adjustment is made.

Example for Northbound Right

1. Right-Turn-On-Green (RTOG)

If NBT is critical move, then:

RTOG = V/C (NBT)

Otherwise,

RTOG = V/C (NBL) + V/C (SBT) - V/C (SBL)

2. Right-Turn-On-Red (RTOR)

If WBL is critical move, then:

RTOR = V/C (WBL)

Otherwise,

RTOR = V/C (EBL) + V/C (WBT) - V/C (EBT)

3. Right-Turn Overlap Adjustment

If the northbound right is assumed to overlap with the adjacent westbound left, adjustments to the RTOG and RTOR values are made as follows:

RTOG = RTOG + V/C (WBL)

RTOR = RTOR - V/C (WBL)

4. Total Right-Turn Capacity (RTC) Availability for NBR

RTC = RTOG + factor x RTOR

Where factor = RTOR saturation flow factor (75%)

Right-turn adjustment is then as follows:

Additional ICU = V/C (NBR) - RTC

A zero or negative value indicates that adequate capacity is available and no adjustment is necessary. A positive value indicates that the available RTOR and RTOG capacity does not adequately accommodate the right-turn V/C; therefore, the right-turn is essentially considered to be a critical movement. In such cases, the right-turn adjustment is noted on the ICU worksheet and it is included in the total capacity utilization value. When it is determined that a right-turn adjustment is required for more than one right-turn movement, the word "multi" is printed on the worksheet instead of an actual right-turn movement reference, and the right-turn adjustments are cumulatively added to the total capacity utilization value. In such cases, further operational evaluation is typically carried out to determine if under actual operational conditions, the critical right-turns would operate simultaneously, and therefore a right-turn adjustment credit should be applied.

Shared Lane V/C Methodology

For intersection approaches where shared usage of a lane is permitted by more than one turn movement (e.g., left/through, through/right, left/through/right), the individual turn volumes are evaluated to determine whether dedication of the shared lane is warranted to any one given turn movement. The following example demonstrates how this evaluation is carried out:

Example for Shared Left/Through Lane

1. Average Lane Volume (ALV)

$$\text{ALV} = \frac{\text{Left-Turn Volume + Through Volume}}{\text{Total Left + Through Approach Lanes (including shared lane)}}$$

2. ALV for Each Approach

$$\text{ALV (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Lanes (including shared lane)}}$$

$$\text{ALV (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Lanes (including shared lane)}}$$

3. Lane Dedication is Warranted

If ALV (Left) is greater than ALV, then full dedication of the shared lane to the left-turn approach is warranted. Left-turn and through V/C ratios for this case are calculated as follows:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Capacity (including shared lane)}}$$

$$\text{V/C (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Capacity (excluding shared lane)}}$$

Similarly, if ALV (Through) is greater than ALV then full dedication to the through approach is warranted, and left-turn and through V/C ratios are calculated as follows:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Capacity (excluding shared lane)}}$$

$$\text{V/C (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Capacity (including shared lane)}}$$

4. Lane Dedication is not Warranted

If ALV (Left) and ALV (Through) are both less than ALV, the left/through lane is assumed to be truly shared and each left, left/through or through approach lane carries an evenly distributed volume of traffic equal to ALV. A combined left/through V/C ratio is calculated as follows:

$$\text{V/C (Left/Through)} = \frac{\text{Left-Turn Volume + Through Volume}}{\text{Total Left + Through Approach Capacity (including shared lane)}}$$

This V/C (Left/Through) ratio is assigned as the V/C (Through) ratio for the critical movement analysis and ICU summary listing.

If split phasing has not been designated for this approach, the relative proportion of V/C (Through) that is attributed to the left-turn volume is estimated as follows:

If approach has more than one left-turn lane (including shared lane), then:

V/C (Left) = V/C (Through)

If approach has only one left-turn lane (shared lane), then:

$$V/C\ (Left) = \frac{\text{Left-Turn Volume}}{\text{Single Approach Lane Capacity}}$$

If this left-turn movement is determined to be a critical movement, the V/C (Left) value is posted in brackets on the ICU summary printout.

These same steps are carried out for shared through/right lanes. If full dedication of a shared through/right lane to the right-turn movement is warranted, the right-turn V/C value calculated in step three is checked against the RTOR and RTOG capacity availability if the option to include right-turns in the V/C ratio calculations is selected. If the V/C value that is determined using the shared lane methodology described here is reduced due to RTOR and RTOG capacity availability, the V/C value for the through/right lanes is posted in brackets.

When an approach contains more than one shared lane (e.g., left/through and through/right), steps one and two listed above are carried out for the three turn movements combined. Step four is carried out if dedication is not warranted for either of the shared lanes. If dedication of one of the shared lanes is warranted to one movement or another, step three is carried out for the two movements involved, and then steps one through four are repeated for the two movements involved in the other shared lane.

1. California & Campus

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	117	.07*	190	.11*
NBT	2	3400	162	.07	194	.10
NBR	0	0	92		132	
SBL	1	1700	117	.07	131	.08
SBT	1	1700	130	.08*	212	.12*
SBR	1	1700	49	.03	29	.02
EBL	1	1700	20	.01*	97	.06
EBT	2	3400	141	.06	620	.25*
EBR	0	0	65		227	
WBL	1	1700	89	.05	127	.07*
WBT	2	3400	473	.18*	411	.14
WBR	0	0	135		60	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.39**		**.60**

Existing + Project Phase 4a

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	130	.08*	197	.12*
NBT	2	3400	177	.08	202	.10
NBR	0	0	97		135	
SBL	1	1700	117	.07	136	.08
SBT	1	1700	134	.08*	222	.13*
SBR	1	1700	49	.03	29	.02
EBL	1	1700	20	.01*	97	.06
EBT	2	3400	141	.06	627	.25*
EBR	0	0	65		230	
WBL	1	1700	91	.05	140	.08*
WBT	2	3400	473	.18*	411	.14
WBR	0	0	135		60	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.40**		**.63**

Existing + Project Phase 4a + 4b

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	137	.08	202	.12*
NBT	2	3400	187	.09*	207	.10
NBR	0	0	107		140	
SBL	1	1700	117	.07*	136	.08
SBT	1	1700	136	.08	230	.14*
SBR	1	1700	49	.03	29	.02
EBL	1	1700	20	.01*	97	.06
EBT	2	3400	141	.06	627	.25*
EBR	0	0	65		237	
WBL	1	1700	93	.05	148	.09*
WBT	2	3400	473	.18*	411	.14
WBR	0	0	135		60	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.40**		**.65**

Existing + Project Phase 4a w/Arroyo Extension

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	130	.08*	197	.12*
NBT	2	3400	177	.08	202	.10
NBR	0	0	97		135	
SBL	1	1700	117	.07	136	.08
SBT	1	1700	134	.08*	222	.13*
SBR	1	1700	49	.03	29	.02
EBL	1	1700	20	.01*	97	.06
EBT	2	3400	141	.06	627	.25*
EBR	0	0	65		230	
WBL	1	1700	91	.05	140	.08*
WBT	2	3400	473	.18*	411	.14
WBR	0	0	135		60	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.40**		**.63**

1. California & Campus

Existing + Project Phase 4a + 4b w/Arroyo Exten

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	137	.08	202	.12*
NBT	2	3400	187	.09*	207	.10
NBR	0	0	107		140	
SBL	1	1700	117	.07*	136	.08
SBT	1	1700	136	.08	230	.14*
SBR	1	1700	49	.03	29	.02
EBL	1	1700	20	.01*	97	.06
EBT	2	3400	141	.06	627	.25*
EBR	0	0	65		237	
WBL	1	1700	93	.05	148	.09*
WBT	2	3400	473	.18*	411	.14
WBR	0	0	135		60	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.40**		**.65**

Buildout No Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	190	.11*	320	.19*
NBT	2	3400	130	.07	340	.15
NBR	0	0	120		180	
SBL	1	1700	130	.08	150	.09
SBT	1	1700	210	.12*	250	.15*
SBR	1	1700	70	.04	40	.02
EBL	1	1700	30	.02*	110	.06
EBT	2	3400	270	.11	810	.33*
EBR	0	0	110		300	
WBL	1	1700	140	.08	130	.08*
WBT	2	3400	600	.22*	540	.17
WBR	0	0	160		50	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.52**		**.80**

Buildout with Project Phase 4a + 4b

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	202	.12*	327	.19*
NBT	2	3400	145	.08	348	.16
NBR	0	0	129		185	
SBL	1	1700	130	.08	153	.09
SBT	1	1700	214	.13*	261	.15*
SBR	1	1700	70	.04	40	.02
EBL	1	1700	30	.02*	110	.06
EBT	2	3400	270	.11	814	.33*
EBR	0	0	110		306	
WBL	1	1700	142	.08	143	.08*
WBT	2	3400	600	.22*	540	.17
WBR	0	0	160		50	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.54**		**.80**

2. California & Arroyo/Dwy

Buildout No Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	10	{.01}*	20	
NBT	2	3400	190	.07	630	.21*
NBR	0	0	30		60	
SBL	0	0	80		220	{.13}*
SBT	2	3400	360	.14*	440	.20
SBR	0	0	20		20	
EBL	0	0	10	{.01}*	20	{.01}*
EBT	1	1700	10	.02	0	.02
EBR	0	0	10		10	
WBL	0	0	50		60	
WBT	1	1700	10	.11*	10	.15*
WBR	0	0	120		190	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.32**		**.55**

Buildout with Project Phase 4a + 4b

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	10	{.01}*	20	
NBT	2	3400	206	.07	639	.21*
NBR	0	0	32		71	
SBL	0	0	82		233	{.14}*
SBT	2	3400	362	.14*	454	.21
SBR	0	0	20		20	
EBL	0	0	10	{.01}*	20	{.01}*
EBT	1	1700	10	.02	0	.02
EBR	0	0	10		10	
WBL	0	0	62		67	
WBT	1	1700	10	.12*	10	.16*
WBR	0	0	140		201	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.33**		**.57**

3. California & Palo Verde/Arroyo (South)

Buildout No Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	10	.01	10	.01*
NBT	2	3400	400	.13*	160	.08
NBR	0	0	30		100	
SBL	1	1700	0	.00	20	.01
SBT	2	3400	70	.03	480	.15*
SBR	0	0	20		30	
EBL	0	0	20	{.01}*	20	{.01}*
EBT	1	1700	0	.02	0	.02
EBR	0	0	20		10	
WBL	0	0	100		40	
WBT	1	1700	0	.09*	0	.04*
WBR	0	0	50		20	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.28**		**.26**

Buildout with Project Phase 4a + 4b

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	10	.01	10	.01*
NBT	2	3400	404	.13*	181	.08
NBR	0	0	30		100	
SBL	1	1700	0	.00	20	.01
SBT	2	3400	94	.03	493	.15*
SBR	0	0	20		30	
EBL	0	0	20	{.01}*	20	{.01}*
EBT	1	1700	0	.02	0	.02
EBR	0	0	20		10	
WBL	0	0	100		40	
WBT	1	1700	0	.09*	0	.04*
WBR	0	0	50		20	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.28**		**.26**

8. Culver & Campus

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	63	.04*	80	.05
NBT	3	5100	685	.13	868	.17*
NBR	d	1700	146	.09	155	.09
SBL	2	3400	330	.10	388	.11*
SBT	2	3400	857	.25*	735	.22
SBR	1	1700	255	.15	281	.17
EBL	2	3400	92	.03*	305	.09
EBT	2	3400	180	.06	467	.17*
EBR	0	0	32		96	
WBL	1	1700	137	.08	89	.05*
WBT	2	3400	374	.11*	201	.06
WBR	1	1700	492	.29	251	.15
Right Turn Adjustment			WBR	.03*		
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .51 .55

Existing + Project Phase 4a

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	63	.04*	80	.05
NBT	3	5100	685	.13	868	.17*
NBR	d	1700	146	.09	155	.09
SBL	2	3400	330	.10	388	.11*
SBT	2	3400	857	.25*	735	.22
SBR	1	1700	257	.15	294	.17
EBL	2	3400	107	.03*	313	.09
EBT	2	3400	180	.06	467	.17*
EBR	0	0	32		96	
WBL	1	1700	137	.08	89	.05*
WBT	2	3400	374	.11*	201	.06
WBR	1	1700	492	.29	251	.15
Right Turn Adjustment			WBR	.03*		
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .51 .55

Existing + Project Phase 4a + 4b

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	63	.04*	80	.05
NBT	3	5100	685	.13	868	.17*
NBR	d	1700	146	.09	155	.09
SBL	2	3400	330	.10	388	.11*
SBT	2	3400	857	.25*	735	.22
SBR	1	1700	259	.15	302	.18
EBL	2	3400	117	.03*	318	.09
EBT	2	3400	180	.06	467	.17*
EBR	0	0	32		96	
WBL	1	1700	137	.08	89	.05*
WBT	2	3400	374	.11*	201	.06
WBR	1	1700	492	.29	251	.15
Right Turn Adjustment			WBR	.03*		
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .51 .55

Existing + Project Phase 4a w/Arroyo Extension

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	63	.04*	80	.05
NBT	3	5100	685	.13	868	.17*
NBR	d	1700	146	.09	155	.09
SBL	2	3400	330	.10	388	.11*
SBT	2	3400	857	.25*	735	.22
SBR	1	1700	257	.15	294	.17
EBL	2	3400	107	.03*	313	.09
EBT	2	3400	180	.06	467	.17*
EBR	0	0	32		96	
WBL	1	1700	137	.08	89	.05*
WBT	2	3400	374	.11*	201	.06
WBR	1	1700	492	.29	251	.15
Right Turn Adjustment			WBR	.03*		
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .51 .55

8. Culver & Campus

Existing + Project Phase 4a + 4b w/Arroyo Exten

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	63	.04*	80	.05
NBT	3	5100	685	.13	868	.17*
NBR	d	1700	146	.09	155	.09
SBL	2	3400	330	.10	388	.11*
SBT	2	3400	857	.25*	735	.22
SBR	1	1700	259	.15	302	.18
EBL	2	3400	117	.03*	318	.09
EBT	2	3400	180	.06	467	.17*
EBR	0	0	32		96	
WBL	1	1700	137	.08	89	.05*
WBT	2	3400	374	.11*	201	.06
WBR	1	1700	492	.29	251	.15
Right Turn Adjustment			WBR	.03*		
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .51 .55

Buildout No Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	90	.05*	110	.06*
NBT	3	5100	740	.15	860	.17
NBR	d	1700	180	.11	120	.07
SBL	2	3400	440	.13	520	.15
SBT	2	3400	800	.24*	930	.27*
SBR	1	1700	360	.21	320	.19
EBL	2	3400	150	.04	410	.12
EBT	2	3400	340	.11*	540	.20*
EBR	0	0	30		130	
WBL	1	1700	250	.15*	60	.04*
WBT	2	3400	720	.21	250	.07
WBR	1	1700	500	.29	270	.16
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .60 .62

Buildout with Project Phase 4a + 4b

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	90	.05*	110	.06*
NBT	3	5100	740	.15	860	.17
NBR	d	1700	180	.11	120	.07
SBL	2	3400	440	.13	520	.15
SBT	2	3400	800	.24*	930	.27*
SBR	1	1700	362	.21	333	.20
EBL	2	3400	165	.05	418	.12
EBT	2	3400	340	.11*	540	.20*
EBR	0	0	30		130	
WBL	1	1700	250	.15*	60	.04*
WBT	2	3400	720	.21	250	.07
WBR	1	1700	500	.29	270	.16
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .60 .62

9. Culver & Vista Del Campo

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	15	.01*	21	.01
NBT	2	3400	902	.27	1033	.30*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	948	.29*	868	.28
SBR	0	0	43		86	
EBL	1	1700	41	.02*	68	.04*
EBT	0	0	0		0	
EBR	1	1700	24	.01	36	.02
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.37**		**.39**

Existing + Project Phase 4a

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	15	.01*	32	.02
NBT	2	3400	902	.27	1033	.30*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	948	.29*	868	.28
SBR	0	0	43		86	
EBL	1	1700	41	.02*	68	.04*
EBT	0	0	0		0	
EBR	1	1700	37	.02	42	.02
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.37**		**.39**

Existing + Project Phase 4a + 4b

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	15	.01*	32	.02
NBT	2	3400	902	.27	1033	.30*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	948	.29*	868	.28
SBR	0	0	43		86	
EBL	1	1700	41	.02*	68	.04*
EBT	0	0	0		0	
EBR	1	1700	37	.02	42	.02
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.37**		**.39**

Existing + Project Phase 4a w/Arroyo Extension

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	13	.01*	27	.02
NBT	2	3400	902	.27	1033	.30*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	948	.29*	868	.28
SBR	0	0	43		86	
EBL	1	1700	41	.02*	68	.04*
EBT	0	0	0		0	
EBR	1	1700	33	.02	36	.02
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.37**		**.39**

9. Culver & Vista Del Campo

Existing + Project Phase 4a + 4b w/Arroyo Exten

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	13	.01*	27	.02
NBT	2	3400	902	.27	1033	.30*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	948	.29*	868	.28
SBR	0	0	43		86	
EBL	1	1700	41	.02*	68	.04*
EBT	0	0	0		0	
EBR	1	1700	33	.02	36	.02
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.37**		**.39**

Buildout No Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	20	.01*	50	.03*
NBT	2	3400	880	.26	1020	.30
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	1040	.32*	910	.33*
SBR	0	0	40		210	
EBL	1	1700	130	.08*	70	.04*
EBT	0	0	0		0	
EBR	1	1700	70	.04	40	.02
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.46**		**.45**

Buildout with Project Phase 4a + 4b

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	21	.01*	58	.03*
NBT	2	3400	880	.26	1020	.30
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	1040	.32*	910	.33*
SBR	0	0	40		210	
EBL	1	1700	130	.08*	70	.04*
EBT	0	0	0		0	
EBR	1	1700	78	.05	45	.03
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.46**		**.45**

Appendix C HCM DELAY CALCULATION WORKSHEETS

Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	14	3	13	0	50	2	116	0	12	209	25
Future Vol, veh/h	0	14	3	13	0	50	2	116	0	12	209	25
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	15	3	14	0	55	2	127	0	13	230	27
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	8.9	9.9	9.6
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	10%	0%	47%	30%	40%	0%
Vol Thru, %	90%	81%	10%	1%	60%	89%
Vol Right, %	0%	19%	43%	69%	0%	11%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	117	130	30	168	196	133
LT Vol	12	0	14	50	78	0
Through Vol	105	105	3	2	118	118
RT Vol	0	25	13	116	0	15
Lane Flow Rate	128	142	33	185	215	146
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.197	0.211	0.052	0.26	0.332	0.214
Departure Headway (Hd)	5.526	5.337	5.628	5.069	5.571	5.29
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	643	665	640	702	638	671
Service Time	3.322	3.133	3.628	3.149	3.362	3.081
HCM Lane V/C Ratio	0.199	0.214	0.052	0.264	0.337	0.218
HCM Control Delay	9.7	9.6	8.9	9.9	11.2	9.5
HCM Lane LOS	A	A	A	A	B	A
HCM 95th-tile Q	0.7	0.8	0.2	1	1.5	0.8

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↰↑↱	
Traffic Vol, veh/h	0	78	235	15
Future Vol, veh/h	0	78	235	15
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	86	258	16
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	10.5
HCM LOS	B

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	24	0	20	0	0	0	0	0	4	179	0
Future Vol, veh/h	0	24	0	20	0	0	0	0	0	4	179	0
Peak Hour Factor	0.92	0.77	0.77	0.77	0.92	0.77	0.77	0.77	0.92	0.77	0.77	0.77
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	31	0	26	0	0	0	0	0	5	232	0
Number of Lanes	0	0	1	0	0	0	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	8.7	0	10
HCM LOS	A	-	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	55%	0%	0%	0%
Vol Thru, %	0%	100%	0%	100%	100%	94%
Vol Right, %	0%	0%	45%	0%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	179	44	0	0	270
LT Vol	4	0	24	0	0	0
Through Vol	0	179	0	0	0	254
RT Vol	0	0	20	0	0	16
Lane Flow Rate	5	232	57	0	0	351
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.008	0.32	0.082	0	0	0.47
Departure Headway (Hd)	5.458	4.955	5.173	5.441	4.87	4.828
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	657	728	693	0	0	747
Service Time	3.181	2.678	3.206	3.485	2.591	2.549
HCM Lane V/C Ratio	0.008	0.319	0.082	0	0	0.47
HCM Control Delay	8.2	10	8.7	8.5	7.6	11.8
HCM Lane LOS	A	A	A	N	N	B
HCM 95th-tile Q	0	1.4	0.3	0	0	2.5

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Lane Configurations		↰	↱	
Traffic Vol, veh/h	0	0	254	16
Future Vol, veh/h	0	0	254	16
Peak Hour Factor	0.92	0.77	0.77	0.77
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	330	21
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	11.8
HCM LOS	B

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			✥				✥				✥	
Traffic Vol, veh/h	0	6	78	9	0	0	181	2	0	12	1	1
Future Vol, veh/h	0	6	78	9	0	0	181	2	0	12	1	1
Peak Hour Factor	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	7	93	11	0	0	215	2	0	14	1	1
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.8	8.4	7.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	86%	6%	0%	0%
Vol Thru, %	7%	84%	99%	8%
Vol Right, %	7%	10%	1%	92%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	14	93	183	12
LT Vol	12	6	0	0
Through Vol	1	78	181	1
RT Vol	1	9	2	11
Lane Flow Rate	17	111	218	14
Geometry Grp	1	1	1	1
Degree of Util (X)	0.022	0.126	0.246	0.016
Departure Headway (Hd)	4.788	4.107	4.065	4.11
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	752	865	880	876
Service Time	2.788	2.172	2.109	2.111
HCM Lane V/C Ratio	0.023	0.128	0.248	0.016
HCM Control Delay	7.9	7.8	8.4	7.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.4	1	0

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			✣	
Traffic Vol, veh/h	0	0	1	11
Future Vol, veh/h	0	0	1	11
Peak Hour Factor	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	1	13
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.2
HCM LOS	A

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	18	34	0	32	17	0	37	24
Future Vol, veh/h	0	18	34	0	32	17	0	37	24
Peak Hour Factor	0.92	0.86	0.86	0.92	0.86	0.86	0.92	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	21	40	0	37	20	0	43	28
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	7.4	7.2	7.6
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	61%
Vol Thru, %	65%	0%	0%	39%
Vol Right, %	35%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	49	18	34	61
LT Vol	0	18	0	37
Through Vol	32	0	0	24
RT Vol	17	0	34	0
Lane Flow Rate	57	21	40	71
Geometry Grp	2	7	7	2
Degree of Util (X)	0.061	0.031	0.045	0.083
Departure Headway (Hd)	3.883	5.256	4.054	4.203
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	914	678	876	848
Service Time	1.943	3.014	1.812	2.254
HCM Lane V/C Ratio	0.062	0.031	0.046	0.084
HCM Control Delay	7.2	8.2	7	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.1	0.3

Intersection	
Intersection Delay, s/veh	16.2
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	22	0	12	0	59	0	191	0	21	290	62
Future Vol, veh/h	0	22	0	12	0	59	0	191	0	21	290	62
Peak Hour Factor	0.92	0.96	0.96	0.96	0.92	0.96	0.96	0.96	0.92	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	23	0	13	0	61	0	199	0	22	302	65
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	10.5	13.5	12.3
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	13%	0%	65%	24%	55%	0%
Vol Thru, %	87%	70%	0%	0%	45%	90%
Vol Right, %	0%	30%	35%	76%	0%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	166	207	34	250	399	197
LT Vol	21	0	22	59	221	0
Through Vol	145	145	0	0	178	178
RT Vol	0	62	12	191	0	19
Lane Flow Rate	173	216	35	260	416	205
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.309	0.368	0.068	0.43	0.73	0.34
Departure Headway (Hd)	6.426	6.148	6.943	5.949	6.321	5.971
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	557	582	512	604	569	601
Service Time	4.191	3.913	5.036	4.01	4.077	3.727
HCM Lane V/C Ratio	0.311	0.371	0.068	0.43	0.731	0.341
HCM Control Delay	12.1	12.5	10.5	13.5	24.4	11.8
HCM Lane LOS	B	B	B	B	C	B
HCM 95th-tile Q	1.3	1.7	0.2	2.2	6.1	1.5

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Lane Configurations			⇆	
Traffic Vol, veh/h	0	221	356	19
Future Vol, veh/h	0	221	356	19
Peak Hour Factor	0.92	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	230	371	20
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	20.2
HCM LOS	C

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	16	0	12	0	0	0	0	0	10	290	0
Future Vol, veh/h	0	16	0	12	0	0	0	0	0	10	290	0
Peak Hour Factor	0.92	0.87	0.87	0.87	0.92	0.87	0.87	0.87	0.92	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	18	0	14	0	0	0	0	0	11	333	0
Number of Lanes	0	0	1	0	0	0	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	8.6	0	11.3
HCM LOS	A	-	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	57%	0%	0%	0%
Vol Thru, %	0%	100%	0%	100%	100%	89%
Vol Right, %	0%	0%	43%	0%	0%	11%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	10	290	28	0	0	262
LT Vol	10	0	16	0	0	0
Through Vol	0	290	0	0	0	234
RT Vol	0	0	12	0	0	28
Lane Flow Rate	11	333	32	0	0	301
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.017	0.448	0.047	0	0	0.402
Departure Headway (Hd)	5.345	4.843	5.3	5.507	4.877	4.802
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	672	747	676	0	0	753
Service Time	3.06	2.557	3.331	3.545	2.592	2.517
HCM Lane V/C Ratio	0.016	0.446	0.047	0	0	0.4
HCM Control Delay	8.2	11.4	8.6	8.5	7.6	10.7
HCM Lane LOS	A	B	A	N	N	B
HCM 95th-tile Q	0.1	2.3	0.1	0	0	1.9

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations		↰	↱	
Traffic Vol, veh/h	0	0	234	28
Future Vol, veh/h	0	0	234	28
Peak Hour Factor	0.92	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	269	32
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	10.7
HCM LOS	B

Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	26	185	61	0	1	199	2	0	30	1	3
Future Vol, veh/h	0	26	185	61	0	1	199	2	0	30	1	3
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	28	199	66	0	1	214	2	0	32	1	3
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	9.3	8.9	8.5
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	88%	10%	0%	12%
Vol Thru, %	3%	68%	99%	6%
Vol Right, %	9%	22%	1%	82%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	34	272	202	17
LT Vol	30	26	1	2
Through Vol	1	185	199	1
RT Vol	3	61	2	14
Lane Flow Rate	37	292	217	18
Geometry Grp	1	1	1	1
Degree of Util (X)	0.053	0.34	0.263	0.023
Departure Headway (Hd)	5.177	4.18	4.356	4.609
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	692	863	828	776
Service Time	3.206	2.194	2.372	2.641
HCM Lane V/C Ratio	0.053	0.338	0.262	0.023
HCM Control Delay	8.5	9.3	8.9	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	1.5	1.1	0.1

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	2	1	14
Future Vol, veh/h	0	2	1	14
Peak Hour Factor	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	2	1	15
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.8
HCM LOS	A

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	39	67	0	59	40	0	62	52
Future Vol, veh/h	0	39	67	0	59	40	0	62	52
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	42	73	0	64	43	0	67	57
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	7.9	7.7	8.2
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	54%
Vol Thru, %	60%	0%	0%	46%
Vol Right, %	40%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	99	39	67	114
LT Vol	0	39	0	62
Through Vol	59	0	0	52
RT Vol	40	0	67	0
Lane Flow Rate	108	42	73	124
Geometry Grp	2	7	7	2
Degree of Util (X)	0.123	0.065	0.088	0.153
Departure Headway (Hd)	4.106	5.55	4.345	4.432
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	876	648	827	813
Service Time	2.115	3.265	2.06	2.441
HCM Lane V/C Ratio	0.123	0.065	0.088	0.153
HCM Control Delay	7.7	8.7	7.5	8.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.2	0.3	0.5

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	14	3	13	0	68	2	141	0	12	217	28
Future Vol, veh/h	0	14	3	13	0	68	2	141	0	12	217	28
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	15	3	14	0	75	2	155	0	13	238	31
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	9.2	10.9	10
HCM LOS	A	B	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	10%	0%	47%	32%	39%	0%
Vol Thru, %	90%	79%	10%	1%	61%	89%
Vol Right, %	0%	21%	43%	67%	0%	11%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	137	30	211	198	135
LT Vol	12	0	14	68	78	0
Through Vol	109	109	3	2	120	120
RT Vol	0	28	13	141	0	15
Lane Flow Rate	132	150	33	232	217	148
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.213	0.233	0.053	0.339	0.352	0.228
Departure Headway (Hd)	5.799	5.603	5.804	5.261	5.841	5.562
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	620	642	616	689	616	646
Service Time	3.528	3.332	3.843	3.261	3.567	3.288
HCM Lane V/C Ratio	0.213	0.234	0.054	0.337	0.352	0.229
HCM Control Delay	10.1	10	9.2	10.9	11.7	9.9
HCM Lane LOS	B	A	A	B	B	A
HCM 95th-tile Q	0.8	0.9	0.2	1.5	1.6	0.9

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↰↑↱	
Traffic Vol, veh/h	0	78	239	15
Future Vol, veh/h	0	78	239	15
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	86	263	16
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	11
HCM LOS	B

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations									
Traffic Vol, veh/h	0	24	20	0	4	185	0	274	16
Future Vol, veh/h	0	24	20	0	4	185	0	274	16
Peak Hour Factor	0.92	0.77	0.77	0.92	0.77	0.77	0.92	0.77	0.77
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	31	26	0	5	240	0	356	21
Number of Lanes	0	1	0	0	1	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	1
HCM Control Delay	8.7	10.1	11.2
HCM LOS	A	B	B

Lane	NBLn1	NBLn2	EBLn1	SBLn1
Vol Left, %	100%	0%	55%	0%
Vol Thru, %	0%	100%	0%	94%
Vol Right, %	0%	0%	45%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	185	44	290
LT Vol	4	0	24	0
Through Vol	0	185	0	274
RT Vol	0	0	20	16
Lane Flow Rate	5	240	57	377
Geometry Grp	7	7	2	5
Degree of Util (X)	0.008	0.33	0.082	0.464
Departure Headway (Hd)	5.453	4.951	5.172	4.431
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	657	728	691	814
Service Time	3.177	2.674	3.212	2.451
HCM Lane V/C Ratio	0.008	0.33	0.082	0.463
HCM Control Delay	8.2	10.1	8.7	11.2
HCM Lane LOS	A	B	A	B
HCM 95th-tile Q	0	1.4	0.3	2.5

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	355	2	0	702	0	10
Future Vol, veh/h	355	2	0	702	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	374	2	0	739	0	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	188
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	822
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	822
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	822	-	-	-
HCM Lane V/C Ratio	0.013	-	-	-
HCM Control Delay (s)	9.4	-	-	-
HCM Lane LOS	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	0	84	10	0	0	228	0	0	13	0	1
Future Vol, veh/h	0	0	84	10	0	0	228	0	0	13	0	1
Peak Hour Factor	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	100	12	0	0	271	0	0	15	0	1
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.8	8.9	8
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	93%	0%	0%	0%
Vol Thru, %	0%	89%	100%	100%
Vol Right, %	7%	11%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	14	94	228	0
LT Vol	13	0	0	0
Through Vol	0	84	228	0
RT Vol	1	10	0	0
Lane Flow Rate	17	112	271	0
Geometry Grp	1	1	1	1
Degree of Util (X)	0.023	0.128	0.305	0
Departure Headway (Hd)	4.897	4.102	4.047	4.779
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	735	865	885	0
Service Time	2.897	2.172	2.087	2.78
HCM Lane V/C Ratio	0.023	0.129	0.306	0
HCM Control Delay	8	7.8	8.9	7.8
HCM Lane LOS	A	A	A	N
HCM 95th-tile Q	0.1	0.4	1.3	0

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	0	0	0
Future Vol, veh/h	0	0	0	0
Peak Hour Factor	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	0	0
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	0
HCM LOS	-

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Lane Configurations									
Traffic Vol, veh/h	0	3	83	0	194	2	0	8	31
Future Vol, veh/h	0	3	83	0	194	2	0	8	31
Peak Hour Factor	0.92	0.84	0.84	0.92	0.84	0.84	0.92	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	4	99	0	231	2	0	10	37
Number of Lanes	0	0	1	0	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	7.9	8.6	7.5
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	0%	21%
Vol Thru, %	97%	99%	0%
Vol Right, %	0%	1%	79%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	86	196	39
LT Vol	3	0	8
Through Vol	83	194	0
RT Vol	0	2	31
Lane Flow Rate	102	233	46
Geometry Grp	1	1	1
Degree of Util (X)	0.119	0.265	0.054
Departure Headway (Hd)	4.198	4.086	4.224
Convergence, Y/N	Yes	Yes	Yes
Cap	844	875	853
Service Time	2.274	2.136	2.224
HCM Lane V/C Ratio	0.121	0.266	0.054
HCM Control Delay	7.9	8.6	7.5
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.4	1.1	0.2

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	18	34	0	32	17	0	50	24
Future Vol, veh/h	0	18	34	0	32	17	0	50	24
Peak Hour Factor	0.92	0.86	0.86	0.92	0.86	0.86	0.92	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	21	40	0	37	20	0	58	28
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	7.4	7.2	7.7
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	68%
Vol Thru, %	65%	0%	0%	32%
Vol Right, %	35%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	49	18	34	74
LT Vol	0	18	0	50
Through Vol	32	0	0	24
RT Vol	17	0	34	0
Lane Flow Rate	57	21	40	86
Geometry Grp	2	7	7	2
Degree of Util (X)	0.062	0.031	0.045	0.101
Departure Headway (Hd)	3.895	5.282	4.079	4.217
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	910	673	869	845
Service Time	1.958	3.051	1.848	2.268
HCM Lane V/C Ratio	0.063	0.031	0.046	0.102
HCM Control Delay	7.2	8.2	7	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.1	0.3

Intersection	
Intersection Delay, s/veh	17.7
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	22	0	12	0	67	0	199	0	21	300	73
Future Vol, veh/h	0	22	0	12	0	67	0	199	0	21	300	73
Peak Hour Factor	0.92	0.96	0.96	0.96	0.92	0.96	0.96	0.96	0.92	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	23	0	13	0	70	0	207	0	22	313	76
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	10.8	14.4	13
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	12%	0%	65%	25%	55%	0%
Vol Thru, %	88%	67%	0%	0%	45%	91%
Vol Right, %	0%	33%	35%	75%	0%	9%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	171	223	34	266	411	206
LT Vol	21	0	22	67	224	0
Through Vol	150	150	0	0	187	187
RT Vol	0	73	12	199	0	19
Lane Flow Rate	178	232	35	277	428	215
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.324	0.404	0.071	0.466	0.766	0.363
Departure Headway (Hd)	6.551	6.255	7.231	6.056	6.437	6.094
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	545	571	498	593	561	588
Service Time	4.328	4.032	5.231	4.126	4.204	3.861
HCM Lane V/C Ratio	0.327	0.406	0.07	0.467	0.763	0.366
HCM Control Delay	12.5	13.3	10.8	14.4	27.4	12.3
HCM Lane LOS	B	B	B	B	D	B
HCM 95th-tile Q	1.4	1.9	0.2	2.5	6.9	1.7

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			⬅⬆⬆➡	
Traffic Vol, veh/h	0	224	374	19
Future Vol, veh/h	0	224	374	19
Peak Hour Factor	0.92	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	233	390	20
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	22.4
HCM LOS	C

Intersection	
Intersection Delay, s/veh	11
Intersection LOS	B

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations									
Traffic Vol, veh/h	0	16	12	0	10	310	0	247	28
Future Vol, veh/h	0	16	12	0	10	310	0	247	28
Peak Hour Factor	0.92	0.87	0.87	0.92	0.87	0.87	0.92	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	18	14	0	11	356	0	284	32
Number of Lanes	0	1	0	0	1	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	1
HCM Control Delay	8.6	11.9	10.3
HCM LOS	A	B	B

Lane	NBLn1	NBLn2	EBLn1	SBLn1
Vol Left, %	100%	0%	57%	0%
Vol Thru, %	0%	100%	0%	90%
Vol Right, %	0%	0%	43%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	10	310	28	275
LT Vol	10	0	16	0
Through Vol	0	310	0	247
RT Vol	0	0	12	28
Lane Flow Rate	11	356	32	316
Geometry Grp	7	7	2	5
Degree of Util (X)	0.017	0.48	0.048	0.392
Departure Headway (Hd)	5.356	4.854	5.328	4.462
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	672	748	671	809
Service Time	3.056	2.554	3.367	2.479
HCM Lane V/C Ratio	0.016	0.476	0.048	0.391
HCM Control Delay	8.1	12	8.6	10.3
HCM Lane LOS	A	B	A	B
HCM 95th-tile Q	0.1	2.6	0.2	1.9

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	883	16	0	633	0	5
Future Vol, veh/h	883	16	0	633	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	960	17	0	688	0	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	489
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	525
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	525
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	525	-	-	-
HCM Lane V/C Ratio	0.01	-	-	-
HCM Control Delay (s)	11.9	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			✥				✥				✥	
Traffic Vol, veh/h	0	0	225	62	0	1	228	0	0	31	0	3
Future Vol, veh/h	0	0	225	62	0	1	228	0	0	31	0	3
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	242	67	0	1	245	0	0	33	0	3
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	9.5	9.2	8.6
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	91%	0%	0%	0%
Vol Thru, %	0%	78%	100%	100%
Vol Right, %	9%	22%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	34	287	229	0
LT Vol	31	0	1	0
Through Vol	0	225	228	0
RT Vol	3	62	0	0
Lane Flow Rate	37	309	246	0
Geometry Grp	1	1	1	1
Degree of Util (X)	0.053	0.357	0.296	0
Departure Headway (Hd)	5.239	4.162	4.332	5.173
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	684	870	832	0
Service Time	3.268	2.162	2.345	3.206
HCM Lane V/C Ratio	0.054	0.355	0.296	0
HCM Control Delay	8.6	9.5	9.2	8.2
HCM Lane LOS	A	A	A	N
HCM 95th-tile Q	0.2	1.6	1.2	0

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			✥	
Traffic Vol, veh/h	0	0	0	0
Future Vol, veh/h	0	0	0	0
Peak Hour Factor	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	0	0
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	0
HCM LOS	-

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Lane Configurations									
Traffic Vol, veh/h	0	20	208	0	209	8	0	5	18
Future Vol, veh/h	0	20	208	0	209	8	0	5	18
Peak Hour Factor	0.92	0.93	0.93	0.92	0.93	0.93	0.92	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	22	224	0	225	9	0	5	19
Number of Lanes	0	0	1	0	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.9	8.7	7.7
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	0%	22%
Vol Thru, %	91%	96%	0%
Vol Right, %	0%	4%	78%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	228	217	23
LT Vol	20	0	5
Through Vol	208	209	0
RT Vol	0	8	18
Lane Flow Rate	245	233	25
Geometry Grp	1	1	1
Degree of Util (X)	0.284	0.268	0.031
Departure Headway (Hd)	4.169	4.139	4.531
Convergence, Y/N	Yes	Yes	Yes
Cap	853	859	795
Service Time	2.239	2.213	2.531
HCM Lane V/C Ratio	0.287	0.271	0.031
HCM Control Delay	8.9	8.7	7.7
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.2	1.1	0.1

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	39	78	0	59	40	0	68	52
Future Vol, veh/h	0	39	78	0	59	40	0	68	52
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	42	85	0	64	43	0	74	57
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	8	7.7	8.3
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	57%
Vol Thru, %	60%	0%	0%	43%
Vol Right, %	40%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	99	39	78	120
LT Vol	0	39	0	68
Through Vol	59	0	0	52
RT Vol	40	0	78	0
Lane Flow Rate	108	42	85	130
Geometry Grp	2	7	7	2
Degree of Util (X)	0.124	0.066	0.103	0.162
Departure Headway (Hd)	4.14	5.569	4.364	4.463
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	868	645	823	806
Service Time	2.153	3.284	2.079	2.476
HCM Lane V/C Ratio	0.124	0.065	0.103	0.161
HCM Control Delay	7.7	8.7	7.6	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.2	0.3	0.6

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	14	3	13	0	68	2	141	0	12	243	28
Future Vol, veh/h	0	14	3	13	0	68	2	141	0	12	243	28
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	15	3	14	0	75	2	155	0	13	267	31
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	9.3	11.1	10.3
HCM LOS	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	9%	0%	47%	32%	39%	0%
Vol Thru, %	91%	81%	10%	1%	61%	89%
Vol Right, %	0%	19%	43%	67%	0%	11%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	134	150	30	211	199	136
LT Vol	12	0	14	68	78	0
Through Vol	122	122	3	2	121	121
RT Vol	0	28	13	141	0	15
Lane Flow Rate	147	164	33	232	219	149
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.237	0.257	0.054	0.342	0.357	0.233
Departure Headway (Hd)	5.81	5.632	5.889	5.304	5.885	5.609
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	619	639	607	677	612	641
Service Time	3.54	3.362	3.932	3.336	3.614	3.337
HCM Lane V/C Ratio	0.237	0.257	0.054	0.343	0.358	0.232
HCM Control Delay	10.3	10.3	9.3	11.1	11.9	10
HCM Lane LOS	B	B	A	B	B	A
HCM 95th-tile Q	0.9	1	0.2	1.5	1.6	0.9

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↰↑↱	
Traffic Vol, veh/h	0	78	242	15
Future Vol, veh/h	0	78	242	15
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	86	266	16
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	11.1
HCM LOS	B

Intersection	
Intersection Delay, s/veh	11
Intersection LOS	B

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations									
Traffic Vol, veh/h	0	24	20	0	4	187	0	294	16
Future Vol, veh/h	0	24	20	0	4	187	0	294	16
Peak Hour Factor	0.92	0.77	0.77	0.92	0.77	0.77	0.92	0.77	0.77
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	31	26	0	5	243	0	382	21
Number of Lanes	0	1	0	0	1	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	1
HCM Control Delay	8.8	10.2	11.8
HCM LOS	A	B	B

Lane	NBLn1	NBLn2	EBLn1	SBLn1
Vol Left, %	100%	0%	55%	0%
Vol Thru, %	0%	100%	0%	95%
Vol Right, %	0%	0%	45%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	187	44	310
LT Vol	4	0	24	0
Through Vol	0	187	0	294
RT Vol	0	0	20	16
Lane Flow Rate	5	243	57	403
Geometry Grp	7	7	2	5
Degree of Util (X)	0.008	0.335	0.083	0.497
Departure Headway (Hd)	5.475	4.972	5.235	4.44
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	655	724	683	813
Service Time	3.199	2.696	3.277	2.46
HCM Lane V/C Ratio	0.008	0.336	0.083	0.496
HCM Control Delay	8.2	10.2	8.8	11.8
HCM Lane LOS	A	B	A	B
HCM 95th-tile Q	0	1.5	0.3	2.8

Intersection						
Int Delay, s/veh	0.1					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	365	2	0	704	0	10
Future Vol, veh/h	365	2	0	704	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	384	2	0	741	0	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	193
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	816
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	816
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	816	-	-	-
HCM Lane V/C Ratio	0.013	-	-	-
HCM Control Delay (s)	9.5	-	-	-
HCM Lane LOS	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	0	84	10	0	0	228	0	0	13	0	1
Future Vol, veh/h	0	0	84	10	0	0	228	0	0	13	0	1
Peak Hour Factor	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	100	12	0	0	271	0	0	15	0	1
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.8	8.9	8
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	93%	0%	0%	0%
Vol Thru, %	0%	89%	100%	100%
Vol Right, %	7%	11%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	14	94	228	0
LT Vol	13	0	0	0
Through Vol	0	84	228	0
RT Vol	1	10	0	0
Lane Flow Rate	17	112	271	0
Geometry Grp	1	1	1	1
Degree of Util (X)	0.023	0.128	0.305	0
Departure Headway (Hd)	4.897	4.102	4.047	4.779
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	735	865	885	0
Service Time	2.897	2.172	2.087	2.78
HCM Lane V/C Ratio	0.023	0.129	0.306	0
HCM Control Delay	8	7.8	8.9	7.8
HCM Lane LOS	A	A	A	N
HCM 95th-tile Q	0.1	0.4	1.3	0

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			✥	
Traffic Vol, veh/h	0	0	0	0
Future Vol, veh/h	0	0	0	0
Peak Hour Factor	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	0	0
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	0
HCM LOS	-

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Lane Configurations									
Traffic Vol, veh/h	0	3	83	0	194	2	0	8	31
Future Vol, veh/h	0	3	83	0	194	2	0	8	31
Peak Hour Factor	0.92	0.84	0.84	0.92	0.84	0.84	0.92	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	4	99	0	231	2	0	10	37
Number of Lanes	0	0	1	0	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	7.9	8.6	7.5
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	0%	21%
Vol Thru, %	97%	99%	0%
Vol Right, %	0%	1%	79%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	86	196	39
LT Vol	3	0	8
Through Vol	83	194	0
RT Vol	0	2	31
Lane Flow Rate	102	233	46
Geometry Grp	1	1	1
Degree of Util (X)	0.119	0.265	0.054
Departure Headway (Hd)	4.198	4.086	4.224
Convergence, Y/N	Yes	Yes	Yes
Cap	844	875	853
Service Time	2.274	2.136	2.224
HCM Lane V/C Ratio	0.121	0.266	0.054
HCM Control Delay	7.9	8.6	7.5
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.4	1.1	0.2

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	18	34	0	32	17	0	50	24
Future Vol, veh/h	0	18	34	0	32	17	0	50	24
Peak Hour Factor	0.92	0.86	0.86	0.92	0.86	0.86	0.92	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	21	40	0	37	20	0	58	28
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	7.4	7.2	7.7
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	68%
Vol Thru, %	65%	0%	0%	32%
Vol Right, %	35%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	49	18	34	74
LT Vol	0	18	0	50
Through Vol	32	0	0	24
RT Vol	17	0	34	0
Lane Flow Rate	57	21	40	86
Geometry Grp	2	7	7	2
Degree of Util (X)	0.062	0.031	0.045	0.101
Departure Headway (Hd)	3.895	5.282	4.079	4.217
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	910	673	869	845
Service Time	1.958	3.051	1.848	2.268
HCM Lane V/C Ratio	0.063	0.031	0.046	0.102
HCM Control Delay	7.2	8.2	7	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.1	0.3

Intersection	
Intersection Delay, s/veh	18.5
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	22	0	12	0	67	0	199	0	21	315	73
Future Vol, veh/h	0	22	0	12	0	67	0	199	0	21	315	73
Peak Hour Factor	0.92	0.96	0.96	0.96	0.92	0.96	0.96	0.96	0.92	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	23	0	13	0	70	0	207	0	22	328	76
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	10.9	14.6	13.3
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	12%	0%	65%	25%	53%	0%
Vol Thru, %	88%	68%	0%	0%	47%	91%
Vol Right, %	0%	32%	35%	75%	0%	9%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	179	231	34	266	423	218
LT Vol	21	0	22	67	224	0
Through Vol	158	158	0	0	199	199
RT Vol	0	73	12	199	0	19
Lane Flow Rate	186	240	35	277	440	227
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.341	0.421	0.072	0.471	0.791	0.386
Departure Headway (Hd)	6.595	6.309	7.325	6.119	6.467	6.135
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	541	567	492	585	559	585
Service Time	4.378	4.091	5.325	4.192	4.239	3.906
HCM Lane V/C Ratio	0.344	0.423	0.071	0.474	0.787	0.388
HCM Control Delay	12.8	13.7	10.9	14.6	29.6	12.8
HCM Lane LOS	B	B	B	B	D	B
HCM 95th-tile Q	1.5	2.1	0.2	2.5	7.5	1.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↰↑↱	
Traffic Vol, veh/h	0	224	397	19
Future Vol, veh/h	0	224	397	19
Peak Hour Factor	0.92	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	233	414	20
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	23.9
HCM LOS	C

Intersection	
Intersection Delay, s/veh	11.4
Intersection LOS	B

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations									
Traffic Vol, veh/h	0	16	12	0	10	326	0	257	28
Future Vol, veh/h	0	16	12	0	10	326	0	257	28
Peak Hour Factor	0.92	0.87	0.87	0.92	0.87	0.87	0.92	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	18	14	0	11	375	0	295	32
Number of Lanes	0	1	0	0	1	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	1
HCM Control Delay	8.7	12.3	10.6
HCM LOS	A	B	B

Lane	NBLn1	NBLn2	EBLn1	SBLn1
Vol Left, %	100%	0%	57%	0%
Vol Thru, %	0%	100%	0%	90%
Vol Right, %	0%	0%	43%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	10	326	28	285
LT Vol	10	0	16	0
Through Vol	0	326	0	257
RT Vol	0	0	12	28
Lane Flow Rate	11	375	32	328
Geometry Grp	7	7	2	5
Degree of Util (X)	0.017	0.506	0.048	0.408
Departure Headway (Hd)	5.365	4.863	5.394	4.485
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	671	746	663	806
Service Time	3.065	2.563	3.436	2.503
HCM Lane V/C Ratio	0.016	0.503	0.048	0.407
HCM Control Delay	8.2	12.4	8.7	10.6
HCM Lane LOS	A	B	A	B
HCM 95th-tile Q	0.1	2.9	0.2	2

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	888	16	0	641	0	5
Future Vol, veh/h	888	16	0	641	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	965	17	0	697	0	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	491
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	523
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	523
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	523	-	-	-
HCM Lane V/C Ratio	0.01	-	-	-
HCM Control Delay (s)	12	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	0	225	62	0	1	228	0	0	31	0	3
Future Vol, veh/h	0	0	225	62	0	1	228	0	0	31	0	3
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	242	67	0	1	245	0	0	33	0	3
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	9.5	9.2	8.6
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	91%	0%	0%	0%
Vol Thru, %	0%	78%	100%	100%
Vol Right, %	9%	22%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	34	287	229	0
LT Vol	31	0	1	0
Through Vol	0	225	228	0
RT Vol	3	62	0	0
Lane Flow Rate	37	309	246	0
Geometry Grp	1	1	1	1
Degree of Util (X)	0.053	0.357	0.296	0
Departure Headway (Hd)	5.239	4.162	4.332	5.173
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	684	870	832	0
Service Time	3.268	2.162	2.345	3.206
HCM Lane V/C Ratio	0.054	0.355	0.296	0
HCM Control Delay	8.6	9.5	9.2	8.2
HCM Lane LOS	A	A	A	N
HCM 95th-tile Q	0.2	1.6	1.2	0

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			✥	
Traffic Vol, veh/h	0	0	0	0
Future Vol, veh/h	0	0	0	0
Peak Hour Factor	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	0	0
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	0
HCM LOS	-

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Lane Configurations									
Traffic Vol, veh/h	0	20	208	0	209	8	0	5	18
Future Vol, veh/h	0	20	208	0	209	8	0	5	18
Peak Hour Factor	0.92	0.93	0.93	0.92	0.93	0.93	0.92	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	22	224	0	225	9	0	5	19
Number of Lanes	0	0	1	0	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.9	8.7	7.7
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	0%	22%
Vol Thru, %	91%	96%	0%
Vol Right, %	0%	4%	78%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	228	217	23
LT Vol	20	0	5
Through Vol	208	209	0
RT Vol	0	8	18
Lane Flow Rate	245	233	25
Geometry Grp	1	1	1
Degree of Util (X)	0.284	0.268	0.031
Departure Headway (Hd)	4.169	4.139	4.531
Convergence, Y/N	Yes	Yes	Yes
Cap	853	859	795
Service Time	2.239	2.213	2.531
HCM Lane V/C Ratio	0.287	0.271	0.031
HCM Control Delay	8.9	8.7	7.7
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.2	1.1	0.1

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	39	78	0	59	40	0	68	52
Future Vol, veh/h	0	39	78	0	59	40	0	68	52
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	42	85	0	64	43	0	74	57
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	8	7.7	8.3
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	57%
Vol Thru, %	60%	0%	0%	43%
Vol Right, %	40%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	99	39	78	120
LT Vol	0	39	0	68
Through Vol	59	0	0	52
RT Vol	40	0	78	0
Lane Flow Rate	108	42	85	130
Geometry Grp	2	7	7	2
Degree of Util (X)	0.124	0.066	0.103	0.162
Departure Headway (Hd)	4.14	5.569	4.364	4.463
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	868	645	823	806
Service Time	2.153	3.284	2.079	2.476
HCM Lane V/C Ratio	0.124	0.065	0.103	0.161
HCM Control Delay	7.7	8.7	7.6	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.2	0.3	0.6

Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	14	3	13	0	61	2	114	0	12	249	26
Future Vol, veh/h	0	14	3	13	0	61	2	114	0	12	249	26
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	15	3	14	0	67	2	125	0	13	274	29
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	9.2	10.5	10.1
HCM LOS	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	9%	0%	47%	34%	31%	0%
Vol Thru, %	91%	83%	10%	1%	69%	90%
Vol Right, %	0%	17%	43%	64%	0%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	137	151	30	177	191	147
LT Vol	12	0	14	61	59	0
Through Vol	125	125	3	2	132	132
RT Vol	0	26	13	114	0	15
Lane Flow Rate	150	165	33	195	209	161
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.237	0.253	0.053	0.288	0.333	0.246
Departure Headway (Hd)	5.682	5.515	5.79	5.332	5.723	5.494
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	633	652	618	679	630	655
Service Time	3.406	3.239	3.828	3.332	3.447	3.218
HCM Lane V/C Ratio	0.237	0.253	0.053	0.287	0.332	0.246
HCM Control Delay	10.2	10.1	9.2	10.5	11.3	10
HCM Lane LOS	B	B	A	B	B	A
HCM 95th-tile Q	0.9	1	0.2	1.2	1.5	1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↰↑↱	
Traffic Vol, veh/h	0	59	263	15
Future Vol, veh/h	0	59	263	15
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	65	289	16
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	10.7
HCM LOS	B

Intersection	
Intersection Delay, s/veh	9.9
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			✥				✥			↰	↱	
Traffic Vol, veh/h	0	24	0	20	0	14	0	41	0	4	181	8
Future Vol, veh/h	0	24	0	20	0	14	0	41	0	4	181	8
Peak Hour Factor	0.92	0.77	0.77	0.77	0.92	0.77	0.77	0.77	0.92	0.77	0.77	0.77
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	31	0	26	0	18	0	53	0	5	235	10
Number of Lanes	0	0	1	0	0	0	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	8.7	8.5	10.5
HCM LOS	A	A	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	55%	25%	100%	0%
Vol Thru, %	0%	96%	0%	0%	0%	91%
Vol Right, %	0%	4%	45%	75%	0%	9%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	189	44	55	29	183
LT Vol	4	0	24	14	29	0
Through Vol	0	181	0	0	0	167
RT Vol	0	8	20	41	0	16
Lane Flow Rate	5	245	57	71	38	238
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.008	0.346	0.082	0.097	0.058	0.331
Departure Headway (Hd)	5.604	5.071	5.136	4.883	5.576	5.011
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	637	707	694	730	641	715
Service Time	3.351	2.818	3.193	2.938	3.322	2.757
HCM Lane V/C Ratio	0.008	0.347	0.082	0.097	0.059	0.333
HCM Control Delay	8.4	10.5	8.7	8.5	8.7	10.2
HCM Lane LOS	A	B	A	A	A	B
HCM 95th-tile Q	0	1.5	0.3	0.3	0.2	1.4

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations		↰	↱	
Traffic Vol, veh/h	0	29	167	16
Future Vol, veh/h	0	29	167	16
Peak Hour Factor	0.92	0.77	0.77	0.77
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	38	217	21
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	10
HCM LOS	A

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	355	2	0	702	0	10
Future Vol, veh/h	355	2	0	702	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	374	2	0	739	0	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	188
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	822
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	822
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	822	-	-	-
HCM Lane V/C Ratio	0.013	-	-	-
HCM Control Delay (s)	9.4	-	-	-
HCM Lane LOS	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			✣				✣				✣	
Traffic Vol, veh/h	0	0	64	10	0	0	195	0	0	13	0	1
Future Vol, veh/h	0	0	64	10	0	0	195	0	0	13	0	1
Peak Hour Factor	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	76	12	0	0	232	0	0	15	0	1
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.6	8.5	7.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	93%	0%	0%	0%
Vol Thru, %	0%	86%	100%	100%
Vol Right, %	7%	14%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	14	74	195	0
LT Vol	13	0	0	0
Through Vol	0	64	195	0
RT Vol	1	10	0	0
Lane Flow Rate	17	88	232	0
Geometry Grp	1	1	1	1
Degree of Util (X)	0.022	0.099	0.26	0
Departure Headway (Hd)	4.761	4.055	4.029	4.641
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	756	877	889	0
Service Time	2.761	2.115	2.061	2.642
HCM Lane V/C Ratio	0.022	0.1	0.261	0
HCM Control Delay	7.9	7.6	8.5	7.6
HCM Lane LOS	A	A	A	N
HCM 95th-tile Q	0.1	0.3	1	0

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			✥	
Traffic Vol, veh/h	0	0	0	0
Future Vol, veh/h	0	0	0	0
Peak Hour Factor	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	0	0
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	0
HCM LOS	-

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Lane Configurations									
Traffic Vol, veh/h	0	3	72	0	161	2	0	8	31
Future Vol, veh/h	0	3	72	0	161	2	0	8	31
Peak Hour Factor	0.92	0.84	0.84	0.92	0.84	0.84	0.92	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	4	86	0	192	2	0	10	37
Number of Lanes	0	0	1	0	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	7.7	8.3	7.3
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	0%	21%
Vol Thru, %	96%	99%	0%
Vol Right, %	0%	1%	79%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	75	163	39
LT Vol	3	0	8
Through Vol	72	161	0
RT Vol	0	2	31
Lane Flow Rate	89	194	46
Geometry Grp	1	1	1
Degree of Util (X)	0.103	0.22	0.053
Departure Headway (Hd)	4.169	4.075	4.111
Convergence, Y/N	Yes	Yes	Yes
Cap	852	877	877
Service Time	2.235	2.119	2.111
HCM Lane V/C Ratio	0.104	0.221	0.052
HCM Control Delay	7.7	8.3	7.3
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.3	0.8	0.2

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	16	34	0	5	13	0	50	5
Future Vol, veh/h	0	16	34	0	5	13	0	50	5
Peak Hour Factor	0.92	0.86	0.86	0.92	0.86	0.86	0.92	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	19	40	0	6	15	0	58	6
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	7.3	6.8	7.6
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	91%
Vol Thru, %	28%	0%	0%	9%
Vol Right, %	72%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	18	16	34	55
LT Vol	0	16	0	50
Through Vol	5	0	0	5
RT Vol	13	0	34	0
Lane Flow Rate	21	19	40	64
Geometry Grp	2	7	7	2
Degree of Util (X)	0.021	0.027	0.044	0.075
Departure Headway (Hd)	3.649	5.183	3.982	4.232
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	973	690	896	844
Service Time	1.701	2.922	1.72	2.27
HCM Lane V/C Ratio	0.022	0.028	0.045	0.076
HCM Control Delay	6.8	8.1	6.9	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.1	0.2

Intersection	
Intersection Delay, s/veh	16.1
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	22	0	12	0	64	0	150	0	21	359	73
Future Vol, veh/h	0	22	0	12	0	64	0	150	0	21	359	73
Peak Hour Factor	0.92	0.96	0.96	0.96	0.92	0.96	0.96	0.96	0.92	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	23	0	13	0	67	0	156	0	22	374	76
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	10.6	13	13.3
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	10%	0%	65%	30%	46%	0%
Vol Thru, %	90%	71%	0%	0%	54%	92%
Vol Right, %	0%	29%	35%	70%	0%	8%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	201	253	34	214	395	232
LT Vol	21	0	22	64	182	0
Through Vol	180	180	0	0	213	213
RT Vol	0	73	12	150	0	19
Lane Flow Rate	209	263	35	223	411	242
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.368	0.444	0.069	0.38	0.717	0.402
Departure Headway (Hd)	6.342	6.083	7.03	6.144	6.276	5.984
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	566	589	506	584	576	599
Service Time	4.104	3.845	5.118	4.204	4.03	3.738
HCM Lane V/C Ratio	0.369	0.447	0.069	0.382	0.714	0.404
HCM Control Delay	12.8	13.7	10.6	13	23.4	12.7
HCM Lane LOS	B	B	B	B	C	B
HCM 95th-tile Q	1.7	2.3	0.2	1.8	5.9	1.9

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↰↑↱	
Traffic Vol, veh/h	0	182	426	19
Future Vol, veh/h	0	182	426	19
Peak Hour Factor	0.92	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	190	444	20
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	19.4
HCM LOS	C

Intersection	
Intersection Delay, s/veh	12
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	16	0	12	0	10	0	73	0	10	301	15
Future Vol, veh/h	0	16	0	12	0	10	0	73	0	10	301	15
Peak Hour Factor	0.92	0.87	0.87	0.87	0.92	0.87	0.87	0.87	0.92	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	18	0	14	0	11	0	84	0	11	346	17
Number of Lanes	0	0	1	0	0	0	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	9.2	9.2	13.5
HCM LOS	A	A	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	57%	12%	100%	0%
Vol Thru, %	0%	95%	0%	0%	0%	90%
Vol Right, %	0%	5%	43%	88%	0%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	10	316	28	83	78	270
LT Vol	10	0	16	10	78	0
Through Vol	0	301	0	0	0	242
RT Vol	0	15	12	73	0	28
Lane Flow Rate	11	363	32	95	90	310
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.018	0.527	0.052	0.14	0.142	0.443
Departure Headway (Hd)	5.757	5.22	5.862	5.269	5.713	5.136
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	618	686	615	674	624	695
Service Time	3.527	2.99	3.862	3.357	3.482	2.905
HCM Lane V/C Ratio	0.018	0.529	0.052	0.141	0.144	0.446
HCM Control Delay	8.6	13.7	9.2	9.2	9.4	12
HCM Lane LOS	A	B	A	A	A	B
HCM 95th-tile Q	0.1	3.1	0.2	0.5	0.5	2.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	78	242	28
Future Vol, veh/h	0	78	242	28
Peak Hour Factor	0.92	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	90	278	32
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	11.4
HCM LOS	B

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	883	16	0	633	0	5
Future Vol, veh/h	883	16	0	633	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	960	17	0	688	0	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	489
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	525
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	525
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	525	-	-	-
HCM Lane V/C Ratio	0.01	-	-	-
HCM Control Delay (s)	11.9	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	0	176	61	0	1	176	0	0	30	0	3
Future Vol, veh/h	0	0	176	61	0	1	176	0	0	30	0	3
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	189	66	0	1	189	0	0	32	0	3
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.7	8.5	8.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	91%	0%	1%	0%
Vol Thru, %	0%	74%	99%	100%
Vol Right, %	9%	26%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	33	237	177	0
LT Vol	30	0	1	0
Through Vol	0	176	176	0
RT Vol	3	61	0	0
Lane Flow Rate	35	255	190	0
Geometry Grp	1	1	1	1
Degree of Util (X)	0.049	0.282	0.222	0
Departure Headway (Hd)	5.004	3.985	4.19	4.931
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	720	889	845	0
Service Time	3.004	2.065	2.272	2.933
HCM Lane V/C Ratio	0.049	0.287	0.225	0
HCM Control Delay	8.3	8.7	8.5	7.9
HCM Lane LOS	A	A	A	N
HCM 95th-tile Q	0.2	1.2	0.8	0

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Lane Configurations			✣	
Traffic Vol, veh/h	0	0	0	0
Future Vol, veh/h	0	0	0	0
Peak Hour Factor	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	0	0
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	0
HCM LOS	-

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Lane Configurations									
Traffic Vol, veh/h	0	20	159	0	157	8	0	5	18
Future Vol, veh/h	0	20	159	0	157	8	0	5	18
Peak Hour Factor	0.92	0.93	0.93	0.92	0.93	0.93	0.92	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	22	171	0	169	9	0	5	19
Number of Lanes	0	0	1	0	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.4	8.2	7.4
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	0%	22%
Vol Thru, %	89%	95%	0%
Vol Right, %	0%	5%	78%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	179	165	23
LT Vol	20	0	5
Through Vol	159	157	0
RT Vol	0	8	18
Lane Flow Rate	192	177	25
Geometry Grp	1	1	1
Degree of Util (X)	0.221	0.202	0.03
Departure Headway (Hd)	4.133	4.092	4.301
Convergence, Y/N	Yes	Yes	Yes
Cap	862	869	837
Service Time	2.186	2.151	2.301
HCM Lane V/C Ratio	0.223	0.204	0.03
HCM Control Delay	8.4	8.2	7.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.8	0.8	0.1

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	34	78	0	10	34	0	68	10
Future Vol, veh/h	0	34	78	0	10	34	0	68	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	37	85	0	11	37	0	74	11
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	7.6	7	7.9
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	87%
Vol Thru, %	23%	0%	0%	13%
Vol Right, %	77%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	44	34	78	78
LT Vol	0	34	0	68
Through Vol	10	0	0	10
RT Vol	34	0	78	0
Lane Flow Rate	48	37	85	85
Geometry Grp	2	7	7	2
Degree of Util (X)	0.051	0.054	0.096	0.102
Departure Headway (Hd)	3.843	5.264	4.062	4.352
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	937	676	873	812
Service Time	1.843	3.032	1.829	2.437
HCM Lane V/C Ratio	0.051	0.055	0.097	0.105
HCM Control Delay	7	8.3	7.3	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.2	0.3	0.3

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	14	3	13	0	61	2	114	0	12	275	26
Future Vol, veh/h	0	14	3	13	0	61	2	114	0	12	275	26
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	15	3	14	0	67	2	125	0	13	302	29
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	9.2	10.6	10.4
HCM LOS	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	8%	0%	47%	34%	31%	0%
Vol Thru, %	92%	84%	10%	1%	69%	90%
Vol Right, %	0%	16%	43%	64%	0%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	150	164	30	177	192	148
LT Vol	12	0	14	61	59	0
Through Vol	138	138	3	2	133	133
RT Vol	0	26	13	114	0	15
Lane Flow Rate	164	180	33	195	211	163
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.26	0.276	0.054	0.292	0.338	0.25
Departure Headway (Hd)	5.692	5.539	5.871	5.401	5.766	5.538
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	633	649	610	669	625	649
Service Time	3.421	3.268	3.91	3.401	3.494	3.266
HCM Lane V/C Ratio	0.259	0.277	0.054	0.291	0.338	0.251
HCM Control Delay	10.4	10.4	9.2	10.6	11.4	10.1
HCM Lane LOS	B	B	A	B	B	B
HCM 95th-tile Q	1	1.1	0.2	1.2	1.5	1

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↰↑↱	
Traffic Vol, veh/h	0	59	266	15
Future Vol, veh/h	0	59	266	15
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	65	292	16
Number of Lanes	0	0	2	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	10.8
HCM LOS	B

Intersection	
Intersection Delay, s/veh	12
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	24	0	20	0	14	0	41	0	4	183	8
Future Vol, veh/h	0	24	0	20	0	14	0	41	0	4	183	8
Peak Hour Factor	0.92	0.77	0.77	0.77	0.92	0.77	0.77	0.77	0.92	0.77	0.77	0.77
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	31	0	26	0	18	0	53	0	5	238	10
Number of Lanes	0	0	1	0	0	0	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	9.1	9	11
HCM LOS	A	A	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	55%	25%	100%	0%
Vol Thru, %	0%	96%	0%	0%	0%	95%
Vol Right, %	0%	4%	45%	75%	0%	5%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	191	44	55	29	303
LT Vol	4	0	24	14	29	0
Through Vol	0	183	0	0	0	287
RT Vol	0	8	20	41	0	16
Lane Flow Rate	5	248	57	71	38	394
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.008	0.361	0.087	0.104	0.059	0.553
Departure Headway (Hd)	5.767	5.234	5.512	5.256	5.601	5.061
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	617	682	644	676	637	708
Service Time	3.532	2.998	3.599	3.338	3.358	2.818
HCM Lane V/C Ratio	0.008	0.364	0.089	0.105	0.06	0.556
HCM Control Delay	8.6	11	9.1	9	8.7	14
HCM Lane LOS	A	B	A	A	A	B
HCM 95th-tile Q	0	1.6	0.3	0.3	0.2	3.4

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations		↰	↱	
Traffic Vol, veh/h	0	29	287	16
Future Vol, veh/h	0	29	287	16
Peak Hour Factor	0.92	0.77	0.77	0.77
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	38	373	21
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	13.5
HCM LOS	B

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱			↑↑		↱
Traffic Vol, veh/h	365	2	0	704	0	10
Future Vol, veh/h	365	2	0	704	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	384	2	0	741	0	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	193
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	816
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	816
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	816	-	-	-
HCM Lane V/C Ratio	0.013	-	-	-
HCM Control Delay (s)	9.5	-	-	-
HCM Lane LOS	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	0	64	10	0	0	195	0	0	13	0	1
Future Vol, veh/h	0	0	64	10	0	0	195	0	0	13	0	1
Peak Hour Factor	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	76	12	0	0	232	0	0	15	0	1
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.6	8.5	7.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	93%	0%	0%	0%
Vol Thru, %	0%	86%	100%	100%
Vol Right, %	7%	14%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	14	74	195	0
LT Vol	13	0	0	0
Through Vol	0	64	195	0
RT Vol	1	10	0	0
Lane Flow Rate	17	88	232	0
Geometry Grp	1	1	1	1
Degree of Util (X)	0.022	0.099	0.26	0
Departure Headway (Hd)	4.761	4.055	4.029	4.641
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	756	877	889	0
Service Time	2.761	2.115	2.061	2.642
HCM Lane V/C Ratio	0.022	0.1	0.261	0
HCM Control Delay	7.9	7.6	8.5	7.6
HCM Lane LOS	A	A	A	N
HCM 95th-tile Q	0.1	0.3	1	0

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			✥	
Traffic Vol, veh/h	0	0	0	0
Future Vol, veh/h	0	0	0	0
Peak Hour Factor	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	0	0
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	0
HCM LOS	-

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Lane Configurations									
Traffic Vol, veh/h	0	3	72	0	161	2	0	8	31
Future Vol, veh/h	0	3	72	0	161	2	0	8	31
Peak Hour Factor	0.92	0.84	0.84	0.92	0.84	0.84	0.92	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	4	86	0	192	2	0	10	37
Number of Lanes	0	0	1	0	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	7.7	8.3	7.3
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	0%	21%
Vol Thru, %	96%	99%	0%
Vol Right, %	0%	1%	79%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	75	163	39
LT Vol	3	0	8
Through Vol	72	161	0
RT Vol	0	2	31
Lane Flow Rate	89	194	46
Geometry Grp	1	1	1
Degree of Util (X)	0.103	0.22	0.053
Departure Headway (Hd)	4.169	4.075	4.111
Convergence, Y/N	Yes	Yes	Yes
Cap	852	877	877
Service Time	2.235	2.119	2.111
HCM Lane V/C Ratio	0.104	0.221	0.052
HCM Control Delay	7.7	8.3	7.3
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.3	0.8	0.2

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	16	34	0	5	13	0	50	5
Future Vol, veh/h	0	16	34	0	5	13	0	50	5
Peak Hour Factor	0.92	0.86	0.86	0.92	0.86	0.86	0.92	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	19	40	0	6	15	0	58	6
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	7.3	6.8	7.6
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	91%
Vol Thru, %	28%	0%	0%	9%
Vol Right, %	72%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	18	16	34	55
LT Vol	0	16	0	50
Through Vol	5	0	0	5
RT Vol	13	0	34	0
Lane Flow Rate	21	19	40	64
Geometry Grp	2	7	7	2
Degree of Util (X)	0.021	0.027	0.044	0.075
Departure Headway (Hd)	3.649	5.183	3.982	4.232
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	973	690	896	844
Service Time	1.701	2.922	1.72	2.27
HCM Lane V/C Ratio	0.022	0.028	0.045	0.076
HCM Control Delay	6.8	8.1	6.9	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.1	0.2

Intersection	
Intersection Delay, s/veh	16.8
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	22	0	12	0	64	0	150	0	21	374	73
Future Vol, veh/h	0	22	0	12	0	64	0	150	0	21	374	73
Peak Hour Factor	0.92	0.96	0.96	0.96	0.92	0.96	0.96	0.96	0.92	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	23	0	13	0	67	0	156	0	22	390	76
Number of Lanes	0	0	1	0	0	0	1	0	0	0	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	10.7	13.1	13.7
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	10%	0%	65%	30%	45%	0%
Vol Thru, %	90%	72%	0%	0%	55%	92%
Vol Right, %	0%	28%	35%	70%	0%	8%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	208	260	34	214	407	244
LT Vol	21	0	22	64	182	0
Through Vol	187	187	0	0	225	225
RT Vol	0	73	12	150	0	19
Lane Flow Rate	217	271	35	223	423	254
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.384	0.461	0.07	0.384	0.742	0.424
Departure Headway (Hd)	6.385	6.134	7.11	6.207	6.305	6.022
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	561	585	500	577	572	596
Service Time	4.152	3.901	5.202	4.267	4.063	3.78
HCM Lane V/C Ratio	0.387	0.463	0.07	0.386	0.74	0.426
HCM Control Delay	13.1	14.1	10.7	13.1	25.1	13.2
HCM Lane LOS	B	B	B	B	D	B
HCM 95th-tile Q	1.8	2.4	0.2	1.8	6.4	2.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↰↑↱	
Traffic Vol, veh/h	0	182	449	19
Future Vol, veh/h	0	182	449	19
Peak Hour Factor	0.92	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	190	468	20
Number of Lanes	0	0	2	0

Approach		SB
Opposing Approach		NB
Opposing Lanes		2
Conflicting Approach Left		WB
Conflicting Lanes Left		1
Conflicting Approach Right		EB
Conflicting Lanes Right		1
HCM Control Delay		20.6
HCM LOS		C

Intersection	
Intersection Delay, s/veh	12.4
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	16	0	12	0	10	0	73	0	10	317	15
Future Vol, veh/h	0	16	0	12	0	10	0	73	0	10	317	15
Peak Hour Factor	0.92	0.87	0.87	0.87	0.92	0.87	0.87	0.87	0.92	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	18	0	14	0	11	0	84	0	11	364	17
Number of Lanes	0	0	1	0	0	0	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	1
HCM Control Delay	9.3	9.3	14.2
HCM LOS	A	A	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	57%	12%	100%	0%
Vol Thru, %	0%	95%	0%	0%	0%	90%
Vol Right, %	0%	5%	43%	88%	0%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	10	332	28	83	78	280
LT Vol	10	0	16	10	78	0
Through Vol	0	317	0	0	0	252
RT Vol	0	15	12	73	0	28
Lane Flow Rate	11	382	32	95	90	322
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.018	0.555	0.053	0.141	0.143	0.461
Departure Headway (Hd)	5.771	5.235	5.938	5.333	5.732	5.158
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	616	683	607	665	621	692
Service Time	3.546	3.01	3.938	3.429	3.506	2.931
HCM Lane V/C Ratio	0.018	0.559	0.053	0.143	0.145	0.465
HCM Control Delay	8.7	14.4	9.3	9.3	9.5	12.3
HCM Lane LOS	A	B	A	A	A	B
HCM 95th-tile Q	0.1	3.4	0.2	0.5	0.5	2.4

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	78	252	28
Future Vol, veh/h	0	78	252	28
Peak Hour Factor	0.92	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	90	290	32
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	11.7
HCM LOS	B

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	888	16	0	641	0	5
Future Vol, veh/h	888	16	0	641	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	965	17	0	697	0	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	491
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	523
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	523
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	523	-	-	-
HCM Lane V/C Ratio	0.01	-	-	-
HCM Control Delay (s)	12	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	0	176	61	0	1	176	0	0	30	0	3
Future Vol, veh/h	0	0	176	61	0	1	176	0	0	30	0	3
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	189	66	0	1	189	0	0	32	0	3
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.7	8.5	8.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	91%	0%	1%	0%
Vol Thru, %	0%	74%	99%	100%
Vol Right, %	9%	26%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	33	237	177	0
LT Vol	30	0	1	0
Through Vol	0	176	176	0
RT Vol	3	61	0	0
Lane Flow Rate	35	255	190	0
Geometry Grp	1	1	1	1
Degree of Util (X)	0.049	0.282	0.222	0
Departure Headway (Hd)	5.004	3.985	4.19	4.931
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	720	889	845	0
Service Time	3.004	2.065	2.272	2.933
HCM Lane V/C Ratio	0.049	0.287	0.225	0
HCM Control Delay	8.3	8.7	8.5	7.9
HCM Lane LOS	A	A	A	N
HCM 95th-tile Q	0.2	1.2	0.8	0

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			✥	
Traffic Vol, veh/h	0	0	0	0
Future Vol, veh/h	0	0	0	0
Peak Hour Factor	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	0	0
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	0
HCM LOS	-

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Lane Configurations									
Traffic Vol, veh/h	0	20	159	0	157	8	0	5	18
Future Vol, veh/h	0	20	159	0	157	8	0	5	18
Peak Hour Factor	0.92	0.93	0.93	0.92	0.93	0.93	0.92	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	22	171	0	169	9	0	5	19
Number of Lanes	0	0	1	0	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.4	8.2	7.4
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	0%	22%
Vol Thru, %	89%	95%	0%
Vol Right, %	0%	5%	78%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	179	165	23
LT Vol	20	0	5
Through Vol	159	157	0
RT Vol	0	8	18
Lane Flow Rate	192	177	25
Geometry Grp	1	1	1
Degree of Util (X)	0.221	0.202	0.03
Departure Headway (Hd)	4.133	4.092	4.301
Convergence, Y/N	Yes	Yes	Yes
Cap	862	869	837
Service Time	2.186	2.151	2.301
HCM Lane V/C Ratio	0.223	0.204	0.03
HCM Control Delay	8.4	8.2	7.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.8	0.8	0.1

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	34	78	0	10	34	0	68	10
Future Vol, veh/h	0	34	78	0	10	34	0	68	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	37	85	0	11	37	0	74	11
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	7.6	7	7.9
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	87%
Vol Thru, %	23%	0%	0%	13%
Vol Right, %	77%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	44	34	78	78
LT Vol	0	34	0	68
Through Vol	10	0	0	10
RT Vol	34	0	78	0
Lane Flow Rate	48	37	85	85
Geometry Grp	2	7	7	2
Degree of Util (X)	0.051	0.054	0.096	0.102
Departure Headway (Hd)	3.843	5.264	4.062	4.352
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	937	676	873	812
Service Time	1.843	3.032	1.829	2.437
HCM Lane V/C Ratio	0.051	0.055	0.097	0.105
HCM Control Delay	7	8.3	7.3	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.2	0.3	0.3

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	10	100	10	0	0	180	10	0	10	10	10
Future Vol, veh/h	0	10	100	10	0	0	180	10	0	10	10	10
Peak Hour Factor	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	12	119	12	0	0	214	12	0	12	12	12
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.1	8.7	7.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	33%	8%	0%	0%
Vol Thru, %	33%	83%	95%	50%
Vol Right, %	33%	8%	5%	50%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	30	120	190	20
LT Vol	10	10	0	0
Through Vol	10	100	180	10
RT Vol	10	10	10	10
Lane Flow Rate	36	143	226	24
Geometry Grp	1	1	1	1
Degree of Util (X)	0.046	0.166	0.259	0.03
Departure Headway (Hd)	4.633	4.176	4.115	4.482
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	777	844	862	803
Service Time	2.635	2.273	2.194	2.484
HCM Lane V/C Ratio	0.046	0.169	0.262	0.03
HCM Control Delay	7.9	8.1	8.7	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.6	1	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	0	10	10
Future Vol, veh/h	0	0	10	10
Peak Hour Factor	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	12	12
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.6
HCM LOS	A

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	20	30	0	30	160	0	40	20
Future Vol, veh/h	0	20	30	0	30	160	0	40	20
Peak Hour Factor	0.92	0.86	0.86	0.92	0.86	0.86	0.92	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	23	35	0	35	186	0	47	23
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	7.8	7.7	7.8
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	67%
Vol Thru, %	16%	0%	0%	33%
Vol Right, %	84%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	190	20	30	60
LT Vol	0	20	0	40
Through Vol	30	0	0	20
RT Vol	160	0	30	0
Lane Flow Rate	221	23	35	70
Geometry Grp	2	7	7	2
Degree of Util (X)	0.22	0.036	0.042	0.084
Departure Headway (Hd)	3.581	5.534	4.329	4.335
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	990	641	816	818
Service Time	1.65	3.321	2.115	2.408
HCM Lane V/C Ratio	0.223	0.036	0.043	0.086
HCM Control Delay	7.7	8.5	7.3	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.1	0.1	0.3

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	30	190	60	0	10	210	10	0	30	10	10
Future Vol, veh/h	0	30	190	60	0	10	210	10	0	30	10	10
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	32	204	65	0	11	226	11	0	32	11	11
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	9.8	9.4	8.7
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	60%	11%	4%	33%
Vol Thru, %	20%	68%	91%	33%
Vol Right, %	20%	21%	4%	33%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	50	280	230	30
LT Vol	30	30	10	10
Through Vol	10	190	210	10
RT Vol	10	60	10	10
Lane Flow Rate	54	301	247	32
Geometry Grp	1	1	1	1
Degree of Util (X)	0.077	0.361	0.306	0.045
Departure Headway (Hd)	5.176	4.313	4.45	5.077
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	690	834	809	703
Service Time	3.221	2.335	2.474	3.125
HCM Lane V/C Ratio	0.078	0.361	0.305	0.046
HCM Control Delay	8.7	9.8	9.4	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	1.7	1.3	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			✥	
Traffic Vol, veh/h	0	10	10	10
Future Vol, veh/h	0	10	10	10
Peak Hour Factor	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	11	11	11
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.4
HCM LOS	A

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	130	130	0	60	80	0	30	50
Future Vol, veh/h	0	130	130	0	60	80	0	30	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	141	141	0	65	87	0	33	54
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	9	8.4	8.5
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	38%
Vol Thru, %	43%	0%	0%	62%
Vol Right, %	57%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	140	130	130	80
LT Vol	0	130	0	30
Through Vol	60	0	0	50
RT Vol	80	0	130	0
Lane Flow Rate	152	141	141	87
Geometry Grp	2	7	7	2
Degree of Util (X)	0.185	0.219	0.172	0.117
Departure Headway (Hd)	4.37	5.583	4.377	4.853
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	822	643	818	739
Service Time	2.393	3.314	2.109	2.882
HCM Lane V/C Ratio	0.185	0.219	0.172	0.118
HCM Control Delay	8.4	9.9	8	8.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.8	0.6	0.4

Intersection						
Int Delay, s/veh	0.1					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	529	2	0	902	0	10
Future Vol, veh/h	529	2	0	902	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	557	2	0	949	0	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	279
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	718
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	718
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	718	-	-	-
HCM Lane V/C Ratio	0.015	-	-	-
HCM Control Delay (s)	10.1	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	10	104	10	0	0	208	10	0	10	10	10
Future Vol, veh/h	0	10	104	10	0	0	208	10	0	10	10	10
Peak Hour Factor	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	12	124	12	0	0	248	12	0	12	12	12
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.2	9	8
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	33%	8%	0%	0%
Vol Thru, %	33%	84%	95%	50%
Vol Right, %	33%	8%	5%	50%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	30	124	218	20
LT Vol	10	10	0	0
Through Vol	10	104	208	10
RT Vol	10	10	10	10
Lane Flow Rate	36	148	260	24
Geometry Grp	1	1	1	1
Degree of Util (X)	0.047	0.177	0.297	0.03
Departure Headway (Hd)	4.715	4.309	4.122	4.565
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	763	837	859	787
Service Time	2.725	2.309	2.21	2.576
HCM Lane V/C Ratio	0.047	0.177	0.303	0.03
HCM Control Delay	8	8.2	9	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.6	1.2	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	0	10	10
Future Vol, veh/h	0	0	10	10
Peak Hour Factor	0.92	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	12	12
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.7
HCM LOS	A

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Lane Configurations									
Traffic Vol, veh/h	0	3	112	0	200	2	0	8	31
Future Vol, veh/h	0	3	112	0	200	2	0	8	31
Peak Hour Factor	0.92	0.84	0.84	0.92	0.84	0.84	0.92	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	4	133	0	238	2	0	10	37
Number of Lanes	0	0	1	0	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.1	8.8	7.6
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	0%	21%
Vol Thru, %	97%	99%	0%
Vol Right, %	0%	1%	79%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	115	202	39
LT Vol	3	0	8
Through Vol	112	200	0
RT Vol	0	2	31
Lane Flow Rate	137	240	46
Geometry Grp	1	1	1
Degree of Util (X)	0.16	0.275	0.056
Departure Headway (Hd)	4.202	4.113	4.315
Convergence, Y/N	Yes	Yes	Yes
Cap	842	866	835
Service Time	2.285	2.176	2.315
HCM Lane V/C Ratio	0.163	0.277	0.055
HCM Control Delay	8.1	8.8	7.6
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.6	1.1	0.2

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	20	31	0	30	160	0	48	20
Future Vol, veh/h	0	20	31	0	30	160	0	48	20
Peak Hour Factor	0.92	0.86	0.86	0.92	0.86	0.86	0.92	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	23	36	0	35	186	0	56	23
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	7.8	7.7	7.9
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	71%
Vol Thru, %	16%	0%	0%	29%
Vol Right, %	84%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	190	20	31	68
LT Vol	0	20	0	48
Through Vol	30	0	0	20
RT Vol	160	0	31	0
Lane Flow Rate	221	23	36	79
Geometry Grp	2	7	7	2
Degree of Util (X)	0.22	0.036	0.043	0.095
Departure Headway (Hd)	3.59	5.549	4.344	4.345
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	988	639	812	816
Service Time	1.661	3.341	2.135	2.417
HCM Lane V/C Ratio	0.224	0.036	0.044	0.097
HCM Control Delay	7.7	8.6	7.3	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.1	0.1	0.3

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1145	16	0	733	0	5
Future Vol, veh/h	1145	16	0	733	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1245	17	0	797	0	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	631
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	424
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	424
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	13.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	424	-	-	-
HCM Lane V/C Ratio	0.013	-	-	-
HCM Control Delay (s)	13.6	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	30	214	60	0	10	228	10	0	30	10	10
Future Vol, veh/h	0	30	214	60	0	10	228	10	0	30	10	10
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	32	230	65	0	11	245	11	0	32	11	11
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	10.2	9.7	8.8
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	60%	10%	4%	33%
Vol Thru, %	20%	70%	92%	33%
Vol Right, %	20%	20%	4%	33%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	50	304	248	30
LT Vol	30	30	10	10
Through Vol	10	214	228	10
RT Vol	10	60	10	10
Lane Flow Rate	54	327	267	32
Geometry Grp	1	1	1	1
Degree of Util (X)	0.079	0.395	0.332	0.046
Departure Headway (Hd)	5.278	4.346	4.483	5.182
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	676	827	803	688
Service Time	3.328	2.373	2.512	3.235
HCM Lane V/C Ratio	0.08	0.395	0.333	0.047
HCM Control Delay	8.8	10.2	9.7	8.5
HCM Lane LOS	A	B	A	A
HCM 95th-tile Q	0.3	1.9	1.5	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	10	10	10
Future Vol, veh/h	0	10	10	10
Peak Hour Factor	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	11	11	11
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.5
HCM LOS	A

Intersection	
Intersection Delay, s/veh	8.9
Intersection LOS	A

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Lane Configurations									
Traffic Vol, veh/h	0	20	222	0	217	8	0	5	18
Future Vol, veh/h	0	20	222	0	217	8	0	5	18
Peak Hour Factor	0.92	0.93	0.93	0.92	0.93	0.93	0.92	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	22	239	0	233	9	0	5	19
Number of Lanes	0	0	1	0	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	9.1	8.9	7.7
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	0%	22%
Vol Thru, %	92%	96%	0%
Vol Right, %	0%	4%	78%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	242	225	23
LT Vol	20	0	5
Through Vol	222	217	0
RT Vol	0	8	18
Lane Flow Rate	260	242	25
Geometry Grp	1	1	1
Degree of Util (X)	0.302	0.279	0.031
Departure Headway (Hd)	4.175	4.151	4.582
Convergence, Y/N	Yes	Yes	Yes
Cap	851	854	786
Service Time	2.248	2.229	2.582
HCM Lane V/C Ratio	0.306	0.283	0.032
HCM Control Delay	9.1	8.9	7.7
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.3	1.1	0.1

Intersection	
Intersection Delay, s/veh	8.8
Intersection LOS	A

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	130	138	0	60	80	0	35	50
Future Vol, veh/h	0	130	138	0	60	80	0	35	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	141	150	0	65	87	0	38	54
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	9	8.4	8.6
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	41%
Vol Thru, %	43%	0%	0%	59%
Vol Right, %	57%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	140	130	138	85
LT Vol	0	130	0	35
Through Vol	60	0	0	50
RT Vol	80	0	138	0
Lane Flow Rate	152	141	150	92
Geometry Grp	2	7	7	2
Degree of Util (X)	0.186	0.22	0.183	0.125
Departure Headway (Hd)	4.394	5.597	4.392	4.879
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	817	642	816	735
Service Time	2.42	3.331	2.125	2.909
HCM Lane V/C Ratio	0.186	0.22	0.184	0.125
HCM Control Delay	8.4	9.9	8.1	8.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.8	0.7	0.4

Appendix D STUDENT HOUSING TRIP RATES DERIVATION

Table A-1 Student Housing Trip Rates and Trip Generation Derivation

ADT Trip Rate for Undergraduate Dormitory

Land Use	**Unit**	**Rate 1**	**Rate 2**	**Rate 1 Description**	**Rate 2 Description**
Student Apartments	Bed	.880	.055	Non-academic vehicle trips (Off-Campus)	Internal academic vehicle trips (On-Campus)

Source: UCI Main Campus Traffic Model

Note: the ADT trip rate for Single Undergraduate Housing category in the Long Range Development Plan (LRDP) is 1.6 per Bed with a car for Rate 1 and .10 for Rate 2. A vehicle ownership factor of .55 was applied to 1.6 (Rate 1) and .10 (Rate 2) to derive the trip rates shown above.

Peak Hour Trip Rates (Percent of ADT)

	AM Peak Hour		**PM Peak Hour**	
Description	**Inbound**	**Outbound**	**Inbound**	**Outbound**
Residence	0.5%	5.3%	4.6%	2.8%

Note: The trip distribution derived is for average weekday vehicle trips.

PHASE 4a

Project ADT Trip Generation

Land Use	**Amount**	**Unit**	**Rate 1 Vehicle Trips (Off-Campus)**	**Rate 2 Vehicle Trips (On-Campus)**
Student Apartments	1,500	Bed	1,320	83

Project Peak Hour Trip Generation

	AM Peak Hour		**PM Peak Hour**	
Description	**Inbound**	**Outbound**	**Inbound**	**Outbound**
Off-Campus				
Residence	7	70	61	37
On-Campus				
Residence	0.4	4	4	2
Staff – 19 FTE	2	0	1	2
Total Phase 4a	**9**	**74**	**66**	**41**

PHASE 4b

Project ADT Trip Generation

Land Use	**Amount**	**Unit**	**Rate 1 Vehicle Trips (Off-Campus)**	**Rate 2 Vehicle Trips (On-Campus)**
Student Apartments	950	Bed	836	52

Project Peak Hour Trip Generation

	AM Peak Hour		**PM Peak Hour**	
Description	**Inbound**	**Outbound**	**Inbound**	**Outbound**
Off-Campus				
Residence	4	44	38	23
On-Campus				
Residence	0.3	3	2	1
Total Phase 4b	**4**	**47**	**40**	**24**
Total Phase 4a + 4b	**13**	**121**	**106**	**65**

APPENDIX F

CEQA Notices

UCI University of California, Irvine

Environmental Planning & Sustainability
4199 Campus Drive, Suite 380
Irvine, CA 92697-2325

(949) 824-6316
www.eps.uci.edu

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

Project Title: East Campus Student Apartments Phase IV
Project Location: University of California, Irvine
Lead Agency: University of California
County: Orange

In accordance with the California Environmental Quality Act (CEQA) Guidelines and University of California Guidelines for Implementation of CEQA, an Initial Study for the East Campus Student Apartments Phase IV project (proposed project) was prepared by the University of California, Irvine (UCI), and was determined that a Mitigated Negative Declaration is the appropriate level of analysis.

Phase IVa would demolish the existing Arroyo Vista 1 (AV-1) and California Temporary (CT) surface parking lots to construct an approximately 600,000-gross-square-foot (GSF) residential structure with a community center, recreational facilities, and open space on a 9.2-acre site located southeast of the Campus Drive and California Avenue intersection in the UCI East Campus. The structure would include approximately 1,500 beds within 425 student apartments including bedrooms, kitchens/dining rooms, bathrooms, and living rooms. A bicycle parking facility and five-story parking structure with 550 spaces would be constructed to the east of the residential facility accessible by driveways at Campus and Arroyo Drives. Phase IVb would construct an approximately 400,000-GSF residential structure with 950 beds in 250 apartment units, a community center, recreational facilities, and open space east of the Phase IVa parking structure on 4.1 acres.

South of the Phase IV project site, a 250-space surface parking lot and extension of Arroyo Drive to a stop-controlled intersection at California Avenue would be constructed. Although the surface parking lot and roadway are not required to support Phase IV and may not be constructed, it is included in the analysis as an optional scope of work.

The project has been analyzed in the Draft Initial Study/Mitigated Negative Declaration (Draft IS/MND) and determined that, with the incorporation of mitigation, it will not have a significant effect on the environment. The document is available for viewing on the UCI website at: http://www.eps.uci.edu/EnvironmentalPlanning/index.html. Hard copies of the Draft IS/MND and referenced documents are available for review during business hours at the University of California, Irvine's Office of Environmental Planning and Sustainability. Comments will be received March 27, 2017 through April 25, 2017, and can be emailed to hashimol@uci.edu or mailed to:

Lindsey Hashimoto, Senior Planner
Office of Environmental Planning and Sustainability
University of California, Irvine
4199 Campus Drive, Suite 380
Irvine, CA 92697

The Draft IS/MND, along with comments received during the public review period, will be considered by the Regents in conjunction with project approval. If adopted by the University, the Draft IS/MND will be finalized.

Richard Demerjian, Assistant Vice Chancellor

THE UNIVERSITY OF CALIFORNIA · IRVINE · LET THERE BE LIGHT

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: East Campus Student Apartments Phase IV

Lead Agency: University of California, Irvine — Contact Person: Richard Demerjian
Mailing Address: 4199 Campus Drive, Suite 380, Irvine, CA 92697 — Phone: (949) 824-7058
City: Irvine — Zip: 92697 — County: Orange

Project Location: County: Orange — City/Nearest Community: Irvine
Cross Streets: Campus Drive and California Avenue — Zip Code: 92697
Longitude/Latitude (degrees, minutes and seconds): 33 ° 38 ′ 54.4 ″ N / -117 ° 49 ′ 39.2 ″ W — Total Acres: ____
Assessor's Parcel No.: ____ — Section: ____ Twp.: ____ Range: ____ Base: ____
Within 2 Miles: State Hwy #: SR-73 and I-405 — Waterways: San Diego Creek
Airports: ____ — Railways: ____ — Schools: University High School

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Document Type:

CEQA: ☐ NOP ☐ Early Cons ☐ Neg Dec ☒ Mit Neg Dec ☐ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.) ____ Other: ____

NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI

Other: ☐ Joint Document ☐ Final Document ☐ Other: ____

Local Action Type:

☐ General Plan Update	☐ Specific Plan	☐ Rezone	☐ Annexation
☐ General Plan Amendment	☐ Master Plan	☐ Prezone	☐ Redevelopment
☐ General Plan Element	☐ Planned Unit Development	☐ Use Permit	☐ Coastal Permit
☐ Community Plan	☐ Site Plan	☐ Land Division (Subdivision, etc.)	☒ Other: Design Approval

---

Development Type:

☒ Residential: Units 675 Acres 13.3
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
☐ Educational: ____
☐ Recreational: ____
☐ Water Facilities: Type ____ MGD ____
☐ Transportation: Type ____
☐ Mining: Mineral ____
☐ Power: Type ____ MW ____
☐ Waste Treatment: Type ____ MGD ____
☐ Hazardous Waste: Type ____
☐ Other: ____

Project Issues Discussed in Document:

☒ Aesthetic/Visual	☐ Fiscal	☒ Recreation/Parks	☒ Vegetation
☐ Agricultural Land	☒ Flood Plain/Flooding	☒ Schools/Universities	☒ Water Quality
☒ Air Quality	☒ Forest Land/Fire Hazard	☒ Septic Systems	☒ Water Supply/Groundwater
☒ Archeological/Historical	☒ Geologic/Seismic	☒ Sewer Capacity	☒ Wetland/Riparian
☒ Biological Resources	☐ Minerals	☒ Soil Erosion/Compaction/Grading	☒ Growth Inducement
☐ Coastal Zone	☒ Noise	☒ Solid Waste	☒ Land Use
☒ Drainage/Absorption	☒ Population/Housing Balance	☒ Toxic/Hazardous	☒ Cumulative Effects
☐ Economic/Jobs	☒ Public Services/Facilities	☒ Traffic/Circulation	☒ Other: Greenhouse Gas

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Present Land Use/Zoning/General Plan Designation:

UC Irvine is not subject to local zoning regulations. Permitted uses in the 2007 UCI LRDP allow residential facilities and parking.

Project Description: *(please use a separate page if necessary)*

Phase IVa would demolish two parking lots to construct an approximately 600,000-gross-square-foot (GSF) residential structure with a community center, recreational facilities, and open space on the East Campus. The structure would include approximately 1,500 beds within 425 student apartments. A bicycle parking facility and parking structure with 550 spaces would be constructed to the east of the residential facility accessible by driveways at Campus and Arroyo Drives. Phase IVb would construct an approximately 400,000-GSF residential structure with 950 beds in 250 apartments. South of the Phase IV project site, a 250-space surface parking lot and extension of Arroyo Drive to a stop-controlled intersection at California Avenue may be constructed as an optional scope of work.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Revised 2010

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

	Air Resources Board		Office of Historic Preservation
	Boating & Waterways, Department of		Office of Public School Construction
	California Emergency Management Agency		Parks & Recreation, Department of
	California Highway Patrol		Pesticide Regulation, Department of
S	Caltrans District #12		Public Utilities Commission
	Caltrans Division of Aeronautics	S	Regional WQCB #8
	Caltrans Planning		Resources Agency
	Central Valley Flood Protection Board		Resources Recycling and Recovery, Department of
	Coachella Valley Mtns. Conservancy		S.F. Bay Conservation & Development Comm.
	Coastal Commission		San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
	Colorado River Board		San Joaquin River Conservancy
	Conservation, Department of		Santa Monica Mtns. Conservancy
	Corrections, Department of		State Lands Commission
	Delta Protection Commission		SWRCB: Clean Water Grants
	Education, Department of		SWRCB: Water Quality
	Energy Commission		SWRCB: Water Rights
S	Fish & Game Region #5		Tahoe Regional Planning Agency
	Food & Agriculture, Department of	S	Toxic Substances Control, Department of
	Forestry and Fire Protection, Department of	S	Water Resources, Department of
	General Services, Department of		
	Health Services, Department of		Other:
	Housing & Community Development		Other:
S	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date March 27, 2017 Ending Date April 25, 2017

Lead Agency (Complete if applicable):

Consulting Firm:
Address:
City/State/Zip:
Contact:
Phone:

Applicant: University of California, Irvine
Address: 4199 Campus Drive, Suite 380
City/State/Zip: Irvine, CA 92697-2325
Phone: (949) 824-7058

Signature of Lead Agency Representative: Date: 3-23-17

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

AFFIDAVIT OF PUBLICATION

STATE OF CALIFORNIA,)
) ss.
County of Orange)

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of **The Orange County Register**, a newspaper of general circulation, published in the city of Santa Ana, County of Orange, and which newspaper has been adjudged to be a newspaper of general circulation by the Superior Court of the County of Orange, State of California, under the date of November 19, 1905, Case No. A-21046, that the notice, of which the annexed is a true printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

March 27, 2017

"I certify (or declare) under the penalty of perjury under the laws of the State of California that the foregoing is true and correct":

Executed at Santa Ana, Orange County, California, on

Date: March 27, 2017

Signature

The Orange County Register
625 N. Grand Ave.
Santa Ana, CA 92701
(714) 796-2209

PROOF OF PUBLICATION

NOTICE OF INTENT
TO ADOPT A MITIGATED NEGATIVE DECLARATION
EAST CAMPUS STUDENT APARTMENTS PHASE IV
UNIVERSITY OF CALIFORNIA, IRVINE

In accordance with the California Environmental Quality Act (CEQA) Guidelines and University of California Guidelines for Implementation of CEQA, an Initial Study for the East Campus Student Apartments Phase IV project (proposed project) was prepared by the University of California, Irvine (UCI), and was determined that a Mitigated Negative Declaration is the appropriate level of analysis.

Phase IVa would demolish the existing Arroyo Vista 1 (AV-1) and California Temporary (CT) surface parking lots to construct an approximately 600,000-gross-square-foot (GSF) residential structure with a community center, recreational facilities, and open space on a 9.2-acre site located southeast of the Campus Drive and California Avenue intersection in the UCI East Campus. The structure would include approximately 1,500 beds within 425 student apartments including bedrooms, kitchens/dining rooms, bathrooms, and living rooms. A bicycle parking facility and five-story parking structure with 550 spaces would be constructed to the east of the residential facility accessible by driveways at Campus and Arroyo Drives. Phase IVb would construct an approximately 400,000-GSF residential structure with 950 beds in 250 apartment units, a community center, recreational facilities, and open space east of the Phase IVa parking structure on 4.1 acres.

South of the Phase IV project site, a 250-space surface parking lot and extension of Arroyo Drive to a stop-controlled intersection at California Avenue would be constructed. The surface parking lot and roadway are not required to support Phase IV, but is included in the analysis as an optional scope of work.

The project has been analyzed in the Draft Initial Study/Mitigated Negative Declaration (Draft IS/MND) and determined that, with the incorporation of mitigation, it will not have a significant effect on the environment. The document is available at: http://www.eps.uci.edu/EnvironmentalPlanning/index.html. The 30-day public review period will begin March 27, 2017 through April 25, 2017. Comments may be sent to Lindsey Hashimoto, Senior Planner, at hashimol@uci.edu or mailed to University of California, Irvine, Office of Environmental Planning and Sustainability, 4199 Campus Drive, Suite 380, Irvine, CA 92697. If you have any questions regarding the project, please call (949) 824-8692.

Published: Orange County Register March 27, 2017 R-518 5195875

APPENDIX G

Response to Comments

EAST CAMPUS STUDENT APARTMENTS PHASE IV IS/MND MAILING LIST

Orange County Public Library
University Park Branch
4512 Sandburg Way
Irvine, CA 92612

City of Irvine
Community Development Dept.
P.O. Box 19575
Irvine, CA 92623-9575
Attn: Mr. Bill Jacobs

County of Orange
Planning & Development Services
300 N. Flower Street

Orange County Transportation Authority
550 South Main Street
Orange, CA 92868

California Department of Fish & Wildlife
3883 Ruffin Road
San Diego, CA 92123

U.S. Fish & Wildlife Service
Division of Ecological Services
2177 Salk Avenue, Suite 250
Carlsbad, CA 92008

Regional Water Quality Control Board - Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3348

U.S. Army Corps of Engineers
Los Angeles District
911 Wilshire Boulevard
Los Angeles, CA 90017

CA Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, California 90630

South Coast Air Quality Management District
21865 East Copley Drive
Diamond Bar, CA 91765-4182

Southern California Association of Governments
818 West 7th Street, 12th Floor
Los Angeles, CA 90017

East Campus Student Apartments Phase IV

Draft Initial Study/Mitigated Negative Declaration
Public Review/Response to Comments

Public Review

The Draft Initial Study/Mitigated Negative Declaration (IS/MND), along with a Notice of Completion (NOC) and Notice of Intent to Adopt a Mitigated Negative Declaration (NOI), were circulated for public review and comment from March 27, 2017 through April 25, 2017. Copies of the document were submitted to the State Clearinghouse; local agencies; UCI faculty, staff, and other members of the campus community; and additional interested groups and persons. On March 27, 2017, a notice regarding the availability of the Draft IS/MND was published in the Orange County Register. Copies of the distribution list and notices are provided in this appendix.

Comments and Responses

Written comments were submitted by the agencies listed below. The letters and the responses to comments are presented on the pages following the Draft IS/MND distribution list.

Commenting Agency	Date
Native American Heritage Commission	April 6, 2017
Department of Toxic Substances Control	April 10, 2017
City of Irvine	April 19, 2017
Irvine Ranch Water District	April 24, 2017
County of Orange	April 25, 2017

EAST CAMPUS STUDENT APARTMENTS PHASE IV IS/MND
MAILING LIST

Orange County Public Library
University Park Branch
4512 Sandburg Way
Irvine, CA 92612

City of Irvine
Community Development Dept.
P.O. Box 19575
Irvine, CA 92623-9575
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2177 Salk Avenue, Suite 250
Carlsbad, CA 92008

Regional Water Quality Control Board - Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3348

U.S. Army Corps of Engineers
Los Angeles District
911 Wilshire Boulevard
Los Angeles, CA 90017

CA Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, California 90630

South Coast Air Quality Management District
21865 East Copley Drive
Diamond Bar, CA 91765-4182

Southern California Association of Governments
818 West 7th Street, 12th Floor
Los Angeles, CA 90017

California Department of Transportation
District 12
1750 East 4th Street, Suite 100
Santa Ana, CA 92705

Orange County Fire Authority
P.O. Box 57115
Irvine, CA 92619-7115

Irvine Ranch Water District
15600 Sand Canyon Ave.
Irvine, CA 92618

Public Utilities Commission
320 W. 4th Street, Suite 500
Los Angeles, CA 90013

Transportation Corridor Agencies
125 Pacifica
Irvine, CA 92618-3304

Irvine Unified School District
5050 Barranca Parkway
Irvine, CA 92604-4698

Metropolitan Water District
P.O. Box 54153
Los Angeles, CA 90054

Native American Heritage Commission
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691

Department of Water Resources
1416 9th Street
Sacramento, CA 95814

University Town Center HOA
Keystone Pacific Management
Susan Seifen
16775 Von Karman Avenue, Suite 100
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Cambridge Court HOA
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16775 Von Karman Avenue, Suite 100
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Broadmoor Campus View Association
Villageway Management, Inc
PO Box 4708

Irvine, CA 92616

Irvine Company
Jeffrey S. Davis
Vice President
Entitlement
550 Newport Center Drive
Newport Beach, California, 92660

STATE OF CALIFORNIA

Edmund G. Brown Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone (916) 373-3710
Fax (916) 373-5471
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov
Twitter: @CA_NAHC

April 6, 2017

Richard Demerjian
University of California, Irvine
4199 Campus Drive, Suite 380
Irvine, CA 92697

sent via e-mail:
rgdemerj@uci.edu

Re: SCH# 2017031061, East Campus Student Apartments Phase IV Project, City of Irvine; Orange County, California

Dear Mr. Demerjian:

The Native American Heritage Commission (NAHC) has reviewed the Supplement Mitigated Negative Declaration prepared for the project referenced above. The review included the Project Description, and the Evaluation of Environmental Impacts prepared by the University of California, Irvine. We have the following concerns:

- Mitigation language for archaeological resources (technical analysis, data recovery, curation) is not always appropriate for or similar to measures specifically for handling Tribal Cultural Resources.
- Mitigation for inadvertent finds of human remains is incomplete or inaccurate. Please refer to California Public Resources Code 5097.98 for the process of designating a MLD for human remains determined to be Native American.

The California Environmental Quality Act (CEQA)[1], specifically Public Resources Code section 21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment.[2] If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an environmental impact report (EIR) shall be prepared.[3] In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources with the area of project effect (APE).

CEQA was amended in 2014 by Assembly Bill 52. (AB 52).[4] **AB 52 applies to any project for which a notice of preparation or a notice of negative declaration or mitigated negative declaration is filed on or after July 1, 2015.** AB 52 created a separate category for "tribal cultural resources"[5], that now includes "a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment.[6] Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource.[7] Your project may also be subject to **Senate Bill 18 (SB 18)** (Burton, Chapter 905, Statutes of 2004), Government Code 65352.3, if it also involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space. **Both SB 18 and AB 52 have tribal consultation requirements**. Additionally, if your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966[8] may also apply.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

Agencies should be aware that AB 52 does not preclude agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52. For that reason, we urge you to continue to request Native American Tribal Consultation Lists and Sacred Lands File searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/. Additional information regarding AB 52 can be found online

[1] Pub. Resources Code § 21000 et seq.
[2] Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, § 15064.5 (b); CEQA Guidelines Section 15064.5 (b)
[3] Pub. Resources Code § 21080 (d); Cal. Code Regs., tit. 14, § 15064 subd.(a)(1); CEQA Guidelines § 15064 (a)(1)
[4] Government Code 65352.3
[5] Pub. Resources Code § 21074
[6] Pub. Resources Code § 21084.2
[7] Pub. Resources Code § 21084.3 (a)
[8] 154 U.S.C. 300101, 36 C.F.R. § 800 et seq.

at http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf, entitled "Tribal Consultation Under AB 52: Requirements and Best Practices".

The NAHC recommends lead agencies consult with all California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources.

A brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments is also attached.

Please contact me at gayle.totton@nahc.ca.gov or call (916) 373-3710 if you have any questions.

Sincerely,

Gayle Totton, B.S., M.A., Ph.D
Associate Governmental Project Analyst

Attachment

cc: State Clearinghouse

Pertinent Statutory Information:

Under AB 52:

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a **lead agency** shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice.

A **lead agency** shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project.[9] and **prior to the release of a negative declaration, mitigated negative declaration or environmental impact report.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code § 65352.4 (SB 18).[10]

The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

- a. Alternatives to the project.
- b. Recommended mitigation measures.
- c. Significant effects.[11]

1. The following topics are discretionary topics of consultation:
   - **a.** Type of environmental review necessary.
   - **b.** Significance of the tribal cultural resources.
   - **c.** Significance of the project's impacts on tribal cultural resources.

If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. [12]

With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process **shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code sections 6254 (r) and 6254.10.** Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public.[13]

If a project may have a significant impact on a tribal cultural resource, **the lead agency's environmental document shall discuss** both of the following:

- a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
- b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code section 21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource.[14]

Consultation with a tribe shall be considered concluded when either of the following occurs:

- a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
- b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached.[15]

Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code section 21080.3.2 **shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program**, if determined to avoid or lessen the impact pursuant to Public Resources Code section 21082.3, subdivision (b), paragraph 2, and shall be fully enforceable.[16]

If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, **the lead agency shall consider feasible mitigation** pursuant to Public Resources Code section 21084.3 (b).[17]

An environmental impact report **may not be certified**, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

- **a.** The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code sections 21080.3.1 and 21080.3.2 and concluded pursuant to Public Resources Code section 21080.3.2.
- **b.** The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.

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[9] Pub. Resources Code § 21080.3.1, subds. (d) and (e)
[10] Pub. Resources Code § 21080.3.1 (b)
[11] Pub. Resources Code § 21080.3.2 (a)
[12] Pub. Resources Code § 21080.3.2 (a)
[13] Pub. Resources Code § 21082.3 (c)(1)
[14] Pub. Resources Code § 21082.3 (b)
[15] Pub. Resources Code § 21080.3.2 (b)
[16] Pub. Resources Code § 21082.3 (a)
[17] Pub. Resources Code § 21082.3 (e)

c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code section 21080.3.1 (d) and the tribe failed to request consultation within 30 days.[18]

This process should be documented in the Tribal Cultural Resources section of your environmental document.

Under SB 18:

Government Code § 65352.3 (a) (1) requires consultation with Native Americans on general plan proposals for the purposes of "preserving or mitigating impacts to places, features, and objects described § 5097.9 and § 5091.993 of the Public Resources Code that are located within the city or county's jurisdiction. Government Code § 65560 (a), (b), and (c) provides for consultation with Native American tribes on the open-space element of a county or city general plan for the purposes of protecting places, features, and objects described in Sections 5097.9 and 5097.993 of the Public Resources Code.

- SB 18 applies to **local governments** and requires them to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf
- Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.**[19]
- There is no Statutory Time Limit on Tribal Consultation under the law.
- Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research,[20] the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code sections 5097.9 and 5097.993 that are within the city's or county's jurisdiction.[21]
- Conclusion Tribal Consultation: Consultation should be concluded at the point in which:
  - The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
  - Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation.[22]

NAHC Recommendations for Cultural Resources Assessments:

- Contact the NAHC for:
  - A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
  - A Native American Tribal Contact List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.
    - The request form can be found at http://nahc.ca.gov/resources/forms/.
- Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
  - If part or the entire APE has been previously surveyed for cultural resources.
  - If any known cultural resources have been already been recorded on or adjacent to the APE.
  - If the probability is low, moderate, or high that cultural resources are located in the APE.
  - If a survey is required to determine whether previously unrecorded cultural resources are present.
- If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
  - The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
  - The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

[18] Pub. Resources Code § 21082.3 (d)
[19] (Gov. Code § 65352.3 (a)(2)).
[20] pursuant to Gov. Code section 65040.2,
[21] (Gov. Code § 65352.3 (b)).
[22] (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

<u>Examples of Mitigation Measures That May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources</u>:

- Avoidance and preservation of the resources in place, including, but not limited to:
  - Planning and construction to avoid the resources and protect the cultural and natural context.
  - Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
- Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
  - Protecting the cultural character and integrity of the resource.
  - Protecting the traditional use of the resource.
  - Protecting the confidentiality of the resource.
- Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
- Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed.[23]
- Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated.[24]

The lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.

- <u>Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources.</u>[25] In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
- <u>Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items</u> that are not burial associated in consultation with culturally affiliated Native Americans.
- <u>Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains</u>. Health and Safety Code section 7050.5, Public Resources Code section 5097.98, and Cal. Code Regs., tit. 14, section 15064.5, subdivisions (d) and (e) (CEQA Guidelines section 15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

[23] (Civ. Code § 815.3 (c)).
[24] (Pub. Resources Code § 5097.991).
[25] per Cal. Code Regs., tit. 14, section 15064.5(f) (CEQA Guidelines section 15064.5(f)).

Response to the Native American Heritage Commission

Comment 1: As discussed on page 4.4-3 of the Final IS/MND, Gabrieleño Band of Mission Indians – Kizh Nation and Juaneño Band of Mission Indians – Acjachemen Nation were notified on February 1, 2017 of the proposed project in compliance with AB 52. The Gabrieleño Band of Mission Indians – Kizh Nation contacted UCI to begin consultation within the 30-day response period, which resulted in the decision for a tribal monitor to be on-site during ground disturbing activities alongside a paleontological and archeological monitor. Although a mitigation measure has not been included in the IS/MND, UCI consulted with interested tribes in compliance with AB 52.

Comment 2: Text in the Final IS/MND has been updated to include language from the California Public Resources Code 5097.98. In the event that human remains are discovered on-site, UCI would comply with all applicable laws.

Department of Toxic Substances Control

Matthew Rodriquez
Secretary for
Environmental Protection

Barbara A. Lee, Director
5796 Corporate Avenue
Cypress, California 90630

Edmund G. Brown Jr.
Governor

April 10, 2017

Mr. Richard Demerjian
Assistant Vice Chancellor
University of California, Irvine
Office of Environmental Planning and Sustainability
4199 Campus Drive, Suite 380
Irvine, CA 92697-2325

INITIAL STUDY AND PROPOSED MITIGATED NEGATIVE DECLARATION (ND) FOR EAST CAMPUS STUDENT APARTMENTS PHASE IV PROJECT (SCH# 2017031061)

Dear Mr. Demerjian:

The Department of Toxic Substances Control (DTSC) has reviewed the subject ND. The following project description is stated in the ND: "The north project site, which includes the student apartments, support facilities, and parking structure of Phase IVa and all of Phase IVb, is located in the East Campus. Off-campus multifamily residential, Cambridge Court, lies to the north across Campus Drive; open space and Vista del Campo Norte student housing lie to the east; Puerta del Sol student housing and the Early Childhood Education Center lie to the west across California Avenue; and Arroyo Vista student housing lies to the south across Arroyo Drive. The existing on-site uses are two surface parking lots, AV-1 and CT, and undeveloped land used for construction staging (see Exhibits 2-1 and 2-3). The south project site, which includes a surface parking lot and the extension of Arroyo Drive, is located south of the residential project site in the East Campus. The Anteater Recreation Center and playfields lie to the north and northeast of the project site across the service road, open space lies to the south and east, and Palo Verde student housing lies to the west across California Avenue. The existing on-site use is the tenant-operated nursery, Shadetree Partnership."

Based on the review of the submitted document DTSC has the following comments:

1. The ND should identify and determine whether current or historic uses at the project site may have resulted in any release of hazardous wastes/substances. A Phase I Environmental Site Assessment may be appropriate to identify any recognized environmental conditions.

2. If there are any recognized environmental conditions in the project area, then proper investigation, sampling and remedial actions overseen by the appropriate regulatory agencies should be conducted prior to the new development or any construction.

3. If the project plans include discharging wastewater to a storm drain, you may be required to obtain an NPDES permit from the overseeing Regional Water Quality Control Board (RWQCB).

4. The ND states, "Phase IVa would demolish the existing 183-space Arroyo Vista 1 (AV-1) and 374-space California Temporary (CT) surface parking lots to construct an approximately 600,000-gross-square-foot (GSF) residential structure with a community center, recreational facilities, and open space on 9.2 acres of the north project site." If planned activities include building modifications/demolitions, lead-based paints or products, mercury, and asbestos containing materials (ACMs) should be addressed in accordance with all applicable and relevant laws and regulations.

5. The ND states, "However, three leaking underground storage tanks (LUST), Campus Gas, Fire Station #4, and Campus Cleaners, were identified across Campus Drive from the north project site, two of which were closed as of March 2017. However, due to the proximity of the LUST sites, a soil and gas investigation was performed in February 2017, which included 14 boring samples at five and ten feet to test the north project site for soil contamination. Of the 14 samples, one tested positive for benzene at ten feet; however, it was not detected at the five-foot sample and was isolated by clean upper soils. Therefore, the proposed project does not require further action regarding vapor concerns and impacts due to hazardous materials sites are less than significant. No mitigation is required."

    a. Identify the name(s) of the regulatory agency(ies) approved the closure of these two LUST sites.

    b. Identify the status of the third LUST site and the regulatory agency involvement.

    c. Indicate whether the LUST resulted in groundwater contamination. If groundwater is impacted, then evaluate potential vapor intrusion onsite associated with groundwater contamination.

    d. DTSC is unable to evaluate whether vapor sampling and/or potential vapor intrusion risk was adequate due to lack of relevant detailed information in the ND.

6. The ND states, north project site includes undeveloped land used for construction staging. The ND further states, "On the south project site, the tenant-operated nursery would be removed to construct a 250-space surface parking lot ("South Parking Lot") and to extend existing Arroyo Drive to a stop-controlled intersection at California Avenue." If the site was used for agricultural or related activities, residual pesticides may be present in onsite soil. DTSC recommends investigation and mitigation, as necessary, to address potential impact to human health and environment from residual pesticides.

7. If the project development involves soil export/import, proper evaluation is required. If soil contamination is suspected or observed in the project area, then excavated soil should be sampled prior to export/disposal. If the soil is contaminated, it should be disposed of properly in accordance with all applicable and relevant laws and regulations. In addition, if imported soil was used as backfill onsite and/or backfill soil will be imported, DTSC recommends proper evaluation/sampling is necessary to ensure the backfill material is free of contamination.

8. If during construction/demolition of the project, soil and/or groundwater contamination is suspected, construction/demolition in the area should cease and appropriate health and safety procedures should be implemented. If it is determined that contaminated soil and/or groundwater exist, the ND should identify how any required investigation and/or remediation will be conducted, and the appropriate government agency to provide regulatory oversight.

If you have any questions regarding this letter, please contact me at (714) 484-5476 or email at Johnson.Abraham@dtsc.ca.gov.

Sincerely,

Johnson P. Abraham
Project Manager
Brownfields Restoration and School Evaluation Branch
Brownfields and Environmental Restoration Program - Cypress

kl/sh/ja

cc: See next page.

cc: Ms. Lindsay Hashimoto (via e-mail)
Senior Planner
Office of Environmental Planning and Sustainability
University of California, Irvine
Lhashimoto@uci.edu

Governor's Office of Planning and Research (via e-mail)
State Clearinghouse
P.O. Box 3044
Sacramento, California 95812-3044
State.clearinghouse@opr.ca.gov

Mr. Guenther W. Moskat, Chief (via e-mail)
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Mr. Dave Kereazis (via e-mail)
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Mr. Shahir Haddad, Chief (via e-mail)
Schools Evaluation and Brownfields Cleanup
Brownfields and Environmental Restoration Program - Cypress
Shahir.Haddad@dtsc.ca.gov

CEQA# 2017031061

Response to the Department of Toxic Substances Control

Comment 1: A Phase I Environmental Site Assessment (ESA) was prepared by American Campus Communities in September 2016.

Comment 2: Based on the findings of the Phase I ESA, as discussed in Section 4.7-3 of the Final IS/MND, a soil and gas investigation was performed in February 2017. Vapor concerns due to the proximity to the leaking underground storage tanks (LUST) sites across Campus Drive were deemed negligible. See Appendix C, Phase II ESA which analyzes the results of the soil and gas investigation.

Comment 3: As discussed on page 4.8-2, Hydrology and Water Quality, the proposed project would comply with the National Pollutant Discharge Elimination System (NPDES). The project would obtain a Construction General Permit as required by the State Water Quality Control Board (SWQCB), which requires the preparation of a Storm Water Pollution Prevention Plan (SWPPP). A Water Quality Management Plan would also be prepared that would install and maintain post-construction best management practices (BMPs) that would reduce any potential runoff in compliance with State water quality standards. Furthermore, LRDP EIR mitigation measure Hyd-2B that has been incorporated as part of the project, would further ensure compliance with water quality standards.

Comment 4: UCI performs lead and asbestos surveying in all structures constructed prior to 1978 and as a routine control, prior to any demolition on campus, the Office of Environmental Health and Safety (EH&S) and the project manager coordinate assessment of potentially contaminated structures. Furthermore, the standard UCI construction contract, which would be implemented as part of the project, specifies that all contractors who disturb or potentially disturb asbestos or lead must comply with all federal, State, and local regulations regarding hazardous materials.

Comment 5: Phase II ESA has been included in the Final IS/MND as Appendix C.

a. The Fire Station #4 and Campus Gas LUST site closures were approved by the County of Orange and Regional Water Quality Control Board – Santa Ana Region (RWQCB).
b. The Campus Cleaners LUST site is overseen by the County of Orange and RWQCB.
c. As discussed in the Phase II ESA and page 4.7-3 of the Final IS/MND, of the 14 boring samples taken at five and ten feet, only one tested positive for benzene at ten feet. Benzene was not detected at the five-foot sample and was isolated by clean upper soils. The Phase II ESA determined that no further action was needed and UCI's EH&S concurred with the findings.
d. Please refer to Appendix C, Phase II ESA.

Comment 6: No recognized environmental concerns (RECs) are located on the East Campus. Furthermore, in the event that contaminated soil or groundwater is discovered during construction, the contractor is required under contract to comply with all federal, State, and local regulations regarding hazardous materials. Construction would be halted and appropriate remediation, including notification of DTSC, would occur. Furthermore, construction at the south site would result in a surface parking lot and roadway and would not result in long-term habitation.

Comment 7: See Appendix C for the Phase II ESA and sampling results, which determined that on-site soil is not contaminated. The project would not import soil on-site, and all exported soil would be stockpiled on the campus adjacent to the proposed surface parking lot project site.

Comment 8: As the Phase II ESA discussed, contaminated soil and groundwater is unlikely to occur on the project site. However, as discussed in the response to Comments 4 and 6, the contractor and UCI will comply with all federal, State, and local regulations if contaminated soil and/or groundwater exist.

Community Development
1 Civic Center Plaza, Irvine, CA 92606-5208
cityofirvine.org
949-724-6000

April 19, 2017

Ms. Lindsey Hashimoto, AICP
University of California, Irvine
Office of Environmental Planning and Sustainability
4199 Campus Drive, Suite 380
Irvine, California 92697

Subject: Draft Initial Study/Mitigated Negative Declaration for East Campus Housing Phase 4A and 4B

Dear Ms. Hashimoto:

Thank you for the opportunity to review the above-noted project. The proposed phased project would demolish the Arroyo Vista and California temporary surface parking lots with a 600,000 square-foot (1,500-bed) residential structure with a community center, recreational facilities and open space in the southeast corner of Campus Drive and California Ave. Adjacent to the resident hall is a planned 550-space parking structure for the housing project. The second phase is located further east at Campus and Culver and includes a 400,000 square-foot (950-bed) residential hall, community center, and recreational facilities. A new 250-space surface parking lot is planned at California and a new extension of Arroyo Dr. The first phase is planned to be constructed by 2020, the second phase timing is unknown.

Upon review of the Initial Study/Notice of Preparation (IS/NOP), The City of Irvine offers the following comments:

1. According to the Traffic Impact Analysis (TIA), the total number of beds exceeds the number analyzed for this site in the 2007 Long Range Development Plan (LRDP) by 2,016 beds. Table 3-1 of the TIA indicates the project will increase trips from what was previously assumed in this area by 81 AM Peak, 104 PM Peak, and 1,509 average daily trips (ADT). However, the IS/MND states that with this project the campus is still under the total number of beds analyzed in the 2007 LRDP Environmental Impact Report and the TIA findings indicate there are no impacts. Please correct this discrepancy.

2. The TIA indicates the project proposes to intensify the area above what was analyzed in the 2007 LRDP; therefore, expand the study area to include the following intersections and adjacent links:
   - Culver/Harvard

- Culver/University
- Culver/Michelson
- Culver I-405 Ramps
- Campus/Turtle Rock Dr
- Turtle Rock Dr./Ridgeline
- University-Jeffrey/I-405 Ramps
- University/Michelson
- University/Ridgeline
- University/Campus
- University/California

2. As part of the findings in the TIA, explain how the proposed project affects the 2007 LRDP mitigation measure findings. Please confirm the disposition and timing of the improvements and whether any changes result from the proposed project.

If you have any questions, please contact me at 949-724- 6521 or by email at bjacobs@cityofirvine.org.

Sincerely,

Bill Jacobs, AICP
Principal Planner

ec: Jaimee Bourgeois, City Traffic Engineer
Kerwin Lau, Development Review Administrator
Sun-Sun T. Murillo, Supervising Transportation Analyst
Karen Urman, Senior Transportation Analyst
Peter Anderson, Senior Transportation Analyst
Ali Banava, Senior Transportation Analyst
Lisa Thai, Senior Transportation Analyst
Martin Mares-Perez, Program Assistant

Response to the City of Irvine

Comment 1: The proposed project exceeds the number of beds in a traffic analysis zone[1] (TAZ) by 2,016 beds, and there are a total of 16 TAZs in the East Campus. Including the existing 8,556 beds and the up to 2,450 additional beds from the proposed project, there is a total of 11,006 beds that will be built on the East Campus by 2019. The total number of beds analyzed in the 2007 LRDP EIR for the East Campus is 12,610 beds, and there is an excess 1,604-bed capacity (12,610 beds minus 11,006 beds) that has not yet been built. Therefore, with the inclusion of the proposed project, the number of beds are under the East Campus threshold analyzed in the 2007 LRDP EIR and the 2007 LRDP EIR Traffic Study. Because the project represents an increase for a East Campus TAZ, the project-specific traffic study was prepared to determine if localized impacts would result due to shifting beds from one TAZ to another.

Comment 2: The traffic study area was defined based on the amount of additional traffic that would be added by the proposed project (see Appendix D, Traffic Study Figures 3-3 and 3-4) and addresses all locations potentially significantly impacted by the project. As shown in the Traffic Study, beyond the current study limits, there are fewer than 25 peak hour project trips expected at any location, which is under the threshold that would generally result in a significant impact. Therefore, expanding the Traffic Study to include additional study locations would not be applicable.

Comment 3: During the public review period of the 2016 Classroom Building (now called the Anteater Learning Pavilion project) IS/MND, the City of Irvine requested analysis of all the 2007 traffic mitigation measures under TRA-1. A copy of the responses provided to the City is included as an attachment.

In compliance with the 2007 LRDP mitigation measure TRA-1D and as discussed in the 2016 Classroom Building Final IS/MND responses to comments, traffic counts were completed in February 2017 for all UCI Transportation Improvement Program (UCITIP) intersections that were analyzed as part as the 2007 Long Range Development Plan (LRDP). All UCITIP intersections were found to be operating at acceptable levels of service (LOS) as shown below, and at this time, no further improvements to LRDP UCITIP intersections are needed. As discussed in Section 4.14 of the Final IS/MND, the addition of the proposed project would not significantly impact intersections located within the study area.

City of Irvine UCITIP Intersections				
	Existing Conditions (February 2017)			
	AM Peak Hour		PM Peak Hour	
Intersection Location	ICU	LOS	ICU	LOS
Von Karman Ave & Campus Dr (b)	0.61	B	0.69	B
Jamboree Rd & Campus Dr (b)	0.64	B	0.65	B
Jamboree Rd & Birch St (b)	0.59	A	0.55	A

[1] TAZs were defined in the 2007 Traffic Study prepared by Austin-Foust Associates, Inc. (now Stantec) for the 2007 LRDP EIR.

Jamboree Rd & MacArthur Blvd (b)	0.62	B	0.68	B
Carlson Ave & Michelson Dr	0.49	A	0.52	A
Carlson Ave & Campus Dr	0.45	A	0.60	A
Harvard Ave & Michelson Dr	0.73	C	0.88	D
University Dr & Campus Dr	0.81	D	0.75	C
University Dr & California	0.72	C	0.65	B
Culver Dr & Michelson Dr	0.65	B	0.76	C
Culver Dr & University Dr	0.73	C	0.78	C
Bonita Cyn. Rd & Newport Coast Dr	0.48	A	0.54	A

UCI LRDP Mitigation Measure Tra-1 Monitoring

Measure	***Status & Summary of Actions***
TRA-1A: To reduce on- and off-campus vehicle trips and resulting impacts, UCI will continue to implement a range of Transportation Demand Management (TDM) strategies. Program elements will include measures to increase transit and shuttle use, encourage alternative transportation modes including bicycle transportation, implement parking polices that reduce demand, and implement other administrative mechanisms that reduce vehicle trips to and from the campus. UCI shall monitor the performance of TDM programs through annual surveys.	Since 2007 UCI has implemented a comprehensive program of TDM measures resulting in an average vehicle ridership of 1.94 (based on 2015 survey), the highest of any employer greater than 3,000 in the Orange, LA, and Riverside County SCAQMD. UCI's annual investment in TDM measures is approximately $4.7 million. • 2015 UCI shuttle system ridership was 2.2 million passengers at a cost of $2.8 million. • "University Pass" transit program with 80% subsidy for unlimited OCTA ridership and coordination OCTA of routes • 20% Rebate on commuter Metrolink and Amtrak train passes • Incentivized Vanpool, carpool, ridesharing programs • Zipcar car sharing program with 6,000 on campus members • Bicycle program highlights include "ZotWheels" the first bike sharing system in the region, over 3,000 bike parking spaces, significant investment in bikeway infrastructure, bicycle education for campus affiliates of all bicycling levels offered quarterly, and major bi-annual bike education festivals to encourage safe and legal riding.
TRA-1B: UCI will continue to pursue the implementation of affordable on-campus housing to reduce peak-hour commuter trips to the campus.	UCI has implemented 2,910 beds of on-campus student housing (Fall 2016 occupancy) since 2007 with an investment of approximately $354 million. Approximately 47% of UCI students live on-campus. Planning is underway for an additional 2,200 student beds for Fall 2019 occupancy. UCI has constructed or approved 708 affordable on-campus faculty and staff homes at a cost of $275 million since 2007. Approximately 2/3rds of UCI faculty live on campus.
TRA-1C: To enhance transit systems serving the campus and local community, UCI will work cooperatively with the City of Irvine, City of Newport Beach, OCTA and other local agencies to coordinate service and routes of the UCI Shuttle with existing and proposed shuttle and transit programs including the proposed Jamboree/IBC Shuttle, proposed Orange County Great Park Shuttle, Irvine Spectrum Shuttle, and other community transit programs.	UCI works collaboratively with the local community to coordinate transit service including the City of Irvine transportation coordination committee to coordinate City-wide transit programs such as the UCI Shuttle, City I-Shuttle, bike programs, and other transit needs. UCI collaborates regularly with OCTA regarding bus routing, schedules, and UCI ridership.
TRA-1D: UCI will monitor campus trip generation and distribution and the performance of UCITP intersections in relationship to	UCI has reached the first 3,000-student-enrollment increase threshold and has initiated monitoring of UCITP intersections and collecting data for

enrollment growth. Monitoring will be conducted in consultation with the City of Irvine and the City of Newport Beach, and will occur at each 3,000-student increase in enrollment (measured as General Campus three-term average headcount), above the 2007-08 General Campus enrollment level. If UCI monitoring determines that LRDP traffic results in significant traffic impacts at UCITP intersections, UCI will implement measures to reduce vehicle trips contributing to the impact or provide "fair share" funding for improvements at the impacted intersections as described in Mitigation Measures Tra-1E and Tra-1F. UCI's share of funding will be determined by the percentage of UCI traffic volumes compared to the total traffic volumes at the impacted intersections.	analysis. UCI has requesting performance data from responsible jurisdictions.
TRA-1E: UCI will collect UCITP traffic fees from "for-profit" development projects on campus or other campus development as determined by the University. Fees will be provided to the City of Irvine, City of Newport Beach, or other public agencies to fund UCI's share of UCITP improvements when the improvements are implemented, as provided in mitigation measure Tra-1D.	No for-profit development has occurred on campus since 2007; therefore, no for-profit traffic fees have been collected.
TRA-1F: If the City of Irvine or City of Newport Beach implements UCITP improvements following UCI determination that LRDP traffic is causing a significant impact, and UCITP fees collected to date are insufficient to fund UCI's fair share, UCI shall identify and obtain funding for the fair share of identified improvements from an alternative source.	UCI currently holds a traffic fee balance of $2.6 million as a result of traffic fee credits from the City of Irvine, but no determination of impact has been identified to date. 2007 LRDP EIR estimated that UCI additionally generates $2 million per year in Measure M funds for off-campus transportation improvements.
TRA-1G: UCITP fees established for future "for-profit" development on UCI's North Campus shall be commensurate with the traffic fees established in the City of Irvine's IBC Transportation Fee program.	No for-profit development projects have occurred at the North Campus.
TRA-1H: UCI will assess a San Joaquin Hills Transportation Corridor fee to future "for-profit" campus development projects in accordance with the development fee program established by the Joint Powers Agreement entered into by the City of Irvine, the County of Orange, and neighbor cities to help pay for the San Joaquin Hills Transportation Corridor. Future "for-profit" campus development shall be required to pay such fees prior to construction. UCI's obligation to pay its share of the costs of the San Joaquin Hills Transportation Corridor shall be satisfied upon the forwarding of	SJHTC fees have been paid for all University Hills faculty/staff homes. No for-profit projects have occurred since adoption of the 2007 LRDP.

these fees to the Transportation Corridor Agencies or other agency designated to collect such fees.	
TRA-1I: UCI shall review individual projects proposed under the 2007 LRDP for consistency with UC Sustainable Transportation Policy and UCI Transportation Demand Management goals to ensure that bicycle and pedestrian improvements, transit stops, and other project features that promote alternative transportation are incorporated to the extent feasible.	All UCI projects undergo review for consistency with UC Sustainable Transportation Policy and UCI TDM goals.
TRA-1J: If a campus construction project or a specific campus event requires an on-campus lane or roadway closure, or could otherwise substantially interfere with campus traffic circulation, the contractor or other responsible party will provide a traffic control plan for review and approval by UCI. The traffic control plan shall ensure that adequate emergency access and egress is maintained and that traffic is allowed to move efficiently and safely in and around the campus. The traffic control plan may include measures such as signage, detours, traffic control staff, a temporary traffic signal, or other appropriate traffic controls. If the interference would occur on a public street, UCI shall apply for all applicable permits from the appropriate jurisdiction.	MM Tra-1J is implemented on all UCI projects.

Irvine Ranch
WATER DISTRICT

April 24, 2017

Ms. Lindsey Hashimoto
Senior Planner
Office of Environmental Planning and Sustainability
University of California, Irvine
4199 Campus Drive, Suite 380
Irvine, CA 92697

Re: NOI/Draft MND for East Campus Student Apartments Phase IV

Dear Ms. Hashimoto:

Irvine Ranch Water District (IRWD) has received the University of California, Irvine's (UCI) Notice of Intent (NOI) for the East Campus Student Apartments Phase IV Mitigated Negative Declaration (MND). IRWD has reviewed the NOI/Draft MND and offers the following comments.

In Section 4.15 Utilities and Service Systems, located on page 3, data related to IRWD's 2005 Urban Water Management Plan (UWMP) should be revised to be consistent with IRWD's 2015 UWMP. Additionally in Section 4.15 Utilities and Service Systems, located on page 4, the Michelson Water Recycling Plant (MWRP) daily treatment should be revised to correspond with the improvements made to MWRP. The MWRP Phase II Plant Upgrade Project, completed in 2014, increased the plant's capacity from 18 mgd to up to 28 mgd so the Draft MND should be revised to reflect a capacity of up to 28 mgd.

IRWD has included the overall demands associated with UCI's 2007 Long Range Development Plan (LRDP) in IRWD's water demands and sewer flow projections. As projects in the LRDP are developed, IRWD will require UCI to complete studies analyzing the impact of the proposed projects on IRWD-owned facilities (potable, recycled, and sewer systems). These studies will verify if any additional off-site improvements to IRWD's existing systems are needed.

Prior to development plan submittal and approval, the developer shall coordinate with IRWD to develop a technical memorandum or Sub Area Master Plan (SAMP) addendum, identifying potential impacts to the potable, recycled, and sewer systems from this project. For questions about the LRDP studies or SAMP addendums, please contact Eric Akiyoshi, Principal Engineer at (949) 453-5552.

IRWD appreciates the opportunity to review and comment on the NOI/Draft MND. If you have any questions or require additional information, please contact the undersigned at (949) 453-5325 or Jo Ann Corey, Engineering Technician III at (949) 453-5326.

Sincerely,

FMSanchez

Fiona M. Sanchez
Director of Water Resources

cc: Eric Akiyoshi, IRWD
Jo Ann Corey, IRWD

Response to the Irvine Ranch Water District

Comment 1: Language has been updated on page 4.15-3 of the Final IS/MND to include the 2015 Urban Water Management Plan (UWMP) and page 4.15-4 to update the Michelson Water Recycling Plant (MWRP) capacity from 18 million gallons per day (mgd) to 28 mgd.

Comment 2: The Office of Environmental Planning and Sustainability at UCI works collaboratively with the Irvine Ranch Water District (IRWD). UCI will continue to work closely with IRWD to ensure capacity of IRWD-owned facilities for potable, recycled, and sewer systems and the need for any off-site improvements to existing systems.

April 25, 2017 NCL-17-027

Lindsey Hashimoto
Office of Environmental Planning and Sustainability
University of California, Irvine
4199 Campus Drive, Suite 380
Anaheim, CA 92803

Subject: Notice of Intent to Adopt a MND for East Campus Student Apartments Phase IV

Dear Lindsey Hashimoto :

Thank you for the opportunity to comment on the Notice of Intent to Adopt a MND for East Campus Student Apartments Phase IV. The County of Orange Environmental Resources Water Quality Compliance has reviewed the *Draft Tiered Initial Study & Mitigated Negative Declaration East Campus Student Apartments Phase IV* and has the following comment:

1. The discussion of hydrology and water quality (commencing Page 4.8-3) notes that:

   The proposed project would comply with the General Construction Storm Water Permit program, which would implement construction control measures to be specified in the project's Storm Water Pollution Prevention Plan (SWPPP) and install and maintain the post-construction BMPs to be specified in the project's Water Quality Management Plan (WQMP).

   This discussion should clarify that UCI is also regulated as a designated Non-Traditional Permittee under the Phase II Small Municipal Separate Storm Sewer System Program (Water Quality Order No. 2013—0001-DWQ – General Permite No. CAS000004) and that this permit contains requirements for post-construction phase stormwater management.

Thank you for the opportunity to review this document. If you have any questions regarding these comments, please contact Richard Boon in Environmental Resources at (714) 955-0670 or Linda Smith at (714) 667-8848. in OC Development Services.

Sincerely,

Laree Alonso, Manager, Planning Division
OC Public Works Service Area/OC Development Services
300 North Flower Street
Santa Ana, California 92702-4048
Laree.alonso@ocpw.ocgov.com

cc: Richard Boon, Environmental Resources

Response to the County of Orange

Comment 1: Language updated on page 4.8-3 of the Final IS/MND to include statement that UCI is a Non-Traditional Permittee under the Phase II Small Municipal Separate Storm Sewer System (MS4) Program.

APPENDIX H

Mitigation Monitoring and Reporting Program

	Mitigation Measure	Responsible Party	Monitoring and Reporting Procedure
Aes-2A	Prior to project design approval for future projects that implement the 2007 LRDP, UCI shall ensure that the projects include design features to minimize glare impacts. These design features shall include use of non-reflective exterior surfaces and low-reflectance glass (e.g., double or triple glazing glass, high technology glass, low-E glass, or equivalent materials with low reflectivity) on all project surfaces that could produce glare.	ACC/EPS	ACC to review during design EPS to confirm
Aes-2B	Prior to approval of construction documents for future projects that implement the 2007 LRDP, UCI shall approve an exterior lighting plan for each project. In accordance with UCI's Campus Standards and Design Criteria for outdoor lighting, the plan shall include, but not be limited to, the following design features: • Full-cutoff lighting fixtures to direct lighting to the specific location intended for illumination (e.g., roads, walkways, or recreation fields) and to minimize stray light spillover into adjacent residential areas, sensitive biological habitat, and other light-sensitive receptors; • Appropriate intensity of lighting to provide campus safety and security while minimizing light pollution and energy consumption; and • Shielding direct lighting within parking areas, parking structures, or roadways away from adjacent residential areas, sensitive biological habitat, and other light-sensitive receptors through site configuration, grading, lighting design, or barriers such as earthen berms, walls, or landscaping.	ACC/EPS	ACC to review during design EPS to confirm
AQ-1	Prior to initiating construction, UCI shall ensure that the project construction contract includes a construction emissions mitigation plan, including measures compliant with SCAQMD Rule 403 (Fugitive Dust), to be implemented and supervised by the on-site construction supervisor, which	ACC/EPS	ACC to confirm and monitor contractor EPS to confirm

	Mitigation Measure	Responsible Party	Monitoring and Reporting Procedure
	shall include, but not be limited to, the following BMPs: • During grading and site preparation activities, exposed soil areas shall be stabilized via frequent watering, non-toxic chemical stabilization, or equivalent measures at a rate to be determined by the on-site construction supervisor. • During windy days when fugitive dust can be observed leaving the construction site, additional applications of water shall be required at a rate to be determined by the onsite construction supervisor. • Disturbed areas designated for landscaping shall be prepared as soon as possible after completion of construction activities. • Areas of the construction site that will remain inactive for three months or longer following clearing, grubbing and/or grading shall receive appropriate BMP treatments (e.g., revegetation, mulching, covering with tarps, etc.) to prevent fugitive dust generation. • All exposed soil or material stockpiles that will not be used within 3 days shall be enclosed, covered, or watered twice daily, or shall be stabilized with approved nontoxic chemical soil binders at a rate to be determined by the on-site construction supervisor. • Unpaved access roads shall be stabilized via frequent watering, non-toxic chemical stabilization, temporary paving, or equivalent measures at a rate to be determined by the on-site construction supervisor. • Trucks transporting materials to and from the site shall allow for at least two feet of freeboard (i.e., minimum vertical distance between the top of the load and the top of the trailer). Alternatively, trucks transporting materials shall be covered.		

Mitigation Measure		Responsible Party	Monitoring and Reporting Procedure
	• Speed limit signs at 15 mph or less shall be installed on all unpaved roads within construction sites. • Where visible soil material is tracked onto adjacent public paved roads, the paved roads shall be swept and debris shall be returned to the construction site or transported off site for disposal. • Wheel washers, dirt knock-off grates/mats, or equivalent measures shall be installed within the construction site where vehicles exit unpaved roads onto paved roads. • Diesel powered construction equipment shall be maintained in accordance with manufacturer's requirements, and shall be retrofitted with diesel particulate filters where available and practicable. • Heavy duty diesel trucks and gasoline powered equipment shall be turned off if idling is anticipated to last for more than 5 minutes. • Where feasible, the construction contractor shall use alternatively fueled construction equipment, such as electric or natural gas-powered equipment or biofuel. • Heavy construction equipment shall use low NOx diesel fuel to the extent that it is readily available at the time of construction. • To the extent feasible, construction activities shall rely on the campus's existing electricity infrastructure rather than electrical generators powered by internal combustion engines. • The construction contractor shall develop a construction traffic management plan that includes the following: • Scheduling heavy-duty truck deliveries to avoid peak traffic periods		

	Mitigation Measure	Responsible Party	Monitoring and Reporting Procedure
	Consolidating truck deliveries. • Where possible, the construction contractor shall provide a lunch shuttle or on-site lunch service for construction workers. • The construction contractor shall, to the extent possible, use pre-coated architectural materials that do not require painting. Water-based or low VOC coatings shall be used that are compliant with SCAQMD Rule 1113. Spray equipment with high transfer efficiency, such as the high volume-low pressure spray method, or manual coatings application shall be used to reduce VOC emissions to the extent possible. • Project constructions plans and specifications will include a requirement to define and implement a work program that would limit the emissions of reactive organic gases (ROG's) during the application of architectural coatings to the extent necessary to keep total daily ROG's for each project to below 75 pounds per day, or the current SCAQMD threshold, throughout that period of construction activity to the extent feasible. The specific program may include any combination of restrictions on the types of paints and coatings, application methods, and the amount of surface area coated as determined by the contractor. • The construction contractor shall maintain signage along the construction perimeter with the name and telephone number of the individual in charge of implementing the construction emissions mitigation plan, and with the telephone number of the SCAQMD's complaint line. The contractor's representative shall maintain a log of any public complaints and corrective actions taken to resolve complaints.		

	Mitigation Measure	Responsible Party	Monitoring and Reporting Procedure
BR-1	If construction occurs during the nesting season (February 1 through August 31), pre-constructing surveys for active nests shall be performed within 30 days prior to the commencement of any clearing or grading activities at locations within 500 feet of the approved limits of disturbance where suitable nesting habitat exists. Construction activities within 300 feet of active nests shall be monitored by a qualified biologist until the biologist determines that the nest is no longer active. Construction may encroach within the 300-foot buffer only at the discretion of the biologist.	ACC/EPS	ACC to coordinate surveys and incorporate into construction documents EPS to confirm
BR-2	During the design phase of the surface parking lot and extension of Arroyo Drive, a project-specific jurisdictional delineation shall be prepared. Appropriate permits shall be obtained through the Army Corps of Engineers, California Department of Fish and Wildlife, and Regional Water Quality Control Board and a mitigation replacement program shall be implemented.	EPS	EPS to coordinate and prepare permits
Cul-1C	Prior to land clearing, grading, or similar land development activities for future projects that implement the 2007 LRDP in areas of identified archaeological sensitivity, UCI shall retain a qualified archaeologist (and, if necessary, a culturally affiliated Native American) to monitor these activities. In the event of an unexpected archaeological discovery during grading, the on-site construction supervisor shall redirect work away from the location of the archaeological find. A qualified archaeologist shall oversee the evaluation and recovery of archaeological resources, in accordance with the procedures listed below, after which the on-site construction supervisor shall be notified and shall direct work to continue in the location of the archaeological find. A record of monitoring activity shall be submitted to UCI each month and at the end of monitoring. If an archaeological discovery is determined to be significant, the archaeologist shall prepare and implement a data recovery plan. The plan shall include, but not be limited to, the following measures: a. Perform appropriate technical analyses;	ACC/EPS	On-site construction supervisor to notify ACC and EPS who will stop/direct work Submit final report to EPS

	Mitigation Measure	Responsible Party	Monitoring and Reporting Procedure
	b. File an resulting reports with South Coast Information Center; and c. Provide the recovered materials to an appropriate repository for curation, in consultation with a culturally-affiliated Native American.		
Cul-4A	Prior to grading or excavation for future project that implement the 2007 LRDP and would excavate sedimentary rock material other than topsoil, UCI shall retain a qualified paleontology to monitor these activities. In the event fossils are discovered during grading, the on-site construction supervisor shall be notified and shall redirect work away from the location of the discovery. The recommendations of the paleontologist shall be implemented with respect to the evaluation and recovery of fossils, in accordance with mitigation measures Cul-4B and Cul-4C, after which the on-site construction supervisor shall be notified and shall direct work to continue in the location of the fossil discovery. A record of monitoring activity shall be submitted to UCI each month and ay the end of monitoring.	ACC/EPS	On-site construction supervisor to notify ACC and EPS who will stop/direct work Submit final report to EPS
Cul-4B	If the fossils are determined to be significant, then mitigation measure Cul-4C shall be implemented.	ACC/EPS	Submit documentation to EPS to report procedures were followed
Cul-4C	For significant fossils as determined by mitigation measure Cul-4B, the paleontologist shall prepare and implement a data recovery plan. The plan shall include, but not be limited to, the following measures: a. The paleontologist shall ensure that all significant fossils collected are cleaned, identified, catalogued, and permanently curated with an appropriate institution with a research interest in the materials (which may include UCI); b. The paleontologist shall ensure that specialty studies are completed, as	ACC/EPS	Submit documentation to EPS to report procedures were followed and an attempt to house found fossils occurred

	Mitigation Measure	Responsible Party	Monitoring and Reporting Procedure
	appropriate, for any significant fossil collected; and c. The paleontologist shall ensure that curation of fossils are completed in consultation with UCI. A letter of acceptance from the curation institution shall be submitted to UCI.		
Haz-6A	Prior to initiating on-site construction for future projects that implement the 2007 LRDP and would involve a land or roadway closure, the construction contractor and/or UCI Design and Construction Services shall notify the UCI Fire Marshal. If determined necessary by the UCI Fire Marshal, local emergency services shall be notified of the lane or roadway closure by the Fire Marshal.	ACC/EPS	ACC to record notification to the Fire Marshall EPS to confirm
Hyd-1A	As early as possible in the planning process of future projects that implement the 2007 LRDP and would result in land disturbance of 1 acre or greater, and for all development projects occurring on the North Campus in the watershed of the San Joaquin Freshwater Marsh, a qualified engineer shall complete a drainage study. Design features and other recommendations from the drainage study shall be incorporated into project development plans and construction documents. Design features shall be consistent with UCI's Storm Water Management Program, shall be operational at the time of project occupancy, and shall be maintained by UCI. At a minimum, all drainage studies required by this mitigation measure shall include, but not be limited to, the following design features: Site design that controls runoff discharge volumes and durations shall be utilized, where applicable and feasible, to maintain or reduce the peak runoff for the 10-year, 6-hour storm event in the post-development condition compared to the pre-development condition, or as defined by current water quality regulatory requirements. Measures that control runoff discharge volumes and durations shall be	ACC/EPS	ACC to incorporate findings into project design EPS to confirm

	Mitigation Measure	Responsible Party	Monitoring and Reporting Procedure
	utilized, where applicable and feasible, on manufactured slopes and newly-graded drainage channels, such as energy dissipaters, revegetation (e.g., hydroseeding and/or plantings), and slope/channel stabilizers.		
Hyd-2A	Prior to initiating on-site construction for future projects that implement the 2007 LRDP, UCI shall approve an erosion control plan for project construction. The plan shall include, but not be limited to, the following applicable measures to protect downstream areas from sediment and other pollutants during site grading and construction: • Proper storage, use, and disposal of construction materials. • Removal of sediment from surface runoff before it leaves the site through the use of silt fences, gravel bags, fiber rolls or other similar measures around the site perimeter. • Protection of storm drain inlets on-site or downstream of the construction site through the use of gravel bags, fiber rolls, filtration inserts, or other similar measures. • Stabilization of cleared or graded slopes through the use of plastic sheeting, geotextile fabric, jute matting, tackifiers, hydro-mulching, revegetation (e.g., hydroseeding and/or plantings), or other similar measures. • Protection or stabilization of stockpiled soils through the use of tarping, plastic sheeting, tackifiers, or other similar measures. • Prevention of sediment tracked or otherwise transported onto adjacent roadways through use of gravel strips or wash facilities at exit areas (or equivalent measures). • Removal of sediment tracked or otherwise transported onto adjacent	ACC/EPS	ACC to prepare erosion control plan and incorporate into construction documents EPS to confirm

Mitigation Measure		Responsible Party	Monitoring and Reporting Procedure
	roadways through periodic street sweeping. • Maintenance of the above-listed sediment control, storm drain inlet protection, slope/stockpile stabilization measures.		
Hyd-2B	Prior to project design approval for future projects that implement the 2007 LRDP and would result in land disturbance of 1 acre or more, the UCI shall ensure that the projects include the design features listed below, or their equivalent, in addition to those listed in mitigation measure Hyd-1A. Equivalent design features may be applied consistent with applicable MS4 permits (UCI's Storm Water Management Plan) at that time. All applicable design features shall be incorporated into project development plans and construction documents; shall be operational at the time of project occupancy; and shall be maintained by UCI. • All new storm drain inlets and catch basins within the project site shall be marked with prohibitive language and/or graphical icons to discourage illegal dumping per UCI standards. • Outdoor areas for storage of materials that may contribute pollutants to the storm water conveyance system shall be covered and protected by secondary containment. • Permanent trash container areas shall be enclosed to prevent off-site transport of trash, or drainage from open trash container areas shall be directed to the sanitary sewer system. • At least one treatment control is required for new parking areas or structures, or for any other new uses identified by UCI as having the potential to generate substantial pollutants. Treatment controls include, but are not limited to, detention basins, infiltration basins, wet ponds or wetlands, bio-swales, filtration devices/inserts at storm drain	ACC/EPS	ACC to incorporate into construction documents EPS to confirm

Mitigation Measure		Responsible Party	Monitoring and Reporting Procedure
	inlets, hydrodynamic separator systems, increased use of street sweepers, pervious pavement, native California plants and vegetation to minimize water usage, and climate controlled irrigation systems to minimize overflow. Treatment controls shall incorporate volumetric or flow-based design standards to mitigate (infiltrate, filter, or treat) storm water runoff, as appropriate.		
NOI-1	The Project Applicant and/or Contractor shall implement the following noise-attenuating measures during construction of the proposed project: • Construction contracts specify that all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers and other state required noise attenuation devices. • The Contractor shall provide evidence that a construction staff member will be designated as a Noise Disturbance Coordinator and will be present on-site during construction activities. The Noise Disturbance Coordinator shall be responsible for responding to any local complaints about construction noise. When a complaint is received, the Noise Disturbance Coordinator shall implement reasonable measures to resolve the complaint, as deemed acceptable by the Community Development Director (or designee). All notices that are sent to residential units immediately surrounding the construction site and all signs posted at the construction site shall include the contact name and the telephone number for the Noise Disturbance Coordinator. • Construction noise reduction methods shall be used where feasible. These reduction methods include shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources, maximizing the distance between construction equipment staging areas and occupied residential areas, and electric	ACC/EPS	ACC to confirm with contractor and incorporate into construction documents EPS to confirm

	Mitigation Measure	Responsible Party	Monitoring and Reporting Procedure
	air compressors and similar power tools. • Construction haul routes shall be designed to avoid noise sensitive uses (e.g., residences, convalescent homes, etc.), to the extent feasible. • During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers. • Construction activities shall not take place outside of the allowable hours specified by the City's *Municipal Code* Section 6-8-205(A) (7:00 a.m. and 7:00 p.m. on weekdays, and 9:00 a.m. and 6:00 p.m. on Saturdays; construction activities are not permitted on Sundays or legal holidays).		
NOI-2	During project plan review and prior to construction, UCI shall ensure that the project design includes the following project design features: • Specific window treatments, such as dual glazing (a minimum Sound Transmission Class rating of 32) and mechanical ventilation shall be utilized in residential units immediately along California Avenue and Campus Drive.	ACC/EPS	ACC to confirm with contractor and incorporate into construction documents EPS to confirm