Attachment No. 5

3727 ROBERTSON PROJECT, CULVER CITY, CA

CEQA Class 32 Categorical Exemption Report

Prepared for
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December 2020

ESA

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CATEGORICAL EXEMPTION REPORT

This report serves as the summary of the environmental analysis performed by ESA for the proposed five story, mixed-use building located at 3727 Robertson Boulevard (Project) in the City of Culver City, California (City). The intent of the analysis is to document whether the Project is eligible for a Class 32 Categorical Exemption (CE) pursuant to the State *California Environmental Quality Act (CEQA) Guidelines* §15332. The report provides an introduction, project description, and evaluation of the Project's consistency with the requirements for a Class 32 exemption. This includes an analysis of the project's potential impacts in the areas of habitat for endangered, rare or threatened species, traffic, noise, air quality, water, and historic resources. This report concludes that the Project is eligible for a Class 32 CE pursuant to the *State CEQA Guidelines* §15332.

1.0 Introduction

The State *California Environmental Quality Act (CEQA) Guidelines* §15332 states that a Class 32 Categorical Exemption (CE) is allowed when an in-fill development project meets the following conditions:

a. The project is consistent with the applicable general plan designation and all applicable general plan policies as well as with applicable zoning designation and regulations.

b. The proposed development occurs within city limits on a project site of no more than five acres substantially surrounded by urban uses.

c. The project site has no value as habitat for endangered, rare or threatened species.

d. Approval of the project would not result in any significant effects relating to traffic, noise, air quality, or water quality.

e. The site can be adequately served by all required utilities and public services.

Additionally, State *CEQA Guidelines* Section 15300.2 lists six exceptions to a categorical exemption. These exemptions include the following conditions:

a. Location. Classes 3, 4, 5, 6, and 11 are qualified by consideration of where the project is to be located – a project that is ordinarily insignificant in its impact on the environment may in a particularly sensitive environment be significant. Therefore, these classes are considered to apply all instances, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.

b. Cumulative Impact. All exemptions for these classes are inapplicable when the cumulative impact of successive projects of the same type in the same place, over time is significant.

c. Significant Effect. A categorical exemption shall not be used for an activity where there is a reasonable possibility that the activity will have a significant effect on the environment due to unusual circumstances.

d. Scenic Highways. A categorical exemption shall not be used for a project which may result in damage to scenic resources, including but not limited to, trees, historic buildings, rock outcroppings, or similar resources, within a highway officially designated as a state scenic highway. This does not apply to improvements which are required as mitigation by an adopted negative declaration or certified EIR.

e. Hazardous Waste Sites. A categorical exemption shall not be used for a project located on a site which is included on any list compiled pursuant to Section 65962.5 of the Government Code.

f. Historical Resources. A categorical exemption shall not be used for a project which may cause a substantial adverse change in the significance of a historical resource.

ESA evaluated the proposed mixed-use 3727 Robertson Boulevard Project (Project) located at 3727 Robertson Boulevard between Venice Boulevard and Washington Boulevard in the City of Culver City (City) with respect to consistency with the above requirements, including its potential impacts in the areas of habitat for endangered, rare or threatened species, traffic, noise, air quality, water quality and historic resources, as well as the six exceptions to a categorical exemption, to confirm the Project's eligibility for the Class 32 CE pursuant to the State *CEQA Guidelines* §15332.

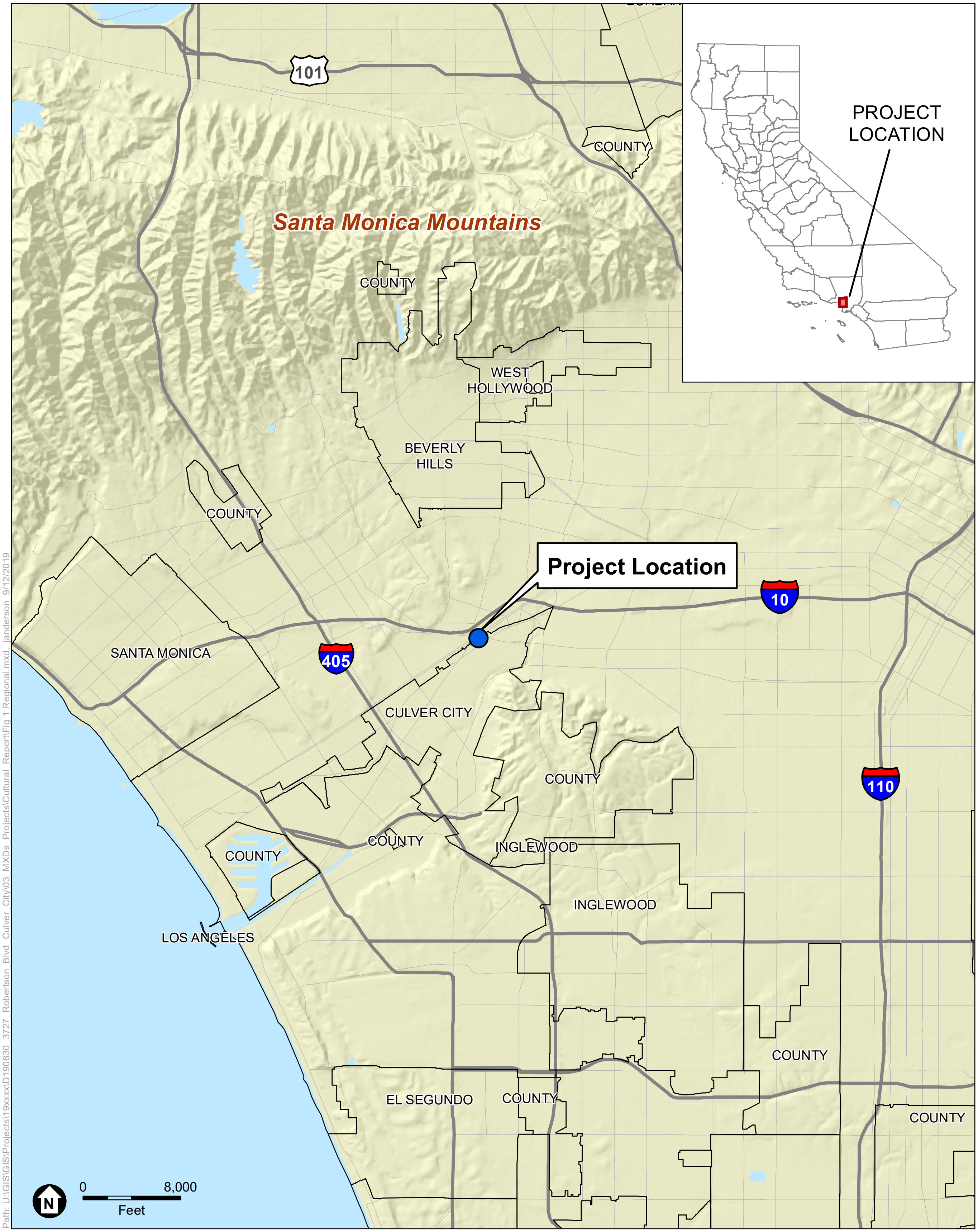
2.0 Project Description

Icon West, Inc. (the Applicant) proposes to develop the proposed Project located at 3727 Roberson Boulevard in the City of Culver City (Project Site). The Project would consist of approximately 3,886 square feet (SF) of ground-floor retail/restaurant space, 5,455 SF of commercial office space on the second floor, and 12 two-bedroom apartment units on floors 3 through 5. Parking would be provided in a one-floor, 19-space subterranean parking garage as well as 6 surface parking space. The Project includes demolition of all existing on-site buildings and features, excavation to accommodate the subterranean parking structure, and the construction of the new mixed-use building.

The Project Site is designated as Commercial-General Corridor based on the City's General Plan Land Use Element Map.[1] The Project Site is currently developed with a sound studio totaling 2,850 SF and a surface parking lot, all of which would be demolished and removed to support development of the Project. The Project Site is shown in Figure 1, Vicinity Location Map. The proposed Project Site plans are provided in **Attachment A** of this report.

Construction of the Project is estimated to require approximately up to 17 months. Construction activities would include demolition, excavation, foundations and concrete pouring, building construction, and architectural coatings. Heavy-duty equipment, vendor supply trucks and concrete trucks would be used during construction of foundations, parking structures, and buildings. Landscaping and architectural coating would occur during the finishing activities. Demolition activities would include the removal of the existing sound studio building and surface parking lot. Approximately 267 tons of demolition debris would be exported from the Project Site. The Project would require the excavation and export of approximately 2,400 cubic yards of soil during grading and excavation activities. The soil excavation and export would be associated with the construction of the proposed one-level subterranean parking structure.

1 City of Culver City, City of Culver City General Plan Land Use Element Map, August, 2007, https://www.culvercity.org/home/showdocument?id=122. Accessed July 2020.



SOURCE: ESRI

3727 S. Robertson Blvd, Culver City

Figure 1
Regional Location

ESA

3.0 Existing Site Conditions

The Project Site is an approximately 0.12 acre (5,100 SF) rectangular-shaped parcel (Project Site) located on Robertson Boulevard between Venice Boulevard and Washington Boulevard in Culver City, as shown above in **Figure 1**, *Regional Location*. A single-lane service alley runs along the western side of the Project Site and the service alley serves as the western boundary of the Project Site. Existing surrounding uses include: business park/office building uses to the east across S. Robertson Boulevard; a construction company office/showroom immediately to the north; a per day care/grooming facility immediately to the south; and light-industrial/commercial/office uses to the west on Willat Avenue. There are no residential, park, hospital, or other environmentally sensitive uses in the immediate vicinity of the Project Site. **Figure 2**, *Aerial Photograph with Surrounding Land Uses*, shows the site and surrounding land uses. The Project Site is currently developed with a sound studio totaling 2,850 square feet and a surface parking lot, which would all be demolished and removed to support development of the Project.

The Project Site is well served by a network of regional transportation facilities. Various public transit stops operated by the Los Angeles County Metropolitan Transportation Authority (Metro), Los Angeles Department of Transportation (LADOT), City of Santa Monica's Big Blue Bus and Culver City Bus are located in close proximity to the Project Site. The Metro Expo Line Culver City light rail station is approximately 0.1 miles northeast of the Project Site.

Path: U:\GIS\GIS\Projects\19xxx\D190830_3727_Robertson_Blvd_Culver_City\03_MXDs_Projects\Cultural_Report\Fig3_Aerial.aprx, janderson 9/12/2019

SOURCE: Mapbox, 2018.

3727 S. Robertson Blvd, Culver City

Figure 2
Aerial Photograph of Project Site and Vicinity

ESA

4.0 Consistency Analysis

Criterion (a): The project is consistent with the applicable general plan designation and all applicable general plan policies as well as with applicable zoning designation and regulations.

The Project Site is designated as Commercial-General Corridor based on the City's General Plan Land Use Element Map.[2] According to the City's General Plan Land Use Element, the General Corridor designation allows a range of small-to-medium-scale commercial uses and is intended to support existing and future neighborhood and community serving commercial uses, and limited medium-density housing opportunities compatible with adjacent residential neighborhoods.[3] The Project Site is designated as Industrial General (IG) on the City's Zoning Map.[4] The IG designation allows for a variety of uses including light industrial and manufacturing and processing, recreational, education, public assembly, retail trade (including restaurant), service (including office), transportation and communication, and limited residential. The Project is mixed-used, with ground-floor retail/restaurant space, commercial office space on the second floor, and limited residential uses (12 dwelling units). Therefore, the Project is consistent with the applicable General Plan Land Use and Zoning Code designations.

The General Plan Land Use Element has several land-use policies that are relevant to the Project, including the following specifically applicable policies for commercial and industrial focus areas related to Commercial Corridors. **Table 1**, *Consistency with Applicable General Plan Land Use Element Objectives and Policies for Commercial Corridors*, presents an evaluation of the Project's consistency with applicable City General Plan Land Use Element objectives and policies for Commercial Corridors.

2 City of Culver City, City of Culver City General Plan Land Use Element Map, August 2007, https://www.culvercity.org/home/showdocument?id=122. Accessed July 2020.

3 City of Culver City, City of Culver City General Plan Land Use Element, page LU-20, July 1996, Amended through February 2000.

4 City of Culver City, City of Culver City Zoning Map, August 2007. https://www.culvercity.org/home/showdocument?id=142. Accessed July 2020.

TABLE 1
CONSISTENCY WITH APPLICABLE GENERAL PLAN LAND USE ELEMENT OBJECTIVES AND POLICIES FOR COMMERCIAL CORRIDORS

Objectives and Policies	Consistency Analysis
Objective 6. Commercial Corridors	
Policy 6.A. Encourage revitalization of commercial corridors in the City through new development and renovation of existing structures with incentives which address development standards and the project approval process.	**Consistent.** The Project would result in the development of new retail/restaurant, office, and residential uses on site. The Project Site would be revitalized with landscaping, including green wall panels, in the patio area for Project Site users. Street-side landscaping would also be provided to revitalize the pedestrian environment.
Policy 6.B. Focus commercial development into cohesive districts by identifying and encouraging intensities and qualities of commercial uses that are sensitive to their locations, and by emphasizing specific uses (i.e., neighborhood serving or general commercial corridors).	**Consistent.** The Project would provide a mix of uses appropriate and consistent with other uses in the area, including retail/restaurant, office, and residential. The Project's on-site commercial uses would provide services and potential job opportunities for the on-site residents. The Project's retail/restaurant and office uses would also provide services to existing nearby uses, which include the business park/office building uses to the east across S. Robertson Boulevard and the neighboring commercial and office uses.
Policy 6.C. Identify and pursue opportunities for providing parking that serves clusters of businesses in commercial corridors to assist existing development and stimulate new development.	**Consistent.** The Project would provide parking within the Project Site to serve the mix of uses within a one-floor, subterranean parking garage. Surface parking spaces would also be provided to provide quick and convenience access to the retail/restaurant uses.
Policy 6.D. Increase revitalization opportunities by allowing, where appropriate, a one lot extension of commercial parking use into residentially zoned areas adjacent to commercial corridors, to provide the adequate depth necessary to meet current parking standards where commercial parcel depth is limited.	**Not Applicable.** The Project Site is not adjacent to residentially zoned areas. However, implementation of the Project would not conflict with the ability of the City to implement lot extensions for commercial parcels as needed under this policy.
Policy 6.E. Encourage restaurants that feature outdoor dining, especially sidewalk cafes within Downtown and areas designated for neighborhood-serving uses.	**Consistent.** The Project would result in the development of new retail/restaurant, office, and residential uses on site. The Project's ground-level retail/restaurant space would feature a landscaped outdoor area adjacent to the sidewalk that would be available for potential seating and dining by a future retail/restaurant operator.
Policy 6.F. Identify public/private joint development projects that may serve as catalysts to encourage quality private development along the commercial corridors.	**Not Applicable.** The Project is a private development Project; therefore, this policy is not applicable. However, implementation of the Project would not conflict with the ability of the City to identify other private/private joint development projects along commercial corridors.
Policy 6.G. Encourage the introduction of neighborhood-serving commercial and retail uses that serve the needs of nearby residential neighborhoods lacking such services.	**Consistent.** The Project would provide a mix of uses, including retail/restaurant, office, and residential. The Project's on-site commercial uses would provide services and potential job opportunities for the on-site residents. The Project's retail/restaurant and office uses would also provide services to existing nearby uses, which include the business park/office building uses to the east across S. Robertson Boulevard and the neighboring commercial and office uses.

Objectives and Policies	Consistency Analysis
Policy 6.H. Encourage high trip-generating uses near transportation corridors to maximize transit use by patrons and employees.	**Consistent.** Retail/restaurant uses are typically high trip-generating uses. Various public transit stops operated by the Los Angeles County Metropolitan Transportation Authority (Metro), Los Angeles Department of Transportation (LADOT), City of Santa Monica's Big Blue Bus and Culver City Bus are located in proximity to the Project Site. In addition, the Metro Expo Line Culver City light rail station is approximately 0.1 miles northeast of the Project Site. The Project's location near multiple options of high-quality transit services would encourage Project patrons, employees, and residents to use the nearby transit options.
Policy 6.I. Plan for streetscape improvements (street trees, landscaping, street furniture, special lighting, decorative paving, screening walls) and facade improvements along commercial corridors that complement each focus area and improve the physical environment.	**Consistent.** The Project Site would be revitalized with landscaping, including green wall panels, in the patio area for Project Site users. Street-side landscaping would also be provided to revitalize the pedestrian environment. In addition, the Project's ground-level retail/restaurant space would feature a landscaped outdoor area adjacent to the sidewalk that would be available for potential seating and dining by a future retail/restaurant operator, which would improve the streetscape environment.

SOURCE: City of Culver City, General Plan Land Use Element, 2000; ESA, 2020.

As discussed in **Table 1**, the proposed project would be consistent with applicable General Plan Land Use Element policies for Commercial Corridors. Furthermore, as discussed above, the proposed Project would be consistent with the City's General Plan designation, which allows for a range of small-to-medium-scale commercial uses and medium-density housing, and the City's zoning code designation, which allows for a variety of uses including retail trade (including restaurant), service (including office), and limited residential. Therefore, the proposed Project would meet this criterion.

Criterion (b): The proposed development occurs within city limits on a project site of no more than five acres substantially surrounded by urban uses.

The Project Site is located on an approximately 0.12-acre parcel within a developed urban neighborhood. It is directly surrounded by urban uses in all directions, as shown in **Figure 1**, above. Existing surrounding uses include: business park/office building uses to the east across S. Robertson Boulevard; an office/showroom immediately to the north; a pet day care/grooming facility immediately to the south; and light-industrial/commercial/office uses to the west on Willat Avenue. Therefore, the proposed Project would meet this criterion.

Criterion (c): The project site has no value as habitat for endangered, rare, or threatened species.

The Project Site is located within a highly developed area. Thus, the Project Site lacks habitat that would be suitable for sensitive animal or plant species. In addition, the Project Site is currently developed with a sound studio and associated parking lot surrounded by minimal vegetation. This vegetation does not provide habitat for sensitive species due to its small size and highly urban context. Furthermore, as discussed above, the area surrounding the Project Site is fully developed with urban uses. Therefore, the Project would meet this criterion.

Criterion (d): Approval of the project would not result in any significant effects relating to traffic, noise, air quality, or water quality.

I. Traffic

The following review of potential traffic impacts is based on the Traffic Impact Analysis prepared by Crain and Associates for the Public Works Engineering Division of the City of Culver City (included as **Attachment B** of this report) for the proposed Project. The goal of the Traffic Impact Analysis was to analyze the impact the development would have on the City's transportation system. With this intention, traffic impact analysis was conducted on two adjacent intersections most likely to be affected by the Project. The Traffic Impact Analysis also included an assessment for Congestion Management Concerns (CMP) locations and a freeway screening analysis.

A summary of findings of the Traffic Impact Analysis is provided below:

- The City's criteria for assessing a Project's significant traffic impact is based on a project-related increase in Critical Movement Analysis (CMA). The Traffic Impact Analysis assessed the impact of the Project on traffic under existing traffic volumes and projected future traffic conditions based on other projects under construction or planned within the Project's vicinity. In both cases, the Traffic Impact Analysis demonstrates that the project-related increase in the CMA value at the two intersections analyzed would not be significant.

- Per Los Angeles County CMP, all CMP intersections where a project would likely add 50 or more trips during peak hours should be analyzed. Furthermore, the CMP requires a review of freeway segments where the Project would likely add 150 or more trips per hour. According to the Traffic Impact Analysis, the Project would not generate more than 50 trips during peak hours at the nearest arterial CMP monitoring intersections. Therefore, the Project impacts to the CMP intersections would be less than significant. Additionally, the Traffic Impact Analysis found that the Project will generate less than 150 directional trips during peak hours on the CMP freeway segments nearest to the Project. Thus, Project impacts to any CMP freeway monitoring location would not be significant.

- The First Amendment to the Agreement between The City of Los Angeles Department of Transportation and Caltrans District 7 on Freeway Impact Analysis Procedures, December 2015, which is agreed to by the City, requires a detailed freeway analysis for land use proposals that meet any of the criteria outlined in Section IV.3.E of the Traffic Impact Analysis included as **Attachment B**. As demonstrated in the Traffic Impact Analysis, the Project's peak hour trips do not meet any of the criteria, and therefore, the Project's freeway mainline impact would not be considered significant.

Conclusion: Based on the Traffic Impact Analysis, the Project would not have significant traffic impacts to the two intersections analyzed, nearby CMP locations, or freeway facilities. For additional details, refer to the full Traffic Impact Analysis provided in **Attachment B** of this report.

II. Noise

The following review of potential noise impacts is based on the Noise Technical Report prepared by ESA (included as **Attachment C** of this report) for the proposed Project. In accordance with Appendix G of the State *CEQA Guidelines*, the proposed Project would result in potentially significant impacts related to noise if it would result in:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generation of excessive groundborne vibration or groundborne noise levels; or
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

A summary of findings of the Noise Technical Report is provided below:

ESA conducted an acoustical study (included as **Attachment C** of this report) to evaluate the potential noise and vibration impacts associated with construction activities, surface transportation, and other aspects of Project construction and operations that have the potential to impact noise sensitive land uses. The findings of the analyses are as follows:

- Through compliance with the City's allowable construction hours, the construction of the Project would not exceed the City's construction noise standards. Thus, the Project would not result in a substantial temporary or periodic increase in noise and impacts would be less than significant.
- Operation of the Project would not exceed the City's traffic or operational stationary source noise standards. Thus, the Project would not result in a substantial permanent increase in ambient noise levels in the vicinity of the Project above levels existing without the Project and impacts would be less than significant.
- With planned setbacks under Project Design Feature PDF-NOI-1, which will be enforceable by the City through standard Conditions of Approval, the Project would not generate excessive groundborne vibration or groundborne noise levels from construction or operational activities. Thus, the Project would result in a less than significant impact from groundborne vibration and groundborne noise.
- The Project Site is not located within an airport land use plan area or within two miles of a public airport or public use airport. The Project Site is not located within the vicinity of a private airstrip, or heliport or helistop. Airport and airfields in proximity to the Project Site include Los Angeles International Airport approximately 5.2 miles to the south, and the Santa Monica Airport approximately 3.2 miles to the west. Therefore, construction or operation of

the Project would not expose people to excessive airport related noise levels. No impact would occur in this regard.

Conclusion: Construction of the Project has the potential to generate an increase in temporary or periodic noise through the use of heavy-duty construction equipment and through vehicle trips generated from construction workers traveling to and from the Project Site. However, use of construction equipment equipped with industry standard noise minimization strategies and compliance with the City's General Plan Noise Element Policy 2.A would minimize the potential for noise generation. Noise from construction of the Project would not exceed the City's standards. Therefore, impacts related to construction noise would be less than significant.

Construction activities would generate vibration from the use of heavy equipment and haul trucks. Consistent with the City's General Plan requirements, the Project will incorporate general industry standard best practices to minimize vibration impacts resulting from heavy duty construction equipment. Specifically, the nearest commercial buildings are located adjacent (approximately 5 feet) to the Project Site and would experience vibration levels up to 0.995 inches per second peak particle velocity (PPV). However, the planned setbacks under PDF-NOI-1, which requires lower power levels for operation of construction equipment that generates high levels of vibration, would sufficiently reduce the vibration levels such that construction vibration impacts would be less than significant.

Project operations would generate an incremental increase in ambient noise from roadway traffic and stationary noise. However, the Project would not result in a substantial increase in roadway traffic noise and would not exceed the significance thresholds. Stationary noise sources would be designed in accordance with City standards and would not exceed the allowable noise levels. As a result, operational noise impacts would be less than significant. The Project's operations would include typical multi-family residential and commercial-grade stationary mechanical and electrical equipment, such as air handling units, condenser units, and exhaust fans, which would produce stationary sources of vibration. In addition, the primary sources of transient vibration would include passenger vehicle circulation within the proposed parking area. However, the potential vibration levels from Project operational sources at the closest sensitive receptor locations would be less than the significance threshold. As a result, operational vibration impacts would be less than significant.

Construction or operation of the Project would not expose people to excessive airport related noise levels. No impact would occur in this regard.

For additional details, refer to the full Noise Technical Report provided in **Attachment C** of this report.

III. Air Quality

The following review of potential air quality impacts is based on the Air Quality Technical Report prepared by ESA (included as **Attachment D-1** of this report) for the proposed Project. In accordance with Appendix G of the State *CEQA Guidelines*, the proposed Project would result in potentially significant impacts related to air quality if it would:

- Conflict with or obstruct the implementation of the applicable air quality plan;
- 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;
- Expose sensitive receptors to substantial pollutant concentrations; or
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

The CEQA Guidelines Section 15064.7 provides the significance criteria established by the applicable air quality management district or air pollution control district, when available, may be relied upon to make determinations of significance. The potential air quality impacts of the Project are, therefore, evaluated according to thresholds developed by the South Coast Air Quality Management District (SCAQMD) in their *CEQA Air Quality Handbook*, *Air Quality Analysis Guidance Handbook*, and subsequent guidance.

A summary of findings of the Air Quality Technical Report is provided below.

ESA conducted an air quality assessment (included as **Attachment D-1** of this report) to evaluate the potential air quality impacts associated with construction activities, mobile sources, building energy demand, and other aspects of Project construction and operations that have the potential to generate criteria air pollutant emissions. The findings of the analyses are as follows:

- The Project would be consistent with air quality policies set forth by the City of Culver City, the SCAQMD, and the Southern California Association of Governments (SCAG).
- The incremental increase in emissions from construction and operation of the Project would be below the regional daily emission thresholds set forth by the SCAQMD. Thus, the Project would not result in a regional violation of applicable air quality standards or jeopardize the timely attainment of such standards in the South Coast Air Basin.
- The incremental increase in on-site emissions from construction and operation of the Project would be below the localized significance thresholds set forth by the SCAQMD. Thus, the Project would not result in a localized violation of applicable air quality standards or expose off-site receptors to substantial levels of regulated air contaminants.
- Emissions from the increase in traffic due to operation of the Project would not have a significant impact upon 1-hour or 8-hour local carbon monoxide (CO) concentrations due to mobile source emissions.
- Project construction and operations would not result in significant levels of odors or other emissions.
- The Project would not result in a significant cumulative air quality impact.

Conclusion: Construction of the Project has the potential to create air quality impacts through the use of heavy-duty construction equipment and through vehicle trips generated from construction workers traveling to and from the Project Site. In addition, fugitive dust emissions would result from grading and construction activities. However, use of typical construction equipment (in terms of size and age/emission standards) and compliance with Rule 403 requirements (regarding dust control measures such as watering twice daily and track out prevention measures), minimizes air emissions to the extent warranted. Regional construction non-attainment pollutant emissions would not exceed the SCAQMD daily significance thresholds. Therefore, impacts related to regional construction emissions would be less than significant. Localized construction emissions would not exceed the SCAQMD localized significance thresholds. Therefore, impacts related to localized construction emissions would be less than significant. As a result, Project-related construction impacts would be less than significant.

Air pollutant emissions associated with Project operations would be generated by the consumption of natural gas and by the operation of on-road vehicles. Regional operational non-attainment pollutant emissions and localized operational emissions associated with the Project would not exceed the SCAQMD daily significance thresholds. In addition, the Project would result in less-than-significant CO hotspot impacts. Furthermore, the Project would be consistent with applicable air quality plans and policies and would not generate odors affecting a substantial number of people or other emissions (i.e., attainment pollutant emissions) above threshold levels. Therefore, impacts related to Project operational emissions and consistency with applicable air quality management plans, policies, or regulations would be less than significant.

For additional details, refer to the full Air Quality Technical Report provided in **Attachment D-1** of this report.

Greenhouse Gas Emissions

The review of potential greenhouse gas impacts resulting from the Project is based on the Greenhouse Gas Technical Report, prepared by Environmental Science Associates (ESA), which is included in **Attachment D-2** of this memorandum.

In accordance with the State CEQA Guidelines Appendix G, the Project would have a significant impact related to GHG's if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

The Project will incorporate sustainable designs as listed in Project Design Feature PDF-GHG-1 that will reduce construction emissions and target sustainable site development, water savings, energy efficiency, green-oriented materials selection, and improved indoor environmental quality. PDFs are part of the Project design, are not mitigation measures, and will be fully enforceable by the City via standard Conditions of Approval. The Project will install a solar photovoltaic power system equivalent to at least 1 percent of the Project's electricity demand and at least 1 kilowatt (kW) of solar photovoltaics per 10,000 square feet of new development or shall provide in-lieu fees or alternate location of solar consistent with applicable provisions of Culver City Municipal

Code Sections 15.02.1000-15.02.1015. The Project will also with the City's adopted Green Building program. As required for projects with new construction totaling up to 49,999 square feet, the Project will comply with 80 percent of the applicable Green Building Program Category 1 Project checklist items.[5] Project applicants for Category I Projects are required to submit a filled checklist with the construction permit application drawings and all items checked must be indicated in the construction permit application drawings.

As determined in the Greenhouse Gas Technical Report, greenhouse gas emissions associated with the Project would be consistent with applicable portions of Culver City's Green Building Program. In addition, the Project would be consistent with the applicable Southern California Association of Governments (SCAG) Regional Transportation Plan (RTP)/Sustainable Communities Strategy (SCS) policies intended to meet the regions' GHG reduction targets as assigned by the California Air Resources Board (CARB). Thus, the Project's GHG emissions would be consistent with regulatory schemes intended to reduce GHG emissions. Therefore, the Project would result in less than significant GHG emissions based on applicable thresholds of significance as evaluated in this GHG Technical Report. Furthermore, the Project would implement green building measures that would reduce the Project's direct and indirect GHG emissions. With the implementation of the Projects' green building measures, the Project would achieve substantial GHG reductions and would achieve reductions consistent with the statewide GHG reduction target.

For additional details, refer to the full Greenhouse Gas Technical Report provided in **Attachment D-2** of this report.

IV. Water Quality

Urban runoff can have a variety of detrimental effects. For instance, heavy metals such as cadmium, chromium, copper and lead can be washed off of paved roads and parking lots and are the most common metals found in urban stormwater runoff. These metals may be toxic to aquatic organisms, and have the potential to contaminate drinking water supplies. Nitrogen and phosphorous from fertilizers can serve as nutrients for algae and vegetation, resulting in accelerated growth and potential oxygen depletion and hypoxic conditions in receiving waters and additional impaired uses of water.

Currently, the Project Site is almost entirely covered with impervious surfaces, although a few trees and street plantings are located along Robertson Boulevard. According to the Geotechnical Investigation and Infiltration Testing report prepared for the Project by RMA GeoScience (2016), no surface water or ponding was seen at the time of site drilling and testing and static groundwater was encountered at a depth of 34 feet below ground surface. Stormwater runoff currently enters storm drains on Robertson Boulevard near Washington Boulevard to existing City drainage facilities. Neither the permeability nor the hydrology of the site would substantially

5 Culver City Building Safety Division Mandatory Green Building Program, Category 1 Qualifying Projects, https://www.culvercity.org/Home/ShowDocument?id=902. Accessed September 2019.

change with project implementation, as the amount of impervious surfaces with the proposed project would be comparable to existing conditions.

Culver City lies within the Marina Del Rey and Ballona Creek watersheds, and thus, within the jurisdiction of the Los Angeles Regional Water Quality Control Board (LARWQBC). The LARWQCB adopted water quality objectives in its Stormwater Quality Management Plan (SQMP), which is designed to ensure stormwater achieves compliance with receiving water limitations. Thus, stormwater generated by a development that complies with the SQMP does not exceed the limitations of receiving waters, and therefore does not exceed water quality standards. Compliance with the SQMP is enforced by application of Section 402 of the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES). Under this section, municipalities are required to obtain permits for the water pollution generated by stormwater in their jurisdiction. These permits are known as Municipal Separate Storm Sewer Systems (MS4) permits. The City of Culver City is a co-permittee in the Los Angeles County MS4 permit (Order No 01-182; NPDES No. CAS0041; Final Order No. R4-2012-0175 as amended by R4-2012-0175-A01). Under this MS4, each permitted municipality is required to implement the SQMP. In accordance with the countywide MS4 permit, all new developments must comply with the SQMP. In addition, as required by the MS4 permit, the City of Culver City has adopted a Standard Urban Stormwater Mitigation Plan (SUSMP) ordinance (see Culver City Municipal Code Chapter 5.05, Stormwater and Urban Runoff Pollution Control, Section 5.05.040, SUSMP Requirements for New Development and Redevelopment Projects).

Point-source pollutants are discharged directly from pipes or spills. Raw sewage draining from a pipe directly into a stream is an example of a point-source water pollutant. The Project consists of a development of retail/restaurant, office, multi-family residential uses, and parking provided in a one-floor subterranean parking garage and surface parking spaces. The Project does not propose any uses that would generate point source pollutants. Therefore, water quality impacts due to point sources would be less than significant.

Non-point-source pollutants (NPS) cannot be traced to a specific original source. NPS pollution is caused by rainfall or snowmelt moving over and through surface areas. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even underground sources of drinking water. These pollutants can include: excess fertilizers, herbicides and insecticides from agricultural lands and residential areas; oil, grease, and toxic chemicals from urban runoff and energy production; sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks; salt from irrigation practices and acid drainage from abandoned mines; bacteria and nutrients from livestock, pet wastes, and faulty septic systems; and atmospheric deposition and hydro modification.

The Project would be subject to all existing regulations associated with the protection of water quality. Construction activities would be carried out in accordance with the requirements of the NPDES General Construction Permit issued by the Los Angeles Regional Water Quality Control Board (LARWQCB), as applicable. According to the Geotechnical Investigation and Infiltration Testing report prepared for the Project by RMA GeoScience (2016), temporary excavations of up to 10 feet maximum height are anticipated to construct the subterranean garage. Therefore, static groundwater is not anticipated to be encountered.

As construction of the Project would involve grading, including the export of approximately 2,400 cubic yards of soil, on an approximately 0.12-acre site, the applicant would not be required to submit a Storm Water Pollution Prevention Plan (SWPPP) to the City of Culver City Public Works Department as the Project would disturb less than one acre of soil and is not part of a larger common plan of development which, in total, disturbs one acre or more. However, the Project would implement best management practices to manage storm water drainage during construction through methods such as retention basins of sufficient size; filtering by use of a barrier system, wattle or other method approved by the enforcing agency prior to being conveyed to a public drainage system; compliance with a lawfully enacted storm water management ordinance in order to avoid discharging pollutants into waterways; or other approved method. Pursuant to the City's Municipal Code 5.05.035, Requirements For Industrial/Commercial and Construction Activities, the Project would submit a local Storm Water Pollution Prevention Plan and Wet Weather Erosion Control Plan for construction activities consistent with the Municipal NPDES Permit to the City of Culver City Public Works Department. Therefore, development of the proposed Project would not result in any significant effects relating to water quality due to construction activities.

As an urban mixed-use commercial and residential development, operation of the Project would add typical, urban, nonpoint-source pollutants to storm water runoff. These pollutants are permitted by the countywide MS4 permit and would not exceed any receiving water limitations. Therefore, operation of the Project would not violate any water quality standards or waste discharge requirements and would have no related significant impacts.

Conclusion: The proposed Project would not adversely affect underground aquifers, drainage patterns, or surface water quality. Impacts related to water quality would be less than significant.

V. Summary for Criterion (d)

As the Project would result in less than significant impacts with respect to traffic, noise, air quality, and water quality, the Project would meet this criterion.

Criterion (e): The site can be adequately served by all required utilities and public services.

The Project would be located in an existing highly urban area served by existing public utilities and services. A considerable increase in demand for services or utilities would not be anticipated with the implementation of the proposed Project since it is located on an existing urban infill location previously developed with an office building. The City of Culver City Department of Public Works and the Los Angeles Department of Water and Power (LADWP) or Southern California Edison (SCE) would provide electricity, water, solid waste collection and sewer services (LADWP and SCE provide service to portions of the City). SoCal gas provides natural gas services to the City of Culver City and would be expected to serve the Project. Thus, the Project meets this criterion.

Exceptions to Categorical Exemption

State *CEQA Guidelines* Section 15300.2 lists six exceptions to a categorical exemption. As discussed below, none of the exceptions apply to the proposed Project.

Location (State CEQA Guidelines §15300.2(a))

This exception applies to Classes 3, 4, 5, 6, and 11. This exception does not apply to a Class 32 exemption. Therefore, this exception does not apply to the Project. Furthermore, the Project Site is not located in a particularly sensitive environment and is located in a previously developed urban infill location and is surrounded by existing urban uses.

Cumulative Impact (State CEQA Guidelines §15300.2(b))

Under this exception, exemptions for these classes are inapplicable when the cumulative impact of successive projects of the same type in the same place, over time is significant. There is no evidence of a potential significant cumulative impact because successive projects of the same type in the same place have not been approved and are not currently proposed. The related projects in the vicinity of the proposed Project, which include the Ivy Station mixed-use project (under construction and nearing completion, located approximately 450 feet to the north of the Project Site north of the Metro Expo Line), the 8888 Washington Boulevard project (a 4-story mixed-use office and retail/restaurant building located southeast of the proposed Project Site) and the 8777 Washington Boulevard project (mixed-use office and retail/restaurant building located east of the proposed Project Site) would not result in project-level or cumulatively significant impacts as determined in certified environmental documents for each of these projects that were prepared by the City pursuant to CEQA. The proposed Project Traffic Impact Analysis did not identify significant cumulative traffic impacts with regards to the Project and buildout of future developments. The proposed Project would not contribute to significant cumulative noise impacts with regards to the Project and buildout of the related projects. In addition, the proposed Project would not result in significant cumulative air quality or water quality impacts with regards to the Project and buildout of the related projects. As a result, there is no evidence of significant cumulative impacts from successive projects of the same type in the same place, over time. Therefore, this exception does not apply to the Project.

Significant Effect (State CEQA Guidelines §15300.2(c))

This exception applies when there is a reasonable possibility that the activity will have a significant effect on the environment due to unusual circumstances. As described above, the proposed Project would consist of approximately 3,886 SF of ground-floor retail/restaurant space, 5,455 SF of commercial office space on the second floor, and 12 two-bedroom apartment units on floors 3 through 5. Parking would be provided in a one-floor, 19-space subterranean parking garage as well as 6 surface parking spaces. The Project is consistent with the General Plan Land Use Element designation and Zoning Code designation, consistent with applicable General Plan Land Use Element Objectives and Policies for Commercial Corridors, and is similar in size and scale to other developments in the area and is not unusual for the location. The Project is located in a developed urban neighborhood, provides residential and commercial uses with convenient access to nearby high-quality public transit options, and is directly surrounded by urban uses in all directions. Based on available facts and reasonable assumptions based on facts, there are no unusual circumstances for the Project that support a reasonable possibility of a significant effect on the environment. Therefore, this exception does not apply to the Project.

Scenic Highways (State CEQA Guidelines §15300.2(d))

This exception applies to a project which may result in damage to scenic resources, including but not limited to, trees, historic buildings, rock outcroppings, or similar resources, within a highway officially designated as a state scenic highway. Based on a review of the California Scenic Highway Mapping System,[6] the proposed Project Site is not located on or near an officially designated scenic highway. The Project would have no impacts on an officially designated scenic highway. Therefore, this exception does not apply to the Project.

Hazardous Waste Sites (State CEQA Guidelines §15300.2(e))

This exception applies to a project located on a site which is included on any list compiled pursuant to Section 65962.5 of the Government Code. Government Code Section 65962.5 refers specifically to a list of hazardous waste facilities compiled by the Department of Toxic Substances Control (DTSC). The Project Site is not included on the DTSC's hazardous waste facilities list.[7] Thus, the Project Site has not been included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. Therefore, this exception does not apply to the Project.

Historic Resources (State CEQA Guidelines §15300.2(f))

State *CEQA Guidelines* §15300.2 states that a categorical exemption "shall not be used for a project which may cause a substantial adverse change in the significance of a historical resource." A Cultural Resources Assessment Report was prepared by ESA (January 2020). The analysis of historical resources indicated that 3727 Robertson Boulevard (subject property) is not a historically significant building. As such, the subject property does not meet the definition of an historical resource as outlined in CEQA Guidelines Section 15064.5(a)(1) or (2), and the Project would not have a direct impact on historical resources.

In addition, indirect impacts were analyzed to determine if the Project would result in a substantial material change to the integrity of historical resources outside of the Project Site such that the resources significance would be materially impaired, which is the CEQA threshold for determining significant impacts. In other words, would it still be eligible following construction and operation of the project? Would it still be able to convey the historical significance? The indirect impacts study area was defined as the immediate Project vicinity. ESA identified one additional off-site potential historic architectural resources that meet the 45-year age threshold to be considered a historical resource to the east and south of the subject property, a potential historic district of a grouping of 1940s and 1950s commercial/industrial vernacular buildings along South Robertson Boulevard and Hoke Avenue (Los Angeles County Office of the Assessor). Nearly all of the buildings in the historic grouping would have a direct or indirect view

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6 California Department of Transportation, California Scenic Highways. Excel file: *List of eligible and officially designated State Scenic Highways*. Updated: August 2019. http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/. Accessed July 2020.

7 Department of Toxic Substances Control, Hazardous Waste and Substance Site List (CORTESE), http://www.envirostor.dtsc.ca.gov/public/mandated_reports.asp. Accessed July 2020.

of the subject property, which would be developed with a five story mixed-use building. However, the subject property itself does not retain the integrity to be a contributor to the district and its demolition would not cause a significant and unavoidable impact. Furthermore, it is located at the northeast corner of the potential district. Therefore, if a five-story development were to happen there, the overall setting of the potential district would not be adversely impacted. Because the Project would not affect these buildings or their immediate surrounding setting that contributes to their potential eligibility, they will not be directly or indirectly impacted by the Project and were therefore not evaluated for significance by ESA. Until they are formally evaluated, they should be considered as potentially eligible for listing in the National and California Registers. However, as discussed, they are not on the Project Site and they would not be directly impacted by the Project. No additional historical architectural resources were identified that would have indirect or direct views of the Project Site.

ESA's Noise Technical Report (January 2020) fully considers noise and vibration impacts to receptors in the vicinity of the Project Site. As discussed on page 33 of the Noise Technical Report, consistent with the City's General Plan requirements, the Project will incorporate general industry standard best practices to minimize noise and vibration impacts described in PDF-NOI-1, which will be enforceable by the City through standard Conditions of Approval. The Noise Technical Report analyzed and disclosed the maximum noise and vibration impacts to sensitive receptors. Noise and vibration impacts to sensitive receptors, including the buildings in the historic grouping discussed above, would be less than significant.

As such, no indirect impacts are anticipated to historical resources.

The Project Site may be potentially sensitive for subsurface historic-period archaeological resources related to the early domestic development on the Project Site. In addition to potentially uncovering historic period archaeological resources, unearthing buried sites related to prehistoric activities in the project are also possible, as the Project Site is located in proximity to resources important to prehistoric peoples and deeply buried sites nearby. It is not known whether the Project Site itself has historic-period archaeological resources or unearthed buried sites related to prehistoric activities. There is no known previous record of such resources on the Project Site. However, should historic-period features be discovered, they may qualify as historical resources under CEQA. The Project consists of ground disturbance and excavation for construction of the subterranean parking. Therefore, the Project has the potential to unearth, expose, or disturb subsurface archaeological resources, if they are present on the Project Site.

Because of the potential to encounter archaeological resources exists for the proposed project, the recommended standard City conditions described below ensure that potential impacts to buried archaeological resources and human remains would be less than significant. These conditions described below will be enforceable by the City through standard Conditions of Approval.

- Prior to issuance of demolition permit, the Applicant shall retain a qualified Archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards (Qualified Archaeologist) to oversee an archaeological monitor who shall be present during construction excavations such as demolition, clearing/grubbing, grading, trenching, or any other construction excavation activity associated with the project. The frequency of monitoring shall be based on the rate of excavation and grading activities, proximity to known archaeological resources, the materials being excavated (younger alluvium vs. older alluvium), and the depth of excavation, and if found, the abundance and type of archaeological resources encountered, as determined by the Qualified Archaeologist). Full-time field observation can be reduced to part-time inspections or ceased entirely if determined appropriate by the Qualified Archaeologist. Prior to commencement of excavation activities, an Archaeological and Cultural Resources Sensitivity Training shall be given for construction personnel. The training session, shall be carried out by the Qualified Archaeologist and shall focus on how to identify archaeological and cultural resources that may be encountered during earthmoving activities and the procedures to be followed in such an event.

- In the event that historic or prehistoric archaeological resources (e.g., bottles, foundations, refuse dumps, Native American artifacts or features, etc.) are unearthed, ground-disturbing activities shall be halted or diverted away from the vicinity of the find so that the find can be evaluated. An appropriate buffer area shall be established by the Qualified Archaeologist around the find where construction activities shall not be allowed to continue. Work shall be allowed to continue outside of the buffer area. All archaeological resources unearthed by project construction activities shall be evaluated by the Qualified Archaeologist and the Gabrielino Tribe. If the resources are Native American in origin, the Gabrieleno Tribe shall consult with the City and Qualified Archaeologist regarding the treatment and curation of any prehistoric archaeological resources. If a resource is determined by the Qualified Archaeologist to constitute a "historical resource" pursuant to CEQA Guidelines Section 15064.5(a) or a "unique archaeological resource" pursuant to Public Resources Code Section 21083.2(g), the Qualified Archaeologist shall coordinate with the Applicant and the City to develop a formal treatment plan that would serve to reduce impacts to the resources. The treatment plan established for the resources shall be in accordance with CEQA Guidelines Section 15064.5(f) for historical resources and Public Resources Code Sections 21083.2(b) for unique archaeological resources. The treatment plan shall incorporate the Gabrielino Tribe's treatment and curation recommendations. Preservation in place (i.e., avoidance) is the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. The treatment plan shall include measures regarding the curation of the recovered resources that may include curation at a public, non-profit institution with a research interest in the materials, such as the Natural History Museum of Los Angeles County or the Fowler Museum, if such an institution agrees to accept the material and/or the Gabrielino Tribe. If no institution or the Gabrielino Tribe accept the resources, they may be donated to a local school or historical society in the area (such as the Culver City Historical Society) for educational purposes.

- Prior to the release of the grading bond, the Qualified Archaeologist shall prepare a final report and appropriate California Department of Parks and Recreation Site Forms at the conclusion of archaeological monitoring. The report shall include a description of resources unearthed, if any, treatment of the resources, results of the artifact processing, analysis, and research, and evaluation of the resources with respect to the California Register of Historical Resources and CEQA. The report and the Site Forms shall be submitted by the applicant to the City, the South Central Coastal Information Center, and representatives of other appropriate or concerned agencies to signify the satisfactory completion of the project and required mitigation measures.

- If human remains are encountered unexpectedly during implementation of the project, State Health and Safety Code Section 7050.5 requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the Native American Heritage Commission (NAHC). The NAHC shall then identify the person(s) thought to be the Most Likely Descendent (MLD). The MLD may, with the permission of the land owner, or his or her authorized representative, inspect the site of the discovery of the Native American remains and may recommend to the owner or the person responsible for the excavation work means for treating or disposing, with appropriate dignity, the human remains and any associated grave goods. The MLD shall complete their inspection and make their recommendation within 48 hours of being granted access by the land owner to inspect the discovery. The recommendation may include the scientific removal and nondestructive analysis of human remains and items associated with Native American burials. Upon the discovery of the Native American remains, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred, as prescribed in this mitigation measure, with the MLD regarding their recommendations, if applicable, taking into account the possibility of multiple human remains. The landowner shall discuss and confer with the descendants all reasonable options regarding the descendants' preferences for treatment.
- If the NAHC is unable to identify a MLD, or the MLD identified fails to make a recommendation, or the landowner rejects the recommendation of the MLD and the mediation provided for in Subdivision (k) of Section 5097.94, if invoked, fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall inter the human remains and items associated with Native American human remains with appropriate dignity on the facility property in a location not subject to further and future subsurface disturbance.

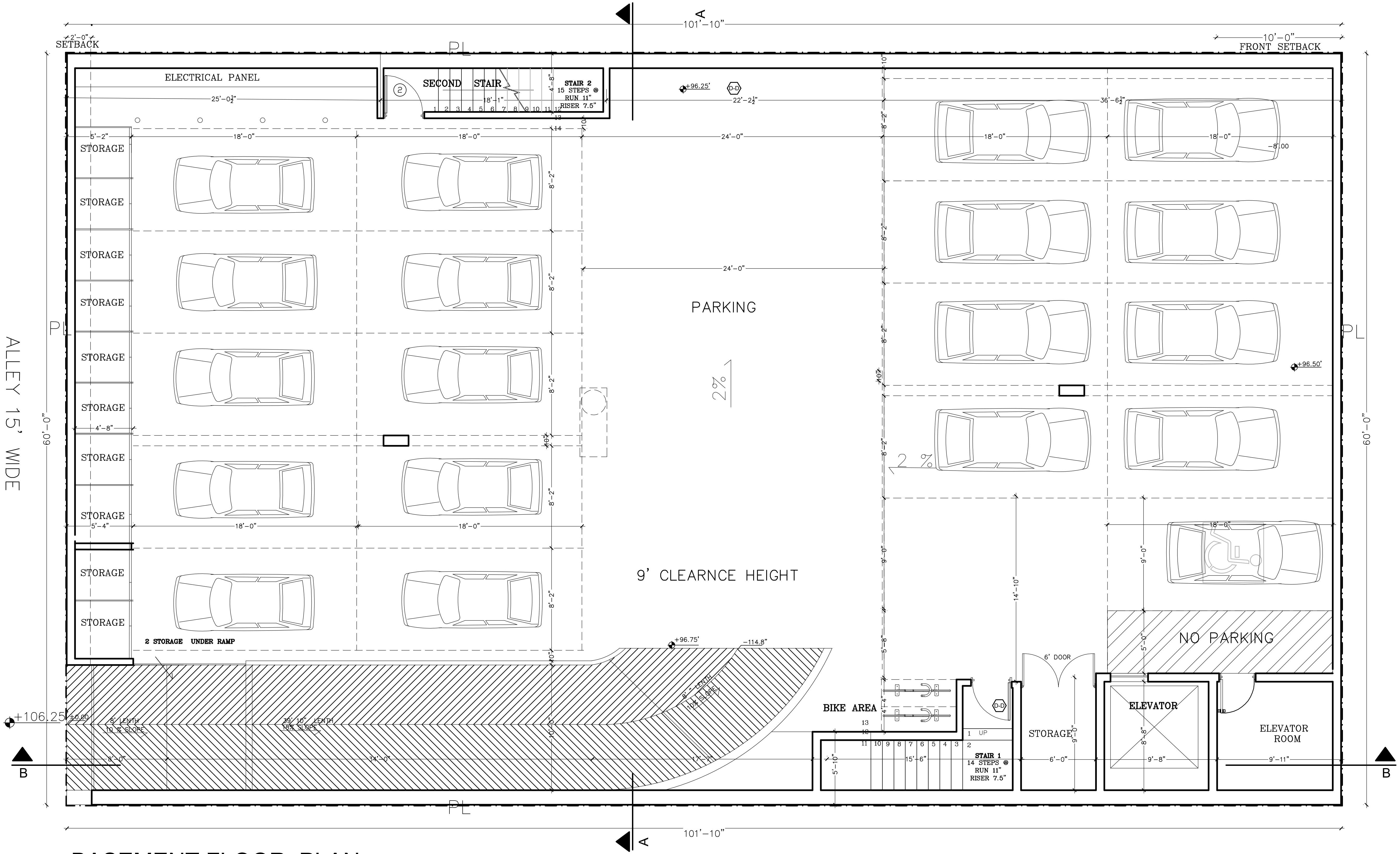
Implementation and adherence to the above City-enforced Conditions of Approval would ensure that potential impacts to buried archaeological resources and human remains would be less than significant. For additional details, refer to the Cultural Resources Assessment Report provided in **Attachment E** of this report.

5.0 Summary

A project qualifies for a Class 32 CE if it is developed on an infill site and meets the conditions described in this report. The five (5) conditions which the project must meet in order to qualify for the Class 32 CE are as follows: (a) The project is consistent with the applicable general plan designation and all applicable general plan policies as well as with the applicable zoning designation and regulations; (b) The proposed development occurs within city limits on a project site of no more than five acres substantially surrounded by urban uses; (c) The project site has no value as habitat for endangered, rare or threatened species; (d) Approval of the project would not result in any significant effects relating to traffic, noise, air quality, or water quality; and (e) The site can be adequately served by all required utilities and public services.

In accordance with the City's Traffic Impact Analysis Guidelines, the Air Quality and Noise Technical and the Cultural Resources Assessment Reports prepared by ESA, as well as the consistency analysis with respect to the criteria specified in the State *CEQA Guidelines* §15332, the proposed Robertson Boulevard Mixed-Use Project meets the criteria for a Class 32 CE. The Project Site will be adequately served by required utilities. Furthermore, none of the exceptions to a CE listed in the State *CEQA Guidelines* §15300.2 apply to the Project. Therefore, it can be found that the project meets the qualifications of the Class 32 CE.

Attachment A
Proposed Project Site Plan



BASEMENT FLOOR PLAN

SCALE: 1/8"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

NORTH

ALT 2

20% RAMP SLOPE

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

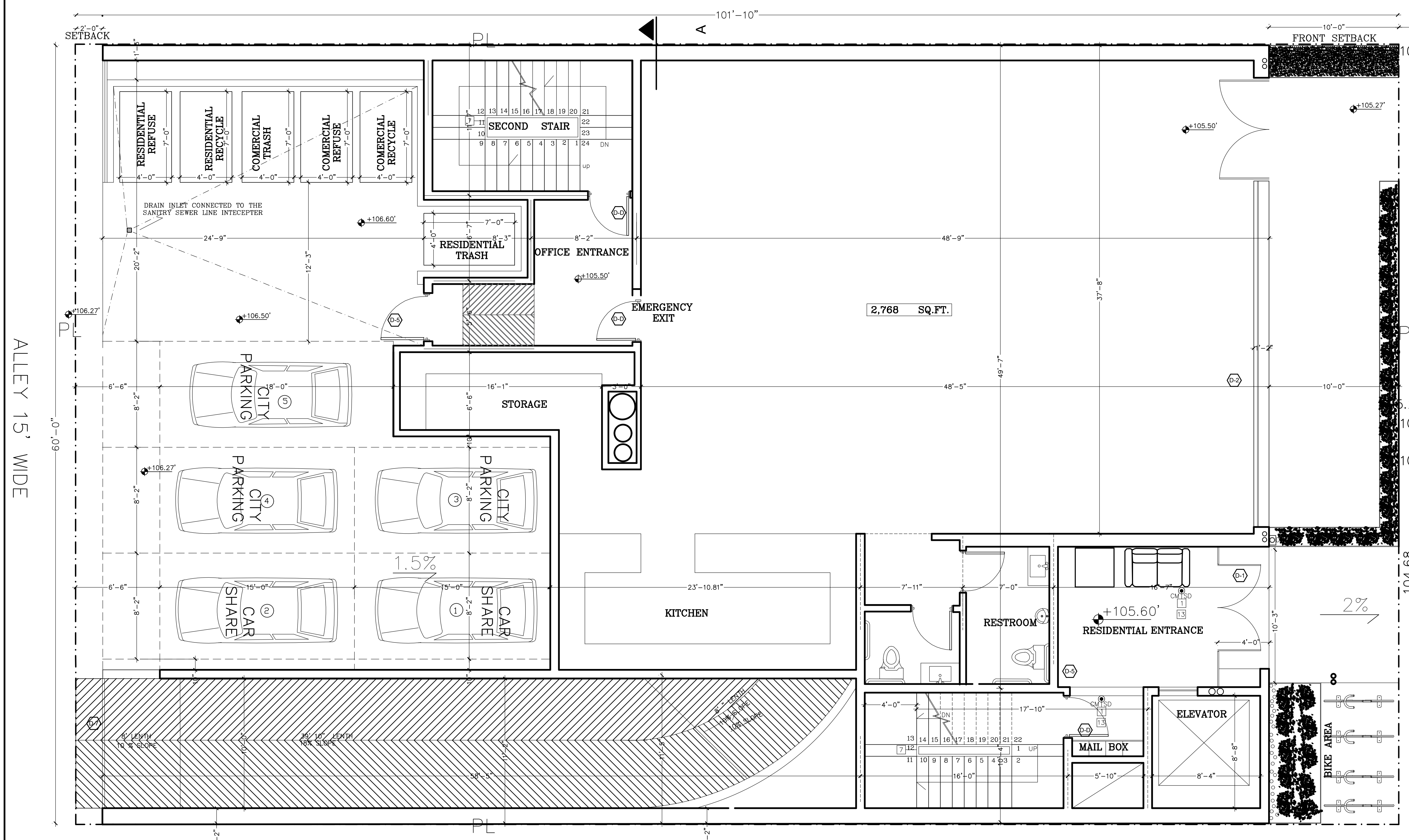
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: BASEMENT FLOOR

SHEET NUMBER: A 2

08/08/2019



FIRST FLOOR PLAN

SCALE BAR1/8 FT SCALE: 1/8"=1'-0"

NORTH

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS: 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

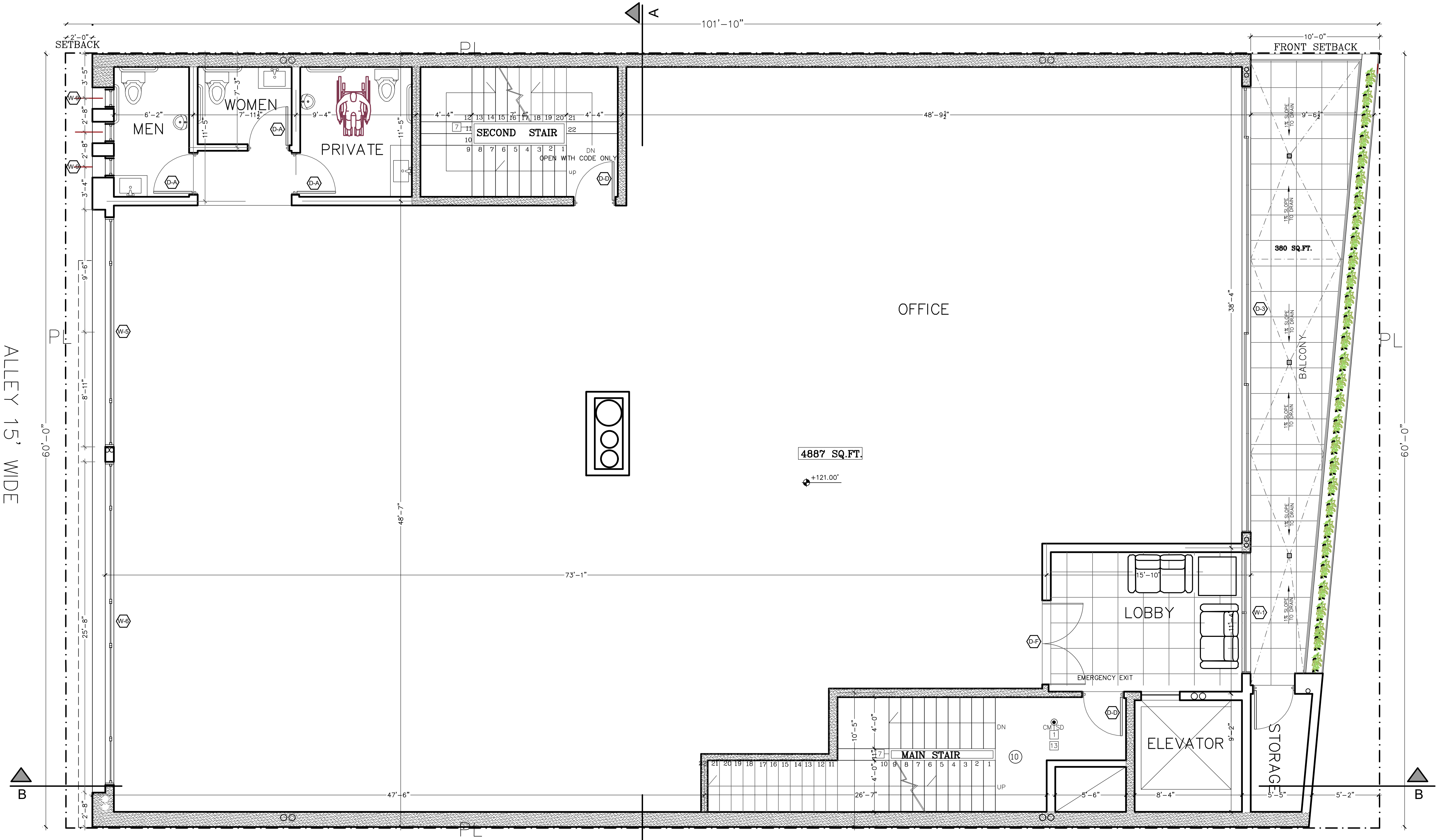
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: FIRST FLOOR

SHEET NUMBER: A3

~~08/13/2019~~



SECOND FLOOR PLAN

SCALE BAR1/8 FT

SCALE: 1/8"=1'-0"

4887 SQ.FT.

3727 ROBERTSON
CULVER CITY CA 90232

NORTH

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER: 4206033057
TRACT: 3872
BLOCK: NONE
LOT: 42 & 43
ZONING: IG

PLAN KEY NOTES:

DENOTES ONE-HR FIRE PROTECTION WALL AND CEILLING (5/8" TYPE "X" GYP. BOARD ON THE SIDE OF GARAGE OR UNDER THE STAIR)

RECESSED HALOGEN DOWNLIGHT

DOOR MUST OPEN OVER A LANDING NOT MORE THAN 1.5" BELOW THE THRESHOLD. EXCEPTION : THE DOOR DOES NOT SWING OVER THE LANDING SHALL BE NOT THAN MORE 7.75" BELOW THE THRESHOLD.

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

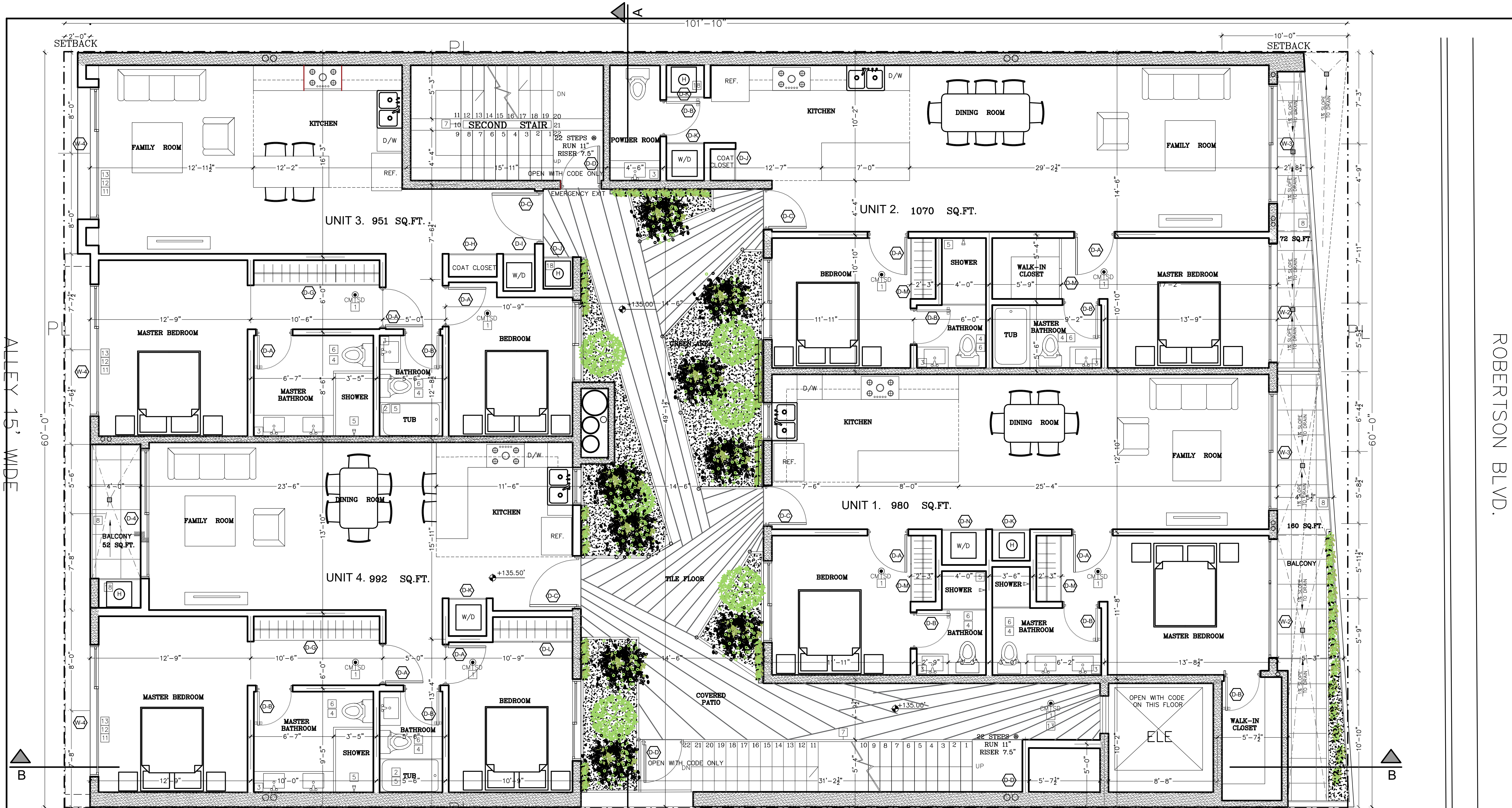
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: SECOND FLOOR

SHEET NUMBER: A 4

08/13/2019



PLAN KEY NOTES:

DENOTES ONE-HR FIRE PROTECTION WALL AND CEILLING (5/8" TYPE "X" GYP. BOARD ON THE SIDE OF GARAGE OR UNDER THE STAIR)

RECESSED HALOGEN DOWNLIGHT

DOOR MUST OPEN OVER A LANDING NOT MORE THAN 1.5" BELOW THE THRESHOLD. EXCEPTION : THE DOOR DOES NOT SWING OVER THE LANDING SHALL BE NOT THAN MORE 7.75" BELOW THE THRESHOLD.

WALL OUTLET W/SENSOR

1 — HARDWIRED SMOKE DETECTORS WITH BATTERY BACKUP

2 — 14"X14" ACCESS PANEL FOR ALL BATH TUBS

3 — MEDICINE CABINET

4 — PROVIDE EXHAUST FAN WITH MINIMUM 5 AIR EXCHANGES PER HOUR AND AS PER GREEN BUILDING REQUIREMENT REFER TO NOTE #25/H&I DWG. G-B FOR BATHROOMS CONTAINING BATHTUBS,SHOWER ,OR TUB/SHOWER COMBINATIONS . IT SHALL BE ENERGY STAR

5 — PROVIDE 70 INCH HIGH NON-ABSORBENT WALL ADJACENT TO SHOWER AND APPROVED-RESISTANT MATERIALS FOR SHOWER ENCLOSURE. 91.807.1.3, 91.2406.4(5), 91.1115B.9.6,7,8

6 — PROVIDE ULTRA FLUSH WATER CLOSETS FOR ALL NEW CONSTRUCTION. EXISTING SHOWER HEADS AND TOILETS MUST BE ADAPTED FOR LOW WATER CONSUMPTION.

8 — HANDRAIL @ 36" ABOVE TREAD NOSING WITH LESS THAN 4" CLEAR SPACING BETWEEN INTERMEDIATE RAILS GUARDRAIL @ 42" HIGH ABOVE THE ADJACENT FINISH FLOOR WITH LESS THAN 4" CLEAR SPACING BETWEEN INTERMEDIATE RAILS

9 — DEX-OTEX DECK COATING LARR # 02306

10 — ONE-HR FIRE RESISTIVE WALL, CEILING, POSTS AND BEAM ON THE SIDE OF GARAGE OR ENCLOSED USEABLE SPACE UNDER INTERIOR STAIRS (5/8" TYPE "X" GYPSUM BOARD)

11 — EMERGENCY EGRESS TYPICAL TO ALL SLEEPING ROOMS MIN.24" CLEAR HT, 20" CLEAR WIDTH , 5.7 SQ.FT. MIN AREA (5.0 SQ. FT. AT GRADE) &42"MIN. -44" MAX. TO SILL

12 — FLOOR TRANSITION STRIP

13 — DOOR MUST OPEN OVER A LANDING NOT MORE THAN 0.5" BELOW THE THRESHOLD. EXCEPTION : THE DOOR DOES NOT SWING OVER THE LANDING SHALL BE NOT THAN MORE 7.75" BELOW THE THRESHOLD.

14 — CARBON MONOXIDE DETECTORS

15 — GAS FIREPLACE - HEAT & GLO, SL-550TR-IPI-E, DIRECT VENT W/SEAL COMBUSTION GAS FIREPLACE REFER TO SPEC #5 DWG A-10b "WOOD BURNING FIREPLACES ARE PROHIBITED PER AQMD RULE 445 (4.503.1, AQMD RULE 445) FOR MORE DETAIL CHECK A-13

FOR FUTURE INSTALLATION OF ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) IN ONE AND TWO FAMILY DWELLINGS AND TOWNHOUSES:

a. MIN. 1" (INSIDE DIAMETER) LISTED RACEWAY IS INSTALLED TO ACCOMMODATE A DEDICATED 208/240 VOLT BRANCH CIRCUIT. THE RACEWAY SHALL ORIGINATE AT THE MAIN SERVICE OR A SUBPANEL AND TERMINATE IN CLOSE PROXIMITY TO THE PROPOSED LOCATION OF THE CHARGING SYSTEM INTO A LISTED CABINET, BOX OR ENCLOSURE.
b. SUFFICIENT CONDUCTOR SIZING AND SERVICE CAPACITY TO INSTALL LEVEL 2 EVSE SHALL BE PROVIDED.
c. A LABEL STATING 'EV CAPABLE' SHALL BE POSTED IN A CONSPICUOUS PLACE AT THE SERVICE PANEL OR SUBPANEL AND NEXT TO THE RACEWAY TERMINATION POINT.

17 — AUTOMATIC IRRIGATION SYSTEM CONTROLLER . MANUFACTURER'S SPECIFICATIONS. (RD-900-EXT- RAIN DIAL SERVICES 9 STATIONS CONTROLLER).

18 — WATER HEATER MUST BE STRAPPED TO THE WALL

19 — DOORS BETWEEN GARAGE AND THE DWELLING UNIT SHALL BE SELF-CLOSING AND SELF-LATCHING, SOLID WOOD OR SOLID OR HONEYCOMB CORE STEEL NOT LESS THAN 1⅜ INCHES THICK, OR HAVE A MINIMUM FIRE PROTECTION RATING OF 20 MINUTES (406.1.4)

20 — TYPE OF CONSTRUCTIONS 1-B

21 — ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH TAPE,PLASTIC,OR SHEET METAL UNTIL THE FINAL STARTUP OF THE HEATING,COOLING AND VENTILATING EQUIPMENT.

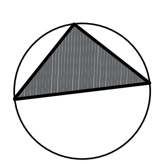
THIRD FLOOR PLAN

SCALE BAR1/8 FT

SCALE: 1/8"=1'-0"

4307 SQ.FT.

3727 ROBERTSON
CULVER CITY CA 90232



NORTH

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

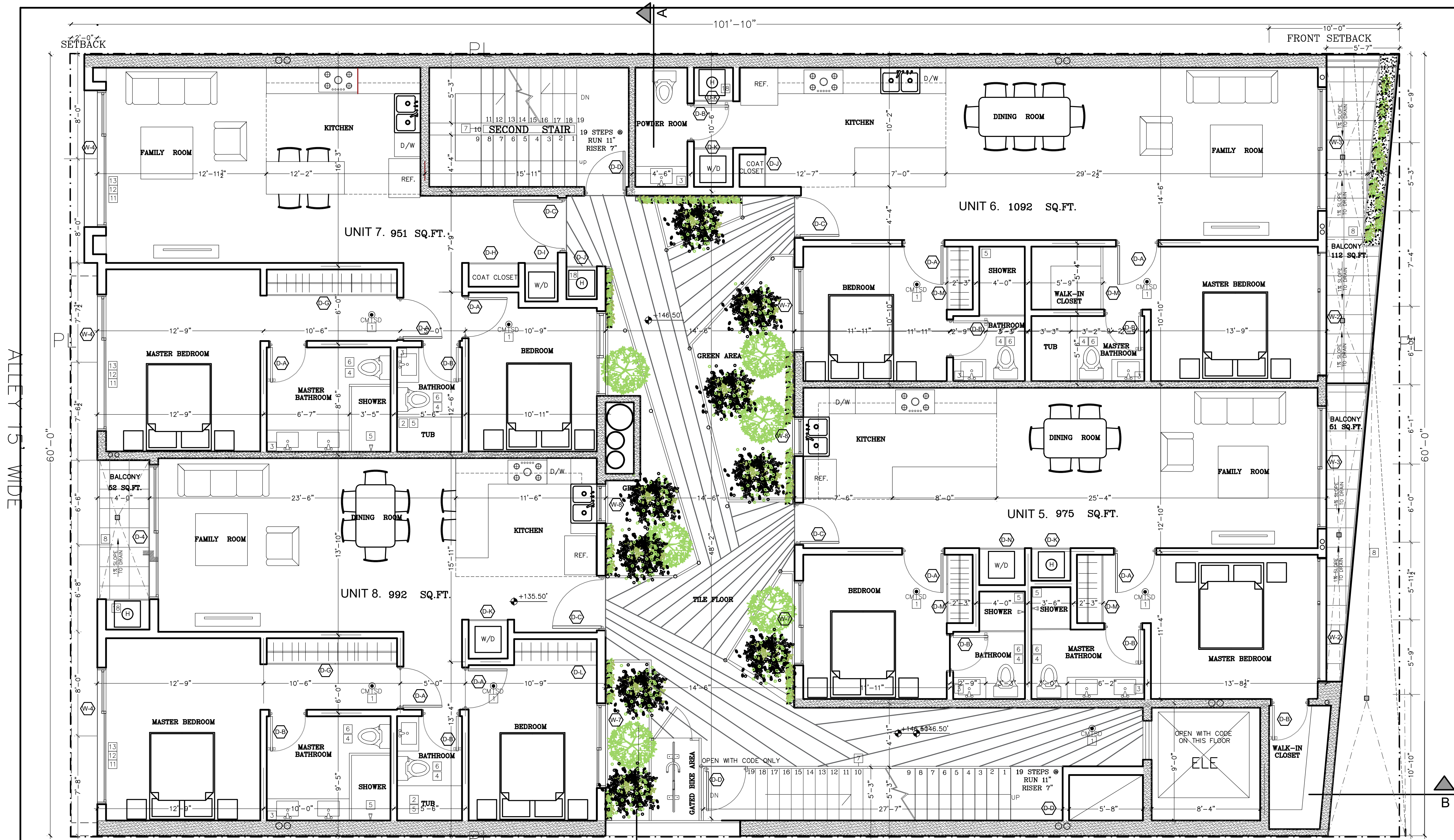
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: THIRD FLOOR

SHEET NUMBER: A 5

~~08/13/2019~~



FORTH FLOOR PLAN

SCALE: 1/4"=1'-0"

4307 SQ.FT.

3727 ROBERTSON
CULVER CITY CA 90232

NORTH

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER: 4206033057
TRACT: 3872
BLOCK: NONE
LOT: 42 & 43
ZONING: IG

PLAN KEY NOTES:

DENOTES ONE-HR FIRE PROTECTION WALL AND CEILLING (5/8" TYPE "X" GYP. BOARD ON THE SIDE OF GARAGE OR UNDER THE STAIR)

RECESSED HALOGEN DOWNLIGHT

DOOR MUST OPEN OVER A LANDING NOT MORE THAN 1.5" BELOW THE THRESHOLD. EXCEPTION : THE DOOR DOES NOT SWING OVER THE LANDING SHALL BE NOT THAN MORE 7.75" BELOW THE THRESHOLD.

WALL OUTLET W/SENSOR

1 HARDWIRED SMOKE DETECTORS WITH BATTERY BACKUP

2 14"X14" ACCESS PANEL FOR ALL BATH TUBS

3 MEDICINE CABINET

4 PROVIDE EXHAUST FAN WITH MINIMUM 5 AIR EXCHANGES PER HOUR AND AS PER GREEN BUILDING REQUIREMENT REFER TO NOTE #25/H&I DWG. G-B FOR BATHROOMS CONTAINING BATHTUBS,SHOWER ,OR TUB/SHOWER COMBINATIONS . IT SHALL BE ENERGY STAR

5 PROVIDE 70 INCH HIGH NON-ABSORBENT WALL ADJACENT TO SHOWER AND APPROVED-RESISTANT MATERIALS FOR SHOWER ENCLOSURE. 91.807.1.3, 91.2406.4(5), 91.1115B.9.6,7,8

6 PROVIDE ULTRA FLUSH WATER CLOSETS FOR ALL NEW CONSTRUCTION. EXISTING SHOWER HEADS AND TOILETS MUST BE ADAPTED FOR LOW WATER CONSUMPTION.

8 HANDRAIL @ 36" ABOVE TREAD NOSING WITH LESS THAN 4" CLEAR SPACING BETWEEN INTERMEDIATE RAILS GUARDRAIL @ 42" HIGH ABOVE THE ADJACENT FINISH FLOOR WITH LESS THAN 4" CLEAR SPACING BETWEEN INTERMEDIATE RAILS

9 DEX-OTEX DECK COATING LARR # 02306

10 ONE-HR FIRE RESISTIVE WALL, CEILING, POSTS AND BEAM ON THE SIDE OF GARAGE OR ENCLOSED USEABLE SPACE UNDER INTERIOR STAIRS (5/8" TYPE "X" GYPSUM BOARD)

11 EMERGENCY EGRESS TYPICAL TO ALL SLEEPING ROOMS MIN.24" CLEAR HT, 20" CLEAR WIDTH , 5.7 SQ.FT. MIN AREA (5.0 SQ. FT. AT GRADE) &42"MIN. -44" MAX. TO SILL

12 FLOOR TRANSITION STRIP

13 DOOR MUST OPEN OVER A LANDING NOT MORE THAN 0.5" BELOW THE THRESHOLD. EXCEPTION : THE DOOR DOES NOT SWING OVER THE LANDING SHALL BE NOT THAN MORE 7.75" BELOW THE THRESHOLD.

14 CARBON MONOXIDE DETECTORS

15 GAS FIREPLACE - HEAT & GLO, SL-550TR-IPI-E, DIRECT VENT W/SEAL COMBUSTION GAS FIREPLACE REFER TO SPEC #5 DWG A-10b "WOOD BURNING FIREPLACES ARE PROHIBITED PER AQMD RULE 445 (4.503.1, AQMD RULE 445) FOR MORE DETAIL CHECK A-13

FOR FUTURE INSTALLATION OF ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) IN ONE AND TWO FAMILY DWELLINGS AND TOWNHOUSES:

a. MIN. 1" (INSIDE DIAMETER) LISTED RACEWAY IS INSTALLED TO ACCOMMODATE A DEDICATED 208/240 VOLT BRANCH CIRCUIT. THE RACEWAY SHALL ORIGINATE AT THE MAIN SERVICE OR A SUBPANEL AND TERMINATE IN CLOSE PROXIMITY TO THE PROPOSED LOCATION OF THE CHARGING SYSTEM INTO A LISTED CABINET, BOX OR ENCLOSURE.
b. SUFFICIENT CONDUCTOR SIZING AND SERVICE CAPACITY TO INSTALL LEVEL 2 EVSE SHALL BE PROVIDED.
c. A LABEL STATING 'EV CAPABLE' SHALL BE POSTED IN A CONSPICUOUS PLACE AT THE SERVICE PANEL OR SUBPANEL AND NEXT TO THE RACEWAY TERMINATION POINT.

17 AUTOMATIC IRRIGATION SYSTEM CONTROLLER . MANUFACTURER'S SPECIFICATIONS. (RD-900-EXT- RAIN DIAL SERVICES 9 STATIONS CONTROLLER).

18 WATER HEATER MUST BE STRAPPED TO THE WALL

19 DOORS BETWEEN GARAGE AND THE DWELLING UNIT SHALL BE SELF-CLOSING AND SELF-LATCHING, SOLID WOOD OR SOLID OR HONEYCOMB CORE STEEL NOT LESS THAN 1⅜ INCHES THICK, OR HAVE A MINIMUM FIRE PROTECTION RATING OF 20 MINUTES (406.1.4)

20 TYPE OF CONSTRUCTIONS 1-B

21 ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH TAPE,PLASTIC,OR SHEET METAL UNTIL THE FINAL STARTUP OF THE HEATING,COOLING AND VENTILATING EQUIPMENT.

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

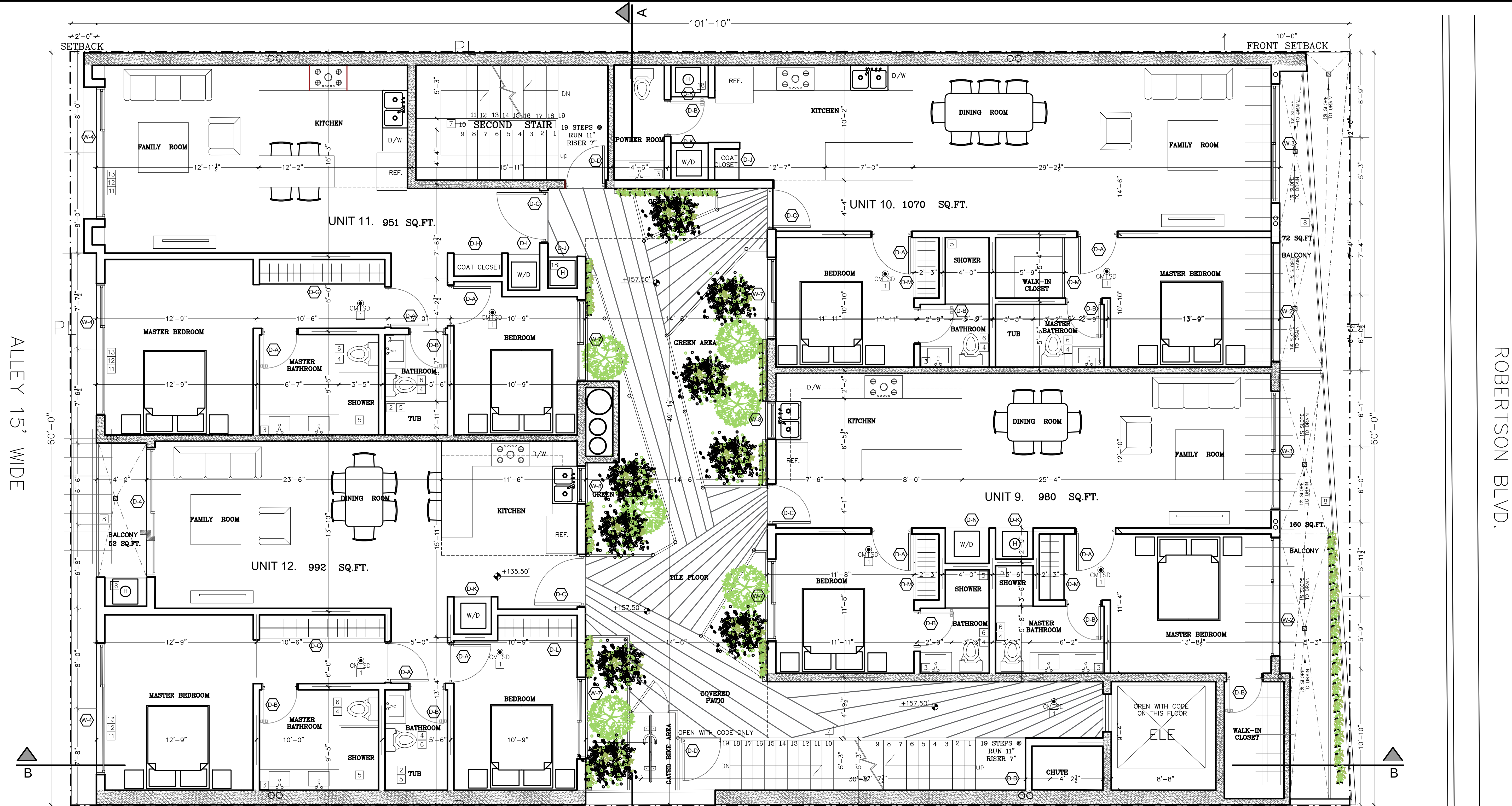
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: FORTH FLOOR

SHEET NUMBER: A 6

08/13/2019



FIFTH FLOOR PLAN

SCALE: 1/4"=1'-0"

SCALE BAR1/8

4307 SQ.FT.

3727 ROBERTSON
CULVER CITY CA 90232

NORTH

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

PLAN KEY NOTES:

DENOTES ONE-HR FIRE PROTECTION WALL AND CEILLING (5/8" TYPE "X" GYP. BOARD ON THE SIDE OF GARAGE OR UNDER THE STAIR)

RECESSED HALOGEN DOWNLIGHT

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6 PROVIDE ULTRA FLUSH WATER CLOSETS FOR ALL NEW CONSTRUCTION. EXISTING SHOWER HEADS AND TOILETS MUST BE ADAPTED FOR LOW WATER CONSUMPTION.

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9 DEX-OTEX DECK COATING LARR # 02306

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20 TYPE OF CONSTRUCTIONS 1-B

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REVISIONS
7

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

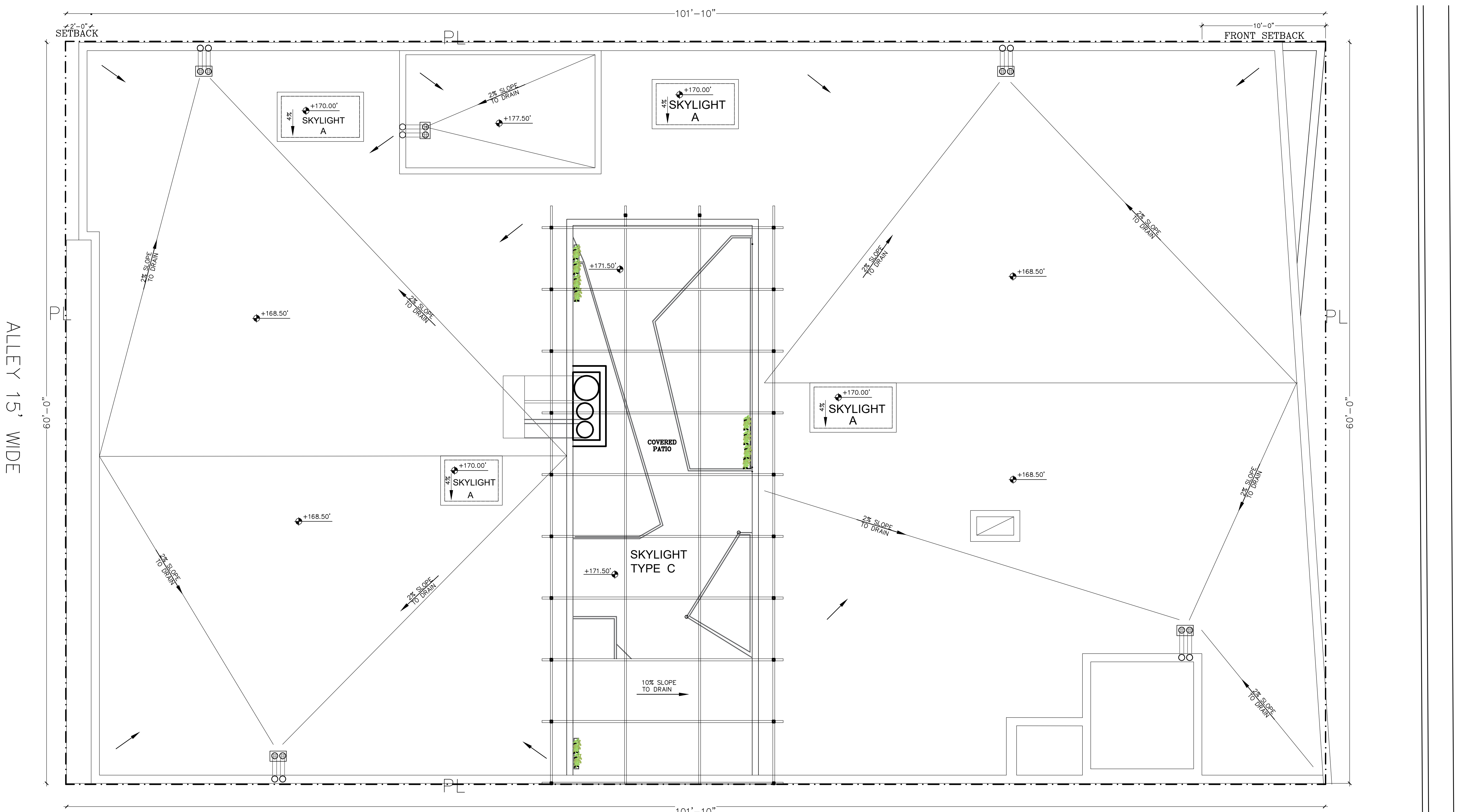
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: FIFTH FLOOR

SHEET NUMBER: A 7

08/13/2019



ROOF FLOOR PLAN

SCALE: 1/4"=1'-0"

SCALE BAR1/8

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

GENERAL NOTES:

A. THE CONSTRUCTION SHALL NOT RESTRICT A FIVE-FOOT CLEAR AND UNOBSTRUCTED ACCESS TO ANY WATER OR POWER DISTRIBUTION FACILITIES (POWER POLES, PULL-BOXES, TRANSFORMERS, VAULTS, PUMPS, VALVES, METERS, APPURTENANCES, ETC.) OR TO THE LOCATION OF THE HOOK-UP. THE CONSTRUCTION SHALL NOT BE WITHIN TEN FEET OF ANY POWER LINES-WHETHER OR NOT THE LINES ARE LOCATED ON THE PROPERTY. FAILURE TO COMPLY MAY CAUSE CONSTRUCTION DELAYS AND/OR ADDITIONAL EXPENSES.
B. AN APPROVED SEISMIC GAS SHUTOFF VALVE WILL BE INSTALLED ON THE FUEL GAS LINE ON THE DOWN STREAM SIDE OF THE UTILITY METER AND BE RIGIDLY CONNECTED TO THE EXTERIOR OF THE BUILDING OR STRUCTURE CONTAINING THE FUEL GAS PIPING."(PER ORDINANCE 170,158) (INCLUDES COMMERCIAL ADDITIONS AND TI WORK OVER $10,000.) SEPARATE PLUMBING PERMIT IS REQUIRED.
C. PLUMBING FIXTURES ARE REQUIRED TO BE CONNECTED TO A SANITARY SEWER OR TO AN APPROVED SEWAGE DISPOSAL SYSTEM (R306.3).
D. PROVIDE 70 INCH HIGH NON-ABSORBENT WALL ADJACENT TO SHOWER AND APPROVED SHATTER-RESISTANT MATERIALS FOR SHOWER ENCLOSURE."(1115B.2 AND 2406.3(5)
E. KITCHEN SINKS, LAVATORIES, BATHTUBS, SHOWERS,BIDETS, LANDRY TUBS AND WASHING MACHINE OUT LETS SHALL BE PROVIED WITH HOT AND COLD WATER AND CONNECTED TO AN APPROVED WATER SUPPLY (R306.4) .
F. WATER HEATER MUST BE STRAPPED TO WALL (SEC. 507.3, UPC)
G. BATHTUB AND SHOWER FLOOR, WALL ABOVE BATHTUBS WITH A SHOWERHEAD, AND SHOWER COMPARTMENT SHALL BE FINISHED WITH A NONABSORBENT SURFACE . SUCH WALL SURFACES SHALL EXTEND TO A HEIGHT OF NOT LESS THAN 6 FEET ABOVE THE FLOOR (R307.2)
H. DUCTS PENETRATING THE WALL OR CEILINGS SEPARATING THE DWELLING FROM THE GARAGE SHALL BE CONSTRUCTED OF A MINIMUM NO. 26 GAGE SHEET STEEL OR OTHER APPROVED MATERIAL AND THERE SHALL BE NO OPENINGS FROM THE DUCTS INTO THE GARAGE (R302.5.2).
I . OTHER PENETRATIONS OF GARAGE/DWELLING AND WALLS ARE TO BE PROTECTED AS REQUIRED BY SECTION R302.11,ITEM 4 9r309.1).
J. GARAGE FLOOR SURFACES SHALL BE OF AN APPROVED NONCOMBUSTIBLE MATERIAL, AND THE AREA USED TO PARK VEHICLES SHALL BE SLOPED TO A DRAIN OR TOWARD THE MAIN VEHICLE ENTRY (R309.1) .
K. AUTOMATIC GARAGE DOOR OPENERS, IF PROVIDED, SHALL BE LISTED IN ACCORDANCE WITH UL 325 .
L. VEHICULAR ACCESS DOORS SHALL COMPLY WITH SECTION R612.7 .
M. BUILDINGS SHALL HAVE APPROVED ADDRESS NUMBERS, BUILDING NUMBERS OR APPROVED BUILDING IDENTIFICATION PLACED IN APOSITION THAT IS PLAINLY LEGIBLE AND VISIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY . (R319) .
N. PROTECTION OF WOOD AND WOOD BASED PRODUCTS FROM DECAY SHALL BE PROVIDED IN THE LOCATIONS SPECIFIED PER SECTION R317 BY THE USE OF NATURALLY DURABLE WOOD OR WOOD THAT IS PRESERVATIVE-TREATED IN ACCORDANCE WITH AWPA UI FOR THE SPECIES, PRODUCT, PRESERVATIVE AND END USE . PRESERVATIVES SHALL BE LISTED IN SECTION 4 OF AWPA U1 .
O. I. A COPY OF THE EVALUATION REPORT AND/OR CONDITIONS OF LISTING SHALL BE MADE AVAILABLE AT THE JOB SITE
P. ANTI GRAFFITI FINISH MAINTENANCE OF BUILDING AFFIDAVIT IS RECORDED BY THE OWNER TO COVENANT AND AGREE W/THE CITY OF L.A. TO REMOVE ANY GRAFFITI W/IN 7-DAYS OF GRAFFITI BEING APPLIED (SEE SHEET A8-b) .
r. ALL WINDOWS TO BE TEMPERED GLAZING WHEN LOCATED IN VHFHSZ.
s. PROVIDE ULTRA-LOW FLUSH WATER CLOSETS FOR ALL NEW CONSTRUCTION, EXISTING SHOWER HEADS AND TOILETS MUST BE ADAPTED FOR LOW WATER CONSUMPTION .
t. A COPY OF THE EVALUTION REPORT AND/OR CONDITION OF LISITING SHALL BE MADE AVAILABLE AT THE JOB SITE .

SKYLIGHT
TYPE A

SKYLIGHT
TYPE B

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS :
3727 ROBERTSON ST.
CULVER CITY
CA 90232

PROJECT TITLE:
3727 ROBERTSON

DATE:
04/27/2016

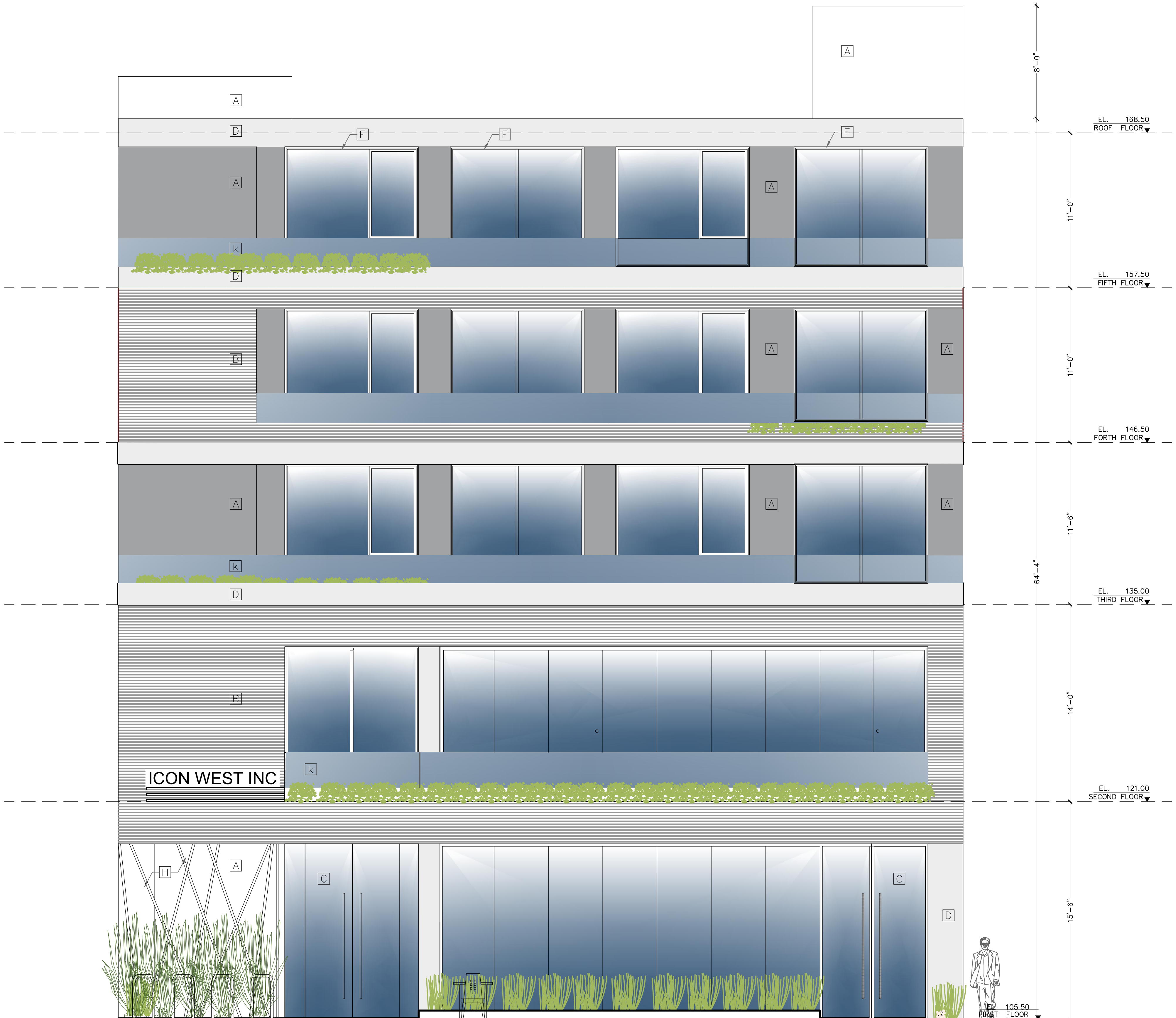
JOB NUMBER:

DRAWING PHASE:
P/CSUBMITTAL

SHEET TITLE:
ROOF FLOOR

SHEET NUMBER:
A
8

08/13/2019



WEST ELEVATION

SCALE: 1/4"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

ELEVATION KEY NOTES:

- A — STUCCO FINISH FIREPLACE
- B — CORRUGATED METAL
- C — GLASS DOOR
- D — ALUMINUM COMPOSITE TILE
- F — ANODIZED ALUMINUM WINDOW
- G — PLEXIGLASS ROOF PANELS
- H — STAINLESS STEEL PIPE
- L — EMERGENCY EGRESS TYPICAL TO ALL SLEEPING ROOMS MIN.24" CLEAR HT, 20" CLEAR WIDTH , 5.7 SQ.FT. MIN AREA (5.0 SQ. FT. AT GRADE) &42"MIN. -44" MAX. TO SILL
- I — METAL RAILING
- K — GLASS GUARDRAIL

PROVIDE ANTI-GRAFFITI FINISH within THE FIRST 9', MEASURED FROM GRADE, AT EXTERIOR WALLS and DOORS PER SECTION 6306

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

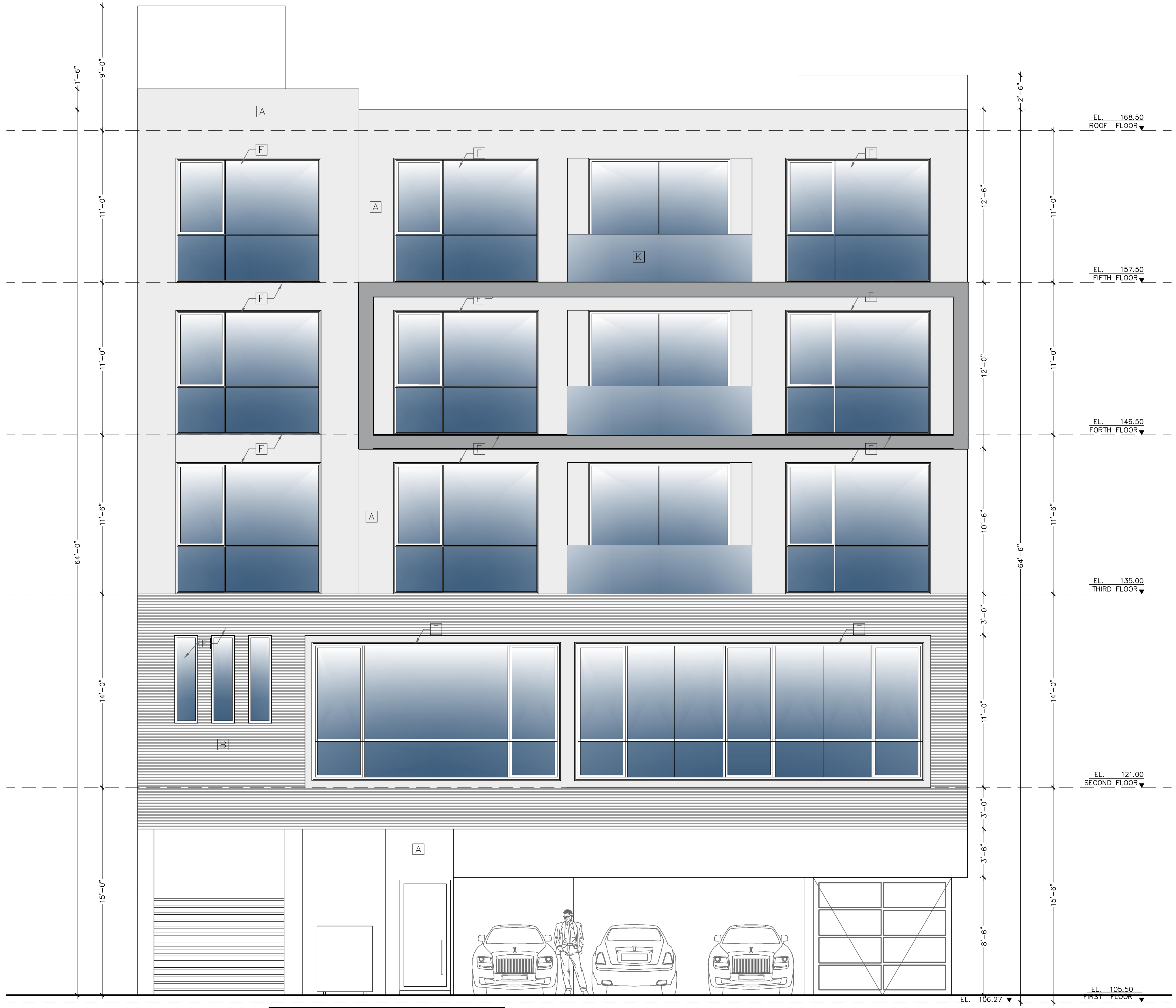
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: EAST ELEVATION

SHEET NUMBER: A 9

08/13/2019



WEST ELEVATION

SCALE BAR1/8 FT SCALE: 1/4"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
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architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS :
3727 ROBERTSON ST.
CULVER CITY
CA 90232

PROJECT TITLE:
3727 ROBERTSON

DATE:
04/27/2016

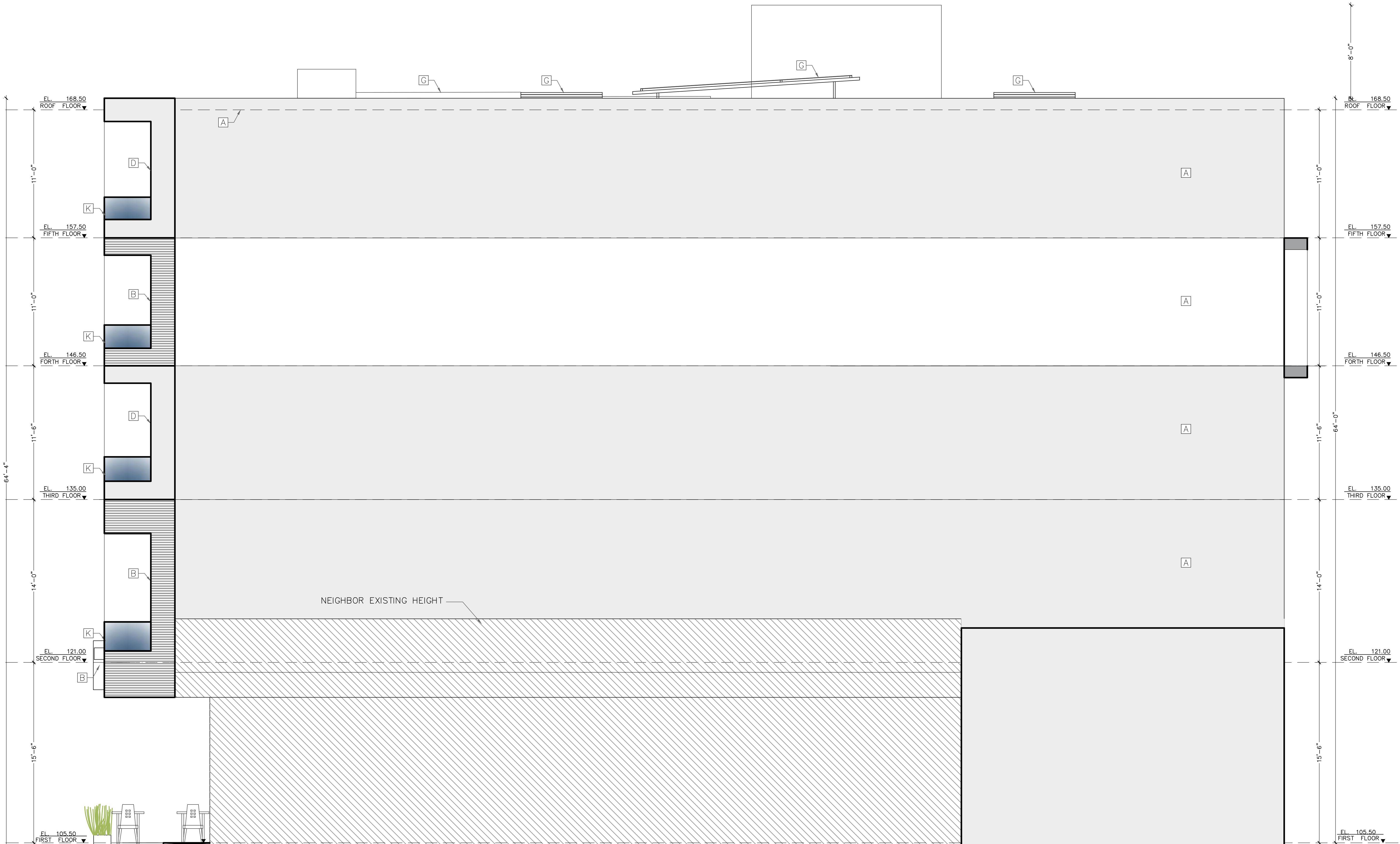
JOB NUMBER:

DRAWING PHASE:
P/CSUBMITTAL

SHEET TITLE:
EAST ELEVATION

SHEET NUMBER:
A
10

08/13/2019



NORTH ELEVATION

SCALE: 1/4"=1'-0"

SCALE BAR1/8

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

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architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

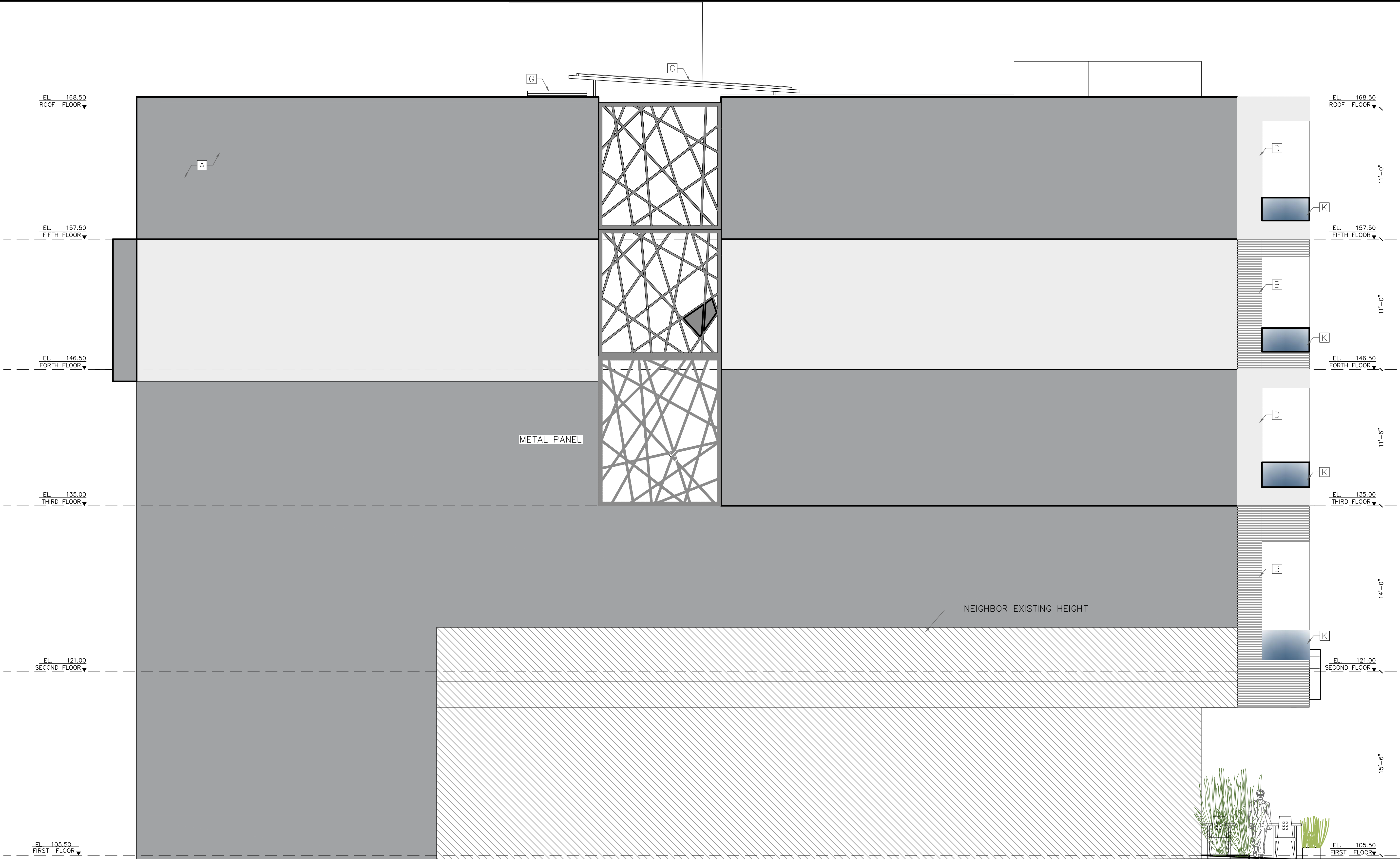
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: WEST ELEVATION

SHEET NUMBER: A 11

08/13/2019



SOUTH ELEVATION

SCALE BAR1/8 FT

SCALE: 1/4"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
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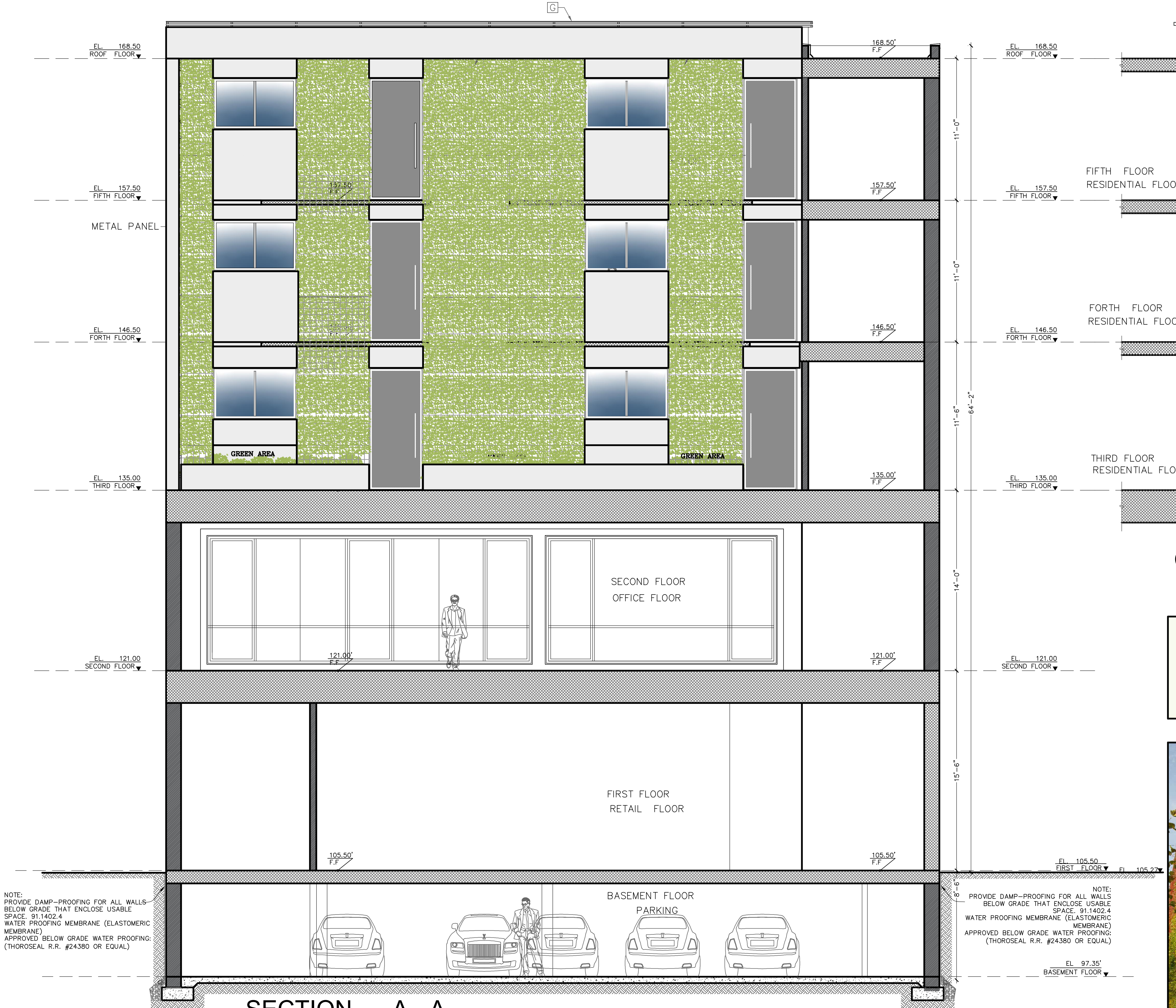
P/CSUBMITTAL

SHEET TITLE:
WEST ELEVATION

SHEET NUMBER:
A
12

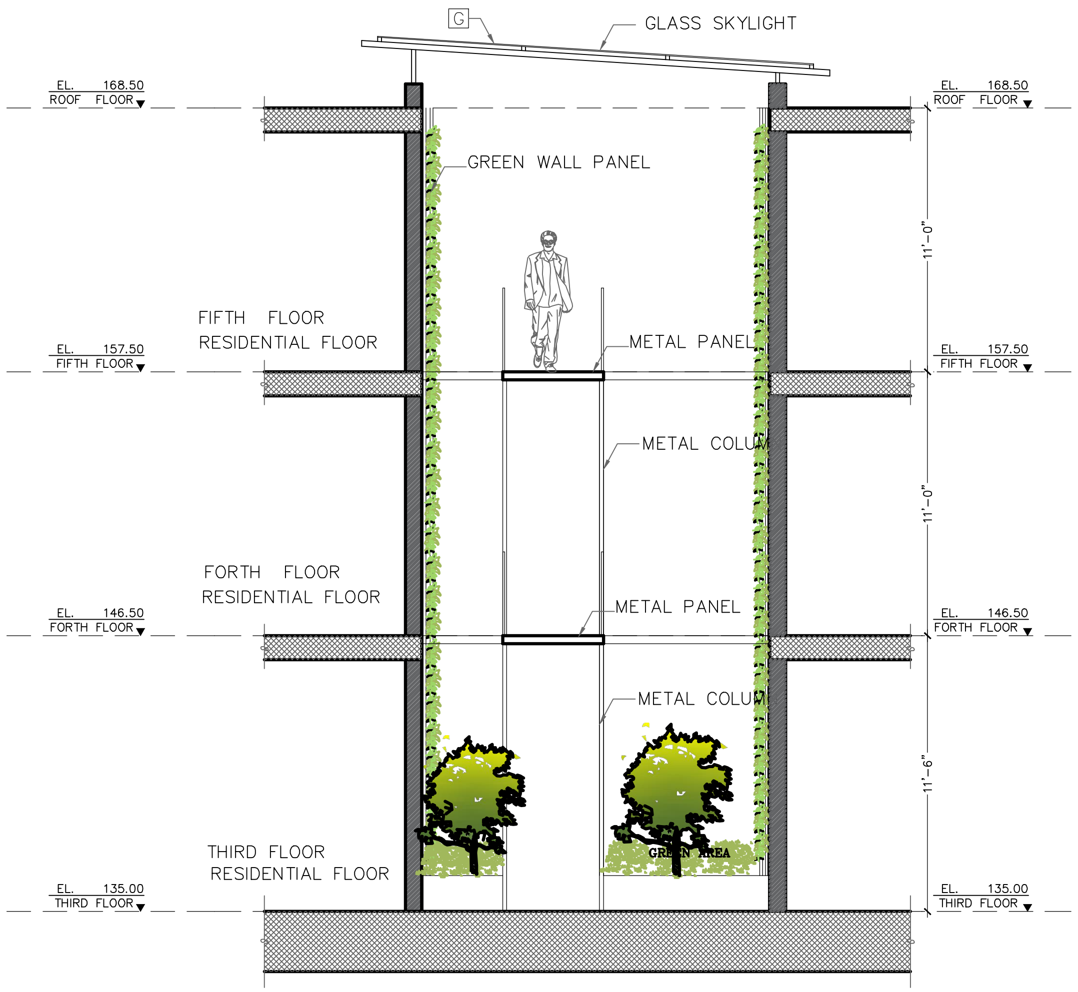
08/13/2019



SECTION A - A

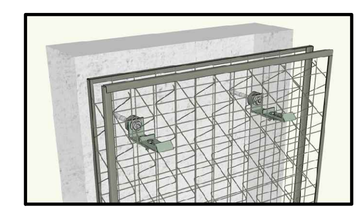
SCALE: 1/4"=1'-0"

SCALE BAR1/8



COURT YARD SECTION

SCALE: 1/4"=1'-0"



GREEN WALL PANEL

architecture west inc.

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REVISIONS

PROJECT ADDRESS :
3727 ROBERTSON ST.
CULVER CITY
CA 90232

PROJECT TITLE:
3727 ROBERTSON

DATE:
04/27/2016

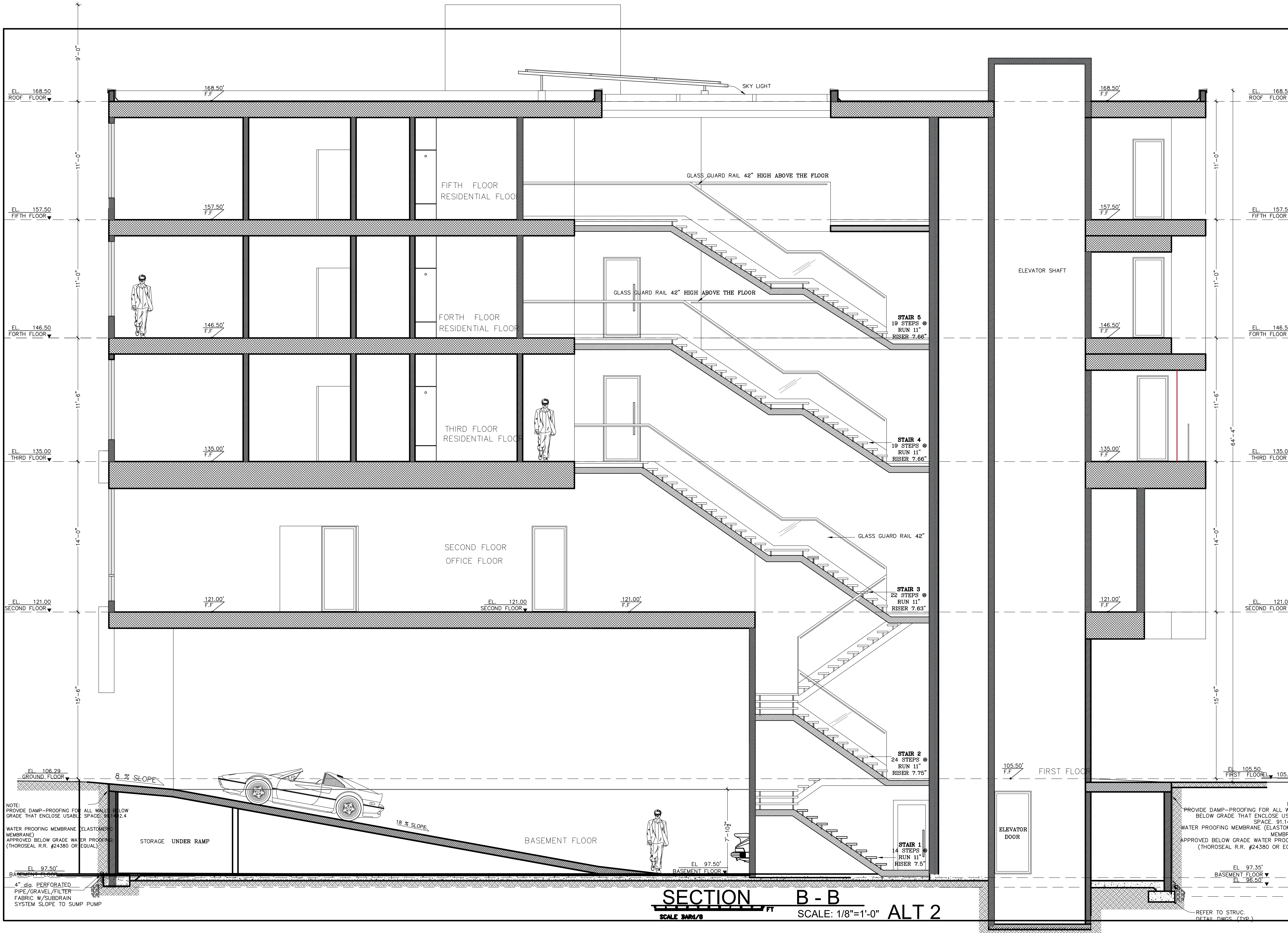
JOB NUMBER:

DRAWING PHASE:
P/CSUBMITTAL

SHEET TITLE:
SECTION A-A

SHEET NUMBER:
A
13

08/13/2019



SECTION B - B

SCALE: 1/8"=1'-0" ALT 2

architecture west inc.

1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: SECTION B-B

SHEET NUMBER: A 14

08/08/2019

EXTERIOR DOOR & WINDOW OPENING SCHEDULE & TYPES

MEASUREMENTS OF DOORS / WINDOWS ARE CLEAR LEAF SIZE

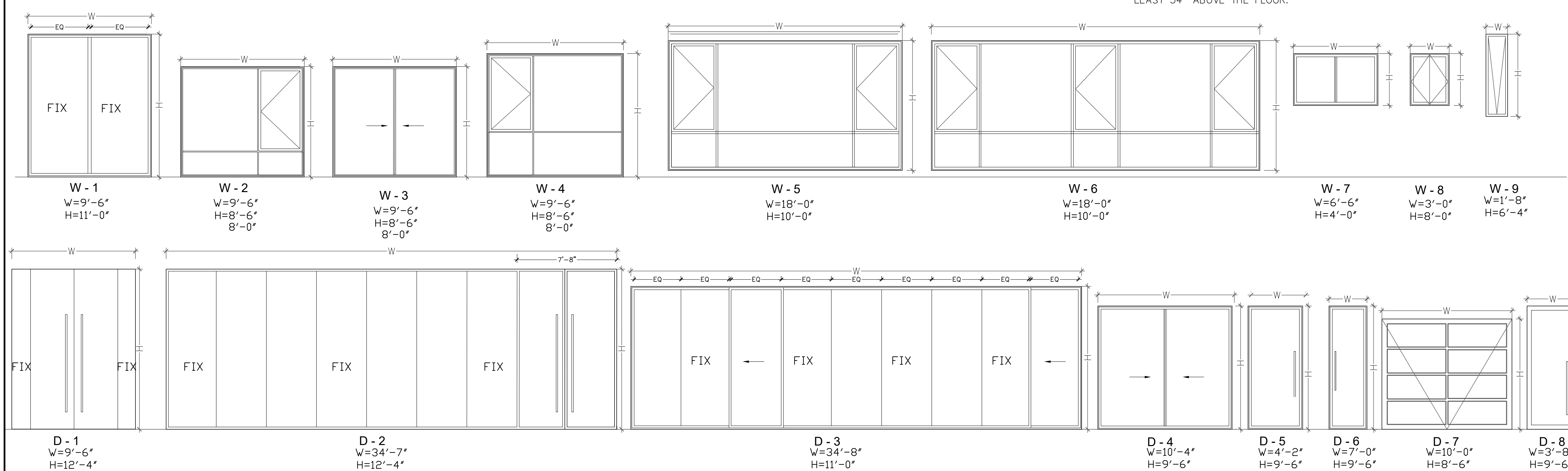
TYPE	FINISH DOOR LEAF SIZE W	H	SILL H	NUMBER	DOOR& WINDOW MATERIAL	COLOR	FRAME	COLOR	FINISH	MANUFACTURE	REMARKS	GLASSES
W - 1	8'-0"	8'-0"	1'-6"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 2	36'-5"	11'-6"	1'-0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 3	18'-0"	10'-6"	1'-0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 4	25'-3"	10'-6"	2'-0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 5	6'-6"	4'-0"	6'-0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 6	3'-0"	4'-0"	6'-0"		ALUMINIUM ANODIZED	DARK GRAY					AWINING	FROSTED
D - 1	7'-0"	12'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY						
D - 2	36'-5"	11'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY						
D - 3	7'-0"	11'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
D - 4	10'-0"	11'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
D - 5	7'-0"	11'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY					AWINING	FROSTED
D - 6	10'-0"	8'-6"	0"		METAL	DARK GRAY						FROSTED

GENERAL NOTES: GLAZING IN THE FOLLOWING LOCATIONS SHALL BE SAFETY GLAZING CONFORMING TO THE HUMAN IMPACT LOADS OF SECTION R308.3. (SEE DWG A-9-b FOR ADDITIONAL NOTES)

1. FIXED AND OPERABLE PANELS OF SWINGING, SLIDING AND BIFOLD DOOR ASSEMBLIES.
2. INDIVIDUAL FIXED OR OPERABLE PANEL ADJACENT TO A DOOR WHERE THE NEAREST VERTICAL EDGE IS WITHIN A 24-INCH ARC OF THE DOOR IN A CLOSED POSITION AND WHOSE BOTTOM EDGE IS LESS THAN 60 INCHES ABOVE THE FLOOR OR WALKING SURFACE
3. EXPOSED AREA OF AN INDIVIDUAL PANE GREATER THAN 9 SQ.FT.
4. BOTTOM EDGE HAS LESS THAN 18 IN. ABOVE THE FLOOR
5. TOP EDGE GREATER THAN 36 IN.ABOVE THE FLOOR
6. ONE OF MORE WALKING SURFACES WITHIN 36 IN. HORIZONTALLY OF THE GLAZING
7. GLAZING IN RAILINGS
8. ENCLOSURES FOR OR WALLS FACING HOT TUBS, WHIRLPOOLS, SAUNAS, STEAM ROOMS, BATHTUBS, AND SHOWERS WHERE THE BOTTOM EDGE OF THE GLAZING IS LESS THAN 60 IN. MEASURED VERTICALLY ABOVE ANY STANDING OR WALKING SURFACE.
9. WALLS AND FENCES ADJACENT TO INDOOR AND OUTDOOR SWIMMING POOLS, HOT TUBS AND SPAS WHERE THE BOTTOM EDGE OF THE GLAZING IS LESS THAN 60 IN. ABOVE A WALKING SURFACE AND WITHIN 60 IN., MEASURED HORIZONTALLY AND IN A STRAIGHT LINE, OF THE WATER'S EDGE.
10. GLAZING ADJACENT TO STAIRWAYS, LANDINGS AND RAMPS WITHIN 36 IN. HORIZONTALLY OF A WALKING SURFACE WHEN THE SURFACE OF THE GLAZING IS LESS THAN 60 IN. ABOVE THE PLANE OF THE ADJACENT WALKING SURFACE.
11. GLAZING ADJACENT TO STAIRWAYS WITHIN 60 IN. HORIZONTALLY OF THE BOTTOM TREAD OF A STAIRWAY IN ANY DIRECTION WHEN THE EXPOSED SURFACE OF THE GLAZING IS LESS THAN 60 IN. ABOVE THE NOSE OF THE TREAD.

PROVIDE AN ALARM FOR DOORS TO THE DWELLING THAT FORM A PART OF THE POOL ENCLOSURE.
THE ALARM SHALL SOUND CONTINUOUSLY FOR A MIN. OF 30 SECONDS IMMEDIATELY AFTER THE DOOR IS OPENED AND BE CAPABLE OF BEING HEARD THROUGHOUT THE HOUSE DURING NORMAL HOUSEHOLD ACTIVITIES. IT SHALL AUTOMATICALLY RESET AND SHALL BE EQ. WITH A MANUAL MEANS TO TEMP. DESACTIVIATE (FOR 15 SECS.MAX.) FOR SINGLE OPENING. THE DESACTIVATION SWITCH SHALL BE AT LEAST 54" ABOVE THE FLOOR.

EXTERIOR DOOR & WINDOW OPENING SCHEDULE & TYPES



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REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: EXTERIOR DOOR

SHEET NUMBER: A 15

08/13/2019

FINISH SCHEDULE

FLOOR

FLOOR		ROOM	MATERIAL									FINISH			
			GLASS	CARPET	HARDWOOD	PORCELAIN TILE FLOOR	STONE	CONCRETE	RUBBER TILE	MARBLE	STAINLESS STEEL	STAIN	CLEAR SEALER	EPOXY PAINT	NOT APPLICABLE
BASEMENT	1	PARKING						●							●
BASEMENT	2	STAIR						●							
BASEMENT	3	TRASH AREA						●							
BASEMENT	4	STORE						●							
BASEMENT	5	MECHANICAL ROOM						●							●
FIRST	6	ENTRANCE					●								
FIRST	7	EMERGENCY EXIT					●								
FIRST	8	OFFICE			●										
FIRST	9	REST ROOM				●									
FIRST	10	PARKING						●							●
SECOND	11	ENTRANCE			●										
SECOND	12	OFFICE			●										
SECOND	13	STORE				●									
SECOND	14	REST ROOM				●									
THIRD,FORTH,FIFTH FLOOR		MASTER BEDROOM		●										●	
THIRD,FORTH,FIFTH FLOOR		MASTER BATHROOM					●							●	
THIRD,FORTH,FIFTH FLOOR		MASTER BATH TUB					●							●	
THIRD,FORTH,FIFTH FLOOR		MASTER SHOWER					●							●	
THIRD,FORTH,FIFTH FLOOR		MASTER TOILET					●							●	
THIRD,FORTH,FIFTH FLOOR		MSTR WALK-IN CLOSET				●								●	
THIRD,FORTH,FIFTH FLOOR		BEDROOM				●								●	
THIRD,FORTH,FIFTH FLOOR		BATHROOM					●							●	
THIRD,FORTH,FIFTH FLOOR		SHOWER					●							●	
THIRD,FORTH,FIFTH FLOOR		KITCHEN		●											●
THIRD,FORTH,FIFTH FLOOR		LIVING ROOM		●											●
THIRD,FORTH,FIFTH FLOOR		FAMILY ROOM		●											●
THIRD,FORTH,FIFTH FLOOR		LAUNDRY						●							●
THIRD,FORTH,FIFTH FLOOR		BALCONY				●									●
THIRD,FORTH,FIFTH FLOOR		INTERIOR YARD						●							
THIRD,FORTH,FIFTH FLOOR		STAIR						●							

BASE

FLOOR		ROOM	MATERIAL						FINISH			
			CARPET	HARDWOOD	TILE	STONE	METAL	NOTHING	GLOSS ENAMEL PAINT	ACRYLIC FLAT FINISH	STAIN ENAMEL	ACRYLIC STAIN
BASEMENT	1	PARKING						●				
BASEMENT	2	STAIR					●					
BASEMENT	3	TRASH AREA						●				
BASEMENT	4	STORE						●				
BASEMENT	5	MECHANICAL ROOM						●				
FIRST	6	ENTRANCE				●						
FIRST	7	EMERGENCY EXIT				●						
FIRST	8	OFFICE		●								
FIRST	9	REST ROOM			●							
FIRST	10	PARKING						●				
SECOND	11	ENTRANCE		●								
SECOND	12	OFFICE		●								
SECOND	13	STORE			●							
SECOND	14	REST ROOM			●							
THIRD,FORTH,FIFTH FLOOR		MASTER BEDROOM						●				
THIRD,FORTH,FIFTH FLOOR		MASTER BATHROOM						●				
THIRD,FORTH,FIFTH FLOOR		MASTER BATH TUB										
THIRD,FORTH,FIFTH FLOOR		MASTER SHOWER						●				
THIRD,FORTH,FIFTH FLOOR		MASTER TOILET						●				
THIRD,FORTH,FIFTH FLOOR		MSTR WALK-IN CLOSET						●				
THIRD,FORTH,FIFTH FLOOR		BEDROOM						●				
THIRD,FORTH,FIFTH FLOOR		BATHROOM						●				
THIRD,FORTH,FIFTH FLOOR		SHOWER						●				
THIRD,FORTH,FIFTH FLOOR		KITCHEN		●								
THIRD,FORTH,FIFTH FLOOR		LIVING ROOM		●								
THIRD,FORTH,FIFTH FLOOR		FAMILY ROOM		●								
THIRD,FORTH,FIFTH FLOOR		LAUNDRY							●			
THIRD,FORTH,FIFTH FLOOR		BALCONY			●							
THIRD,FORTH,FIFTH FLOOR		INTERIOR YARD								●		
THIRD,FORTH,FIFTH FLOOR		STAIR					●					

WALLS

FLOOR		ROOM	MATERIAL							FINISH					
			5/8" TYPE X DRYWALL	GREEN BOARD	STUCCO	STONE/BRICK/CONCRETE	TILE /GREEN BOARD	WOOD PANEL/DRYWALL	FABRIC / DRYWALL	ACRYLIC FLAT FINISH	ACRYLIC LOW SHEEN	ACRYLIC GLOSS FINISH	STAIN ENAMEL	ELASTOMERIC PAINT	CLEAR SEALER
BASEMENT	1	PARKING				●									
BASEMENT	2	STAIR			●					●					
BASEMENT	3	TRASH AREA				●									
BASEMENT	4	STORE			●					●					
BASEMENT	5	MECHANICAL ROOM			●					●					
FIRST	6	ENTRANCE	●							●					
FIRST	7	EMERGENCY EXIT	●							●					
FIRST	8	OFFICE	●							●					
FIRST	9	REST ROOM					●				●				
FIRST	10	PARKING				●									
SECOND	11	ENTRANCE	●							●					
SECOND	12	OFFICE	●							●					
SECOND	13	STORE	●							●					
SECOND	14	REST ROOM					●				●				
THIRD,FORTH,FIFTH FLOOR		MASTER BEDROOM		●							●				
THIRD,FORTH,FIFTH FLOOR		MASTER BATHROOM			●							●			
THIRD,FORTH,FIFTH FLOOR		MASTER BATH TUB													
THIRD,FORTH,FIFTH FLOOR		MASTER SHOWER			●							●			
THIRD,FORTH,FIFTH FLOOR		MASTER TOILET			●							●			
THIRD,FORTH,FIFTH FLOOR		MSTR WALK-IN CLOSET		●							●				
THIRD,FORTH,FIFTH FLOOR		BEDROOM		●							●				
THIRD,FORTH,FIFTH FLOOR		BATHROOM			●							●			
THIRD,FORTH,FIFTH FLOOR		SHOWER			●							●			
THIRD,FORTH,FIFTH FLOOR		KITCHEN				●							●		
THIRD,FORTH,FIFTH FLOOR		LIVING ROOM			●							●			
THIRD,FORTH,FIFTH FLOOR		FAMILY ROOM			●							●			
THIRD,FORTH,FIFTH FLOOR		LAUNDRY					●					●			
THIRD,FORTH,FIFTH FLOOR		BALCONY													
THIRD,FORTH,FIFTH FLOOR		INTERIOR YARD			●					●					
THIRD,FORTH,FIFTH FLOOR		STAIR			●					●					

CEILING

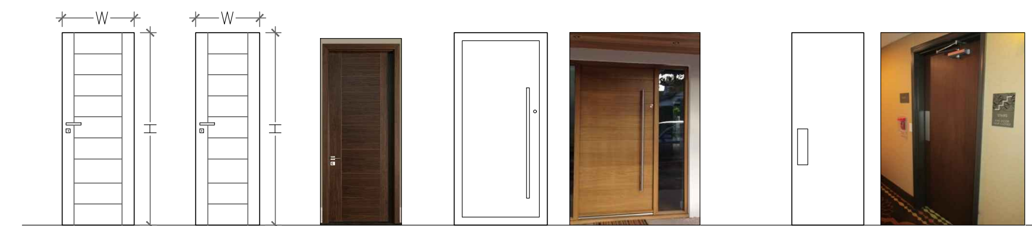
FLOOR		ROOM	MATERIAL							FINISH						REMARKS
			5/8" TYPE X DRYWALL	GREEN BOARD	STUCCO	STONE	CERAMIC TILE	WOOD	FABRIC	ACRYLIC FLAT FINISH	ACRYLIC LOW SHEEN	ACRYLIC GLOSS FINISH	STAIN ENAMEL	CLEAR SEALER	ELASTOMERIC PAINT	
BASEMENT	1	PARKING														
BASEMENT	2	STAIR								●						
BASEMENT	3	TRASH AREA								●						
BASEMENT	4	STORE														
BASEMENT	5	MECHANICAL ROOM														
FIRST	6	ENTRANCE								●						
FIRST	7	EMERGENCY EXIT								●						
FIRST	8	OFFICE								●						
FIRST	9	REST ROOM									●					
FIRST	10	PARKING														
SECOND	11	ENTRANCE								●						
SECOND	12	OFFICE								●						
SECOND	13	STORE								●						
SECOND	14	REST ROOM									●					
THIRD,FORTH,FIFTH FLOOR		MASTER BEDROOM		●							●					
THIRD,FORTH,FIFTH FLOOR		MASTER BATHROOM			●							●				
THIRD,FORTH,FIFTH FLOOR		MASTER BATH TUB														
THIRD,FORTH,FIFTH FLOOR		MASTER SHOWER			●							●				
THIRD,FORTH,FIFTH FLOOR		MASTER TOILET			●							●				
THIRD,FORTH,FIFTH FLOOR		MSTR WALK-IN CLOSET		●							●					
THIRD,FORTH,FIFTH FLOOR		BEDROOM		●							●					
THIRD,FORTH,FIFTH FLOOR		BATHROOM			●							●				
THIRD,FORTH,FIFTH FLOOR		SHOWER			●							●				
THIRD,FORTH,FIFTH FLOOR		KITCHEN				●							●			
THIRD,FORTH,FIFTH FLOOR		LIVING ROOM			●							●				
THIRD,FORTH,FIFTH FLOOR		FAMILY ROOM			●							●				
THIRD,FORTH,FIFTH FLOOR		LAUNDRY					●					●				
THIRD,FORTH,FIFTH FLOOR		BALCONY			●					●						
THIRD,FORTH,FIFTH FLOOR		INTERIOR YARD								●						
THIRD,FORTH,FIFTH FLOOR		STAIR														

INTERIOR DOOR OPENING SCHEDULE & TYPES

MEASUREMENTS OF DOORS / WINDOWS ARE CLEAR LEAF SIZE

TYPE	FINISH DOOR LEAF SIZE W	FINISH DOOR LEAF SIZE H	SILL H	NUMBER	DOOR& WINDOW MATERIAL	COLOR	FRAME	COLOR	FINISH	MANUFACTURE	REMARKS	GLASSES
D - A	3′-0″	8′-0″	0		WOOD		WOOD				BED ROOM- LANDRY	
D - B	2′-8″	8′-0″	0		WOOD		WOOD				BED ROOM- BATH ROOM	
D - C	3′-10″	8′-0″	0		WOOD		WOOD					
D - D	3′-0″	8′-0″	0		WOOD		WOOD				FIRE-RESISTANT DOOR	
D - E	5′-2″	6′-6″	0′-6″		GLASS		METAL				TEMPERED SHOWER GLASS PANELS	CLEAR
D - F	6′-6″	8′-0″	0		GLASS		METAL				GLASS DOORS	CLEAR
D - G	10′-0″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - H	3′-10″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - I	2′-6″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - J	2′-4″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - K	3′-0″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - L	6′-4″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - M	4′-10″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - N	3′-6″	8′-0″	0		GLASS		METAL					

INTERIOR DOOR OPENING SCHEDULE & TYPES



D - A
W=3′-0″
H=8′-0″

D - B
W=2′-8″
H=8′-0″

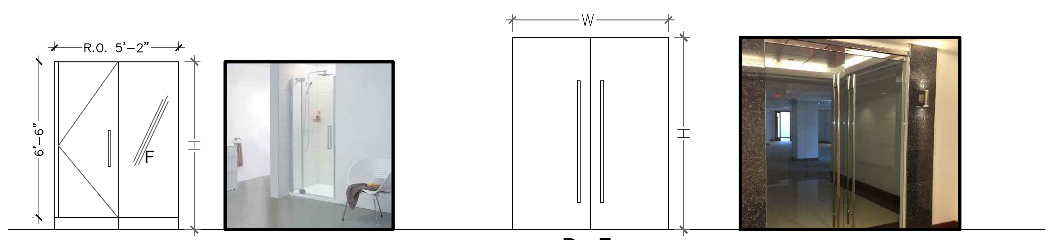
VIEW

D - C
W=3′-10″
H=7′-0″

VIEW

D - D
W=3′-0″
H=8′-0″

VIEW
FIRE-RESISTANT DOOR

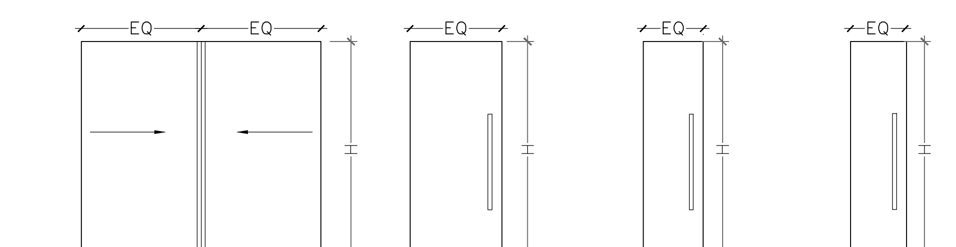


D - E
TEMPERED SHOWER GLASS PANELS

VIEW

D - F
W=6′-6″
H=8′-0″

VIEW
GLASS DOOR

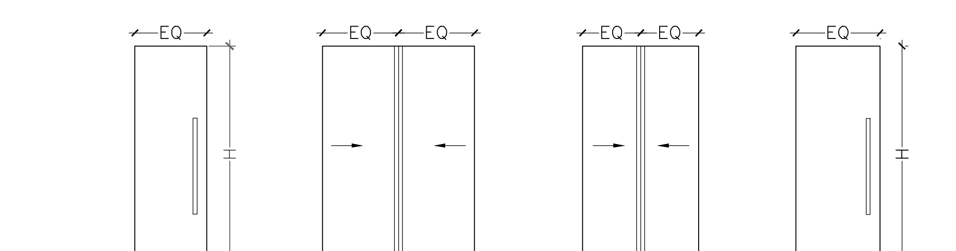


D - G
CLOSET

D - H
CLOSET

D - I
CLOSET

D - J
CLOSET



D - K
CLOSET

D - L
CLOSET

D - M
CLOSET

D - N
CLOSET

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS :
3727 ROBERTSON ST.
CULVER CITY
CA 90232

PROJECT TITLE:
3727 ROBERTSON

CLIENT:

DATE:
04/27/2016

JOB NUMBER:

DRAWING PHASE:
P/CSUBMITTAL

SHEET TITLE:
INTERIOR DOOR & SCHEDULE

SHEET NUMBER:
A
16

08/13/2019

Attachment B

Crain and Associates, Traffic Impact Analysis

300 Corporate Pointe, Suite 470, Culver City, CA 90230
T: (310) 473-6508 | www.crainandassociates.com

CRAIN
A KOA Corporation Company

November 4, 2020

Heba El-Guindy
Mobility and Traffic Engineering Manager
City of Culver City, Public Works Engineering Division
9770 Culver Blvd, 2nd Floor
Culver City, California 90232

RE: 3727 S. Robertson Mixed-Use Project Traffic Impact Analysis

Dear Heba,

A mixed-use project is proposed to be located at 3727 S. Robertson Boulevard in the City of Culver City (the Project). This technical memorandum contains assumptions, procedures and results of the Project traffic impact analysis for the study area surrounding the Project site.

The traffic impact analysis documented in the following technical memorandum incorporates a detailed evaluation of traffic conditions at two Project area study intersections, vehicular swept path analysis at the Project parking locations, and a site distance analysis at the Project driveway to the lower level parking garage. These intersections are the locations contained in the approved Memorandum of Understanding (MOU) with the City of Culver City (the City) for the Project traffic impact analysis. The MOU establishes the assumptions and parameters that were followed in this technical memorandum. The approved MOU is included as Appendix A.

Two Project site adjacent intersections were selected for inclusion in the traffic impact analysis. The selected study locations are those most likely to be directly impacted by the traffic generated by the proposed Project. Figure 1 contains a site vicinity map of the proposed Project which depicts the locations of the Project site and study intersections. To address potential Congestion Management Program (CMP) concerns, Project traffic impacts were also analyzed for CMP locations. Regional facilities, including freeway segments near the Project site, were evaluated in the CMP analysis. In addition, per the most recent agreement between Caltrans and the City of Los Angeles, which the City of Culver City agrees to, a freeway screening analysis on freeway mainline and off-ramps was analyzed based on the existing freeway capacity. No potential significant freeway impacts were identified.

I. PROJECT DESCRIPTION

The proposed Project is located at 3727 S. Robertson Boulevard in the City of Culver City. As shown in Figure 2 (the Conceptual Site Plan), the Project consists of a 12-unit apartment building with 5,455 square feet of office and 3,886 square feet of retail/restaurant uses. The Project site currently houses a 3,500 square feet of sound studio use, which will be demolished to accommodate the Project. Additionally, the Project will include a 10 foot setback along Robertson Boulevard. The provision of this setback will provide for a future 10 foot right-of-way dedication along the Project's frontage with Robertson Boulevard to conform with the City's designation of this roadway as a Primary Artery and will match the 10 foot dedication provided by the properties along Robertson Boulevard, north of Hoke Avenue.

Parking for the Project will be provided at the ground level and in a parking garage underneath the Project building, together containing a total of 23 parking spaces. The proposed parking supply is expected to meet the requirements of the City of Culver City Municipal Code under Section 17.400.065 I a. 4. As shown in Figure 2, four parking spaces will be located adjacent to the alley at the western boundary of the Project site, and each parking stall will provide direct access to/from that alley. Vehicular access to the basement level containing a total of 19 parking spaces is anticipated to be from a driveway with a ramp that is located at the southwest corner of the Project site, which connects to the north-south alley along the western boundary of the Project site.

II. EXISTING TRAFFIC VOLUMES AND LEVEL OF SERVICE

The exiting traffic conditions in the Project area were determined by the collection and analysis of traffic volume data conducted as described in this section. Also described are the results of the traffic analysis under the existing conditions.

II. 1 Traffic Volume Data Collection

Traffic volumes for existing weekday conditions at the two study intersections were obtained from traffic counts conducted in May, 2019. In accordance with the City of Culver City Traffic Study Policies and Procedures, the traffic counts were conducted on a regular weekday when most schools were in session. For the study intersections, AM and PM peak-hour volumes were determined individually for each intersection. The volumes were based on the combined four highest consecutive 15-minute increment volumes for all vehicular movements at each intersection during the 7 to 10 AM and 3 to 6 PM periods, respectively. Weekday peak-hour volumes at the study intersections are illustrated in Figure 3. The manual intersection traffic count data sheets are provided in Appendix B. Other data (i.e., intersection geometrics, parking-related curb restrictions and traffic signal operations) were obtained through field surveys at the study locations. The intersection lane configurations and signal operations information are provided in Appendix C.

II. 2 Intersection LOS Calculation Methodology

The traffic analysis was performed through the use of established traffic engineering techniques. The methodology used in this study for the analysis and evaluation of traffic operations at each study intersection is based on procedures outlined in Circular Number 212 of the Transportation Research Board. In the discussion of Critical Movement Analysis (CMA) for signalized intersections, procedures have been developed for determining operating characteristics of an intersection in terms of the Level of Service (LOS) provided for different levels of traffic volume and other variables, such as the number of signal phases. The term "Level of Service" describes the quality of traffic flow. Levels of Service A to C operate quite well. Level D typically is the level for which a metropolitan area street system is designed. Level E represents volumes at or near the capacity of the highway which might result in stoppages of momentary duration and fairly unstable flow. Level F occurs when a facility is overloaded and is characterized by stop-and-go traffic with stoppages of long duration.

A determination of the LOS at an intersection, where traffic volumes are known or have been projected, can be obtained through a summation of the critical movement volumes at that intersection. Once the sum of critical movement volumes has been obtained, the values indicated in Table 1 can be used to determine the applicable LOS.

Table 1
Critical Movement Volume Ranges*
For Determining Levels of Service

	Maximum Sum of Critical Volumes (VPH)		
Level of Service	**Two Phase**	**Three Phase**	**Four or More Phases**
A	900	855	825
B	1,050	1,000	965
C	1,200	1,140	1,100
D	1,350	1,275	1,225
E	**1,500**	**1,425**	**1,375**
F	*--------------Not Applicable---------------*		

Note:
* For planning applications only, i.e., not appropriate for operations and design applications. Also, a computerized traffic signal coordination system, such as Automated Traffic Surveillance and Control (ATSAC), increases these values by approximately seven percent. With the addition of a further upgrade, such as Adaptive Traffic Control System (ATCS), an additional three percent increase in these values occurs.

"Capacity" represents the maximum total hourly movement volume of vehicles in the critical lanes which has a reasonable expectation of passing through an intersection under prevailing roadway and traffic conditions. For planning purposes, capacity equates to the maximum value of Level of Service E for signalized intersections, as indicated in Table 1.

The CMA indices used in this study were calculated by dividing the sum of critical movement volumes by the appropriate capacity value for the type of signal control present at the study intersections.

Thus, the LOS corresponding to a range of CMA values is shown in Table 2.

Table 2
Level of Service
As a Function of CMA Values

Level of Service	Volume/Capacity Ratio	Delay per Vehicle (sec / veh)	Definition
A	0.000 - 0.600	<= 10	Excellent. No vehicle waits longer than one red light and no approach phase is fully used.
B	0.601 - 0.700	> 10 - 20	Very Good. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701 - 0.800	> 20 - 35	Good. Occasionally, drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801 - 0.900	> 35 - 55	Fair. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901 - 1.000	> 55 - 80	Poor. Respresents the most vehicles that intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	Greater than 1.000	> 80	Failure. Backups from nearby intersections or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths.

* Source: Traffic Study Criteria for the Review of Proposed Development Projects within the City of Culver Cit
July 2012.

II. 3 Existing LOS Conditions

An analysis of existing traffic conditions at the two study intersections shows that the intersection of Robertson Boulevard/Exposition Boulevard & Venice Boulevard operates at LOS F during both peak hours and the intersection of Robertson Boulevard/Higuera Street & Washington Boulevard operates at LOS D during the AM peak hour and LOS F during the PM peak hour. Table 3 shows the existing weekday AM and PM peak-hour LOS values for the study intersections. The level of service calculation worksheets are included in Appendix D.

Table 3
Existing (2019) Level of Service Summary

		Existing Condition			
		AM Peak Hour		PM Peak Hour	
No.	Intersection	CMA	LOS	CMA	LOS
1	Robertson Blvd./Exposition Blvd. & Venice Blvd.	1.657	F	1.712	F
2	Robertson Blvd./Higuera St. & Washington Blvd.	0.885	D	1.030	F

III. PROJECT TRAFFIC

The following section contains information describing the vehicular trip generating characteristics of the proposed Project. This section also outlines the methodology used to estimate the trip generation, distribution and assignment of the Project site.

III. 1 Project Trip Generation

The traffic generating characteristics of numerous land uses are identified in Trip Generation, 10th Edition published in 2017 by the Institute of Transportation Engineers (ITE). This manual is recognized as the industry standard for trip generation documentation and provides information on the trip-making profiles for many land uses, including the apartment, office and retail/restaurant uses proposed at the Project site.

The rates used to calculate the Project trip generation present a conservative condition, as these rates do not account for such trip-reducing factor as multi-purpose trips, extensive transit/bicycle/walking trips, or pass-by trips. These factors play a significant role in determining the actual traffic generating characteristics of the Project, and therefore, adjustments to the traffic generation estimates were deemed appropriate.

On the basis of the trip generation rates shown in Table 4, estimates of the Project's traffic were determined and are summarized in Table 5. An estimated 349 net daily trips will be generated by the proposed Project, including 30 AM peak-hour trips and 30 PM peak-hour trips for area intersections.

III. 2 Project Trip Distribution and Assignment

Estimation of the geographic distribution of Project trips was the next step in the analytical process. The trip distribution patterns for the Project were determined by considering the nature of the Project uses, existing traffic patterns, the surrounding roadway system characteristics, geographic location of the Project site and its proximity to major travel routes such as freeways and rail lines, and other factors.

Total Project trips, calculated in Table 5, were assigned to specific routes serving the Project area. The Project trip assignment percentages are presented in Figure 4. As noted, Project development area driveway locations, driveway turn restrictions and access factors were considered in the assignment of Project trips. The results of these traffic assignments provide the necessary level of detail to conduct the traffic analysis. Figure 5 illustrates the total AM and PM peak-hour traffic increases on the nearby street system resulting from the proposed Project. To be conservative, pass-by credit was not applied to the Project site adjacent intersection of Robertson Boulevard & Hoke Avenue, as shown in Figure 5.

Table 4
Project Component Trip Generation Rates

LU **Use/Description**

Multifamily Housing (Mid-Rise) - General Urban/Suburban

Daily:	5.44	Trips per	Dwelling Unit		
AM Peak Hour:	0.36	Trips per	Dwelling Unit	Inbound 26%	Outbound 74%
PM Peak Hour:	0.44	Trips per	Dwelling Unit	Inbound 61%	Outbound 39%

General Office Building - General Urban/Suburban

Daily:	9.74	Trips per	Dwelling Unit		
AM Peak Hour:	1.16	Trips per	Dwelling Unit	Inbound 86%	Outbound 14%
PM Peak Hour:	1.15	Trips per	Dwelling Unit	Inbound 16%	Outbound 84%

Shopping Center - General Urban/Suburban

Daily:	37.75	Trips per	KSF		
AM Peak Hour:	0.94	Trips per	KSF	Inbound 62%	Outbound 38%
PM Peak Hour:	3.81	Trips per	KSF	Inbound 48%	Outbound 52%

High-Turnover Restaurant - General Urban/Suburban

Daily:	112.18	Trips per	Dwelling Unit		
AM Peak Hour:	9.94	Trips per	Dwelling Unit	Inbound 55%	Outbound 45%
PM Peak Hour:	9.77	Trips per	Dwelling Unit	Inbound 62%	Outbound 38%

Source:
Trip Generation, 10th Edition, 2017, Institute of Transportation Engineers (ITE).

Table 5
Project Traffic Generation

LU	Use/Description		Size	Units	Daily	AM Peak Hour I/B	AM Peak Hour O/B	AM Peak Hour Total	PM Peak Hour I/B	PM Peak Hour O/B	PM Peak Hour Total
PROPOSED USES											
221	Apartment		12	du	65	1	3	4	3	2	5
710	Office		5.455	ksf	53	5	1	6	1	5	6
932	Retail/Restaurant		3.886	ksf	436	21	18	39	24	14	38
	Subtotal [A]				**554**	**27**	**22**	**49**	**28**	**21**	**49**
	Internal Trips										
	Apartment	10%			(7)	0	0	0	0	0	0
	Office	10%			(5)	(1)	0	(1)	0	(1)	(1)
	Retail/Restaurant	depends on other uses			(12)	0	(1)	(1)	(1)	0	(1)
	Subtotal [B]				**(24)**	**(1)**	**(1)**	**(2)**	**(1)**	**(1)**	**(2)**
	*Transit/Walk-in Trips**										
	Apartment	15%			(9)	0	(1)	(1)	(1)	0	(1)
	Office	15%			(7)	(1)	0	(1)	0	(1)	(1)
	Retail/Restaurant	15%			(64)	(3)	(3)	(6)	(3)	(3)	(6)
	Subtotal [C]				**(80)**	**(4)**	**(4)**	**(8)**	**(4)**	**(4)**	**(8)**
[D] Driveway/Adj. Int. Trips = [A] + [B] + [C]					**450**	**22**	**17**	**39**	**23**	**16**	**39**
	Pass-by Trips										
	Apartment	0%			0	0	0	0	0	0	0
	Office	0%			0	0	0	0	0	0	0
	Retail/Restaurant	20%			(72)	(4)	(2)	(6)	(4)	(2)	(6)
	Subtotal [E]				**(72)**	**(4)**	**(2)**	**(6)**	**(4)**	**(2)**	**(6)**
[F] Area Intersection Trips (Proposed Uses) = [D]+[E]					**378**	**18**	**15**	**33**	**19**	**14**	**33**
EXISTING USES											
710	Office		3.500	ksf	34	3	1	4	1	3	4
	Subtotal [G]				**34**	**3**	**1**	**4**	**1**	**3**	**4**
	Existing Transit/Walk-in Trips										
	Office	15%			(5)	(1)	0	(1)	0	(1)	(1)
	Subtotal [H]				**(5)**	**(1)**	**0**	**(1)**	**0**	**(1)**	**(1)**
[I] Existing Driveway/Adj. Int. Trips = [G] + [H]					**29**	**2**	**1**	**3**	**1**	**2**	**3**
	Pass-by Trips										
	Office	0%			0	0	0	0	0	0	0
	Subtotal [J]				**0**	**0**	**0**	**0**	**0**	**0**	**0**
[K] Area Intersection Trips (Existing Uses) = [I]+[J]					**29**	**2**	**1**	**3**	**1**	**2**	**3**
NET PROJECT TRIP GENERATION											
Driveway/Adjacent Intersection Trips = [D] - [I]					**421**	**20**	**16**	**36**	**22**	**14**	**36**
Area Intersection Trips (Net Project) = [F] - [K]					**349**	**16**	**14**	**30**	**18**	**12**	**30**

* Transit credit calculated by applying 15% credit to each individual use.

IV. WITH PROJECT TRAFFIC LEVEL OF SERVICE CONDITIONS

The traffic Level of Service analysis considers the impact of the Project under two scenarios. It compares the "Existing" and "Existing With Project" cases to determine the Project impacts without consideration of cumulative growth. In addition, our analysis determines the Project impacts under the scenario that cumulative growth does occur through a comparison of the Future (2022) "Without Project" and "With Project" scenarios. This following section contains the impact analyses of the Project traffic impacts under both scenarios.

IV. 1 Significant Traffic Impact Criteria

The City of Culver City defines a significant traffic impact attributable to a project based on a "stepped scale" as summarized in Table 6.

Table 6
City of Culver City Criteria for Significant Traffic Impact

LOS	Final CMA Value	Project-Related Increase in CMA Value
C	> 0.700 - 0.800	equal to or greater than 0.050
D	> 0.800 - 0.900	equal to or greater than 0.040
E, F	> 0.900	equal to or greater than 0.020

IV. 2 Existing (2019) With Project Conditions

The analysis of existing traffic conditions at the study intersections for the existing year (2019) was performed as described previously. The existing intersection volumes for the AM and PM peak hours were shown previously on Figure 3. These estimates are the "benchmark" volumes used in determining Project traffic impacts on the existing street system. Traffic volumes generated by the Project were then added to the Existing (2019) volumes to form the "Existing With Project" intersection volumes, as depicted on Figure 6. These volumes were used to determine traffic impacts directly attributable to the proposed Project.

Table 7 presents the results of the CMA and LOS analysis of the Existing (2019) and Existing With Project conditions. As shown in Table 7, neither of the study intersections would be significantly impacted by the Project traffic under the Existing (2019) conditions. (The CMA calculations for these traffic conditions are included in Appendix D.)

Table 7
CMA and LOS Summary
Existing (2019) With Project Traffic Conditions

		Peak	Existing		Existing + Project		
No.	**Intersection**	**Hour**	**CMA**	**LOS**	**CMA**	**LOS**	**Impact**
1.	Robertson Blvd./Exposition Blvd.	AM	1.657	F	1.663	F	0.006
	& Venice Blvd.	PM	1.712	F	1.720	F	0.008
2.	Robertson Blvd./Higuera St.	AM	0.885	D	0.889	D	0.004
	& Washington Blvd.	PM	1.030	F	1.036	F	0.006

An * indicates a significant impact (per City of Culver City).

IV. 3 Future (2022) With Project Conditions

There are a number of projects under construction or planned for development in the Project vicinity which may contribute to traffic volumes in the study area. For this reason, the analysis of future traffic conditions was expanded to include potential traffic volume increases expected to be generated by projects that have not yet been developed. Based on analyses of trends in traffic growth in this portion of Culver City over the last several years, as documented in the Los Angeles County Congestion Management Program (CMP), the City of Culver City staff has determined that using an annual traffic growth factor of 1.5 percent is reasonable. This growth factor is used to account for increases in traffic resulting from potential development projects in the study area. The ambient traffic growth factor was applied to the existing 2019 traffic volumes to develop the estimated volumes for the future (2022) conditions. The result represents the traffic volumes for the analysis of future (2022) conditions. Finally, Project traffic was analyzed as an incremental addition to the Future (2022) Without Project condition to determine the Future (2022) With Project condition.

IV.3.A Future Roadway Network

Los Angeles's ATSAC System. These intersection capacity improvements have been incorporated in the analysis of existing (2019) and future (2022) traffic conditions for the signalized study intersections.

In order to accurately forecast future (2022) traffic conditions in the Project area, an investigation into anticipated transportation improvements to the street system serving the Project area was conducted. The future installation of bicycle facility improvements as describe in Section IV.3.B would include widenings and parking removals. The Bicycle Network improvements are not anticipated to affect roadway configurations at the study intersections. Therefore, no future lane configurations are expected to change. The City of Culver City Public Works department also did not indicate any other future roadway improvements near the Project site. The existing and future lane configurations are shown in Appendix C and were applied to the future (2022) conditions.

IV.3.B Future Bicycle Network

The Culver City Bicycle & Pedestrian Action Plan was adopted by the City in June 2020. In the Project vicinity, the Culver City Bicycle & Pedestrian Action Plan calls for the installation of a Class IV Separated Bikeway on Robertson Boulevard between Venice Boulevard and Washington Boulevard (where Roberson Boulevard aligns with Higuera Street). A Class IV Bikeway is also to be installed along Washington Boulevard between Culver Boulevard and Helms Avenue. Additionally, Higuera Street, south of Washington Boulevard is designated as a Class III Bike Route. In the City of Los Angeles, north of the project site, Class I Bicycle Lanes are currently provided along Venice Boulevard in the Project vicinity. Further, the City of Los Angeles Mobility Plan 2035 identifies providing a Bicycle Path along the Expo Rail right-of-way as well as Tier 1 Protected Bicycle Lanes on Venice Boulevard.

IV.3.C Surface Street Impacts

Figure 7 shows the future (2022) AM and PM peak-hour traffic volumes for the Without Project condition. Figure 8 shows the Future (2022) With Project traffic volumes. For consistency and compatibility, the same lane configurations were assumed for both the With and Without Project scenarios.

Using these assumptions, Table 8 presents the results of the AM and PM peak-hour analysis of future traffic conditions. These include Without and With Project traffic conditions at the study intersections. As shown in Table 8, neither of the study intersections would be significantly impacted by Project traffic under the future (2022) conditions. Level of Service calculation worksheets are included in Appendix D.

Table 8
Level of Service Summary
- **Future (2022) Traffic Conditions**

		Peak	Future		Future + Project		
No.	**Intersection**	**Hour**	**CMA**	**LOS**	**CMA**	**LOS**	**Impact**
1.	Robertson Blvd./Exposition Blvd.	AM	1.738	F	1.743	F	0.005
	& Venice Blvd.	PM	1.795	F	1.803	F	0.008
2.	Robertson Blvd./Higuera St. &	AM	0.929	E	0.932	E	0.003
	& Washington Blvd.	PM	1.080	F	1.086	F	0.006

An * indicates a significant impact (per City of Culver City).

IV.3.D Impacts on Regional Transportation System

The Los Angeles County CMP requires that all CMP intersections be analyzed where a project would likely add 50 or more trips during the peak hours. The nearest arterial CMP monitoring intersections are Overland Avenue & Venice Boulevard and La Cienega Boulevard & Venice Boulevard, approximately one mile southwest and one mile northeast of the Project, respectively. A review of the Project trip generation shows that the proposed Project will generate less than 50 trips during both peak hours. Thus, neither of these CMP intersections will be impacted by 50 or more vehicles during peak hours, and no CMP intersection analysis was performed.

In addition to the arterial intersection analysis requirements, the CMP requires a review of freeway segments to which the Project would add 150 or more trips per hour in either direction. The CMP freeway segments nearest to the Project were reviewed on the San Diego Freeway (I-405) north of Venice Boulevard, approximately two miles southwest of the Project site, and on the Santa Monica Freeway (I-10) east of Overland Avenue, approximately one and a half miles west of the Project site. As shown in Table 5, the Project will generate less than 150 directional trips during both peak hours; therefore, no significant Project impact to any CMP freeway monitoring location is forecast and no detailed CMP freeway mainline analysis was performed.

IV.3.E Freeway Impact Screening Analysis

Per First Amendment to the Agreement between The City of Los Angeles Department of Transportation (LADOT) and Caltrans District 7 on Freeway Impact Analysis Procedures, December 2015, which is agreed to by the City of Culver City, a detailed freeway analysis is required for land use proposals that meet any of the following criteria:

- The project's peak hour trips would result in a 1-percent or more increase to the freeway mainline capacity of a freeway segment operating at level-of-service (LOS) E or F (based on an assumed capacity of 2,000 vehicles per hour per lane); or
- The project's peak hour trips would result in a 2-percent or more increase to the freeway mainline capacity of a freeway segment operating at LOS D (based on an assumed capacity of 2,000 vehicles per hour per lane); or
- The project's peak hour trips would result in a 1-percent or more increase to the capacity of a freeway off-ramp operating at LOS E or F (based on an assumed ramp capacity of 850 vehicles per hour per lane); or
- The Project's peak hour trips would result in a 2-percent or more increase to the capacity of a freeway off-ramp operating at LOS D (based on an assumed ramp capacity of 850 vehicles per hour per lane).

The Project trips along the Santa Monica Freeway (I-10) mainline were analyzed and the results are included in Table 9. As shown in Table 9, the Project's peak hour trips would result in less than 1% increase to the freeway mainline capacity. Therefore, a freeway mainline impact analysis is not required.

Table 9
Freeway Mainline Screening Analysis

Mainline Segment	Direction	Project Trips AM	Project Trips PM	# of Lanes	Mainline Capacity	Percentage by Project AM	Percentage by Project PM	Percentage For Screening*	Requires Analysis?
I-10 Fwy	WB	2	3	4	8000	0.03%	0.04%	1.00%	**No**
e/o Washington Bl	EB	2	2	4	8000	0.03%	0.03%	1.00%	**No**
I-10 Fwy	SB	2	3	4	10000	0.03%	0.04%	1.00%	**No**
w/o Bagley Ave.	NB	2	2	4	10000	0.03%	0.03%	1.00%	**No**

* Criteria for freeway mainline segments and off-ramps operating at LOS E or F per *Agreement Between City of Los Angeles and Caltrans District 7 On Freeway Impact Analysis Procedure* , December 2015.

The freeway off-ramps that are likely to be most utilized by Project traffic are the Santa Monica Freeway (I-10) off-ramps, which were analyzed and the results are included in Table 10. As shown in Table 10, the Project's peak hour trips would result in less than 1% increase to the freeway ramp capacity. Therefore, a freeway off-ramp impact analysis is not required.

Table 10
Freeway Ramp Screening Analysis

Off-Ramp Location	Direction	Project Trips AM	Project Trips PM	# of Lanes	Ramp Capacity	by Project AM	by Project PM	Percentage For Screening*	Requires Analysis?
I-10 Fwy WB Off-Ramp to Venice Bl.	WB	2	2	1	850	0.2%	0.2%	1.00%	**No**
I-10 Fwy EB Off-Ramp to Robertson Bl.	EB	2	3	1	850	0.2%	0.4%	1.00%	**No**

* Criteria for freeway mainline segments and off-ramps operating at LOS E or F per *Agreement Between City of Los Angeles and Caltrans District 7 On Freeway Impact Analysis Procedure* , December 2015.

V. SWEPT PATH ANALYSIS

Per the signed Project MOU, a swept path analysis was conducted to verify that passenger vehicles will be able to access the parking spaces and Project driveway from the alley behind the Project site. This analysis was conducted using procedures from A Policy on Geometric Design of Highways and Streets, American Associates of State and Highway Transportation Officials, 6th Edition, 2011 (the AASHTO Manual). This analysis is provided within Appendix E. This analysis demonstrates that all project parking spaces can be accessed from the alley.

VI. DRIVEWAY SIGHT DISTANCE ANALYSIS

In accordance with discussions with the City, the Project driveway design was examined to ensure that sufficient sight distance was provided for vehicles exiting the Project driveway onto the alley adjacent to the Project site. A convex mirror is to be added to the end of the ramp at the alley to assist driver sight distance. The sight distance analysis with the mirror was performed to align with requirements set by the American Association of State and Highway Transportation Officials (AASHTO). This analysis is provided with Appendix F.

VII. SUMMARY

The above analysis has been prepared with the assumptions and parameters outlined in the MOU signed on May 21, 2019. Based on the results of this analysis, the proposed Robertson (3727) Mixed-Use Project will not have significant traffic impacts at any study intersections, CMP locations, or freeway facilities.

Sincerely,
Crain & Associates

George Rhyner, PE
Transportation Engineer
TE 2143, CE 47763

GR
C22533
Attachments

FIGURES

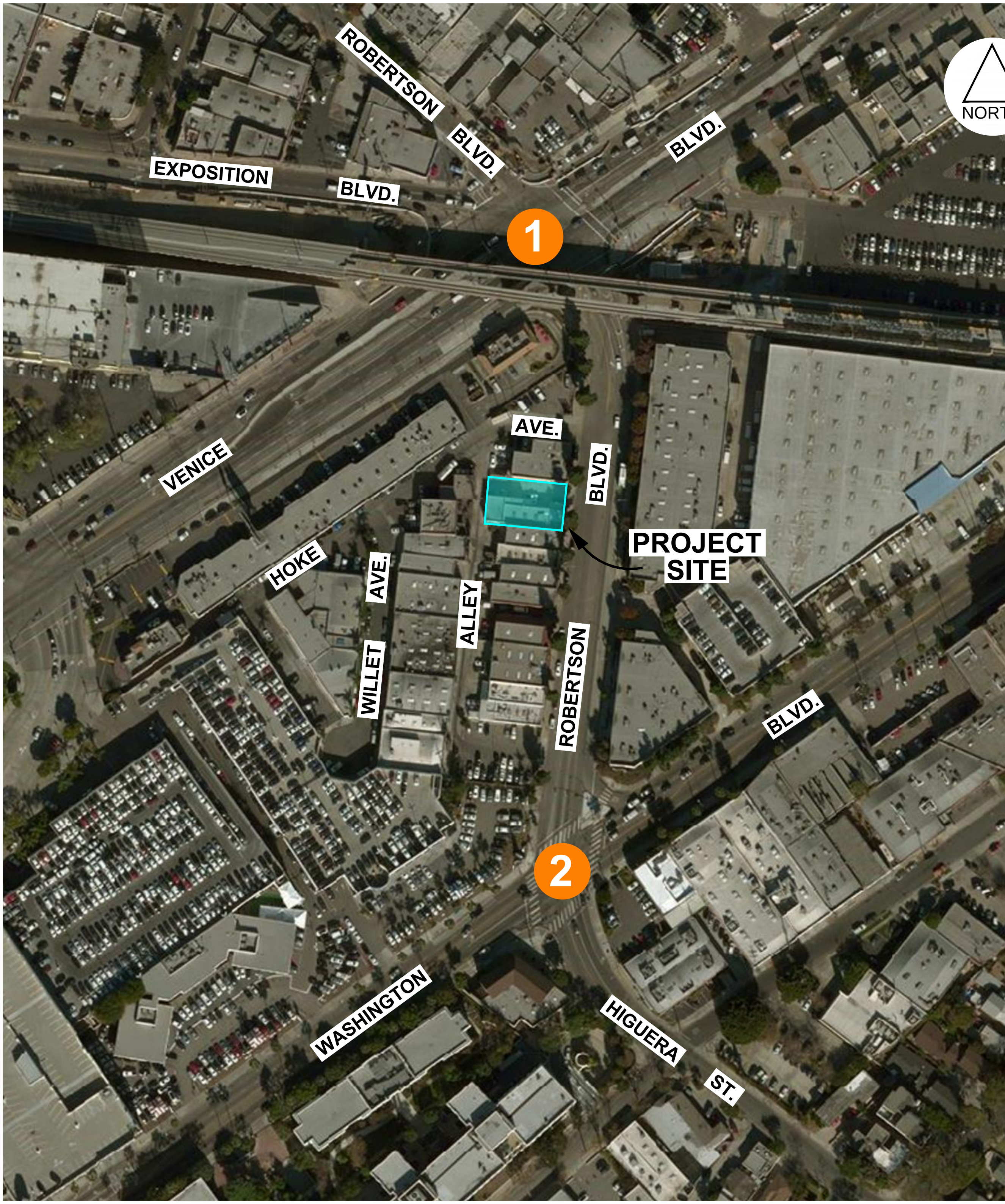


FIGURE 1

6/26/2019

FN: Robertson(3727)MixedUseCulverCity/SITE-VICINITY

SITE VICINITY & STUDY INTERSECTION
LOCATION MAP

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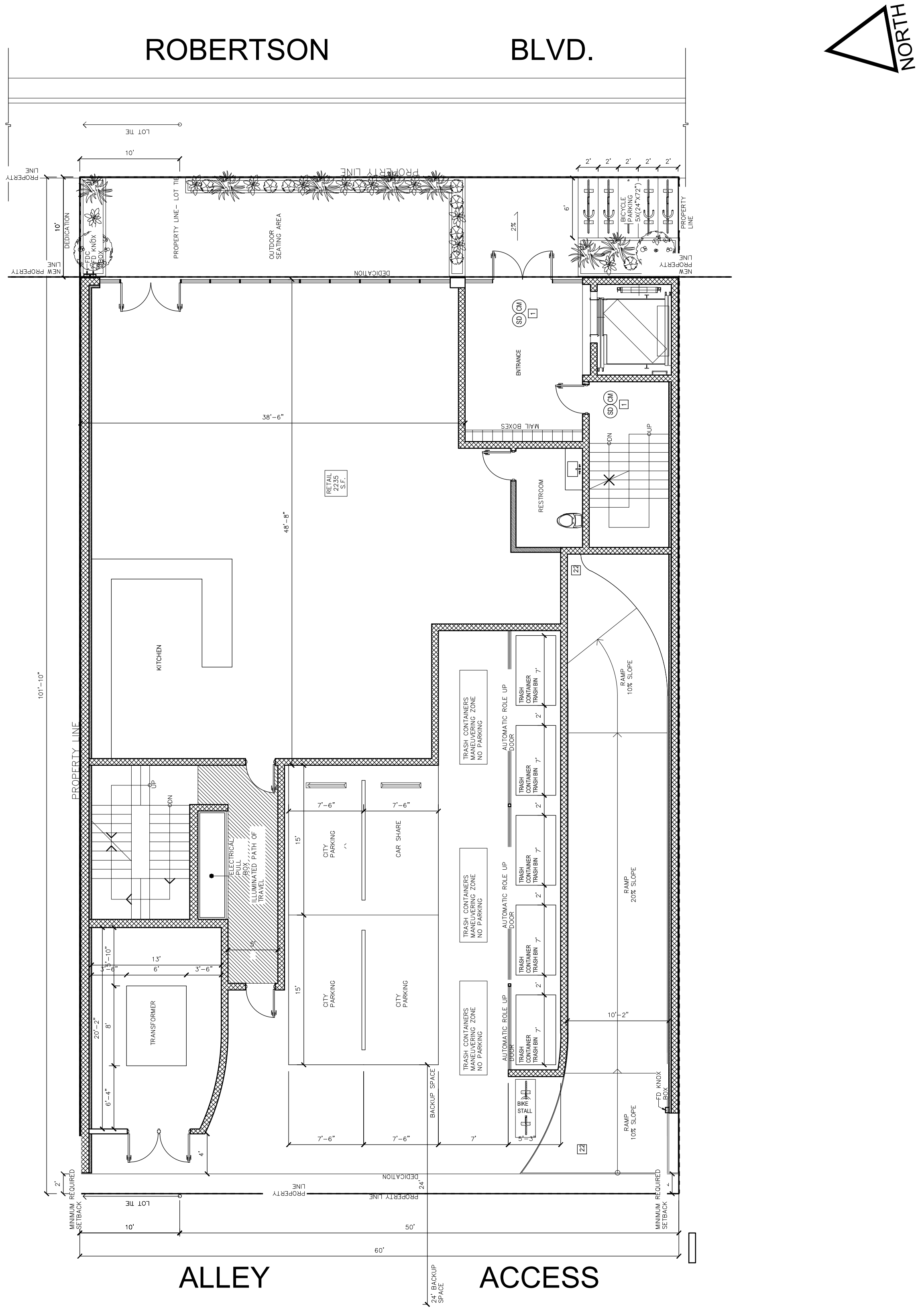

FIGURE 2

11/4/2020

ROBERTSON(3727)MIXEDUSE\SITE PLAN

PROJECT SITE PLAN

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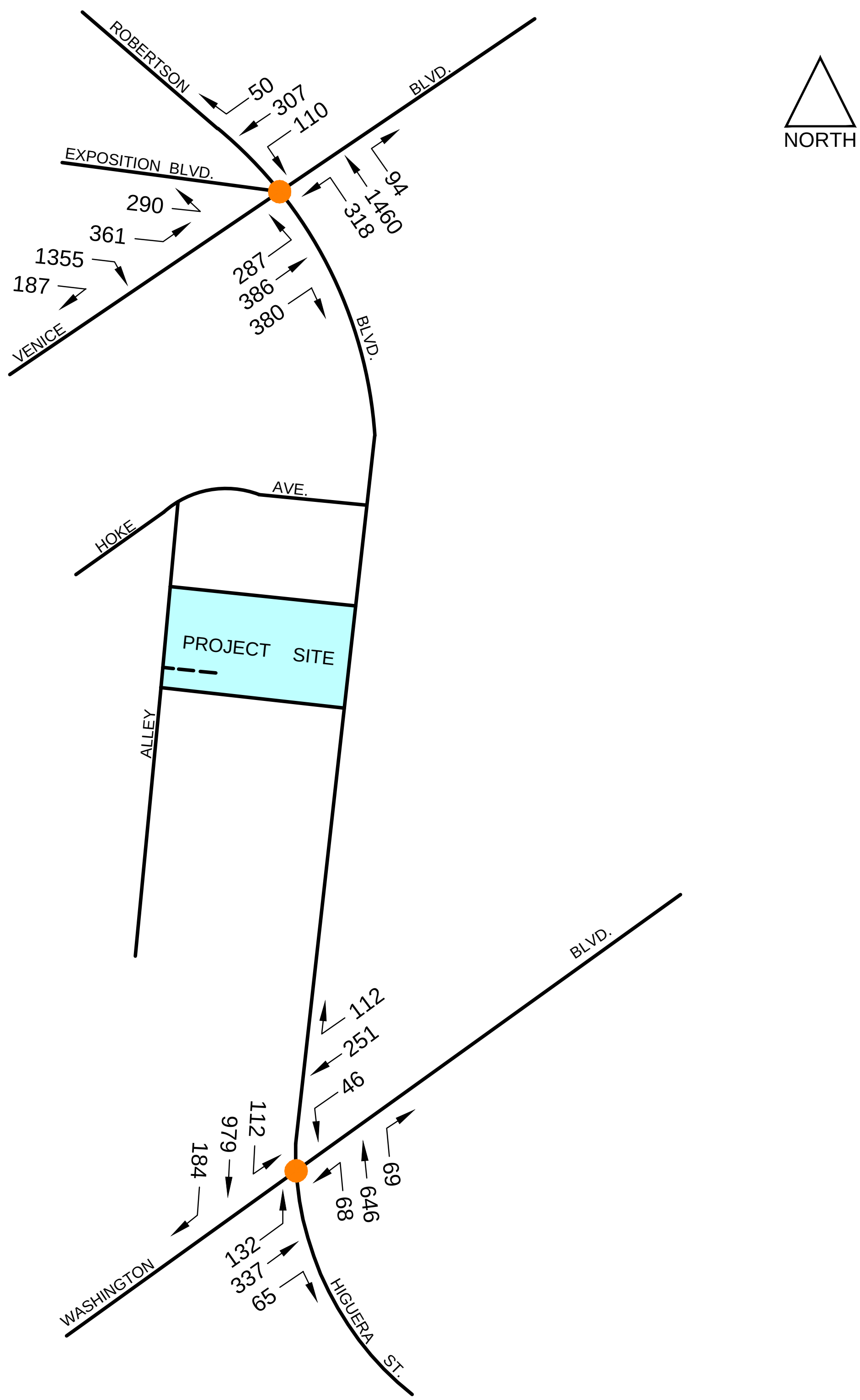

FIGURE 3(a)

6/26/2019

Robertson(3727)MixedUseCulverCity\AM2019

EXISTING (2019) TRAFFIC VOLUMES
AM PEAK HOUR

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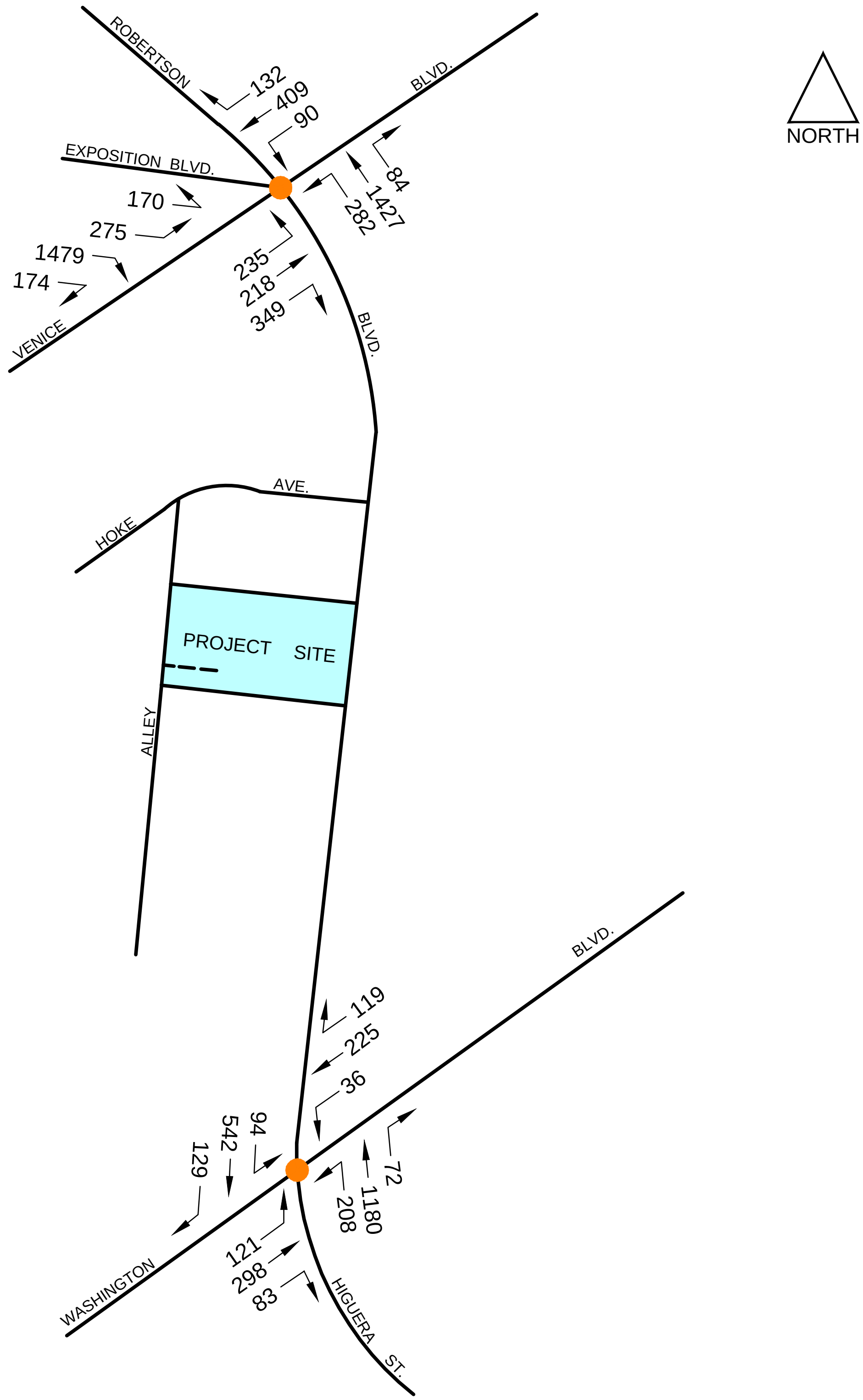

FIGURE 3(b)

6/26/2019

Robertson(3727)MixedUseCulverCity\PM2019

EXISTING (2019) TRAFFIC VOLUMES
PM PEAK HOUR

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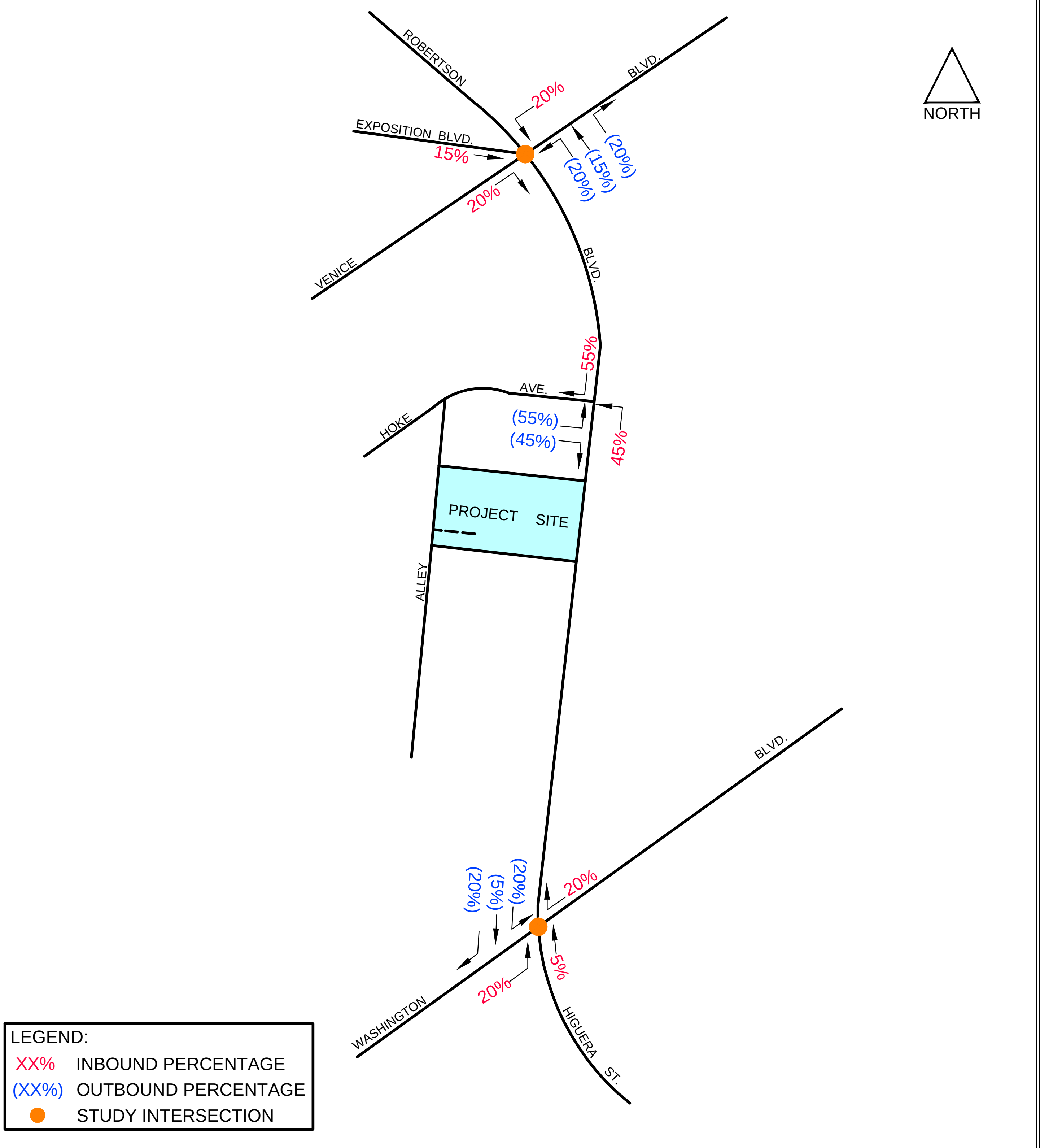

FIGURE 4

2/12/2019

FN: Robertson(3727)MixedUseCulverCity\PROJ-DIST

PROJECT TRIP ASSIGNMENT PERCENTAGES

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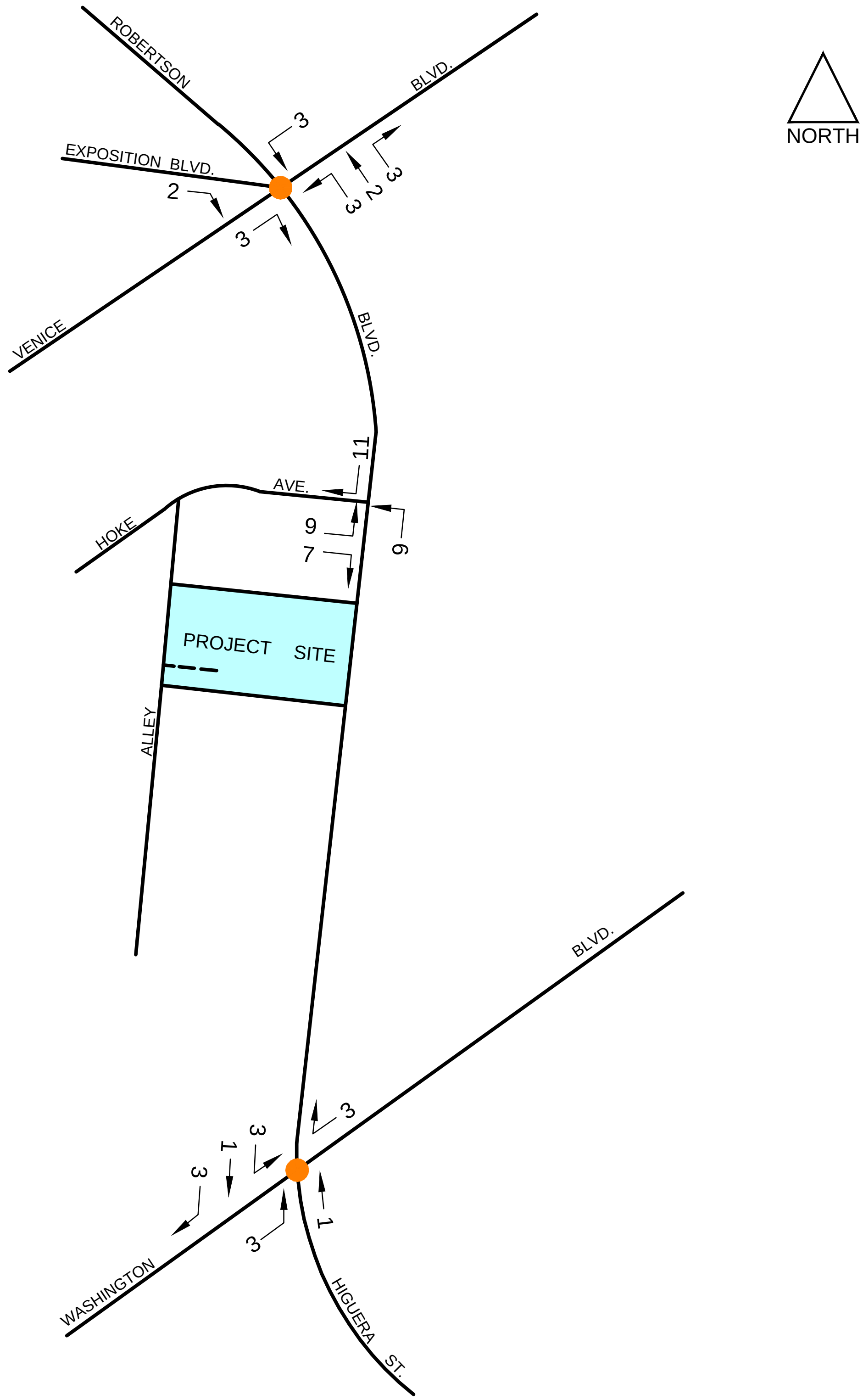

FIGURE 5(a)

6/26/2019

Robertson(3727)MixedUseCulverCity\AM-PROJ-VOLS

PROJECT TRAFFIC VOLUMES
AM PEAK HOUR

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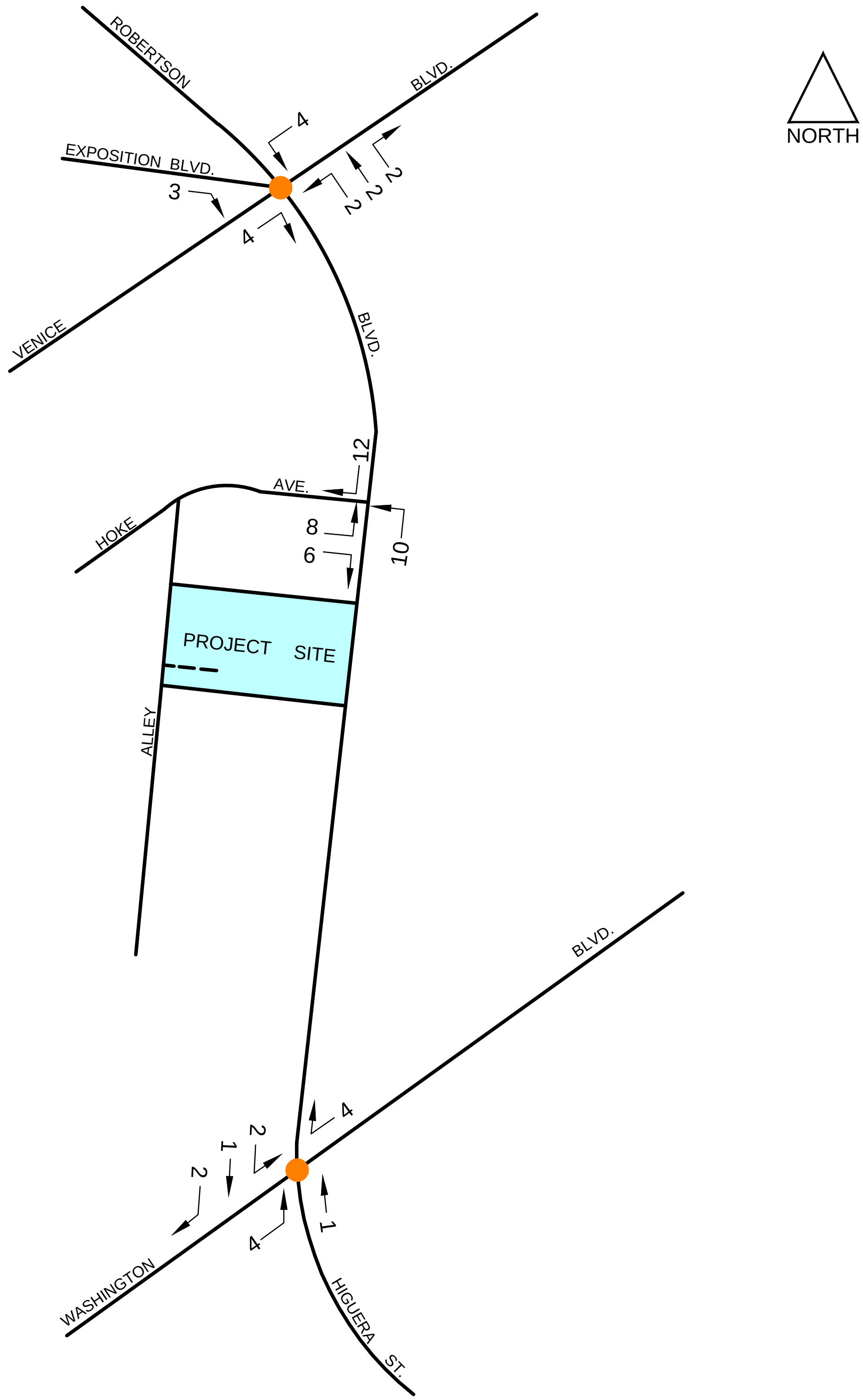

FIGURE 5(b)

6/26/2019

Robertson(3727)MixedUseCulverCity\PM-PROJ-VOLS

PROJECT TRAFFIC VOLUMES
PM PEAK HOUR

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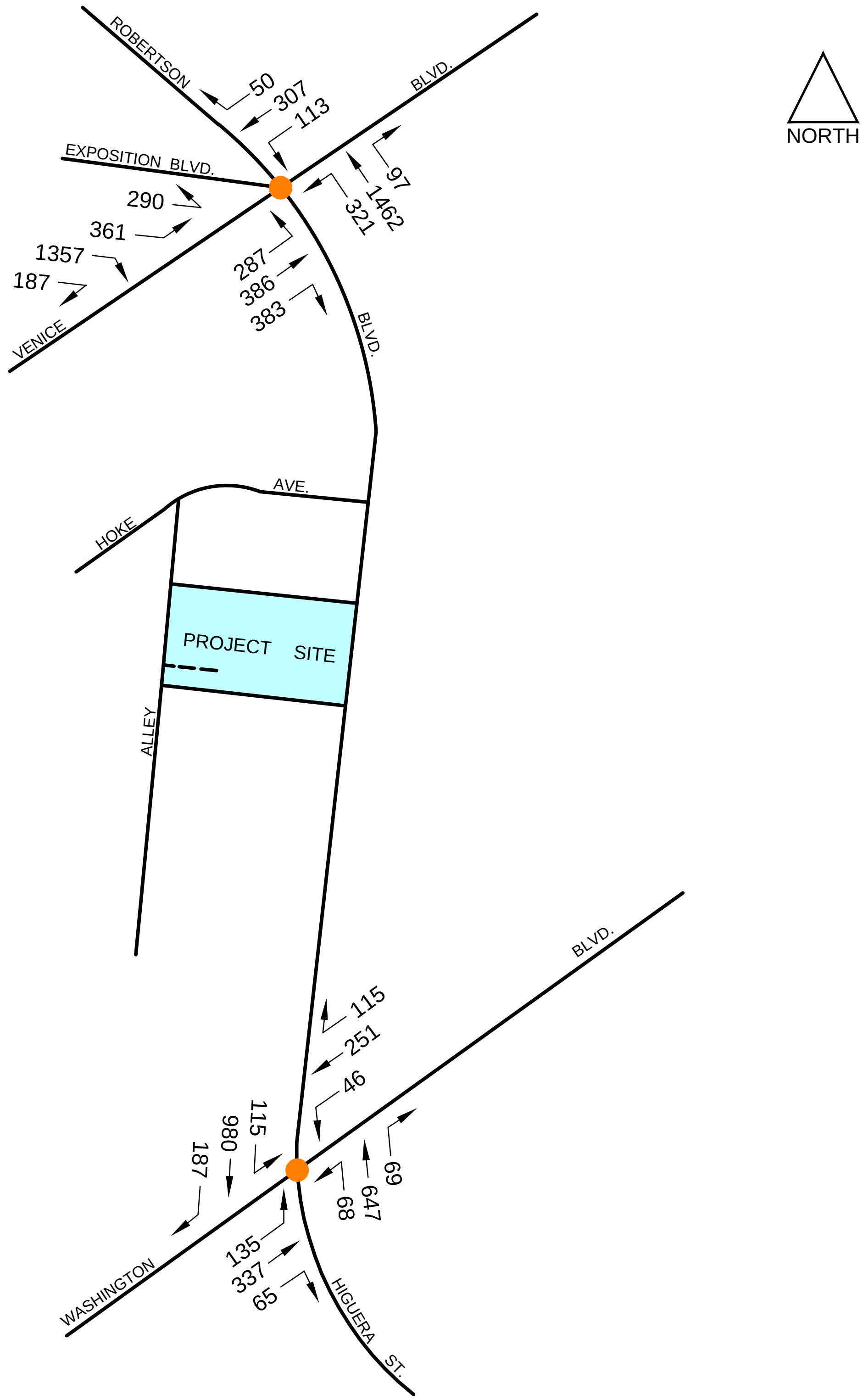

FIGURE 6(a)

6/26/2019

Robertson(3727)MixedUseCulverCity\AM2019WP

EXISTING (2019) TRAFFIC VOLUMES
WITH PROJECT
AM PEAK HOUR

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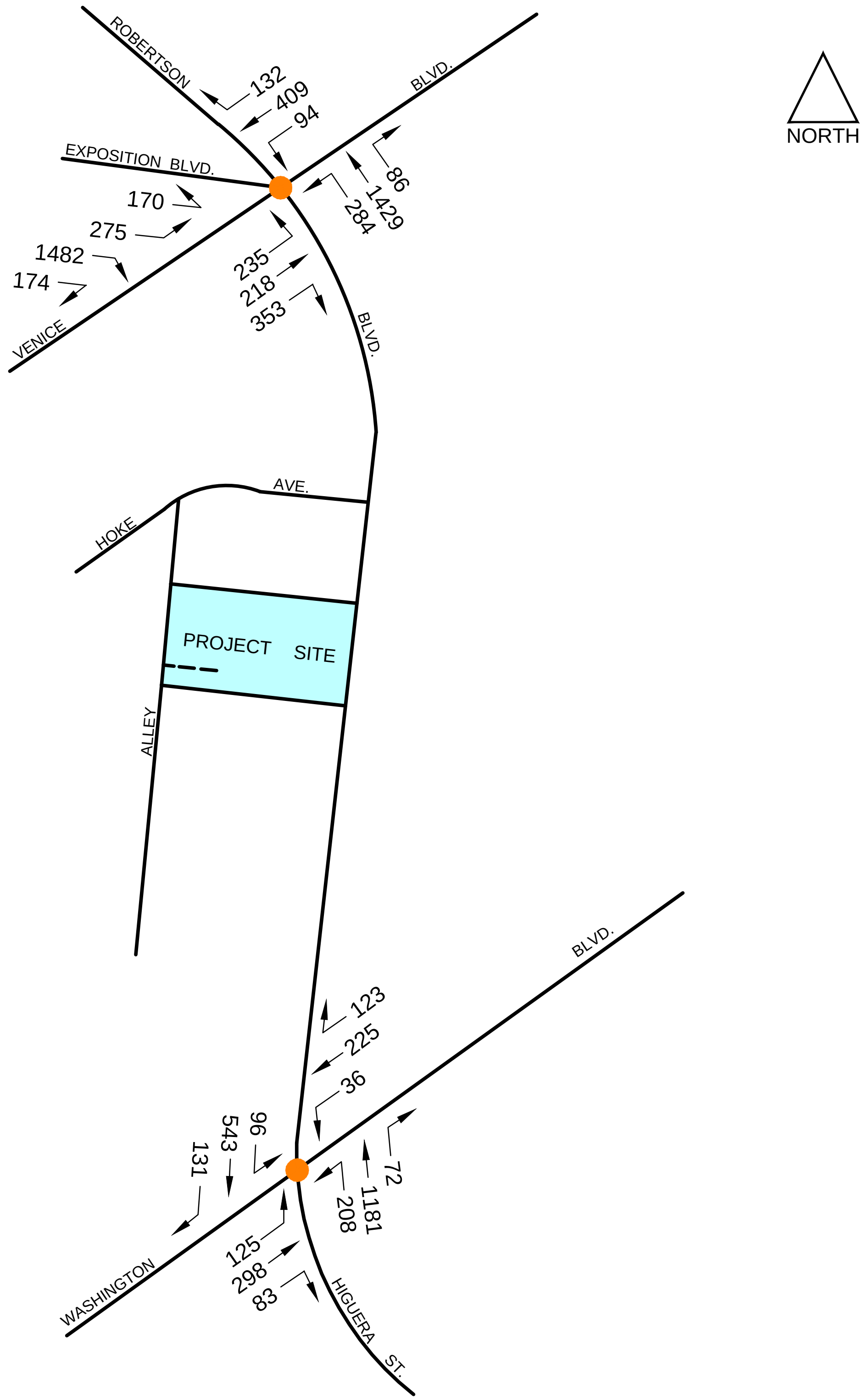

FIGURE 6(b)

6/26/2019

Robertson(3727)MixedUseCulverCity\PM2019WP

EXISTING (2019) TRAFFIC VOLUMES
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PM PEAK HOUR

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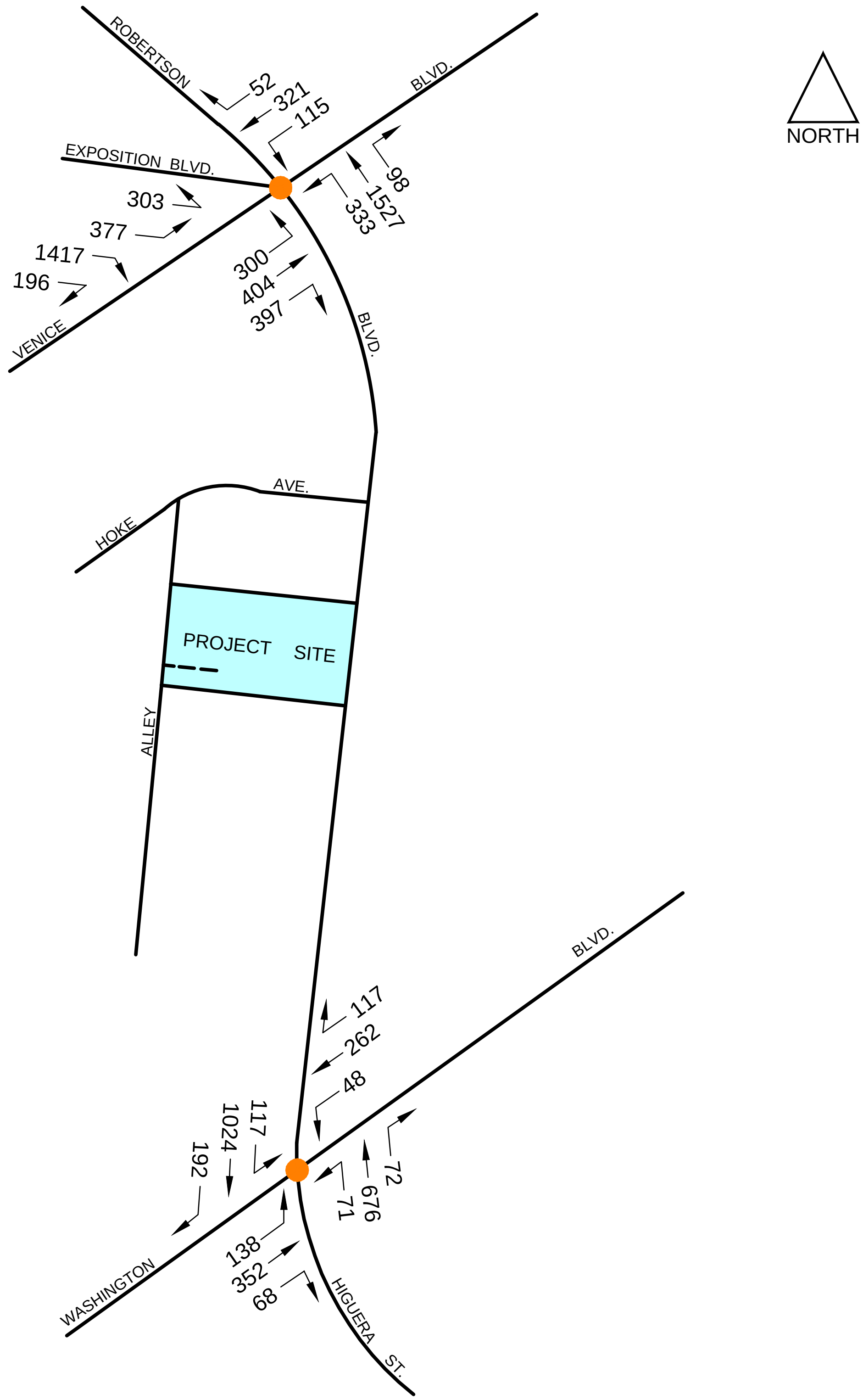

FIGURE 7(a)

6/26/2019

Robertson(3727)MixedUseCulverCity\AM2022WO

FUTURE (2022) TRAFFIC VOLUMES
WITHOUT PROJECT
AM PEAK HOUR

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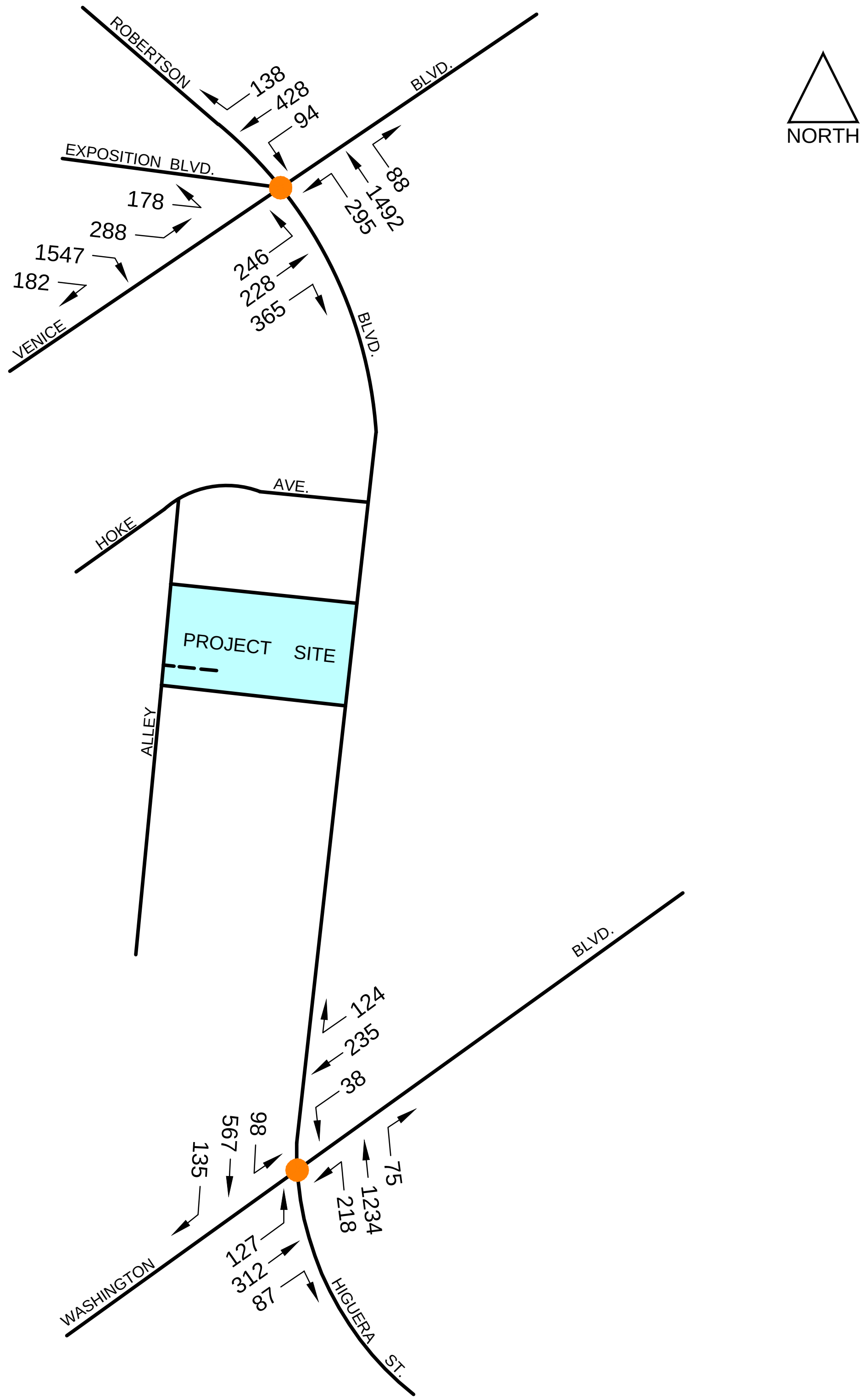

FIGURE 7(b)

6/26/2019

Robertson(3727)MixedUseCulverCity\PM2022WO

FUTURE (2022) TRAFFIC VOLUMES
WITHOUT PROJECT
PM PEAK HOUR

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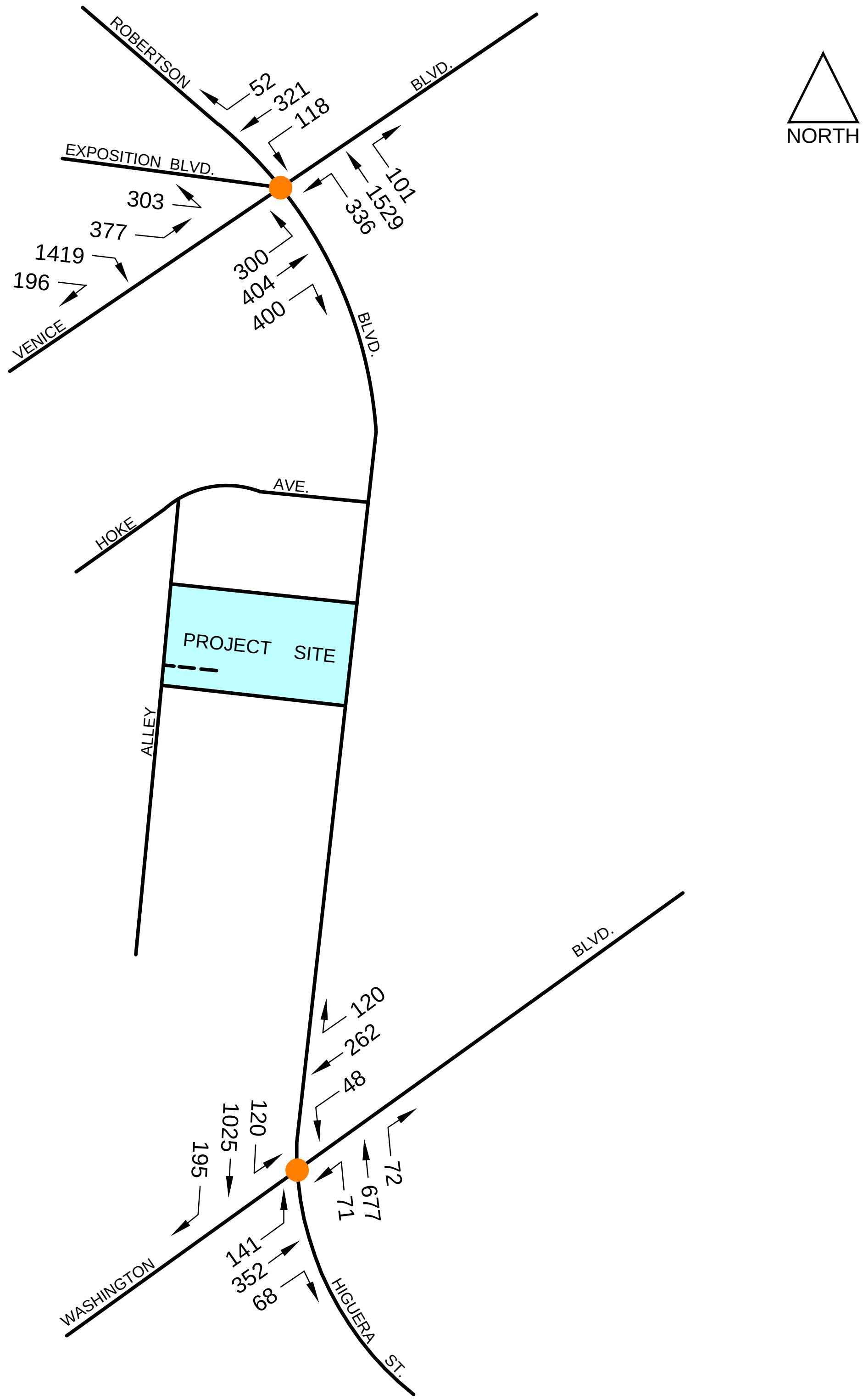

FIGURE 8(a)

6/26/2019

Robertson(3727)MixedUseCulverCity\AM2022WP

FUTURE (2022) TRAFFIC VOLUMES
WITH PROJECT
AM PEAK HOUR

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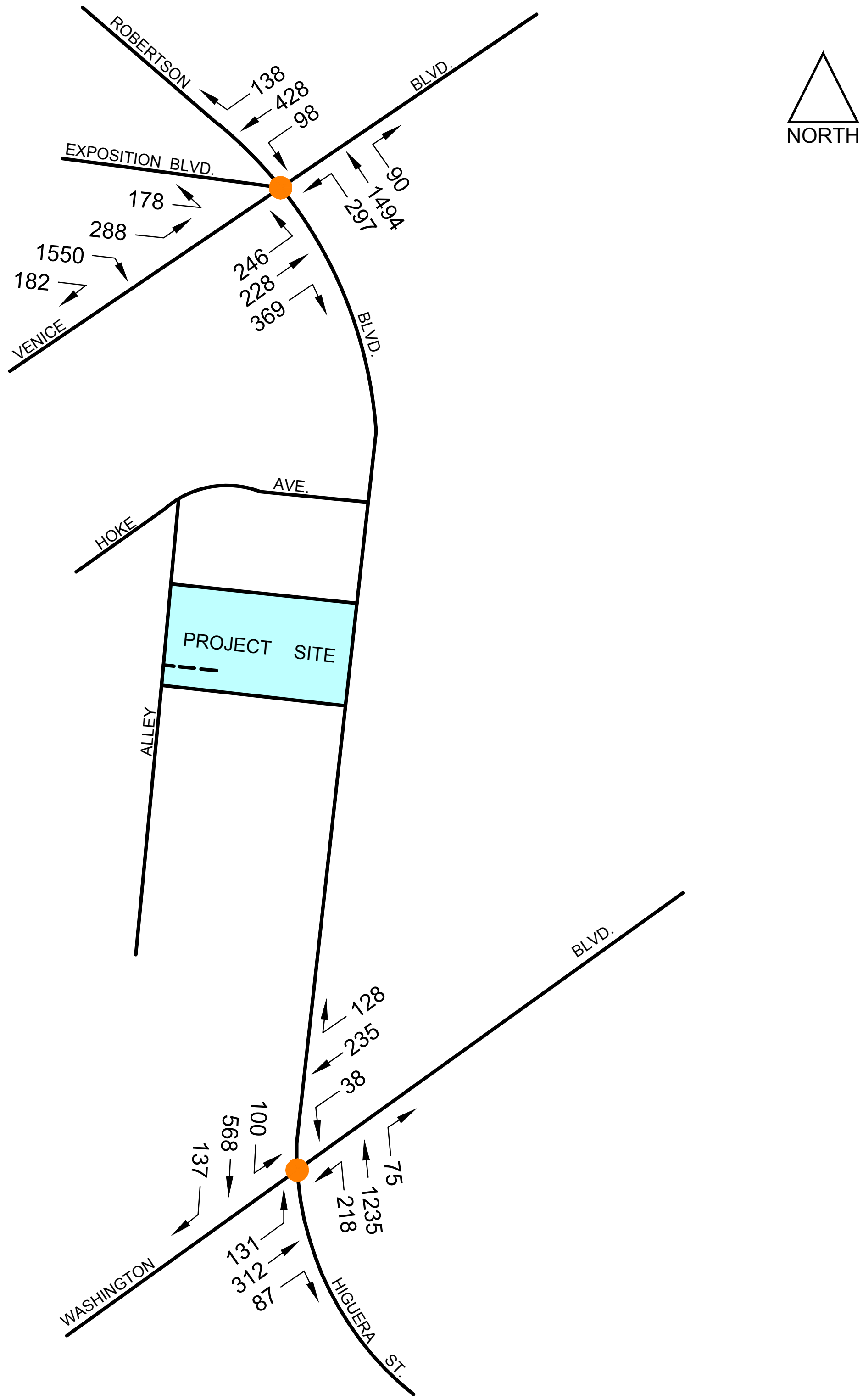

FIGURE 8(b)

6/26/2019

Robertson(3727)MixedUseCulverCity\PM2022WP

FUTURE (2022) TRAFFIC VOLUMES
WITH PROJECT
PM PEAK HOUR

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APPENDIX A
TRAFFIC STUDY – MEMORANDUM OF UNDERSTANDING (MOU)

Rec'd 5/20/2019

SCOPING MOU FOR TRAFFIC STUDY

This Memorandum of Understanding (MOU) acknowledges City of Culver City Transportation Department requirements of traffic impact analysis for the following project:

Project Name: Robertson (3727) Mixed-Use (Residential, Office & Retail/Restaurant) Project

Project Address: 3727 S. Robertson Boulevard, Culver City

Project Description: Mixed-use building with 12 apartment units, 5,455 square feet of office and 3,886 square feet of retail/restaurant (See Attachment 1 for Conceptual Site Plan)

Geographic Distribution: N 15% S 5% E 40% W 40%
See Attachment 2 for project trip Assignment percentages and volumes.

Trip Generation Rate(s): ITE Trip Generation, 10th Edition
See Attachment 3 for Project trip generation rates.

Trip Generation: Project trip generation calculations attached in Attachment 3.

Project Buildout Year: 2022 Ambient or CMP Growth Rate: 1.5% per yr.

Related Projects: 1.5% per year ambient growth rate to account for related project volumes.

Subject to Freeway Impact Analysis Screening review: YES _ NO X (See attachment 4)

City of Culver City Bicycle & Pedestrian Master Plan Analysis (Site Vicinity): YES _ NO X

Study Intersections [See Attachment 2]

1. Robertson Blvd. & Venice Blvd. (LOS Analysis)
2. Robertson Blvd. & Washington Pl. (LOS Analysis)
3. Robertson Blvd. & Hoke Ave. (no LOS Analysis, only showing project traffic)

Swept Path Analysis: Passenger car (or largest vehicle size) vehicular swept path analysis for the Project parking at north end of the alley. Showing the loading and trash can location and the swept path to access these locations.

Dedication: 10' setback for a future 10' right of way dedication along the Project's frontage with Robertson Bl. to conform with the City's Primary Artery designation of Robertson Bl. and to match the 10' dedication for the properties on Robertson Bl. north of Hoke Ave.

Trip Credits: (Exact amount of credit subject to approval by City of Culver City)

	yes	no
Transportation Demand Management (TDM)	☐	☒
Existing Active Land Use	☒	☐
Previous Land Use	☐	☒
Internal Trip	☒	☐
Pass-By Trip	☒	☐
Transit	☒	☐

This analysis must follow latest Culver City Traffic Study guidelines.

	Consultant	Developer
Name	Crain & Associates	Icon West, Inc.
Address	300 Corporate Pointe, Suite 470 Culver City, CA 90230	520 S. La Fayette Park Pl., Ste# 503 Los Angeles, CA 90057
Phone No.	(310) 473-6508	(213) 385-0027

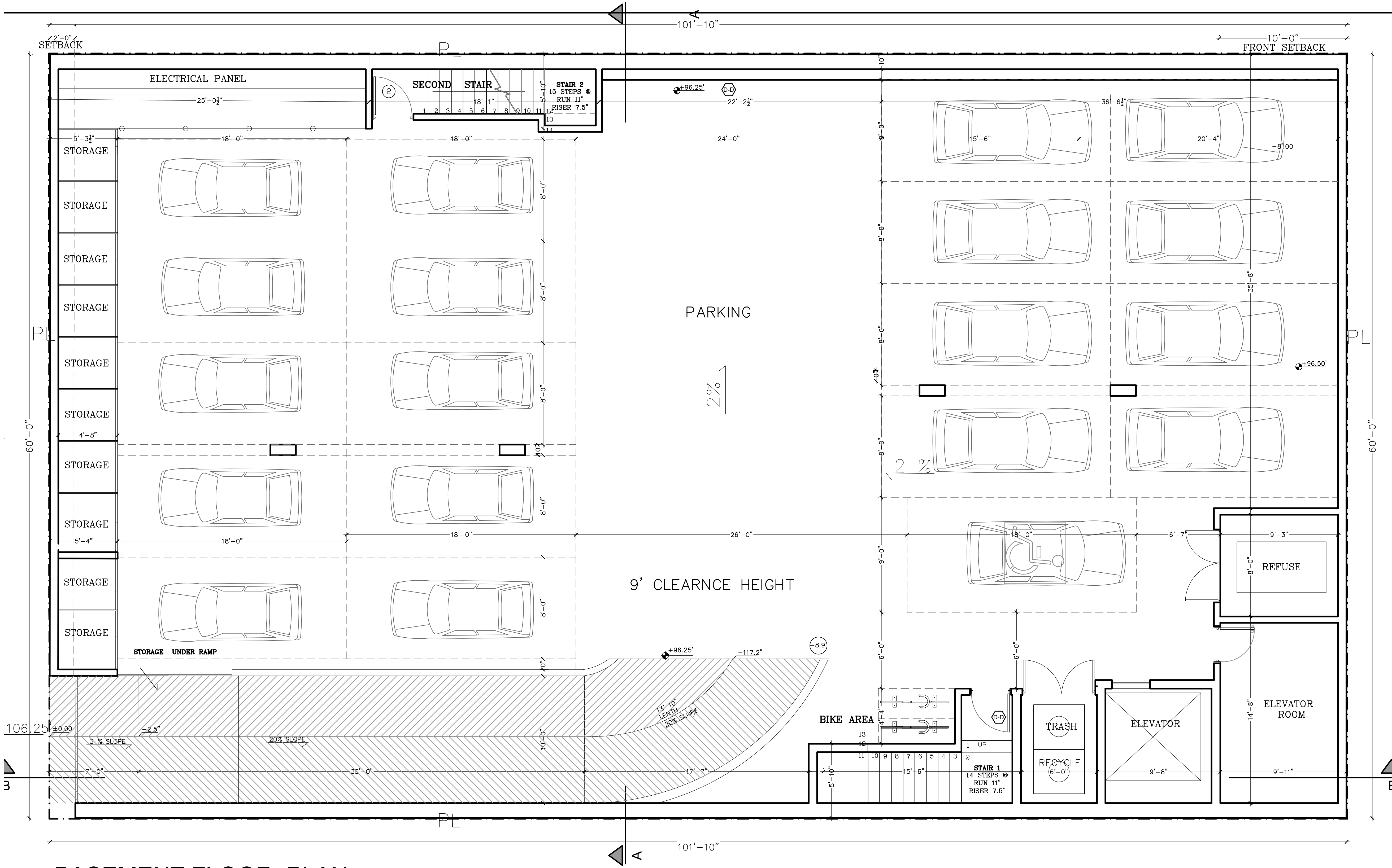
Approved by:

Helen Shi 5/20/2019
Consultant's Representative Date

[signature] 5/21/2019
Culver City Representative Date

ATTACHMENT 1

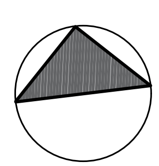
PROJECT CONCEPTUAL SITE PLAN



BASEMENT FLOOR PLAN

SCALE BAR1/8 FT

SCALE: 1/8"=1'-0"



3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

ALT 2

20% RAMP SLOPE

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS: 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

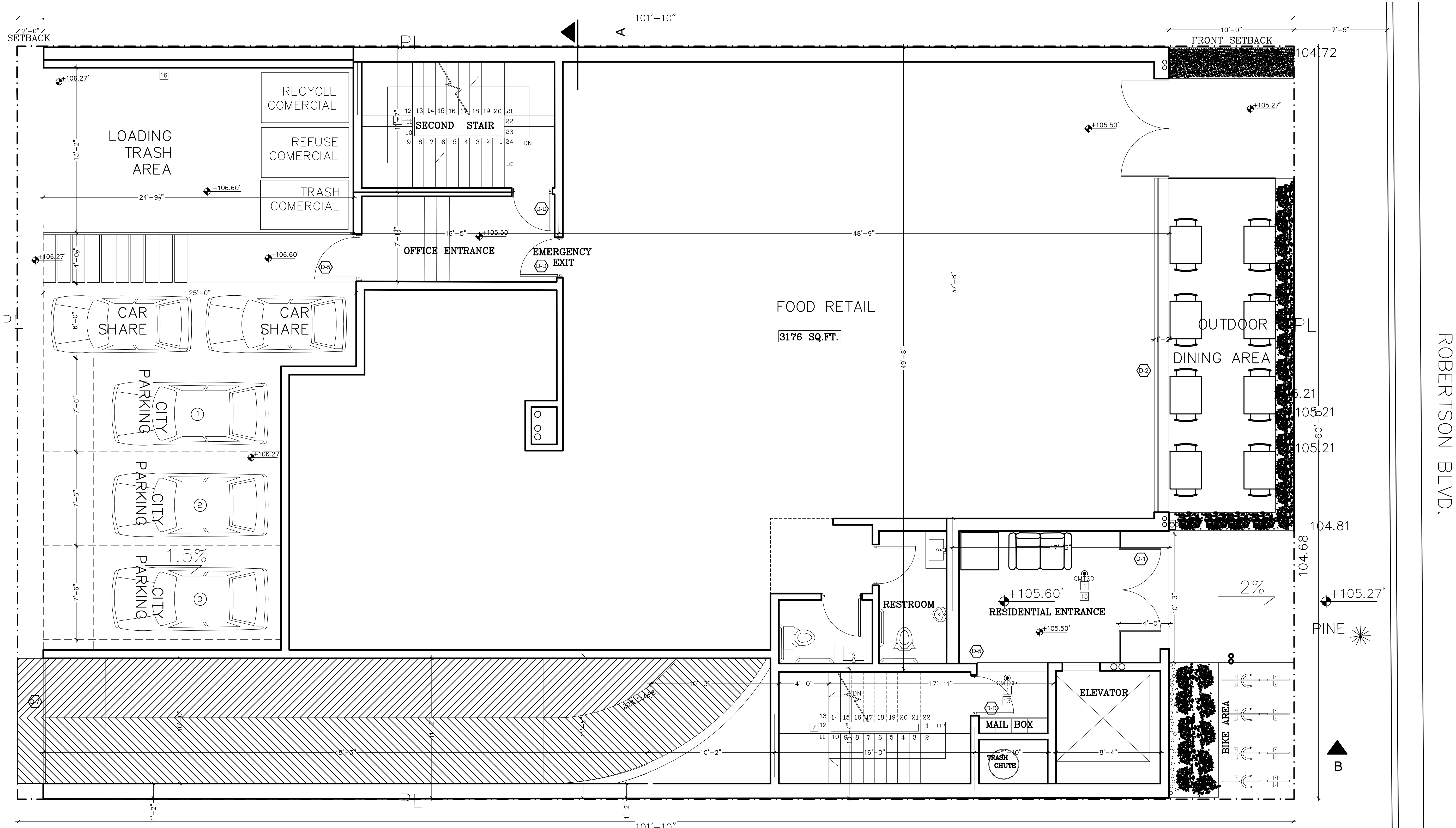
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: BASEMENT FLOOR

SHEET NUMBER: A 2

05/16/2019



FIRST FLOOR PLAN

SCALE BAR1/8 FT SCALE: 1/8"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232

NORTH

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

JOB NUMBER

DRAWING PHAS P/CSUBMITTAL

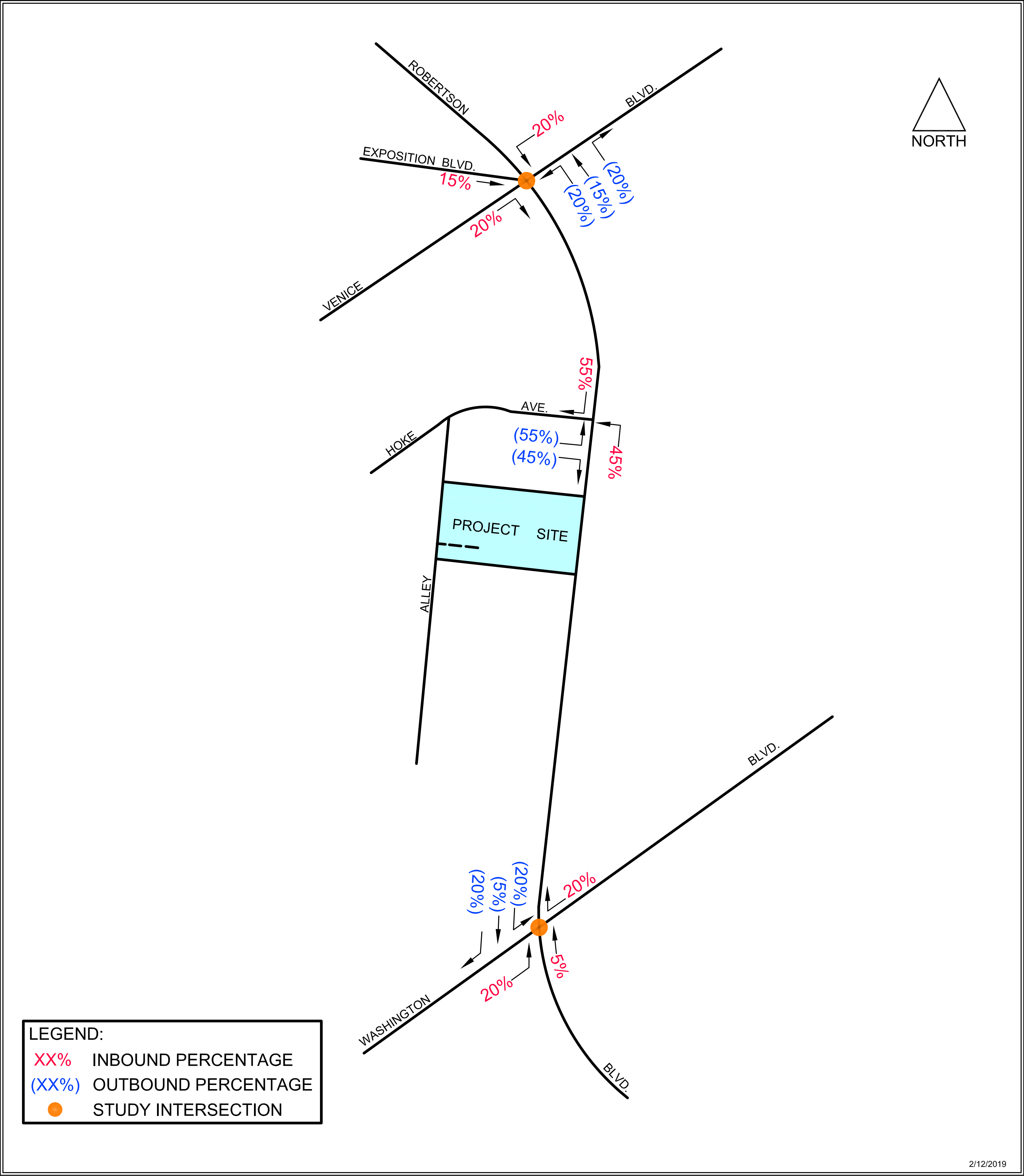
SHEET TITLE: FIRST FLOOR

SHEET NUMBE A3

05/16/20

ATTACHMENT 2

PROJECT TRIP ASSIGNMENT



2/12/2019

FN: Robertson(3727)MixedUseCulverCity\PROJ-DIST

PROJECT TRIP ASSIGNMENT PERCENTAGES

CRAIN & ASSOCIATES
Transportation Planning
Traffic Engineering
300 Corporate Pointe, Suite 470
Culver City, California 90230
PH (310) 473 6508 F (310) 444 9771
www.crainandassociates.com

ATTACHMENT 3

PROJECT TRIP GENERATION

Robertson (3727) Mixed-Use Development
Project Trip Generation Calculation Rates

LU	Use/Description	ITE		
221	Multifamily Housing (Mid-Rise) - General Urban/Suburban			
	Daily:	5.44	Trips per	dwelling unit
	AM Peak Hour:	0.36	Trips per	dwelling unit
	Inbound		26%	
	Outbound		74%	
	PM Peak Hour:	0.44	Trips per	dwelling unit
	Inbound		61%	
	Outbound		39%	
710	General Office Building - General Urban/Suburban			
	Daily:	9.74	Trips per	KSF of Building Area
	AM Peak Hour:	1.16	Trips per	KSF of Building Area
	Inbound		86%	
	Outbound		14%	
	PM Peak Hour:	1.15	Trips per	KSF of Building Area
	Inbound		16%	
	Outbound		84%	
820	Shopping Center - General Urban/Suburban			
	Daily:	37.75	Trips per	KSF of Building Area
	AM Peak Hour:	0.94	Trips per	KSF of Building Area
	Inbound		62%	
	Outbound		38%	
	PM Peak Hour:	3.81	Trips per	KSF of Building Area
	Inbound		48%	
	Outbound		52%	
932	High-Turnover Restaurant - General Urban/Suburban			
	Daily:	112.18	Trips per	KSF of Building Area
	AM Peak Hour:	9.94	Trips per	KSF of Building Area
	Inbound		55%	
	Outbound		45%	
	PM Peak Hour:	9.77	Trips per	KSF of Building Area
	Inbound		62%	
	Outbound		38%	

Sources:
Trip Generation, 10th Edition, 2017, Institute of Transportation Engineers (ITE).

Robertson (3727) Mixed-Use Development
Project Trip Generation Calculations

LU	Use/Description		Size	Units	Daily	AM Peak Hour I/B	AM Peak Hour O/B	AM Peak Hour Total	PM Peak Hour I/B	PM Peak Hour O/B	PM Peak Hour Total
	PROPOSED USES										
221	Apartment		12	du	65	1	3	4	3	2	5
710	Office		5.455	ksf	53	5	1	6	1	5	6
932	Retail/Restaurant		3.886	ksf	436	21	18	39	24	14	38
	Subtotal [A]				**554**	**27**	**22**	**49**	**28**	**21**	**49**
	Internal Trips										
	Apartment	10%			(7)	0	0	0	0	0	0
	Office	10%			(5)	(1)	0	(1)	0	(1)	(1)
	Retail/Restaurant	depends on other uses			(12)	0	(1)	(1)	(1)	0	(1)
	Subtotal [B]				**(24)**	**(1)**	**(1)**	**(2)**	**(1)**	**(1)**	**(2)**
	*Transit/Walk-in Trips**										
	Apartment	15%			(9)	0	(1)	(1)	(1)	0	(1)
	Office	15%			(7)	(1)	0	(1)	0	(1)	(1)
	Retail/Restaurant	15%			(64)	(3)	(3)	(6)	(3)	(3)	(6)
	Subtotal [C]				**(80)**	**(4)**	**(4)**	**(8)**	**(4)**	**(4)**	**(8)**
	[D] Driveway/Adj. Int. Trips = [A] + [B] + [C]				**450**	**22**	**17**	**39**	**23**	**16**	**39**
	Pass-by Trips										
	Apartment	0%			0	0	0	0	0	0	0
	Office	0%			0	0	0	0	0	0	0
	Retail/Restaurant	20%			(72)	(4)	(2)	(6)	(4)	(2)	(6)
	Subtotal [E]				**(72)**	**(4)**	**(2)**	**(6)**	**(4)**	**(2)**	**(6)**
	[F] Area Intersection Trips (Proposed Uses) = [D]+[E]				**378**	**18**	**15**	**33**	**19**	**14**	**33**
	EXISTING USES										
710	Office		3.500	ksf	34	3	1	4	1	3	4
	Subtotal [G]				**34**	**3**	**1**	**4**	**1**	**3**	**4**
	Existing Transit/Walk-in Trips										
	Office	15%			(5)	(1)	0	(1)	0	(1)	(1)
	Subtotal [H]				**(5)**	**(1)**	**0**	**(1)**	**0**	**(1)**	**(1)**
	[I] Existing Driveway/Adj. Int. Trips = [G] + [H]				**29**	**2**	**1**	**3**	**1**	**2**	**3**
	Pass-by Trips										
	Office	0%			0	0	0	0	0	0	0
	Subtotal [J]				**0**	**0**	**0**	**0**	**0**	**0**	**0**
	[K] Area Intersection Trips (Existing Uses) = [I]+[J]				**29**	**2**	**1**	**3**	**1**	**2**	**3**
	NET PROJECT TRIP GENERATION										
	Driveway/Adjacent Intersection Trips = [D] - [I]				**421**	**20**	**16**	**36**	**22**	**14**	**36**
	Area Intersection Trips (Net Project) = [F] - [K]				**349**	**16**	**14**	**30**	**18**	**12**	**30**

* Transit credit calculated by applying 15% credit to each individual use.

ATTACHMENT 4

PROJECT FREEWAY TRIP SCREENING

Robertson (3727) Mixed-Use Project
Traffic Volume Contributions to State Freeway Mainline and Off-Ramp Facilities

PROJECT TRIP GENERATION

Direction	Net Project AM	Net Project PM
Inbound	16	18
Outbound	14	12

CALTRANS FREEWAY IMPACT ANALYSIS

FREEWAY MAINLINE VOLUME CALCULATIONS

Mainline Segment Location	Direction	Proj. Trip Direction	Net Project Percentages Distribution	Net Project AM	Net Project PM	Number of Lanes	Capacity per Lane*	Total Capacity	Percentage Added by Project AM	Percentage Added by Project PM	Threshold Percentage For Screening*	Ramp Opration Volumes	Ramp Opration LOS	Requires Analysis?
I-10 Fwy, e/o Washington Blvd.	Westbound	Inbound	15%	2	3	4	2000	8000	0.03%	0.04%	1.00%	-	-	**No**
	Eastbound	Outbound	15%	2	2	4	2000	8000	0.03%	0.03%	1.00%	-	-	**No**
I-10 Fwy, w/o Bagley Ave.	Eastbound	Inbound	15%	2	3	4	2000	8000	0.03%	0.04%	1.00%	-	-	**No**
	Westbound	Outbound	15%	2	2	4	2000	8000	0.03%	0.03%	1.00%	-	-	**No**

FREEWAY OFF-RAMP VOLUME CALCULATIONS

Off-Ramp Location	Direction	Proj. Trip Direction	Net Project Percentages Distribution	Net Project AM	Net Project PM	Number of Lanes	Capacity per Lane*	Total Capacity	Percentage Added by Project AM	Percentage Added by Project PM	Threshold Percentage For Screening*	Ramp Opration Volumes	Ramp Opration LOS	Requires Analysis?
I-10 Fwy WB Off-Ramp to Venice Blvd.	Westbound	Inbound	10%	2	2	1	850	850	0.24%	0.24%	1.00%	-	-	**No**
I-10 Fwy EB Off-Ramp to Robertson Blvd.	Eastbound	Inbound	15%	2	3	1	850	850	0.24%	0.35%	1.00%	-	-	**No**

* Criteria for freeway mainline segments and off-ramps operating at LOS E or F per *Agreement Between City of Los Angeles and Caltrans District 7 On Freeway Impact Analysis Procedure, December 2015* .

APPENDIX B
EXISTING MANUAL COUNTS

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Los Angeles
N/S: Robertson Boulevard/Exposition Blvd
E/W: Venice Boulevard
Weather: Clear

File Name : 01_LAC_Robertson_Exposition_Venice AM
Site Code : 16619341
Start Date : 5/15/2019
Page No : 1

Groups Printed- Passenger Vehicles - Dual Wheeled - Buses

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	73	63	350	72	558	19	68	8	95	63	247	14	324	29	31	57	117	1094
07:15 AM	78	71	330	65	544	36	73	10	119	85	314	10	409	36	36	71	143	1215
07:30 AM	108	94	388	36	626	22	92	9	123	75	319	11	405	26	37	78	141	1295
07:45 AM	98	81	297	37	513	27	79	8	114	86	329	21	436	66	74	66	206	1269
Total	357	309	1365	210	2241	104	312	35	451	309	1209	56	1574	157	178	272	607	4873
08:00 AM	81	69	306	37	493	17	75	8	100	74	317	13	404	74	82	79	235	1232
08:15 AM	94	77	353	34	558	32	73	14	119	69	361	19	449	60	98	105	263	1389
08:30 AM	87	70	355	37	549	24	73	11	108	97	371	28	496	78	99	102	279	1432
08:45 AM	96	74	331	50	551	38	88	14	140	74	355	27	456	75	99	97	271	1418
Total	358	290	1345	158	2151	111	309	47	467	314	1404	87	1805	287	378	383	1048	5471
09:00 AM	84	69	316	66	535	16	73	11	100	78	373	20	471	74	90	76	240	1346
09:15 AM	78	61	348	46	533	16	62	16	94	68	297	30	395	64	77	84	225	1247
09:30 AM	81	63	340	31	515	16	61	14	91	64	294	14	372	59	78	98	235	1213
09:45 AM	104	86	328	51	569	21	48	12	81	51	311	15	377	77	71	89	237	1264
Total	347	279	1332	194	2152	69	244	53	366	261	1275	79	1615	274	316	347	937	5070
Grand Total	1062	878	4042	562	6544	284	865	135	1284	884	3888	222	4994	718	872	1002	2592	15414
Apprch %	16.2	13.4	61.8	8.6		22.1	67.4	10.5		17.7	77.9	4.4		27.7	33.6	38.7		
Total %	6.9	5.7	26.2	3.6	42.5	1.8	5.6	0.9	8.3	5.7	25.2	1.4	32.4	4.7	5.7	6.5	16.8	
Passenger Vehicles	1021	848	3881	545	6295	275	842	103	1220	870	3784	202	4856	697	850	986	2533	14904
% Passenger Vehicles	96.1	96.6	96	97	96.2	96.8	97.3	76.3	95	98.4	97.3	91	97.2	97.1	97.5	98.4	97.7	96.7
Dual Wheeled	36	25	118	17	196	9	13	19	41	14	78	10	102	19	22	15	56	395
% Dual Wheeled	3.4	2.8	2.9	3	3	3.2	1.5	14.1	3.2	1.6	2	4.5	2	2.6	2.5	1.5	2.2	2.6
Buses	5	5	43	0	53	0	10	13	23	0	26	10	36	2	0	1	3	115
% Buses	0.5	0.6	1.1	0	0.8	0	1.2	9.6	1.8	0	0.7	4.5	0.7	0.3	0	0.1	0.1	0.7

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 08:15 AM																		
08:15 AM	94	**77**	353	34	**558**	32	73	**14**	119	69	361	19	449	60	98	**105**	263	1389
08:30 AM	87	70	**355**	37	549	24	73	11	108	**97**	371	**28**	**496**	**78**	**99**	102	**279**	**1432**
08:45 AM	**96**	74	331	50	551	**38**	**88**	14	**140**	74	355	27	456	75	99	97	271	1418
09:00 AM	84	69	316	**66**	535	16	73	11	100	78	**373**	20	471	74	90	76	240	1346
Total Volume	361	290	1355	187	2193	110	307	50	467	318	1460	94	1872	287	386	380	1053	5585
% App. Total	16.5	13.2	61.8	8.5		23.6	65.7	10.7		17	78	5		27.3	36.7	36.1		
PHF	.940	.942	.954	.708	.983	.724	.872	.893	.834	.820	.979	.839	.944	.920	.975	.905	.944	.975

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Los Angeles
N/S: Robertson Boulevard/Exposition Blvd
E/W: Venice Boulevard
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File Name : 01_LAC_Robertson_Exposition_Venice AM
Site Code : 16619341
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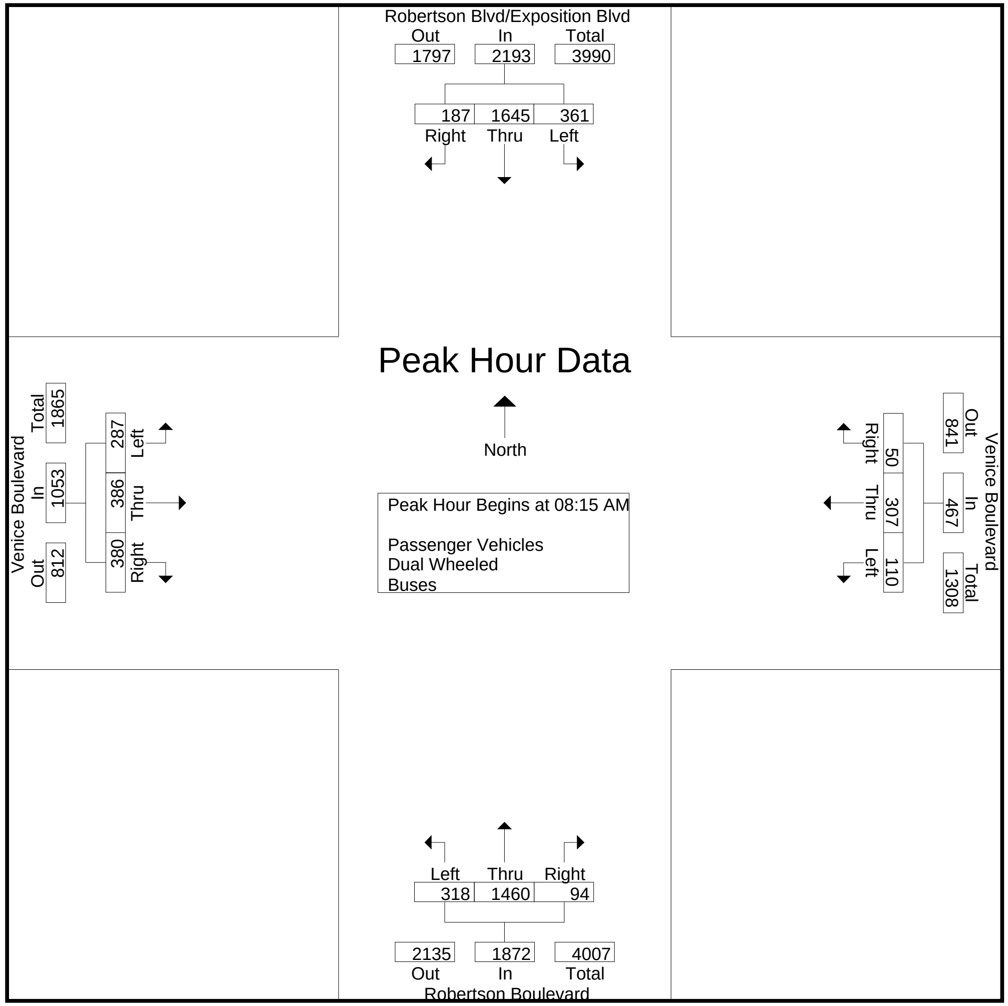

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Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																		
Peak Hour for Each Approach Begins at:																		
	07:00 AM					08:00 AM				08:15 AM				08:15 AM				
+0 mins.	73	63	350	**72**	558	17	75	8	100	69	361	19	449	60	98	**105**	263	
+15 mins.	78	71	330	65	544	32	73	**14**	119	**97**	371	**28**	**496**	**78**	**99**	102	**279**	
+30 mins.	**108**	**94**	**388**	36	**626**	24	73	11	108	74	355	27	456	75	99	97	271	
+45 mins.	98	81	297	37	513	**38**	**88**	14	**140**	78	**373**	20	471	74	90	76	240	
Total Volume	357	309	1365	210	2241	111	309	47	467	318	1460	94	1872	287	386	380	1053	
% App. Total	15.9	13.8	60.9	9.4		23.8	66.2	10.1		17	78	5		27.3	36.7	36.1		
PHF	.826	.822	.880	.729	.895	.730	.878	.839	.834	.820	.979	.839	.944	.920	.975	.905	.944	

Counts Unlimited
PO Box 1178
Corona, CA 92878
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City of Los Angeles
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E/W: Venice Boulevard
Weather: Clear

File Name : 01_LAC_Robertson_Exposition_Venice AM
Site Code : 16619341
Start Date : 5/15/2019
Page No : 1

Groups Printed- Passenger Vehicles

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	69	59	330	70	528	18	66	5	89	62	235	9	306	24	30	56	110	1033
07:15 AM	73	67	318	64	522	36	72	8	116	83	304	9	396	34	34	70	138	1172
07:30 AM	104	90	373	35	602	22	89	7	118	74	310	10	394	26	35	76	137	1251
07:45 AM	94	78	283	36	491	26	78	6	110	83	322	20	425	66	74	66	206	1232
Total	340	294	1304	205	2143	102	305	26	433	302	1171	48	1521	150	173	268	591	4688
08:00 AM	79	67	297	37	480	17	75	6	98	73	309	12	394	71	79	78	228	1200
08:15 AM	92	77	344	34	547	31	71	12	114	68	352	18	438	60	94	103	257	1356
08:30 AM	86	70	342	37	535	23	71	10	104	95	363	27	485	75	97	102	274	1398
08:45 AM	92	72	324	49	537	37	87	12	136	73	345	27	445	74	98	96	268	1386
Total	349	286	1307	157	2099	108	304	40	452	309	1369	84	1762	280	368	379	1027	5340
09:00 AM	80	66	307	62	515	15	70	9	94	77	367	17	461	74	89	74	237	1307
09:15 AM	76	60	332	42	510	15	60	9	84	68	291	27	386	62	74	81	217	1197
09:30 AM	77	60	323	31	491	16	59	11	86	63	285	12	360	58	77	97	232	1169
09:45 AM	99	82	308	48	537	19	44	8	71	51	301	14	366	73	69	87	229	1203
Total	332	268	1270	183	2053	65	233	37	335	259	1244	70	1573	267	309	339	915	4876
Grand Total	1021	848	3881	545	6295	275	842	103	1220	870	3784	202	4856	697	850	986	2533	14904
Apprch %	16.2	13.5	61.7	8.7		22.5	69	8.4		17.9	77.9	4.2		27.5	33.6	38.9		
Total %	6.9	5.7	26	3.7	42.2	1.8	5.6	0.7	8.2	5.8	25.4	1.4	32.6	4.7	5.7	6.6	17	

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 08:15 AM to 09:00 AM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 08:15 AM																		
08:15 AM	**92**	**77**	**344**	34	**547**	31	71	**12**	114	68	352	18	438	60	94	**103**	257	1356
08:30 AM	86	70	342	37	535	23	71	10	104	**95**	363	**27**	**485**	**75**	97	102	**274**	**1398**
08:45 AM	92	72	324	49	537	**37**	**87**	12	**136**	73	345	27	445	74	**98**	96	268	1386
09:00 AM	80	66	307	**62**	515	15	70	9	94	77	**367**	17	461	74	89	74	237	1307
Total Volume	350	285	1317	182	2134	106	299	43	448	313	1427	89	1829	283	378	375	1036	5447
% App. Total	16.4	13.4	61.7	8.5		23.7	66.7	9.6		17.1	78	4.9		27.3	36.5	36.2		
PHF	.951	.925	.957	.734	.975	.716	.859	.896	.824	.824	.972	.824	.943	.943	.964	.910	.945	.974

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City of Los Angeles
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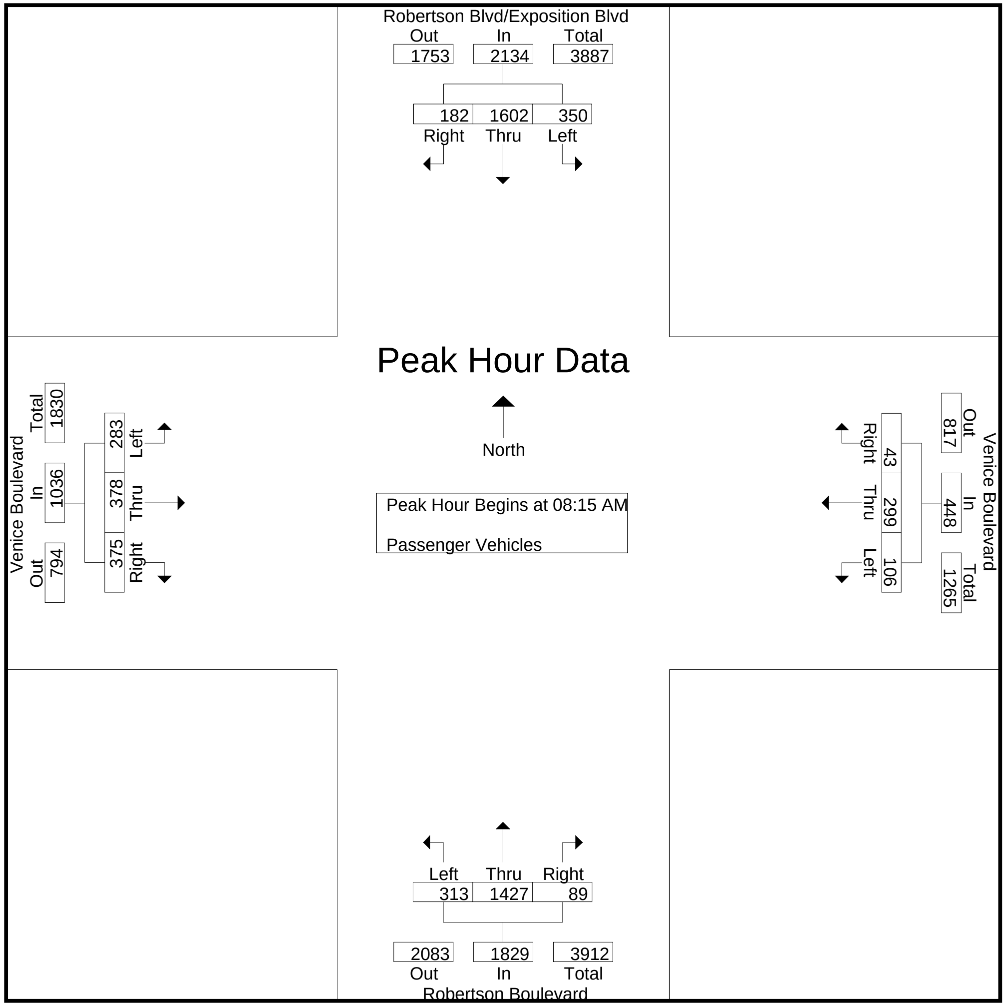
Weather: Clear

File Name : 01_LAC_Robertson_Exposition_Venice AM
Site Code : 16619341
Start Date : 5/15/2019
Page No : 2



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City of Los Angeles
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Weather: Clear

File Name : 01_LAC_Robertson_Exposition_Venice AM
Site Code : 16619341
Start Date : 5/15/2019

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 08:15 AM to 09:00 AM - Peak 1 of 1																		
Peak Hour for Each Approach Begins at:																		
	08:15 AM					08:15 AM				08:15 AM				08:15 AM				
+0 mins.	**92**	**77**	**344**	34	**547**	31	71	**12**	114	68	352	18	438	60	94	**103**	257	
+15 mins.	86	70	342	37	535	23	71	10	104	**95**	363	**27**	**485**	**75**	97	102	**274**	
+30 mins.	92	72	324	49	537	**37**	**87**	12	**136**	73	345	27	445	74	**98**	96	268	
+45 mins.	80	66	307	**62**	515	15	70	9	94	77	**367**	17	461	74	89	74	237	
Total Volume	350	285	1317	182	2134	106	299	43	448	313	1427	89	1829	283	378	375	1036	
% App. Total	16.4	13.4	61.7	8.5		23.7	66.7	9.6		17.1	78	4.9		27.3	36.5	36.2		
PHF	.951	.925	.957	.734	.975	.716	.859	.896	.824	.824	.972	.824	.943	.943	.964	.910	.945	

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File Name : 01_LAC_Robertson_Exposition_Venice AM
Site Code : 16619341
Start Date : 5/15/2019

Groups Printed- Dual Wheeled

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	3	3	15	2	23	1	1	2	4	1	10	4	15	5	1	1	7	49
07:15 AM	3	2	6	1	12	0	1	1	2	2	7	0	9	1	2	1	4	27
07:30 AM	3	3	10	1	17	0	2	1	3	1	5	1	7	0	2	2	4	31
07:45 AM	4	3	9	1	17	1	0	1	2	3	6	0	9	0	0	0	0	28
Total	13	11	40	5	69	2	4	5	11	7	28	5	40	6	5	4	15	135
08:00 AM	2	2	6	0	10	0	0	0	0	1	5	0	6	2	3	1	6	22
08:15 AM	2	0	5	0	7	1	1	2	4	1	6	0	7	0	4	2	6	24
08:30 AM	1	0	10	0	11	1	1	0	2	2	6	0	8	3	2	0	5	26
08:45 AM	4	2	5	1	12	1	0	1	2	1	9	0	10	1	1	0	2	26
Total	9	4	26	1	40	3	2	3	8	5	26	0	31	6	10	3	19	98
09:00 AM	4	3	6	4	17	1	2	1	4	1	4	1	6	0	1	2	3	30
09:15 AM	2	1	13	4	20	1	2	5	8	0	5	2	7	2	3	3	8	43
09:30 AM	3	2	15	0	20	0	0	2	2	1	7	2	10	1	1	1	3	35
09:45 AM	5	4	18	3	30	2	3	3	8	0	8	0	8	4	2	2	8	54
Total	14	10	52	11	87	4	7	11	22	2	24	5	31	7	7	8	22	162
Grand Total	36	25	118	17	196	9	13	19	41	14	78	10	102	19	22	15	56	395
Apprch %	18.4	12.8	60.2	8.7		22	31.7	46.3		13.7	76.5	9.8		33.9	39.3	26.8		
Total %	9.1	6.3	29.9	4.3	49.6	2.3	3.3	4.8	10.4	3.5	19.7	2.5	25.8	4.8	5.6	3.8	14.2	

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 08:15 AM to 09:00 AM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 08:15 AM																		
08:15 AM	2	0	5	0	7	**1**	1	**2**	**4**	1	6	0	7	0	**4**	**2**	**6**	24
08:30 AM	1	0	**10**	0	11	1	1	0	2	**2**	6	0	8	**3**	2	0	5	26
08:45 AM	**4**	2	5	1	12	1	0	1	2	1	**9**	0	**10**	1	1	0	2	26
09:00 AM	4	**3**	6	**4**	**17**	1	**2**	1	4	1	4	**1**	6	0	1	2	3	**30**
Total Volume	11	5	26	5	47	4	4	4	12	5	25	1	31	4	8	4	16	106
% App. Total	23.4	10.6	55.3	10.6		33.3	33.3	33.3		16.1	80.6	3.2		25	50	25		
PHF	.688	.417	.650	.313	.691	1.00	.500	.500	.750	.625	.694	.250	.775	.333	.500	.500	.667	.883

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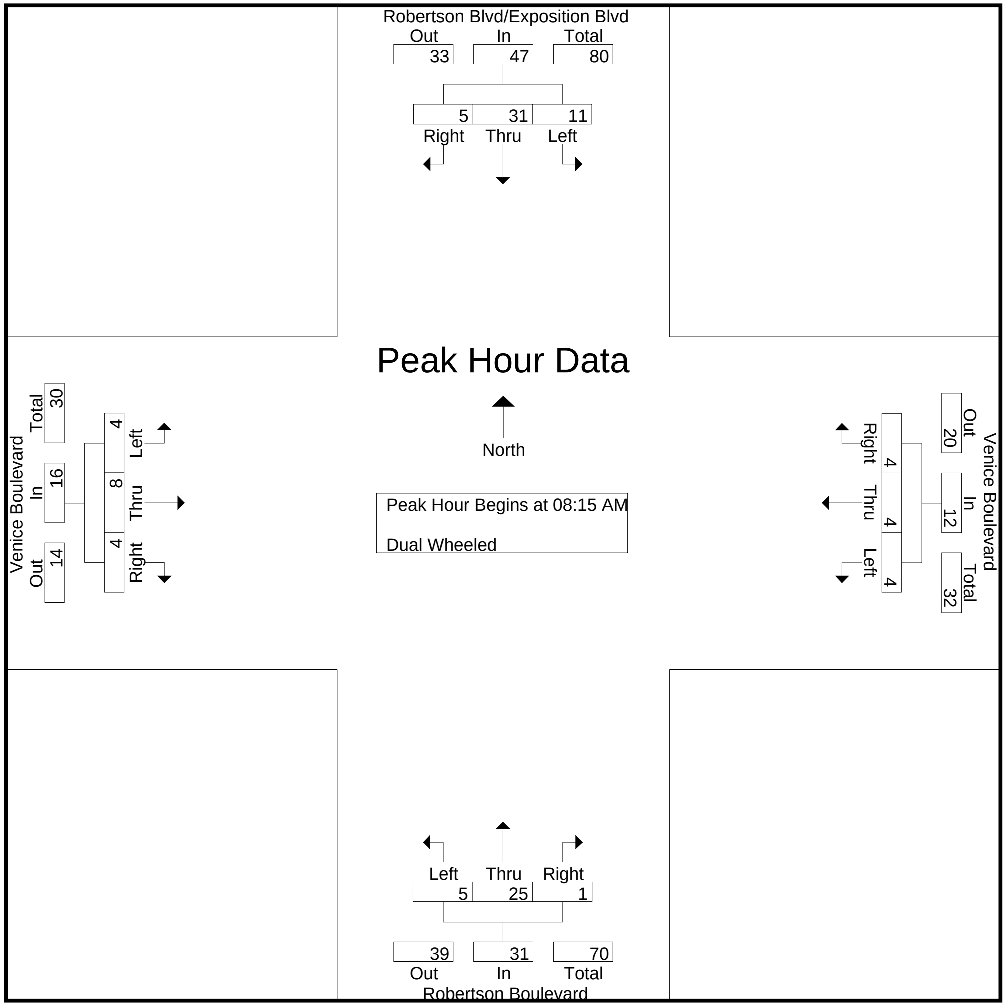
Site Code : 16619341
Start Date : 5/15/2019
Page No : 2



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	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 08:15 AM to 09:00 AM - Peak 1 of 1																		
Peak Hour for Each Approach Begins at:																		
	08:15 AM					08:15 AM				08:15 AM				08:15 AM				
+0 mins.	2	0	5	0	7	**1**	1	**2**	**4**	1	6	0	7	0	**4**	**2**	**6**	
+15 mins.	1	0	**10**	0	11	1	1	0	2	**2**	6	0	8	**3**	2	0	5	
+30 mins.	**4**	2	5	1	12	1	0	1	2	1	**9**	0	**10**	1	1	0	2	
+45 mins.	4	**3**	6	**4**	**17**	1	**2**	1	4	1	4	**1**	6	0	1	2	3	
Total Volume	11	5	26	5	47	4	4	4	12	5	25	1	31	4	8	4	16	
% App. Total	23.4	10.6	55.3	10.6		33.3	33.3	33.3		16.1	80.6	3.2		25	50	25		
PHF	.688	.417	.650	.313	.691	1.000	.500	.500	.750	.625	.694	.250	.775	.333	.500	.500	.667	

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File Name : 01_LAC_Robertson_Exposition_Venice AM
Site Code : 16619341
Start Date : 5/15/2019
Page No : 1

Groups Printed- Buses

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	1	5	0	7	0	1	1	2	0	2	1	3	0	0	0	0	12
07:15 AM	2	2	6	0	10	0	0	1	1	0	3	1	4	1	0	0	1	16
07:30 AM	1	1	5	0	7	0	1	1	2	0	4	0	4	0	0	0	0	13
07:45 AM	0	0	5	0	5	0	1	1	2	0	1	1	2	0	0	0	0	9
Total	4	4	21	0	29	0	3	4	7	0	10	3	13	1	0	0	1	50
08:00 AM	0	0	3	0	3	0	0	2	2	0	3	1	4	1	0	0	1	10
08:15 AM	0	0	4	0	4	0	1	0	1	0	3	1	4	0	0	0	0	9
08:30 AM	0	0	3	0	3	0	1	1	2	0	2	1	3	0	0	0	0	8
08:45 AM	0	0	2	0	2	0	1	1	2	0	1	0	1	0	0	1	1	6
Total	0	0	12	0	12	0	3	4	7	0	9	3	12	1	0	1	2	33
09:00 AM	0	0	3	0	3	0	1	1	2	0	2	2	4	0	0	0	0	9
09:15 AM	0	0	3	0	3	0	0	2	2	0	1	1	2	0	0	0	0	7
09:30 AM	1	1	2	0	4	0	2	1	3	0	2	0	2	0	0	0	0	9
09:45 AM	0	0	2	0	2	0	1	1	2	0	2	1	3	0	0	0	0	7
Total	1	1	10	0	12	0	4	5	9	0	7	4	11	0	0	0	0	32
Grand Total	5	5	43	0	53	0	10	13	23	0	26	10	36	2	0	1	3	115
Apprch %	9.4	9.4	81.1	0		0	43.5	56.5		0	72.2	27.8		66.7	0	33.3		
Total %	4.3	4.3	37.4	0	46.1	0	8.7	11.3	20	0	22.6	8.7	31.3	1.7	0	0.9	2.6	

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 08:15 AM to 09:00 AM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 08:15 AM																		
08:15 AM	0	0	**4**	0	**4**	0	**1**	0	1	0	**3**	1	**4**	0	0	0	0	**9**
08:30 AM	0	0	3	0	3	0	1	**1**	**2**	0	2	1	3	0	0	0	0	8
08:45 AM	0	0	2	0	2	0	1	1	2	0	1	0	1	0	0	**1**	**1**	6
09:00 AM	0	0	3	0	3	0	1	1	2	0	2	**2**	4	0	0	0	0	9
Total Volume	0	0	12	0	12	0	4	3	7	0	8	4	12	0	0	1	1	32
% App. Total	0	0	100	0		0	57.1	42.9		0	66.7	33.3		0	0	100		
PHF	.000	.000	.750	.000	.750	.000	1.00	.750	.875	.000	.667	.500	.750	.000	.000	.250	.250	.889

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Site Code : 16619341
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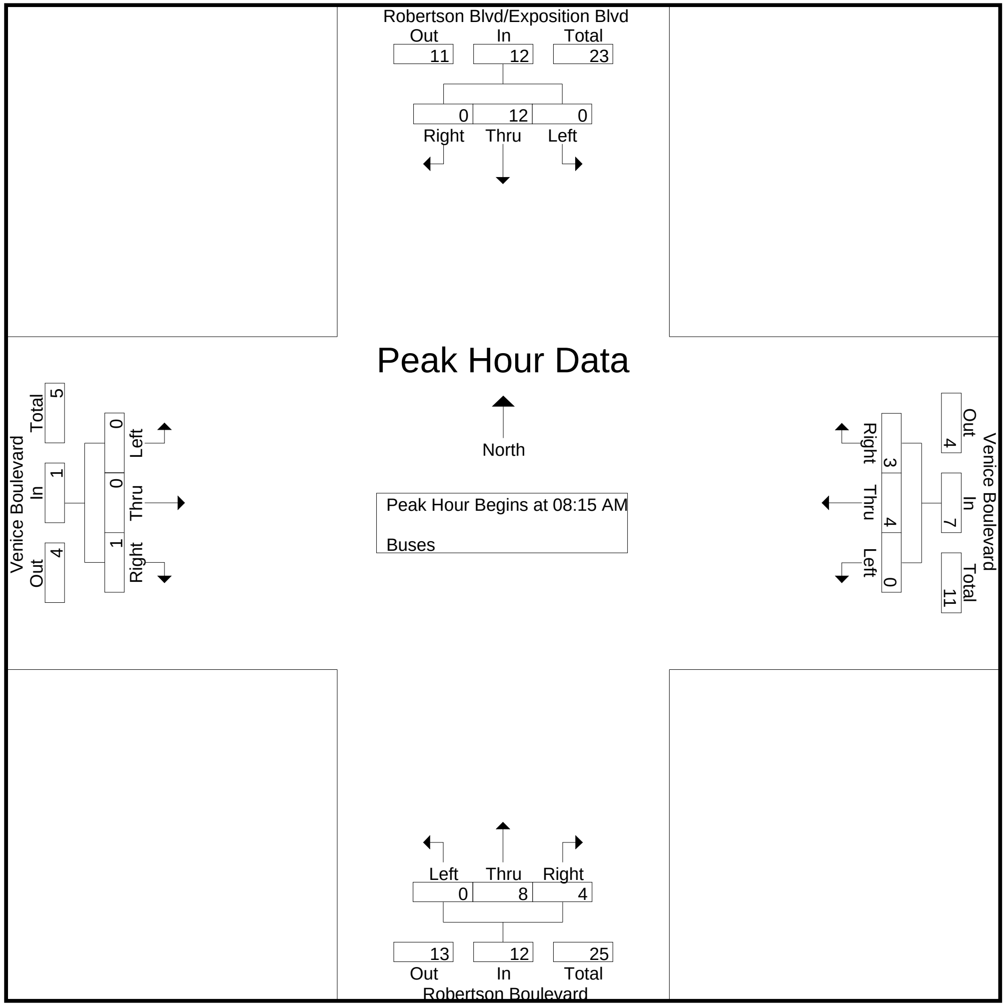

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	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 08:15 AM to 09:00 AM - Peak 1 of 1																		
Peak Hour for Each Approach Begins at:																		
	08:15 AM					08:15 AM				08:15 AM				08:15 AM				
+0 mins.	0	0	**4**	0	**4**	0	**1**	0	1	0	**3**	1	**4**	0	0	0	0	
+15 mins.	0	0	3	0	3	0	1	**1**	**2**	0	2	1	3	0	0	0	0	
+30 mins.	0	0	2	0	2	0	1	1	2	0	1	0	1	0	0	**1**	**1**	
+45 mins.	0	0	3	0	3	0	1	1	2	0	2	**2**	4	0	0	0	0	
Total Volume	0	0	12	0	12	0	4	3	7	0	8	4	12	0	0	1	1	
% App. Total	0	0	100	0		0	57.1	42.9		0	66.7	33.3		0	0	100		
PHF	.000	.000	.750	.000	.750	.000	1.000	.750	.875	.000	.667	.500	.750	.000	.000	.250	.250	

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Groups Printed- Passenger Vehicles - Dual Wheeled - Buses

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	63	44	261	30	398	19	61	11	91	63	369	34	466	82	53	49	184	1139
03:15 PM	70	44	352	45	511	15	41	19	75	47	234	25	306	81	65	67	213	1105
03:30 PM	65	46	409	66	586	20	47	16	83	70	369	26	465	53	47	70	170	1304
03:45 PM	81	49	364	47	541	20	54	17	91	47	290	34	371	69	56	69	194	1197
Total	279	183	1386	188	2036	74	203	63	340	227	1262	119	1608	285	221	255	761	4745
04:00 PM	53	36	402	54	545	18	57	11	86	67	321	17	405	54	37	65	156	1192
04:15 PM	45	22	402	47	516	16	77	20	113	64	327	8	399	47	57	56	160	1188
04:30 PM	57	42	359	35	493	22	64	27	113	74	312	25	411	70	56	67	193	1210
04:45 PM	77	49	366	47	539	12	76	22	110	60	330	14	404	62	65	88	215	1268
Total	232	149	1529	183	2093	68	274	80	422	265	1290	64	1619	233	215	276	724	4858
05:00 PM	87	52	367	49	555	26	100	41	167	64	322	20	406	55	68	78	201	1329
05:15 PM	78	46	345	44	513	20	107	37	164	75	342	23	440	52	43	94	189	1306
05:30 PM	53	28	374	41	496	20	100	30	150	64	367	28	459	60	53	76	189	1294
05:45 PM	57	44	393	40	534	24	102	24	150	79	396	13	488	68	54	101	223	1395
Total	275	170	1479	174	2098	90	409	132	631	282	1427	84	1793	235	218	349	802	5324
Grand Total	786	502	4394	545	6227	232	886	275	1393	774	3979	267	5020	753	654	880	2287	14927
Apprch %	12.6	8.1	70.6	8.8		16.7	63.6	19.7		15.4	79.3	5.3		32.9	28.6	38.5		
Total %	5.3	3.4	29.4	3.7	41.7	1.6	5.9	1.8	9.3	5.2	26.7	1.8	33.6	5	4.4	5.9	15.3	
Passenger Vehicles	774	492	4337	540	6143	232	867	257	1356	768	3865	253	4886	740	650	873	2263	14648
% Passenger Vehicles	98.5	98	98.7	99.1	98.7	100	97.9	93.5	97.3	99.2	97.1	94.8	97.3	98.3	99.4	99.2	99	98.1
Dual Wheeled	9	7	34	5	55	0	9	7	16	5	73	4	82	12	3	7	22	175
% Dual Wheeled	1.1	1.4	0.8	0.9	0.9	0	1	2.5	1.1	0.6	1.8	1.5	1.6	1.6	0.5	0.8	1	1.2
Buses	3	3	23	0	29	0	10	11	21	1	41	10	52	1	1	0	2	104
% Buses	0.4	0.6	0.5	0	0.5	0	1.1	4	1.5	0.1	1	3.7	1	0.1	0.2	0	0.1	0.7

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 05:00 PM																		
05:00 PM	**87**	**52**	367	**49**	**555**	**26**	100	**41**	**167**	64	322	20	406	55	**68**	78	201	1329
05:15 PM	78	46	345	44	513	20	**107**	37	164	75	342	23	440	52	43	94	189	1306
05:30 PM	53	28	374	41	496	20	100	30	150	64	367	**28**	459	60	53	76	189	1294
05:45 PM	57	44	**393**	40	534	24	102	24	150	**79**	**396**	13	**488**	**68**	54	**101**	**223**	**1395**
Total Volume	275	170	1479	174	2098	90	409	132	631	282	1427	84	1793	235	218	349	802	5324
% App. Total	13.1	8.1	70.5	8.3		14.3	64.8	20.9		15.7	79.6	4.7		29.3	27.2	43.5		
PHF	.790	.817	.941	.888	.945	.865	.956	.805	.945	.892	.901	.750	.919	.864	.801	.864	.899	.954

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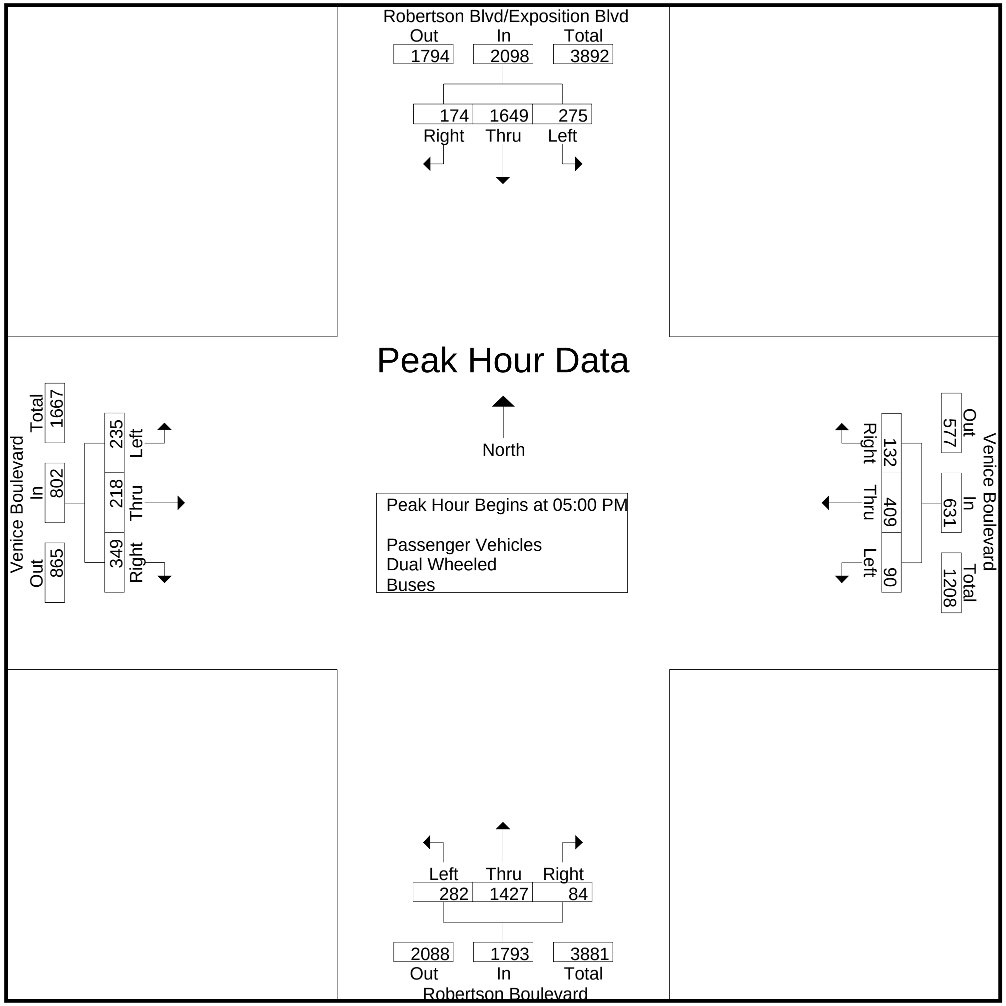

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	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																		
Peak Hour for Each Approach Begins at:																		
	03:30 PM					05:00 PM				05:00 PM				05:00 PM				
+0 mins.	65	46	**409**	**66**	**586**	**26**	100	**41**	**167**	64	322	20	406	55	**68**	78	201	
+15 mins.	**81**	**49**	364	47	541	20	**107**	37	164	75	342	23	440	52	43	94	189	
+30 mins.	53	36	402	54	545	20	100	30	150	64	367	**28**	459	60	53	76	189	
+45 mins.	45	22	402	47	516	24	102	24	150	**79**	**396**	13	**488**	**68**	54	**101**	**223**	
Total Volume	244	153	1577	214	2188	90	409	132	631	282	1427	84	1793	235	218	349	802	
% App. Total	11.2	7	72.1	9.8		14.3	64.8	20.9		15.7	79.6	4.7		29.3	27.2	43.5		
PHF	.753	.781	.964	.811	.933	.865	.956	.805	.945	.892	.901	.750	.919	.864	.801	.864	.899	

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City of Los Angeles
N/S: Robertson Boulevard/Exposition Blvd
E/W: Venice Boulevard
Weather: Clear

File Name : 01_LAC_Robertson_Exposition_Venice PM
Site Code : 16619341
Start Date : 5/15/2019
Page No : 1

Groups Printed- Passenger Vehicles

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	61	42	257	29	389	19	59	9	87	62	357	30	449	82	52	48	182	1107
03:15 PM	70	44	346	44	504	15	39	17	71	47	220	24	291	79	65	67	211	1077
03:30 PM	63	44	404	66	577	20	47	16	83	69	354	26	449	52	47	69	168	1277
03:45 PM	80	48	359	47	534	20	53	13	86	47	276	33	356	67	56	68	191	1167
Total	274	178	1366	186	2004	74	198	55	327	225	1207	113	1545	280	220	252	752	4628
04:00 PM	53	36	397	54	540	18	55	11	84	67	314	16	397	52	37	64	153	1174
04:15 PM	44	21	399	47	511	16	75	16	107	62	318	7	387	46	57	55	158	1163
04:30 PM	56	41	357	35	489	22	61	27	110	72	305	23	400	69	56	67	192	1191
04:45 PM	75	48	359	46	528	12	73	21	106	60	320	13	393	62	64	88	214	1241
Total	228	146	1512	182	2068	68	264	75	407	261	1257	59	1577	229	214	274	717	4769
05:00 PM	85	51	360	49	545	26	99	39	164	64	317	20	401	55	67	78	200	1310
05:15 PM	78	46	341	43	508	20	106	36	162	75	338	21	434	52	42	93	187	1291
05:30 PM	53	28	370	40	491	20	99	30	149	64	357	28	449	57	53	75	185	1274
05:45 PM	56	43	388	40	527	24	101	22	147	79	389	12	480	67	54	101	222	1376
Total	272	168	1459	172	2071	90	405	127	622	282	1401	81	1764	231	216	347	794	5251
Grand Total	774	492	4337	540	6143	232	867	257	1356	768	3865	253	4886	740	650	873	2263	14648
Apprch %	12.6	8	70.6	8.8		17.1	63.9	19		15.7	79.1	5.2		32.7	28.7	38.6		
Total %	5.3	3.4	29.6	3.7	41.9	1.6	5.9	1.8	9.3	5.2	26.4	1.7	33.4	5.1	4.4	6	15.4	

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 05:00 PM																		
05:00 PM	**85**	**51**	360	**49**	**545**	**26**	99	**39**	**164**	64	317	20	401	55	**67**	78	200	1310
05:15 PM	78	46	341	43	508	20	**106**	36	162	75	338	21	434	52	42	93	187	1291
05:30 PM	53	28	370	40	491	20	99	30	149	64	357	**28**	449	57	53	75	185	1274
05:45 PM	56	43	**388**	40	527	24	101	22	147	**79**	**389**	12	**480**	**67**	54	**101**	**222**	**1376**
Total Volume	272	168	1459	172	2071	90	405	127	622	282	1401	81	1764	231	216	347	794	5251
% App. Total	13.1	8.1	70.4	8.3		14.5	65.1	20.4		16	79.4	4.6		29.1	27.2	43.7		
PHF	.800	.824	.940	.878	.950	.865	.955	.814	.948	.892	.900	.723	.919	.862	.806	.859	.894	.954

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Weather: Clear

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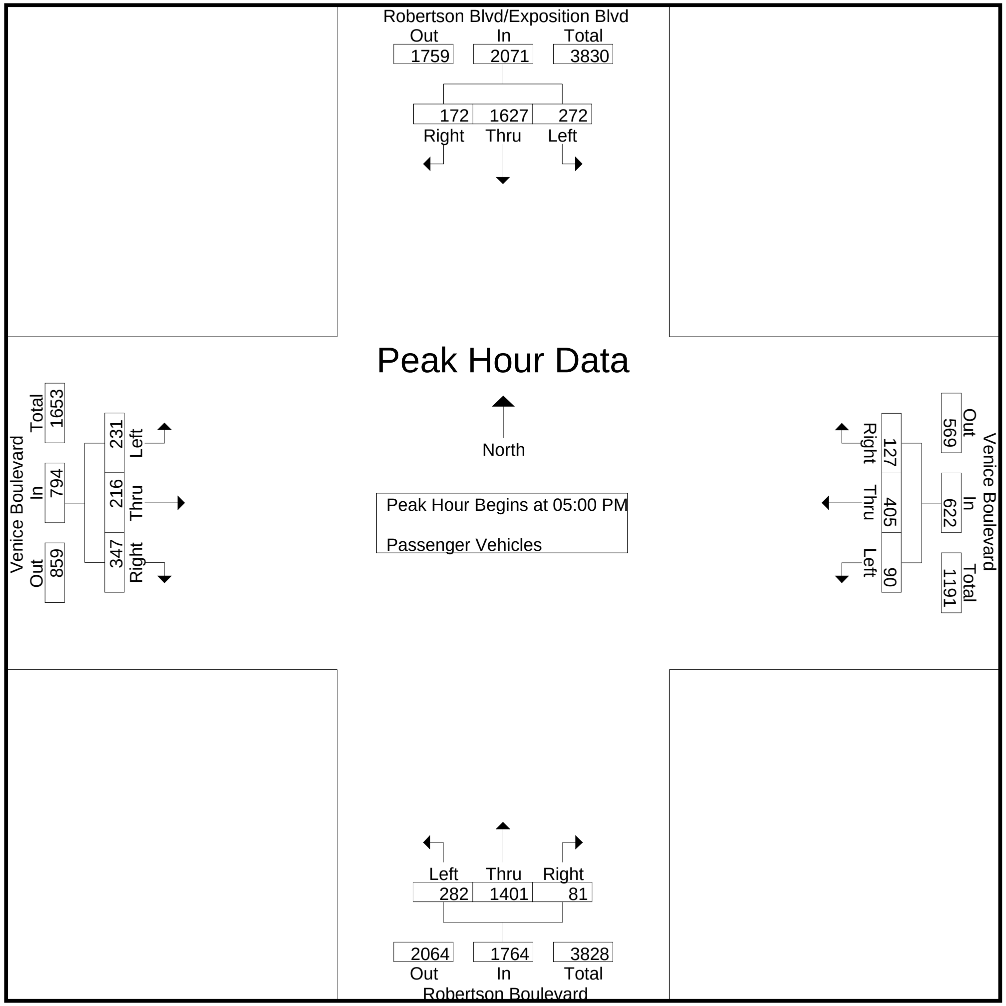
Site Code : 16619341
Start Date : 5/15/2019
Page No : 2



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	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																		
Peak Hour for Each Approach Begins at:																		
	05:00 PM					05:00 PM				05:00 PM				05:00 PM				
+0 mins.	**85**	**51**	360	**49**	**545**	**26**	99	**39**	**164**	64	317	20	401	55	**67**	78	200	
+15 mins.	78	46	341	43	508	20	**106**	36	162	75	338	21	434	52	42	93	187	
+30 mins.	53	28	370	40	491	20	99	30	149	64	357	**28**	449	57	53	75	185	
+45 mins.	56	43	**388**	40	527	24	101	22	147	**79**	**389**	12	**480**	**67**	54	**101**	**222**	
Total Volume	272	168	1459	172	2071	90	405	127	622	282	1401	81	1764	231	216	347	794	
% App. Total	13.1	8.1	70.4	8.3		14.5	65.1	20.4		16	79.4	4.6		29.1	27.2	43.7		
PHF	.800	.824	.940	.878	.950	.865	.955	.814	.948	.892	.900	.723	.919	.862	.806	.859	.894	

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Start Date : 5/15/2019
Page No : 1

Groups Printed- Dual Wheeled

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	2	2	3	1	8	0	1	1	2	0	7	3	10	0	1	1	2	22
03:15 PM	0	0	2	1	3	0	1	1	2	0	10	0	10	2	0	0	2	17
03:30 PM	1	1	2	0	4	0	0	0	0	1	10	0	11	1	0	1	2	17
03:45 PM	0	0	3	0	3	0	0	3	3	0	9	0	9	2	0	1	3	18
Total	3	3	10	2	18	0	2	5	7	1	36	3	40	5	1	3	9	74
04:00 PM	0	0	4	0	4	0	1	0	1	0	4	0	4	2	0	1	3	12
04:15 PM	1	1	0	0	2	0	1	1	2	2	5	1	8	1	0	1	2	14
04:30 PM	1	1	1	0	3	0	2	0	2	2	6	0	8	1	0	0	1	14
04:45 PM	2	1	5	1	9	0	2	0	2	0	6	0	6	0	1	0	1	18
Total	4	3	10	1	18	0	6	1	7	4	21	1	26	4	1	2	7	58
05:00 PM	2	1	5	0	8	0	0	1	1	0	3	0	3	0	1	0	1	13
05:15 PM	0	0	2	1	3	0	1	0	1	0	2	0	2	0	0	1	1	7
05:30 PM	0	0	4	1	5	0	0	0	0	0	6	0	6	3	0	1	4	15
05:45 PM	0	0	3	0	3	0	0	0	0	0	5	0	5	0	0	0	0	8
Total	2	1	14	2	19	0	1	1	2	0	16	0	16	3	1	2	6	43
Grand Total	9	7	34	5	55	0	9	7	16	5	73	4	82	12	3	7	22	175
Apprch %	16.4	12.7	61.8	9.1		0	56.2	43.8		6.1	89	4.9		54.5	13.6	31.8		
Total %	5.1	4	19.4	2.9	31.4	0	5.1	4	9.1	2.9	41.7	2.3	46.9	6.9	1.7	4	12.6	

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 05:00 PM																		
05:00 PM	**2**	**1**	**5**	0	**8**	0	0	**1**	**1**	0	3	0	3	0	**1**	0	1	13
05:15 PM	0	0	2	**1**	3	0	**1**	0	1	0	2	0	2	0	0	**1**	1	7
05:30 PM	0	0	4	1	5	0	0	0	0	0	**6**	0	**6**	**3**	0	1	**4**	**15**
05:45 PM	0	0	3	0	3	0	0	0	0	0	5	0	5	0	0	0	0	8
Total Volume	2	1	14	2	19	0	1	1	2	0	16	0	16	3	1	2	6	43
% App. Total	10.5	5.3	73.7	10.5		0	50	50		0	100	0		50	16.7	33.3		
PHF	.250	.250	.700	.500	.594	.000	.250	.250	.500	.000	.667	.000	.667	.250	.250	.500	.375	.717

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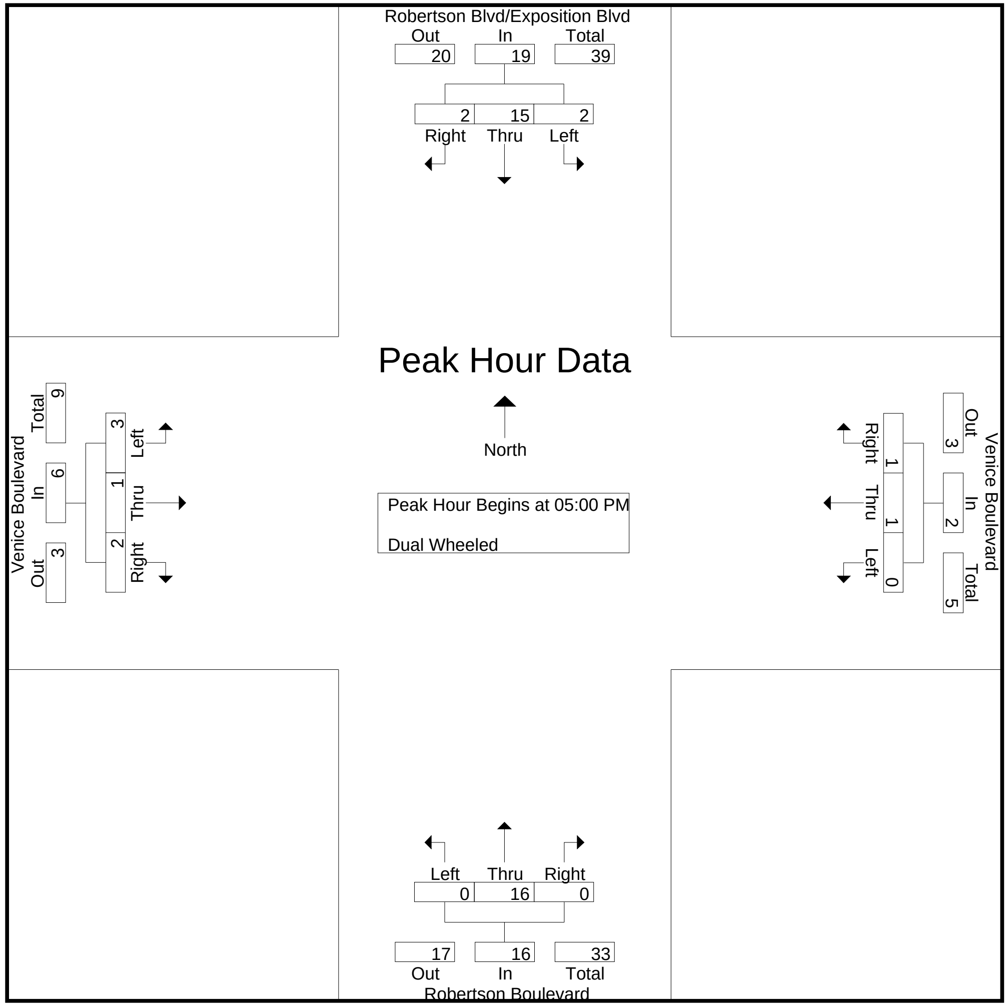

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	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																		
Peak Hour for Each Approach Begins at:																		
	05:00 PM					05:00 PM				05:00 PM				05:00 PM				
+0 mins.	**2**	**1**	**5**	0	**8**	0	0	**1**	**1**	0	3	0	3	0	**1**	0	1	
+15 mins.	0	0	2	**1**	3	0	**1**	0	1	0	2	0	2	0	0	**1**	1	
+30 mins.	0	0	4	1	5	0	0	0	0	0	**6**	0	**6**	**3**	0	1	**4**	
+45 mins.	0	0	3	0	3	0	0	0	0	0	5	0	5	0	0	0	0	
Total Volume	2	1	14	2	19	0	1	1	2	0	16	0	16	3	1	2	6	
% App. Total	10.5	5.3	73.7	10.5		0	50	50		0	100	0		50	16.7	33.3		
PHF	.250	.250	.700	.500	.594	.000	.250	.250	.500	.000	.667	.000	.667	.250	.250	.500	.375	

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Site Code : 16619341
Start Date : 5/15/2019
Page No : 1

Groups Printed- Buses

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	0	0	1	0	1	0	1	1	2	1	5	1	7	0	0	0	0	10
03:15 PM	0	0	4	0	4	0	1	1	2	0	4	1	5	0	0	0	0	11
03:30 PM	1	1	3	0	5	0	0	0	0	0	5	0	5	0	0	0	0	10
03:45 PM	1	1	2	0	4	0	1	1	2	0	5	1	6	0	0	0	0	12
Total	2	2	10	0	14	0	3	3	6	1	19	3	23	0	0	0	0	43
04:00 PM	0	0	1	0	1	0	1	0	1	0	3	1	4	0	0	0	0	6
04:15 PM	0	0	3	0	3	0	1	3	4	0	4	0	4	0	0	0	0	11
04:30 PM	0	0	1	0	1	0	1	0	1	0	1	2	3	0	0	0	0	5
04:45 PM	0	0	2	0	2	0	1	1	2	0	4	1	5	0	0	0	0	9
Total	0	0	7	0	7	0	4	4	8	0	12	4	16	0	0	0	0	31
05:00 PM	0	0	2	0	2	0	1	1	2	0	2	0	2	0	0	0	0	6
05:15 PM	0	0	2	0	2	0	0	1	1	0	2	2	4	0	1	0	1	8
05:30 PM	0	0	0	0	0	0	1	0	1	0	4	0	4	0	0	0	0	5
05:45 PM	1	1	2	0	4	0	1	2	3	0	2	1	3	1	0	0	1	11
Total	1	1	6	0	8	0	3	4	7	0	10	3	13	1	1	0	2	30
Grand Total	3	3	23	0	29	0	10	11	21	1	41	10	52	1	1	0	2	104
Apprch %	10.3	10.3	79.3	0		0	47.6	52.4		1.9	78.8	19.2		50	50	0		
Total %	2.9	2.9	22.1	0	27.9	0	9.6	10.6	20.2	1	39.4	9.6	50	1	1	0	1.9	

	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 05:00 PM																		
05:00 PM	0	0	**2**	0	2	0	**1**	1	2	0	2	0	2	0	0	0	0	6
05:15 PM	0	0	2	0	2	0	0	1	1	0	2	**2**	**4**	0	**1**	0	**1**	8
05:30 PM	0	0	0	0	0	0	1	0	1	0	**4**	0	4	0	0	0	0	5
05:45 PM	**1**	**1**	2	0	**4**	0	1	**2**	**3**	0	2	1	3	**1**	0	0	1	**11**
Total Volume	1	1	6	0	8	0	3	4	7	0	10	3	13	1	1	0	2	30
% App. Total	12.5	12.5	75	0		0	42.9	57.1		0	76.9	23.1		50	50	0		
PHF	.250	.250	.750	.000	.500	.000	.750	.500	.583	.000	.625	.375	.813	.250	.250	.000	.500	.682

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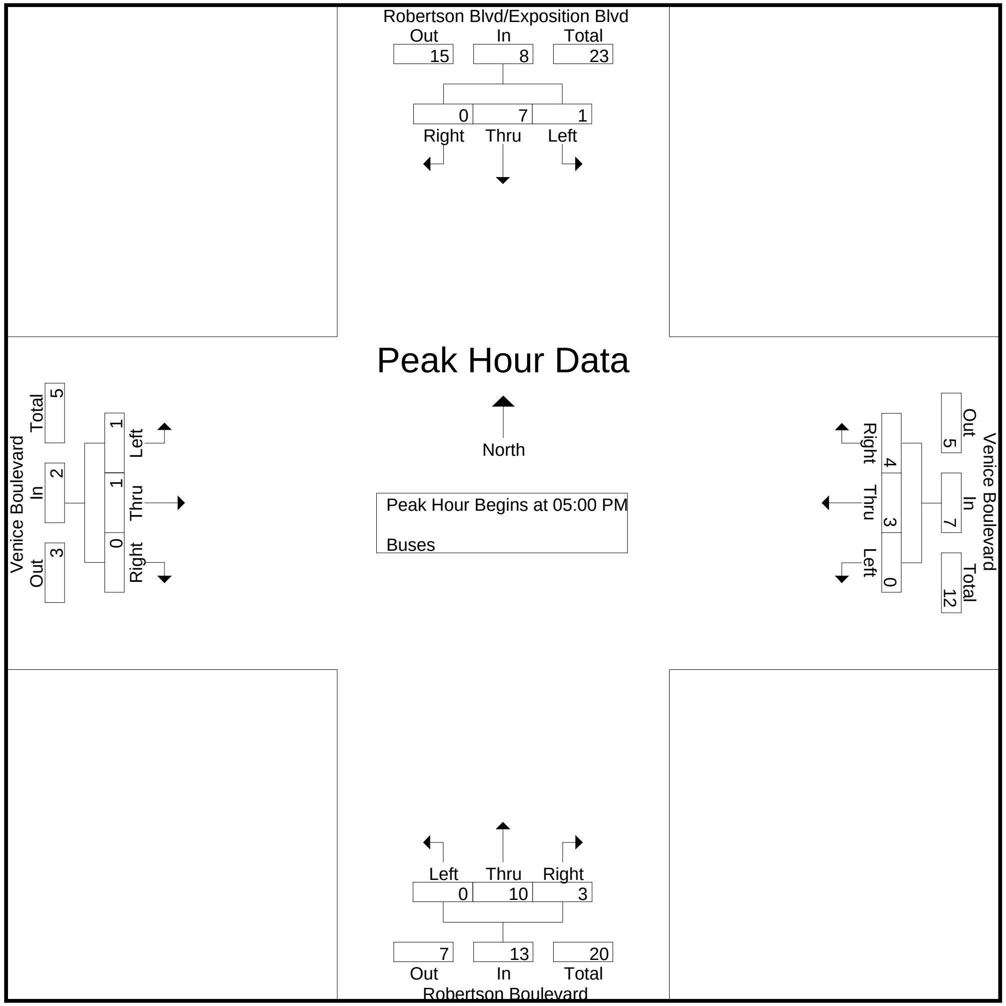

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	Robertson Blvd/Exposition Blvd Southbound					Venice Boulevard Westbound				Robertson Boulevard Northbound				Venice Boulevard Eastbound				
Start Time	Left	U-Turns	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																		
Peak Hour for Each Approach Begins at:																		
	05:00 PM					05:00 PM				05:00 PM				05:00 PM				
+0 mins.	0	0	**2**	0	2	0	**1**	1	2	0	2	0	2	0	0	0	0	
+15 mins.	0	0	2	0	2	0	0	1	1	0	2	**2**	**4**	0	**1**	0	**1**	
+30 mins.	0	0	0	0	0	0	1	0	1	0	**4**	0	4	0	0	0	0	
+45 mins.	**1**	**1**	2	0	**4**	0	1	**2**	**3**	0	2	1	3	**1**	0	0	1	
Total Volume	1	1	6	0	8	0	3	4	7	0	10	3	13	1	1	0	2	
% App. Total	12.5	12.5	75	0		0	42.9	57.1		0	76.9	23.1		50	50	0		
PHF	.250	.250	.750	.000	.500	.000	.750	.500	.583	.000	.625	.375	.813	.250	.250	.000	.500	

City Of Los Angeles
Department Of Transportation
MANUAL TRAFFIC COUNT SUMMARY

STREET:

North/South Robertson Boulevard

East/West Venice Blvd/Exposition Blvd

Day: Wednesday **Date:** May 15, 2019 **Weather:** CLEAR

Hours: 7-10AM 3-6PM **Staff:** CUI

School Day: YES **District:** Western I/S CODE 12459

	N/B	S/B	E/B	W/B
DUAL-WHEELED	184	219	78	57
BIKES	56	36	13	22
BUSES	88	74	5	44

	N/B	TIME	S/B	TIME	E/B	TIME	W/B	TIME
AM PK 15 MIN	496	8.30	532	7.30	279	8.30	140	8.45
PM PK 15 MIN	488	5.45	540	3.30	223	5.45	167	5.00
AM PK HOUR	1872	8.15	1932	7.00	1053	8.15	467	8.00
PM PK HOUR	1793	5.00	2035	3.30	802	5.00	631	5.00

NORTHBOUND Approach / **SOUTHBOUND Approach** / **TOTAL** / **XING S/L** / **XING N/L**

Hours	Lt	Th	Rt	Total	Hours	Lt	Th	Rt	Total	N-S	Ped	Sch	Ped	Sch
7-8	309	1209	56	1574	*7-8*	357	1365	210	1932	3506	0	0	366	99
8-9	314	1404	87	1805	*8-9*	358	1345	158	1861	3666	0	0	260	23
9-10	261	1275	79	1615	*9-10*	347	1332	194	1873	3488	0	0	137	5
3-4	227	1262	119	1608	*3-4*	279	1386	188	1853	3461	0	0	395	78
4-5	265	1290	64	1619	*4-5*	232	1529	183	1944	3563	0	0	208	30
5-6	282	1427	84	1793	*5-6*	275	1479	174	1928	3721	1	0	237	8
TOTAL	1658	7867	489	10014	TOTAL	1848	8436	1107	11391	21405	1	0	1603	243

EASTBOUND Approach / **WESTBOUND Approach** / **TOTAL** / **XING W/L** / **XING E/L**

Hours	Lt	Th	Rt	Total	Hours	Lt	Th	Rt	Total	E-W	Ped	Sch	Ped	Sch
7-8	157	178	272	607	*7-8*	104	312	35	451	1058	51	0	139	3
8-9	287	378	383	1048	*8-9*	111	309	47	467	1515	35	0	165	5
9-10	274	316	347	937	*9-10*	69	244	53	366	1303	64	0	110	0
3-4	285	221	255	761	*3-4*	74	203	63	340	1101	73	0	231	40
4-5	233	215	276	724	*4-5*	68	274	80	422	1146	38	0	235	13
5-6	235	218	349	802	*5-6*	90	409	132	631	1433	70	0	238	11
TOTAL	1471	1526	1882	4879	TOTAL	516	1751	410	2677	7556	331	0	1118	72

(Rev Oct 06)

City of Los Angeles
Department of Transportation

BICYCLE COUNT SUMMARY

STREET:

North/South:	Robertson Boulevard				
East/West:	Venice Blvd/Exposition Blvd				
Day:	Wednesday	Date:	5/15/2019	Weather:	CLEAR
School Day:	Yes	District:	Western	I/S Code:	12459
Hours:	7-10 AM, 3-6 PM	Staff:	CUI		

NORTHBOUND Approach / **SOUTHBOUND Approach** / **TOTAL**

Hours	Lt	Th	Rt	Total	Hours	Lt	Th	Rt	Total	N-S
7-8	0	12	0	12	7-8	1	5	0	6	18
8-9	0	5	0	5	8-9	1	6	1	8	13
9-10	0	2	0	2	9-10	2	2	0	4	6
3-4	0	7	0	7	3-4	1	5	0	6	13
4-5	1	16	0	17	4-5	0	3	0	3	20
5-6	0	13	0	13	5-6	4	5	0	9	22
TOTAL	1	55	0	56	TOTAL	9	26	1	36	92

EASTBOUND Approach / **WESTBOUND Approach** / **TOTAL**

Hours	Lt	Th	Rt	Total	Hours	Lt	Th	Rt	Total	E-W
7-8	3	2	0	5	7-8	2	2	2	6	11
8-9	1	1	0	2	8-9	3	2	2	7	9
9-10	1	0	0	1	9-10	0	2	1	3	4
3-4	2	1	0	3	3-4	1	1	0	2	5
4-5	1	0	0	1	4-5	1	0	1	2	3
5-6	1	0	0	1	5-6	1	0	1	2	3
TOTAL	9	4	0	13	TOTAL	8	7	7	22	35

REMARKS (6 hour total):

	NB	**SB**	**EB**	**WB**	**TOTAL**
- Female Riders	3	0	0	1	4
- No helmet riders	23	18	7	7	55
- Sidewalk Riding	7	14	7	4	32
- Wrong way riding	1	12	6	0	19

NB: Northbound, **SB**: Southbound, **EB**: Eastbound, **WB**: Westbound, **I/S**: Intersection

Source: CUI

LADOT 2015 CMP

City of Los Angeles
Department of Transportation

PEDESTRIAN COUNT SUMMARY

STREET:

North/South:	Robertson Boulevard				
East/West:	Venice Blvd/Exposition Blvd				
Day:	Wednesday	Date:	May 15, 2019	Weather:	CLEAR
School Day:	YES	District:	Western	I/S Code:	12459
Hours:	7-10 AM, 3-6 PM	Staff:	CUI		

AM PEAK PERIOD

15 Min. Interval	N-LEG	S-LEG	E-LEG	W-LEG	TOTAL
7:00-7:15	102	0	36	20	158
7:15-7:30	123	0	33	8	164
7:30-7:45	123	0	23	15	161
7:45-8:00	117	0	50	8	175
8:00-8:15	59	0	31	2	92
8:15-8:30	89	0	68	5	162
8:30-8:45	71	0	48	12	131
8:45-9:00	64	0	23	16	103
9:00-9:15	56	0	27	27	110
9:15-9:30	28	0	52	7	87
9:30-9:45	31	0	16	19	66
9:45-10:00	27	0	15	11	53
Hours					
7 - 8	465	0	142	51	658
8 - 9	283	0	170	35	488
9 - 10	142	0	110	64	316
TOTAL	890	0	422	150	1462

PM PEAK PERIOD

15 Min. Interval	N-LEG	S-LEG	E-LEG	W-LEG	TOTAL
3:00-3:15	68	0	34	8	110
3:15-3:30	211	0	128	60	399
3:30-3:45	122	0	132	68	322
3:45-4:00	72	0	168	10	250
4:00-4:15	64	0	104	24	192
4:15-4:30	37	0	130	14	181
4:30-4:45	73	0	126	26	225
4:45-5:00	64	0	110	12	186
5:00-5:15	75	2	94	28	199
5:15-5:30	56	0	136	26	218
5:30-5:45	54	0	138	56	248
5:45-6:00	60	0	108	30	198
Hours					
3 - 4	473	0	462	146	1081
4 - 5	238	0	470	76	784
5 - 6	245	2	476	140	863
	956	2	1408	362	2728

REMARKS (6 hour total):

	N-LEG	**S-LEG**	**E-LEG**	**W-LEG**	**TOTAL**
- Wheelchair/special needs assistance	0	0	1	0	1
- Skateboard/scooter	14	0	14	3	31

N: North, **S**: South, **E**: East, **W**: West, **I/S**: Intersection

Source: LADOT 2015 CMP

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Culver City
N/S: Robertson Blvd/Higuera Street
E/W: Washington Boulevard
Weather: Clear

File Name : 02_CVC_Robertson_Higuera_Washington AM
Site Code : 16619341
Start Date : 5/15/2019
Page No : 1

Groups Printed- Passenger Vehicles - Dual Wheeled - Buses

	Robertson Boulevard Southbound				Washington Boulevard Westbound				Higuera Street Northbound				Washington Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	10	187	44	241	11	79	19	109	17	87	8	112	17	28	10	55	517
07:15 AM	13	204	28	245	12	76	16	104	6	102	4	112	12	30	13	55	516
07:30 AM	7	243	31	281	5	94	19	118	13	137	10	160	20	38	11	69	628
07:45 AM	26	246	29	301	10	65	24	99	14	168	17	199	30	60	20	110	709
Total	56	880	132	1068	38	314	78	430	50	494	39	583	79	156	54	289	2370
08:00 AM	27	253	38	318	17	79	28	124	12	173	15	200	38	66	15	119	761
08:15 AM	28	267	47	342	11	52	28	91	21	172	17	210	32	84	14	130	773
08:30 AM	31	241	47	319	8	53	22	83	18	169	19	206	32	85	18	135	743
08:45 AM	26	218	52	296	10	67	34	111	17	132	18	167	30	102	18	150	724
Total	112	979	184	1275	46	251	112	409	68	646	69	783	132	337	65	534	3001
09:00 AM	32	180	31	243	12	59	21	92	19	143	24	186	34	80	23	137	658
09:15 AM	26	179	27	232	11	72	24	107	17	97	16	130	30	71	19	120	589
09:30 AM	18	163	31	212	10	54	10	74	7	94	15	116	18	71	26	115	517
09:45 AM	23	164	36	223	9	42	30	81	10	68	13	91	22	70	19	111	506
Total	99	686	125	910	42	227	85	354	53	402	68	523	104	292	87	483	2270
Grand Total	267	2545	441	3253	126	792	275	1193	171	1542	176	1889	315	785	206	1306	7641
Apprch %	8.2	78.2	13.6		10.6	66.4	23.1		9.1	81.6	9.3		24.1	60.1	15.8		
Total %	3.5	33.3	5.8	42.6	1.6	10.4	3.6	15.6	2.2	20.2	2.3	24.7	4.1	10.3	2.7	17.1	
Passenger Vehicles	262	2477	391	3130	119	783	268	1170	153	1512	173	1838	273	776	195	1244	7382
% Passenger Vehicles	98.1	97.3	88.7	96.2	94.4	98.9	97.5	98.1	89.5	98.1	98.3	97.3	86.7	98.9	94.7	95.3	96.6
Dual Wheeled	4	42	34	80	6	8	7	21	12	22	3	37	32	9	11	52	190
% Dual Wheeled	1.5	1.7	7.7	2.5	4.8	1	2.5	1.8	7	1.4	1.7	2	10.2	1.1	5.3	4	2.5
Buses	1	26	16	43	1	1	0	2	6	8	0	14	10	0	0	10	69
% Buses	0.4	1	3.6	1.3	0.8	0.1	0	0.2	3.5	0.5	0	0.7	3.2	0	0	0.8	0.9

	Robertson Boulevard Southbound				Washington Boulevard Westbound				Higuera Street Northbound				Washington Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	27	253	38	318	**17**	**79**	28	**124**	12	**173**	15	200	**38**	66	15	119	761
08:15 AM	28	**267**	47	**342**	11	52	28	91	**21**	172	17	**210**	32	84	14	130	**773**
08:30 AM	**31**	241	47	319	8	53	22	83	18	169	**19**	206	32	85	**18**	135	743
08:45 AM	26	218	**52**	296	10	67	**34**	111	17	132	18	167	30	**102**	18	**150**	724
Total Volume	112	979	184	1275	46	251	112	409	68	646	69	783	132	337	65	534	3001
% App. Total	8.8	76.8	14.4		11.2	61.4	27.4		8.7	82.5	8.8		24.7	63.1	12.2		
PHF	.903	.917	.885	.932	.676	.794	.824	.825	.810	.934	.908	.932	.868	.826	.903	.890	.971

Counts Unlimited
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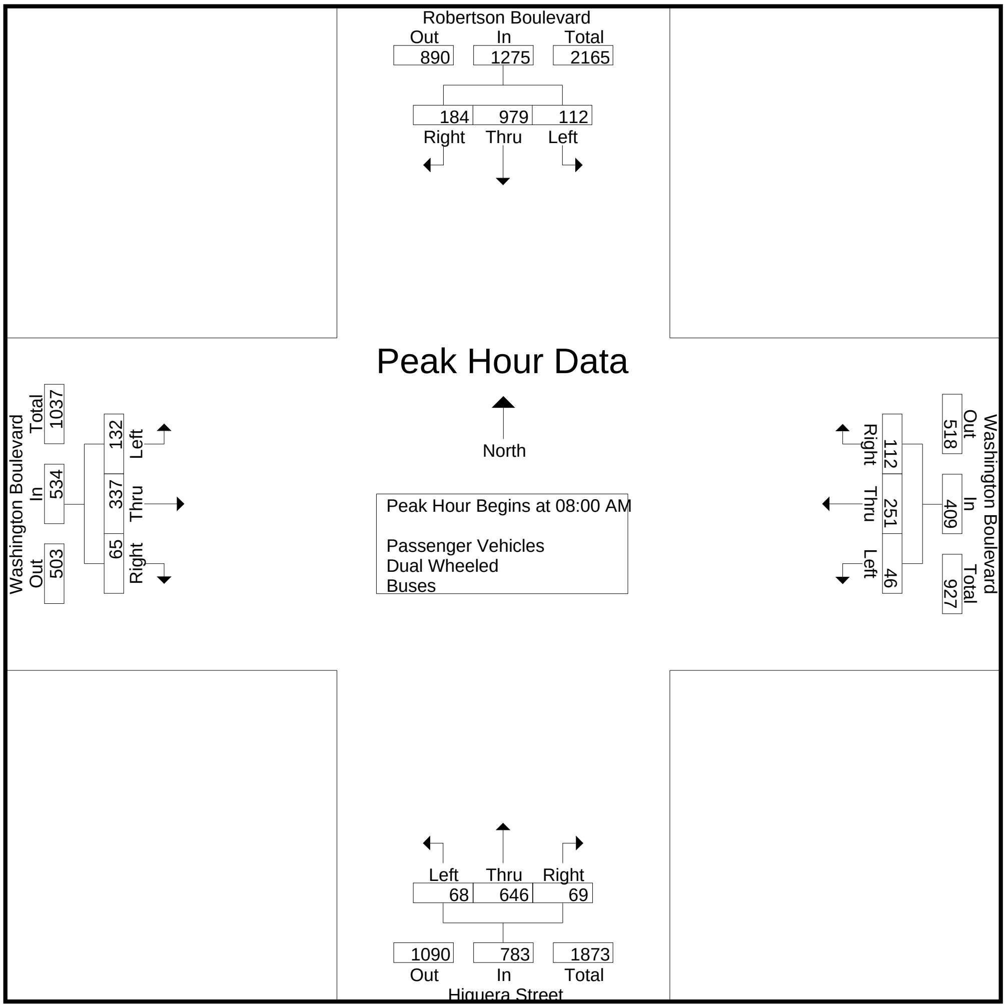
City of Culver City
N/S: Robertson Blvd/Higuera Street
E/W: Washington Boulevard
Weather: Clear

File Name : 02_CVC_Robertson_Higuera_Washington AM
Site Code : 16619341
Start Date : 5/15/2019



Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:15 AM				07:45 AM				08:15 AM			
+0 mins.	26	246	29	301	12	76	16	104	14	168	17	199	32	84	14	130
+15 mins.	27	253	38	318	5	**94**	19	118	12	**173**	15	200	32	85	18	135
+30 mins.	28	**267**	**47**	**342**	10	65	24	99	**21**	172	17	**210**	30	**102**	18	**150**
+45 mins.	**31**	241	47	319	**17**	79	**28**	**124**	18	169	**19**	206	**34**	80	**23**	137
Total Volume	112	1007	161	1280	44	314	87	445	65	682	68	815	128	351	73	552
% App. Total	8.8	78.7	12.6		9.9	70.6	19.6		8	83.7	8.3		23.2	63.6	13.2	
PHF	.903	.943	.856	.936	.647	.835	.777	.897	.774	.986	.895	.970	.941	.860	.793	.920

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City of Culver City
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Weather: Clear

File Name : 02_CVC_Robertson_Higuera_Washington AM
Site Code : 16619341
Start Date : 5/15/2019
Page No : 1

Groups Printed- Passenger Vehicles

	Robertson Boulevard Southbound				Washington Boulevard Westbound				Higuera Street Northbound				Washington Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	10	180	39	229	10	78	19	107	15	86	8	109	13	26	9	48	493
07:15 AM	11	196	27	234	11	76	14	101	6	98	4	108	8	30	9	47	490
07:30 AM	7	240	27	274	5	94	18	117	12	137	10	159	18	38	10	66	616
07:45 AM	25	240	29	294	10	64	24	98	12	166	17	195	27	60	19	106	693
Total	53	856	122	1031	36	312	75	423	45	487	39	571	66	154	47	267	2292
08:00 AM	27	248	32	307	16	78	28	122	9	171	15	195	35	66	14	115	739
08:15 AM	28	262	42	332	10	51	28	89	20	169	17	206	28	80	14	122	749
08:30 AM	31	234	45	310	8	53	21	82	17	166	19	202	27	85	18	130	724
08:45 AM	26	213	48	287	10	66	33	109	17	130	18	165	27	102	18	147	708
Total	112	957	167	1236	44	248	110	402	63	636	69	768	117	333	64	514	2920
09:00 AM	31	178	26	235	12	58	20	90	18	138	23	179	30	79	22	131	635
09:15 AM	26	174	23	223	10	71	24	105	14	91	16	121	26	70	19	115	564
09:30 AM	17	152	26	195	8	54	10	72	5	93	15	113	15	70	26	111	491
09:45 AM	23	160	27	210	9	40	29	78	8	67	11	86	19	70	17	106	480
Total	97	664	102	863	39	223	83	345	45	389	65	499	90	289	84	463	2170
Grand Total	262	2477	391	3130	119	783	268	1170	153	1512	173	1838	273	776	195	1244	7382
Apprch %	8.4	79.1	12.5		10.2	66.9	22.9		8.3	82.3	9.4		21.9	62.4	15.7		
Total %	3.5	33.6	5.3	42.4	1.6	10.6	3.6	15.8	2.1	20.5	2.3	24.9	3.7	10.5	2.6	16.9	

	Robertson Boulevard Southbound				Washington Boulevard Westbound				Higuera Street Northbound				Washington Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 08:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	27	248	32	307	**16**	**78**	28	**122**	9	**171**	15	195	**35**	66	14	115	739
08:15 AM	28	**262**	42	**332**	10	51	28	89	**20**	169	17	**206**	28	80	14	122	**749**
08:30 AM	**31**	234	45	310	8	53	21	82	17	166	**19**	202	27	85	**18**	130	724
08:45 AM	26	213	**48**	287	10	66	**33**	109	17	130	18	165	27	**102**	18	**147**	708
Total Volume	112	957	167	1236	44	248	110	402	63	636	69	768	117	333	64	514	2920
% App. Total	9.1	77.4	13.5		10.9	61.7	27.4		8.2	82.8	9		22.8	64.8	12.5		
PHF	.903	.913	.870	.931	.688	.795	.833	.824	.788	.930	.908	.932	.836	.816	.889	.874	.975

Counts Unlimited
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City of Culver City
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Weather: Clear

File Name : 02_CVC_Robertson_Higuera_Washington AM
Site Code : 16619341
Start Date : 5/15/2019
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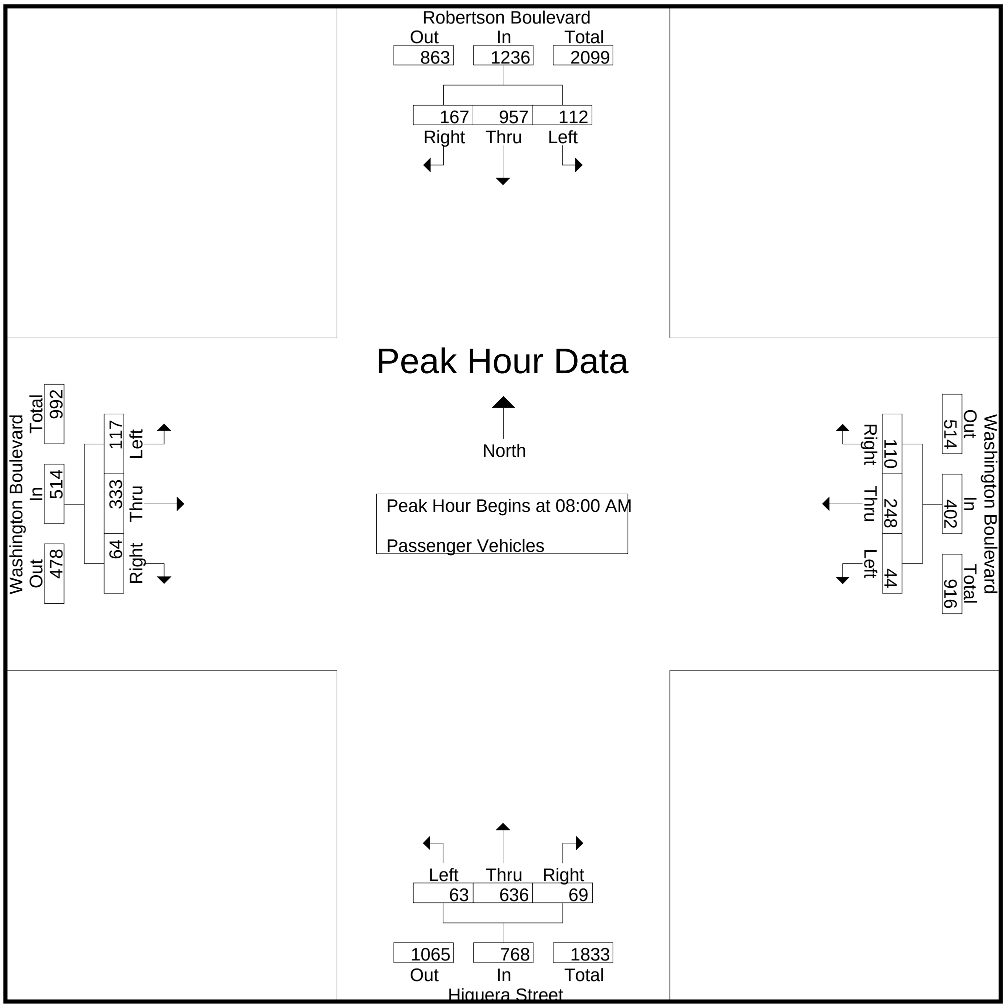

Peak Hour Analysis From 08:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM				08:00 AM				08:00 AM				08:00 AM			
+0 mins.	27	248	32	307	**16**	**78**	28	**122**	9	**171**	15	195	**35**	66	14	115
+15 mins.	28	**262**	42	**332**	10	51	28	89	**20**	169	17	**206**	28	80	14	122
+30 mins.	**31**	234	45	310	8	53	21	82	17	166	**19**	202	27	85	**18**	130
+45 mins.	26	213	**48**	287	10	66	**33**	109	17	130	18	165	27	**102**	18	**147**
Total Volume	112	957	167	1236	44	248	110	402	63	636	69	768	117	333	64	514
% App. Total	9.1	77.4	13.5		10.9	61.7	27.4		8.2	82.8	9		22.8	64.8	12.5	
PHF	.903	.913	.870	.931	.688	.795	.833	.824	.788	.930	.908	.932	.836	.816	.889	.874

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City of Culver City
N/S: Robertson Blvd/Higuera Street
E/W: Washington Boulevard
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File Name : 02_CVC_Robertson_Higuera_Washington AM
Site Code : 16619341
Start Date : 5/15/2019
Page No : 1

Groups Printed- Dual Wheeled

	Robertson Boulevard Southbound				Washington Boulevard Westbound				Higuera Street Northbound				Washington Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	6	3	9	1	1	0	2	1	0	0	1	3	2	1	6	18
07:15 AM	2	3	0	5	0	0	2	2	0	2	0	2	3	0	4	7	16
07:30 AM	0	1	3	4	0	0	1	1	1	0	0	1	2	0	1	3	9
07:45 AM	1	4	0	5	0	1	0	1	1	2	0	3	2	0	1	3	12
Total	3	14	6	23	1	2	3	6	3	4	0	7	10	2	7	19	55
08:00 AM	0	4	4	8	1	1	0	2	2	1	0	3	2	0	1	3	16
08:15 AM	0	3	3	6	1	1	0	2	1	2	0	3	3	4	0	7	18
08:30 AM	0	5	1	6	0	0	1	1	0	3	0	3	4	0	0	4	14
08:45 AM	0	3	3	6	0	1	1	2	0	2	0	2	3	0	0	3	13
Total	0	15	11	26	2	3	2	7	3	8	0	11	12	4	1	17	61
09:00 AM	1	1	4	6	0	1	1	2	1	4	1	6	2	1	1	4	18
09:15 AM	0	4	3	7	1	0	0	1	2	4	0	6	3	1	0	4	18
09:30 AM	0	5	3	8	2	0	0	2	2	1	0	3	3	1	0	4	17
09:45 AM	0	3	7	10	0	2	1	3	1	1	2	4	2	0	2	4	21
Total	1	13	17	31	3	3	2	8	6	10	3	19	10	3	3	16	74
Grand Total	4	42	34	80	6	8	7	21	12	22	3	37	32	9	11	52	190
Apprch %	5	52.5	42.5		28.6	38.1	33.3		32.4	59.5	8.1		61.5	17.3	21.2		
Total %	2.1	22.1	17.9	42.1	3.2	4.2	3.7	11.1	6.3	11.6	1.6	19.5	16.8	4.7	5.8	27.4	

	Robertson Boulevard Southbound				Washington Boulevard Westbound				Higuera Street Northbound				Washington Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 08:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	4	**4**	**8**	**1**	**1**	0	**2**	**2**	1	0	**3**	2	0	**1**	3	16
08:15 AM	0	3	3	6	1	1	0	2	1	2	0	3	3	**4**	0	**7**	**18**
08:30 AM	0	**5**	1	6	0	0	**1**	1	0	**3**	0	3	**4**	0	0	4	14
08:45 AM	0	3	3	6	0	1	1	2	0	2	0	2	3	0	0	3	13
Total Volume	0	15	11	26	2	3	2	7	3	8	0	11	12	4	1	17	61
% App. Total	0	57.7	42.3		28.6	42.9	28.6		27.3	72.7	0		70.6	23.5	5.9		
PHF	.000	.750	.688	.813	.500	.750	.500	.875	.375	.667	.000	.917	.750	.250	.250	.607	.847

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City of Culver City
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Site Code : 16619341
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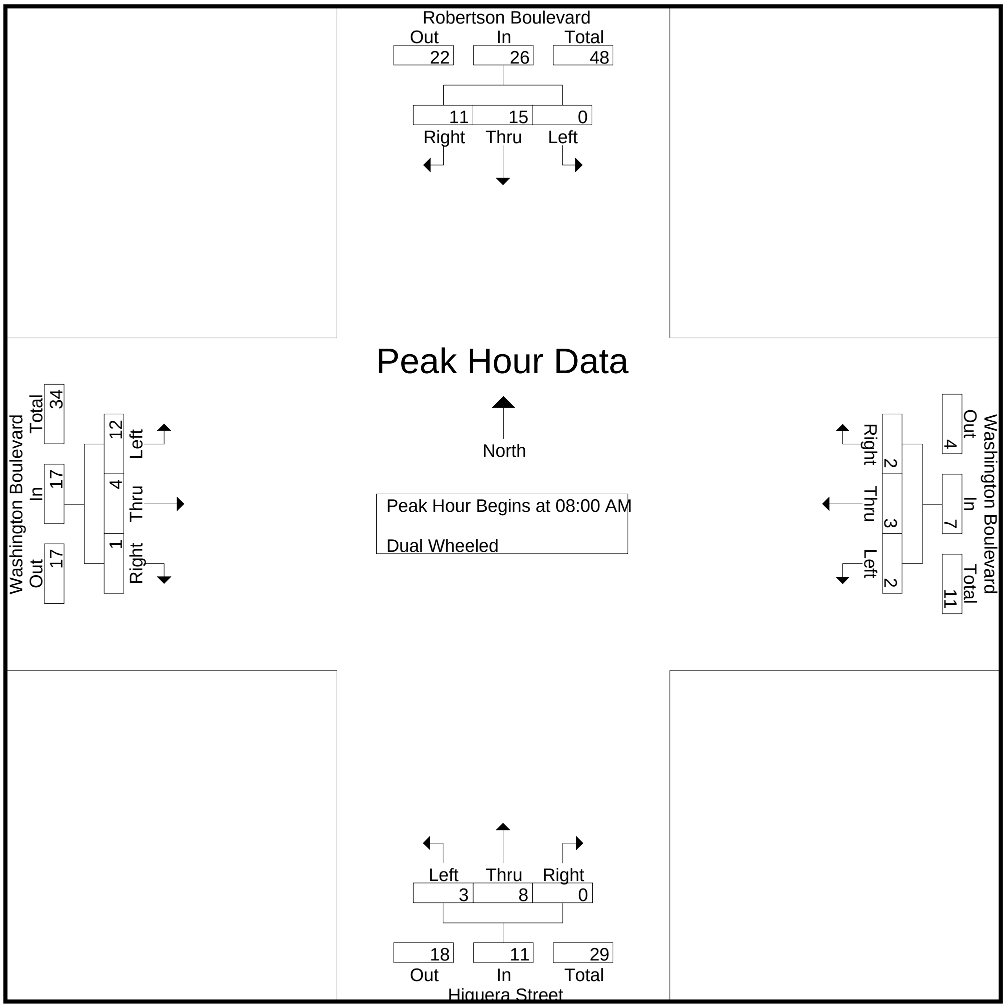
Page No : 2



Peak Hour Analysis From 08:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM				08:00 AM				08:00 AM				08:00 AM			
+0 mins.	0	4	**4**	**8**	**1**	**1**	0	**2**	**2**	1	0	**3**	2	0	**1**	3
+15 mins.	0	3	3	6	1	1	0	2	1	2	0	3	3	**4**	0	**7**
+30 mins.	0	**5**	1	6	0	0	**1**	1	0	**3**	0	3	**4**	0	0	4
+45 mins.	0	3	3	6	0	1	1	2	0	2	0	2	3	0	0	3
Total Volume	0	15	11	26	2	3	2	7	3	8	0	11	12	4	1	17
% App. Total	0	57.7	42.3		28.6	42.9	28.6		27.3	72.7	0		70.6	23.5	5.9	
PHF	.000	.750	.688	.813	.500	.750	.500	.875	.375	.667	.000	.917	.750	.250	.250	.607

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City of Culver City
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E/W: Washington Boulevard
Weather: Clear

File Name : 02_CVC_Robertson_Higuera_Washington AM
Site Code : 16619341
Start Date : 5/15/2019
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Groups Printed- Buses

	Robertson Boulevard Southbound				Washington Boulevard Westbound				Higuera Street Northbound				Washington Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	1	2	3	0	0	0	0	1	1	0	2	1	0	0	1	6
07:15 AM	0	5	1	6	1	0	0	1	0	2	0	2	1	0	0	1	10
07:30 AM	0	2	1	3	0	0	0	0	0	0	0	0	0	0	0	0	3
07:45 AM	0	2	0	2	0	0	0	0	1	0	0	1	1	0	0	1	4
Total	0	10	4	14	1	0	0	1	2	3	0	5	3	0	0	3	23
08:00 AM	0	1	2	3	0	0	0	0	1	1	0	2	1	0	0	1	6
08:15 AM	0	2	2	4	0	0	0	0	0	1	0	1	1	0	0	1	6
08:30 AM	0	2	1	3	0	0	0	0	1	0	0	1	1	0	0	1	5
08:45 AM	0	2	1	3	0	0	0	0	0	0	0	0	0	0	0	0	3
Total	0	7	6	13	0	0	0	0	2	2	0	4	3	0	0	3	20
09:00 AM	0	1	1	2	0	0	0	0	0	1	0	1	2	0	0	2	5
09:15 AM	0	1	1	2	0	1	0	1	1	2	0	3	1	0	0	1	7
09:30 AM	1	6	2	9	0	0	0	0	0	0	0	0	0	0	0	0	9
09:45 AM	0	1	2	3	0	0	0	0	1	0	0	1	1	0	0	1	5
Total	1	9	6	16	0	1	0	1	2	3	0	5	4	0	0	4	26
Grand Total	1	26	16	43	1	1	0	2	6	8	0	14	10	0	0	10	69
Apprch %	2.3	60.5	37.2		50	50	0		42.9	57.1	0		100	0	0		
Total %	1.4	37.7	23.2	62.3	1.4	1.4	0	2.9	8.7	11.6	0	20.3	14.5	0	0	14.5	

	Robertson Boulevard Southbound				Washington Boulevard Westbound				Higuera Street Northbound				Washington Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 08:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	1	**2**	3	0	0	0	0	**1**	**1**	0	**2**	**1**	0	0	**1**	**6**
08:15 AM	0	**2**	2	**4**	0	0	0	0	0	1	0	1	1	0	0	1	6
08:30 AM	0	2	1	3	0	0	0	0	1	0	0	1	1	0	0	1	5
08:45 AM	0	2	1	3	0	0	0	0	0	0	0	0	0	0	0	0	3
Total Volume	0	7	6	13	0	0	0	0	2	2	0	4	3	0	0	3	20
% App. Total	0	53.8	46.2		0	0	0		50	50	0		100	0	0		
PHF	.000	.875	.750	.813	.000	.000	.000	.000	.500	.500	.000	.500	.750	.000	.000	.750	.833

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File Name : 02_CVC_Robertson_Higuera_Washington AM
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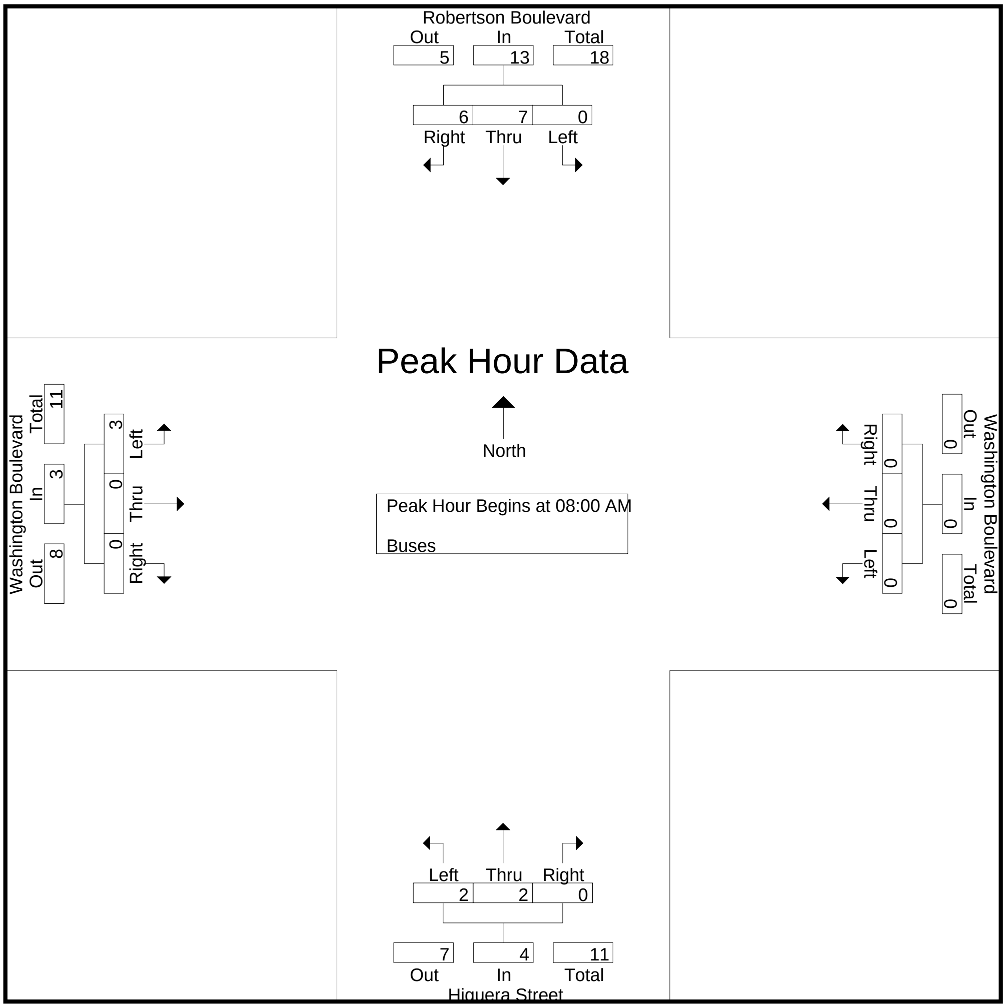

Peak Hour Analysis From 08:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM				08:00 AM				08:00 AM				08:00 AM			
+0 mins.	0	1	**2**	3	0	0	0	0	**1**	**1**	0	**2**	**1**	0	0	**1**
+15 mins.	0	**2**	2	**4**	0	0	0	0	0	1	0	1	1	0	0	1
+30 mins.	0	2	1	3	0	0	0	0	1	0	0	1	1	0	0	1
+45 mins.	0	2	1	3	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	7	6	13	0	0	0	0	2	2	0	4	3	0	0	3
% App. Total	0	53.8	46.2		0	0	0		50	50	0		100	0	0	
PHF	.000	.875	.750	.813	.000	.000	.000	.000	.500	.500	.000	.500	.750	.000	.000	.750

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File Name : 02_CVC_Robertson_Higuera_Washington PM
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Groups Printed- Passenger Vehicles - Dual Wheeled - Buses

	Robertson Boulevard Southbound				Washington Boulevard Westbound				Higuera Street Northbound				Washington Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	12	112	38	162	7	42	34	83	19	246	13	278	35	65	23	123	646
03:15 PM	22	121	25	168	6	25	23	54	13	205	15	233	44	84	21	149	604
03:30 PM	15	163	35	213	10	38	27	75	18	296	17	331	36	60	16	112	731
03:45 PM	18	147	22	187	9	37	20	66	17	208	18	243	28	67	23	118	614
Total	67	543	120	730	32	142	104	278	67	955	63	1085	143	276	83	502	2595
04:00 PM	21	137	30	188	9	43	29	81	26	251	11	288	46	52	16	114	671
04:15 PM	13	160	24	197	6	46	13	65	36	313	14	363	30	66	15	111	736
04:30 PM	25	139	21	185	6	36	17	59	37	274	16	327	38	54	8	100	671
04:45 PM	27	128	20	175	10	35	27	72	43	263	22	328	34	60	19	113	688
Total	86	564	95	745	31	160	86	277	142	1101	63	1306	148	232	58	438	2766
05:00 PM	27	121	39	187	7	56	32	95	49	285	21	355	22	94	17	133	770
05:15 PM	25	144	26	195	10	55	29	94	57	262	18	337	37	69	25	131	757
05:30 PM	24	142	30	196	8	59	28	95	50	282	16	348	34	74	23	131	770
05:45 PM	18	135	34	187	11	55	30	96	52	351	17	420	28	61	18	107	810
Total	94	542	129	765	36	225	119	380	208	1180	72	1460	121	298	83	502	3107
Grand Total	247	1649	344	2240	99	527	309	935	417	3236	198	3851	412	806	224	1442	8468
Apprch %	11	73.6	15.4		10.6	56.4	33		10.8	84	5.1		28.6	55.9	15.5		
Total %	2.9	19.5	4.1	26.5	1.2	6.2	3.6	11	4.9	38.2	2.3	45.5	4.9	9.5	2.6	17	
Passenger Vehicles	244	1618	326	2188	99	522	304	925	404	3201	189	3794	395	802	220	1417	8324
% Passenger Vehicles	98.8	98.1	94.8	97.7	100	99.1	98.4	98.9	96.9	98.9	95.5	98.5	95.9	99.5	98.2	98.3	98.3
Dual Wheeled	3	8	5	16	0	4	4	8	5	28	4	37	6	3	3	12	73
% Dual Wheeled	1.2	0.5	1.5	0.7	0	0.8	1.3	0.9	1.2	0.9	2	1	1.5	0.4	1.3	0.8	0.9
Buses	0	23	13	36	0	1	1	2	8	7	5	20	11	1	1	13	71
% Buses	0	1.4	3.8	1.6	0	0.2	0.3	0.2	1.9	0.2	2.5	0.5	2.7	0.1	0.4	0.9	0.8

	Robertson Boulevard Southbound				Washington Boulevard Westbound				Higuera Street Northbound				Washington Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**27**	121	**39**	187	7	56	**32**	95	49	285	**21**	355	22	**94**	17	**133**	770
05:15 PM	25	**144**	26	195	10	55	29	94	**57**	262	18	337	**37**	69	**25**	131	757
05:30 PM	24	142	30	**196**	8	**59**	28	95	50	282	16	348	34	74	23	131	770
05:45 PM	18	135	34	187	**11**	55	30	**96**	52	**351**	17	**420**	28	61	18	107	**810**
Total Volume	94	542	129	765	36	225	119	380	208	1180	72	1460	121	298	83	502	3107
% App. Total	12.3	70.8	16.9		9.5	59.2	31.3		14.2	80.8	4.9		24.1	59.4	16.5		
PHF	.870	.941	.827	.976	.818	.953	.930	.990	.912	.840	.857	.869	.818	.793	.830	.944	.959

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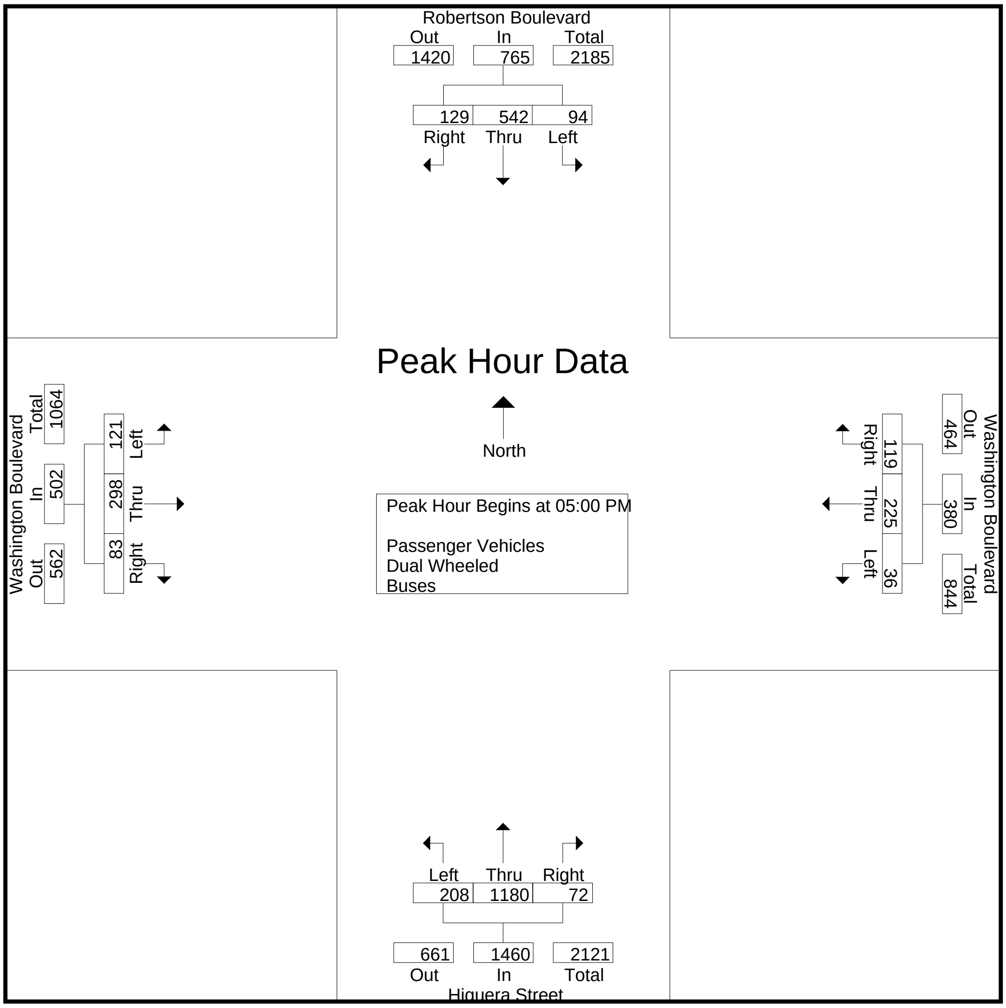

Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	03:30 PM				05:00 PM				05:00 PM				04:45 PM			
+0 mins.	15	**163**	**35**	**213**	7	56	**32**	95	49	285	**21**	355	34	60	19	113
+15 mins.	18	147	22	187	10	55	29	94	**57**	262	18	337	22	**94**	17	**133**
+30 mins.	**21**	137	30	188	8	**59**	28	95	50	282	16	348	**37**	69	**25**	131
+45 mins.	13	160	24	197	**11**	55	30	**96**	52	**351**	17	**420**	34	74	23	131
Total Volume	67	607	111	785	36	225	119	380	208	1180	72	1460	127	297	84	508
% App. Total	8.5	77.3	14.1		9.5	59.2	31.3		14.2	80.8	4.9		25	58.5	16.5	
PHF	.798	.931	.793	.921	.818	.953	.930	.990	.912	.840	.857	.869	.858	.790	.840	.955

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Groups Printed- Passenger Vehicles

	Robertson Boulevard Southbound				Washington Boulevard Westbound				Higuera Street Northbound				Washington Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	12	111	36	159	7	41	32	80	17	243	13	273	33	63	22	118	630
03:15 PM	21	119	21	161	6	25	22	53	13	202	14	229	43	82	19	144	587
03:30 PM	15	158	34	207	10	38	25	73	17	290	17	324	36	60	16	112	716
03:45 PM	17	146	21	184	9	36	20	65	17	204	17	238	25	67	23	115	602
Total	65	534	112	711	32	140	99	271	64	939	61	1064	137	272	80	489	2535
04:00 PM	21	133	28	182	9	42	29	80	24	251	10	285	44	52	16	112	659
04:15 PM	13	156	23	192	6	44	13	63	35	308	12	355	29	66	15	110	720
04:30 PM	25	136	20	181	6	36	17	59	34	272	16	322	37	54	8	99	661
04:45 PM	27	127	18	172	10	35	27	72	42	257	20	319	32	60	18	110	673
Total	86	552	89	727	31	157	86	274	135	1088	58	1281	142	232	57	431	2713
05:00 PM	27	118	39	184	7	56	32	95	49	283	19	351	21	94	17	132	762
05:15 PM	24	141	26	191	10	55	29	94	55	261	18	334	34	69	25	128	747
05:30 PM	24	139	28	191	8	59	28	95	50	279	16	345	34	74	23	131	762
05:45 PM	18	134	32	184	11	55	30	96	51	351	17	419	27	61	18	106	805
Total	93	532	125	750	36	225	119	380	205	1174	70	1449	116	298	83	497	3076
Grand Total	244	1618	326	2188	99	522	304	925	404	3201	189	3794	395	802	220	1417	8324
Apprch %	11.2	73.9	14.9		10.7	56.4	32.9		10.6	84.4	5		27.9	56.6	15.5		
Total %	2.9	19.4	3.9	26.3	1.2	6.3	3.7	11.1	4.9	38.5	2.3	45.6	4.7	9.6	2.6	17	

	Robertson Boulevard Southbound				Washington Boulevard Westbound				Higuera Street Northbound				Washington Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**27**	118	**39**	184	7	56	**32**	95	49	283	**19**	351	21	**94**	17	**132**	762
05:15 PM	24	**141**	26	**191**	10	55	29	94	**55**	261	18	334	**34**	69	**25**	128	747
05:30 PM	24	139	28	191	8	**59**	28	95	50	279	16	345	34	74	23	131	762
05:45 PM	18	134	32	184	**11**	55	30	**96**	51	**351**	17	**419**	27	61	18	106	**805**
Total Volume	93	532	125	750	36	225	119	380	205	1174	70	1449	116	298	83	497	3076
% App. Total	12.4	70.9	16.7		9.5	59.2	31.3		14.1	81	4.8		23.3	60	16.7		
PHF	.861	.943	.801	.982	.818	.953	.930	.990	.932	.836	.921	.865	.853	.793	.830	.941	.955

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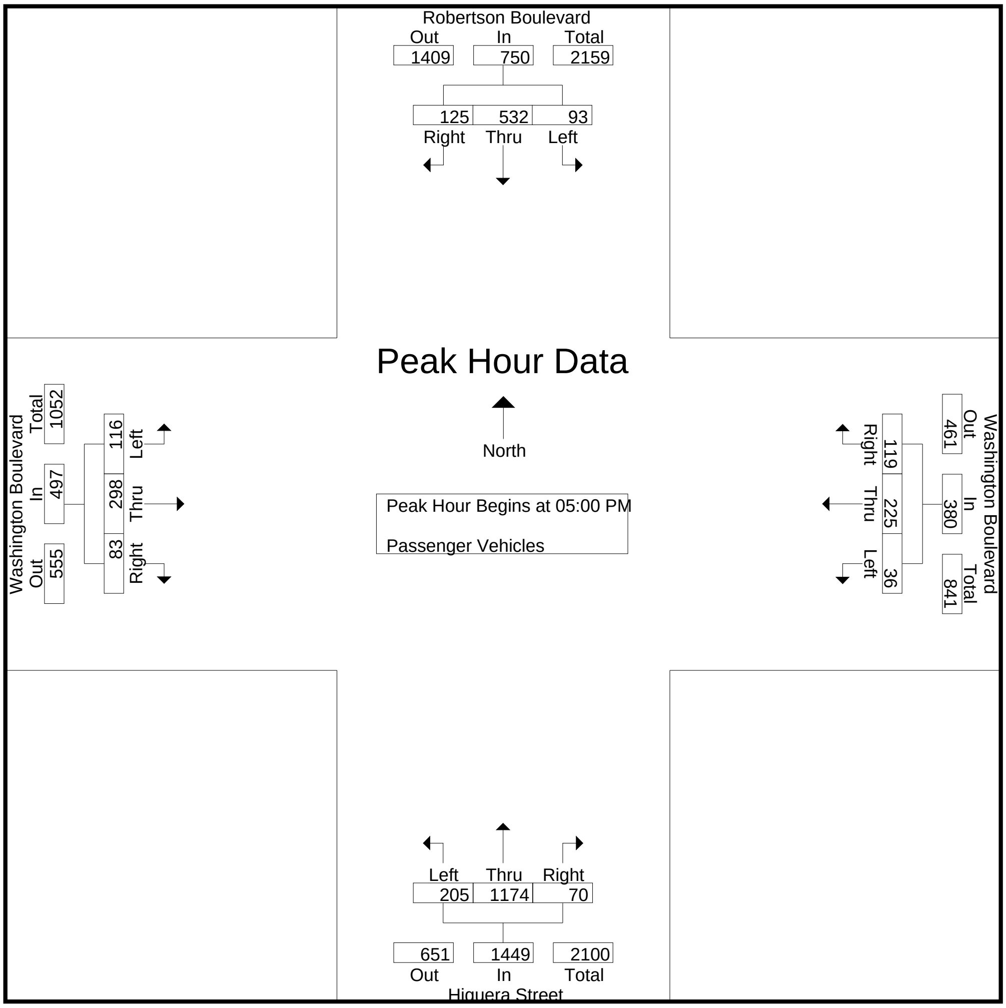

Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				05:00 PM				05:00 PM				05:00 PM			
+0 mins.	**27**	118	**39**	184	7	56	**32**	95	49	283	**19**	351	21	**94**	17	**132**
+15 mins.	24	**141**	26	**191**	10	55	29	94	**55**	261	18	334	**34**	69	**25**	128
+30 mins.	24	139	28	191	8	**59**	28	95	50	279	16	345	34	74	23	131
+45 mins.	18	134	32	184	**11**	55	30	**96**	51	**351**	17	**419**	27	61	18	106
Total Volume	93	532	125	750	36	225	119	380	205	1174	70	1449	116	298	83	497
% App. Total	12.4	70.9	16.7		9.5	59.2	31.3		14.1	81	4.8		23.3	60	16.7	
PHF	.861	.943	.801	.982	.818	.953	.930	.990	.932	.836	.921	.865	.853	.793	.830	.941

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Groups Printed- Dual Wheeled

	Robertson Boulevard Southbound				Washington Boulevard Westbound				Higuera Street Northbound				Washington Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	0	0	2	2	0	1	1	2	0	2	0	2	1	2	1	4	10
03:15 PM	1	0	3	4	0	0	1	1	0	2	0	2	0	1	2	3	10
03:30 PM	0	1	0	1	0	0	2	2	0	5	0	5	0	0	0	0	8
03:45 PM	1	0	0	1	0	1	0	1	0	4	0	4	2	0	0	2	8
Total	2	1	5	8	0	2	4	6	0	13	0	13	3	3	3	9	36
04:00 PM	0	2	0	2	0	0	0	0	1	0	0	1	1	0	0	1	4
04:15 PM	0	2	0	2	0	2	0	2	1	5	1	7	1	0	0	1	12
04:30 PM	0	0	0	0	0	0	0	0	2	2	0	4	0	0	0	0	4
04:45 PM	0	1	0	1	0	0	0	0	0	5	1	6	1	0	0	1	8
Total	0	5	0	5	0	2	0	2	4	12	2	18	3	0	0	3	28
05:00 PM	0	0	0	0	0	0	0	0	0	1	2	3	0	0	0	0	3
05:15 PM	1	1	0	2	0	0	0	0	1	1	0	2	0	0	0	0	4
05:30 PM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	2	0	3	0	0	0	0	1	3	2	6	0	0	0	0	9
Grand Total	3	8	5	16	0	4	4	8	5	28	4	37	6	3	3	12	73
Apprch %	18.8	50	31.2		0	50	50		13.5	75.7	10.8		50	25	25		
Total %	4.1	11	6.8	21.9	0	5.5	5.5	11	6.8	38.4	5.5	50.7	8.2	4.1	4.1	16.4	

	Robertson Boulevard Southbound				Washington Boulevard Westbound				Higuera Street Northbound				Washington Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	0	0	0	0	0	**1**	**2**	**3**	0	0	0	0	3
05:15 PM	**1**	**1**	0	**2**	0	0	0	0	**1**	1	0	2	0	0	0	0	**4**
05:30 PM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	1	2	0	3	0	0	0	0	1	3	2	6	0	0	0	0	9
% App. Total	33.3	66.7	0		0	0	0		16.7	50	33.3		0	0	0		
PHF	.250	.500	.000	.375	.000	.000	.000	.000	.250	.750	.250	.500	.000	.000	.000	.000	.563

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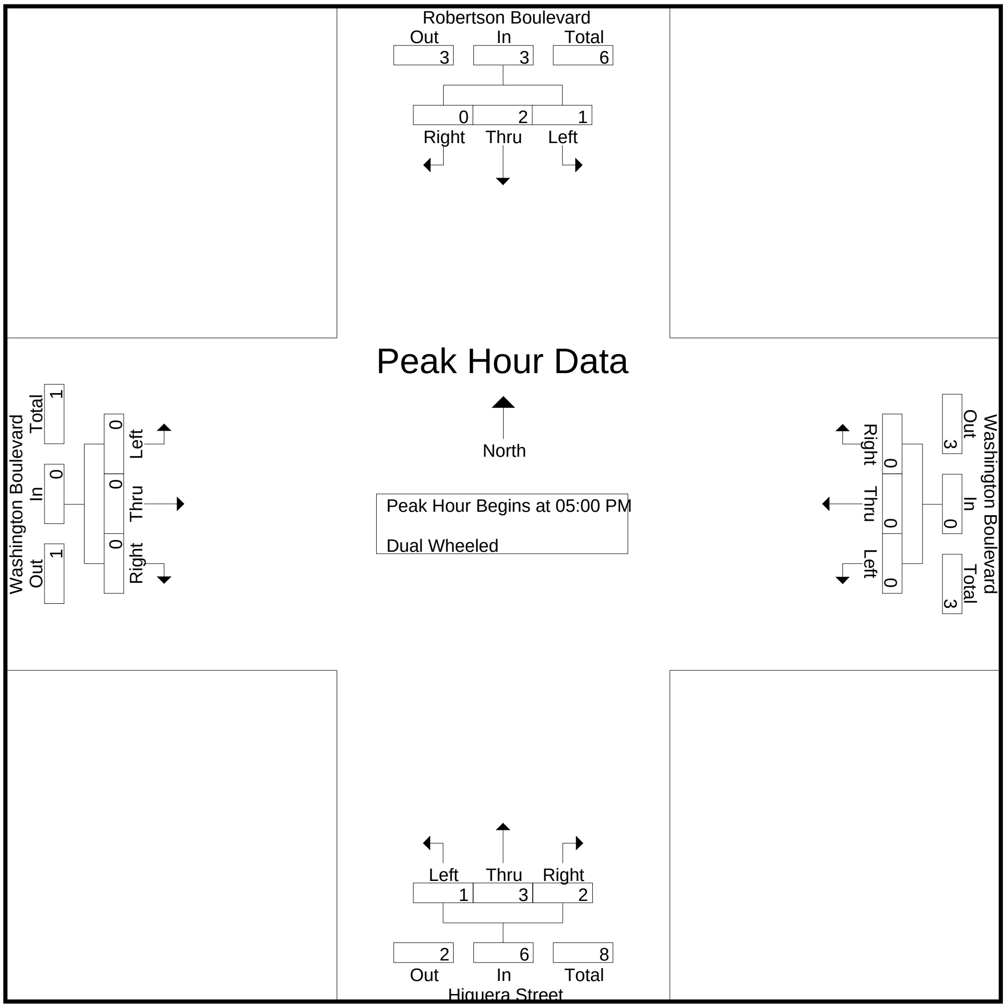
Site Code : 16619341
Start Date : 5/15/2019



Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				05:00 PM				05:00 PM				05:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	**1**	**2**	**3**	0	0	0	0
+15 mins.	**1**	**1**	0	**2**	0	0	0	0	**1**	1	0	2	0	0	0	0
+30 mins.	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	1	2	0	3	0	0	0	0	1	3	2	6	0	0	0	0
% App. Total	33.3	66.7	0		0	0	0		16.7	50	33.3		0	0	0	
PHF	.250	.500	.000	.375	.000	.000	.000	.000	.250	.750	.250	.500	.000	.000	.000	.000

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Culver City
N/S: Robertson Blvd/Higuera Street
E/W: Washington Boulevard
Weather: Clear

File Name : 02_CVC_Robertson_Higuera_Washington PM
Site Code : 16619341
Start Date : 5/15/2019
Page No : 1

Groups Printed- Buses

	Robertson Boulevard Southbound				Washington Boulevard Westbound				Higuera Street Northbound				Washington Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	0	1	0	1	0	0	1	1	2	1	0	3	1	0	0	1	6
03:15 PM	0	2	1	3	0	0	0	0	0	1	1	2	1	1	0	2	7
03:30 PM	0	4	1	5	0	0	0	0	1	1	0	2	0	0	0	0	7
03:45 PM	0	1	1	2	0	0	0	0	0	0	1	1	1	0	0	1	4
Total	0	8	3	11	0	0	1	1	3	3	2	8	3	1	0	4	24
04:00 PM	0	2	2	4	0	1	0	1	1	0	1	2	1	0	0	1	8
04:15 PM	0	2	1	3	0	0	0	0	0	0	1	1	0	0	0	0	4
04:30 PM	0	3	1	4	0	0	0	0	1	0	0	1	1	0	0	1	6
04:45 PM	0	0	2	2	0	0	0	0	1	1	1	3	1	0	1	2	7
Total	0	7	6	13	0	1	0	1	3	1	3	7	3	0	1	4	25
05:00 PM	0	3	0	3	0	0	0	0	0	1	0	1	1	0	0	1	5
05:15 PM	0	2	0	2	0	0	0	0	1	0	0	1	3	0	0	3	6
05:30 PM	0	2	2	4	0	0	0	0	0	2	0	2	0	0	0	0	6
05:45 PM	0	1	2	3	0	0	0	0	1	0	0	1	1	0	0	1	5
Total	0	8	4	12	0	0	0	0	2	3	0	5	5	0	0	5	22
Grand Total	0	23	13	36	0	1	1	2	8	7	5	20	11	1	1	13	71
Apprch %	0	63.9	36.1		0	50	50		40	35	25		84.6	7.7	7.7		
Total %	0	32.4	18.3	50.7	0	1.4	1.4	2.8	11.3	9.9	7	28.2	15.5	1.4	1.4	18.3	

	Robertson Boulevard Southbound				Washington Boulevard Westbound				Higuera Street Northbound				Washington Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	**3**	0	3	0	0	0	0	0	1	0	1	1	0	0	1	5
05:15 PM	0	2	0	2	0	0	0	0	**1**	0	0	1	**3**	0	0	**3**	**6**
05:30 PM	0	2	**2**	**4**	0	0	0	0	0	**2**	0	**2**	0	0	0	0	6
05:45 PM	0	1	2	3	0	0	0	0	1	0	0	1	1	0	0	1	5
Total Volume	0	8	4	12	0	0	0	0	2	3	0	5	5	0	0	5	22
% App. Total	0	66.7	33.3		0	0	0		40	60	0		100	0	0		
PHF	.000	.667	.500	.750	.000	.000	.000	.000	.500	.375	.000	.625	.417	.000	.000	.417	.917

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City of Culver City
N/S: Robertson Blvd/Higuera Street
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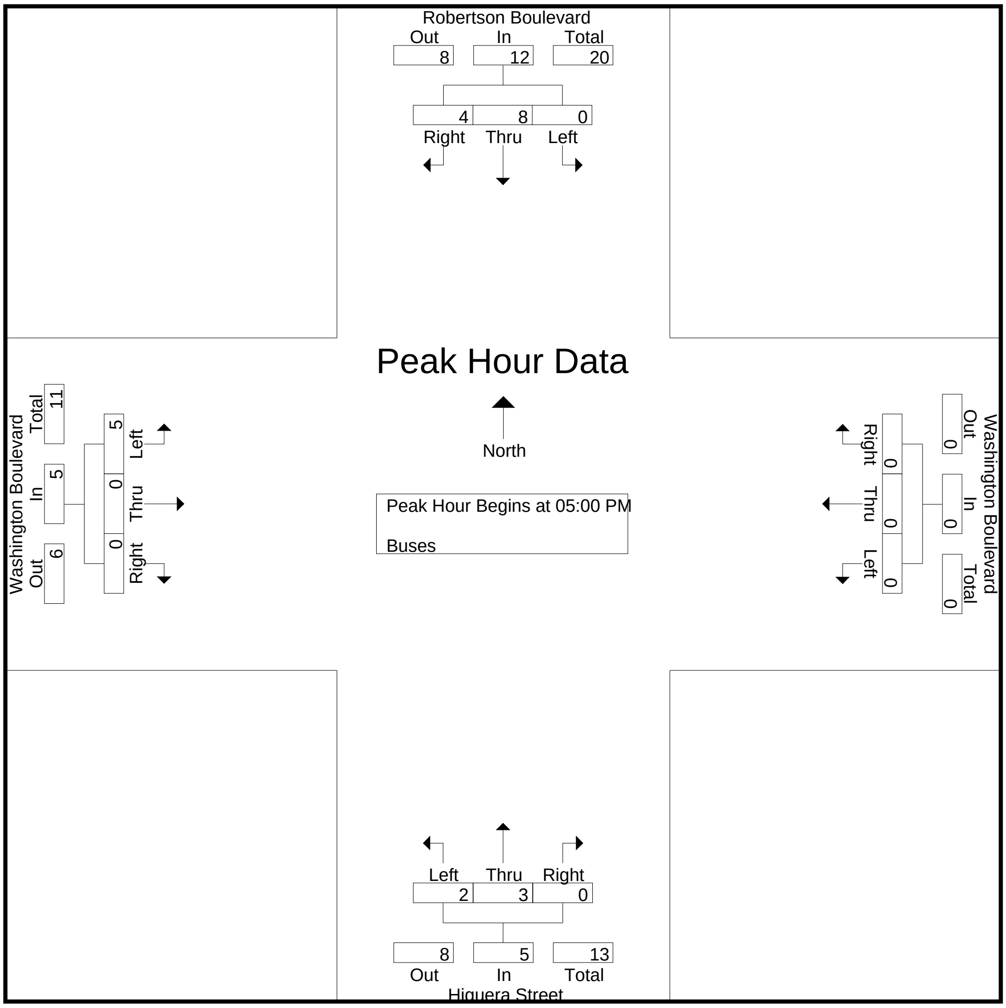


Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				05:00 PM				05:00 PM				05:00 PM			
+0 mins.	0	**3**	0	3	0	0	0	0	0	1	0	1	1	0	0	1
+15 mins.	0	2	0	2	0	0	0	0	**1**	0	0	1	**3**	0	0	**3**
+30 mins.	0	2	**2**	**4**	0	0	0	0	0	**2**	0	**2**	0	0	0	0
+45 mins.	0	1	2	3	0	0	0	0	1	0	0	1	1	0	0	1
Total Volume	0	8	4	12	0	0	0	0	2	3	0	5	5	0	0	5
% App. Total	0	66.7	33.3		0	0	0		40	60	0		100	0	0	
PHF	.000	.667	.500	.750	.000	.000	.000	.000	.500	.375	.000	.625	.417	.000	.000	.417

City Of Los Angeles
Department Of Transportation

MANUAL TRAFFIC COUNT SUMMARY

STREET:

North/South Robertson Blvd/Higuera Street

East/West Washington Boulevard

Day: Wednesday **Date:** May 15, 2019 **Weather:** CLEAR

Hours: 7-10AM 3-6PM **Staff:** CUI

School Day: YES **District:** Culver City I/S CODE 0

	N/B	S/B	E/B	W/B
DUAL-WHEELED	74	96	64	29
BIKES	27	23	24	22
BUSES	34	79	23	4

	N/B	TIME	S/B	TIME	E/B	TIME	W/B	TIME
AM PK 15 MIN	210	8.15	342	8.15	150	8.45	124	8.00
PM PK 15 MIN	420	5.45	213	3.30	149	3.15	96	5.45
AM PK HOUR	815	7.45	1280	7.45	552	8.15	445	7.15
PM PK HOUR	1460	5.00	785	3.30	508	4.45	380	5.00

NORTHBOUND Approach / **SOUTHBOUND Approach** / **TOTAL** / **XING S/L** / **XING N/L**

Hours	Lt	Th	Rt	Total	Hours	Lt	Th	Rt	Total	N-S	Ped	Sch	Ped	Sch
7-8	50	494	39	583	*7-8*	56	880	132	1068	1651	19	0	23	0
8-9	68	646	69	783	*8-9*	112	979	184	1275	2058	25	0	53	0
9-10	53	402	68	523	*9-10*	99	686	125	910	1433	22	0	45	0
3-4	67	955	63	1085	*3-4*	67	543	120	730	1815	35	0	43	0
4-5	142	1101	63	1306	*4-5*	86	564	95	745	2051	36	0	47	0
5-6	208	1180	72	1460	*5-6*	94	542	129	765	2225	29	0	60	0
TOTAL	588	4778	374	5740	TOTAL	514	4194	785	5493	11233	166	0	271	0

EASTBOUND Approach / **WESTBOUND Approach** / **TOTAL** / **XING W/L** / **XING E/L**

Hours	Lt	Th	Rt	Total	Hours	Lt	Th	Rt	Total	E-W	Ped	Sch	Ped	Sch
7-8	79	156	54	289	*7-8*	38	314	78	430	719	25	0	9	0
8-9	132	337	65	534	*8-9*	46	251	112	409	943	47	0	15	0
9-10	104	292	87	483	*9-10*	42	227	85	354	837	35	0	22	0
3-4	143	276	83	502	*3-4*	32	142	104	278	780	50	0	14	0
4-5	148	232	58	438	*4-5*	31	160	86	277	715	47	0	15	0
5-6	121	298	83	502	*5-6*	36	225	119	380	882	61	0	24	0
TOTAL	727	1591	430	2748	TOTAL	225	1319	584	2128	4876	265	0	99	0

(Rev Oct 06)

City of Los Angeles
Department of Transportation

BICYCLE COUNT SUMMARY

STREET:

North/South:	Robertson Blvd/Higuera Street				
East/West:	Washington Boulevard				
Day:	Wednesday	Date:	5/15/2019	Weather:	CLEAR
School Day:	Yes	District:	Culver City	I/S Code:	0
Hours:	7-10 AM, 3-6 PM	Staff:	CUI		

NORTHBOUND Approach / **SOUTHBOUND Approach** / **TOTAL**

Hours	Lt	Th	Rt	Total	Hours	Lt	Th	Rt	Total	N-S
7-8	1	3	0	4	7-8	0	3	0	3	7
8-9	1	4	1	6	8-9	0	3	0	3	9
9-10	0	6	3	9	9-10	3	6	0	9	18
3-4	0	3	0	3	3-4	0	4	0	4	7
4-5	0	3	0	3	4-5	0	2	0	2	5
5-6	0	2	0	2	5-6	1	1	0	2	4
TOTAL	2	21	4	27	TOTAL	4	19	0	23	50

EASTBOUND Approach / **WESTBOUND Approach** / **TOTAL**

Hours	Lt	Th	Rt	Total	Hours	Lt	Th	Rt	Total	E-W
7-8	0	2	1	3	7-8	1	2	1	4	7
8-9	0	3	1	4	8-9	0	5	0	5	9
9-10	0	6	1	7	9-10	1	1	0	2	9
3-4	0	2	1	3	3-4	0	0	0	0	3
4-5	0	0	0	0	4-5	0	2	0	2	2
5-6	0	5	2	7	5-6	0	4	5	9	16
TOTAL	0	18	6	24	TOTAL	2	14	6	22	46

REMARKS (6 hour total):

	NB	**SB**	**EB**	**WB**	**TOTAL**
- Female Riders	2	0	2	2	6
- No helmet riders	15	13	14	14	56
- Sidewalk Riding	10	8	11	9	38
- Wrong way riding	6	0	5	1	12

NB: Northbound, **SB**: Southbound, **EB**: Eastbound, **WB**: Westbound, **I/S**: Intersection

Source: CUI

LADOT 2015 CMP

City of Los Angeles
Department of Transportation

PEDESTRIAN COUNT SUMMARY

STREET:

North/South:	Robertson Blvd/Higuera Street				
East/West:	Washington Boulevard				
Day:	Wednesday	Date:	May 15, 2019	Weather:	CLEAR
School Day:	YES	District:	Culver City	I/S Code:	0
Hours:	7-10 AM, 3-6 PM	Staff:	CUI		

AM PEAK PERIOD

15 Min. Interval	N-LEG	S-LEG	E-LEG	W-LEG	TOTAL
7:00-7:15	7	3	3	2	15
7:15-7:30	3	1	0	8	12
7:30-7:45	9	7	5	8	29
7:45-8:00	4	8	1	7	20
8:00-8:15	14	5	3	4	26
8:15-8:30	12	9	5	18	44
8:30-8:45	14	5	4	12	35
8:45-9:00	13	6	3	13	35
9:00-9:15	14	5	7	14	40
9:15-9:30	13	7	6	5	31
9:30-9:45	8	7	3	6	24
9:45-10:00	10	3	6	10	29
Hours					
7 - 8	23	19	9	25	76
8 - 9	53	25	15	47	140
9 - 10	45	22	22	35	124
TOTAL	121	66	46	107	340

PM PEAK PERIOD

15 Min. Interval	N-LEG	S-LEG	E-LEG	W-LEG	TOTAL
3:00-3:15	7	20	8	24	59
3:15-3:30	17	16	8	30	71
3:30-3:45	9	22	6	22	59
3:45-4:00	10	12	6	24	52
4:00-4:15	14	14	2	18	48
4:15-4:30	11	14	10	18	53
4:30-4:45	6	12	6	16	40
4:45-5:00	16	32	12	42	102
5:00-5:15	5	22	12	20	59
5:15-5:30	22	14	0	48	84
5:30-5:45	21	14	22	34	91
5:45-6:00	12	8	14	20	54
Hours					
3 - 4	43	70	28	100	241
4 - 5	47	72	30	94	243
5 - 6	60	58	48	122	288
	150	200	106	316	772

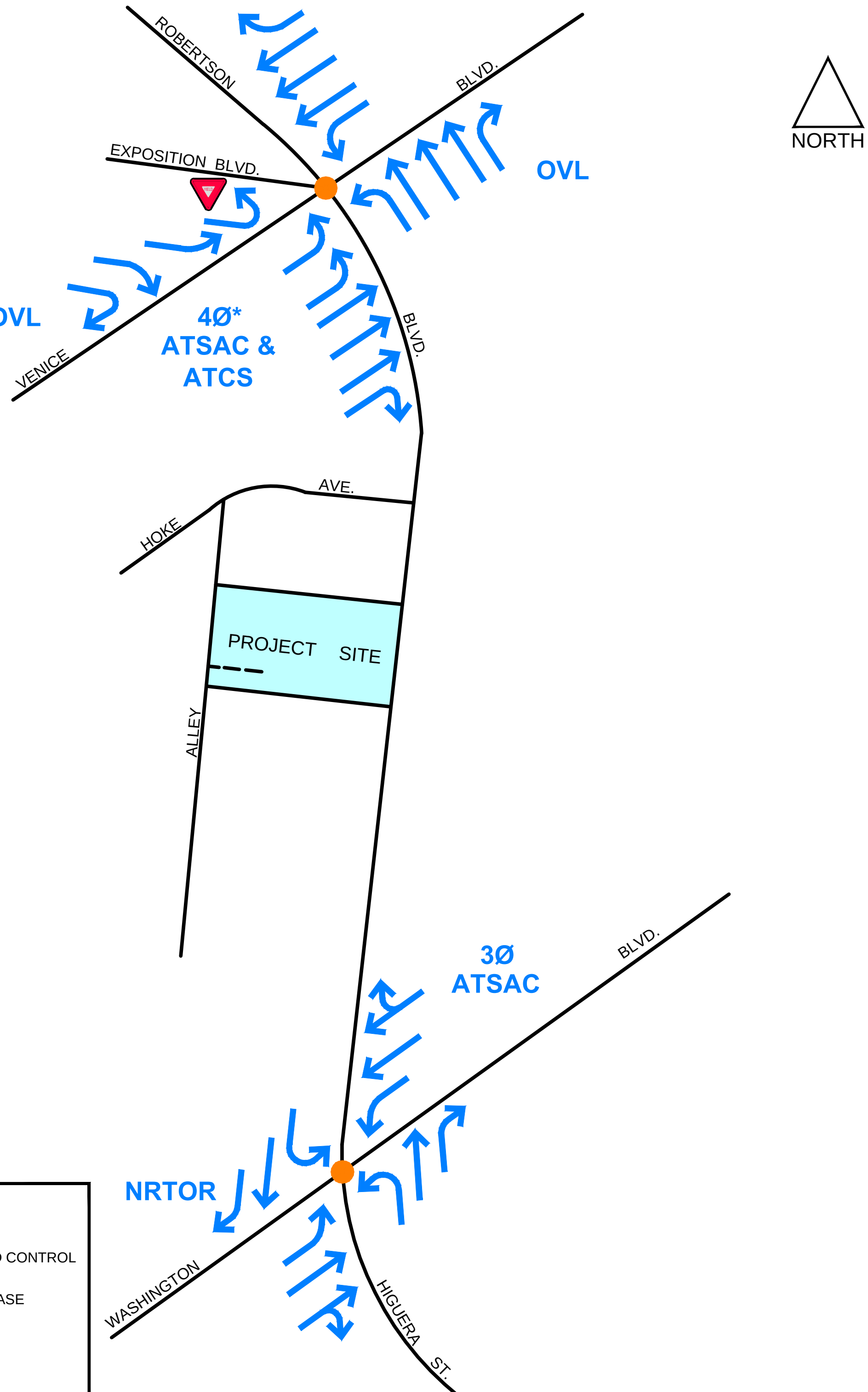
REMARKS (6 hour total):

	N-LEG	**S-LEG**	**E-LEG**	**W-LEG**	**TOTAL**
- Wheelchair/special needs assistance	0	1	0	0	1
- Skateboard/scooter	5	6	7	8	26

N: North, **S**: South, **E**: East, **W**: West, **I/S**: Intersection

Source: LADOT 2015 CMP

APPENDIX C
STUDY INTERSECTIONS GEOMETRICS



LEGEND

	: NUMBER OF SIGNAL PHASES
ATSAC	: AUTOMATED TRAFFIC SURVEILLANCE AND CONTROL
ATCS	: ADAPTIVE TRAFFIC CONTROL SYSTEM
OVL	: RIGHT TURN OVERLAP WITH EXISTING PHASE
NRTOR	: NO RIGHT TURN ON RED
*	: NORTH-SOUTH OPPOSED PHASING
	: YIELD CONTROLLED TURNING MOVEMENT
	: LANE GEOMETRICS

APPENDIX C

6/27/2019

Robertson(3727)MixedUseCulverCity\LANE-CONFIG

STUDY INTERSECTION GEOMETRICS
AND SIGNAL INFORMATION

CRAIN & ASSOCIATES
Transportation Planning
Traffic Engineering
300 Corporate Pointe, Suite 470
Culver City, California 90230
PH (310) 473 6508 F (310) 444 9771
www.crainandassociates.com

APPENDIX D
LEVEL OF SERVICE CALCULATION SHEETS

Level of Service Workheet
(Circular 212 Method)

I/S #:	North-South Street:	ROBERTSON BOULEVARD	Year of Count:	2019	Ambient Growth: (%):	1.5	Conducted by:	DH	Date:	7/9/2019
1	East-West Street:	VENICE BOULEVARD	Projection Year:	2022	Peak Hour:	AM	Reviewed by:		Project:	Robertson (3727) Mixed-Use

	Existing Condition				Existing Plus Project				Future Condition W/O Project				Future Condition W/ Project				Future W/ Project W/ Mitigation			
No. of Phases				4				4				4				4				
Opposed Ø'ing: N/S-1, E/W-2 or Both-3?				1				1				1				1				
Right Turns: FREE-1, NRTOR-2 or OLA-3?	NB--	3	SB--	3	NB--	3	SB--	3	NB--	3	SB--	3	NB--	3	SB--	3	NB--		SB--	
	EB--	0	WB--	0	EB--	0	WB--	0	EB--	0	WB--	0	EB--	0	WB--	0	EB--		WB--	
ATSAC-1 or ATSAC+ATCS-2?				2				2				2				2				
Override Capacity				0				0				0				0				

	MOVEMENT	EXISTING CONDITION			EXISTING PLUS PROJECT			FUTURE CONDITION W/O PROJECT				FUTURE CONDITION W/ PROJECT				FUTURE W/ PROJECT W/ MITIGATION			
		Volume	No. of Lanes	Lane Volume	Project Traffic	Total Volume	Lane Volume	Added Volume	Total Volume	No. of Lanes	Lane Volume	Added Volume	Total Volume	No. of Lanes	Lane Volume	Added Volume	Total Volume	No. of Lanes	Lane Volume
NORTHBOUND	Left	318	1	318	3	321	321	0	333	1	333	3	336	1	336		336		0
	Left-Through									0				0					
	Through	1460	2	730	2	1462	731	0	1527	2	764	2	1529	2	765		1529		0
	Through-Right									0				0					
	Right	94	1	0	3	97	0	0	98	1	0	3	101	1	0		101		0
	Left-Through-Right									0				0					
	Left-Right																		
SOUTHBOUND	Left	361	1	361	0	361	361	0	377	1	377	0	377	1	377		377		0
	Left-Through									0				0					
	Through	1355	1	1355	2	1357	1357	0	1417	1	1417	2	1419	1	1419		1419		0
	Through-Right									0				0					
	Right	187	1	29	0	187	29	0	196	1	31	0	196	1	31		196		0
	Left-Through-Right									0				0					
	Left-Right																		
EASTBOUND	Left	287	2	158	0	287	158	0	300	2	165	0	300	2	165		300		0
	Left-Through									0				0					
	Through	386	3	129	0	386	129	0	404	3	135	0	404	3	135		404		0
	Through-Right									0				0					
	Right	380	1	221	3	383	223	0	397	1	231	3	400	1	232		400		0
	Left-Through-Right									0				0					
	Left-Right																		
WESTBOUND	Left	110	1	110	3	113	113	0	115	1	115	3	118	1	118		118		0
	Left-Through									0				0					
	Through	307	3	102	0	307	102	0	321	3	107	0	321	3	107		321		0
	Through-Right									0				0					
	Right	50	1	0	0	50	0	0	52	1	0	0	52	1	0		52		0
	Left-Through-Right									0				0					
	Left-Right																		

	Existing Condition		Existing Plus Project		Future Condition W/O Project		Future Condition W/ Project		Future W/ Project W/ Mitigation	
CRITICAL VOLUMES	*North-South:*	2085	*North-South:*	2088	*North-South:*	2181	*North-South:*	2184	*North-South:*	0
	East-West:	331	*East-West:*	336	*East-West:*	346	*East-West:*	350	*East-West:*	0
	SUM:	2416	*SUM:*	2424	*SUM:*	2527	*SUM:*	2534	*SUM:*	0
VOLUME/CAPACITY *(V/C)* RATIO:		1.757		1.763		1.838		1.843		0.000
V/C LESS ATSAC/ATCS ADJUSTMENT:		1.657		1.663		1.738		1.743		0.000
LEVEL OF SERVICE (LOS):		F		F		F		F		A

REMARKS:

Version: 1i Beta; 8/4/2011

PROJECT IMPACT

Change in *v/c* due to project:	0.005	Δ*v/c* after mitigation:	-1.738
Significant impacted?	NO	Fully mitigated?	N/A

Level of Service Workheet
(Circular 212 Method)

I/S #:	North-South Street:	ROBERTSON BOULEVARD	Year of Count:	2019	Ambient Growth: (%):	1.5	Conducted by:	DH	Date:	7/9/2019
1	East-West Street:	VENICE BOULEVARD	Projection Year:	2022	Peak Hour:	PM	Reviewed by:		Project:	Robertson (3727) Mixed-Use

	Existing Condition	Existing Plus Project	Future Condition W/O Project	Future Condition W/ Project	Future W/ Project W/ Mitigation
No. of Phases	4	4	4	4	
Opposed Ø'ing: N/S-1, E/W-2 or Both-3?	1	1	1	1	
Right Turns: FREE-1, NRTOR-2 or OLA-3?	NB-- 3 SB-- 3 EB-- 0 WB-- 0	NB-- 3 SB-- 3 EB-- 0 WB-- 0	NB-- 3 SB-- 3 EB-- 0 WB-- 0	NB-- 3 SB-- 3 EB-- 0 WB-- 0	NB-- SB-- EB-- WB--
ATSAC-1 or ATSAC+ATCS-2?	2	2	2	2	
Override Capacity	0	0	0	0	

		EXISTING CONDITION			EXISTING PLUS PROJECT			FUTURE CONDITION W/O PROJECT				FUTURE CONDITION W/ PROJECT				FUTURE W/ PROJECT W/ MITIGATION			
	MOVEMENT	Volume	No. of Lanes	Lane Volume	Project Traffic	Total Volume	Lane Volume	Added Volume	Total Volume	No. of Lanes	Lane Volume	Added Volume	Total Volume	No. of Lanes	Lane Volume	Added Volume	Total Volume	No. of Lanes	Lane Volume
NORTHBOUND	Left	282	1	282	2	284	284	0	295	1	295	2	297	1	297		297		**0**
	Left-Through		0							0				0					
	Through	1427	2	**714**	2	1429	**715**	0	1492	2	**746**	2	1494	2	**747**		1494		0
	Through-Right		0							0				0					
	Right	84	1	0	2	86	0	0	88	1	0	2	90	1	0		90		0
	Left-Through-Right		0							0				0					
	Left-Right																		
SOUTHBOUND	Left	275	1	275	0	275	275	0	288	1	288	0	288	1	288		288		0
	Left-Through		0							0				0					
	Through	1479	1	**1479**	3	1482	**1482**	0	1547	1	**1547**	3	1550	1	**1550**		1550		**0**
	Through-Right		0							0				0					
	Right	174	1	45	0	174	45	0	182	1	47	0	182	1	47		182		0
	Left-Through-Right		0							0				0					
	Left-Right																		
EASTBOUND	Left	235	2	129	0	235	129	0	246	2	135	0	246	2	135		246		0
	Left-Through		0							0				0					
	Through	218	3	73	0	218	73	0	228	3	76	0	228	3	76		228		**0**
	Through-Right		0							0				0					
	Right	349	1	**208**	4	353	**211**	0	365	1	**218**	4	369	1	**221**		369		0
	Left-Through-Right		0							0				0					
	Left-Right																		
WESTBOUND	Left	90	1	**90**	4	94	**94**	0	94	1	**94**	4	98	1	**98**		98		**0**
	Left-Through		0							0				0					
	Through	409	3	136	0	409	136	0	428	3	143	0	428	3	143		428		0
	Through-Right		0							0				0					
	Right	132	1	0	0	132	0	0	138	1	0	0	138	1	0		138		0
	Left-Through-Right		0							0				0					
	Left-Right																		
CRITICAL VOLUMES			*North-South:*	2193		*North-South:*	2197			*North-South:*	2293			*North-South:*	2297			*North-South:*	0
			East-West:	298		*East-West:*	305			*East-West:*	312			*East-West:*	319			*East-West:*	0
			SUM:	2491		*SUM:*	2502			*SUM:*	2605			*SUM:*	2616			*SUM:*	0
VOLUME/CAPACITY *(V/C)* RATIO:				1.812			1.820				1.895				1.903				0.000
V/C LESS ATSAC/ATCS ADJUSTMENT:				1.712			1.720				1.795				1.803				0.000
LEVEL OF SERVICE (LOS):				F			F				F				F				A

REMARKS:

Version: 1i Beta; 8/4/2011

PROJECT IMPACT

Change in *v/c* due to project:	0.008	Δ*v/c* after mitigation:	-1.795
Significant impacted?	NO	Fully mitigated?	N/A

Level of Service Workheet
(Circular 212 Method)

I/S #:	North-South Street:	ROBERTSON BOULEVARD	Year of Count:	2019	Ambient Growth: (%):	1.5	Conducted by:	DH	Date:	7/9/2019
2	East-West Street:	WASHINGTON BOULEVARD	Projection Year:	2022	Peak Hour:	AM	Reviewed by:		Project:	Robertson (3727) Mixed-Use

	Existing Condition				Existing Plus Project				Future Condition W/O Project				Future Condition W/ Project				Future W/ Project W/ Mitigation			
No. of Phases				3				3				3				3				
Opposed Ø'ing: N/S-1, E/W-2 or Both-3?				0				0				0				0				
Right Turns: FREE-1, NRTOR-2 or OLA-3?	NB--	0	SB--	2	NB--	0	SB--	2	NB--	0	SB--	2	NB--	0	SB--	2	NB--		SB--	
	EB--	0	WB--	0	EB--	0	WB--	0	EB--	0	WB--	0	EB--	0	WB--	0	EB--		WB--	
ATSAC-1 or ATSAC+ATCS-2?				1				1				1				1				
Override Capacity				0				0				0				0				

	MOVEMENT	EXISTING CONDITION			EXISTING PLUS PROJECT			FUTURE CONDITION W/O PROJECT				FUTURE CONDITION W/ PROJECT				FUTURE W/ PROJECT W/ MITIGATION			
		Volume	No. of Lanes	Lane Volume	Project Traffic	Total Volume	Lane Volume	Added Volume	Total Volume	No. of Lanes	Lane Volume	Added Volume	Total Volume	No. of Lanes	Lane Volume	Added Volume	Total Volume	No. of Lanes	Lane Volume
NORTHBOUND	Left	68	1	68	0	68	68	0	71	1	71	0	71	1	71		71		0
	Left-Through									0				0					
	Through	646	1	646	1	647	647	0	676	1	676	1	677	1	677		677		0
	Through-Right									0				0					
	Right	69	1	46	0	69	46	0	72	1	48	0	72	1	48		72		0
	Left-Through-Right									0				0					
	Left-Right																		
SOUTHBOUND	Left	112	1	112	3	115	115	0	117	1	117	3	120	1	120		120		0
	Left-Through									0				0					
	Through	979	1	979	1	980	980	0	1024	1	1024	1	1025	1	1025		1025		0
	Through-Right									0				0					
	Right	184	1	184	3	187	187	0	192	1	192	3	195	1	195		195		0
	Left-Through-Right									0				0					
	Left-Right																		
EASTBOUND	Left	132	1	132	3	135	135	0	138	1	138	3	141	1	141		141		0
	Left-Through									0				0					
	Through	337	1	201	0	337	201	0	352	1	210	0	352	1	210		352		0
	Through-Right		1							1				1					
	Right	65		65	0	65	65	0	68	0	68	0	68	0	68		68		0
	Left-Through-Right									0				0					
	Left-Right																		
WESTBOUND	Left	46	1	46	0	46	46	0	48	1	48	0	48	1	48		48		0
	Left-Through									0				0					
	Through	251	1	182	0	251	183	0	262	1	190	0	262	1	191		262		0
	Through-Right		1							1				1					
	Right	112		112	3	115	115	0	117	0	117	3	120	0	120		120		0
	Left-Through-Right									0				0					
	Left-Right																		
CRITICAL VOLUMES			*North-South:*	1047		*North-South:*	1048			*North-South:*	1095			*North-South:*	1096			*North-South:*	0
			East-West:	314		*East-West:*	318			*East-West:*	328			*East-West:*	332			*East-West:*	0
			SUM:	1361		*SUM:*	1366			*SUM:*	1423			*SUM:*	1428			*SUM:*	0
VOLUME/CAPACITY *(V/C)* RATIO:				0.955			0.959				0.999				1.002				0.000
V/C LESS ATSAC/ATCS ADJUSTMENT:				0.885			0.889				0.929				0.932				0.000
LEVEL OF SERVICE (LOS):				D			D				E				E				A

REMARKS:

Version: 1i Beta; 8/4/2011

PROJECT IMPACT

Change in *v/c* due to project:	0.003	Δ*v/c* after mitigation:	-0.929
Significant impacted?	NO	Fully mitigated?	N/A

Level of Service Workheet
(Circular 212 Method)

I/S #:	North-South Street:	ROBERTSON BOULEVARD	Year of Count:	2019	Ambient Growth: (%):	1.5	Conducted by:	DH	Date:	7/9/2019
2	East-West Street:	WASHINGTON BOULEVARD	Projection Year:	2022	Peak Hour:	PM	Reviewed by:		Project:	Robertson (3727) Mixed-Use

	Existing Condition				Existing Plus Project				Future Condition W/O Project				Future Condition W/ Project				Future W/ Project W/ Mitigation			
No. of Phases				3				3				3				3				
Opposed Ø'ing: N/S-1, E/W-2 or Both-3?				0				0				0				0				
Right Turns: FREE-1, NRTOR-2 or OLA-3?	*NB--*	0	*SB--*	2	*NB--*	0	*SB--*	2	*NB--*	0	*SB--*	2	*NB--*	0	*SB--*	2	*NB--*		*SB--*	
	EB--	0	*WB--*	0	*EB--*	0	*WB--*	0	*EB--*	0	*WB--*	0	*EB--*	0	*WB--*	0	*EB--*		*WB--*	
ATSAC-1 or ATSAC+ATCS-2?				1				1				1				1				
Override Capacity				0				0				0				0				

	MOVEMENT	EXISTING CONDITION			EXISTING PLUS PROJECT			FUTURE CONDITION W/O PROJECT				FUTURE CONDITION W/ PROJECT				FUTURE W/ PROJECT W/ MITIGATION			
		Volume	No. of Lanes	Lane Volume	Project Traffic	Total Volume	Lane Volume	Added Volume	Total Volume	No. of Lanes	Lane Volume	Added Volume	Total Volume	No. of Lanes	Lane Volume	Added Volume	Total Volume	No. of Lanes	Lane Volume
NORTHBOUND	Left	208	1	208	0	208	208	0	218	1	218	0	218	1	218		218		**0**
	Left-Through		0							0				0					
	Through	1180	1	**1180**	1	1181	**1181**	0	1234	1	**1234**	1	1235	1	**1235**		1235		0
	Through-Right		0							0				0					
	Right	72	1	54	0	72	54	0	75	1	56	0	75	1	56		75		0
	Left-Through-Right		0							0				0					
	Left-Right																		
SOUTHBOUND	Left	94	1	**94**	2	96	**96**	0	98	1	**98**	2	100	1	**100**		100		0
	Left-Through		0							0				0					
	Through	542	1	542	1	543	543	0	567	1	567	1	568	1	568		568		**0**
	Through-Right		0							0				0					
	Right	129	1	129	2	131	131	0	135	1	135	2	137	1	137		137		0
	Left-Through-Right		0							0				0					
	Left-Right																		
EASTBOUND	Left	121	1	**121**	4	125	**125**	0	127	1	**127**	4	131	1	**131**		131		0
	Left-Through		0							0				0					
	Through	298	1	191	0	298	191	0	312	1	200	0	312	1	200		312		**0**
	Through-Right		1							1				1					
	Right	83	0	83	0	83	83	0	87	0	87	0	87	0	87		87		0
	Left-Through-Right		0							0				0					
	Left-Right																		
WESTBOUND	Left	36	1	36	0	36	36	0	38	1	38	0	38	1	38		38		**0**
	Left-Through		0							0				0					
	Through	225	1	**172**	0	225	**174**	0	235	1	**180**	0	235	1	**182**		235		0
	Through-Right		1							1				1					
	Right	119	0	119	4	123	123	0	124	0	124	4	128	0	128		128		0
	Left-Through-Right		0							0				0					
	Left-Right																		
CRITICAL VOLUMES			*North-South:*	1274		*North-South:*	1277			*North-South:*	1332			*North-South:*	1335			*North-South:*	0
			East-West:	293		*East-West:*	299			*East-West:*	307			*East-West:*	313			*East-West:*	0
			SUM:	1567		*SUM:*	1576			*SUM:*	1639			*SUM:*	1648			*SUM:*	0
VOLUME/CAPACITY *(V/C)* RATIO:				1.100			1.106				1.150				1.156				0.000
V/C LESS ATSAC/ATCS ADJUSTMENT:				1.030			1.036				1.080				1.086				0.000
LEVEL OF SERVICE (LOS):				F			F				F				F				A

REMARKS:

Version: 1i Beta; 8/4/2011

PROJECT IMPACT

Change in *v/c* due to project:	0.006	Δ*v/c* after mitigation:	-1.080
Significant impacted?	NO	Fully mitigated?	N/A

APPENDIX E
SWEPT PATH ANALYSIS FOR ACCESS TO THE PROJECT PARKING LOCATIONS

Swept Path Analysis
Vehicular Access to Project Parking Locations

The signed Project MOU included provisions that a swept path analysis be conducted to verify that vehicles will be able to access the Project parking areas, including both the parking stalls along the alley west of the Project site and the lower level parking garage. As shown in the Project site plan, the Project's main commercial and residential trash areas will be located on the ground floor at the northwest corner of the Project site. Therefore, large City sanitation trucks will not need to access the lower level parking garage and the largest vehicle anticipated to utilize the Project driveway is a compact sized passenger vehicle per the Project applicant confirmation. However, to be conservative, the swept path analysis for the driveway and ramp to the basement level was conducted for a standard design sized automobile using procedures from A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials, 6th Edition, 2011 (the AASHTO Manual). A swept path analysis was conducted for the surface level compact size spaces on using a compact size vehicle from the AASHTO Manual.

As shown in Figure E-1 and E-2, based on the current site plan, show a standard design size vehicle will be able to enter the ramp from the alley on the First Floor level and access the basement parking level. Figure E-3 shows that the first to be utilized parking space in the northeast corner of the surface lot can be accessed, as can the last to be utilized sparking space in the northwest corner of the surface lot.

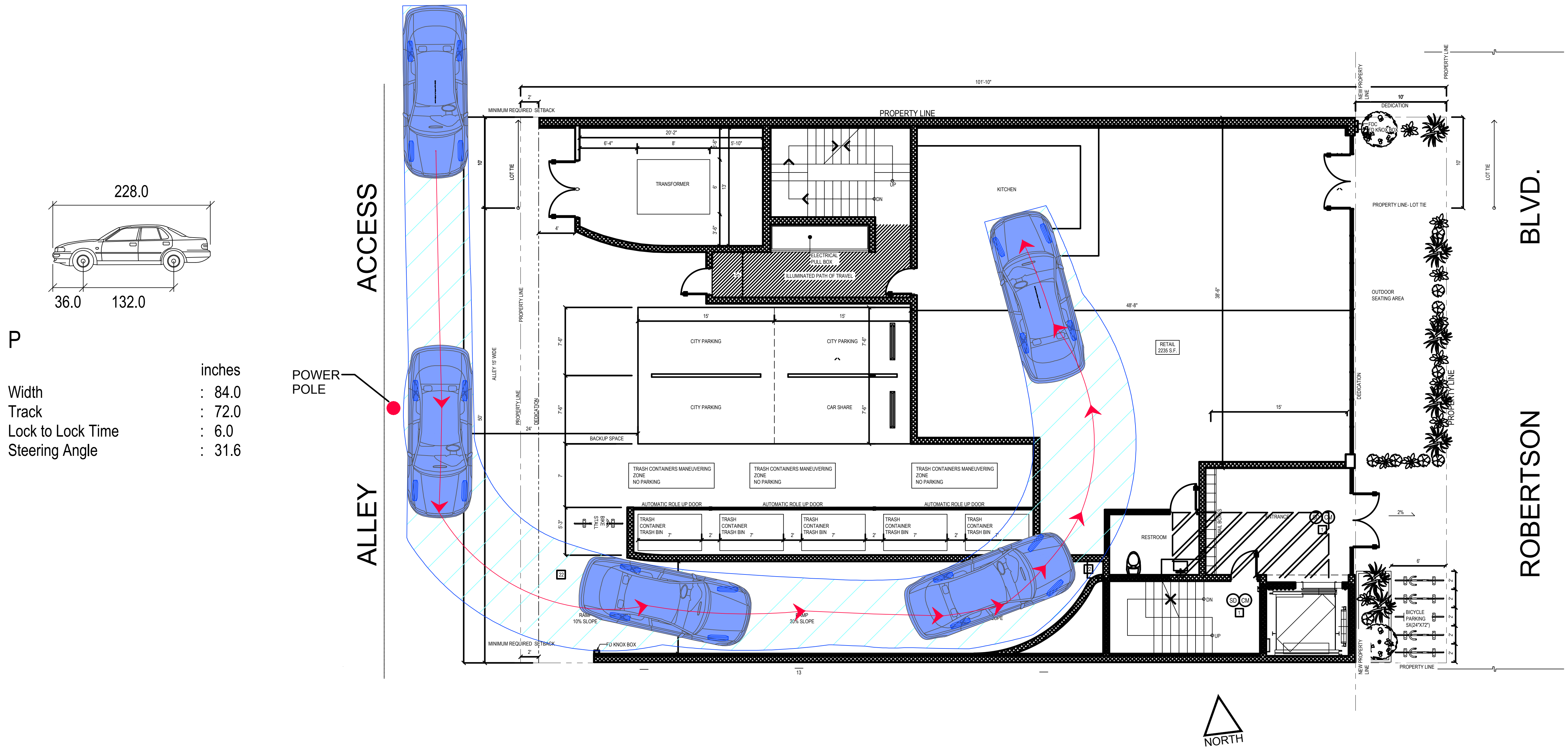


FIGURE E-1
FIRST FLOOR RAMP ENTRY
ACCESS SWEPT PATH

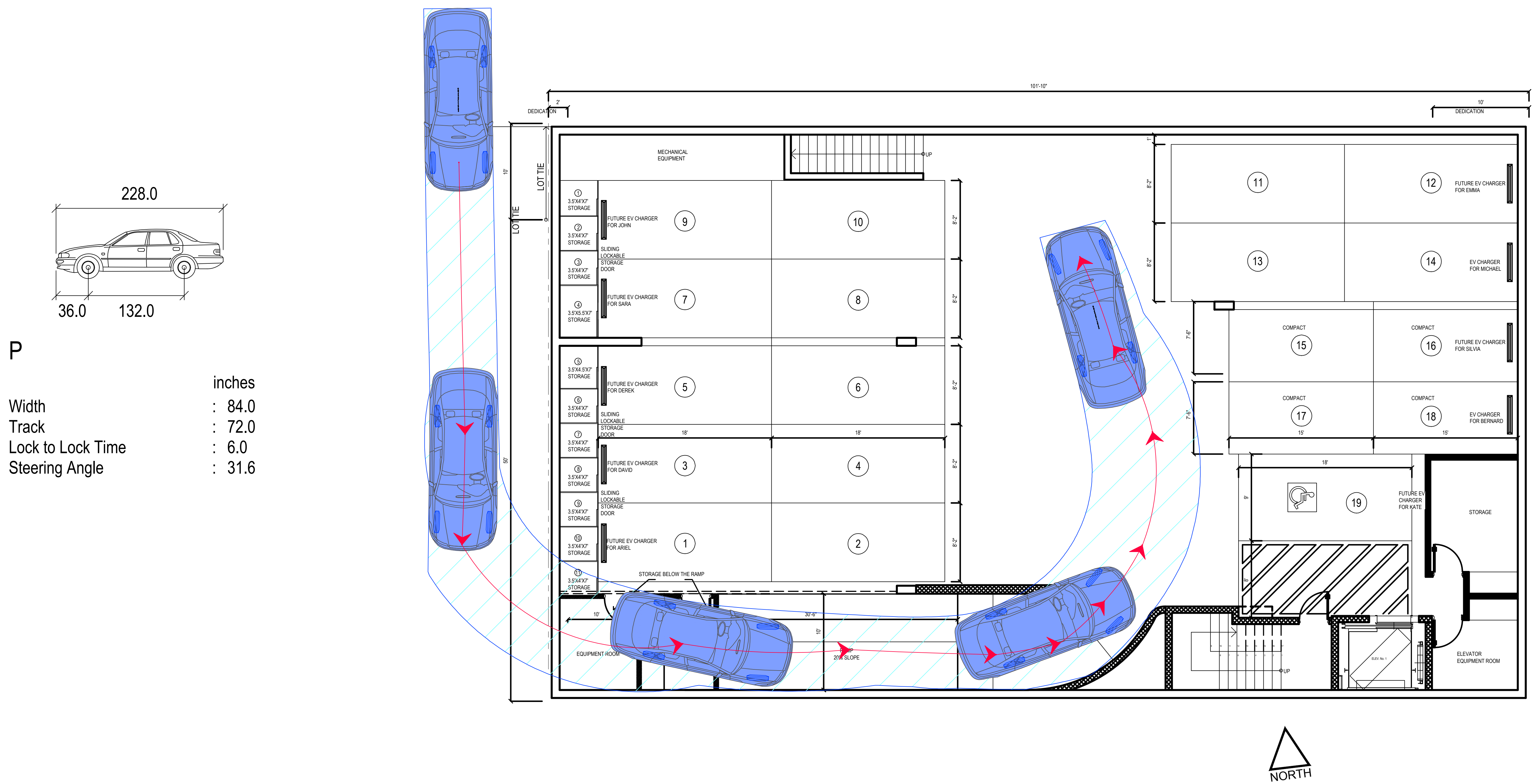


FIGURE E-2
BASEMENT PARKING LEVEL
ACCESS SWEPT PATH

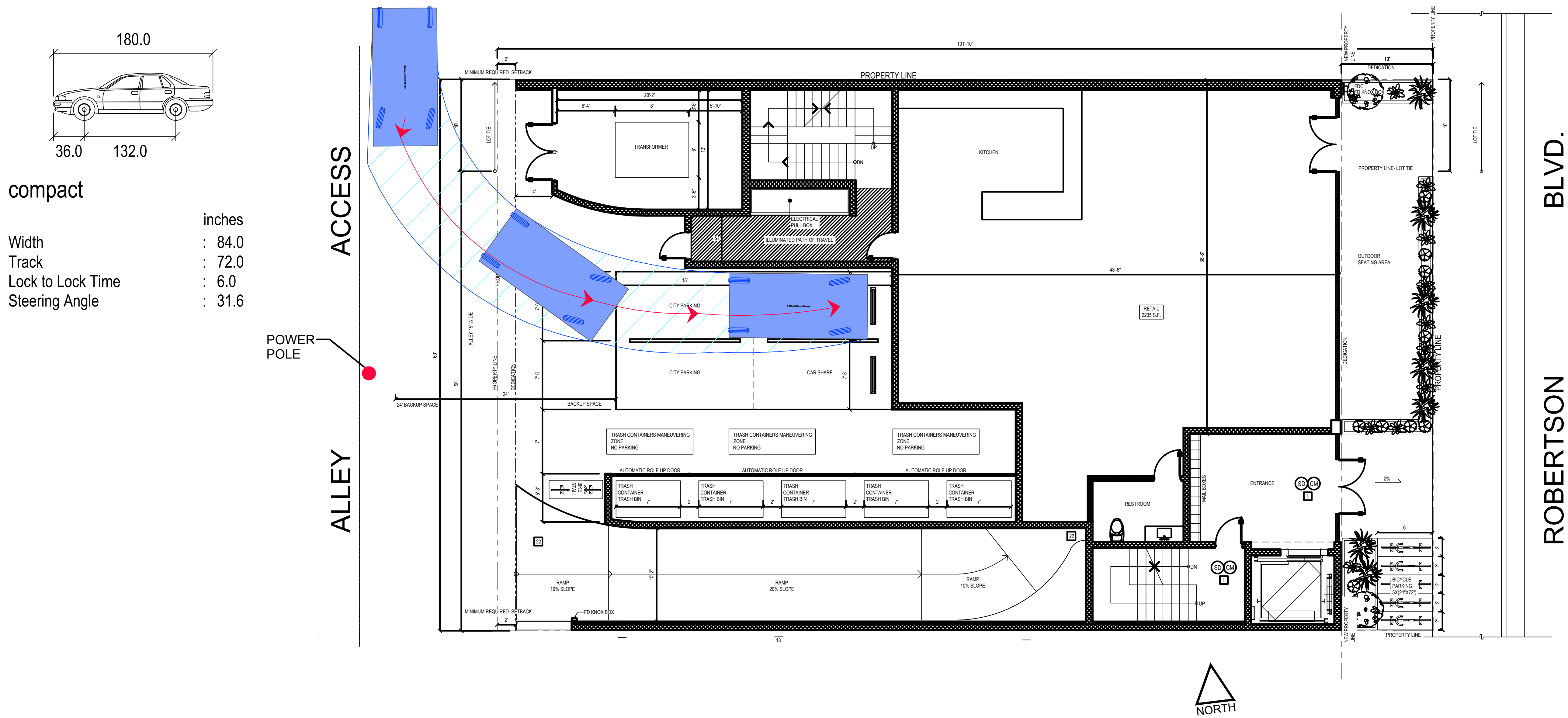


FIGURE E-3
FIRST FLOOR NORTHEAST CORNER
PARKING SPACE ACCESS SWEPT PATH

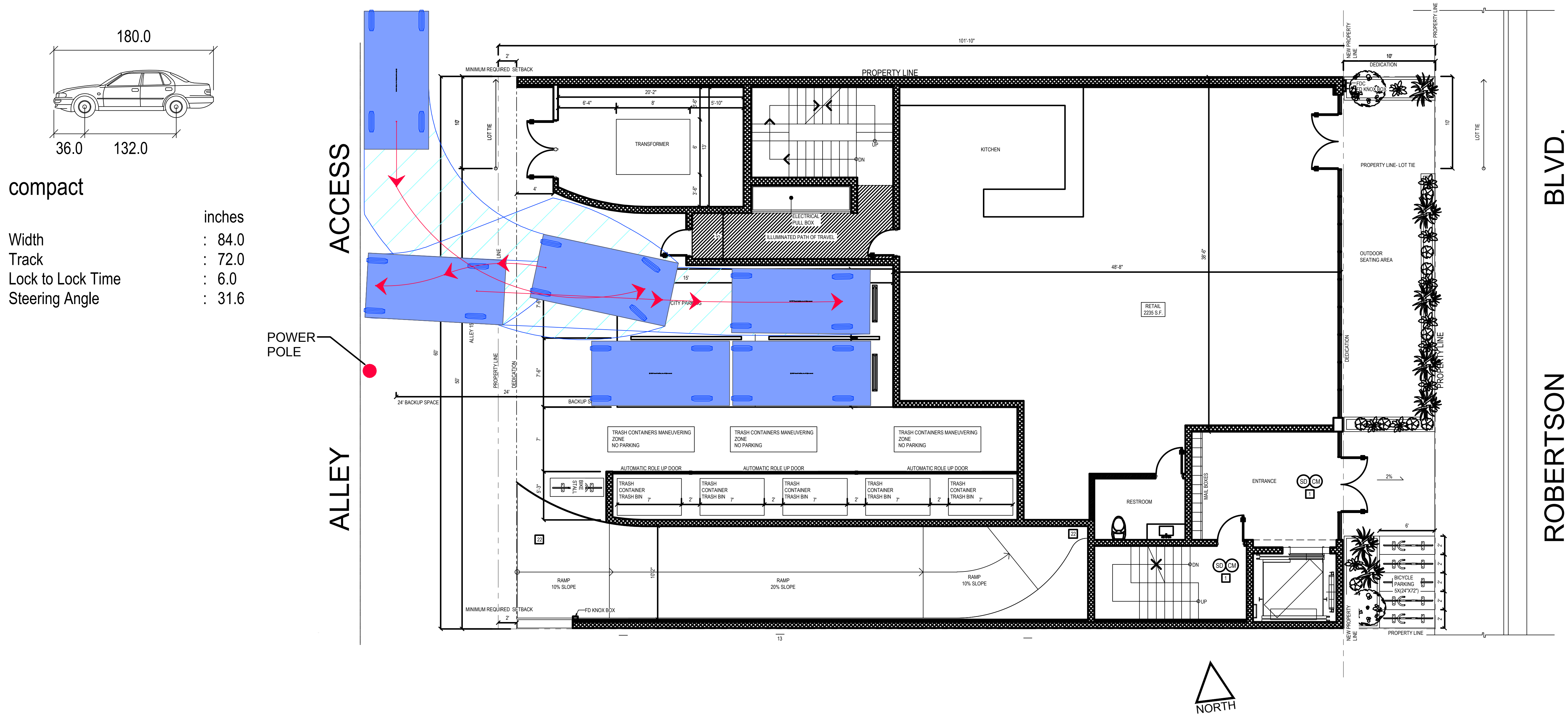


FIGURE E-4
FIRST FLOOR NORTHWEST CORNER
PARKING SPACE ACCESS SWEPT PATH

APPENDIX F
SIGHT DISTANCE ANALYSIS
VEHICULAR EGRESS FROM THE LOWER LEVEL PARKING GARAGE

Sight Distance Analysis
Vehicular Egress from the Lower Level Parking Garage

Sight distance measurements were performed at the location of the Project driveway along the north-south alley south of Hoke Avenue to determine if enough sigh distance is provided to ensure that a vehicle exiting the driveway will have adequate visibility of oncoming traffic. These measurements were performed in accordance with American Association of State Highway and Transportation Officials (AASHTO) requirements. Both stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance required by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. ISD or corner sight distance (CSD) is the sight distance required by a driver entering or crossing an intersecting roadway to perceive an oncoming vehicle and safely complete a turning or crossing maneuver with oncoming traffic. In accordance with AASHTO standards, at a minimum, sufficient SSD must be provided at an intersection, although the provision of ISD is preferable as being safer and more efficient.

The speed limit for Alley is 15 miles per hour (mph). Table F-1 presents the required, desirable, and measured SSD and ISD for westbound movements from the Project driveway at its intersection with the adjacent Alley. The sight distance measurements based on AASHTO requirements are shown in Figure F-1.

Table F-1
Sight Distance Measurements

Location	Stopping Sight Distance (Feet)[1]	Intersection Sight Distance (Feet)[2]
Eastbound Project Driveway and Western Avenue		
Left-Turn from Driveway	80	170
Right-Turn from Driveway o	80	145

Notes
[1] Recommended minimum values (Stopping Sight Distance) obtained from A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO), 2011, and based on a 15 mph design speed for motorists on the adjacent Alley approaching the Project driveway from the north and south.
[2] Values shown are desirable intersection sight distances (ISD) for vehicles exiting the driveway under STOP control. With ISD, motorists approaching the intersection on the major street should not need to adjust their travel speed to less than 70 percent of their initial approach speed.

The available SSD and ISD were measured in the field. Currently, there are no sight obstructions on the east side of the alley that would impede the sight lines from the driveway exiting the Project site. However, the design of the Project driveway includes structural walls on either side of the driveway ramp, which could impede the ability for exiting drivers to see in the northerly and southerly directions along the adjacent alley. Therefore, due to these structural walls as shown in the current site plan, drivers exiting the Project may not have the necessary sight distance to identify oncoming northbound and southbound traffic, which may result in potential conflicts between vehicles exiting the Project site and vehicles traveling along the alley.

Looking north from Project driveway along alley   Looking south from Project driveway along alley

To alleviate the sight distance issues at the Project driveway, the walls are to be restricted to grade height near the alley. Additionally, convex mirrors or other measures will be installed to alert the drivers of the potential oncoming conflict at the Project driveway locations. Such reduced wall heights and a convex mirror are shown in the sightline analysis in Figure F-1.

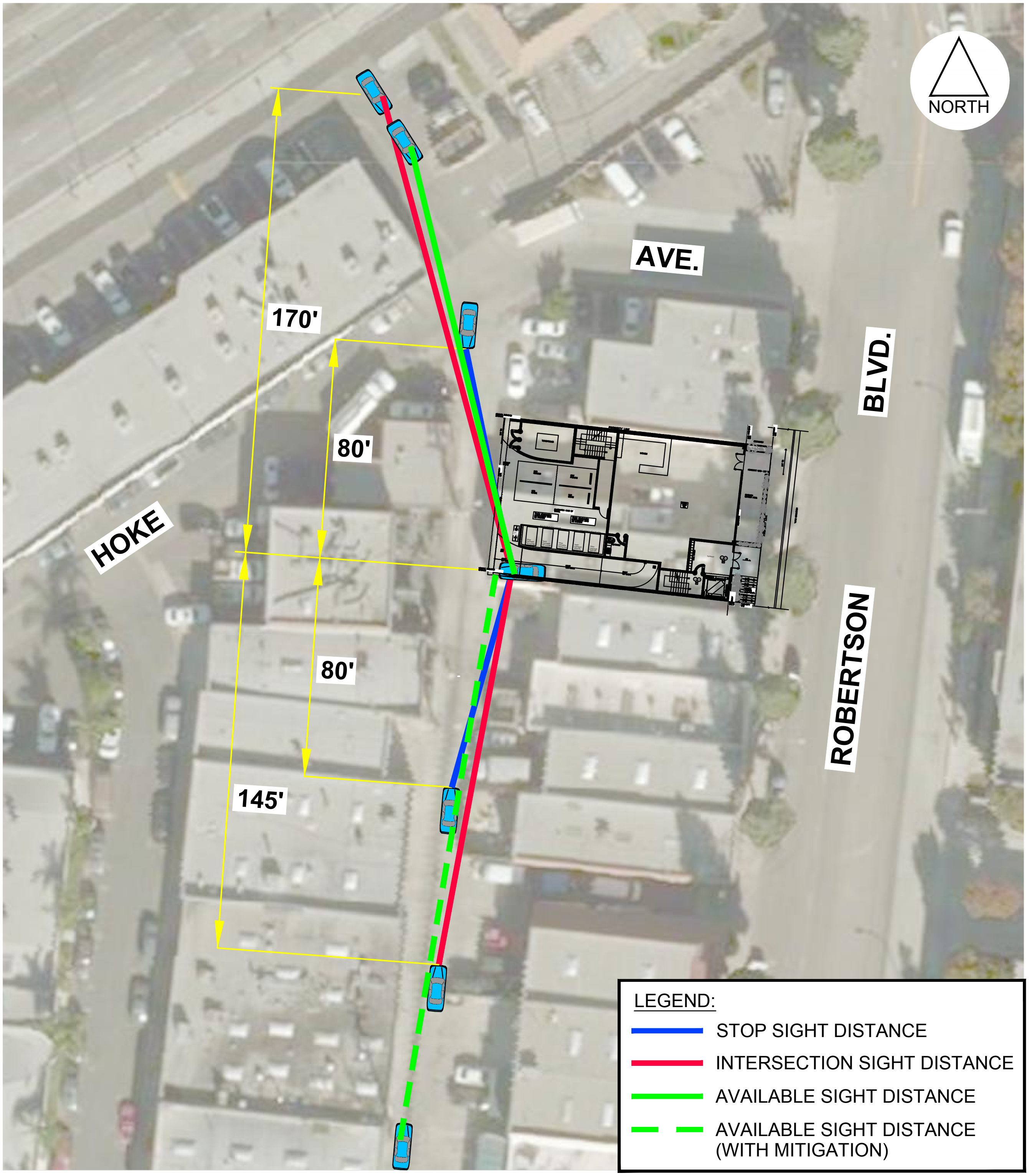


FIGURE F-1

10/21/2020

FN: Robertson(3727)MixedUseCulverCity/SIGHT-DIST20201021

PROJECT DRIVEWAY AND ADJACENT ALLEY
SIGHT DISTANCE ANALYSIS

CRAIN & ASSOCIATES
Transportation Planning
Traffic Engineering
300 Corporate Pointe, Suite 470
Culver City, California 90230
PH (310) 473 6508 F (310) 444 9771
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Attachment C
ESA, Noise Technical Report

3727 ROBERTSON PROJECT, CULVER CITY, CA

Noise and Vibration Technical Report

Prepared for

Icon West, Inc.
520 South La Fayette Park Place, Suite 503
Los Angeles, CA 90057

January 2020

3727 ROBERTSON PROJECT, CULVER CITY, CA

Noise and Vibration Technical Report

Prepared for

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D190830.00

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Noise and Vibration Technical Report

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
City	City of Culver City
CCMC	Culver City Municipal Code
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted dB scale
FTA	Federal Transit Administration
FHWA	Federal Highway Administration
L_{dn}	Day-night average noise level
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Noise Level
L_{min}	Minimum Noise Level
Metro	Los Angeles County Metropolitan Transportation Authority
MM	Mitigation Measure
Noise Element	City of Culver City General Plan Noise Element
PPV	peak particle velocity
RCNM	Roadway Construction Noise Model
TeNS	Caltrans Technical Noise Supplement
TIA	Traffic Impact Assessment
TNM	Traffic Noise Model

EXECUTIVE SUMMARY

Icon West, Inc. proposes to develop a five-story, mixed-use building located at 3727 Robertson Boulevard (Project) in Culver City, California. In accordance with the requirements under the California Environmental Quality Act (CEQA), this Technical Report provides an estimate of noise and vibration levels for the Project and the potential impacts from associated construction and operational activities. The analysis describes the existing noise environment in the vicinity of the Project Site, estimates future noise and vibration levels at surrounding land uses resulting from construction and operation of the Project, and identifies the potential for significant noise impacts based on applicable noise and vibration threshold of significance.

The Project is located on an approximately 0.12 acre (5,100 square feet) rectangular parcel (Project Site). The Project would be designed to accommodate ground-floor retail/restaurant space, commercial office space on the second floor, and 12 two-bedroom apartment units on floors 3 through 5. Parking would be provided in a one-floor, 19-space subterranean parking garage as well as 6 surface parking space. Development of the Project would require the demolition of the existing low-rise commercial building and surface parking lot.

The findings of the analyses are as follows:

- Construction activities would be required to comply with Culver City's allowable construction hours of between 8:00 A.M. and 8:00 P.M. Mondays through Friday, 9:00 A.M. and 7:00 P.M. Saturdays, and 10:00 A.M. and 7:00 P.M. Sundays, and would be temporary in nature. Through compliance with Culver City's allowable construction hours, and applicable noise reduction strategies in the City's General Plan Noise Element Policy 2.A, noise impacts related to on-site construction activities would be less than significant.

- Off-site haul truck trip would not substantially increase noise levels over the ambient condition. In addition, construction activities would occur only during daytime hours within the allowable hours specified in the City's Municipal Code. Therefore, noise impacts from off-site construction traffic would be less than significant and no mitigation measures are required.

- The Project's noise impacts on existing development from operational on-site stationary noise sources and traffic would not exceed the established thresholds. Operational related noise impacts would be less than significant.

- With implementation of PDF-NOI-1, Project construction and operation would not generate excessive vibration levels at nearby sensitive receptor locations. Thus, vibration impacts would be less than significant.

SECTION 1
Introduction

ESA has conducted an acoustical study with respect to potential noise and vibration impacts with construction activities, surface transportation, and other aspects of Project operations that are noise and vibration intensive and that have the potential to impact neighboring noise sensitive land uses. The objectives of this noise study are to:

a. Quantify the existing ambient noise environment at the proposed Project Site;
b. Evaluate the construction and operational noise and vibration impacts to nearby noise sensitive receptors (i.e., residential uses) based on applicable City standards and thresholds;
c. Provide, if needed, noise mitigation measures as required to meet applicable noise regulations and standards as specified by the City of Culver City.

1.1 Project Description

Icon West, Inc. proposes to develop a five-story, mixed-use building located at 3727 Robertson Boulevard (Project) in Culver City, California. In accordance with the requirements under the California Environmental Quality Act (CEQA), this Technical Report provides an estimate of air quality emissions for the Project and the potential impacts from associated construction and operational activities. The report includes the categories and types of emission sources resulting from the Project, the calculation procedures used in the analysis, and any assumptions or limitations.

The Project is located on an approximately 0.12 acre (5,100 square feet) rectangular parcel (Project Site). The Project would be designed to accommodate approximately 3,886 square feet of ground-floor retail/restaurant space, 5,455 square feet of commercial office space on the second floor, and 12 two-bedroom apartment units on floors 3 through 5. Parking would be provided in a one-floor, 19-space subterranean parking garage as well as 6 surface parking space.

1.2 Existing Conditions

The Project Site is located on Robertson Boulevard between Venice Boulevard and Washington Boulevard in Culver City, as shown in **Figure 1**, *Regional Location*. A single-lane service alley runs along the western side of the Project Site and the service alley serves as the western boundary of the Project Site. Existing surrounding uses include: business park/office building uses to the east across S. Robertson Boulevard; a construction company office/showroom immediately to the north; a per day care/grooming facility immediately to the south; and light-industrial/commercial/office uses to the west on Willat Avenue. There are no residential, park, hospital, or other environmentally sensitive uses in the immediate vicinity of the Project Site.

Figure 2, *Aerial Photograph with Surrounding Land Uses*, shows the site and surrounding land uses. The Project Site is currently developed with a sound studio totaling 2,850 square feet and a surface parking lot, which would all be demolished and removed to support development of the Project.

1.3 Noise and Vibration Descriptors

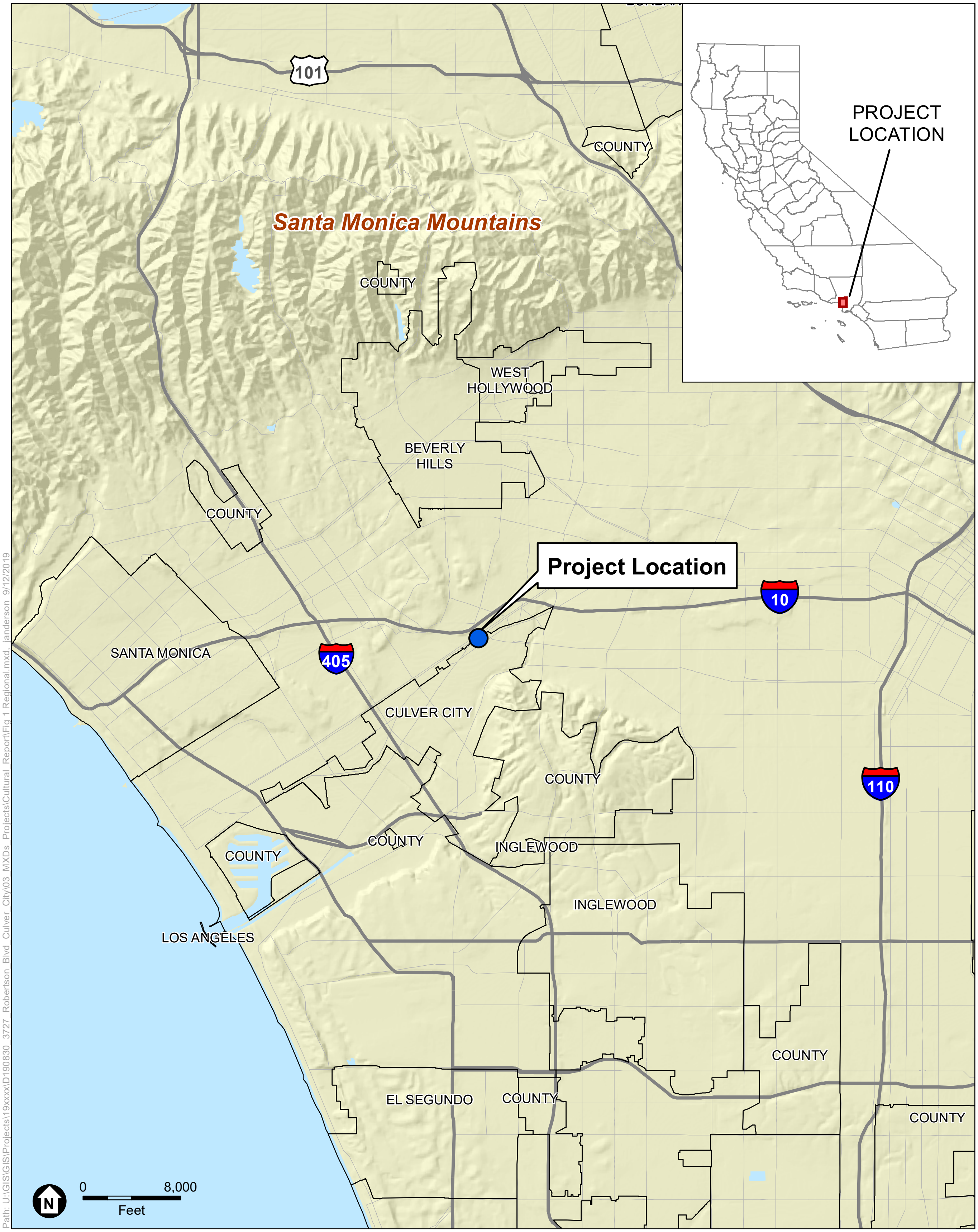
Noise

Noise Principals and Descriptors

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air). Noise is generally defined as unwanted sound (i.e., loud, unexpected, or annoying sound). Acoustics is defined as the physics of sound. In acoustics, the fundamental scientific model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. Acoustics addresses primarily the propagation and control of sound.

Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) that is measured in decibels (dB), which is the standard unit of sound amplitude measurement. The dB scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound, with 0 dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude, with audible frequencies of the sound spectrum ranging from 20 to 20,000 Hz. The typical human ear is not equally sensitive to this frequency range. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that deemphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to these extremely low and extremely high frequencies. This method of frequency filtering or weighting is referred to as A-weighting, expressed in units of A-weighted decibels (dBA), which is typically applied to community noise measurements. Some representative common outdoor and indoor noise sources and their corresponding A-weighted noise levels are shown in **Figure 3**, *Decibel Scale and Common Noise Sources*.



Path: U:\GIS\GIS\Projects\19xxxx\D190830 3727 Robertson Blvd Culver City\03 MXDs Projects\Cultural Report\Fig 1 Regional.mxd, janderson 9/12/2019

SOURCE: ESRI

3727 S. Robertson Blvd, Culver City

Figure 1
Regional Location

ESA

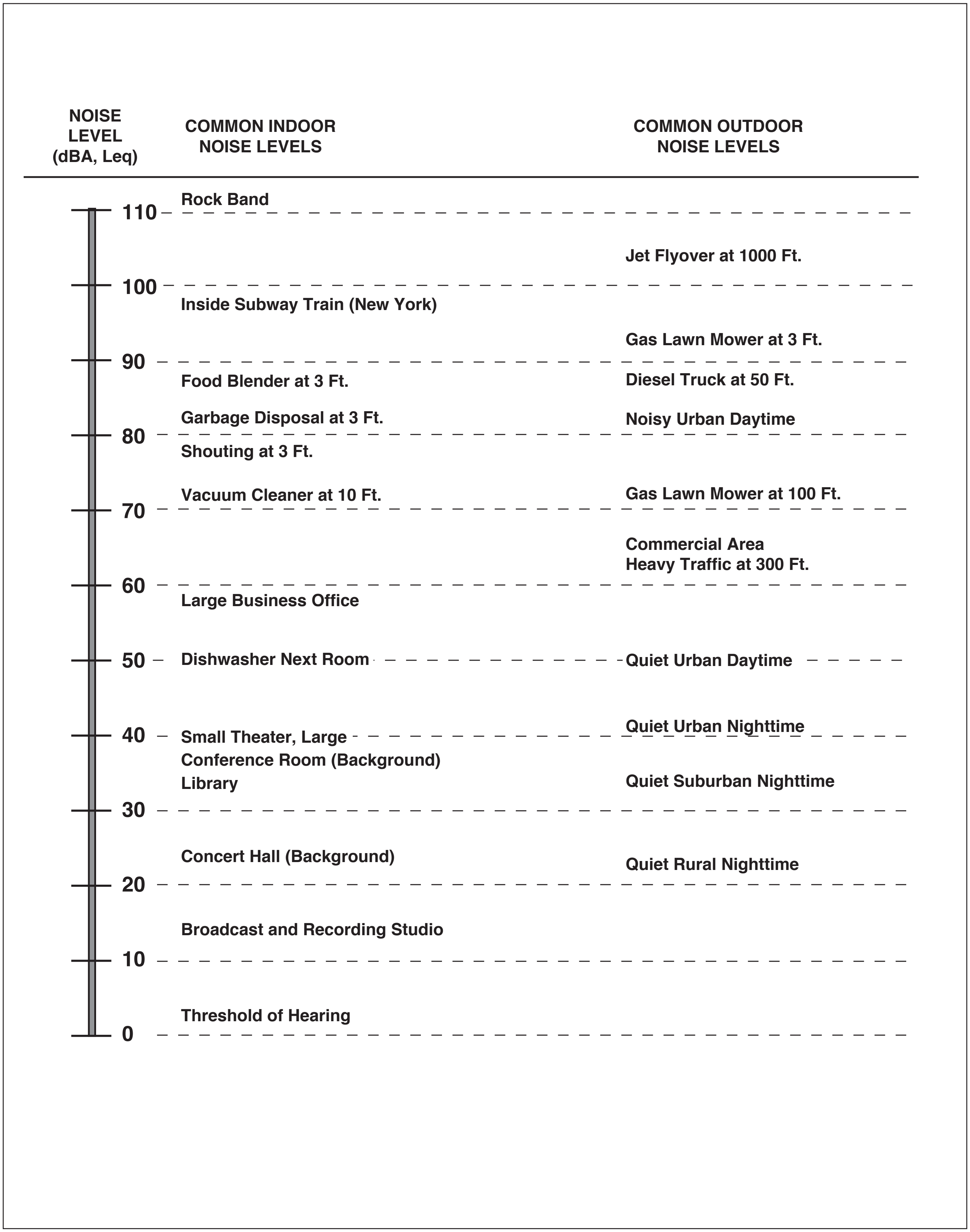
Path: U:\GIS\GIS\Projects\19xxx\D190830_3727_Robertson_Blvd_Culver_City\03_MXDs_Projects\Cultural_Report\Fig3_Aerial.aprx, janderson 9/12/2019

SOURCE: Mapbox, 2018.

3727 S. Robertson Blvd, Culver City

ESA

Figure 2
Aerial Photograph with Surrounding Land Uses



D170431.00

SOURCE: State of California, Department of Transportation (Caltrans), Technical Noise Supplement (TeNS). October 1998. Available: http://www.dot.ca.gov/hq/env/noise/pub/Technical Noise Supplement.pdf

3727 Robertson Project

Figure 3
Decibel Scale and Common Noise Sources

Noise Exposure and Community Noise

An individual's noise exposure is a measure of noise over a period of time; a noise level is a measure of noise at a given instant in time, as presented in Figure 3. However, noise levels rarely persist at that level over a long period of time. Rather, community noise varies continuously over a period of time with respect to the sound sources contributing to the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with many of the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources, such as changes in traffic volume. What makes community noise variable throughout a day, besides the slowly changing background noise, is the addition of short-duration, single-event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual. These successive additions of sound to the community noise environment change the community noise level from instant to instant, requiring the noise exposure to be measured over periods of time to characterize an existing community noise environment. The following noise descriptors are used to characterize environmental noise levels over time, which are applicable to the Project.

L_{eq}: The equivalent sound level over a specified period of time, typically, 1 hour (L_{eq}). The L_{eq} may also be referred to as the average sound level.

L_{max}: The maximum, instantaneous noise level experienced during a given period of time.

L_{min}: The minimum, instantaneous noise level experienced during a given period of time.

L_x: The noise level exceeded a percentage of a specified time period. For instance, L_{50} and L_{90} represent the noise levels that are exceeded 50 percent and 90 percent of the time, respectively.

L_{dn}: The average A-weighted noise level during a 24-hour day, obtained after an addition of 10 dB to measured noise levels between the hours of 10:00 p.m. to 7:00 a.m. to account nighttime noise sensitivity. The L_{dn} is also termed the day-night average noise level (DNL).

CNEL: The Community Noise Equivalent Level (CNEL) is the average A-weighted noise level during a 24-hour day that includes an addition of 5 dB to measured noise levels between the hours of 7:00 a.m. to 10:00 p.m. and an addition of 10 dB to noise levels between the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.

Effects of Noise on People

Noise is generally loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity that is a nuisance or disruptive. The effects of noise on people can be placed into four general categories:

- Subjective effects (e.g., dissatisfaction, annoyance)
- Interference effects (e.g., communication, sleep, and learning interference)
- Physiological effects (e.g., startle response)
- Physical effects (e.g., hearing loss)

Although exposure to high noise levels has been demonstrated to cause physical and physiological effects, the principal human responses to typical environmental noise exposure are related to subjective effects and interference with activities. Interference effects interrupt daily activities and include interference with human communication activities, such as normal conversations, watching television, telephone conversations, and interference with sleep. Sleep interference effects can include both awakening and arousal to a lesser state of sleep.[1]

With regard to the subjective effects, the responses of individuals to similar noise events are diverse and influenced by many factors, including the type of noise, the perceived importance of the noise, the appropriateness of the noise to the setting, the duration of the noise, the time of day and the type of activity during which the noise occurs, and individual noise sensitivity. Overall, there is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction on people. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted (i.e., comparison to the ambient noise environment). In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships generally occur[2]:

- Except in carefully controlled laboratory experiments, a change of 1 dBA in ambient noise levels cannot be perceived;
- Outside of the laboratory, a 3 dBA change in ambient noise levels is considered to be a barely perceivable difference;
- A change in ambient noise levels of 5 dBA is considered to be a readily perceivable difference; and
- A change in ambient noise levels of 10 dBA is subjectively heard as doubling of the perceived loudness.

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1 California Department of Transportation, Technical Noise Supplement, Section 2.2.1, September 2013. http://www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013B.pdf. Accessed January 24, 2018.

2 California Department of Transportation, Technical Noise Supplement, Section 2.2.1, September 2013.

These relationships occur in part because of the logarithmic nature of sound and the decibel scale. The human ear perceives sound in a non-linear fashion; therefore, the dBA scale was developed. Because the dBA scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but rather logarithmically. Under the dBA scale, a doubling of sound energy corresponds to a 3 dBA increase. In other words, when two sources are each producing sound of the same loudness, the resulting sound level at a given distance would be approximately 3 dBA higher than one of the sources under the same conditions. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA. Under the dB scale, three sources of equal loudness together produce a sound level of approximately 5 dBA louder than one source, and ten sources of equal loudness together produce a sound level of approximately 10 dBA louder than the single source.[3]

Noise Attenuation

When noise propagates over a distance, the noise level reduces with distance at a rate that depends on the type of noise source and the propagation path. Noise from a localized source (i.e., point source) propagates uniformly outward in a spherical pattern, referred to as “spherical spreading.” Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (i.e., reduce) at a rate between 6 dBA for acoustically “hard” sites and 7.5 dBA for “soft” sites for each doubling of distance from the reference measurement, as their energy is continuously spread out over a spherical surface (e.g., for hard surfaces, 80 dBA at 50 feet attenuates to 74 at 100 feet, 68 dBA at 200 feet, etc.).[4] Hard sites are those with a reflective surface between the source and the receiver, such as asphalt or concrete surfaces or smooth bodies of water.[5] No excess ground attenuation is assumed for hard sites and the reduction in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source.[6] Soft sites have an absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees, which in addition to geometric spreading, provides an excess ground attenuation value of 1.5 dBA (per doubling distance).[7]

Roadways and highways consist of several localized noise sources on a defined path, and hence are treated as “line” sources, which approximate the effect of several point sources.[8] Noise from a line source propagates over a cylindrical surface, often referred to as “cylindrical spreading.”[9] Line sources (e.g., traffic noise from vehicles) attenuate at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement.[10]

3 California Department of Transportation, Technical Noise Supplement, Section 2.2.1.1, September 2013.
4 California Department of Transportation, Technical Noise Supplement, Section 2.1.4.2, September 2013.
5 California Department of Transportation, Technical Noise Supplement, Section 2.1.4.2, September 2013.
6 California Department of Transportation, Technical Noise Supplement, Section 2.1.4.2, September 2013.
7 California Department of Transportation, Technical Noise Supplement, Section 2.1.4.2, September 2013.
8 California Department of Transportation, Technical Noise Supplement, Section 2.1.4.1, September 2013.
9 California Department of Transportation, Technical Noise Supplement, Section 2.1.4.1, September 2013.
10 California Department of Transportation, Technical Noise Supplement, Section 2.1.4.1, September 2013.

Therefore, noise due to a line source attenuates less with distance than that of a point source with increased distance.

Additionally, receptors located downwind from a noise source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels.[11] Atmospheric temperature inversion (i.e., increasing temperature with elevation) can increase sound levels at long distances (e.g., more than 500 feet). Other factors such as air temperature, humidity, and turbulence can also have significant effects on noise levels.[12]

Vibration

Foundations of Vibration

Vibration can be interpreted as energy transmitted in waves through the ground or man-made structures, which generally dissipate with distance from the vibration source. Because energy is lost during the transfer of energy from one particle to another, vibration becomes less perceptible with increasing distance from the source.

As discussed in the California Department of Transportation's (Caltrans) *Transportation and Construction Vibration Guidance Manual,* operation of construction equipment generates ground vibration.[13] Maintenance operations and traffic traveling on roadways can also be a source of such vibration.[14] If the amplitudes are high enough, ground vibration has the potential to damage structures, cause cosmetic damage or disrupt the operation of vibration-sensitive equipment such as electron microscopes and advanced technology production and research equipment.[15] Groundborne vibration and groundborne noise can also be a source of annoyance to individuals who live or work close to vibration-generating activities.[16] Traffic, including heavy trucks traveling on a highway, rarely generates vibration amplitudes high enough to cause structural or cosmetic damage.[17] However, there have been cases in which heavy trucks traveling over potholes or other discontinuities in the pavement have caused vibration high enough to result in complaints from nearby residents.[18]

In describing vibration in the ground and in structures, the motion of a particle (i.e., a point in or on the ground or structure) is used. The concepts of particle displacement, velocity, and

11 California Department of Transportation, Technical Noise Supplement, Section 2.1.4.3, September 2013.

12 California Department of Transportation, Technical Noise Supplement, Section 2.1.4.3, September 2013.

13 California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, Page 1, http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf. Accessed April 9, 2018.

14 California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, Page 1.

15 California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, Page 1.

16 California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, Page 1.

17 California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, Page 1.

18 California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, Page 1.

acceleration are used to describe how the ground or structure responds to excitation. Although displacement is generally easier to understand than velocity or acceleration, it is rarely used to describe ground and structure-borne vibration because most transducers used to measure vibration directly measure velocity or acceleration, not displacement. Accordingly, vibratory motion is commonly described by identifying the peak particle velocity (PPV).[19] Caltrans has identified used by governmental agencies, including the Federal Transit Administration and reported by various researchers and organizations, that can be used as screening tools for assessing the potential for adverse vibration effects related to structural damage and human perception.[20] The Caltrans Manual is meant to provide practical guidance to Caltrans engineers, planners, and consultants who must address vibration issues associated with the construction, operation, and maintenance of Caltrans projects.[21] Structural damage can potentially result from vibration events that generate vibration levels of 0.2-inch per second PPV at fragile buildings, 0.5-inch per second PPV at older residential buildings or historic buildings, and 2.0-inch per second PPV at modern industrial or commercial buildings.[22] Vibration events that generate a vibration level of 0.04-inch per second PPV is considered barely perceptible by a human.[23]

Groundborne noise specifically refers to the rumbling noise emanating from the motion of building room surfaces due to vibration of floors and walls; it is perceptible only inside buildings.[24] The relationship between groundborne vibration and groundborne noise depends on the frequency content of the vibration and the acoustical absorption characteristics of the receiving room. For typical buildings, groundborne vibration that causes low frequency noise (i.e., the vibration spectrum peak is near 30 Hz) results in a groundborne noise level that is approximately 40 decibels lower than the velocity level. For groundborne vibration that causes mid-frequency noise (i.e., the vibration spectrum peak is near 60 Hz), the groundborne noise level will be approximately 25 decibels lower than the velocity level.[25] Therefore, for typical buildings, the groundborne noise decibel level is lower than the groundborne vibration velocity level.

In general, manmade earthborne vibrations attenuate rapidly with distance from the source. For instance, vibration of truck pass by is characterized by peaks that are considerably higher than those generated by automobiles.[26] These peaks last no more than a few seconds and often only a

19 California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, Page 6.

20 California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, pages 21-25, 38.

21 California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, page 1.

22 California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, page 38.

23 California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, page 38.

24 Federal Transit Administration (FTA), Noise and Vibration Manual, 2018, Page 109, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Accessed March 27, 2019.

25 FTA, Noise and Vibration Manual, 2018, Page 119.

26 California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, Appendix A, page 13.

fraction of a second, including a rapid drop-off with distance.[27] Truck vibration levels at 50 feet from the centerline of the nearest lane would be about half of vibration levels measured at 15 feet from the centerline of the near lane.[28] At 100 feet, vibration levels from trucks are about one fourth, at 200 feet about one tenth, and at 300 feet less than one twentieth.[29] Because vibration drops off rapidly with distance, there is rarely a cumulative increase in groundborne vibration from the presence of multiple trucks.[30]

1.4 Existing Noise Environment

Noise-Sensitive Receptor Locations

Some land uses are considered more sensitive to noise than others due to the types of activities typically involved at the receptor locations and the effect that noise can have on those activities and the persons engaged in them. Noise sensitive receptors are defined as those specific land uses that have associated indoor and/or outdoor human activities that may be subject to stress and/or significant interference from noise produced by community sound sources. Typically, residences, hospitals and schools are considered noise sensitive, as their land uses of sleeping, recuperation, and concentration, can be adversely affected by noise.

The closest existing noise sensitive uses are located greater than 785 feet from the Project Site and there a many intervening structures that would block the line-of-sight between the Project Site and the sensitive receptors. Therefore, noise levels at the closest sensitive receptors would be minimal. The closest receptors listed below are also shown in **Figure 4**, *Noise Measurements and Existing Noise Sensitive Locations*:

- Residential Uses: Existing one- and two-story single-family residences are located approximately 785 feet southeast of the Project.

The Ivy Station mixed-use project is under construction approximately 450 feet to the north of the Project Site north of the Metro Expo Line; however, these uses are not yet built or occupied. All other noise-sensitive uses are located at greater distances from the Project Site and would experience lower noise levels from potential sources of noise on the Project Site. As explained above, the sensitive receptors would not experience a noticeable increase in noise levels and are not evaluated. However, the closest land uses regardless of whether or not they are considered sensitive were evaluated.

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[27] California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, Appendix A, page 13.

[28] California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, Appendix A, page 13.

[29] California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, page 10.

[30] California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, Appendix A, page 13.

SOURCE: ESRI

3727 S. Robertson Blvd, Culver City

Figure 4
Noise Measurements and Existing Noise Sensitive Locations

ESA

Ambient Noise Levels

The predominant existing noise source surrounding the Project Site is traffic noise from Robertson Boulevard to the east, Venice Boulevard to the north, and Washington Boulevard to the south. Secondary noise sources include general commercial-related activities, such as loading dock/delivery truck activities, trash compaction, and refuse service activities, from the surrounding commercial land uses and noise from the nearby Culver City Metro Station to the north and elevated above street level.

Ambient noise measurements were taken at two locations, representing the nearby land uses in the vicinity of the Project Site to establish conservative ambient noise levels. The measurement locations, along with existing development, are shown on **Figure 4**. Short-term (15-minute) noise measurements were taken on Wednesday, August 28, 2019.

The ambient noise measurements were conducted using the Larson-Davis Soundtrack LxT1 Precision Integrated Sound Level Meter ("SLM"). The Larson-Davis Soundtrack LxT1 SLM is a Type 1 standard instrument as defined in the American National Standard Institute S1.4. All instruments were calibrated and operated according to the applicable manufacturer specification. The microphone was placed at a height of 5 feet above the local grade, at the following locations as shown in Figure 4:

- Measurement Location R1: This measurement location represents the existing noise environment of the Project Site along Robertson Boulevard, and is considered representative of the noise environment of the existing traffic levels and operations of the nearby commercial and light industrial uses. The sound level meter was placed on the northeastern boundary of the Project Site.

- Measurement Location R2: This measurement location represents the existing noise environment of commercial activities occurring in the alleyway just west of the Project Site running from north to south. The sound level meter was placed near the corner of the alleyway and Hoke Avenue.

A summary of noise measurement data is provided in **Table 1,** *Summary of Ambient Noise Measurements*. Noise levels ranged from 64.8 dBA to 69.8 dBA L_{eq}.

TABLE 1
SUMMARY OF AMBIENT NOISE MEASUREMENTS

	Measured Ambient Noise Levels (dBA) [a]
Location, Duration, Existing Land Uses and, Date of Measurements	**Measured Daytime 15-minute L_{eq}**
R1, 8/28/19 (3:38 P.M. to 3:53 P.M.)	69.8
R2, 8/28/19 (3:54 P.M. to 4:09 P.M.)	64.8

[a] Detailed measured noise data, including hourly Leq levels, are included in Exhibit A.

SOURCE: ESA, 2019

Existing Roadway Noise Levels

Existing roadway CNEL noise levels were calculated for one roadway segment located in the vicinity of the Project Site. The roadway segment selected for analysis is considered to be that which is expected to be the most directly impacted by Project-related traffic, which, for the purpose of this analysis, includes the roadway that is located near and immediately adjacent to the Project Site. This roadway, when compared to roadways located farther away from the Project Site, would experience the greatest percentage increase in traffic generated by the Project (as distances are increased from the Project Site, traffic is spread out over a greater geographic area and its effects are reduced).

Existing roadway CNEL noise levels were calculated using the Federal Highway Administration's (FHWA's) Highway Traffic Noise Model (FHWA-TNM) and traffic volumes at the study intersections reported in the Project's Transportation Impact Analysis (TIA) prepared by Crain and Associates, July 2019.[31] The model calculates the average noise level at specific locations based on traffic volumes, average speeds, and site environmental conditions.

The noise levels along the roadway segment along Robertson Boulevard between Venice Boulevard and Washington Boulevard are presented in **Table 2**, *Predicted Existing Vehicular Traffic Noise Levels*. As shown in **Table 2**, the ambient noise environment of the Project vicinity can be characterized by 24-hour CNEL levels attributable to existing traffic on local roadways. The calculated CNEL (at a distance of between 40 feet from the roadway right-of-way) from actual existing traffic volumes on the analyzed roadway segments was 69.8 dBA for commercial areas surrounding the Project Site and located adjacent to Robertson Boulevard.

TABLE 2
PREDICTED EXISTING VEHICULAR TRAFFIC NOISE LEVELS

Roadway Segment	Existing CNEL (dBA) at Referenced Distances from Roadway Right-of-Way [a]
Robertson Boulevard	
Between Venice Boulevard and Washington Boulevard	69.8

SOURCE: ESA 2019, Crain and Associates 2019

Vibration-Sensitive Receptor Locations

Typically, groundborne vibration generated by man-made activities (i.e., rail and roadway traffic, operation of mechanical equipment and typical construction equipment) diminishes rapidly with

[31] Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.

distance from the vibration source.[32] The FTA Transit Noise and Vibration Impact Assessment provides vibration structure damage criteria for: (1) reinforced-concrete, steel, or timber (no plaster); (2) engineered concrete and masonry (no plaster); (3) non-engineered timber and masonry buildings; (3) and buildings extremely susceptible to vibration damage.[33]

The FTA's document also provides vibration human annoyance criteria. The nearest off-site buildings to the Project Site that could be subjected to Project-related vibration structural damage and human annoyance impacts are the commercial uses located north, south, and west of the Project Site (directly adjacent to the north and south and about 35 feet west) with the potential for perceptible vibration due to short-term construction and long-term Project operations.

Existing Groundborne Vibration Levels

Aside from periodic construction work occurring throughout the city, field observations noted that other sources of groundborne vibration in the Project Site vicinity are limited to heavy-duty vehicular travel (buses, etc.) on local roadways. Rubber-tired vehicles traveling at a distance of 50 feet typically generates groundborne vibration velocity levels of approximately .006 inches per second PPV (approximately 63 VdB).[34] As stated earlier, groundborne noise impacts would generally be 25 to 40 decibels lower than the velocity level depending on the frequency level of the source.[35]

[32] California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, page 38, http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf. Accessed January 24, 2018.

[33] FTA, Transit Noise and Vibration Impact Assessment. September, 2018.

[34] FTA, Transit Noise and Vibration Impact Assessment, Figure 6-4, September 2018.

[35] California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013, page 38.

SECTION 2
Regulatory Framework

2.1 Federal

Federal Noise Standards

Under the authority of the Noise Control Act of 1972, the United States Environmental Protection Agency (USEPA) established noise emission criteria and testing methods published in Parts 201 through 205 of Title 40 of the Code of Federal Regulations (CFR) that apply to some transportation equipment (e.g., interstate rail carriers, medium trucks, and heavy trucks) and construction equipment. In 1974, the USEPA issued guidance levels for the protection of public health and welfare in residential land use areas of an outdoor L_{dn} of 55 dBA and an indoor L_{dn} of 45 dBA. These guidance levels are not considered as standards or regulations and were developed without consideration of technical or economic feasibility.[36] There are no federal noise standards that directly regulate environmental noise related to the construction or operation of the Project.

Federal Vibration Standards

There are no federal vibration standards or regulations adopted by an agency that are applicable to evaluating vibration impacts from land use development projects such as the Project. However, the Federal Transit Administration (FTA) has adopted vibration criteria. The vibration damage criteria adopted by the FTA are shown in **Table 3,** *Construction Vibration Damage Criteria***.**

TABLE 3
CONSTRUCTION VIBRATION DAMAGE CRITERIA

Building Category	PPV (in/sec)
I. Reinforced-concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

SOURCE: FTA, Transit Noise and Vibration Impact Assessment. May, 2006.

[36] United States Environmental Protection Agency, EPA Identifies Noise Levels Affecting Health and Welfare. April 1974.

2.2 State of California

California Noise Standards

The State of California has established noise insulation standards for new multi-family residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (Title 24, California Code of Regulations). The noise insulation standards set forth an interior standard of 45 dBA CNEL in any habitable room. The standards require an acoustical analysis demonstrating that dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to exterior noise levels greater than 60 dBA CNEL. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

Groundborne Vibration and Noise

Caltrans' Transportation and Construction Vibration Manual (2013) and FTA's Transit Noise and Vibration Impact Assessment (2018) document provide thresholds of vibration impact for structure and human annoyance. The threshold of vibration impact for human annoyance would apply for residential uses since commercial uses are not considered vibration sensitive uses.[37] This FTA document is used to identify the impacts for this project.

Table 4, *Caltrans Vibration Annoyance Potential Criteria*, and **Table 5**, *Groundborne Vibration Impact Criteria for Structure Damage*, include the vibration impact criteria for human annoyance and for structure damage.

TABLE 4
CALTRANS VIBRATION ANNOYANCE POTENTIAL CRITERIA

	Maximum PPV (in/sec)	
Structure and Condition	**Transient Sources**	**Continuous/Frequent Intermittent Sources**
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.1
Severe	2.0	0.4

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Source: Caltrans, Transportation and Construction Vibration Guidance Manual. September, 2013.

[37] Caltrans, Transportation and Construction Vibration Manual, 2013.

TABLE 5
GROUNDBORNE VIBRATION IMPACT CRITERIA FOR STRUCTURE DAMAGE

Building Class	Continuous Source PPV (in/sec)
Class I: buildings in steel or reinforced concrete, such as factories, retaining wall, bridges, steel towers, open channels, underground chambers, and tunnels with and without concrete alignment	0.5
Class II: buildings with foundation walls and flows in concrete, walls in concrete or masonry, stone masonry retaining walls, underground chambers and tunnels with masonry alignments, conduits in loose material	0.3
Class III: buildings as mentioned above but with wooden ceilings and walls in masonry	0.2
Class IV: construction very sensitive to vibration; objects of historic interest	0.12

Source: FTA, Transit Noise and Vibration Impact Assessment, 2018.

2.3 City of Culver City

Noise Standard

The City of Culver City Noise Standards are developed from those of several Federal and State agencies including the Federal Highway Administration, the Environmental Protection Agency, the Department of Housing and Urban Development, the American National Standards Institute, and the State of California Department of Health Services. These standards set limits on the noise exposure level for various land uses. **Table 6**, *City of Culver City Interior and Exterior Noise Standards*, lists interior and exterior noise level standards and the type of occupancy to which they should be applied.

TABLE 6
CITY OF CULVER CITY INTERIOR AND EXTERIOR NOISE STANDARDS

Zone	Interior Standard dBA (CNEL)	Exterior Standard dBA(CNEL)
Residential	45	65
Commercial Retail	55	--
Office Building	50	--
Open Space - Parks	--	65

Source: *City of Culver City Noise Element*.

Section 9.07.055 of Culver City's Noise Regulations Chapter 9.07 states that it shall be prohibited for any persons to operate a loud speaker or sound amplified equipment for the purposes of transmitting messages, giving instructions or providing entertainment which is audible at a distance of fifty (50) feet or beyond the subject's property line without first filing an application and obtaining a permit. According to Section 9.07.055, every user of sound amplifying equipment on public or private property, except block parties which have obtained a permit from the Chief of Police or activities in public parks which have obtained a permit for use of amplifying equipment from the Parks, Recreation and Community Services Department shall file an application with the Committee on Permits and Licenses at least ten (10) days prior to the day on which the sound amplifying equipment is to be used. The commercial and noncommercial use of sound amplifying equipment shall be subject to the following restrictions:

- The only sounds permitted shall be either music or human speech, or both.
- The operation of sound amplifying equipment shall occur only between the hours of:
  - 8:00 a.m. through 8:00 p.m. Monday through Thursday,
  - 8:00 a.m. through 10:00 p.m. Friday,
  - 10:00 a.m. through 10:00 p.m. Saturday,
  - 10:00 a.m. through 8:00 p.m. Sunday and City specified holidays.

Table 7, *Noise and Land Use Compatibility Matrix – California,* illustrates land use compatibility with regard to noise. These standards and criteria will be incorporated into the land use planning process to reduce future noise and land use incompatibilities. This table is the primary tool that allows the City of Culver City to ensure integrated planning for compatibility between land uses and outdoor noise. Community Noise Equivalent Level (CNEL) for specific land uses are classified into four categories: (1) "Clearly Compatible" (2) "Compatible with Mitigation" (3) "Normally Incompatible" and (4) "Clearly Incompatible". A CNEL value of 70 dBA is considered the dividing line between a "conditionally acceptable" and "normally unacceptable" noise environment for noise sensitive land uses, including residences, transient lodgings, schools, and library.

TABLE 7
NOISE AND LAND USE COMPATIBILITY MATRIX - CALIFORNIA

	Community Noise Exposure CNEL (dBA)			
Land Use	**Normally Acceptable[a]**	**Conditionally Acceptable[b]**	**Normally Unacceptable[c]**	**Clearly Unacceptable[d]**
Residential – Low density, Single-Family, Duplex, Mobile Homes	50 – 60	55 – 70	70 – 75	75 – 85
Residential – Multiple Family	50 – 65	60 – 70	70 – 75	70 – 85
Transient Lodging – Motel, Hotels	50 – 65	60 – 70	70 – 80	80 – 85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 – 70	60 – 70	70 – 80	80 – 85
Auditoriums, Concert Halls, Amphitheaters	NA	50 – 70	NA	65 – 85
Sports Arenas, Outdoor Spectator Sports	NA	50 – 75	NA	70 – 85
Playgrounds, Neighborhood Parks	50 – 70	NA	67.5 – 75	72.5 – 85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 – 70	NA	70 – 80	80 – 85

Land Use	Community Noise Exposure CNEL (dBA)			
	Normally Acceptable[a]	Conditionally Acceptable[b]	Normally Unacceptable[c]	Clearly Unacceptable[d]
Office Buildings, Business Commercial and Professional	50 – 70	67.5 – 77.5	75 – 85	NA
Industrial, Manufacturing, Utilities, Agriculture	50 – 75	70 – 80	75 – 85	NA

[a] **Normally Acceptable –** Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
[b] **Conditionally Acceptable –** New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
[c] **Normally Unacceptable –** New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
[d] **Clearly Unacceptable** – New construction or development should generally not be undertaken.
NA: Not Applicable

Source: Office of Planning and Research, State of California General Plan Guidelines, October 2003.

The City's General Plan Noise Element includes Policy 2.A, pertaining to stationary noise sources, as follows:

Policy 2.A Create a comprehensive ordinance establishing noise regulation criteria, and standards for noise sources and receptors to include but not be limited to the following:

- Noise reduction features during site planning to mitigate anticipated noise impacts on affected noise sensitive land uses, such as schools, hospitals, convalescent homes, and libraries.
- Temporary sound barrier installation at construction site if construction noise is impacting nearby noise sensitive land uses.
- Noise abatement and acoustical design criteria for construction and operation of any new development.

Municipal Code

Chapter 9.07 of the City of Culver City Municipal Code (CCMC) provides specific noise restrictions and exemptions for noise sources within the City. CCMC noise regulations state that construction activity shall be prohibited, except between the hours of 8:00 A.M. and 8:00 P.M. Mondays through Fridays; 9:00 A.M. and 7:00 P.M. Saturdays; 10:00 A.M. and 7:00 P.M. Sundays. It is prohibited for any person to operate any radio, disc player or cassette player or similar device at a construction site in a manner that results in noise levels that are audible beyond the construction site property line.

Groundborne Vibration

The City of Culver City does not address vibration either in their municipal code or in the Noise Element of the General Plan. Instead, the Caltrans *Transportation and Construction Vibration Manual* (2013) and the FTA *Transit Noise and Vibration Impact Assessment* (2018) guidance documents provide screening level thresholds for vibration impacts for potential building structural damage and human annoyance.

SECTION 3

Thresholds of Significance

In accordance with the State CEQA Guidelines Appendix G, the Project would have a significant impact related to noise and vibration if it would result in:

a) ***Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.***

b) ***Generation of excessive groundborne vibration or groundborne noise levels.***

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

The Project Site is not located within an airport land use plan area or within two miles of a public airport or public use airport. The Project Site is not located within the vicinity of a private airstrip, or heliport or helistop. Airport and airfields in proximity to the Project Site include Los Angeles International Airport approximately 5.2 miles to the south, and the Santa Monica Airport approximately 3.2 miles to the west. Therefore, construction or operation of the Project would not expose people to excessive airport related noise levels. No impact would occur in this regard, and these issues are not assessed further in the report.

The following significance thresholds evaluate potential noise and vibration impacts of the project based on the regulatory framework described above. The project would result in potentially significant impacts under the following circumstances:

- Project construction activities occur between the hours of 8:00 P.M. and 8:00 A.M. Monday through Friday; 7:00 P.M. and 9:00 A.M. on Saturdays; 7:00 P.M. and 10:00 A.M. on Sundays;
- The Project-related operations would cause ambient noise levels to increase by 5 dBA, L_{eq} or more;
- Potential Building Damage - Project construction activities cause ground-borne vibration levels to exceed 0.2 inch-per-second PPV at the nearest buildings; or
- Potential Human Perception - Project construction activities cause ground-borne vibration levels to exceed 0.04 inch-per-second PPV at the nearest residential buildings.

SECTION 4
Methodology

4.1 On-Site Construction Noise

On-site construction noise impacts were projected by determining the noise levels expected to be generated by the different types of construction activities anticipated, calculating the construction-related noise levels produced by the construction equipment assumed at sensitive receptors. More, specifically, the following steps were undertaken to assess construction-period noise impacts.

1. Ambient noise levels at surrounding sensitive receptor locations were estimated based on field measurement data (see Table 1);
2. Typical noise levels for each type of construction equipment expected to be used based on information provided by the Project applicant were obtained from the Federal Highway Administration (FHWA) roadway construction noise model (RCNM);
3. Distances between construction site locations (noise sources) within the Project Site and surrounding sensitive receptors were measured using Project architectural drawing, Google Earth, and site plans;
4. The construction noise levels were then calculated for each construction phase using the FHWA RCNM, conservatively, in terms of hourly L_{eq}, for sensitive receptor locations based on the standard point source noise-distance attenuation factor of 6.0 dBA for each doubling of distance, assuming that all of the equipment for each construction phase would be in use concurrently and that the loudest equipment would be located at the edge of the Project Site closest to the sensitive receptor locations; and
5. Construction noise levels were then compared to the construction noise significance thresholds identified above in Section 3, *Thresholds of Significance*.

4.2 Off-Site Roadway Noise (Construction and Operations)

Roadway CNEL noise levels were calculated using the methodology based on the Federal Highway Administration's (FHWA's) Highway Traffic Noise Model (TNM) and traffic volumes at the study intersections reported in the Project's Transportation Impact Analysis (TIA) prepared by Crain and Associates, March 2019.[38] The modeling analysis calculates the average noise level at specific locations based on traffic volumes, average speeds, and site environmental conditions.

[38] Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.

This method allows for the definition of roadway configurations, barrier information (if any), and receiver locations. Roadway noise attributable to Project development was calculated and compared to baseline noise levels that would occur under the "without Project" condition.

4.3 Stationary Point-Source Noise (Operations)

Stationary point-source noise levels were evaluated by identifying the noise levels generated by outdoor stationary noise sources such as rooftop mechanical equipment, parking structure, automobile operations, and loading/refuse collection area activity, calculating the hourly L_{eq} noise level from each noise source at sensitive receiver property lines, and comparing such noise levels to existing ambient noise levels. More specifically, the following steps were undertaken to calculate outdoor stationary point-source noise impacts:

1. Ambient noise levels at surrounding sensitive receptor locations were estimated based on field measurement data (see Table 1);
2. Typical noise levels generated by each type of stationary point-source noise generator including mechanical equipment, open spaces, loading dock, and parking structure operations were obtained from measured noise levels for similar equipment/activities, noise levels published in environmental noise assessment documents for land use development projects or scientific journals, or noise levels from equipment manufacturer specifications
3. Distances between stationary point-source noise generators and surrounding sensitive receptor locations were measured using Project architectural drawings, Google Earth, and site plans;
4. Stationary point-source noise levels were then calculated for each sensitive receptor location based on the standard point source noise-distance attenuation factor of 6.0 dBA for each doubling of distance;
5. Noise level increases, if any, were compared to the stationary point-source noise significance thresholds identified above in Section 3, *Thresholds of Significance*; and
6. Outdoor mechanical equipment is assessed based on the City Municipal Code requirements and measured data, and their impacts on the nearby offsite receptors are determined based on their distance from these receptors. The noise levels determined at the offsite, noise-sensitive receptors are then compared to the stationary source noise significance thresholds identified in the City Municipal Code.

4.4 Groundborne Vibration and Noise (Construction and Operations)

Groundborne vibration and noise impacts were evaluated for potential building damage and human annoyance impacts by identifying the Project's potential vibration sources, estimating the distance between the Project's vibration sources and the nearest structure and vibration annoyance receptor locations, and making a significance determination based on the significance thresholds described above in Section 3, *Thresholds of Significance*.

Construction activities may generate groundborne vibration and noise from transient sources due to the temporary and sporadic use of vibration-generating equipment. Operation of the Project has no potential to cause structure damage to the Project's own buildings or to off-site buildings that are farther away because the Project would not include any equipment that would generate substantial vibration or noise levels. Construction and operational activities may generate groundborne vibration and noise levels that could be felt by people as a result of trucks and vehicles driving to and from the Project Site, or from the operation of typical commercial-grade stationary mechanical and electrical equipment used for residential and commercial land uses, such as air handling units, condenser units, and exhaust fans, which could produce groundborne vibration and noise.

4.5 Project Design Features

The following Project Design Feature (PDF) is applicable to the Project:

> **NOISE-PDF-1:** The operation of construction equipment that generates high levels of vibration, such as large bulldozers/caisson drilling, loaded trucks, jackhammers, and small bulldozers shall not be used at maximum operating power within 15 feet for large bulldozers/caisson drilling and loaded trucks, 8 feet for jackhammers, and 2 feet for small bulldozers of the adjacent commercial buildings. If equipment must be used within the distances above to construct the Project, the contractor will ensure equipment are used at lower power settings to minimize vibration levels sufficient to avoid structural damage to the adjacent commercial buildings.

SECTION 5
Environmental Impacts

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

Impact Statement: The Project would not result in the generation of a temporary or permanent increases in ambient noise levels in excess of the standards. Impacts would be less than significant.

5.1 Temporary Increase in Ambient Noise Levels

On-Site Construction Noise

Noise impacts from construction activities are generally a function of the noise generated by construction equipment, equipment locations, the sensitivity of nearby land uses, and the timing and duration of the noise-generating activities. Construction would be completed in five stages: (1) demolition; (2) grading/excavation; (3) building construction; (4) paving, and (5) architectural coating. The Project would be constructed using typical construction techniques; no blasting or impact pile driving would be used. As discussed in Chapter II, *Project Description*, construction is anticipated to begin in 2020 with full build out and occupancy occurring in 2021.

Project construction would require the use of mobile heavy equipment with high noise-level characteristics. Individual pieces of construction equipment expected to be used during Project construction could produce maximum noise levels of 77 dBA to 82 dBA at a reference distance of 50 feet from the noise source (with half of the equipment assumed to be located at 50 feet and half at 100 feet), as shown in **Table 8**, *Construction Equipment Noise Levels*. These maximum noise levels would occur when equipment is operating under full power conditions. The estimated usage factor for the equipment is also shown in **Table 8**. The usage factors are based on the FHWA's Roadway Construction Noise Model User's Guide.[39] To more accurately characterize construction-period noise levels, the average (Hourly L_{eq}) noise level associated with each construction stage has been calculated based on the quantity, type, and usage factors for each type of equipment expected to be used during each construction stage assuming that multiple pieces of equipment are operating, simultaneously. Additionally, overlapping construction phase (building

[39] Federal Highway Administration, Roadway Construction Noise Model User's Guide, 2006. https://www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/rcnm.pdf

construction, paving, and architectural coating) noise levels were combined to estimate the maximum construction noise level during a worst-case scenario.

TABLE 8
CONSTRUCTION EQUIPMENT NOISE LEVELS

Equipment	Estimated Usage Factor, %	Maximum Noise Level at 50 feet from Equipment, dBA (Lmax)
Air Compressor	50	78
Bore/Drill Rig	20	79
Crane	40	81
Dump/Haul Truck	20	76
Excavator	40	81
Forklift	10	75
Paver	50	77
Pump	50	81
Roller	20	80
Rubber Tired Dozer	40	82
Tractor/Loader/Backhoe	25	80

SOURCE: FHWA Roadway Construction Noise Model User's Guide, 2006.

TABLE 9
ESTIMATED CONSTRUCTION NOISE LEVELS AT EXISTING OFF-SITE SENSITIVE RECEPTORS

Noise Analysis Location	Construction Phases	Distance between Nearest Receptor and Construction Site, feet	Estimated Construction Noise Levels at Noise Sensitive Receptor by Construction Phase Hourly L_{eq} (dBA)
R1, Reference distance of 50 ft from the Project Site [a]	Demolition	50	84
	Grading/Excavation	50	82
	Building Construction / Paving / Architectural Coating	50	85
Residential Uses 785 feet to the southeast of the Project Site [b]	Demolition	785	56
	Grading/Excavation	785	54
	Building Construction / Paving / Architectural Coating	785	57

[a] Estimated construction noise levels represent the worst-case condition when noise generators are located at a reference distance of 50 feet from Project construction (with half of the equipment assumed to be located at 50 feet and half at 100 feet). Noise generators are also assumed to be operating simultaneously during each phase.

[b] The line-of-sight between the Project Site and the residential uses to the southeast are partially or fully blocked. Therefore, the analysis includes a 5 dBA reduction in noise level from noise shielding effects.

Source: ESA, 2019

A summary of the construction noise impacts at the existing nearby sensitive receptors is provided in **Table 9,** *Estimated Construction Noise Levels at Existing Off-Site Sensitive Receptors*, with supporting calculation files provided in **Exhibit B** of this Technical Report. As shown in **Table 9**, construction noise levels are estimated to reach a maximum of 85 dBA at a reference distance of 50 feet. The closest sensitive receptor is located approximately 785 feet southeast of the site with intervening structures between the Project Site and the sensitive uses. At this distance and accounting for noise attenuation from intervening structures, the Project's construction noise levels at the sensitive receptors would be less than general ambient noise levels for an urban environment. As such, the sensitive receptors would not be adversely impacted by construction noise from the Project Site.

Project construction activities would not occur between the hours of 8:00 P.M. and 8:00 A.M. Monday through Friday; 7:00 P.M. and 9:00 A.M. on Saturdays; 7:00 P.M. and 10:00 A.M. on Sundays, consistent with the City ordinance. Therefore, on-site construction noise impacts would be less than significant.

Although no significant impacts are identified related to project construction activities, Policy 2.A of the Noise Element requires noise reduction techniques be implemented to ensure that noise levels are reduces to the maximum extent feasible. Therefore, in accordance with Policy 2.A, the Project would implement the following noise reduction measures:

- Noise reduction features during site planning to mitigate anticipated noise impacts on affected noise sensitive land uses, such as schools, hospitals, convalescent homes, and libraries.
- Temporary sound barrier installation at construction site if construction noise is impacting nearby noise sensitive land uses.
- Noise abatement and acoustical design criteria for construction and operation of any new development.

The measures identified above would further reduce the noise levels shown in **Table 9** by an additional 10 dBA from the installation of noise barriers.

Off-Site Construction Noise

Delivery and haul truck trips would occur throughout the construction period, although no truck trips would occur between 8:00 PM and 8:00 AM Monday Through Friday, before 9:00 AM or after 7:00 PM on Saturday, or before 10:00 AM and 7:00 PM on Sunday. Haul trucks would be anticipated to access the site from Robertson Boulevard to remove demolition materials and provide deliveries to the Project Site during construction activities. Therefore, off-site construction noise impacts would be less than significant.

Peak hour traffic volumes for Robertson Avenue, east of the Project Site, are close to 3,338 vehicles, based on data from the TIA.[40] The paving phase has the highest volume of haul trucks (18 trips per day) and therefore has the highest potential to cause a noise impact. The addition of 18 haul trucks per day would result in a negligible noise level increase and would not increase noise levels by a "clearly noticeable" increase of 5 dBA over the ambient condition. The 18 trucks would be spread out over the entire day and would result in approximately 3 trucks per hour. The addition of 3 truck trips per hour along Robertson Boulevard would result in a noise level of 51.6 dBA L_{eq} which would not exceed the 64.8 or 69.8 dBA L_{eq} ambient noise levels measured near the Project Site and as seen in Table 1 (see modeling in **Exhibit C**). Additionally, this 18 trucks per day would occur only for 14 days. During the remainder of the construction activities the maximum number of trucks accessing the site would be 14 per day. Therefore, based on this additional supporting evidence, noise impacts from off-site construction traffic would be less than significant and no mitigation measures are required.

5.2 Permanent Increase in Ambient Noise Levels

Impacts from On-site Stationary Noise Sources

Fixed Mechanical Equipment

The operation of mechanical equipment such as air conditioning equipment may generate audible noise levels. However, mechanical equipment would be shielded from nearby noise sensitive uses to attenuate noise and avoid conflicts with adjacent uses. It is not anticipated that the mechanical equipment would be significantly different than the mechanical equipment that is currently present. In addition, the project's mechanical equipment would need to comply with the City's noise standards, which establish maximum permitted noise levels from mechanical equipment. Project compliance with the City's noise standards would ensure that operational noise impacts are minimal.

Parking Garage

The parking garage would consist of one subterranean level accessed from the alleyway to the west of the site. All cars visiting the site would enter from the southwest corner driveway in the alleyway. Based on the Project's TIA, the peak hour traffic volume would be 49 vehicles.[41] Using FTA's calculation for noise generated by parking lot traffic, the entering vehicles would create noise levels up to 43.3 dBA.[42] This value would be less than the measured ambient noise levels at R1 (69.8 dBA) and R2 (64.8 dBA). It should also be noted that there are no sensitive receptors near the parking garage entrance. Therefore, based on this conservative analysis, the noise impacts from the parking garage would be less than significant.

Loading Dock and Refuse Collection

The loading dock and refuse collection area for the Project would be located at the northwestern end of the site along the alleyway. The area would be completely enclosed and shielded from

[40] Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.
[41] Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.
[42] FTA, Transit Noise and Vibration Impact Assessment. September, 2018, Tables 4-13 and 4-14.

surrounding uses. Based on a noise survey that was conducted at a loading dock and trash collection facilities by ESA, loading dock activity (namely idling semi-trucks and backup alarm beeps) and trash compactors could generate noise levels of approximately 70 dBA L_{eq} and 66 dBA L_{eq}, respectively, at a reference distance of 50 feet.[43] Loading dock/trash collection noise levels have been calculated at each sensitive receptor accounting for a 20 dBA reduction in noise level provided by the enclosure.[44] Loading dock activity and trash compaction would be reduced to 50 dBA L_{eq} and 46 dBA L_{eq} at a distance of 50 feet, respectively. Furthermore, as discussed above, there are no sensitive receptors in the project vicinity that would be affected by loading dock and refuse collection noise. Therefore, the noise levels from the Project's loading dock and refuse collection area would be below the ambient noise levels captured at both R1 and R2 and impacts would be less than significant.

Offsite Project Traffic

Impacts Under Existing Traffic Baseline Conditions

Existing roadway noise levels were calculated along one roadway segment near to the Project Site. Roadway noise attributable to Project development was calculated using the traffic noise model previously described and was compared to baseline noise levels that would occur under the "No Project" condition.

Project impacts are shown in **Table 11**, *Off-Site Traffic Noise Impacts – Existing Baseline Conditions* with supporting calculation files provided in **Exhibit C** of this Technical Report. As indicated, there is no increase in Project-related traffic noise levels over existing traffic noise levels. Therefore, Project-related noise increases would be less than the applicable threshold and therefore less than significant, and no mitigation measures would be required.

TABLE 10
OFF-SITE TRAFFIC NOISE IMPACTS – EXISTING BASELINE CONDITIONS

	Calculated Traffic Noise Levels at 25 feet from Roadway, CNEL (dBA)			
Roadway Segment	**Existing [a] (A)**	**Existing with Project [b] (B)**	**Project Increment (B - A)**	**Exceed Threshold?**
Robertson Blvd				
Between Venice Blvd and Washington Blvd	69.8	69.8	0.0	No

[a] Existing data is taken from Table 2.

SOURCE: ESA, 2019, Crain and Associates 2019

43 The loading dock facility noise measurements were conducted at a loading dock facility at a Wal-Mart store using the Larson-Davis 820 Precision Integrated Sound Level Meter ("SLM") in May 2003. The Larson-Davis 820 SLM is a Type 1 standard instrument as defined in the American National Standard Institute S1.4. All instruments were calibrated and operated according to the applicable manufacturer specification. The microphone was placed at a height of approximately 5 feet above the local grade.

44 Federal Highway Administration. Noise Barrier Design Handbook, Section 3.4.2.

Impacts Under Future Traffic Conditions

Future (2022) roadway noise levels were also calculated along one roadway segment near the Project to establish future baseline traffic noise levels that would occur with implementation of the related projects, to which the Project's offsite traffic noise during operations could be added. Project impacts are shown in **Table 12**, *Off-Site Traffic Noise Impacts – Future 2022 Conditions*. As indicated, there would be no increase in Project-related traffic noise levels over the future traffic noise levels. Therefore, Project-related noise increases, when measured against the 2022 conditions, would be less than the applicable threshold and therefore less than significant.

TABLE 11
OFF-SITE TRAFFIC NOISE IMPACTS – FUTURE 2022 BASELINE CONDITIONS

	Calculated Traffic Noise Levels at 25 feet from Roadway, CNEL (dBA)				
Roadway Segment	**Existing (A)**	**Future No Project (B)**	**Future with Project [a] (C)**	**Future Project Increment [b] (C-B)**	**Exceed Threshold?**
Robertson Blvd					
Between Venice Blvd and Washington Blvd	69.8	70.0	70.0	0.0	No

[a] Include future growth plus related (cumulative) projects and project traffic.
[b] Increase due to project-related traffic only at project build-out.

SOURCE: ESA 2019, Crain and Associates 2019

Impacts Under Cumulative Traffic Noise

Cumulative off-site traffic-generated noise impacts were assessed based on a comparison of the future cumulative base traffic volumes with the Project to the existing base traffic volumes without the Project. The results of that comparison are provided in **Table 13**, *Off-Site Traffic Noise Impacts – Future (2022) Cumulative Increase*. Table 14 shows the Project's contribution to the cumulative noise levels. The maximum cumulative noise increase from the Project plus related Project traffic would be 0.2 dBA CNEL. This increase in sound level would not exceed the significance thresholds of an increase of 5 dBA CNEL. As a result, cumulative off-site traffic-related noise impacts would not be cumulatively considerable and cumulative impacts would be less than significant.

TABLE 12
OFF-SITE TRAFFIC NOISE IMPACTS – FUTURE (2024) CUMULATIVE INCREASE

	Calculated Traffic Noise Levels dBA CNEL[a]			
Roadway Segment	Existing (A)	Future with Project (B)	Cumulative Increment (B-A)	Exceed Threshold?
Robertson Blvd				
Between Venice Blvd and Washington Blvd	69.8	70.0	0.2	No

[a] Based on noise levels at property lines of adjacent uses along roadways.

SOURCE: ESA 2019; Crain and Associates 2019

Threshold b) Generation of excessive groundborne vibration or groundborne noise levels?

Impact Statement: The Project would not generate excessive groundborne vibration during construction or operations. However, groundborne noise would create a potential human annoyance impact on nearby sensitive receptors during construction and the impact would be potentially significant. With mitigation, the groundborne noise impact would be reduced to less than significant.

5.3 Groundborne Vibration

Structural Impacts

Construction

Construction activities can generate varying degrees of groundborne vibration, depending on the construction procedures and the construction equipment used. The 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 varies depending on soil type, ground strata, and construction characteristics of the receptor buildings. 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 vibration from construction activities rarely reaches levels that damage structures. The Caltrans guidance manual incorporates FTA standard vibration velocities for construction equipment operations (Table 18 of the Caltrans guidance manual). The PPV for construction equipment pieces anticipated to be used during Project construction are listed in **Table 14**, *Typical Vibration Velocities for Potential Project Construction Equipment*.

TABLE 13
TYPICAL VIBRATION VELOCITIES FOR THE PROJECT CONSTRUCTION EQUIPMENT

	Approximate PPV (in/sec)				
Equipment	**25 Feet**	**50 Feet**	**60 Feet**	**75 Feet**	**100 Feet**
Large Bulldozer	0.089	0.031	0.024	0.017	0.011
Caisson Drilling	0.089	0.031	0.024	0.017	0.011
Loaded Trucks	0.076	0.027	0.020	0.015	0.010
Jackhammer	0.035	0.012	0.009	0.007	0.004
Small Bulldozer	0.003	0.001	0.0008	0.0006	0.0004

Source: FTA, Transit Noise and Vibration Impact Assessment, September 2018; ESA, 2019

Construction of the Project would generate groundborne construction vibration during site grading, excavation, and building construction activities. Based on the vibration data provided in Table 13, vibration velocities from operation of construction equipment would range from approximately 0.003 to 0.089 inches per second PPV at 25 feet from the source of activity.

The nearest commercial buildings are located adjacent (approximately 5 feet) to the Project Site and would experience vibration levels up to 0.995 inches per second PPV. However, with planned setbacks under PDF-NOI-1, the vibration levels would be reduced to a maximum of 0.191 in/sec PPV at 15 feet. This value would not exceed the 0.2 inch per second PPV significance threshold for potential building damage and impacts would be less than significant.

Operation

The Project's operations would include typical commercial-grade stationary mechanical and electrical equipment, such as air handling units, condenser units, and exhaust fans, which would produce vibration. In addition, the primary sources of transient vibration would include passenger vehicle circulation within the proposed parking area. Groundborne vibration generated by each of the above-mentioned activities would generate approximately up to 0.005 inches per second PPV adjacent to the Project Site.[45] The potential vibration levels from all Project operational sources at the closest existing sensitive receptor locations would be less than the significance threshold of 0.2 inch per second PPV significance threshold for potential residential building damage. As such, vibration impacts associated with operation of the Project would be below the significance threshold and impacts would be less than significant.

45 This vibration estimate is based on data presented in the USDOT Federal Transit Administration, 2018; which is included in Exhibit D of this Technical Report.

Human Annoyance

Construction

The Thresholds Guide identifies residences, schools, motels and hotels, libraries, religious institutions, hospitals, nursing homes, and parks as sensitive uses. Off-site non-residential uses such as retail and commercial uses are not considered vibration sensitive receptors for human annoyance under CEQA. The only uses in the Project vicinity that are sensitive uses are residential uses. The nearest existing off-site residential structure is located approximately 785 feet southeast of the construction site, with other residential structures at greater distances further south. Considering vibration attenuates quickly as distance increases, the vibration levels at the nearest sensitive receptors would be virtually indistinguishable from ambient levels of vibration. The vibration from construction equipment would not exceed the 0.04 inch per second PPV significance threshold for human annoyance and therefore, impact would be less than significant.

Operation

Groundborne noise generated by operational activities would generate approximately up to 0.001 inch per second PPV adjacent to the Project Site.[46] The potential groundborne noise levels from all Project operational sources at the closest existing sensitive receptor locations would be less than the significance threshold of 0.04 inch per second PPV for perceptibility. As such, groundborne noise impacts associated with operation of the Project would be below the significance threshold and impacts would be less than significant.

As discussed above, operation of the Project would result in vibration levels substantially less than the significance threshold for groundborne vibration at vibration-sensitive receptors. For typical buildings, groundborne vibration results in groundborne noise levels approximately 25 to 40 decibels lower than the velocity level.[47] Given that the vibration level would be much lower than the perceptibility threshold at vibration-sensitive uses, and given that groundborne noise would be approximately 25 to 40 decibels lower than the velocity level, operational groundborne noise impacts would also be less than significant at vibration-sensitive uses.

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

Impact Statement: The Project is not located within the vicinity of a private airstrip or airport land use plan. Therefore, the Project would have no impact.

46 This vibration estimate is based on data presented in the USDOT Federal Transit Administration, 2018; which is included in Exhibit D of this Technical Report.

47 Federal Transit Administration, Noise and Vibration Manual, 2018, Page 120.

5.4 Airport Vicinity

The Project Site is not located within an airport land use plan or within two miles of an airport. The nearest airport is the Santa Monica Municipal Airport, located approximately 3.5 miles southwest of the Project Site. Therefore, the Project would not expose people in the Project vicinity to excessive noise levels from airport use and no impact would occur. No further analysis is required.

SECTION 6
Summary of Results

Construction Noise and Vibration

The Project would result in less than significant construction impacts related to noise and vibration and no mitigation is required. Nonetheless, consistent with City General Plan policies, the Project would implement the City's General Plan Policy 2.A to ensure noise levels are minimized and do not cause adverse effects to the nearby sensitive receptors. Construction activities would be required to comply with Culver City's allowable construction hours of between 8:00 A.M. and 8:00 P.M. Mondays through Friday, 9:00 A.M. and 7:00 P.M. Saturdays, and 10:00 A.M. and 7:00 P.M. Sundays. Through compliance with Culver City's allowable construction hours, and applicable noise reduction strategies in the City's General Plan Noise Element Policy 2.A, noise impacts related to on-site construction activities would be less than significant at noise sensitive receptor locations.

Off-site haul truck trip would not substantially increase noise levels over the ambient condition. In addition, construction activities would occur only during daytime hours within the allowable hours specified in the City's Municipal Code. Therefore, noise impacts from off-site construction traffic would be less than significant and no mitigation measures are required.

Project construction would not generate excessive vibration levels at nearby sensitive receptor locations. Thus, vibration impacts would be less than significant and no mitigation is required.

Operational Noise and Vibration

The Project would result in less than significant operational impacts related to noise and vibration and no mitigation is required. The Project's noise impacts on existing development from operational on-site stationary noise sources and traffic would not exceed the established thresholds. Operational related noise impacts would be less than significant.

Project operation would not generate excessive vibration levels at nearby sensitive receptor locations. Thus, vibration impacts would be less than significant and no mitigation is required.

EXHIBIT A

Ambient Noise Data

Summary

File Name on Meter	LxT_Data.031
File Name on PC	SLM_0004983_LxT_Data_031.01.ldbin
Serial Number	0004983
Model	SoundTrack LxT®
Firmware Version	2.302
User	
Location	R1
Job Description	
Note	

Measurement

Description	
Start	2019-08-28 15:38:50
Stop	2019-08-28 15:53:50
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre Calibration	2019-08-28 15:37:30
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting			
Peak Weight	A Weighting			
Detector	Slow			
Preamp	PRMLxT1			
Microphone Correction	Off			
Integration Method	Exponential			
Overload	144.7 dB			
	A	**C**	**Z**	
Under Range Peak	**101.0**	98.0	103.0	dB
Under Range Limit	**50.0**	48.0	56.0	dB
Noise Floor	36.8	37.5	45.1	dB

Results

LASeq	69.8 dB	
LASE	99.4 dB	
EAS	965.229 µPa²h	
EAS8	30.887 mPa²h	
EAS40	154.437 mPa²h	
LApeak (max)	2019-08-28 15:53:34	109.5 dB
LASmax	2019-08-28 15:53:34	92.7 dB
LASmin	2019-08-28 15:39:14	55.1 dB
SEA	-99.9 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	1	3.1 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LApeak > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LApeak > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LApeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
LCSeq	78.9 dB	
LASeq	69.8 dB	
LCSeq - LASeq	9.1 dB	
LAIeq	73.8 dB	
LAeq	69.8 dB	
LAIeq - LAeq	4.0 dB	

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
Leq	69.8					
LS(max)	92.7	2019/08/28 15:53:34				
LS(min)	55.1	2019/08/28 15:39:14				
LPeak(max)	109.5	2019/08/28 15:53:34				

# Overloads	0
Overload Duration	0.0 s

Dose Settings		
Dose Name	OSHA-1	OSHA-2
Exchange Rate	5	5 dB
Threshold	90	80 dB
Criterion Level	90	90 dB
Criterion Duration	8	8 h

Results		
Dose	0.00	0.01 %
Projected Dose	0.15	0.32 %
TWA (Projected)	43.1	48.6 dB
TWA (t)	18.1	23.6 dB
Lep (t)	54.8	54.8 dB

Statistics	
LAS5.00	73.7 dB
LAS10.00	72.3 dB
LAS33.30	67.8 dB
LAS50.00	65.7 dB
LAS66.60	64.2 dB
LAS90.00	60.1 dB

Summary

File Name on Meter	LxT_Data.032
File Name on PC	SLM_0004983_LxT_Data_032.01.ldbin
Serial Number	0004983
Model	SoundTrack LxT®
Firmware Version	2.302
User	
Location	R2
Job Description	
Note	

Measurement

Description	
Start	2019-08-28 15:54:40
Stop	2019-08-28 16:09:40
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre Calibration	2019-08-28 15:37:29
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting			
Peak Weight	A Weighting			
Detector	Slow			
Preamp	PRMLxT1			
Microphone Correction	Off			
Integration Method	Exponential			
Overload	144.7 dB			
	A	**C**	**Z**	
Under Range Peak	**101.0**	98.0	103.0	dB
Under Range Limit	**50.0**	48.0	56.0	dB
Noise Floor	36.8	37.5	45.1	dB

Results

LASeq	64.8 dB	
LASE	94.4 dB	
EAS	304.688 µPa²h	
EAS8	9.750 mPa²h	
EAS40	48.750 mPa²h	
LApeak (max)	2019-08-28 16:08:45	101.4 dB
LASmax	2019-08-28 16:08:50	80.4 dB
LASmin	2019-08-28 16:01:36	55.9 dB
SEA	-99.9 dB	

LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LApeak > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LApeak > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LApeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s

LCSeq	77.5 dB
LASeq	64.8 dB
LCSeq - LASeq	12.7 dB
LAIeq	67.1 dB
LAeq	64.8 dB
LAIeq - LAeq	2.3 dB

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
Leq	64.8					
LS(max)	80.4	2019/08/28 16:08:50				
LS(min)	55.9	2019/08/28 16:01:36				
LPeak(max)	101.4	2019/08/28 16:08:45				

# Overloads	0
Overload Duration	0.0 s

Dose Settings			
Dose Name	OSHA-1	OSHA-2	
Exchange Rate	5	5	dB
Threshold	90	80	dB
Criterion Level	90	90	dB
Criterion Duration	8	8	h

Results			
Dose	-99.9	0.00	%
Projected Dose	-99.9	0.02	%
TWA (Projected)	-99.9	27.5	dB
TWA (t)	-99.9	2.5	dB
Lep (t)	49.8	49.8	dB

Statistics		
LAS5.00	69.6	dB
LAS10.00	65.8	dB
LAS33.30	62.4	dB
LAS50.00	61.4	dB
LAS66.60	60.4	dB
LAS90.00	58.1	dB

EXHIBIT B

Construction Noise and Vibration Calculations

Project: 3727 Robertson Project

Construction Noise Impact on Sensitive Receptors

Parameters

Leq to L10 factor	3

				Residential Uses (line-of-sight blocked)				
Construction Phase **Equipment Type**	**No. of Equip.**	**Reference Noise Level at 50ft, Lmax**	**Acoustical Usage Factor**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**
Demolition					**56**	***56***		
Generator Sets	1	81	50%	785	52	49	52	5
Dozer	1	82	40%	785	53	49	52	5
Other Equipment	1	85	50%	785	56	53	56	5
Grading					**55**	***54***		
Excavator	2	81	40%	785	55	51	54	5
Auger Drill Rig	1	84	20%	785	55	48	51	5
Tractor/Loader/Backhoe	2	80	25%	785	54	48	51	5
Building Construction					**54**	***53***		
Cranes	1	81	16%	785	52	44	47	5
Forklift	2	75	10%	785	49	39	42	5
Tractor/Loader/Backhoe	2	80	25%	785	54	48	51	5
Pumps	1	81	50%	785	52	49	52	5
Paving					**56**	***54***		
Paver	1	77	50%	785	48	45	48	5
Cement and Mortar Mixers	4	79	40%	785	56	52	55	5
Roller	1	80	20%	785	51	44	47	5
Tractor/Loader/Backhoe	1	80	25%	785	51	45	48	5
Architectural Coating					**48**	***45***		
Paver	1	77	50%	785	48	45	48	5
Maximum Noise Level (Overlapping Phases)								
Building Construction/Paving/Architectural Coating						***57***		

Source for Ref. Noise Levels: LA CEQA Thresholds Guide, 2006 & FHWA RCNM, 2005

Project: 3727 Robertson Project
Construction Noise Impact on Sensitive Receptors

Parameters

Leq to L10 factor	3

Construction Phase Equipment Type	No. of Equip.	Reference Noise Level at 50ft, Lmax	Acoustical Usage Factor	R1, Reference Level at 50 feet				
				Distance (ft)	Lmax	Leq	L10	Estimated Noise Shielding, dBA
Demolition					**85**	***84***		
Generator Sets	1	81	50%	100	75	72	75	0
Dozer	1	82	40%	50	82	78	81	0
Other Equipment	1	85	50%	50	85	82	85	0
Grading					**84**	***82***		
Excavator	2	81	40%	50	84	80	83	0
Auger Drill Rig	1	84	20%	50	84	77	80	0
Tractor/Loader/Backhoe	2	80	25%	100	77	71	74	0
Building Construction					**83**	***81***		
Cranes	1	81	16%	100	75	67	70	0
Forklift	2	75	10%	100	72	62	65	0
Tractor/Loader/Backhoe	2	80	25%	50	83	77	80	0
Pumps	1	81	50%	50	81	78	81	0
Paving					**85**	***82***		
Paver	1	77	50%	100	71	68	71	0
Cement and Mortar Mixers	4	79	40%	50	85	81	84	0
Roller	1	80	20%	100	74	67	70	0
Tractor/Loader/Backhoe	1	80	25%	100	74	68	71	0
Architectural Coating					**77**	***74***		
Paver	1	77	50%	50	77	74	77	0
Maximum Noise Level (Overlapping Phases)								
Building Construction/Paving/Architectural Coating						***85***		

Source for Ref. Noise Levels: LA CEQA Thresholds Guide, 2006 & FHWA RCNM, 2005

3727 Robertson Blvd

Vibration Level Calculations

Based on Federal Transit Administration, Office of Planning and Environment

N =	1.5

Construction Equipment	Project Equipment	Equipment Peak Particle Velocity @ 25 Feet* (inches/second)	Distance to Receptor for < 0.5 PPV (Feet)	Estimated Velocity Decibels @ Distance** (VdB)	Estimated Peak Particle Velocity @ Distance*** (inches/second)
Unmitigated Vibration Levels					
R1					
Large Bulldozer or Bore/Drill Rig	Yes	0.089	15	93.6	0.191
Loaded Trucks	Yes	0.076	15	92.2	0.164
Jackhammer	Yes	0.035	8	93.7	0.193
Small Bulldozer	Yes	0.003	2	90.4	0.133

Source:

Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual,* 2018.

Notes:

* Values taken from Table 7-4.

** Based on the formula VdB = 20 x LOG10 (v/v_{ref}), where v_{ref} is equal to 1×10^{-6} in/sec (see page 111).
The approximate rms vibration velocity level (v) is calculated from PPV using a crest factor of 4 (see page 184).

*** Based on the formula PPV(D) = PPV(25 ft) x $(25/D)^N$, where D is equal to the distance (see page 185).
N = soil type classification factor (typically ranges from 1 to 1.5)

Off-Site Construction Haul Trucks

Equipment	Reference Vibration Levels at 50 ft, in/sec PPV	Estimated Vibration Levels , in/sec PPV	
		20 ft	
Typical Road Surface	0.00565	0.071	

Ref. Levels based on FTA Figure 5-4 (converted from VdB to PPV)

EXHIBIT C

Off-Site Construction & Operational Traffic Noise Calculations

TRAFFIC NOISE ANALYSIS TOOL

ESA

Project Name: 3727 Robertson Blvd Project
Analysis Scenario: Haul Trucks
Source of Traffic Volumes: Crain + Associates

Roadway Segment	Ground Type	Distance from Roadway Center to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Robertson Blvd Between Venice Blvd and Washington Blvd	Hard	40	30	30	30	0	0	3	51.3	51.6

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
- For hard ground, the propagation rate is 3 dB per doubling the distance.
- For soft ground, the propagation rate is 4.5 dB per doubling the distance.

Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: 3727 Robertson Blvd Project
Analysis Scenario: Existing
Source of Traffic Volumes: Crain + Associates

Roadway Segment	Ground Type	Distance from Roadway Center to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Robertson Blvd Between Venice Blvd and Washington Blvd	Hard	40	30	30	30	3238	67	33	69.5	69.8

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: 3727 Robertson Blvd Project
Analysis Scenario: Existing + Project
Source of Traffic Volumes: Crain + Associates

Roadway Segment	Ground Type	Distance from Roadway Center to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Robertson Blvd Between Venice Blvd and Washington Blvd	Hard	40	30	30	30	3257	67	34	69.5	69.8

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: 3727 Robertson Blvd Project
Analysis Scenario: Future Baseline
Source of Traffic Volumes: Crain + Associates

Roadway Segment	Ground Type	Distance from Roadway Center to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Robertson Blvd Between Venice Blvd and Washington Blvd	Hard	40	30	30	30	3386	70	35	69.7	70.0

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: 3727 Robertson Blvd Project
Analysis Scenario: Future + Project
Source of Traffic Volumes: Crain + Associates

Roadway Segment	Ground Type	Distance from Roadway Center to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Robertson Blvd Between Venice Blvd and Washington Blvd	Hard	40	30	30	30	3406	70	35	69.7	70.0

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
- For hard ground, the propagation rate is 3 dB per doubling the distance.
- For soft ground, the propagation rate is 4.5 dB per doubling the distance.

Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

EXHIBIT D

Federal Transit Administration, Noise and Vibration Manual (vibration sections), 2018

FTA

FEDERAL TRANSIT ADMINISTRATION

Transit Noise and Vibration Impact Assessment Manual

SEPTEMBER 2018

FTA Report No. 0123
Federal Transit Administration

PREPARED BY
John A. Volpe National Transportation Systems Center

U.S. Department of Transportation
Federal Transit Administration

COVER PHOTO

Courtesy of Edwin Adilson Rodriguez, Federal Transit Administration

DISCLAIMER

Transit Noise and Vibration Impact Assessment Manual

SEPTEMBER 2018
FTA Report No. 0123

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Federal Transit Administration
Office of Planning and Environment
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

Metric Conversion Table

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
		LENGTH		
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
		VOLUME		
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
		NOTE: volumes greater than 1000 L shall be shown in m^3		
		MASS		
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
		TEMPERATURE (exact degrees)		
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C

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14. ABSTRACT
This report is the third edition of a guidance manual originally issued in 1995. It includes clarifications to existing policy and updates to outdated references where applicable. Topics presented in this manual include procedures for predicting and assessing noise and vibration impacts of proposed transit projects for different stages of project development and different levels of analysis. Additional topics include descriptions of noise and vibration mitigation measures, construction noise and vibration, and how to present these analyses in the Federal Transit Administration's environmental documents. This guidance is for technical specialists who conduct the analyses, as well as project sponsor staff, Federal agency reviewers, and members of the general public who may be affected by the projects.

15. SUBJECT TERMS
Transit noise and vibration analysis, noise and vibration impact criteria, noise and vibration mitigation measures, environmental impact assessment, Nation Environmental Policy Act compliance.

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**		258	**19b. TELEPHONE NUMBER** *(Include area code)*
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Abstract

This report is the third edition of a guidance manual originally issued in 1995. It includes clarifications to existing policy and updates to outdated references where applicable. Topics presented in this manual include procedures for predicting and assessing noise and vibration impacts of proposed transit projects for different stages of project development and different levels of analysis. Additional topics include descriptions of noise and vibration mitigation measures, construction noise and vibration, and how to present these analyses in the Federal Transit Administration's environmental documents. This guidance is for technical specialists who conduct the analyses, as well as project sponsor staff, Federal agency reviewers, and members of the general public who may be affected by the projects.

Acknowledgments

The original 1995 version of this manual was developed by the firm Harris Miller Miller & Hanson Inc. (HMMH) and peer-reviewed by a group of specialists in the fields of acoustics and environmental planning and analysis. HMMH updated the original manual in 2006.

The updates for this current version were provided by the John A. Volpe National Transportation Systems Center, Cross Spectrum Acoustics, and FTA, and it was peer-reviewed by a panel of experts.

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SECTION 5

Transit Vibration

This section presents the basic concepts of transit ground-borne vibration, also referred throughout this manual as simple "vibration," and low-frequency groundborne-noise that sometimes results from vibration. The steps for the screening and assessing of potential vibration impacts of transit projects for FTA NEPA approval are described in the following sections.

The Source-Path-Receiver framework for ground-borne vibration for a rail system illustrated in Figure 5-1 is central to all environmental vibration studies. The train wheels rolling on the rails create vibration energy that is transmitted through the track support system into the transit structure. The vibration of the transit structure excites the adjacent ground, creating vibration waves that propagate through the ground and into nearby buildings creating ground-borne vibration effects that potentially interfere with activities. The vibrating building components may radiate sound, which this manual refers to as ground-borne noise. Airborne noise from transit sources is covered in Sections 2.3–4.5 of this manual. Ground-borne noise refers to the noise generated by ground-borne vibration.

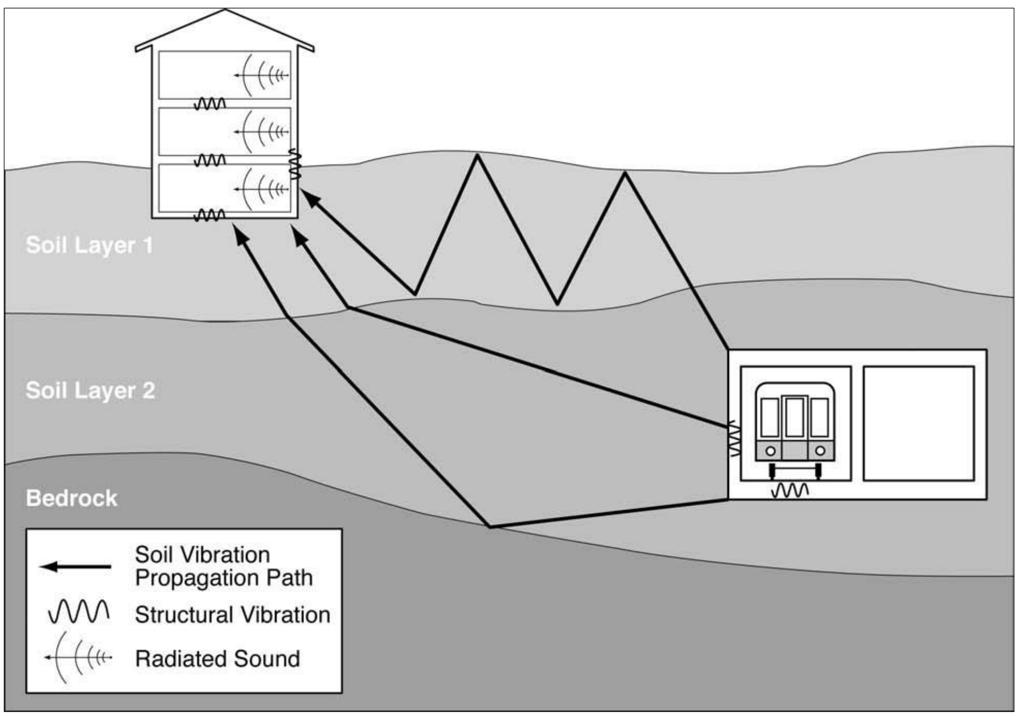

Figure 5-1 Propagation of Ground-Borne Vibration into Buildings

This section contains the following:

- Section 5.1 The ground-borne vibration and noise metrics used in this manual
- Section 5.2 An overview of transit vibration sources

- Section 5.3 An overview of transit vibration paths
- Section 5.4 An overview of receiver factors of transit vibration and a discussion of the technical background for ground-borne noise criteria

5.1 Ground-Borne Vibration and Noise Metrics

Vibration is an oscillatory motion that can be described in terms of the displacement, velocity, or acceleration. Because the motion is oscillatory, there is no net movement of the vibration element and the average of any of the motion metrics is zero. Displacement is the most intuitive metric. For a vibrating floor, the displacement is simply the distance that a point on the floor moves away from its static position. The velocity represents the instantaneous speed of the floor movement and acceleration is the rate of change of the speed.

Although displacement is easier to understand than velocity or acceleration, it is rarely used for describing ground-borne vibration. Most transducers used for measuring ground-borne vibration use either velocity or acceleration. Furthermore, the response of humans, buildings, and equipment to vibration is more accurately described using velocity or acceleration.

This manual uses the metrics outlined in Table 5-1 for transit ground-borne vibration and noise measurements, computations, and assessment. These metrics are consistent with common usage in the United States.

Table 5-1 Ground-borne Vibration and Noise Metrics

Metric	Abbreviation	Definition
Vibration Decibels	VdB	The vibration velocity level in decibel scale.
Peak Particle Velocity	PPV	The peak signal value of an oscillating vibration velocity waveform. Usually expressed in inches/second in the United States.
Root Mean Square	rms	The square root of the arithmetic average of the squared amplitude of the signal.
A-weighted Sound Level	dBA	A-weighted sound levels represent the overall noise at a receiver that is adjusted in frequency to approximate typical human hearing sensitivity. This unit is used to characterize ground-borne noise.

The metrics in the table above are illustrated in Figure 5-2. The components in the figure include:

- **Raw signal** – This curve shows the instantaneous vibration velocity, which fluctuates positively and negatively about the zero point.

- **Peak particle velocity (PPV)** – PPV is the maximum instantaneous positive or negative peak of the vibration signal. PPV is often used in monitoring of construction vibration (such as blasting) since it is related to the stresses that are experienced by buildings and is not used to evaluate human response.

- **Root mean square (rms) velocity** – Because the net average of a vibration signal is zero, the rms amplitude is used to describe smoothed vibration amplitude. The rms of a signal is the square root of the average of the squared amplitude of the signal. The average is typically calculated over a one-second period. The rms amplitude is always less than the PPV[viii] and is always positive. The rms amplitude is used to convey the magnitude of the vibration signal felt by the human body, in inches/second.

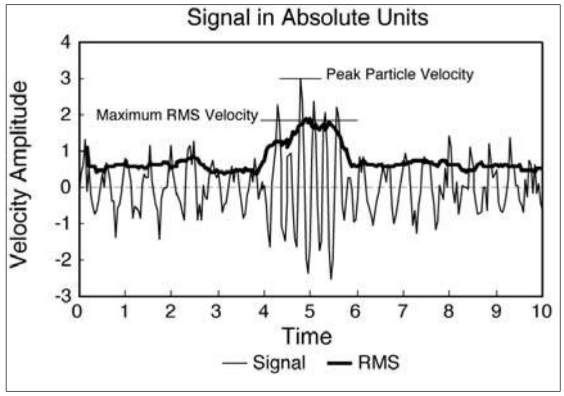

Figure 5-2 Vibration Signal in Absolute Units

The PPV and rms velocity are described in inches per second in the United States and meters per second internationally (with several different reference values). Although it is not universally accepted, vibration is commonly expressed in decibel notation. The decibel scale compresses the range of numbers required to describe vibration.

The graph in Figure 5-3 shows the rms curve from Figure 5-2 expressed in decibels.

Vibration velocity level in decibels is defined as:

$$L_v = 20 \log\left(\frac{v}{v_{ref}}\right) \qquad \textbf{Eq. 5-1}$$

where:

L_v = velocity level, VdB
v = rms velocity amplitude
v_{ref} = 1×10^{-6} in/sec in the USA
= 1×10^{-8} m/sec internationally*

*Because of the variations in the reference quantities, it is important to be clear about what reference quantity is being used when specifying velocity levels. All vibration levels in this manual are referenced to 1×10^{-6} inches/second.

viii The ratio of PPV to maximum rms amplitude is defined as the crest factor for the signal. The crest factor is typically greater than 1.41, although a crest factor of 8 or more is not unusual for impulsive signals. For ground-borne vibration from trains, the crest factor is usually 4 to 5.

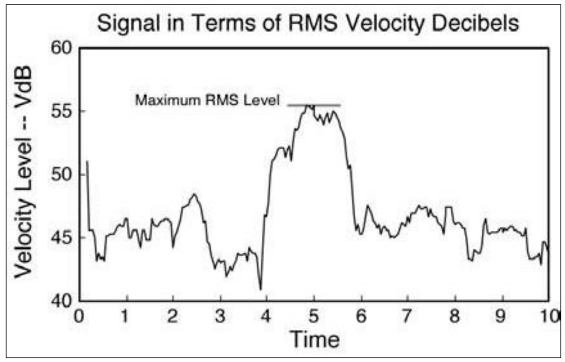

Figure 5-3 Vibration Signal in RMS Velocity Decibels

Ground-borne noise occurs when vibration radiates through a building interior and creates a low-frequency sound, often described as a rumble, as a train passes by. The annoyance potential of ground-borne noise is typically characterized with the A-weighted sound level. Although the A-weighted sound level is typically used to characterize community noise, characterizing low-frequency noise using A-weighting can be challenging because the non-linearity of human hearing causes sounds dominated by low-frequency components to seem louder than broadband sounds (sounds consisting of many frequency components, with no dominant frequencies) that have the same A-weighted level. The result is that ground-borne noise with a level of 40 dBA sounds louder than 40 dBA broadband noise. Because ground-borne noise sounds louder than broadband noise at the same noise level, the limits for ground-borne noise are lower (i.e., stricter) than would be the case for broadband noise.

5.2 Sources of Transit Ground-borne Vibration and Noise

Ground-borne vibration can be a concern for nearby neighbors of a transit system route or maintenance facility. However, in contrast to airborne noise, ground-borne vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. This section discusses common sources of ground-borne vibration and noise.

Most perceptible indoor vibration is caused by sources within buildings such as operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of vibration waves that propagate through the ground and create perceptible ground-borne vibration in nearby buildings include construction equipment, steel-wheeled trains, and traffic on rough roads. If the roadway is fairly smooth, the vibration from rubber-tired traffic is rarely perceptible. Building damage due to vibration is also rare for typical transportation projects; but in extreme cases, such as during blasting or pile-driving during construction, vibration could cause damage to buildings.

Figure 5-4 illustrates common vibration sources and the human and structural response to ground-borne vibration ranging from approximately 50 VdB (below perceptibility) to 100 VdB (the threshold of potential damage). The background vibration velocity level in residential areas is usually 50 VdB or lower,[ix] and the threshold of perception for humans is approximately 65 VdB. A vibration level of 85 VdB in a residence can result in strong annoyance.

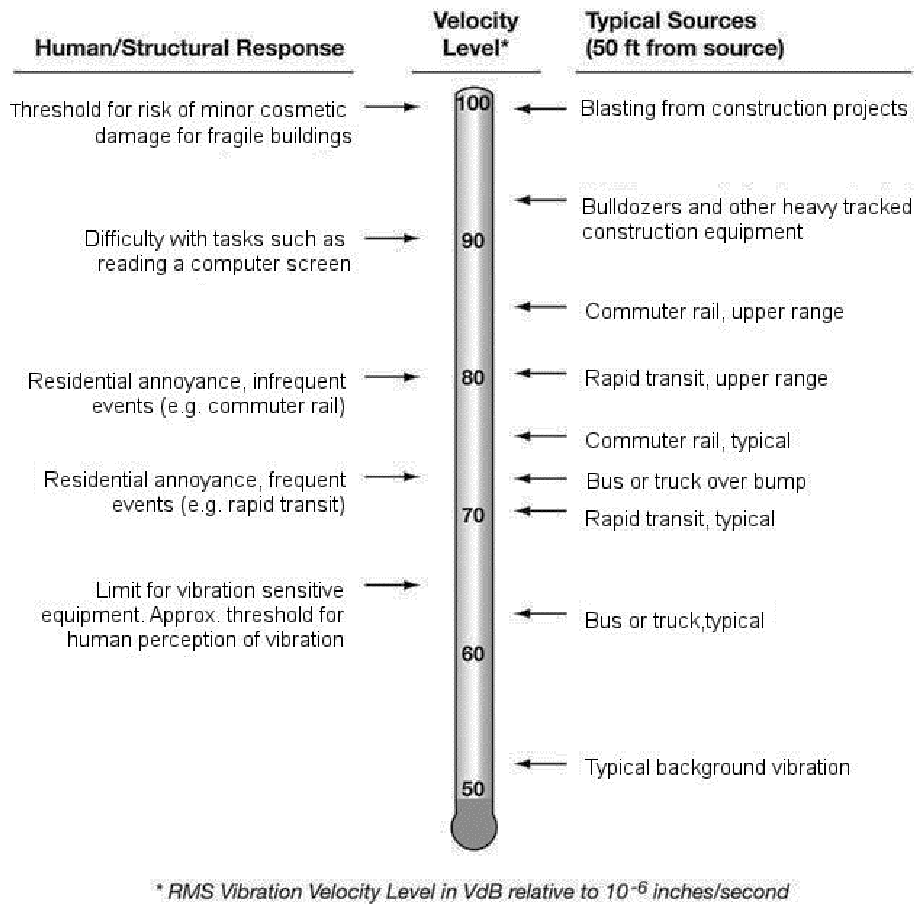

Figure 5-4 Typical Levels of Ground-Borne Vibration

Rapid transit or light rail systems typically generate vibration levels of 70 VdB or more near their tracks, while buses and trucks rarely create vibration that exceeds 70 VdB unless there are bumps due to frequent potholes in the road. Heavy locomotives on diesel commuter rail systems create vibration levels approximately 5 to 10 dB higher than rail transit vehicles.

Vibration from trains is strongly dependent on factors such as how smooth the wheels and rails are, as well as the resonance frequencies of the vehicle suspension system and the track support system. These systems, like all mechanical systems, have resonances that result in increased vibration response at certain frequencies, called natural frequencies. Unusually rough road or track, steel-wheel flats, geologic conditions that promote efficient propagation of vibration, or vehicles with very stiff suspension systems could increase typical

[ix] Background vibration is typically well below the threshold of human perception and is of concern only when the vibration affects very sensitive manufacturing or research equipment. Electron microscopes and high-resolution lithography equipment are examples of equipment that is highly sensitive to vibration.

vibration levels by approximately 10 VdB. Common factors that contribute to ground-borne vibration and noise at the source are presented in Table 5-2. These factors are discussed in more detail throughout this Section.

Table 5-2 Factors that Influence Levels of Ground-Borne Vibration and Noise at the Source

Category	Factors	Influence
Operations and Vehicles	Speed	Higher speeds result in higher vibration levels. Doubling speed results in a vibration level increase of approximately 4 to 6 dB.
	Vehicle Suspension	Stiff suspension in the vertical direction can increase the effective vibration forces. On transit cars, the primary suspension has the largest effect on vibration levels.
	Wheel Condition and Type	Wheel flats and general wheel roughness are major sources of vibration from steel wheel/steel rail systems. Resilient wheels on rail transit systems can provide some vibration reduction over solid steel wheels, but are usually too stiff to provide substantial reduction. For more information, see Section 6.4, Step 2.
Guideway	Track/Roadway Surface	Rough track or rough roads are often sources of excessive vibration. Maintaining a smooth surface will reduce vibration levels.
	Track Support System	On rail systems, the track support system is one of the major components in determining the levels of vibration. The highest vibration levels are created by track that is rigidly attached to a concrete trackbed (e.g., track on wood half-ties embedded in the concrete). The vibration levels are much lower when special vibration control track systems such as resilient fasteners, ballast mats, and floating slabs are used.
	Transit Structure	Heavier transit structures typically result in the lower vibration levels. The vibration levels from a lightweight bored tunnel will usually be higher than from a poured concrete box subway.
	Transit System Elevation	A rail system guideway will be either underground (subway), at-grade, or elevated, with substantial differences in the vibration characteristics at each elevation. ▪ Underground: vibration is typically the most important environmental factor of interest. ▪ At-grade: airborne noise is typically the dominant factor, although vibration and noise can be a problem, particularly at interior locations well isolated from exterior noise. ▪ Elevated: it is rare for vibration to be an issue with elevated railways except when guideway supports are located within 50 ft of buildings.

Brief discussions of ground-borne vibration and noise sources for different modes of transit are provided below.

At-Grade Heavy Rail and Light Rail

Ground-borne vibration and noise from urban heavy rail and LRT is common when there is less than 50 ft between the track and building foundations. Local geology and structural details of the building determine if the source of complaints is due to perceptible vibration or audible ground-borne noise. Complaints about ground-borne vibration from surface track are more common than ground-borne noise complaints. A substantial percentage of complaints about both ground-borne vibration and noise correlate with proximity of special track work, rough or corrugated track, or wheel flats. Light rail systems tend to generate fewer complaints than heavy rail due to lower operating speeds.

Commuter and Intercity Passenger Trains

There is the potential for vibration-related issues when new commuter or intercity rail passenger service (including electric multiple units (EMUs) and diesel multiple units (DMUs)) powered by either diesel or electric locomotives is introduced in an urban or suburban area. Commuter and intercity passenger trains have similar characteristics, but commuter trains typically operate on a more frequent schedule. These passenger trains often share track with freight trains, which have different vibration characteristics as discussed below.

Freight Trains

Local and long-distance freight trains are similar in that they both are diesel-powered and have the same types of cars. They differ in their overall length, number and size of locomotives, and number of heavily loaded cars. However, because locomotive suspensions are similar, the maximum vibration levels of local and long-distance freights are similar. Locomotives and rail cars with wheel flats are the sources of the highest vibration levels.

If the transit project does not in any way change the freight service, tracks, etc., then vibration from the freight line would be part of the existing conditions and need to be considered in terms of cumulative impacts (see Section 6.2, Step 3 on how to consider cumulative impacts). If the project results in changes to the freight path, operations, frequency, etc. (e.g., relocating freight tracks within the ROW to make room for the transit tracks) then those potential impacts and mitigation should be evaluated as part of the proposed project. However, note that vibration mitigation is very difficult to implement on tracks where freight trains with heavy axle loads operate.

High-Speed Passenger Trains

Passenger trains travelling at high speeds, 90 to 250 miles per hour, have the potential for creating high levels of ground-borne vibration. Ground-borne vibration should be anticipated as one of the major environmental impacts of any trains travelling at high speeds located in an urban or suburban area.[x] For projects that are specifically high-speed transportation refer to the FRA "High-Speed Ground Transportation Noise and Vibration Impact Assessment" guidance manual.(39)

AGT Systems

AGT systems include a wide range of transportation vehicles that provide local circulation in downtown areas, airports, and theme parks. Because AGT systems normally operate at low speeds, have lightweight vehicles, run on elevated structures, and rarely operate in vibration-sensitive areas, ground-borne vibration problems are very rare.

Subway and At-grade Track

While ground-borne vibration produced from trains operating subway and at-grade track have very different characteristics, they have comparable overall vibration velocity levels. Complaints about ground-borne vibration are often more common near subways than near at-grade track. This is not because

[x] Amtrak trains (branded Acela at the time of publication) on the Northeast Corridor between Boston and Washington, DC, which attain moderate to high speeds in some sections with improved track, fit into this category.

subways create higher vibration levels than at-grade systems, rather because subways are usually located in more densely developed areas in closer proximity to building foundations, and the airborne noise is usually a more serious problem for at-grade systems than the ground-borne vibration. Another difference between subway and at-grade track is that the ground-borne vibration from subways tends to be higher frequency than the vibration from at-grade track, which makes the ground-borne noise more noticeable.

Streetcars
Complaints about ground-borne vibration from street cars are uncommon given that streetcars typically operate at very low speeds (less than 25 mph).

Buses
Because the rubber tires and suspension systems of buses provide vibration isolation, it is unusual for buses to cause ground-borne vibration or noise problems. For most issues with bus-related vibration, such as rattling of windows, the cause is almost always airborne noise and directly related to running surface conditions such as potholes, bumps, expansion joints, or other discontinuities in the road surface (usually resolved by smoothing the discontinuities).

Buses operating inside buildings will likely cause vibration concerns for other building inhabitants. An example of this situation is a bus transfer station in the same building as commercial office space. Sudden loading of a building slab by a heavy moving vehicle or by vehicles running over lane divider bumps can cause intrusive building vibration.

5.3 Paths of Transit Ground-Borne Vibration and Noise

Vibration travels from the source through the transit structure and excites the adjacent ground, creating vibration waves that propagate through soil layers and rock strata to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the building structure. The vibration of the building structure and room surfaces can radiate a low-frequency rumble called ground-borne noise (Figure 5-1).

Soil and subsurface conditions are known to have a strong influence on the levels of ground-borne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock. Vibration propagation is more efficient in stiff clay soils. Shallow rock may concentrate the vibration energy close to the surface, resulting in ground-borne vibration problems at large distances from the track. Factors such as soil layers and depth to water table can have substantial effects on the propagation of ground-borne vibration. These factors are summarized in Table 5-3.

Table 5-3 Factors that Influence Levels of Ground-borne Vibration and Noise along Path

Geology Factors	Influence
Soil type	Vibration levels are generally higher in stiff clay-type soil than in loose sandy soil.
Rock layers	Vibration levels are usually high near at-grade track when the depth to bedrock is 30 ft or less. Subways founded in rock will result in lower vibration amplitudes close to the subway. Vibration levels do not attenuate as rapidly in rock as in soil.
Soil layering	Soil layering can have a substantial effect on the vibration levels since each stratum can have considerably different dynamic characteristics.
Depth to water table	The presence of the water table may have a substantial effect on vibration, but a definite relationship has not been established.

5.4 Receiver Factors that Influence Ground-Borne Vibration and Noise

Ground-borne vibration is a concern almost exclusively inside buildings. Train vibration may be perceptible to people who are outdoors, but it is very rare for outdoor vibration to cause complaints.

The vibration levels inside a building are dependent on the vibration energy that reaches the building foundation, coupling of the building foundation to the soil, and propagation of the vibration through the building. In general, the heavier a building is, the lower the response will be to the incident vibration energy. Common factors that contribute to ground-borne vibration and noise at the receiver are presented in Table 5-4.

Table 5-4 Factors that Influence Levels of Ground-Borne Vibration and Noise at the Receiver

Receiver Building Factors	Influence
Foundation type	The heavier the building foundation, the greater the coupling loss as the vibration propagates from the ground into the building.
Building construction	Each building has different characteristics relative to structure-borne vibration, but, in general, the heavier the building, the lower the levels of vibration. The maximum vibration amplitudes of the floors and walls of a building will often occur at the resonance frequencies of the components of the building.
Acoustical absorption	The more acoustically absorptive materials in the receiver room, the lower the ground-borne noise level. Note that because ground-borne noise usually is a low-frequency phenomenon, it is affected by low-frequency absorption (e.g., below 250 Hz).

5.5 Human Response to Transit Ground-borne Vibration and Noise

This section contains an overview of human receiver response to ground-borne vibration and noise. It serves as background information for the vibration impact criteria in Section 6.2.

The effects of ground-borne vibration can include perceptible movement of floors in buildings, rattling of windows, shaking of items on shelves or hanging on walls, and low-frequency noise (ground-borne noise). Building damage is not a factor for typical transportation projects, but in extreme cases, such as during blasting or pile-driving during construction, vibration could cause damage to buildings. Although the perceptibility threshold is approximately 65 VdB, human response to vibration is not usually substantial unless the vibration exceeds 70 VdB (Figure 5-4). A vibration level that causes annoyance is well below the damage risk threshold for typical buildings (100 VdB).

Ground-borne vibration is almost never a problem outdoors. Although the motion of the ground may be perceived, without the effects associated with the shaking of a building, the motion does not provoke the same adverse human reaction. Ground-borne noise that accompanies the building vibration is usually perceptible only inside buildings and typically is only an issue at locations with subway or tunnel operations where there is no airborne noise path or for buildings with substantial sound insulation such as a recording studio.

One of the challenges in developing suitable criteria for ground-borne vibration is that there has been relatively little research into human response to vibration and, specifically, human annoyance with building vibration. The American National Standards Institute (ANSI) developed criteria for evaluation of human exposure to vibration in buildings in 1983,[40] and the International Organization for Standardization (ISO) adopted similar criteria in 1989[41] and revised them in 2003.[42] The 2003 version of ISO 2631-2 acknowledges that "human response to vibration in buildings is very complex." It further indicates that the degree of annoyance cannot always be explained by the magnitude of the vibration alone. In some cases, complaints are associated with measured vibration that is lower than the perception threshold. Other phenomena such as ground-borne noise, rattling, visual effects such as movement of hanging objects, and time of day (e.g., late at night) all play some role in the response of individuals. To understand and evaluate human response, which is often measured by complaints, all of these related effects need to be considered.

Figure 5-5 illustrates the relationship between the vibration velocity level measured in 22 homes and the general response of the occupants to the vibration from measurements performed for several transit systems along with subjective ratings by researchers and residents. These data are published in the "State-of-the-Art Review of Ground-borne Noise and Vibration."[43] The figure also includes a curve representing the percent of people annoyed by vibration from high-speed trains from a Japanese study for comparison.[44]

Both the occupants and the people who performed the measurements agreed that floor vibration in the Distinctly Perceptible range is unacceptable for a residence. The data indicates that residential vibration exceeding 75 VdB is unacceptable for a repetitive vibration source such as rapid transit trains that pass every 5 to 15 minutes. The results from the Japanese study confirm the conclusion that at a vibration velocity level of 75 to 80 VdB, many people will find the vibration annoying. A Transportation Research Board (TRB) study of human response to vibration from 2009 also supports this finding and indicates that incidence of complaints fall rapidly with a level decreasing below 72 VdB.[42][45]

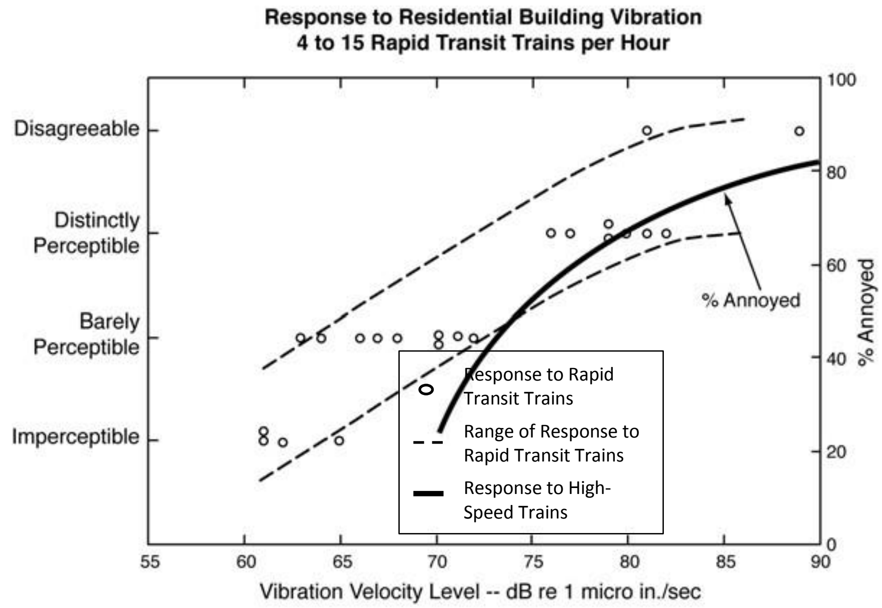

Figure 5-5 Response to Transit-Induced Residential Vibration

Table 5-5 presents the human response to different levels of ground-borne vibration and noise on which the criteria presented in Section 6.2 are based. The vibration level (VdB) is presented with the corresponding frequency assuming that the vibration spectrum peaks at 30 Hz or 60 Hz.[xi] The ground-borne noise levels (dBA) are estimated for the specified vibration velocity with a peak vibration spectrum of 30 Hz (Low Freq) and 60 Hz (Mid Freq). Note that the human response differs for vibration velocity level based on frequency. For example, the noise caused by vibrating structural components may cause annoyance even though the vibration cannot be felt. Alternatively, a low-frequency vibration can cause annoyance while the ground-borne noise level it generates does not.

[xi] The A-weighted level of ground-borne noise can be estimated by applying A-weighting to the vibration velocity spectrum and by subtracting an additional 5 dB for a room with average acoustical absorption. Since the A-weighting at 31.5 Hz is -39.4 dB, if the vibration spectrum peaks at 30 Hz, the A-weighted sound level will be approximately 40 dB lower than the velocity level. If the vibration spectrum peaks at 60 Hz, the A-weighted sound level will be approximately 25 dB lower than the velocity level.

Table 5-5 Human Response to Different Levels of Ground-Borne Vibration and Noise

Vibration Velocity Level	Noise Level		Human Response
	Low Freq*	Mid Freq**	
65 VdB	25 dBA	40 dBA	Approximate threshold of perception for many humans. Low-frequency sound: usually inaudible. Mid-frequency sound: excessive for quiet sleeping areas.
75 VdB	35 dBA	50 dBA	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level annoying. Low-frequency noise: tolerable for sleeping areas. Mid-frequency noise: excessive in most quiet occupied areas.
85 VdB	45 dBA	60 dBA	Vibration tolerable only if there are an infrequent number of events per day. Low-frequency noise: excessive for sleeping areas. Mid-frequency noise: excessive even for infrequent events for some activities.

*Approximate noise level when vibration spectrum peak is near 30 Hz.
**Approximate noise level when vibration spectrum peak is near 60 Hz.

SECTION

6

Vibration Impact Analysis

The FTA vibration impact analysis process is a multi-step process used to evaluate a project for potential vibration impacts. If impact is determined, measures necessary to mitigate adverse impacts are to be considered for incorporation into the project.[3]

The FTA vibration impact analysis steps are summarized as follows and are described in the following sections:

6.1 Determine vibration analysis level.

6.2 Determine vibration impact criteria.
Option A: General Vibration Assessment Criteria
Option B: Vibration Impact Criteria for a Detailed Vibration Analysis

6.3 Evaluate Impact: Vibration Screening Procedure
Step 1: Classify project vehicles.
Step 2: Determine project type.
Step 3: Determine screening distance.
Step 4: Identify vibration-sensitive land uses.

6.4 Evaluate Impact: General Vibration Assessment.
Step 1: Select base curve for ground surface vibration level.
Step 2: Apply adjustments.
Step 3: Inventory vibration impact.

6.5 Evaluate Impact: Detailed Vibration Analysis
Step 1: Characterize Existing Vibration
Step 2: Estimate Vibration Impact
Step 3: Assess Vibration Impacts
Step 4: Determine Vibration Mitigation Measures

A similar process for the noise impact analysis is presented in Section 4. After the noise and vibration analyses have been completed, assess construction noise and vibration according to Section 7 and document findings according to Section 8.

6.1 Determine Vibration Analysis Level

There are three levels of analysis to assess the potential ground-borne vibration and noise impacts resulting from a public transportation project. The appropriate level of analysis varies by project based on the type and scale of the project, the stage of project development, and its environmental setting. These three levels are: the Vibration Screening Procedure, the General Vibration Assessment, and the Detailed Vibration Analysis. These levels of vibration analysis mirror the levels of noise analysis discussed in Section 4.2.

The Vibration Screening Procedure, performed first, defines the study area of any subsequent vibration impact assessment. Where there is potential for impact, the General Vibration Assessment and Detailed Vibration Analysis procedures are used to determine the extent and severity of impact. In some cases, a General Vibration Assessment may be all that is needed. However, if the proposed project is near noise-sensitive land uses and it appears at the outset that the impact would be substantial, it is prudent to conduct a Detailed Vibration Analysis.

The methods for analyzing transit vibration are consistent with those described in recognized handbooks and international standards.[46][47]

Conduct the vibration screening procedure and then determine the appropriate vibration analysis option:

Vibration Screening Procedure – The Vibration Screening Procedure is a simplified method of identifying the potential for vibration impact from transit projects. The Vibration Screening Procedure is applicable to all types of transit projects and does not require any specific knowledge about the vibration characteristics of the system or the geology of the area. This procedure uses simplified assumptions and considers the type of project and the presence or absence of vibration-sensitive land uses within a screening distance that has been developed to identify most potential vibration impacts. If no vibration-sensitive land uses are present within the defined screening distance, then no further vibration assessment is necessary.

The Vibration Screening Procedure steps are provided in Section 6.3, Step 1.

General Vibration Assessment – The General Vibration Assessment is used to examine potential impacts to vibration-sensitive land use areas identified in the screening step more closely. It uses generalized information likely to be available at an early stage in the project development process and during the development of most environmental documents.

Vibration levels at receivers are determined by estimating the overall vibration velocity level and A-weighted ground-borne noise levels as a function of distance from the track and applying adjustments to account for factors such as track support systems, vehicle speed, type of building, and track and wheel conditions.

A General Vibration Assessment is sufficient for the environmental review of many projects, including projects that compare transit modal alternatives or relocate a crossover or turnout. The General Vibration Assessment may also be sufficient if it results in a commitment to mitigation that eliminates the vibration impacts, such as a change in transit mode or alignment. However, if impact is identified through the General Vibration Assessment procedures and not mitigated, a Detailed Vibration Analysis of the selected alternative must be completed. Most vibration mitigation measures can only be specified after a Detailed Vibration Analysis has been done.

The General Vibration Assessment procedure is provided in Section 6.3, Step 2.

Detailed Vibration Analysis – The Detailed Vibration Analysis procedure is a comprehensive assessment method that produces the most accurate estimates of vibration impact for a proposed project and is often accomplished during the engineering phase of a project when there are sufficient data identifying potential adverse vibration impacts from the project. However, a Detailed Vibration Analysis may be warranted earlier in the environmental review process if there are potentially severe impacts due to the proximity of vibration-sensitive land uses. This type of assessment requires professionals with experience in performing and interpreting vibration propagation tests.

A Detailed Vibration Analysis may not be necessary for all segments of a project. Generalized prediction curves from the General Vibration Assessment procedures may be sufficient for most of the alignment, and the Detailed Vibration Analysis procedure may only need to be applied to particularly sensitive receivers (Section 6.3). Note that a Detailed Vibration Analysis is typically required when designing special track-support systems such as floating slabs or ballast mats. These and other costly vibration mitigation measures can only be specified after a Detailed Vibration Analysis has been done in the engineering phase of the project.

The Detailed Vibration Analysis procedure is presented in Section 6.3, Step 3.

6.2 Determine Vibration Impact Criteria

Use the FTA criteria presented in this section when conducting a General Vibration Assessment or a Detailed Vibration Assessment. Like noise, the sensitivity to vibration varies by land use type, and the criteria represent these sensitivities. These criteria are based on national and international standards,[(38)(39)(48)] as well as experience on human response to building vibration. See Section 5.5 for additional background information on the development of FTA vibration criteria. The criteria for environmental impact from ground-borne vibration and noise are based on the maximum root-mean-square (rms) vibration velocity levels for repeated events of the same source.

Determine the appropriate criteria based on the level of analysis (Section 6.1). The impact criteria for the General Vibration Assessment are presented in Option A, and the impact criteria for the Detailed Vibration Analysis are presented in Option B.

Option A: General Vibration Assessment Criteria

Determine the land use according to Step 1 and the frequency of events according to Step 2. The impact criteria for the General Vibration Analysis are presented in Step 3.

Step 1: Land Use Categories

Determine the appropriate land use category for the receiver of vibration impacts of the project or project segment. Sensitive land use categories for vibration assessment are presented in Table 6-1 in order of sensitivity. Consider indoor use of the buildings when determining land use categories for ground-borne vibration and noise, since impact is experienced indoors.

Table 6-1 Land Use Categories for General Vibration Assessment Impact Criteria

Land Use Category	Land Use Type	Description of Land Use Category
-	Special Buildings	This category includes special-use facilities that are very sensitive to vibration and noise that are not included in the categories below and require special consideration. However, if the building will rarely be occupied when the source of the vibration (e.g., the train) is operating, there is no need to evaluate for impact. Examples of these facilities include concert halls, TV and recording studios, and theaters.
1	High Sensitivity	This category includes buildings where vibration levels, including those below the threshold of human annoyance, would interfere with operations within the building. Examples include buildings where vibration-sensitive research and manufacturing* is conducted, hospitals with vibration-sensitive equipment, and universities conducting physical research operations. The building's degree of sensitivity to vibration is dependent on the specific equipment that will be affected by the vibration. Equipment moderately sensitive to vibration, such as high resolution lithographic equipment, optical microscopes, and electron microscopes with vibration isolation systems are included in this category.** For equipment that is more sensitive, a Detailed Vibration Analysis must be conducted.
2	Residential	This category includes all residential land use and buildings where people normally sleep, such as hotels and hospitals. Transit-generated ground-borne vibration and noise from subways or surface running trains are considered to have a similar effect on receivers.***
3	Institutional	This category includes institutions and offices that have vibration-sensitive equipment and have the potential for activity interference such as schools, churches, doctors' offices. Commercial or industrial locations including office buildings are not included in this category unless there is vibration-sensitive activity or equipment within the building. As with noise, the use of the building determines the vibration sensitivity.

* Manufacturing of computer chips is an example of a vibration-sensitive process.
** Standard optical microscopes can be impacted at vibration levels below the threshold of human annoyance.
*** Even in noisy urban areas, the bedrooms will often be in quiet buildings with effective noise insulation. However, ground-borne vibration and noise are experienced indoors, and building occupants have practically no means to reduce their exposure. Therefore, occupants in noisy urban areas are just as likely to be exposed to ground-borne vibration and noise as those in quiet suburban areas.

- **Ground-borne Vibration** – Locations with equipment that is highly-sensitive to vibration should be included in category 1 or assessed using the Detailed Vibration Analysis procedures (Section 6.3, Step 3) and criteria (Section 6.2, Option B) or specific criteria of the equipment manufacturer.

  Most computer installations or telephone switching equipment is not considered sensitive to vibration. Although the owners of this type of equipment often are concerned with the potential for ground-borne vibration interrupting smooth operation of their equipment, it is rare for computer or other electronic equipment to be particularly sensitive to vibration. This type of equipment is typically designed to operate in common building environments where the equipment may experience occasional disturbances and continuous background vibration caused by other equipment.

- **Ground-borne Noise** – Ground-borne noise is typically only assessed at locations with subway or tunnel operations where there is no airborne noise path, or for buildings with substantial sound insulation such as a recording studio. For typical buildings with at-grade or elevated transit operations, the interior airborne noise levels are often higher than the ground-borne noise levels. For interior rooms or other special cases, ground-borne noise may need to be assessed.

Step 2: Identify Event Frequency

Determine the appropriate frequency of events for the project or project segment.

Community response to vibration correlates with the frequency of events and, intuitively, more frequent events of low vibration levels may evoke the same response as fewer high vibration level events. This effect is accounted for in the ground-borne vibration and noise impact criteria by characterizing projects by frequency of events. Event frequency definitions are presented in Table 6-2.

Table 6-2 Event Frequency Definitions

Category	Definition	Typical Project Types
Frequent Events	More than 70 events per day	Most rapid transit
Occasional Events	30–70 events per day	Most commuter trunk lines
Infrequent Events	Fewer than 30 events per day	Most commuter rail branch lines

Step 3: Apply Impact Criteria by Land Use and Event Frequency

Select the appropriate impact criteria for ground-borne vibration and noise based on the previously identified land use categories and frequency of events. It is also important to consider the time of vibration sensitivity. If the building is not typically occupied when the vibration source (e.g., train) is operating, it is not necessary to consider impact.

The criteria in this section are appropriate for assessing human annoyance or interference with vibration-sensitive equipment for common projects. While not typical, existing conditions, freight train operations, and building damage may require consideration.

- **Existing Conditions** – The criteria in this section do not consider existing conditions. In most cases, the existing environment does not include a substantial number of perceptible ground-borne vibration or noise events. However, existing conditions must be evaluated in some cases, such as for projects located in an existing rail corridor. For criteria considering existing conditions, see Step 3b.

- **Freight Train Operations** – The criteria are primarily based on experience with passenger train operations. Passenger train operations (rapid transit, commuter rail, and intercity passenger railroad) create vibration events that last approximately 10 seconds or less while a typical line-haul freight train event lasts approximately two minutes. This manual is oriented to transit projects. However, situations will occur when freight train operations must be evaluated, such as when freight train tracks are relocated for a transit project within a railroad ROW. Guidelines on applying these criteria to freight train operations are presented in Step 3c.

- **Building Damage** – It is extremely rare for vibration from train operations to cause substantial or even minor cosmetic building damage. However, damage to fragile historic buildings located near the ROW may be of concern. Even in these cases, damage is unlikely except when the track is located very close to the structure. Damage thresholds that apply to these structures are discussed in Section 7.2, Step 4 on Construction Vibration Impacts.

3a. Choose the impact criteria by land use category and event frequency. The criteria for ground-borne vibration and noise land use categories 1-3 are presented in Table 6-3. The criteria are presented in terms of acceptable indoor ground-borne vibration and noise levels. Impact will occur if these levels are exceeded. Criteria for ground-borne vibration are expressed in terms of rms velocity levels in VdB, and criteria for ground-borne noise are expressed in terms of A-weighted sound pressure levels in dBA.

Table 6-3 Indoor Ground-Borne Vibration (GBV) and Ground-Borne Noise (GBN) Impact Criteria for General Vibration Assessment

Land Use Category	GBV Impact Levels (VdB re 1 micro-inch /sec)			GBN Impact Levels (dBA re 20 micro Pascals)		
	Frequent Events	Occasional Events	Infrequent Events	Frequent Events	Occasional Events	Infrequent Events
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB*	65 VdB*	65 VdB*	N/A**	N/A**	N/A**
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

* This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. For equipment that is more sensitive, a Detailed Vibration Analysis must be performed.
** Vibration-sensitive equipment is generally not sensitive to ground-borne noise; however, the manufacturer's specifications should be reviewed for acoustic and vibration sensitivity.

The criteria for ground-borne vibration and noise for special land uses are presented in Table 6-4. The criteria are presented in terms of acceptable indoor ground-borne vibration and noise levels. Impact will occur if these levels are exceeded. As for the other land uses, the criteria for ground-borne vibration are expressed in terms of rms velocity levels in VdB, and criteria for ground-borne noise are expressed in terms of sound pressure levels in dBA.

Table 6-4 Indoor Ground-Borne Vibration and Noise Impact Criteria for Special Buildings

Type of Building or Room	Ground-Borne Vibration Impact Levels (VdB re 1 micro-inch/sec)		Ground-Borne Noise Impact Levels (dBA re 20 micro-Pascals)	
	Frequent Events	Occasional or Infrequent Events	Frequent Events	Occasional or Infrequent Events
Concert halls	65 VdB	65 VdB	25 dBA	25 dBA
TV studios	65 VdB	65 VdB	25 dBA	25 dBA
Recording studios	65 VdB	65 VdB	25 dBA	25 dBA
Auditoriums	72 VdB	80 VdB	30 dBA	38 dBA
Theaters	72 VdB	80 VdB	35 dBA	43 dBA

3b. Consider the presence of existing vibration conditions.
When the project will cause vibration more than 5 dB above the existing vibration, the existing source can be ignored, and the standard vibration criteria in Step 3a are appropriate. When the project will cause vibration less than 5 dB above the existing vibration level, use the instructions presented in this section to determine the appropriate impact criteria for the project. For information on characterizing existing vibration conditions, see Section 6.2, Step 3.

Use Table 6-5 and Figure 6-1 to determine the appropriate impact criteria. Sources of existing vibration are typically longer in duration than the events introduced into the environment due to the project. The frequency of use in the rail corridor is also a factor in characterizing the existing conditions. Both factors are considered in the process of determining appropriate impact criteria in Table 6-5 and Figure 6-1.
Examples of projects considering the existing vibration conditions in Table 6-5 and Figure 6-1 include:

- An automated people mover system planned for a corridor with an existing rapid transit service with 220 trains per day that did not have a significant increase in events from the existing 220 trains per day and that is not 3 dB above the existing vibration level would cause no additional impact.
- Where a new commuter rail line shares a heavily-used corridor with a rapid transit system, the project vibration exceeds the existing vibration level, there is not a significant increase in the number of events, and the project vibration exceeds the existing vibration level by 3 dB or more, the projected vibration levels must be evaluated using the standard impact criteria to determine impact.
- If a new transit project will use an existing railroad ROW and the location of existing railroad tracks are shifted, existing vibration can be substantial. The track relocation and reconstruction can result in lower vibration levels that would benefit the receivers and not introduce any adverse impact. However, if the track relocation causes higher vibration levels at vibration-sensitive receivers, then the projected vibration levels must be evaluated using the standard impact criteria to determine impact.

Table 6-5 Impact Criteria Considering Existing Conditions

Category	Number of Operations (At present – without project)	Criteria
Heavily Used	More than 12 trains per day	Use the standard vibration criteria in Section 6.2, Step 3a for the following scenarios: ▪ The existing vibration does not exceed the standard vibration criteria. ▪ The existing vibration exceeds the standard vibration criteria and there is a significant increase in events.* ▪ The existing vibration exceeds the standard vibration criteria, and the project vibration is 3 dB or more above the existing vibration. The project has no impact if the existing vibration exceeds the standard vibration criteria, the number of events does not increase significantly, and the project vibration does not exceed the existing vibration by 3 dB or more.
Moderately Used	5 – 12 trains per day	Use the standard vibration criteria in Section 6.2 Step 3a for the following scenarios: ▪ The existing vibration does not exceed the standard vibration criteria. ▪ The existing vibration exceeds the standard vibration criteria, and the project vibration is not 5 dB or more below the existing vibration. The project has no impact if the existing vibration exceeds the standard vibration criteria and the project vibration is at least 5 dB below the existing vibration.
Infrequently Used	Fewer than 5 trains per day	The standard vibration criteria in Section 6.2, Step 3a apply.

* Approximately doubling the number of events is required for a significant increase.

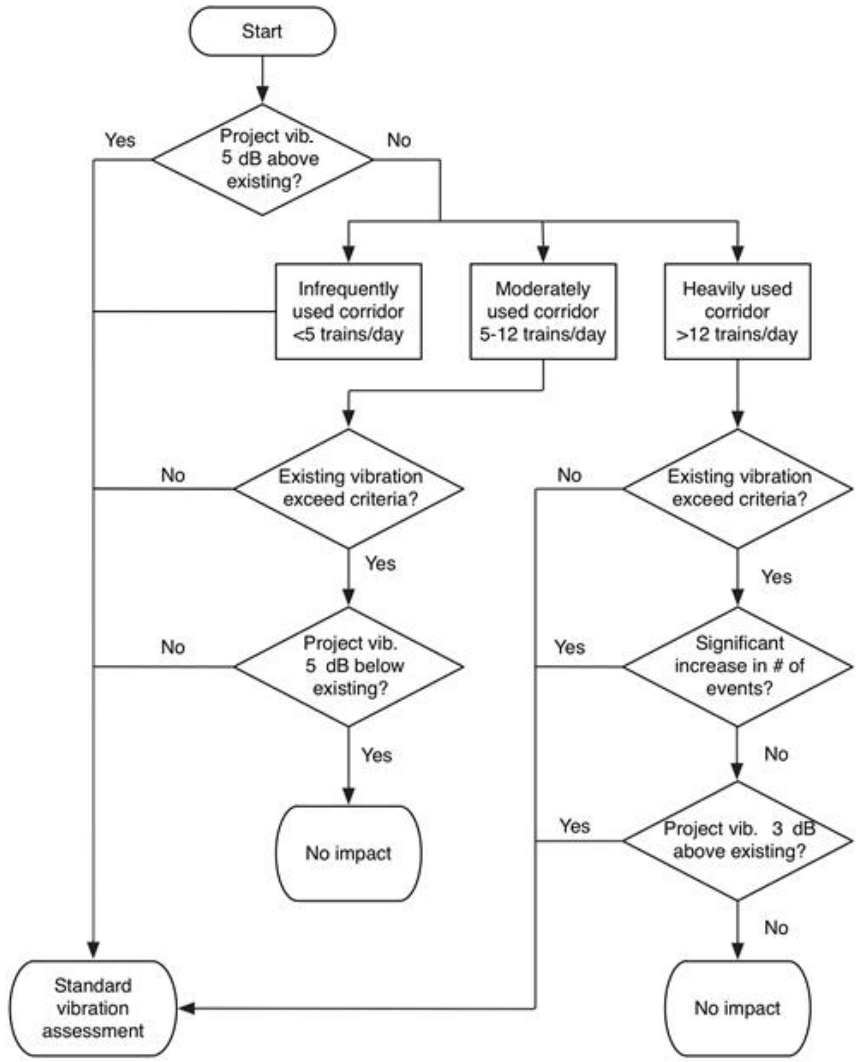

Figure 6-1 Existing Vibration[xii] Criteria Flow Chart

3c. Apply criteria to freight trains if part of the project.

Use the criteria presented in Step 3a to assess the vibration from freight trains in shared ROW scenarios because no specific impact criteria exist for freight railroads. It is important to consider that freight operations occur over substantially greater distances than passenger train operations and have different weight and axle loads.

When assessing vibration from freight train operations, consider the locomotive and rail car vibration separately. Since locomotive vibration lasts for a very short time, it can be characterized by the infrequent events category in Table 6-2. Rail car vibration from a typical line-haul freight train usually lasts for several minutes and can be characterized by the frequent events category in Table 6-2. Note

[xii] Vibration is abbreviated as "vib." in this flowchart.

that locomotives often create vibration levels that are 3 to 8 dB higher than those created by rail cars.

Use good engineering judgment to confirm the approach is reasonable for each project. For example, some spur rail lines carry very little rail traffic (sometimes only one train per week) or have short trains, in which case it may not be necessary to evaluate for impact. If there is uncertainty in how to determine the appropriate criteria, contact the FTA Regional office.

Decisions to relocate freight tracks closer to vibration-sensitive sites should be made with the understanding that increased vibration due to freight rail may not be possible to mitigate. Freight rail vibration may not always be successfully mitigated by the same methods as rail transit systems.

Option B: Vibration Impact Criteria for a Detailed Vibration Analysis

Determine the appropriate impact criteria for ground-borne vibration and ground-borne noise for a Detailed Vibration Analysis.

Step 1: Ground-Borne Vibration

Choose the appropriate criteria based on Figure 6-2 and Table 6-6.

Ground-borne vibration criteria presented in this section are more detailed than in the General Vibration Assessment. The criteria are based on international standards for the effects of vibration on people related to annoyance and interference with activities in buildings(39) as well as industry standards for vibration-sensitive equipment.(46) The criteria in this section are used to assess the potential for interference or annoyance from building response and to determine performance of vibration reduction methods. Note that for highly-sensitive equipment, specific vibration criteria provided by the manufacturer supersede the criteria in this section.

The criteria are presented by category in Figure 6-2 and are defined by international and industry standards.(39)(46) These criteria define limits for acceptable maximum rms vibration velocity level with a one-second averaging time at the floor of the receiving building in terms of a one-third octave band frequency spectrum. Band levels that exceed a particular criterion curve indicate impact; and therefore, mitigation options should be evaluated considering the specific frequency range in which the treatment is most effective. Interpretations of the criteria are presented in Table 6-6.

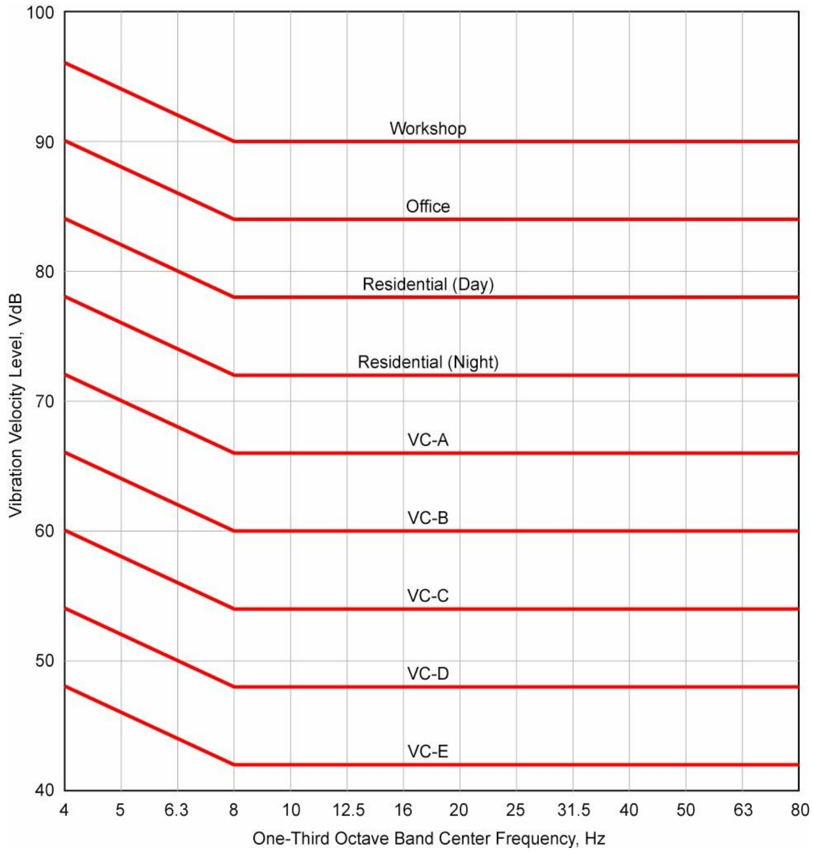

Figure 6-2 Criteria for Detailed Vibration Analysis

Table 6-6 Interpretation of Vibration Criteria for Detailed Vibration Analysis

Criterion Curve	Max Lv,* VdB	Description of Use
Workshop (ISO)	90	Vibration that is distinctly felt. Appropriate for workshops and similar areas not as sensitive to vibration.
Office (ISO)	84	Vibration that can be felt. Appropriate for offices and similar areas not as sensitive to vibration.
Residential Day (ISO)	78	Vibration that is barely felt. Adequate for computer equipment and low-power optical microscopes (up to 20X).
Residential Night, Operating Rooms (ISO)	72	Vibration is not felt, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power optical microscopes (100X) and other equipment of low sensitivity.
VC-A	66	Adequate for medium- to high-power optical microscopes (400X), microbalances, optical balances, and similar specialized equipment.
VC-B	60	Adequate for high-power optical microscopes (1000X) and inspection and lithography equipment to 3-micron line widths.
VC-C	54	Appropriate for most lithography and inspection equipment to 1-micron detail size.
VC-D	48	Suitable in most instances for the most demanding equipment, including electron microscopes operating to the limits of their capabilities.
VC-E	42	The most demanding criterion for extremely vibration-sensitive equipment.

* As measured in 1/3-octave bands of frequency over the frequency range 8 to 80 Hz.

In addition to the uses described in Table 6-6, the detailed vibration criteria can be applied to the three land use categories presented in Table 6-3.

- For residential land uses (category 2), use the residential night criterion curve in Table 6-6.
- For institutional uses (category 3), use the residential day criterion curve in Table 6-6.
- For category 1, the specific use of the building should be matched to the appropriate criterion curve in Table 6-6.
- For special buildings, such as those found in Table 6-4, either the criteria in Table 6-4 or specific criteria presented by the building operator should be used.

These criteria use a frequency spectrum because vibration-related problems generally occur due to resonances of the structural components of a building or vibration-sensitive equipment. Resonant response is frequency-dependent. A Detailed Vibration Analysis can provide an assessment that identifies potential problems resulting from resonances.

The detailed vibration criteria are based on generic cases when people are standing or equipment is mounted on the floor in a conventional manner. Consequently, the criteria are less stringent at very low frequencies below 8 Hz. Where special vibration isolation has been provided in the form of pneumatic isolators, the resonant frequency of the isolation system is very low. Consequently, in this special case, the curves may be extended flat at lower frequencies.

Step 2: Ground-borne Noise

Ground-borne noise impacts are assessed based on criteria for human annoyance and activity interference. The Detailed Vibration Analysis procedure provides vibration spectra inside a building. To evaluate ground-borne noise, convert these vibration spectra to sound pressure level spectra in the occupied spaces using the method described in Section 6.5 and compare to the criteria as follows:

- For residential buildings, use the criteria presented in Table 6-3.
- For special buildings listed in Table 6-4, A-weighted noise may not be sufficient to assess activity interference for a Detailed Vibration Analysis. Each special building may have a unique specification for acceptable noise levels and criteria must be determined on a case-by-case basis. For example, a recording studio may have stringent requirements for allowable noise in each frequency band.

6.3 Evaluate Impact: Vibration Screening Procedure

Determine the potential for impact using the Vibration Screening Procedure by identifying any vibration-sensitive land uses (Table 6-1) within the appropriate screening distance.

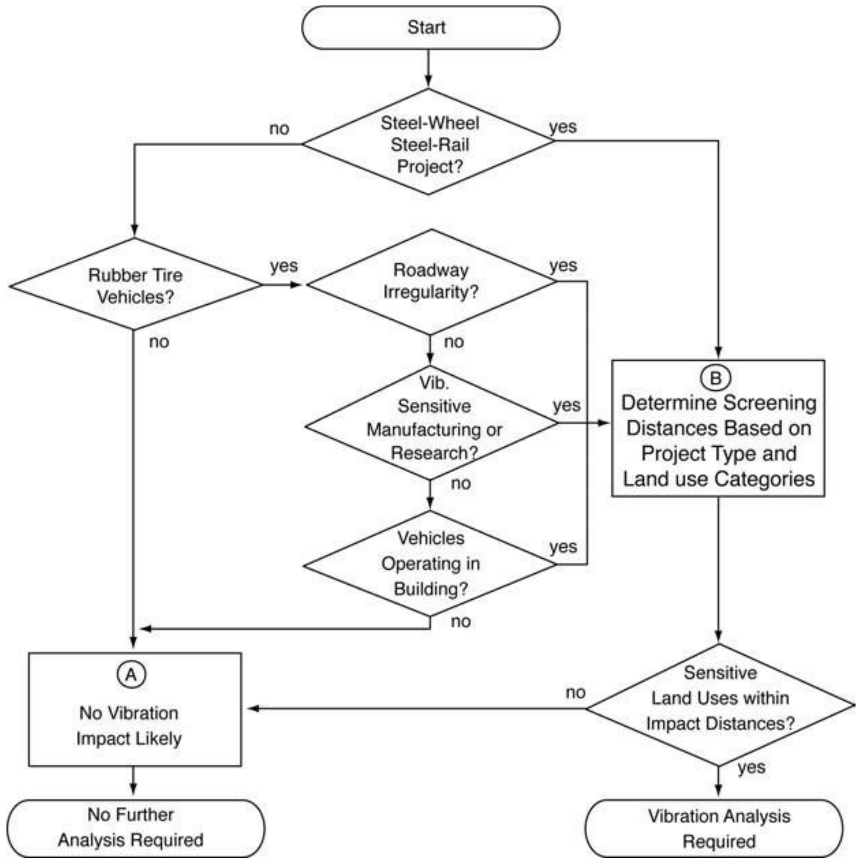

Figure 6-3 Flow Chart of Vibration Screening Process

Step 1: Classify Project Vehicles

Determine the project type and the next step based on the guidelines below.

Option A: No Vehicles – Transit projects that do not involve vehicles do not have potential for vibration impact and do not require further analysis (Box A in Figure 6-3).

Many smaller FTA-funded projects, such as bus terminals, park-and-ride lots, and station rehabilitation are in this category, and do not require further analysis of ground-borne vibration impact. However, if track systems are modified (e.g., tracks moved or switches modified), *proceed to Step 2***.**

Option B: Steel-wheeled/Steel-rail Vehicles – Transit projects with steel-wheeled/steel-rail vehicles have potential for vibration impact (Box B in Figure 6-3); *proceed to Step 2*. These rail systems include urban rapid transit, LRT, commuter rail, and steel-wheel intermediate capacity transit (ICT) systems.

Option C: Rubber-tire Vehicles – For projects that involve rubber-tire vehicles and do not meet the following conditions, vibration impact is unlikely, and no further analysis is needed. *Proceed to Step 2* for projects that involve rubber-tire vehicles and meet the following conditions (Box A in Figure 6.3):

- **Roadway irregularity** – Expansion joints, speed bumps, or other design features that result in unevenness in the road surface can result in perceptible ground-borne vibration at distances up to 75 ft away.
- **Operation close to vibration-sensitive buildings** – Buses, trucks, or other heavy vehicles operating close to a vibration-sensitive building (within approximately 100 ft from the property line) may impact vibration-sensitive activities, such as research that uses electron microscopes or manufacturing of computer chips.
- **Vehicles operating within buildings** – Special considerations are often required for shared use facilities where vehicles operate inside or directly underneath buildings such bus stations located inside an office building complex.

Step 2: Determine Project Type

Determine the project type according to Table 6-7.

Table 6-7 Project Types for Vibration Screening Procedure

Project Type Number	Project Type	Description
1	Conventional Commuter Railroad	Both locomotives and passenger vehicles create vibration. For commuter trains, the highest vibration levels are typically created by the locomotives. Electric commuter rail vehicles create levels of ground-borne vibration that are comparable to electric rapid transit vehicles.
2	RRT	Ground-borne vibration impact from rapid transit trains is one of the major environmental issues for new systems. Ground-borne vibration is usually a major concern for subway operations. It is less common for at-grade and elevated rapid transit lines to create intrusive ground-borne vibration and noise since air-borne noise typically dominates.
3	LRT and Streetcars	The ground-borne vibration characteristics of light rail systems are very similar to those of rapid transit systems. Because the speeds of light rail systems are usually lower, typical vibration levels are usually lower. Steel-wheel/steel-rail AGT is included in either this category or the ICT category depending on the level of service and train speeds.
4	Intermediate Capacity Transit	Because of the low operating speeds of most ICT systems, vibration problems are not common. However, steel-wheel ICT systems that operate close to* vibration-sensitive buildings have the potential of causing intrusive vibration. With a stiff suspension system, an ICT system could create intrusive vibration.
5	Bus and Rubber-Tire Transit Projects	This category encompasses most projects that do not include steel-wheel trains of some type. Examples include diesel buses, electric trolley buses, and rubber-tired people movers. Most projects that do not include steel-wheel trains do not cause vibration impacts.**

*See the screening distances for category 1 land uses in Table 6-8.

****** Most complaints about vibration caused by buses and trucks are related to rattling of windows or items hung on the walls. These vibrations are usually the result of airborne noise and not ground-borne vibration. In the case where ground-borne vibration is the source of the complaint, the vibration can usually be attributed to irregularities in the road.

Step 3: Determine Screening Distance

Determine the appropriate screening distances based on land use and project type according to Table 6-8.

The distances are based on the criteria presented in Section 6.3, the procedures in Section 6.4 assuming normal vibration propagation, and include a 5-dB factor of safety. Even so, areas with very efficient vibration propagation can have substantially higher vibration levels.

Because of the 5-decibel safety factor, the screening distances will identify most of the potentially impacted areas, even for areas with efficient propagation. However, when there is evidence of efficient propagation, such as previous complaints about existing transit facilities or a history of problems with construction vibration, increase the distances in Table 6-8 by a factor of 1.5.

Table 6-8 Screening Distances for Vibration Assessments

Type of Project	Critical Distance for Land Use Categories* Distance from ROW or Property Line, ft		
	Land Use Cat. 1	Land Use Cat. 2	Land Use Cat. 3
Conventional Commuter Railroad	600	200	120
RRT	600	200	120
LRT and Streetcars	450	150	100
ICT	200	100	50
Bus Projects (if not previously screened out)	100	50	--

*For the Vibration Screening Procedure, evaluate special buildings as follows: Category 1 - concert halls and TV studios, Category 2 - theaters and auditoriums

Step 4: Identify Vibration-Sensitive Land Uses

Identify all vibration-sensitive land uses (Table 6-1) within the chosen screening distance. If no vibration-sensitive land uses are identified, no further vibration analysis is needed. If one or more of the vibration-sensitive land uses are in the screening distance, complete a General Vibration Assessment (Section 6.4) or a Detailed Vibration Analysis (Section 6.5).

6.4 Evaluate Impact: General Vibration Assessment

Evaluate for impact using the General Vibration Assessment procedure if the Vibration Screening Procedure (Section 6.3) identified vibration-sensitive receivers within the screening distance of the transit vibration source.

For guidelines on when the General Vibration Assessment is appropriate, review Section 6.1.

The basic approach for the General Vibration Assessment is to define a curve or set of curves that predicts the overall ground-borne vibration as a function of distance from the source, then apply adjustments to these curves to account for factors such as vehicle speed, geologic conditions, building type, and receiver location within the building. When the vehicle type is not covered by the curves included in this section, it will be necessary to define an appropriate curve either by extrapolating from existing information or performing measurements at an existing facility.

Step 1: Select Base Curve for Ground Surface Vibration Level

Select a standard vibration curve to represent general vibration characteristics for the source.

The curves presented in Figure 6-4 are based on measurements of ground-borne vibration at representative North American transit systems and can be used to represent vibration characteristics for standard transportation systems in the General Vibration Assessment.

These curves assume typical ground-borne vibration levels, equipment in good condition, and speeds of 50 mph for the rail systems and 30 mph for buses. Adjustments to account for differences in speed and geologic conditions are included in Step 2.

Select a base curve from Figure 6-4 according to the guidelines in Table 6-9. Equations for the curves in Figure 6-4 are included in Table 6-10. Additional considerations for selecting a base curve for systems not included in Table 6-9 are presented below by transit mode.

Table 6-9 Ground Surface Vibration Level Base Curve Descriptions

Curve	Description
Locomotive-Powered Passenger or Freight Curve	Appropriate for vehicles powered by diesel or electric locomotives including intercity passenger trains and commuter rail trains.
Rapid Transit or Light Rail Vehicles Curve	Appropriate for both heavy and light-rail vehicles on at-grade and subway track.
Rubber-Tired Vehicles Curve	Appropriate for rubber-tire vehicles. These types of vehicles rarely create ground-borne vibration problems unless there is a discontinuity or bump in the road that causes the vibration. This curve represents the vibration level for a typical bus operating on smooth roadway.

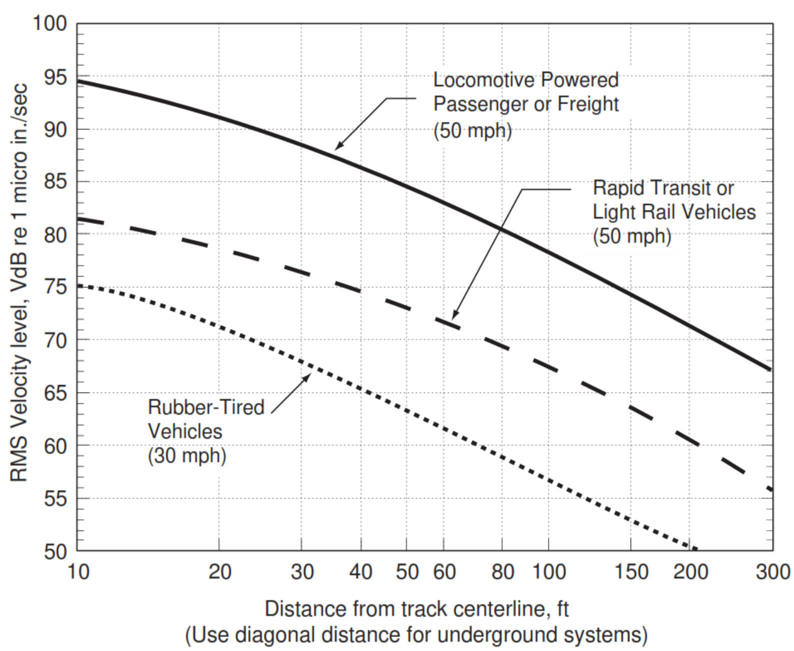

Figure 6-4 Generalized Ground Surface Vibration Curves

Table 6-10 Generalized Ground Surface Vibration Equations

Curve	Equation	
Locomotive Powered Passenger or Freight Curve	$L_v = 92.28 + 14.81\log(D) - 14.17\log(D)^2 + 1.65\log(D)^3$	**Eq. 6-1**
Rapid Transit or Light Rail Vehicles Curve	$L_v = 85.88 - 1.06\log(D) - 2.32\log(D)^2 - 0.87\log(D)^3$	**Eq. 6-2**
Rubber-Tired Vehicles Curve	$L_v = 66.08 + 34.28\log(D) - 30.25\log(D)^2 + 5.40\log(D)^3$	**Eq. 6-3**
L_v = velocity level, VdB D = distance, ft		

Considerations for selecting a base curve for different transit modes include:

- **Intercity passenger trains** – Although intercity passenger trains can be an important source of environmental vibration, it is rare that they are considered for FTA-funded projects unless a new transit mode uses an existing rail alignment. When a new transit line uses an existing rail alignment, changes in the intercity passenger traffic can result in either positive or negative impacts. Use the locomotive-powered passenger or freight curve for intercity passenger trains unless there are specific data available on the ground-borne vibration created by the new train operations.

- **Locomotive-powered commuter rail** – Use the locomotive-powered passenger or freight curve for all commuter rail system powered by either diesel or electric locomotives.

- **Electric multiple unit (EMU)** – Use the rapid transit or light rail vehicles curve for self-powered electric commuter rail trains.

- **Diesel multiple unit (DMU)** – Self-powered DMUs create vibration levels somewhere between rapid transit vehicles and locomotive-powered passenger trains. A vibration curve for DMUs can be estimated by lowering the locomotive-powered passenger or freight curve by 5 dB.

- **Subway heavy rail or light rail** – Use the rapid transit or light rail vehicles curve for subway heavy rail and subway light rail. Although vibrations from subway and at-grade tracks have very different characteristics, the overall vibration velocity levels are comparable. When applied to subways, the rapid transit or light rail vehicles curve assumes a relatively lightweight bored concrete tunnel in soil. The vibration levels will be lower for heavier subway structures such as cut-and-cover box structures and stations.

- **At-grade heavy rail or light rail** – Use the rapid transit or light rail vehicles curve for at-grade heavy rail or light rail. Heavy rail and LRT vehicles have similar suspension systems and axle loads and create similar levels of ground-borne vibration.

- **Elevated guideways or aerial structures** – Vibration from operations on an elevated structure is typically not an issue unless the guideway is supported by a building or located very close to buildings. Apply the appropriate adjustment for the aerial structures (Section 6.4, Step 2).

- **Streetcars** – Use the rapid transit or light rail vehicles curve for street cars.

- **ICT** – Use the rapid transit or light rail vehicles curve for ICT systems with steel wheels and the rubber-tired vehicles curve for ICT systems with rubber tires.

- **Other vehicle types** – For less common modes such as magnetically-levitated vehicles (maglev), monorail, or AGT, use good engineering judgment to choose a standard curve to best fit the mode or if a new curve needs to be developed, as a function of distance from the track. Examples include:
    - Vibration from a rubber-tire monorail operating on aerial guideway can be approximated using the rubber-tired vehicles curve with the appropriate adjustment for the aerial structure (Section 6.4, Step 2).
    - Most of the data available on the noise and vibration characteristics of maglev vehicles comes from high-speed systems intended for inter-city service. Even though there is no direct contact between the vehicle and the guideway, the dynamic loads on the guideway can generate ground-borne vibration. Measurements on a German high-speed maglev resulted in ground-borne vibrations at 75 mph which is comparable to the base curve for rubber-tired vehicles at 30 mph.[(49)]

Step 2: Apply Adjustments

Apply project-specific adjustments to the standard vibration curve.

Once the base curve has been selected, use the adjustments in the following instructions to develop project-specific vibration projections at each receiver. All adjustments are given as single numbers to add to, or subtract from, the base level.

Adjustments are separated by source, path, and receiver and include speed, wheel and rail type and condition, type of track support system, type of building foundation, and number of floors above the basement level. Calculate the appropriate adjustments to the base level. An example of the General Vibration Assessment is provided at the end of this Section.

It should be recognized that many of these adjustments are strongly dependent on the frequency spectrum of the vibration source and the frequency dependence of the vibration propagation. The adjustments in this section are suitable for generalized evaluation of the vibration impact and vibration mitigation measures because they are based on typical vibration spectra. However, these adjustments are not adequate for detailed evaluations of impact of vibration-sensitive buildings or for detailed specification of mitigation measures.

2a. Apply source adjustments to the base curve using Table 6-11 and the descriptions below to account for the project-specific source characteristics.

Table 6-11 Source Adjustment Factors for Generalized Predictions of GB Vibration and Noise

Source Factor	Adjustment to Propagation Curve			Comment
Speed		Reference Speed		Vibration level is approximately proportional to 20log(speed/speed$_{ref}$), see Eq. 6-4.
	Vehicle Speed	50 mph	30 mph	
	60 mph	+1.6 dB	+6.0 dB	
	50 mph	0.0 dB	+4.4 dB	
	40 mph	-1.9 dB	+2.5 dB	
	30 mph	-4.4 dB	0.0 dB	
	20 mph	-8.0 dB	-3.5 dB	
Vehicle Parameters (not additive, apply greatest value only)				
Vehicle with stiff primary suspension	+8 dB			Transit vehicles with stiff primary suspensions have been shown to create high vibration levels. Include this adjustment when the primary suspension has a vertical resonance frequency greater than 15 Hz.
Resilient Wheels	0 dB			Resilient wheels do not generally affect ground-borne vibration except at frequencies greater than about 80 Hz.
Worn Wheels or Wheels with Flats	+10 dB			Wheel flats or wheels that are unevenly worn can cause high vibration levels.
Track Conditions (not additive, apply greatest value only)				
Worn or Corrugated Track	+10 dB			Corrugated track is a common problem. Mill scale* on new rail can cause higher vibration levels until the rail has been in use for some time. If there are adjustments for vehicle parameters and the track is worn or corrugated, only include one adjustment.
Special Trackwork within 200 ft	+10 dB (within 100 ft) +5 dB (between 100 and 200 ft)			Wheel impacts at special trackwork will greatly increase vibration levels. The increase will be less at greater distances from the track. Do not include an adjustment for special trackwork more than 200 ft away.
Jointed Track	+5 dB			Jointed track can cause higher vibration levels than welded track.
Uneven Road Surfaces	+5 dB			Rough roads or expansion joints are sources of increased vibration for rubber-tire transit.
Track Treatments (not additive, apply greatest value only)				
Floating Slab Trackbed	-15 dB			The reduction achieved with a floating slab trackbed is strongly dependent on the frequency characteristics of the vibration.
Ballast Mats	-10 dB			Actual reduction is strongly dependent on frequency of vibration.
High-Resilience Fasteners	-5 dB			Slab track with track fasteners that are very compliant in the vertical direction can reduce vibration at frequencies greater than 40 Hz.

*Mill scale on a new rail is a slightly corrugated condition caused by certain steel mill techniques.

In addition to the comments in Table 6-11, use the following guidelines to select the appropriate adjustment factors. Some adjustments in the same category are not cumulative (additive) and only the greatest applicable adjustment should be applied. The adjustments that are not additive are noted in Table 6-11 and in the descriptions below. Note that some adjustments are not additive across multiple categories and are noted in the comments of Table 6-11. For example, the adjustment for a vehicle with stiff primary suspension is 8 dB, and the adjustment for wheel flats is 10 dB. If the vehicle has a stiff primary suspension and has wheel flats, the projected vibration levels should be increased by 10 dB, not 18 dB.

In addition, some vibration control measures are targeted for specific frequency ranges. The shape of the actual vibration spectra should be considered so that an appropriate vibration control measure may be selected.

- **Speed** – The levels of ground-borne vibration and noise vary, approximately, as 20 times the logarithm of speed. This means that doubling train speed will increase the vibration levels approximately 6 dB, and halving train speed will reduce the levels by 6 dB. The adjustments in Table 6-11 have been tabulated for reference vehicle speeds of 30 mph for rubber-tired vehicles and 50 mph for steel-wheel vehicles. Use the following relationship to calculate the adjustments for other speeds.

  $$Adj_{speed}\ (dB) = 20\log(\frac{speed}{speed_{ref}}) \qquad \textbf{Eq. 6-4}$$

  Variation with speed has been observed to be as low as $15\log(\frac{speed}{speed_{ref}})$, but unless specific speed data for vibration for a vehicle has been obtained, use Eq. 6-4.

- **Vehicle Parameters** – The most important factors for the vehicles are the suspension system, wheel condition, and wheel type. Most new heavy rail and light rail vehicles have relatively soft primary suspensions. However, a stiff primary suspension (vertical resonance frequency greater than 15 Hz) can result in higher levels of ground-borne vibration than soft primary suspensions. Vehicles, for which the primary suspension consists of rubber or neoprene around the axle bearing, usually have a very stiff primary suspension with a vertical resonance frequency greater than 40 Hz or more.

  Deteriorated wheel condition is another factor that increases vibration levels. It can be assumed that a new system has vehicles with wheels in good condition. When older vehicles are used on new track, it is important to consider the condition of the wheels, and it may be appropriate to include an adjustment for the wheel condition.

  Resilient wheels will reduce vibration levels at frequencies greater than the effective resonance frequency of the wheel. When this resonance frequency is relatively high, greater than 80 Hz, resilient wheels may only have a marginal effect on ground-borne vibration.

The adjustments in this category are not additive; apply the greatest applicable value only.

- **Track Conditions** – This category includes the type of rail (welded, jointed, or special trackwork), the track support system, and the condition of the rail. The base curves assume welded rail in good condition. Jointed rail causes higher vibration levels than welded rail and the increase depends on the condition of the joints.

  Wheel impacts at special trackwork, such as frogs at crossovers, create much higher vibration forces than typical track conditions. Because of the higher vibration levels at special trackwork, crossovers are the principal areas of vibration impact on new systems. Methods of mitigating the vibration impact include modifying the track support system, installing low-impact frogs, or relocating the crossover. Special track support systems such as ballast mats, high-resilience track fasteners, resiliently supported ties, and floating slabs have all been shown to be effective in reducing vibration levels.

  The condition of the running surface of the rails can strongly affect vibration levels. Factors such as corrugations, general wear, or mill scale on new track can cause vibration levels 5 to 15 dB higher than normal. Mill scale will typically wear away after some time in service, but the track must be ground to remove corrugations or to reduce the roughness from wear.

  Roadway surfaces in the rubber-tired vehicle base curve are assumed to be smooth. Rough washboard surfaces, bumps, or uneven expansion joints are the types of running surface defects that cause increased vibration levels over the smooth road condition.

  The adjustments in this category are not additive; apply the greatest applicable value only. If there are adjustments for vehicle parameters and the track is worn or corrugated, only include one adjustment.

2b. Apply path adjustments to the base curve using Table 6-12 and the descriptions below to account for the project-specific path characteristics.

Table 6-12 Path Adjustment Factors for Generalized Predictions of GB Vibration and Noise

Path Factor	Adjustment to Propagation Curve			Comment
Resiliently Supported Ties (Low-Vibration Track, LVT)	-10 dB			Resiliently supported tie systems have been found to provide very effective control of low-frequency vibration.
Track Structure (not additive, apply greatest value only)				
Type of Transit Structure	Relative to at-grade tie & ballast:			In general, the heavier the structure, the lower the vibration levels. Putting the track in cut may reduce the vibration levels slightly. Rock-based subways generate higher-frequency vibration.
	Elevated structure		-10 dB	
	Open cut		0 dB	
	Relative to bored subway tunnel in soil:			
	Station		-5 dB	
	Cut and cover		-3 dB	
	Rock-based		-15 dB	
Ground-borne Propagation Effects				
Geologic conditions that promote efficient vibration propagation	Efficient propagation in soil		+10 dB	Refer to the text for guidance on identifying areas where efficient propagation is possible.
	Propagation in rock layer	Dist.	Adjust.	The positive adjustment accounts for the lower attenuation of vibration in rock compared to soil. It is generally more difficult to excite vibrations in rock than in soil at the source.
		50 ft	+2 dB	
		100 ft	+4 dB	
		150 ft	+6 dB	
		200 ft	+9 dB	
Coupling to building foundation	Wood-Frame Houses		-5 dB	In general, the heavier the building construction, the greater the coupling loss.
	1-2 Story Masonry		-7 dB	
	3-4 Story Masonry		-10 dB	
	Large Masonry on Piles		-10 dB	
	Large Masonry on Spread Footings		-13 dB	
	Foundation in Rock		0 dB	

In addition to the comments in Table 6-12, use the following guidelines to select the appropriate adjustment factors.

- **Track Structure** – The weight and size of a transit structure affects the vibration radiated by that structure. In general, vibration levels are lower for heavier transit structures. Therefore, the vibration levels from a cut-and-cover concrete double-box subway can be assumed to be lower than the vibration from a lightweight concrete-lined bored tunnel.

  The vibration from elevated structures is lower than from at-grade track because of the mass and damping of the structure and the extra distance that the vibration must travel before it reaches the receiver. Elevated structures in AGT applications are sometimes designed to bear on building elements. This is a special case and may require detailed design considerations.

  The adjustments in this category are not additive; apply the greatest applicable value only.

- **Ground-Borne Propagation Effects – Geologic Conditions** – Although it is known that geologic conditions have a considerable effect on the vibration levels, it is rarely possible to develop more than a general understanding of the vibration propagation characteristics for a General Vibration Assessment. One of the challenges with identifying the cause of efficient propagation is the difficulty in determining whether higher than normal vibration levels are due to geologic conditions or due to special source conditions (e.g., rail corrugations or wheel flats).

  Some geologic conditions are repeatedly associated with efficient propagation. Shallow bedrock, less than 30 ft below the surface, is likely to have efficient propagation. Soil type and stiffness are also important factors in determining propagation characteristics. In particular, stiff, clayey soils, consolidated sand, gravel, and glacial till can be associated with efficient vibration propagation. Investigation of soil boring records can be used to estimate depth to bedrock and the presence of problem soil conditions.

  A conservative approach would be to use the 10-dB adjustment for efficient propagation for areas where efficient propagation is likely. However, this adjustment can greatly overstate the potential for vibration impact where efficient propagation is not present and should be applied using good judgment. Review available geological data and any complaint history from existing transit lines and major construction sites near the transit corridor to identify areas where efficient propagation is possible. If there is reason to suspect efficient propagation conditions, conduct a Detailed Vibration Analysis during the engineering phase and include vibration propagation tests at the areas with potential for efficient propagation.

- **Track Structure and Geologic Conditions** – **Examples**
  - **Subway**
    For a subway, determine if the subway will be founded in bedrock. Bedrock is considered to be hard rock. It is usually appropriate to consider soft siltstone and sandstone to be more like soil than hard rock. Whether a subway is founded in soil or rock can make a 15-dB difference in the vibration levels.

    When a subway structure is founded in rock, include the following Track Structure and Ground-borne Propagation Effects adjustments from Table 6-12:
    - Type of Transit Structure adjustment: Rock-based – 15 dB
    - Geologic Conditions adjustment: Propagation in rock layer for the appropriate distance.

    This adjustment increases with distance because vibration attenuates more slowly in rock than in the soil used as a basis for the reference curve.

- **At-grade** – When considering at-grade vibration sources, determine if the vibration propagation characteristics are typical or efficient. Efficient vibration propagation results in vibration levels approximately 10 dB higher than typical levels. This more than doubles the potential impact zone for ground-borne vibration.

- **Ground-Borne Propagation Effects – Coupling to Building Foundation** – Since annoyance from ground-borne vibration and noise is an indoor phenomenon, the effects of the building structure on the vibration must be considered. Wood-frame buildings, such as typical residential structures, are more easily excited by ground vibration than heavier buildings. In contrast, large masonry buildings with spread footings have a low response to ground vibration.

  When a building foundation is directly on the rock layer, there is no coupling loss due to the weight and stiffness of the building. Use the standard coupling factors based on building type if there is at least a 10-foot layer of soil between the building foundation and the rock layer.

2c. Apply receiver adjustments to the base curve using Table 6-13 and the descriptions below to account for the project-specific receiver characteristics. The data in Table 6-13 is applicable when the building structural features are known.

For more generic cases that do not have detailed information on individual buildings, use a conservative approach and apply the following adjustments to predict indoor vibration based on the outdoor vibration, instead of using the adjustments in Table 6-13:(43)(50)

- Light-weight, wood-frame construction 1st floor: +3 dB
- Light-weight, wood-frame construction 2nd and 3rd floors: +6 dB
- Large buildings: 0 dB
- Small masonry buildings: +3 dB

Table 6-13 Receiver Adjustment Factors for Generalized Predictions of GB Vibration and Noise

<table>
<tr><th>Receiver Factor</th><th colspan="2">Adjustment to Propagation Curve</th><th>Comment</th></tr>
<tr><td rowspan="2">Floor-to-floor attenuation</td><td>1 to 5 floors above grade</td><td>-2 dB/floor</td><td rowspan="2">This factor accounts for dispersion and attenuation of the vibration energy as it propagates through a building starting with the first suspended floor.*</td></tr>
<tr><td>5 to 10 floors above grade</td><td>-1 dB/floor</td></tr>
<tr><td>Amplification due to resonances of floors, walls, and ceilings</td><td colspan="2">+6 dB</td><td>The actual amplification will vary greatly depending on the type of construction. The amplification is lower near the wall/floor and wall/ceiling intersections.</td></tr>
</table>

* Floor-to-floor attenuation adjustments for the first floor assume a basement.

In addition to the comments in Table 6-13, use the following guidelines to select the appropriate adjustment factors. Note that receiver adjustments are additive.

- Vibration generally reduces in level as it propagates through a building. As indicated in Table 6-13, a 1- to 2-decibel attenuation per floor is typically appropriate.
- Resonances of the building structure, particularly the floors, will cause some amplification of the vibration. Consequently, for a wood-frame structure, the building-related adjustments nearly cancel out. Example: All adjustments for the first floor assuming a basement are: -5 dB for the coupling loss; -2 dB for the propagation from the basement to the first floor; and +6 dB for the floor amplification. The total adjustment in this case is -1 dB.

2d. Apply adjustments to the final adjusted curve using Table 6-14 and the descriptions below to convert ground-borne vibration levels to ground-borne noise levels.

Table 6-14 Conversion to Ground-borne Noise

Conversion to Ground-borne Noise			
Noise Level in dBA	Peak frequency of ground vibration:		Use these adjustments to estimate the A-weighted sound level given the average vibration velocity level of the room surfaces. See text for guidelines for selecting low-, mid-, or high-frequency characteristics. Use the high-frequency adjustment for subway tunnels in rock or if the dominant frequencies of the vibration spectrum are known to be 60 Hz or greater.
	Low frequency (<30 Hz)	-50 dB	
	Mid Frequency (peak 30 to 60 Hz)	-35 dB	
	High frequency (>60 Hz)	-20 dB	

Estimate the levels of radiated noise using the average vibration amplitude of the room surfaces (floors, walls, and ceiling), and the total acoustical absorption in the room.

The un-weighted sound pressure level is approximately 5 dB(37)(43) less than the vibration velocity level when the velocity level is referenced to 1×10^{-6} inches/sec; but for a better estimate, it is necessary to consider general frequency ranges. Since ground-borne noise is A-weighted, the adjustments vary by frequency range, as described below. See Appendix B.1.4.1 for more information on A-weighting.

To select the appropriate adjustment, classify the frequency characteristics according to the guidelines below.

- **Low Frequency (<30 Hz)** – Low-frequency vibration characteristics can be assumed for the following conditions:
    - Subways surrounded by cohesionless sandy soil
    - Vibration isolation track support systems
    - Most surface track

- **Mid Frequency (peak 30 to 60 Hz)** – The mid-frequency vibration characteristic can be assumed for the following conditions:
    - Subways, unless other information indicates that one of the other assumptions is appropriate,
    - Surface track when the soil is very stiff with high clay content

- **High Frequency (>60 Hz)** – High-frequency characteristics can be assumed for the following conditions:
    - Subways with the transit structure founded in rock
    - Subways, when there is very stiff, clayey soil

Step 3: Inventory of Vibration Impact

Take inventory of vibration-sensitive land uses with impact and determine if a Detailed Vibration Analysis is required.

Compare the projected vibration levels, including all appropriate adjustments in Section 6.4, Step 2, to the criteria to determine if impact from ground-borne vibration or noise is likely. Note that for any transit mode, variation in vibration levels under apparently similar conditions is not uncommon. In the General Vibration Assessment, it is preferable to make a conservative assessment of the impact and include buildings that may ultimately not be subject to impact.

The standard curves in Section 6.4, Step 1, represent the upper range of vibration levels from well-maintained systems. Although actual levels fluctuate widely, it is rare that ground-borne vibration will exceed these curves by more than 1 or 2 dB unless there are extenuating circumstances such as wheel- or running-surface defects. However, because actual levels of ground-borne vibration will sometimes differ substantially from the projections, use the following guidelines to interpret vibration impact:

- **Projected vibration is below the impact threshold** – Vibration impact is unlikely, and the environmental document should state this.

- **Projected ground-borne vibration is 0 to 5 dB greater than the impact threshold** – There is a strong chance that actual ground-borne vibration levels will be below the impact threshold. The environmental document should report impact at these locations as exceeding the applicable threshold, present possible mitigation measures and costs, and commit to conducting more detailed studies to refine the vibration impact analysis during the engineering phase. During the Detailed Vibration Analysis, determine appropriate mitigation, if necessary. A site-specific Detailed Vibration Analysis may show that vibration impacts will not occur and control measures are not needed.

- **Projected ground-borne vibration is 5 dB or greater than the impact threshold** – Vibration impact is probable and Detailed Vibration Analysis must be conducted during the engineering phase to determine appropriate vibration control measures. The environmental document should report impact at these locations as exceeding the applicable threshold, present possible mitigation measures and costs, and commit to conducting more detailed studies to refine the vibration impact analysis during the engineering phase. During the Detailed Vibration Analysis, determine appropriate mitigation, if necessary. A site-specific, Detailed Vibration Analysis may show that very costly vibration mitigation must be incorporated into the project to eliminate the impacts.

FTA recommends the reporting of a vibration level as a single value and not as a range, as ranges tend to confuse the interpretation of impact.

Express the results of the General Vibration Assessment in terms of an inventory with the following components:

- Include all vibration-sensitive land uses as identified in the Vibration Screening Procedure.
- Organize the inventory according to the categories described in Table 6-8.
- Include information on potentially feasible mitigation measures to reduce vibration to acceptable levels based on the generalized reduction estimates provided in this section. To be considered feasible, the measure or combination of measures must provide at least a 5-dB reduction of the vibration levels and be reasonable in terms of cost.

These potential mitigation measures are considered preliminary. Final vibration mitigation measures can only be specified after a Detailed Vibration Analysis has been done; see Section 6.5 for more information. Vibration control is frequency-dependent; therefore, specific recommendations of vibration control measures can only be made after evaluating the frequency characteristics of the vibration.

Example 6-1 General Vibration Assessment – LRT

General Vibration Assessment for an LRT project

The hypothetical project is a LRT system that operates at 40 mph on at-grade, ballast and tie track with welded rail. The first floor of houses is at 125 ft from the LRT tracks and there is efficient propagation through the soil. The houses are constructed with wood frames. The houses will be exposed to 260 train passbys per day. Calculate the ground-borne vibration and assess for impact.

Select Base Curve for Ground Surface Vibration

Determine the appropriate base curve and the RMS velocity level (L_v).

According to Table 6-9, the Rapid Transit or Light Rail Vehicles curve is appropriate.

$L_v = 65\,VdB$ at 125 ft for this curve at 50 mph

Apply Adjustments

Apply the appropriate source adjustments using Table 6-11.

$$Source\ Speed\ Adjustment = 20\log\left(\frac{40}{50}\right) = -1.9\ dB$$
$$L_v = 65 - 1.9 = 63.1\ VdB$$

Apply the appropriate path adjustments using Table 6-12.

$$Efficient\ propagation = +10\ dB$$
$$Coupling\ to\ building\ foundation\ (wood\ frame) = -5\ dB$$
$$L_v = 63.1 + 10 - 5 = 68.1\ VdB$$

Apply the appropriate receiver adjustments using Table 6-13.

$$Amplification\ due\ to\ resonance\ of\ floor = +6\ dB$$
$$First\ floor\ attenuation = -2\ dB$$
$$L_v = 68.1 + 6 - 2 = 72.1\ VdB$$

Assess for Impact
Because there are more than 70 events per day, this project is in the Frequent Events category (Table 6-2). For category 2 land uses (residences) with frequent events, the impact criteria is 72 VdB (Table 6-3). Therefore, according to the General Vibration Assessment, there is potential for impact and a Detailed Vibration Analysis should be completed.

6.5 Evaluate Impact: Detailed Vibration Analysis

Evaluate for impact using the Detailed Vibration Analysis procedure, if appropriate (Section 6.1).

The goal of the Detailed Vibration Analysis is to use all available tools to develop accurate projections of potential ground-borne vibration impact and when necessary, to design mitigation measures. A Detailed Vibration Analysis requires developing estimates of the frequency components of the vibration signal, usually in terms of 1/3-octave-band spectra. The analytical techniques for solving vibration problems are complex, and the technology continually advances. Therefore, the approach presented in this section focuses on the key steps for these analyses. The key elements of the Detailed Vibration Analysis procedure and recommended steps are described below.

The methods in this section generally assume a steel-wheel/rail system. The procedures could be adapted to bus systems. However, this is rarely necessary because vibration impact is very infrequent with rubber-tired transit.

In general, when situations arise that are not explicitly covered in the Detailed Vibration Analysis, professional judgment may be used to extend these methods to cover these unique cases, when appropriate. Appendix G provides information on developing and using non-standard modeling procedures.

Step 1: Characterize Existing Vibration Conditions

Conduct measurements to survey and document the existing vibration conditions.

In contrast to noise impact analysis, the existing ambient vibration is not required to assess vibration impact in most cases; but, it is important to document general background vibration in the project corridor. Because the existing environmental vibration is usually below human perception, a limited vibration survey is sufficient even for a Detailed Vibration Analysis.

It is particularly valuable to survey vibration conditions at sensitive locations for the following reasons:

- To obtain valuable information on the true sensitivity of the activity to external vibration and obtain a reference condition under which vibration is not problematic.
- To document that existing vibration levels are above or below the normal threshold of human perception for the existing condition.
- To document levels of vibration created by existing rail lines. If vibration from an existing rail line is higher than the proposed train, there may not be impact even if the standard impact criteria are exceeded.
- To use existing vibration sources to characterize propagation. Existing vibration sources such as freight trains, industrial processes, quarrying operations, or normal traffic can be used to characterize vibration propagation. Carefully designed and performed measurements may eliminate the need for more complex propagation tests. See Appendix G for information on using non-standard modeling procedures.
- To identify the potential for efficient vibration propagation. If a measurement site has existing vibration approaching the range of human perception (e.g., the maximum vibration velocity levels are greater than about 65 VdB), then this site should be carefully evaluated for the possibility of efficient vibration propagation.

Conduct measurements to characterize existing vibration conditions. The goal of most ambient vibration measurements is to characterize the rms vertical vibration velocity level at the ground surface. In almost all cases, it is sufficient to measure only vertical vibration and ignore the transverse components of the vibration. Although transverse components(51) can transmit vibration energy into a building, the vertical component typically dominates.

1a. Choose Measurement Locations – Conduct outdoor and/or indoor measurements to characterize existing vibration conditions, as appropriate, for the project. Although ground-borne vibration is almost exclusively a problem inside buildings, it is generally recommended to perform measurements outdoors because equipment inside the building may cause more vibration than exterior sources. Additionally, the building structure and the resonances of the building can have strong effects on the vibration that are difficult to predict. It can also be important to measure and document those indoor sources of vibration. These indoor sources may cause vibration greater than that due to external sources like street traffic or aircraft overflights. When measuring (indoor) floor vibration, take measurements near the center of a floor span where the vibration amplitudes are the highest.

1b. Measurement Considerations

- **Site selection** – Selecting sites for an ambient vibration survey requires good judgment. Sites selected to characterize a transit corridor should be distributed along the entire project where potential for impacts have been identified and should be representative of the types of vibration environments found in the corridor. This would commonly include:
  - Measurements in quiet, residential areas removed from major traffic arterials to characterize low-ambient vibration areas;
  - Measurements along major traffic arterials and highways or freeways to characterize high-ambient vibration areas;
  - Measurements in any area with vibration-sensitive activities; and
  - Measurements at any major existing source of vibration such as railroad lines.

- **Transducer placement** – Place the transducers near the building setback line. For ambient measurements along railroad lines, it is recommended to include:
  - Multiple sites at several distances from the rail line at each site, and
  - 4 to 10 train passbys for each test.

  Because of the irregular schedule for freight trains and the low number of operations each day, it is often impractical to perform tests at more than two or three sites along the rail line or to measure more than two or three passbys at each site.

  Rail type and condition strongly affect the vibration levels. Consequently, it is important to inspect the track to locate any switches, bad rail joints, corrugations, or other factors that could be responsible for higher than normal vibration levels. Locations with these kinds of irregularities should be represented in addition to locations with rail in better condition.

- **Transducer mounting methods** – The way a transducer is mounted can affect the measured levels of ground-borne vibration.
  - Straightforward methods of mounting transducers on the ground surface or on pavement are adequate for vertical vibration measurements for the frequencies of concern for ground-borne vibration (less than about 200 Hz).
  - Quick-drying epoxy, clay, or beeswax can be used to mount transducers to smooth paved surfaces or metal stakes driven into the ground.
  - Rough concrete or rock surfaces require special mountings. One approach is to use a liberal base of epoxy to attach small aluminum blocks to the surface, and then mount the transducers on the aluminum blocks.
  - When in doubt, review the specific transducer documentation and discuss additional mounting guidance with the transducer manufacturer.

1c. Existing Vibration Characterization – The appropriate methods of characterizing ambient vibration are dependent on the type of information required for the analysis. Consider the following when characterizing the existing vibration:

- **Ambient vibration** – Ambient vibration is usually characterized with a continuous 10- to 30-minute measurement of vibration. The rms velocity level of the vibration velocity level over the measurement period provides an indication of the average vibration energy. The rms velocity level over the measurement period is typically equivalent to a long averaging time rms level.

- **Specific events** – Characterize specific events such as train passbys by the rms level over the time that the train passes by. If the locomotives produce vibration levels more than 5 dB higher than the passenger or freight cars, obtain a separate rms level for the locomotives. The locomotives can usually be characterized by the L_{max} during the train passby. The rms averaging time or time constant should be 1 second when determining L_{max}. In some cases, it may be adequate to characterize the train passby using L_{max}, which is simpler to obtain than the rms averaged over the entire train passby.

- **Spectral analysis** – Perform a spectral analysis of vibration propagation data. For example, if vibration transmission of the ground is suspected of having particular frequency characteristics, use 1/3-octave band charts to describe vibration behavior. Narrowband spectra also can be valuable, particularly for identifying discrete frequency components and designing specific mitigation measures.

  Note that it is preferred to characterize existing vibration in terms of the rms velocity level instead of the peak PPV, which is commonly used to monitor construction vibration. As discussed in Section 5.1, rms velocity is considered more appropriate than PPV for describing human response to building vibration.

Step 2: Estimate Vibration Impact

Estimate ground-borne vibration and noise at sites where significant impact is probable and assess for impact.

Predicting ground-borne vibration associated with a transportation project continues to be a developing field. Because ground-borne vibration is a complex phenomenon that is difficult to model and predict accurately, most projection procedures that have been used for transit projects rely on empirical data.

The procedure described in this section is based on site-specific tests of vibration propagation. This procedure was developed under a FTA-funded research contract(52) and is recommended for detailed evaluations of ground-borne vibration. Other approaches to a prediction procedure, such as finite element methods, can be used. See Appendix G for information on using non-standard modeling procedures.

Overview of Prediction Procedure – This procedure was developed to allow the use of data collected in one location to accurately predict vibration levels in another site where the geologic conditions may be completely different. The procedure is based on transfer mobility. Transfer mobility is the complex velocity response produced by a point force as a function of frequency. It represents the relationship between a vibration source that excites the ground and the resulting vibration of the ground surface. It is a function of both frequency and distance from the source. The analyses in this manual focus on transfer mobility magnitude, which is the magnitude for the velocity relative to the force without reference to phase. The transfer mobility level is the level in decibels relative to 1E-6 in/lb-s.

The transfer mobility measured at an existing transit system is used to normalize ground-borne vibration data and remove the effects of geology. The normalized vibration is referred to as the force density. Force density is the force per root distance along the track in lb/ft$^{1/2}$. The force density can be combined with transfer mobility measurements at vibration-sensitive sites along a new project to develop projections of future ground-borne vibration.

The transfer mobility between two points completely defines the composite vibration propagation characteristics between the two points. In most practical cases, receivers are close enough to the train tracks that the vibration cannot be considered as originating from a single point. Therefore, the vibration source must be modeled as a line-source. Consequently, the point transfer mobility must be modified to account for a line-source. The subsequent line-source transfer mobility is given in units of decibels relative to 1e-6 in/s/lb/sqrt(ft).

The prediction procedure considers ground-borne vibration to be divided into several basic components described below and shown in Figure 6-5.

- **Excitation Force (Force Density)** – The vibration energy is created by oscillatory and impulsive forces. Steel wheels rolling on smooth steel rails create random oscillatory forces. When a wheel encounters a discontinuity such as a rail joint, an impulsive force is created. The force excites the transit structure, such as the subway tunnel or the ballast for at-grade track.

  In the prediction method, the combination of the actual force generated at the wheel/rail interface and the vibration of the transit structure are usually combined into an equivalent force density level. The force density level is the level in decibels of the force density relative to 1 lb/ft$^{1/2}$ and describes the force that excites the soil/rock surrounding the transit structure.

- **Vibration Propagation (Transfer Mobility)** – The vibration of the transit structure causes vibration waves in the soil that propagate away from the transit structure. The vibration energy can propagate through the soil or rock in a variety of wave forms. All ground vibration includes shear and compression waves. Rayleigh waves [(49)] are also created and propagate along the ground surface. These Rayleigh waves can be a major carrier of vibration energy. The mathematical modeling of vibration is complicated when there are soil strata with different elastic properties, which is common. As indicated in Figure 6-5, the propagation through the soil/rock is modeled using the transfer mobility, which is usually determined experimentally.

The combination of the force density level and the transfer mobility is used to predict the ground- surface vibration. This is the major difference from the General Vibration Assessment, which generalizes estimates of the ground-borne vibration.

- **Building Vibration** – When the ground vibration excites a building foundation, it sets the building into vibratory motion and vibration waves propagate throughout the building structure. The interaction between the ground and the foundation causes some reduction in vibration levels. The amount of reduction is dependent on the mass and stiffness of the foundation. The more massive the foundation, the lower the response to ground vibration. As the vibration waves propagate through the building, they can create vibration that can be felt and cause windows and household items to rattle.

- **Audible Noise** – In addition to vibration that can be felt, the vibration of room surfaces radiates low-frequency sound that may be audible. The sound level is affected by the amount of acoustical absorption in the receiver room.

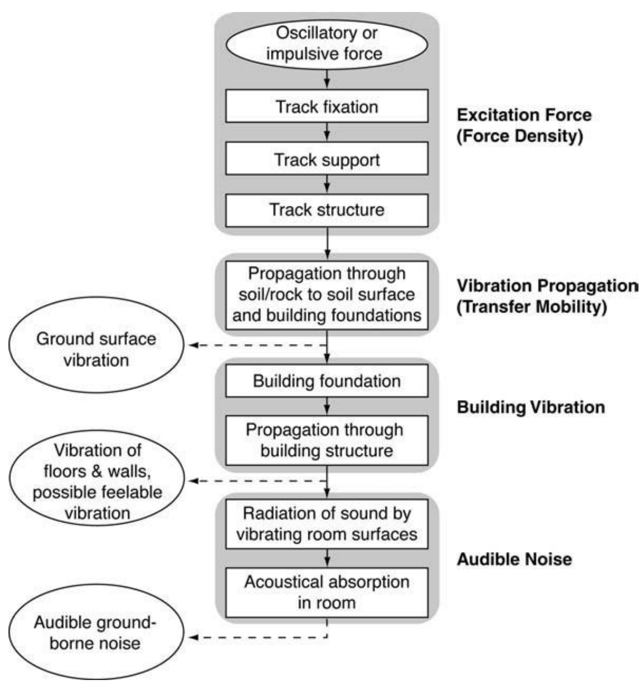

Figure 6-5 Ground-Borne Vibration and Noise Model

A fundamental assumption of the prediction approach outlined in this section is that the force density, transfer mobility, and the building coupling to the ground are all independent factors. The following equations are the basis for the prediction procedure, where all of the quantities are one-third octave band spectral levels in decibels with consistent reference values:

$$L_v = FDL + LSTM + C_{build} \quad \textbf{Eq. 6-5}$$

$$L_A = L_v + K_{rad} + K_{A-wt} \quad \textbf{Eq. 6-6}$$

where:

L_v = rms vibration velocity level in VdB
FDL = force density level in dB for a line vibration source such as a train
$LSTM$ = line-source transfer mobility level in dB from the tracks to the sensitive site
C_{build} = adjustments to account for ground-building foundation interaction and attenuation of vibration amplitudes as vibration propagates through buildings
L_A = A-weighted sound level
K_{rad} = adjustment to account for conversion from vibration to sound pressure level including accounting for the amount of acoustical absorption inside the room. A value of -5 dB can be used for K_{rad} for typical residential rooms when the decibel reference value for L_v is 1 micro in/sec [37][50]
K_{A-wt} = A-weighting adjustment at the 1/3-octave band center frequency

All of the quantities given above are functions of frequency, and the standard approach is to develop projections on a 1/3-octave band basis using the average values for each 1/3-octave band. The end results of the analysis are the 1/3-octave band spectra of the ground-borne vibration and the ground-borne noise.

The spectra are then compared to the vibration criteria for the Detailed Vibration Analysis. The A-weighted ground-borne noise level can be calculated from the vibration spectrum and compared to the criteria. This more detailed approach differs from the General Vibration Assessment, where the overall vibration velocity level and A-weighted sound level are predicted without any consideration of the particular frequency characteristics of the propagation path.

The key steps in obtaining quantities for Eq. 6-5 and Eq. 6-6 are presented in the following steps and include:

Step 2a. Estimate force density
Step 2b. Measure the point-source transfer mobility
Step 2c. Estimate line-source transfer mobility
Step 2d. Project ground-borne vibration and ground-borne noise

2a. Estimate Force Density – The estimate of force density can be based on previous measurements or a special test program can be designed to measure the force density at an existing facility.

If no suitable measurements are available, conduct testing at a transit facility with equipment similar to the planned vehicles. Adjustments for factors such as train speed, track support system, and vehicle suspension may be needed to match the force density to the conditions at a specific site. Review the report

"State-of- the-Art Review: Prediction and Control of Ground-Borne Noise and Vibration from Rail Transit Trains" [41] for examples of appropriate adjustments.

Force density is not a quantity that can be measured directly; it must be inferred from measurements of transfer mobility and train vibration at the same site. To derive force density, the best results are achieved by deriving line-source transfer mobility from a line of impacts. The standard approach is to average the force density from measurements at three or more positions at one site. If feasible, it is recommended to take measurements at more than one site and at multiple speeds.

If no suitable measurements are available, see Steps 2b and 2c for guidelines on obtaining line-source transfer mobility.

The force density for each 1/3-octave band is as follows:

$$FDL = L_v - LSTM \qquad \textbf{Eq. 6-7}$$

where:

FDL = force density level in dB

L_v = measured train ground-borne vibration level in VdB

$LSTM$ = line-source transfer mobility level in dB

Figure 6-6 shows example trackbed force densities in decibels relative to 1 $lb/(ft)^{1/2}$. These force densities were developed from measurements of vibration from heavy and LRT vehicles and represent an incoherent line of vibration force equal to the length of transit trains. This figure provides a comparison of the vibration forces from heavy commuter trains and LRT vehicles with different types of primary suspensions, illustrating the range of vibration forces commonly experienced in a transit system. A force density of a vehicle includes the characteristics of its track support system at the measurement site. Adjustments must be applied to the force density to account for differences between the facility where the force density was measured and the new system being analyzed.

Figure 6-7 shows typical force densities for rail transit vehicles at 40 mph on ballast and tie tracks, which are approximately within the tolerances shown in Figure 6-6. The force densities should be applied very carefully for other track types and speeds. The embedded tracks, although considerably stiffer than ballast and tie tracks, are expected to show similar force density levels.[53] The curves in Figure 6-7 should also be applied with caution for newer generations of light rail vehicles as well as vehicles that utilize direct fixation tracks. The preferred approach for vibration predictions would be to perform force density measurements at a system with vehicles and operations that are similar to those of the future project.

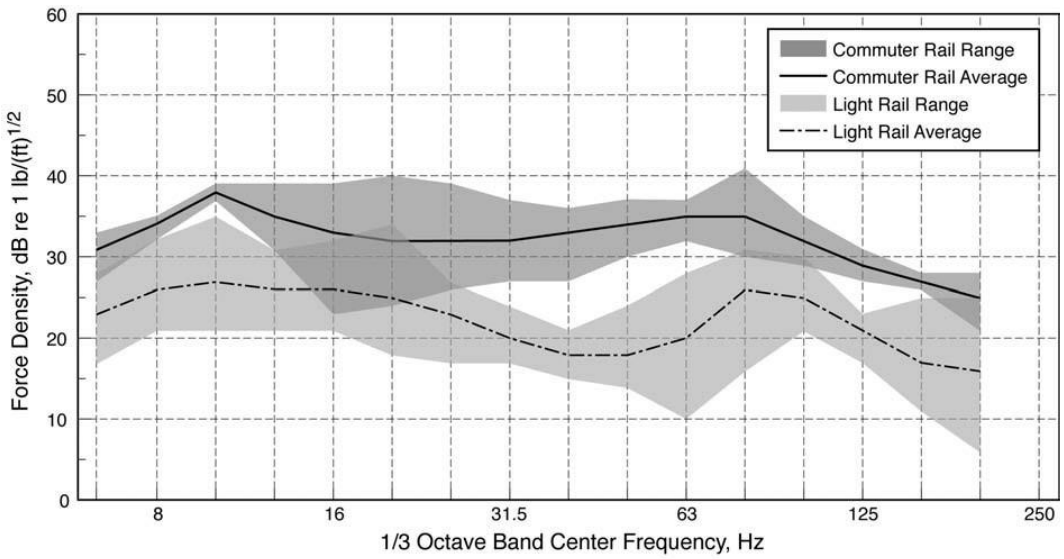

Figure 6-6 Typical Force Densities for Rail Transit Vehicles, 40 mph

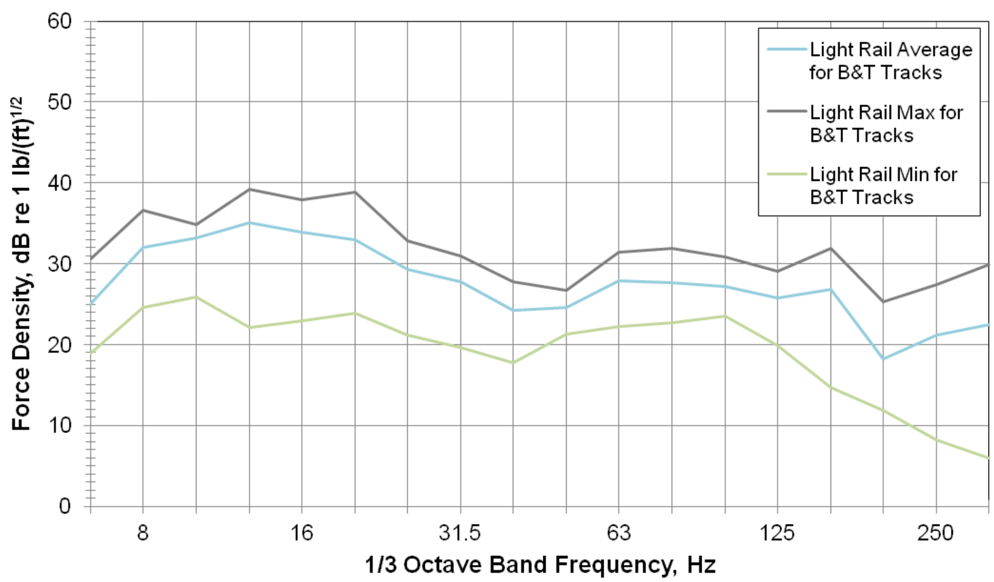

Figure 6-7 Typical Force Densities for LRT Vehicles, 40 mph

2b. Measure Point-Source Transfer Mobility – Using the appropriate instrumentation, measure point-source transfer mobility for sources with short lengths, such as buses or single car vehicles or columns supporting elevated structures. For longer vehicles, see Section 2c for a discussion of measuring line-source transfer mobilities.

The test procedure to measure point-source transfer mobility consists of impacting the ground by dropping a heavy weight and measuring the force into the ground and the response at several distances from the impact. Other excitation sources may include swept sine, sine-dwell, random vibration, and maximum length sequence. The goal of the test is to create vibration pulses that travel from the source to the receiver using the same path that will be taken by the transit system vibration.

Figure 6-8 illustrates the field procedure for measuring both at-grade and subway testing of transfer mobility. A weight is dropped from a height of 3 to 4 ft onto a force transducer. The responses of the force and vibration transducers are recorded on a multichannel recorder for later analysis in the laboratory. An alternative approach is to set up the analysis equipment in the field and capture the signals directly. This complicates the field testing, but eliminates the laboratory analysis of recorded data.

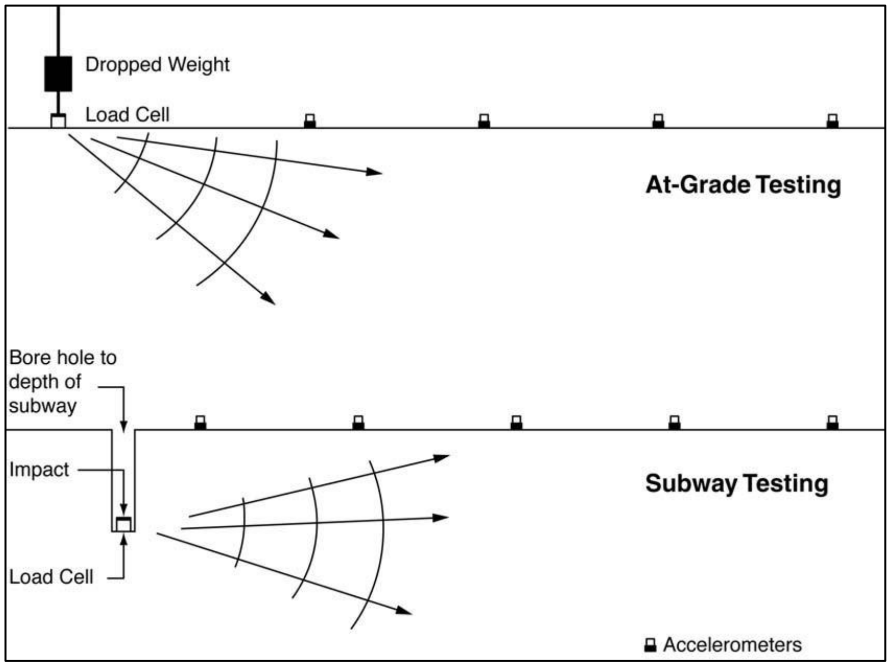

Figure 6-8 Test Configuration for Measuring Transfer Mobility

When the procedure is applied to subways, the force must be located at the approximate depth of the subway. This is done by drilling a bore hole and locating the force transducer at the bottom of the hole. The tests are usually performed while the bore holes are drilled to allow for the use of the soil-sampling equipment on the drill rig for the transfer mobility testing. The force transducer is attached to the bottom of the drill string and lowered to the bottom of the hole. A standard soil sampling hammer is used to excite the ground; typically, a 140-pound weight is dropped 18 inches onto a collar that is attached to the drill string. The force transducer must be capable of operating under water if the water table is near the surface or a slurry drilling process is used.

Standard signal-processing techniques are used to determine the transfer function (frequency response function) between the exciting force and the resultant ground-borne vibration. Numerical regression methods are used to combine a number of two-point transfer functions into a smooth point-source transfer mobility level that represents the average vibration propagation characteristics of a site as a function of both distance from the source and frequency. The transfer mobility level is usually expressed in terms of a group of 1/3-octave band transfer mobility levels. Figure 6-9 is an example of point-source transfer mobility levels from a series of tests at the Transportation Technology Center in Pueblo, Colorado.(50)(54)(55)(56)(57)

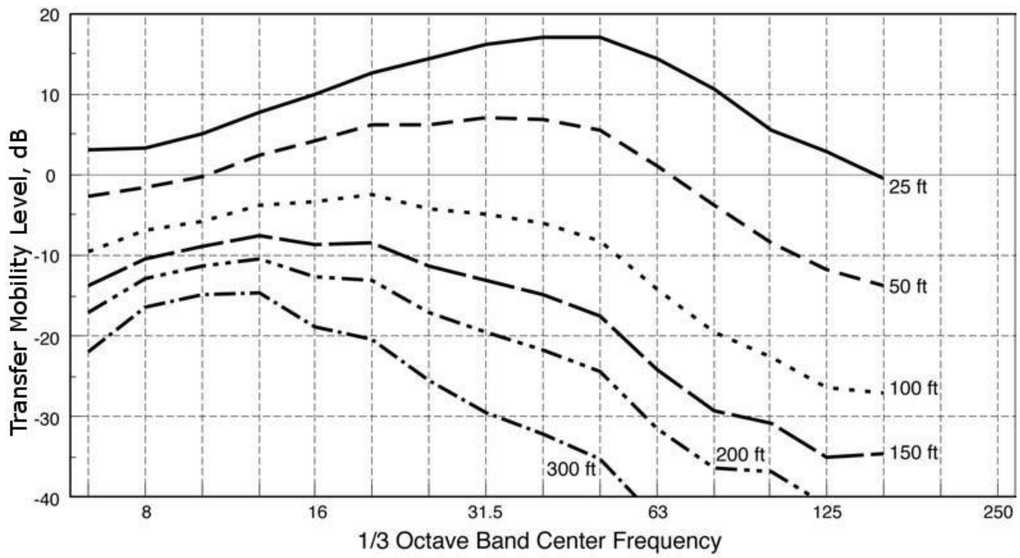

Figure 6-9 Example of Point-Source Transfer Mobility

Instrumentation

Performing a transfer mobility test requires specialized equipment, which is generally available from commercial sources. Typical instrumentation for field-testing and laboratory analysis of transfer mobility is shown in Figure 6-10.

A load cell can be used as the force transducer. The force transducer should be capable of impact loads of 5,000 to 50,000 pounds depending on the hammer used for the impact. For borehole testing, the load cell must be hermetically sealed and capable of being used at the bottom of a 30- to 100-foot-deep hole partially filled with water.

Either accelerometers or geophones can be used as the vibration transducers. Geophones should be carefully mounted so that they are vertical. The requirement is that the transducers with the associated amplifiers be capable of accurately measuring levels of 0.0001 in/sec at 40 Hz and have a flat frequency response from 6 Hz to 400 Hz. Data should be acquired with a digital acquisition system with a flat frequency response over the range of 6 to 400 Hz.

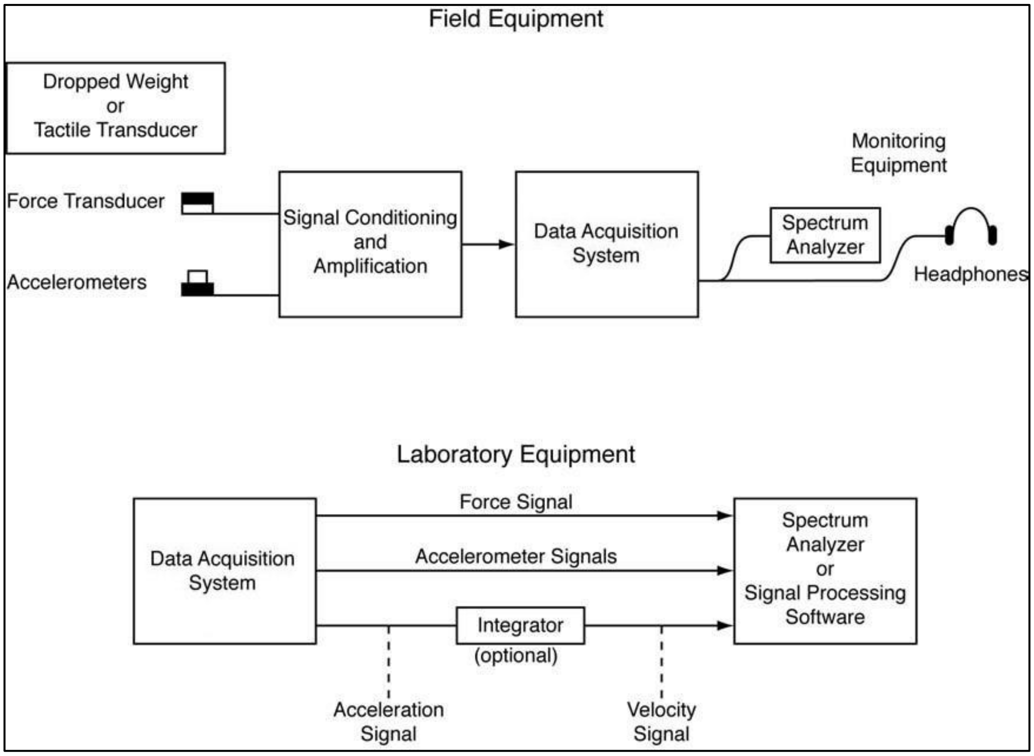

Figure 6-10 Equipment Required for Field Testing and Laboratory Analysis

A narrowband spectrum analyzer or signal-processing software can be used to calculate the transfer function and coherence between the force and vibration data. The analyzer must be capable of capturing impulses from at least two channels to calculate the frequency spectrum of the transfer function between the force and vibration channels. All transfer functions should include the average of at least 20 impulses. Time averaging of the impulses will provide substantial signal enhancement, which is usually required to accurately characterize the transfer function. Signal enhancement is particularly important when the vibration transducer is more than 100 ft from the impact.

Alternative methods of determining transfer mobility may be used, provided that these techniques have been demonstrated to provide the same results as the conventional weight-drop method over the frequency range of 6 Hz to 400 Hz. See Appendix G for information on developing and using non-standard procedures. These methods may include using other impulse-response measurement systems involving the use of shakers or electro-mechanical actuators, stimuli such as sweeps or maximum length sequences (MLS), and various signal processing techniques. A forthcoming ANSI Standard will describe in detail the procedures, methodologies, and reporting requirements for performing ground-borne vibration propagation measurements.

The transfer function can be calculated with either a spectrum analyzer or signal-processing software. Note that transfer functions should include the average of at least 20 impulses. Specialized multi-channel spectrum analyzers have built-in capabilities for computing transfer functions and are computationally efficient. However, signal-processing software can offer more flexibility in analyzing data signals and allows the use of different digital signal processing methods. Typical measurement programs involve acquisition of data in the field and later processing of the information in a laboratory. However, recent advances in instrumentation and signal-processing software allow data to be collected and analyzed while in the field.

2c. Estimate Line-Source Transfer Mobility – Estimate line-source transfer mobility for long sources such as multi-car trains. Line-source transfer mobilities are used to normalize measured vibration velocity levels from train passbys and to obtain force density. Two different approaches can be used to develop estimates of line-source transfer mobility. The first consists of using lines of transducers and the second consists of a line of impact positions.

Option A: Lines of Transducers – Develop line-source transfer mobility curves from tests using one or more lines of transducers as shown in Figure 6-11 and described below.

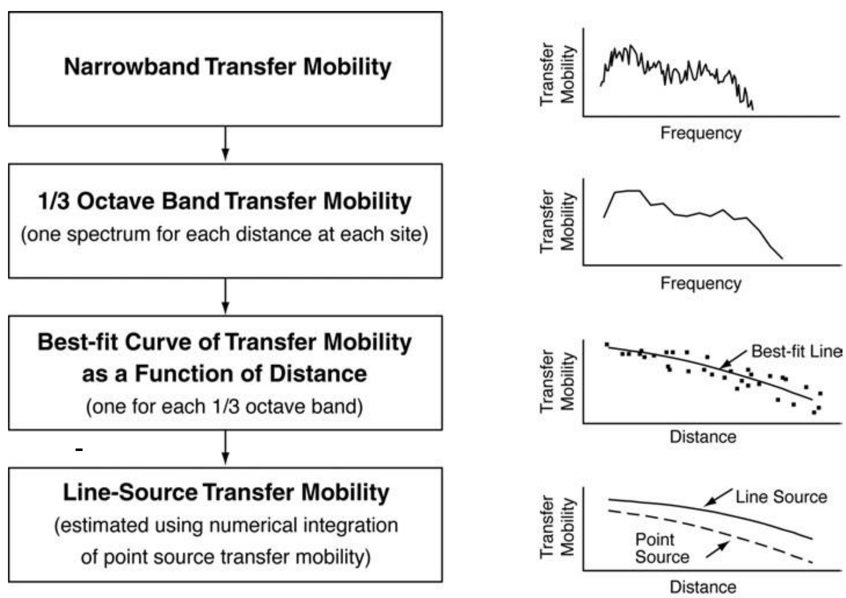

Figure 6-11 Analysis of Transfer Mobility

Ai. Obtain the narrowband transfer function between source and receiver at each measurement position. There should be a minimum of four distances in any test line. Because of the possibility of local variations in propagation characteristics, two or more lines should be used to characterize a site if possible. A total of 10 to 20 transducer positions are often used to characterize a site.

Aii. Calculate the equivalent 1/3-octave band transfer functions, generally between 6 and 400 Hz. This reduces each spectrum to 15 numbers. As shown in Figure 6-11, the 1/3-octave band spectrum is much smoother than the narrowband spectrum.

Aiii. Calculate a best-fit curve of transfer mobility as a function of distance for each 1/3-octave band. When analyzing a specific site, the best-fit curve will be based on 10 to 20 points. Up to several hundred points could be used to determine average best-fit curves for a number of sites.

Aiv. Apply the best-fit curve to the vibration sources. The 1/3-octave band best-fit curves can be directly applied to point vibration sources. Buses can usually be considered point-sources, as can columns supporting elevated structures. However, for a line vibration source such as a train, numerical integration must be used to calculate the equivalent line-source transfer mobility. The numerical integration procedures are detailed in the TRB publication: "A Prediction Procedure for Rail Transportation Ground-Borne Noise and Vibration."[(50)]

Option B: Line of Impulses – This second procedure for estimating line-source transfer mobility is best for detailed assessment of specific vibration paths or specific buildings and is a more direct approach.

Bi. Measure multiple point-source transfer mobilities according to the procedures in Step 2b above. The vibration transducers are placed at specific points of interest and a line of impacts is used. For example, a 150-foot train might be represented by a line of 11 impact positions along the track centerline at 15-foot intervals (Figure 6-12).

Bii. Sum the point-source results using Simpson's rule[xiii] for numerical integration to calculate the line-source transfer mobility.

Figure 6-13 shows an example of line-source transfer mobilities that were derived from the point-source transfer mobilities shown in Figure 6-9.

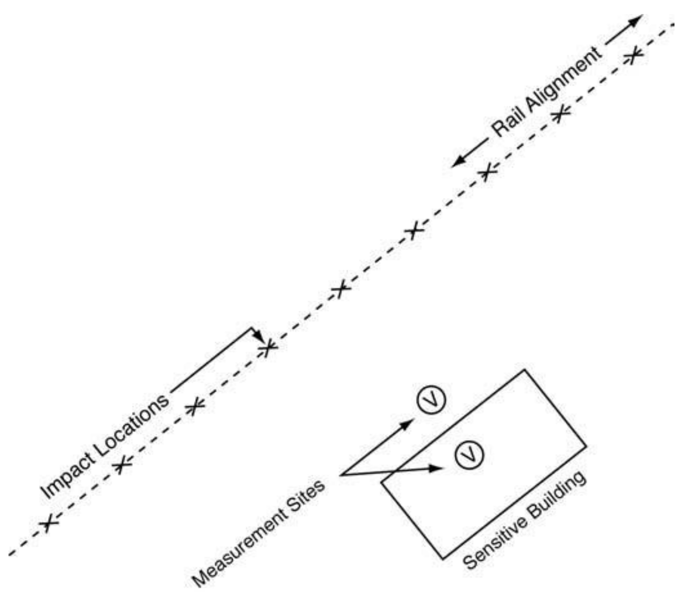

Figure 6-12 Schematic of Transfer Mobility Measurements Using a Line of Impacts

[xiii] Simpson's rule is a method for approximating integrals.

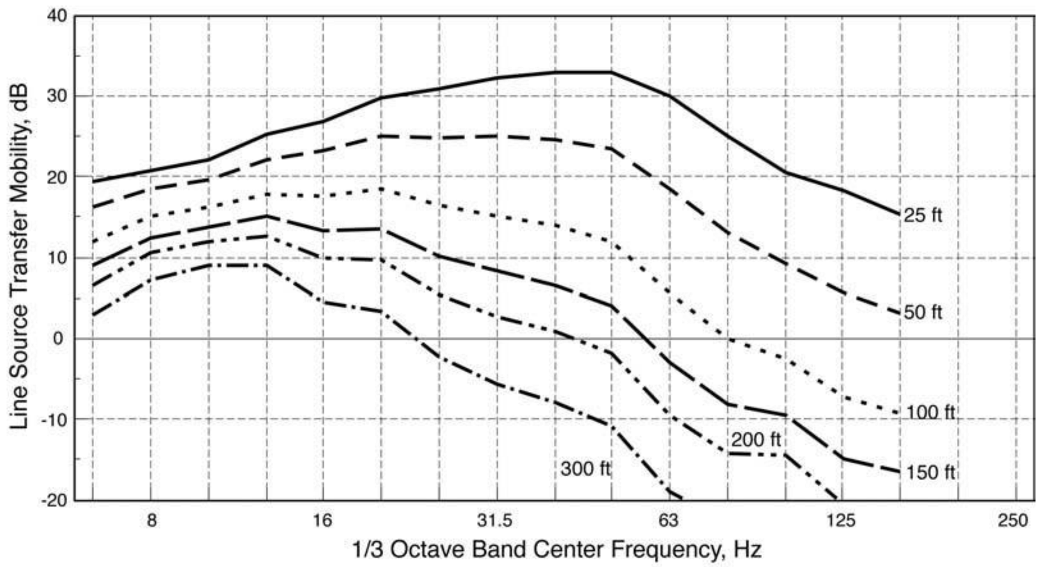

Figure 6-13 Example of Line-source Transfer Mobility

2d. Project Ground-Borne Vibration and Noise – Combine force density and line-source transfer mobility to project ground-borne vibration. Then, apply adjustment factors to estimate the building response to the ground-borne vibration and to estimate the A-weighted sound level inside buildings.

The propagation of vibration from the building foundation to the receiver room is very complex and dependent on the specific design of the building. Detailed evaluation of the vibration propagation would require extensive use of numerical procedures such as the finite element method. Such a detailed evaluation is generally not practical for individual buildings considered in this manual. If the detailed features of the individual buildings are available, the recommended procedure is to estimate the propagation of vibration through a building and the radiation of sound by vibrating building surfaces using simple empirical or theoretical models. The recommended procedures are outlined in the Handbook of Urban Rail Noise and Vibration Control.(44) The approach consists of adding the following adjustments to the 1/3-octave band spectrum of the projected ground-borne vibration:

- **Building response or coupling loss** – This adjustment represents the change in the incident ground-borne vibration due to the presence of the building foundation. The adjustments described in the handbook (44) are shown in Figure 6-14. Note that the correction is zero when estimating basement floor vibration or vibration of at-grade slabs. Measured values may be used in place of these generic adjustments.

- **Transmission through the building** – The vibration amplitude typically decreases as the vibration energy propagates from the foundation through the remainder of the building. The general assumption is that vibration attenuates by 1 to 2 dB for each floor.

- **Floor resonances** – Vibration amplitudes will be amplified because of resonances of the floor/ceiling systems. For a typical wood-frame residential structure, the fundamental resonance is usually in the 15 to 20 Hz range. Reinforced-concrete slab floors in modern buildings will have fundamental resonance frequencies in the 20 to 30 Hz range. An amplification resulting in a gain of approximately 6 dB should be used in the frequency range of the fundamental resonance.

- **Floor vibration and ground-borne noise** – The projected floor vibration is used to estimate the levels of ground-borne noise. The primary factors affecting noise level are the average vibration level of the room surfaces and the amount of acoustical absorption within the room. The radiation adjustment is -5 dB for typical rooms, (37) (50) which gives:

$$L_A \approx L_V + K_{A-wt} - 5 \qquad \textbf{Eq. 6-8}$$

where:

L_A = A-weighted sound level in a 1/3-octave band
L_v = rms vibration velocity level in that band
K_{A-wt} = A-weighting adjustment at the 1/3-octave band center frequency

The A-weighted levels in the 1/3-octave bands are combined to produce the overall A-weighted sound level.

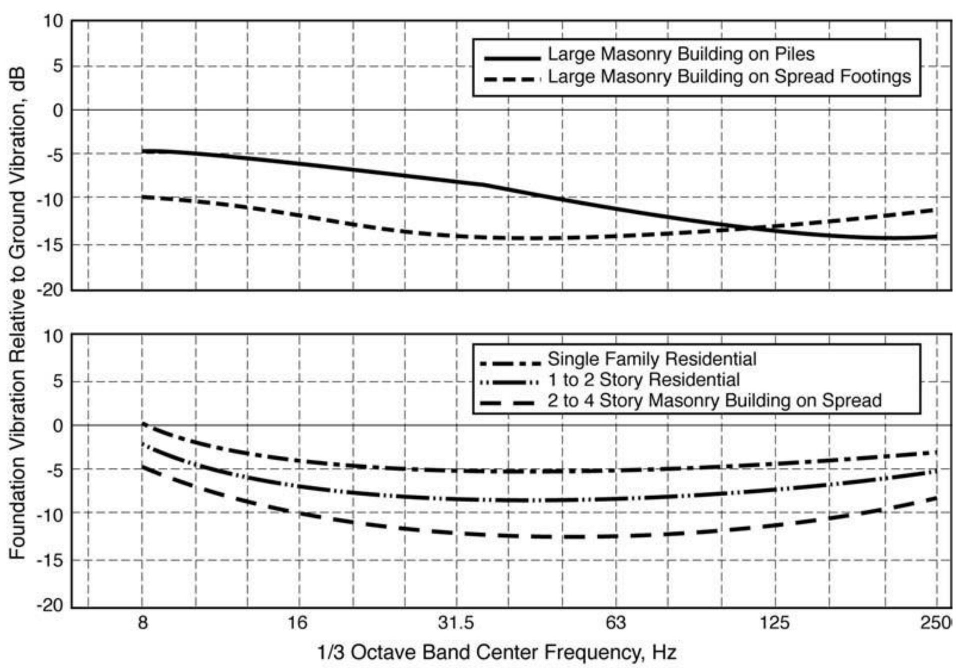

Figure 6-14 Foundation Response for Various Types of Buildings

Where detailed information on the structural features of individual buildings are unavailable and there are no site-specific data on outdoor to indoor propagation characteristics, the preferred approach is to apply a combined factor for the foundation response and the gain from floor resonances. Empirical data based on the TCRP D-12 Project from 34 measurement sites across 5 cities in North

America and other studies suggest that the average change in vibration from outdoor to indoor was 0 dB across all 1/3-octave bands with a standard deviation of approximately 5 to 6 dB in the 31.5 to 63 Hz frequency.(43)(48) Therefore, the recommended approach for predicting indoor vibration based on outdoor data is to use an adjustment of +3 to +6 dB for light-weight, wood-frame construction and use an adjustment of 0 dB for heavier buildings.

However, for buildings with high-vibration sensitivity or where there is concern regarding interference with vibration-sensitive equipment, it is advisable to measure the outdoor-indoor response of the building, using the process described in Section 2b or 2c, to determine the actual response of the foundation and building to vibration.

Step 3: Assess Vibration Impact

Take inventory of vibration-sensitive land uses with impact.

Assess vibration impact at each receiver of interest using the impact criteria in Section 6.3. Note that ground-borne vibration and noise levels that exceeded criteria in the General Vibration Assessment may not cause impact according to the more detailed procedures of the Detailed Vibration Analysis; in which case, mitigation is not required. But if projected levels still exceed the criteria, evaluate vibration mitigation measures using the spectra provided by the Detailed Vibration Analysis.

Step 4: Determine Vibration Mitigation Measures

Select practical vibration control measures that will be effective at the dominant vibration frequencies and compatible with the given transit structure and track support system.

The purpose of vibration mitigation is to minimize the adverse effects that the project ground-borne vibration and ground-borne noise will have on sensitive land uses. Because ground-borne vibration is not as common a problem as environmental noise, the mitigation approaches have not been as well defined. In some cases it may be necessary to develop innovative approaches to control the impact. See Appendix G for information on using non-standard methods.

Standard vibration control measures for rail transit systems are discussed in this step. Note that vibration control measures for rail transit systems are not always effective for freight trains.(xiv) Bus systems rarely cause vibration impact, but if impact occurs, roadway roughness or unevenness caused by bumps, pot holes, expansion joints, or driveway transitions are usually the causes. Smoothing the roadway surface is typically the recommended course of action.(xv)

[xiv] The heavy axle loads associated with freight rail are outside the range of applicable design parameters for vibration reduction on lighter rail transit systems. Plans to relocate existing railroad tracks closer to vibration-sensitive sites in order to accommodate a new rail transit line in the ROW must be carefully considered because it may not be possible to mitigate the increased vibration impact from freight trains.

[xv] In cases where a rubber-tired system runs inside a building, such as an airport people mover, vibration control may involve additional measures. Loading and unloading of guideway support beams may generate dynamic forces that transmit into the building structure. Special guideway support systems may be required, similar to the discussion below regarding floating slabs.

Vibration reduction measures incur additional costs to a system. Some of the same treatments for noise mitigation can be considered for vibration mitigation. Costs for noise control measures are documented in a report from the Transit Cooperative Research Program (TCRP).[31] Where applicable to vibration reduction, costs for noise abatement methods from that report are given in the following sections. These costs reflect the noise mitigation costs as of 1997 (unless otherwise noted), and should only be used as representative estimates when considering noise mitigation options. Current noise mitigation costs should be researched before decisions on noise mitigation options are finalized, and then they should be documented according to Section 8.

Mitigation of vibration impacts may involve treatments at the source, along the source-to-receiver propagation path, or at the receiver.

1a. Evaluate Source Treatments – The most effective vibration mitigation treatments are applied at the vibration source. This is the preferred approach to mitigation when possible. Possible source treatments include:

- **Preventative Maintenance** – Effective maintenance programs are essential for controlling ground-borne vibration. Key vibration points are discussed below; see Section 4.5, Step 7 for more detailed information on the benefits of effective maintenance programs on controlling transit noise and vibration. While these are not mitigation measures in the traditional sense, and should not be included as mitigation in an environmental document, they can help to keep both noise and vibration levels at a "like-new" level or reduce both in systems with deferred maintenance.

    - **Rail grinding** is a particularly important practice for vibration mitigation for rail that develops corrugations. The TCRP report notes that periodic rail grinding results in a net savings per year on wheel and rail wear. Most transit systems contract out rail grinding, although some of the larger systems make the investment and do their own grinding. As mentioned in Section 4.5, Step 7, the typical rail grinding cost would be $1000 to $7000 per grinding pass mile, with an additional investment of approximately $1 million for the equipment for a larger transit system to do its own grinding.

    - **Dramatic vibration reduction** results can be achieved by removing wheel flats through **wheel truing**. As mentioned in Section 4.5, Step 7, a wheel truing machine costs approximately $1 million, including associated maintenance, materials, and labor costs. The TCRP report figures a system with 700 vehicles would incur a yearly cost of $300,000 to $400,000 for a wheel truing program.

    - **Profile grinding of the rail head** in combination with a wheel truing program may be the most practical approach to controlling and reducing vibration and noise where such practices are not normally conducted. Profiles should be defined during the design phase and should be in place when system opens.[32] The cost of wheel and rail profile matching may be incorporated in the new vehicle and new rail costs.

Rough wheels or rails can increase vibration levels by as much as 20 dB in extreme cases, negating the effects of even the most effective vibration control measures. Yet, it is rare that vibration control measures (such as those discussed below) will provide more than 15 to 20 dB attenuation. When there are ground-borne vibration impacts with existing transit equipment, the best vibration control measure often is to implement new or improved maintenance procedures. Grinding rough or corrugated rail and wheel truing to eliminate wheel flats and restore the wheel contour may provide considerable vibration reduction. Regular maintenance may replace the need to modify the existing track system, such as through adding floating slabs.

- **Planning and Design of Special Trackwork** – A large percentage of the vibration impact from a new transit facility is often caused by wheel impacts at special trackwork for turnouts and crossovers. When feasible, the most effective vibration control measure is to relocate the special trackwork to a less vibration-sensitive area. This may require adjusting the location by several hundred feet provided it will not have an adverse impact on the operation plan for the system. Careful review of crossover and turnout locations during the project development phase is an important step to minimizing potential for vibration impact.

  Another approach is to use special devices (frogs) at turnouts and crossovers that incorporate mechanisms to close the gaps between running rails. Frogs with spring-loaded mechanisms and frogs with movable points can substantially reduce vibration levels near crossovers. According to the TCRP report, a spring frog costs about $12,000, twice the cost of a standard frog. A movable point frog involves elaborate signal and control circuitry resulting in higher costs at approximately $200,000.

- **Vehicle Specifications** – The ideal rail vehicle with respect to minimizing ground-borne vibration should have the following characteristics:
  - Low, unsprung weight
  - Soft primary suspension
  - A minimum of metal-to-metal contact between moving parts of the truck
  - Smooth wheels that are perfectly round

  A limit for the vertical resonance frequency of the primary suspension should be included in the specifications for any new vehicle. A vertical resonance frequency of 12 Hz or less is sufficient to control the levels of ground-borne vibration, although some have recommended the vertical resonance frequency be less than 8 Hz.

- **Special Track Support Systems** – When the vibration assessment indicates that vibration levels will be excessive, the track support system is typically modified to reduce the vibration levels.

  Floating slabs, resiliently supported ties, high-resilience fasteners, and ballast mats can be used to reduce the levels of ground-borne vibration. To be effective, all of these measures must be optimized for the frequency spectrum of the vibration. Most of these relatively standard procedures have been successfully used on several subway projects.

  Applications on at-grade and elevated track are less common. This is because vibration impact is less common for at-grade and elevated track. Note that the cost of these types of vibration control measures is a higher percentage of the overall construction costs for at-grade and elevated track, and exposure to the elements can require substantial design modifications.

  Each major vibration control measure for track support is discussed below. Costs for these treatments are not covered by the TCRP report, but are given as estimates based on transit agency experience.

  - **Resilient fasteners** – Resilient fasteners are used to fasten the rail to concrete track slabs. Standard resilient fasteners are very stiff in the vertical direction, usually in the range of 200,000 lb/in, and do provide some vibration reduction compared to the rigid fastening systems used on older systems (e.g., wood half-ties embedded in concrete).

    Special fasteners with vertical stiffness in the range of 30,000 lb/in may reduce vibration by as much as 5 to 10 dB at frequencies above 30 to 40 Hz. These premium fasteners vary in cost and can be priced competitively when purchased in large quantities.

  - **Ballast mats** – A ballast mat consists of a rubber or other type of elastomer pad that is placed under the ballast. In general, the mat must be placed on a concrete pad to be effective. They will not be as effective if placed directly on the soil or the sub-ballast. Consequently, most ballast mat applications are in subway or elevated structures.

    Ballast mats can provide 8 to 12 dB attenuation at frequencies above 25 to 30 Hz.[58] Ballast mats are often a good retrofit measure for existing tie-and-ballast track where there is vibration impact. Installed ballast mats cost approximately $180 per track-foot.

  - **Undertie pads** – Undertie pads (resiliently supported concrete ties) consist of a rubber pad mounted on the bottom of a concrete tie directly on the ballast. The pads provide vibration isolation at frequencies above 25 Hz and are easy to install or retrofit. Installed undertie pads cost approximately $260 per track-foot.

- **Resiliently supported ties** – The resiliently supported tie system consists of concrete ties supported by rubber pads resting on top of a slab track or subway invert. The rails are fastened directly to the concrete ties using standard rail clips. Resiliently supported ties provide vibration reduction in between 15 to 40 Hz, which is particularly appropriate for transit systems with vibration impact in the 20 to 30 Hz range. A resiliently supported tie system costs approximately $400 per track-foot.

- **Floating slabs** – Floating slabs can be very effective at controlling ground-borne vibration and noise and consist of a concrete slab supported on resilient elements such as rubber or a similar elastomer. Floating slabs are effective at frequencies greater than their single-degree-of-freedom vertical resonance frequency.

  Floating slabs are among the most expensive vibration control treatments. A typical double-tie floating slab system costs approximately 4 times the cost of ballast and tie per track foot. Examples of floating slabs include:
    - Floating slabs used in Washington, DC; Atlanta, GA; and Boston, MA, were all designed to have a vertical resonance in the 14 to 17 Hz range.
    - A special system referred to as the double-tie system was first used in Toronto. It consists of 5-foot-long slabs with four or more rubber pads under each slab. This system was designed with a resonance frequency in the 12 to 16 Hz rang3.
    - Another special floating slab was used in San Francisco's Bay Area Rapid Transit (BART) system. It uses a discontinuous precast concrete double-tie system with a resonance frequency in the 5 to 10 Hz frequency range.

- **Tire-derived aggregate (TDA)** – TDA (shredded tires) consists of a layer of tire shreds wrapped in geotech fabric placed underneath the ballast on hard packed ground. This is a new, low-cost option that can provide reduction in vibration levels at frequencies above 25 Hz. This mitigation measure has proven to be effective for the Denver Regional Transportation District (RTD) light rail system as well as the Santa Clara Valley Transportation Authority (VTA) light rail system,[59] but the effective life of TDA has not been determined. Installed TDA costs approximately $260 per track-foot.

- **Other treatments** – Changing any feature of the track support system can change the levels of ground-borne vibration. Approaches such as using heavier rail, thicker ballast, or heavier ties can be expected to reduce the vibration levels. There also is some indication that vibration levels are lower with wood ties compared to concrete ties. But there is little confirmation that any of these approaches will make a substantial change in the vibration levels.

- **Operational Changes** – The most effective operational change is to reduce the vehicle speed. Reducing the train speed by a factor of two will reduce vibration levels approximately 6 dB. Other operational changes include:
  - Use of equipment that generates the lowest vibration levels during the nighttime hours when people are most sensitive to vibration and noise.
  - Adjusting nighttime schedules to minimize movements in the most sensitive hours.

While there are tangible mitigation benefits from speed reductions and limits on operations during the most sensitive time periods, FTA does not generally accept speed reduction as a vibration mitigation measure for two important reasons: (1) speed reduction is unenforceable and negated if vehicle operators do not adhere to established policies, and (2) it is contrary to the purpose of the transit investment by FTA, which is to move as many people as possible as efficiently and safely as possible. FTA does not recommend limits on operations as a way to reduce vibration impacts.

1b. Evaluate Path Treatments – When vibration mitigation treatments cannot be applied at the vibration source or additional mitigation is required after treating the source, the next preferred placement of vibration mitigation is along the vibration propagation path between the source and receiver. Possible path treatments include:

- **Trenches** – Use of trenches to control ground-borne vibration is analogous to controlling airborne noise with noise barriers. This approach has not received much attention in the United States, but trenches could be a practical method for controlling transit vibration from at-grade track. A rule-of-thumb given by Richert and Hall(60) is that if the trench is located close to the source, the trench bottom must be at least 0.6 times the Rayleigh wavelength below the vibration source. For most soils, Rayleigh waves travel at around 600 ft/sec, which means that the wavelength at 30 Hz is 20 ft, requiring that a trench be approximately 15 ft deep to be effective at 30 Hz.

  A trench can be effective as a vibration barrier if it is either open or solid. The Toronto Transit Commission tested a trench filled with Styrofoam to keep it open and reported successful performance over a period of at least one year. Solid barriers can be constructed with sheet piling or concrete poured into a trench.

- **Buffer Zones** – Expanding the rail ROW can be the most economical method of reducing the vibration impact by simply increasing the distance between the source and receiver. A similar approach is to negotiate a vibration easement from the affected property owners (e.g., a row of single-family homes adjacent to a proposed commuter rail line). There may be legal limitations, however, on the ability of funding agencies to acquire land strictly for the purpose of mitigating vibration (or noise) impact.

1c. Evaluate Receiver Treatments – When vibration mitigation treatments cannot be applied at the source or along the propagation path, or if combinations of treatments are required, treatments to the receivers can be considered as described below.

- **Building Modifications** – In some circumstances, it is practical to modify the affected building to reduce the vibration level. Vibration isolation of buildings consists of supporting the building foundation on elastomer pads, similar to bridge bearing pads. Vibration isolation of buildings is seldom an option for existing buildings and is typically only possible for new construction. Vibration impacts on sensitive laboratory instruments, such as electron microscopes, may be controlled with vibration isolation tables.

  This approach is particularly important for shared-use facilities such as an office space above a transit station or terminal. When vibration-sensitive equipment such as electron microscopes will be affected by transit vibration, specific modifications to the building structure may be the most cost-effective method of controlling the impact aside from modification of equipment mounting systems. For example, the floor upon which the vibration-sensitive equipment is located could be stiffened and isolated from the remainder of the building to reduce the vibration. Alternatively, the equipment mounting systems could be modified or the equipment could be relocated to a different building at far less cost.

SECTION 7

Noise and Vibration during Construction

Construction noise and vibration often generates complaints from the community, even when construction is for a limited timeframe. Public concerns about construction noise and vibration increase considerably with lengthy periods of heavy construction on major projects as well as prevalence of nighttime construction (often scheduled to avoid disrupting workday road and rail traffic). Noise and vibration complaints typically arise from interference with people's activities, especially when the adjacent community has no clear understanding of the extent or duration of the construction. Misunderstandings can arise when the community thinks a contractor is being insensitive, and the contractor believes it is performing the work in compliance with local ordinances. This situation underscores the need for early identification and assessment of potential problem areas.

This section outlines the procedures for assessing noise and vibration impacts during construction. The type of assessment (qualitative or quantitative) and the level of analysis are determined based on the scale of the project and surrounding land uses. In cases where a full quantitative assessment is not warranted, a qualitative assessment of the construction noise and vibration environment can lead to greater understanding and tolerance in the community. For major projects with extended periods of construction at specific locations, a quantitative assessment can aid contractors in making bids by allowing changes in construction approach and including mitigation costs before the construction plans are finalized.

Generally, local noise ordinances are not very useful for evaluating construction noise impact. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should take into account the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land uses. While it is not the purpose of this manual to specify standardized criteria for construction noise impact, the following guidelines can be considered reasonable criteria for assessment. If these criteria are exceeded, there may be adverse community reaction.

Procedures for assessing construction noise are presented in Section 7.1. Procedures for assessing construction vibration are presented in Section 7.2.

7.1 Construction Noise Assessment

Noise impacts from construction may vary greatly depending on the duration and complexity of the project. The key elements of the Construction Noise Assessment procedure and recommended workflow are as follows.

Step 1: Determine Level of Construction Noise Assessment

Step 2: Use a Qualitative Construction Noise Assessment to Estimate Construction Noise

Step 3: Use a Quantitative Construction Noise Assessment to Estimate Construction Noise

Step 4: Assess Construction Noise Impact

Step 5: Determine Construction Noise Mitigation Measures

If there is uncertainty in how to determine the appropriate level of assessment, contact the FTA Regional office.

Step 1: Determine Level of Construction Noise Assessment

Determine the appropriate level of assessment based on the scale and type of the project and depending on the stage of environmental review.

Consider the following factors:

- Scale of the project
- Proximity of noise-sensitive sites to the construction zones
- Number of noise-sensitive receivers in the project area
- Duration of construction activities near noise-sensitive receivers
- Schedule, including the construction days, hours, and time periods
- Method (e.g., cut-and-cover vs. bored tunneling)
- Concern about construction noise expressed in comments by the general public (e.g., through scoping or public meetings)

1a. Determine if an assessment is required – Construction Noise Assessments are not required for many small projects including:

- Installation of safety features like grade-crossing signals;
- Track improvements within the ROW; or
- Erecting small buildings and facilities which are similar in scale to the surrounding development.

For small projects like these, include descriptions in the environmental document of the length of construction, the loudest equipment to be used, the expected truck access routes, the avoidance of nighttime activity, and any other relevant planned construction method.

1b. Determine whether a qualitative or quantitative assessment is required

- **Qualitative Construction Noise Assessment** – Qualitative Construction Noise Assessments may be required for projects with less than a month of construction time in a noise-sensitive area. See Step 2 for more information on Qualitative Construction Noise Assessments.

- **Quantitative Construction Noise Assessments** – Quantitative Construction Noise Assessments may be required for projects with a month or more of construction in noise-sensitive areas or if particularly noisy equipment will be involved. See Step 3 for more information on Quantitative Construction Noise Assessments.

Step 2: Use a Qualitative Construction Noise Assessment to Estimate Construction Noise

Use a qualitative construction noise assessment to estimate construction noise for appropriate projects per Section 7.1, Step 1b.

Provide qualitative descriptions in the environmental document of the following elements:

- Duration of construction (both overall and at specific locations)
- Equipment expected to be used (e.g., noisiest equipment)
- Schedule with limits on times of operation (e.g., daytime use only)
- Monitoring of noise
- Forum for communicating with the public
- Commitments to limit noise levels to certain levels, including any local ordinances that apply
- Consideration of application of noise control treatments used successfully in other projects

Effective community outreach and relations are important for these projects. Disseminate information to the public early regarding the kinds of construction equipment, expected noise levels, and durations to forewarn potentially affected neighbors about the temporary inconvenience. Including a general description of the variation of noise levels during a typical construction day may also be helpful.

Note that the construction criteria in Step 4 do not apply to qualitative assessments.

Step 3: Use a Quantitative Construction Noise Assessment to Estimate Construction Noise

Use a quantitative construction noise assessment to estimate construction noise for appropriate projects per Section 7.1, Step 1b.

For Quantitative Construction Noise Assessments, follow the recommended procedure in this step and include a description of the planned construction methods and any basic measures that have been identified to reduce the potential impact, such as prohibiting the noisiest construction activities during the nighttime, in the environmental document. It may be prudent, however, to defer final decisions on noise control measures until the project and construction plans are defined in greater detail during the engineering phase.

- **Noise Source Levels from Typical Construction Equipment and Operations** – The noise levels generated by construction equipment vary greatly on factors such as the type of equipment, the equipment model, the operation being performed, and the condition of the equipment. Typically, the dominant source of noise from most construction equipment is the engine, often a diesel engine, which usually does not have sufficient muffling. In other cases, such as impact pile-driving or pavement-breaking, noise generated by the process dominates. Construction equipment can be considered to operate in the following two modes for Construction Noise Assessments:

- **Stationary** – Stationary equipment operates in one location for one or more days at a time, with either a fixed power operation (pumps, generators, compressors) or a variable noise operation (pile drivers, pavement breakers).
- **Mobile** – Mobile equipment moves around the construction site with power applied in cyclic fashion (bulldozers, loaders), or to and from the site (trucks). Movement around the site is considered in the construction noise prediction procedure.

Variation in power imposes additional complexity in characterizing the noise source level from mobile equipment. Describe the noise at a reference distance from the equipment operating at full power and adjusting it based on the duty cycle of the activity to determine the $L_{eq(t)}$ of the operation.

Typical noise levels from representative equipment are included in Table 7-1. The levels are based on an EPA Report,[61] measured data from railroad construction equipment taken during the 1976 Northeast Corridor Improvement Project, the FHWA Roadway Construction Noise Model, and other measured data.

For equipment that is not represented in Table 7-1, measure the noise levels according to the standard procedures for measuring the exterior noise levels for the certification of mobile and stationary construction equipment by the Society of Automotive Engineers.[62][63]

Table 7-1 Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level 50 ft from Source, dBA
Air Compressor	80
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	82
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	80
Paver	85
Pile-driver (Impact)	101
Pile-driver (Sonic)	95
Pneumatic Tool	85
Pump	77
Rail Saw	90
Rock Drill	95
Roller	85
Saw	76
Scarifier	83
Scraper	85
Shovel	82
Spike Driver	77
Tie Cutter	84
Tie Handler	80
Tie Inserter	85
Truck	84

3a. Use the metric $L_{eq(t)}$ to assess construction noise. This unit is appropriate because $L_{eq(t)}$ can be used to describe:

- Noise level from operation of each piece of equipment separately, and levels can be combined to represent the noise level from all equipment operating during a given period
- Noise level during an entire phase
- Average noise over all phases of the construction

3b. Use Eq. 7-1 to predict construction noise impact for major transit projects, considering the noise generated by the equipment and noise propagation due to distance. Calculate $L_{eq.equip}$ for all equipment individually, then use decibel addition to sum the $L_{Aeq.equip}$ for all equipment operating during the same time period. See Appendix B.1.1 for information on decibel addition.

$$L_{eq.equip} = L_{emission} + 10\log(Adj_{Usage}) - 20\log(\frac{D}{50}) - 10G\log(\frac{D}{50}) \qquad \textbf{Eq. 7-1}$$

where:

$L_{eq,equip}$	= $L_{eq(t)}$at a receiver from the operation of a single piece of equipment over a specified time period, dBA
$L_{emission}$	= noise emission level of the particular piece of equipment at the reference distance of 50 ft, dBA
Adj_{Usage}	= usage factor to account for the fraction of time that the equipment is in use over the specified time period
D	= distance from the receiver to the piece of equipment, ft
G	= a constant that accounts for topography and ground effects

Determine the quantities for Eq. 7-1 based on the level of assessment as described below.

- A general assessment of construction noise is warranted for projects in an early assessment stage when the equipment roster and schedule are undefined and only a rough estimate of construction noise levels is practical.
- A detailed analysis of construction noise is warranted when many noise-sensitive sites are adjacent to a construction project or where contractors are faced with stringent local ordinances or heightened public concerns expressed in early outreach efforts.

Complete the appropriate assessment for each phase of construction. Major construction projects are accomplished in several different phases. Each phase has a specific equipment mix, depending on the work to be accomplished during that phase. As a result of the equipment mix, each phase has its own noise characteristics; some phases have higher continuous noise levels than others, and some have higher impact noise levels than others.

Option A: General Assessment – Determine the quantities for Eq. 7-1 based on the following assumptions for a General Assessment of each phase of construction.

- **Noise emission level ($L_{emission}$)** – Determine the emission level at 50 ft according to noise from typical construction equipment described above and Table 7-1.

- **Usage factor (Adj_{Usage})** – Assume a usage factor of 1. This assumes a time period of one-hour with full power operation. Most construction equipment operates continuously for periods of one-hour or more during the construction period.

  Therefore, $10\log(Adj_{usage}) = 0$ and can be omitted from the equation.

- **Distance (D)** – Assume that all equipment operates at the center of the project, or centerline for guideway or highway construction project.

- **Ground effect (G)** – G = 0 assuming free-field conditions and ignoring ground effects. If ground effects are of specific importance to the assessment, consider using the Detailed Analysis procedure.

Only determine the $L_{eq.equip}$ for the two noisiest pieces of equipment expected to be used in each phase of construction. Then, sum the levels for each phase of construction using decibel addition.

Option B: Detailed Analysis – Determine the quantities for Eq. 7-1 based on the following assumptions for a Detailed Analysis of each phase of construction. Alternatively, for detailed, long-term, and complex construction projects or projects near a particularly sensitive site, the FHWA's Windows-based screening tool, "Roadway Construction Noise Model (RCNM)," can be used for the prediction of construction noise.(64)

- **Noise emission level ($L_{emission}$)** – Measure or certify the noise emission level for each piece of equipment.

- **Usage factor (Adj_{Usage})** – Long-term construction project noise impact is based on a 30-day average L_{dn}, the times of day of construction activity (nighttime noise is penalized by 10 dB in residential areas), and the percentage of time the equipment is used during a period of time that will affect Adj_{Usage}.

  For example, an 8-hour $L_{eq(t)}$ is determined by making Adj_{Usage} the percentage of time each individual piece of equipment operates under full power in that period. Similarly, the 30-day average L_{dn} is determined from the Adj_{Usage} expressed by the percentage of time the equipment is used during the daytime hours (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.), separately, over a 30-day period. To account for increased sensitivity to nighttime noise, the nighttime noise levels are adjusted by 10 dB in the L_{dn} computation (see Appendix B.1.4.5).

- **Distance (D)** – Determine the location of each piece of equipment during operation and the distance to each receiver.

- **Ground effect (G)** – Use Table 4-26 in Section 4.5, Step 3 to calculate G to account for the site topography, natural and man-made barriers, and ground effects.

  Compute the 8-hour $L_{eq(t)}$ ($L_{eq.equip(8hr)}$) and the 30-day average L_{dn} ($L_{dn.equip(30day)}$) for all equipment expected to be used in each phase of construction separately. Then, sum the levels for each phase of construction using Eq. 4-56 and Eq. 4-57 in Table 4-32.

Step 4: Assess Construction Noise Impact

Compare the predicted noise levels from the Quantitative Construction Noise Assessment with impact criteria to assess impact from construction noise for each phase of construction.

No standardized criteria have been developed for assessing construction noise impact. Consequently, criteria must be developed on a project-specific basis unless local ordinances apply. As stated earlier in this section, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should account for the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. <u>While it is not the purpose of this manual to specify standardized criteria for construction noise impact, the following guidelines can be considered reasonable criteria for assessment. If these criteria are exceeded, there may be adverse community reaction.</u>

The construction impact guidelines are presented based on the level of quantitative assessment.

Option A: General Assessment – Compare the combined $L_{eq.equip(1hr)}$ for the two noisiest pieces of equipment for each phase of construction determined in Section 7.1, Step 3 to the criteria below. Then, identify locations where the level exceeds the criteria.

Table 7-2 General Assessment Construction Noise Criteria

Land Use	$L_{eq.equip(1hr)}$, dBA	
	Day	Night
Residential	90	80
Commercial	100	100
Industrial	100	100

Option B: Detailed Analysis – Compare the combined $L_{eq.equip(1hr)}$ and the combined $L_{dn.equip(30day)}$ for all equipment for each phase of construction determined in Section 7.1, Step 3 to the criteria below. Then, identify locations where the level exceeds the criteria.

Table 7-3 Detailed Analysis Construction Noise Criteria

Land Use	$L_{eq.equip(8hr)}$, dBA		$L_{dn.equip(30day)}$, dBA
	Day	Night	30-day Average
Residential	80	70	75
Commercial	85	85	80*
Industrial	90	90	85*

*Use a 24-hour $L_{eq(24hr)}$ instead of $L_{dn.equip(30day)}$.

Step 5: Determine Construction Noise Mitigation Measures

Evaluate the need for mitigation and select appropriate mitigation measures.

Where potential impacts have been identified according to Section 7.1, Step 4, evaluate appropriate control measures. Include descriptions of how each affected location will be treated with one or more mitigation measures in the environmental document.

5a. Determine the appropriate approach for construction noise control. Categories of approaches include:

- **Design considerations and project layout**
  - Construct noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers.
  - Re-route truck traffic away from residential streets. Select streets with the fewest homes if no alternatives are available.
  - Site equipment on the construction lot as far away from noise-sensitive sites as possible.
  - Construct walled enclosures around especially noisy activities or clusters of noisy equipment. For example, shields can be used around pavement breakers, and loaded vinyl curtains can be draped under elevated structures.

- **Sequence of operations**
  - Combine noisy operations to occur in the same time period. The total noise level produced will not be substantially greater than the level produced if the operations were performed separately.
  - Avoid nighttime activities. Sensitivity to noise increases during the nighttime hours in residential neighborhoods.

- **Alternative construction methods**
  - Avoid impact pile-driving where possible in noise-sensitive areas. Drilled piles or the use of a sonic/vibratory pile driver or push pile driver are quieter alternatives where the geological conditions permit their use.
  - Use specially-quieted equipment, such as quieted and enclosed air compressors and properly-working mufflers on all engines.
  - Select quieter demolition methods. For example, sawing bridge decks into sections that can be loaded onto trucks results in lower cumulative noise levels than impact demolition by pavement breakers.

Include descriptions of how each impacted location will be treated with one or more mitigation measures in the environmental impact assessment when possible.

5b. Describe and commit to a mitigation plan that will be developed later when the information is available to make final decisions (not often available during the project development phase) on all specific mitigation measures. This may be the case for large, complex projects. The objective of the plan should be to minimize construction noise using all reasonable (e.g., cost vs. benefit) and feasible (e.g., possible to construct) means available.

Components of a mitigation plan may include some or all of the following provisions, which should also be specified in construction contracts:

- **Equipment noise emission limits** – Equipment noise limits are absolute noise limits applied to generic classes of equipment at a reference distance (typically 50 ft). The limits should be set no higher than what is reasonably achievable for well-maintained equipment with effective mufflers. Lower limits that require source noise control may be appropriate for certain equipment when needed to minimize community noise impact, if reasonable and feasible. Provisions could also be included to require equipment noise certification testing prior to use on-site.

- **Lot-line construction noise limits** – Lot-line construction noise limits are noise limits that apply at the lot-line of specific noise-sensitive properties. The limits are typically specified in terms of both noise exposure (usually $L_{eq(t)}$ over a 20-30-minute period) and maximum noise level. They should be based on local noise ordinances if applicable, as well as pre-construction baseline noise levels (usually 3 to 5 dB above the baseline).

- **Operational and/or equipment restrictions** – It may be necessary to prohibit or restrict certain construction equipment and activities near residential areas during nighttime hours. This is particularly true for activities that generate tonal, impulsive, or repetitive sounds, such as back-up alarms, hoe ram demolition, and pile-driving.

- **Noise abatement requirements** – In some cases, specifications may be provided for particular noise control treatments based on the results of the design analysis and/or prior commitments made to the public by civic authorities. An example would be the requirement for a temporary noise barrier to shield a particular community area from noisy construction activities.

- **Noise monitoring plan requirements** – Plans can be developed for pre-project noise monitoring to establish baseline noise levels at sensitive locations, as well as for periodic equipment and lot-line noise monitoring during the construction period. The plan should outline the measurement and reporting methods that will be used to demonstrate compliance with the project noise limits.

- **Noise control plan requirements** – For major construction projects, preparation and submission of noise control plans on a periodic basis (e.g., every six months) are generally required. These plans should predict the construction noise at noise-sensitive receiver locations based on the proposed construction equipment and methods. If the analysis predicts that the specified noise limits will be exceeded, the plan should specify the mitigation measures that will be applied and should demonstrate the expected noise reductions these measures will achieve. The objective of this proactive approach is to minimize the likelihood of community noise complaints by ensuring that any necessary mitigation measures are included in the construction plans.

- **Compliance enforcement program** – If construction noise is an issue in the community, it is important that a program be implemented to monitor contractor compliance with the noise control specifications and mitigation plan. It is recommended that this function be performed by a construction management team on behalf of the public agency.

- **Public information and complaint response procedures** – To maintain positive community relations, it is recommended to keep the public informed about the construction plans and efforts to minimize noise, and procedures should be established for prompt response and corrective action to noise complaints during construction.

Most of these provisions are appropriate for large-scale projects, where construction activity will continue for many months, if not years. The linked references contain more information on construction noise for major transportation projects.(60)(65)

7.2 Construction Vibration Assessment

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings founded on the soil near the construction site respond to these vibrations with varying results, ranging from no perceptible effects at the lowest levels, low rumbling sounds and perceptible vibrations at moderate levels, and slight damage at the highest levels.

While ground vibrations from construction activities do not often reach the levels that can damage structures, fragile buildings must receive special consideration. The construction vibration criteria include consideration of the building condition.

The key elements of the Construction Vibration Assessment procedures and recommended workflow are as follows:

Step 1: Determine level of construction vibration assessment

Step 2: Use a qualitative construction vibration assessment

Step 3: Use a quantitative construction vibration assessment

Step 4: Assess construction vibration impact

Step 5: Determine construction vibration mitigation measures

Step 1: Determine Level of Construction Vibration Assessment

Determine the appropriate level of assessment based on the scale and type of the project and the stage of environmental review.

1a. Determine if an assessment is required.
Construction Vibration Assessments are not required for many small projects including:

- Installation of safety features like grade-crossing signals
- Track improvements within the ROW
- Erecting small buildings and facilities, which are similar in scale to the surrounding development

1b. Determine whether a qualitative or quantitative assessment is required.

- **Qualitative Construction Vibration Assessment** – A qualitative construction vibration assessment is appropriate for projects where prolonged annoyance or damage from construction vibration is not expected. For example, equipment that generates little or no ground vibration—such as air compressors, light trucks, and hydraulic loaders—only require qualitative descriptions. See Section 7.2, Step 2 for more information on qualitative construction vibration assessments.

- **Quantitative Construction Vibration Assessment** – A quantitative construction vibration analysis is appropriate for projects where construction vibration may result in building damage or prolonged annoyance. For example, activities such as blasting, pile-driving, vibratory compaction, demolition, and drilling or excavation near sensitive structures require a quantitative analysis. See Section 7.2, Step 3 for more information on quantitative construction vibration assessments.

If there is uncertainty in how to determine the appropriate level of assessment, contact the FTA Regional office.

Step 2: Use a Qualitative Construction Vibration Assessment

Use a qualitative construction vibration assessment to estimate vibration for appropriate projects per Section 7.2, Step 1b.

Provide qualitative descriptions in the environmental document of the following elements:

- Duration of construction (both overall and at specific locations)
- Equipment expected to be used
- Description of how ground-borne vibration will be maintained at an acceptable level

Note that the criteria in Section 7.2, Step 4 do not apply to qualitative assessments.

Step 3: Use a Quantitative Construction Vibration Assessment

Use a quantitative construction vibration assessment to estimate vibration for appropriate projects per Section 7.2, Step 1b.

For quantitative construction vibration assessments, follow the recommended procedure in this step. Vibration source levels from typical construction equipment and operations are provided below, and procedures on how to estimate construction vibration for damage and annoyance are provided in Steps 3a and 3b, respectively.

- **Vibration Source Levels from Construction Equipment** – Table 7-4 presents average source levels in terms of velocity for various types of construction equipment measured under a wide variety of construction activities. The approximate rms vibration velocity levels were calculated from the PPV limits using a crest factor of 4, representing a PPV-rms difference of 12 dB. Note that although the table gives one level for each piece of equipment, there is considerable variation in reported ground vibration levels from construction activities. The data in Table 7-4 provide a reasonable estimate for a wide range of soil conditions.(66)(67)(68)(69)

Table 7-4 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft, in/sec	Approximate Lv* at 25 ft
Pile Driver (impact)	upper range	1.518	112
	typical	0.644	104
Pile Driver (sonic)	upper range	0.734	105
	typical	0.17	93
Clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.21	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

* RMS velocity in decibels, VdB re 1 micro-in/sec

3a. Damage Assessment

Assess for building damage for each piece of equipment individually.

Construction vibration is generally assessed in terms of peak particle velocity (PPV), as described in Section 5.1.

- Determine the vibration source level (PPV_{ref}) for each piece of equipment at a reference distance of 25 ft as described above and in Table 7-4.
- Use Eq. 7-2 to apply the propagation adjustment to the source reference level to account for the distance from the equipment to the receiver. Note that the equation is based on point sources with normal propagation conditions.

$$PPV_{equip} = PPV_{ref} \times (\frac{25}{D})^{1.5} \qquad \textbf{Eq. 7-2}$$

where:

PPV_{equip}	= the peak particle velocity of the equipment adjusted for distance, in/sec
PPV_{ref}	= the source reference vibration level at 25 ft, in/sec
D	= distance from the equipment to the receiver, ft

3b. Annoyance Assessment
Assess for annoyance for each piece of equipment individually. Ground-borne vibration related to human annoyance is related to rms velocity levels, expressed in VdB as described in Section 5.1.

Estimate the vibration level (L_v) using Eq. 7-3.

$$L_{v.distance} = L_{vref} - 30log(\frac{D}{25}) \qquad \textbf{Eq. 7-3}$$

where:

$L_{v.distance}$	= the rms velocity level adjusted for distance, VdB
L_{vref}	= the source reference vibration level at 25 ft, VdB
D	= distance from the equipment to the receiver, ft

Step 4: Assess Construction Vibration Impact

Compare the predicted vibration levels from the Quantitative Construction Vibration Assessment with impact criteria to assess impact from construction vibration.

Assess potential damage effects from construction vibration for each piece of equipment individually. Note that equipment operating at the same time could increase vibration levels substantially, but predicting any increase could be difficult. The criteria presented in this section should be used during the environmental impact assessment phase to identify problem locations that must be addressed during the engineering phase.

Compare the PPV and approximate L_v for each piece of equipment determined in Section 7.2, Step 3 to the vibration damage criteria in Table 7-5, which is presented by building/structural category, to assess impact.(70)(71) The approximate rms vibration velocity levels were calculated from the PPV limits using a crest factor of 4.

Table 7-5 Construction Vibration Damage Criteria

Building/ Structural Category	PPV, in/sec	Approximate L_v*
I. Reinforced-concrete, steel or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

*RMS velocity in decibels, VdB re 1 micro-in/sec

Compare the L_v determined in Section 7.2, Step 3 to the criteria for the General Vibration Assessment in Section 6.2 to assess annoyance or interference with vibration-sensitive activities due to construction vibration.

Step 5: Determine Construction Vibration Mitigation Measures

Evaluate the need for mitigation and select appropriate mitigation measures where potential human impacts or building damage from construction vibration have been identified according to Section 7.2, Step 4.

5a. Determine the appropriate approach for construction vibration mitigation considering equipment location and processes.

- **Design considerations and project layout**
  - Route heavily-loaded trucks away from residential streets. Select streets with the fewest homes if no alternatives are available.
  - Operate earth-moving equipment on the construction lot as far away from vibration-sensitive sites as possible.

- **Sequence of operations**
  - Phase demolition, earth-moving, and ground-impacting operations so as not to occur in the same time period. Unlike noise, the total vibration level produced could be substantially less when each vibration source operates separately.
  - Avoid nighttime activities. Sensitivity to vibration increases during the nighttime hours in residential neighborhoods.

- **Alternative construction methods**
  - Carefully consider the use of impact pile-driving versus drilled piles or the use of a sonic/vibratory pile driver or push pile driver where those processes might create lower vibration levels if geological conditions permit their use.
    - Pile-driving is one of the greatest sources of vibration associated with equipment used during construction of a project. The source levels in Table 7-4 indicate that sonic pile drivers may provide substantial reduction of vibration levels compared to impact pile drivers. But, there are some additional vibration effects of sonic pile drivers that may limit their use in sensitive locations.
    - A sonic pile driver operates by continuously shaking the pile at a fixed frequency, literally vibrating it into the ground. Continuous operation at a fixed frequency may, however, be more

noticeable to nearby residents, even at lower vibration levels. Furthermore, the steady-state excitation of the ground may induce a growth in the resonant response of building components. Resonant response may be unacceptable in cases of fragile buildings or vibration-sensitive manufacturing processes. Impact pile drivers, however, produce a high vibration level for a short time (0.2 seconds) with sufficient time between impacts to allow any resonant response to decay.

- Select demolition methods involving little to no impact, where possible. For example, sawing bridge decks into sections that can be loaded onto trucks results in lower vibration levels than impact demolition by pavement breakers. Milling generates lower vibration levels than excavation using clam shell or chisel drops.
- Avoid vibratory rollers and packers near sensitive areas.

5b. Describe and commit to a mitigation plan that will be developed and implemented during the engineering and construction phase when the information available during the project development phase will not be sufficient to define specific construction vibration mitigation measures. The objective of the plan should be to minimize construction vibration damage using all reasonable and feasible means available. The plan should include the following components:

- A procedure for establishing threshold and limiting vibration values for potentially affected structures, based on an assessment of each structure's ability to withstand the loads and displacements due to construction vibrations
- A commitment to develop a vibration monitoring plan during the engineering phase and to implement a compliance monitoring program during construction

SECTION 8

Documentation of Noise and Vibration Assessment

The level of required documentation is determined according to the project class of action. Section 2.1 covers the appropriate class of action (EIS, EA, or CE) for different projects. If there is uncertainty in the appropriate level of documentation, contact the FTA Regional office.

The noise and vibration analysis must be articulated to the public in a clear, comprehensive manner for all levels of documentation. The technical data and information necessary to withstand scrutiny in the environmental review process must be documented in a way that remains intelligible to the public. Justification for all assumptions used in the analysis, such as selection of representative measurement sites and all baseline conditions, must be presented for review.

A separate technical report or memorandum is often prepared as a supplement to the environmental document. A technical report is appropriate in cases when including the data from the assessment would create an unreasonably long environmental document. The details of the analysis are important for establishing the basis for the assessment. Therefore, all details in the technical report should be contained in a well-organized format for easy access to the information.

For large-scale projects, the environmental document should contain a summary of the essential analysis information to provide subject matter context and the analysis findings. For these projects, separate technical reports are usually prepared as supplements to the EIS or EA and referred to in the environmental document. For smaller projects, or projects with minimal noise or vibration impact, all of the technical information may be presented in the environmental document itself or in a technical memorandum. Other projects might have no potential for noise or vibration impacts. For those projects, that environmental documentation should explain that no noise or vibration impacts are expected.

This section provides guidance on presenting the necessary noise and vibration information in the environmental document (Section 8.1) and the associated technical report (Section 8.2).

8.1 Environmental Document

In the environmental document, provide a summary of the comprehensive noise and vibration information from the technical report and emphasize the salient points of the analysis in a format and style that the public can understand. Smaller projects may have all of the technical information contained within the environmental document, so take special care in summarizing the technical details to convey the information adequately.

Step 1: Choose the Information to Include

Choose the appropriate noise and vibration analysis information to include based on the level of environmental review and the associated documentation.

1a. Provide full disclosure of noise and vibration impacts in the environmental document, including identification of locations where impacts cannot be mitigated below the severe impact level. In general, an EIS describes significant impacts and plans to mitigate the impacts. For EAs, completion of the environmental review with a finding of no significant impact (FONSI) may depend on mitigation being considered for incorporation in the proposed project. The way mitigation is presented in the environmental document depends on the type of impact (noise or vibration) and the stage of project development and environmental review. Projects that meet the criteria of a CE may also require the completion of a noise and/or vibration analysis, and the results of such an analysis should be documented in a noise memo or the CE documentation.

1b. Document noise impacts – Typically, airborne noise impacts can be accurately predicted during the environmental review. For projects that focus on a single alternative, noise impacts can be accurately identified in the draft environmental document. If mitigation is anticipated, then mitigation options should be explored in the EA or draft EIS; firm decisions on mitigation can be deferred to the final document. But for all projects, decisions on noise mitigation should be made before the final document is approved.

1c. Document vibration impacts – Predicting vibration impacts accurately is more complex because ground-borne vibration may be strongly influenced by subsurface conditions. The geotechnical studies that reveal these conditions are normally undertaken during the engineering phase, after the environmental review process is complete. Therefore, the final environmental document will usually not be able to state with certainty whether mitigation is needed for ground-borne vibration and noise.

If the engineering phase is conducted at the same time as the final environmental document, report the results of the Detailed Vibration Analysis in the final environmental document. If the engineering phase is conducted after the final environmental document, report the results of the General Vibration Assessment in the final environmental document. If impact is determined, include a commitment in the final document to conduct a Detailed Vibration Analysis during the engineering phase to complete the impact assessment. Also, include a discussion on various control measures that could be used and the likelihood that the criteria could be met through the use of one or more of the measures. It may be possible to state a commitment in the final environmental document to adhere to the impact criteria for the Detailed Vibration Analysis, while deferring the selection of specific vibration control measures until the completion of detailed studies in the engineering phase. When work is conducted after FTA signs its final decision document (i.e., ROD, combined FEIS/ROD, or FONSI), additional documentation, such as a reevaluation of the previous decision, may be necessary. FTA recommends contacting the FTA Regional office directly in these situations.

1d. Describe mitigation measures in the decision document – After the decision document is approved, incorporate the mitigation measures by reference in the actual grant agreements signed by FTA and the project sponsor. The mitigation measures then become contractual conditions that must be adhered to by the project sponsor.

It is typically appropriate to include the following noise and vibration information in the environmental document, as described in Section 8.1:

- The existing conditions (affected environment)
- The direct impacts from operation (environmental consequences)
- The construction impacts (environmental consequences)

Step 2: Organize information in the Environmental Document

Include information in the following sections of the environmental document separating out the noise and vibration information.

2a. Existing Conditions (Affected Environment) – Describe the existing conditions (conditions without the project) in terms of the existing noise and vibration conditions in this section of the document. The primary function of this section is to establish the focus and baseline conditions for the discussion of environmental impacts. Include the following basic information and separate the noise and vibration sections.

- **Description of noise/vibration metrics, effects and typical levels** – Include a targeted summary of relevant information from Section 3 of this manual. This will serve as background for the discussions of noise/vibration levels and characteristics that will follow in later sections. Provide illustrative material to convey typical levels to the public.

- **Inventory of noise/vibration-sensitive sites** – Describe the approach for identifying noise- and vibration-sensitive sites as well as the identified sites and site descriptions. Use sufficient detail to demonstrate completeness. Document these results on a map.

- **Noise/vibration measurements** – Document the basis for selecting measurement sites, including tables of sites coordinated with maps showing locations of sites. Summarize the measurement approach and include the justification for the measurement procedures used.

  Present measurement data in well-organized tables and figures with a summary and interpretation of measured data. Measurements are often included in the table of measurement sites described in the previous paragraph. In some cases, measurements may be supplemented or replaced by collected data relevant to the noise and vibration characteristics of the area. For example, soil information for estimating ground-borne vibration propagation characteristics may be available from other projects in the area.

A summary and interpretation of how the collected data define the project setting is fundamental to this section.

2b. Direct Impacts – Include the following in the discussion on direct impacts due to project operation:

- **Overview of approach** – Provide a targeted summary of relevant information on the assessment procedure for determining noise/vibration impacts as a framework for the following sections.

- **Estimated noise/vibration levels** – Provide a general description of prediction models used to estimate project noise/vibration levels. Describe any distinguishing features unique to the project, such as source levels associated with various technologies.

  Describe the results of the predictions in general terms first, followed by a detailed accounting of predicted noise levels. Supplement this information with tables and illustrate by contours, cross-sections, or shaded mapping. If contours are included in a technical report, it is not necessary to repeat them in this section.

- **Criteria for noise/vibration impact** – Describe the impact criteria for the project in detail and reference the appropriate section in this manual. Include tables listing the criteria levels or the figures included in this manual.

- **Noise/vibration impact assessment** – Present the impact assessment in its own section or combined with the section above.

  Describe the locations, as identified in the screening procedure, where noise/vibration impact is expected to occur without implementation of mitigation measures, based on the screening results, predicted future levels, existing levels, and application of the impact criteria.

  Include inventory tables of impacted noise- and vibration-sensitive sites to quantify the impacts for all noise/vibration-sensitive sites included in the Affected Environment (Existing Conditions) as described in the Existing Conditions section above.

- **Noise/vibration mitigation measures** – Perhaps the greatest difference between the technical report and the environmental document is with mitigation. The technical report discusses mitigation options and recommendations, while the environmental document provides the vehicle for reaching decisions on appropriate mitigation measures.

  Begin this section with a summary of the noise/vibration mitigation measures considered for the impacted locations. Describe the specific measures selected for implementation in detail. Also, include any applicable, specific noise or vibration policies the project sponsor may have in place.

In cases where it is not possible to commit to a specific mitigation measure in the final environmental document, it may be possible to commit to a certain noise/vibration level. For example, the environmental document could include a commitment to meet or exceed the impact criteria specified in Sections 4.1 and 6.2.

- **Unavoidable adverse environmental effects** – If it is projected that adverse noise/vibration impacts will result after all reasonable abatement measures have been incorporated, identify these impacts in this section.

2c. Construction Impacts – Discuss construction impacts in the environmental document's section on construction impacts, if present. If, because of the scale of the project, the environmental document does not have a separate construction impacts section, then the construction impacts should be discussed with the rest of the resource impacts.

When a special section on construction noise/vibration impacts is included in the document, it should be organized according to the comprehensive outline on long-term impacts described above. For projects with relatively minor effects, include a brief summary of impact.

8.2 Technical Report on Noise and Vibration

The technical report is intended to present complete technical data and descriptions in a manner that can be understood by the general public, but is more technical than the information found in the environmental document. All necessary background information should be present in the technical report, including tables, maps, charts, drawings, and references that may be too detailed for the environmental document, but which are important in helping to draw conclusions about the project's noise and vibration impacts and mitigation options.

Include the following major subject headings and key information described below. If both noise and vibration have been assessed, include separate sections for noise and vibration with subsections for key information as described below. Additional details on documentation requirements for the technical report of non-standard procedures and methodologies are included in Appendix G.

- **Overview** – Include a brief description of the project and an overview of the noise/vibration concerns to highlight initial considerations in framing the scope of the study.

- **Inventory of Noise/Vibration-Sensitive Sites** – Describe the approach for identifying noise- and vibration-sensitive sites as well as the identified sites and site descriptions. Use sufficient detail to demonstrate completeness. Document results on a map.

- **Measurements of Existing Noise/Vibration Conditions**
  - Document the basis for selecting measurement sites, including tables of sites coordinated with maps showing locations of sites. Summarize the measurement approach with justification for the measurement procedures used.
  - If the measurement data are used to estimate existing conditions at other locations, include the rationale and the method of estimation. Describe measurement procedures in detail.
  - Include tables of measurement instruments documenting manufacturer, type, serial number, and date of most recent calibration by authorized testing laboratory. Document measurement periods, including the time of day and length of time at each site to demonstrate adequate representation of ambient conditions.
  - Present measurement data in well-organized tables and figures with a summary and interpretation of measured data.

- **Additional Measurements Related to the Project** – Include detailed description of measurements and results for projects that require specialized measurements at noise- and vibration-sensitive sites. Examples include:
  - Outdoor-to-indoor noise level reduction of homes
  - Transmission of vibration into concert halls and recording studios
  - Special source-level characterization

- **Predictions of Noise/Vibration from the Project**
  - Describe the prediction model used to estimate future project conditions and specific data used as input to the models. Reference the appropriate section in this manual. Document any change or extension to the models recommended in this manual, so that the validity of the adjustments can be confirmed. See Appendix G for more information.
  - Describe in detail the modeled scenarios and why the scenarios were chosen.
  - Tabulate computed levels and illustrate by contours, cross-sections, or shaded mapping. Illustrate noise/vibration impacts with base maps at a scale with enough detail to provide reference for the location.

- **Noise/Vibration Criteria**
  - Describe the impact criteria for the project in detail and reference the appropriate section in this manual. Include tables specifying the criteria levels or the figures included in this manual.
  - If construction noise and/or vibration assessments were conducted, include the construction criteria in a separate section with the construction assessment details. See below for more information.

- **Noise/Vibration Impact Assessment**
    - Describe the impact assessment according to the appropriate noise and/or vibration impact assessment sections in this manual.
    - If an alternatives analysis was conducted, present a resulting impact inventory for each alternative mode or alignment in a format that allows comparison among alternatives.
    - Tabulate the inventory according to the different types of affected noise- and vibration-sensitive sites. Present the results of the assessment both before and after mitigation.

- **Noise/Vibration Mitigation**
    - Begin this section with a summary of all treatments considered, including those not carried to final consideration.
    - Consider final candidate mitigation treatments separately and provide a description of the features of the treatment, including costs, expected benefit in reducing impacts, locations where the benefit would be realized, and a discussion of the practicality of alternative treatments.
    - Include enough noise and vibration impact information to allow the project sponsor and FTA to reach decisions on mitigation prior to issuance of an environmental decision document.

- **Construction Noise/Vibration Impacts**
    - Describe criteria adopted for construction noise or vibration if construction noise and/or vibration assessments were conducted.
    - Describe the method used for predicting construction noise or vibration and include inputs to the models such as equipment roster by construction phase, equipment source levels, assumed usage factors, and other assumed site characteristics.
    - Present predicted levels for noise- and vibration-sensitive sites and identify short-term impacts.
    - In cases where construction impacts are identified, discuss feasible abatement methods using enough detail to allow construction contract documents to include mitigation measures.

- **References** – Provide references for all criteria, approaches, and data used in the analyses, as well as other reports related to the project that may be relied on for information, e.g., geotechnical reports.

Appendix A: Glossary of Terms

Terminology used through the manual is defined in this appendix.(49)(72)

A-weighting	A standardized filter used to alter the sensitivity of a sound level meter with respect to frequency so that the instrument is less sensitive at low and high frequencies where the human ear is less sensitive. Abbreviated as dBA.
Absolute Noise Impact	Noise that interferes with activities independent of existing noise levels and is expressed as a fixed level threshold.
Accelerometer	A transducer that converts vibratory motion to an electrical signal proportional to the acceleration of that motion.
Ambient	The pre-project background noise or vibration level, which is often used interchangeably with "existing noise" in this manual.
Amplitude	Difference between the extremes of an oscillating signal.
Alignment	The horizontal location of a railroad or transit system as described by curved and tangent track.
At-grade	Tracks on the ground surface.
Automated Guideway Transit (AGT)	Guided steel-wheel or rubber-tired transit passenger vehicles operating singly or in multi-car trains with a fully automated system on fixed-guideways along an exclusive ROW. AGT includes personal rapid transit, group rapid transit, and automated people mover systems.
Auxiliaries	The term applied to a number of separately driven machines, operated by power from the main engine or electric generation. They include the air compressor, radiator fan, traction motor blower, and air conditioning equipment.
Ballast mat	A 2- to 3-inch-thick elastomer mat placed under the normal track ballast on top of a rigid slab or packed sub-grade.
Ballast	Granular material placed on the trackbed for the purpose of holding the track in line and at surface.
Bus Rapid Transit (BRT)	A type of limited-stop bus operation that relies on technology to help speed up the service. Buses can operate on exclusive transitways, high-occupancy-vehicle lanes, expressways, or ordinary streets.
Catenary	On electric railroad and LRT systems, the term describing the overhead conductor that is contacted by the pantograph or trolley, and its support structure.
Commuter rail	Conventional passenger railroad serving areas surrounding an urban center. Most commuter railroads utilize locomotive-hauled coaches, often in push-pull configuration.
Consist	The total number and type of cars, locomotives, or transit vehicles in a trainset.
Continuous welded rail	A number of rails welded together to form unbroken lengths of track without gaps or joints.
Corrugated rail	A rough condition of alternating ridges and grooves which develops on the rail head in service.
Crest factor	The ratio of peak particle velocity to maximum RMS amplitude in an oscillating signal.
Criteria	Plural form of "criterion," the relationship between a measure of exposure (e.g., sound or vibration level) and its corresponding effect.
Cross tie	The transverse member of the track structure to which the rails are spiked or otherwise fastened to provide proper gage and to cushion, distribute, and transmit the stresses of traffic through the ballast to the trackbed.
Crossover	Two turnouts with the track between the frogs arranged to form a continuous passage between two nearby and generally parallel tracks.
Cumulative	The summation of individual sounds into a single total value related to the effect over time.
Cut	A terrain feature typically created to allow for a trackbed to be at a lower level than the surrounding ground.

dB	See Decibel.
dBA	See A-weighting.
Decibel	The standard unit of measurement for sound pressure level and vibration level. Technically, a decibel is the unit of level which denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm of this ratio. Abbreviated as dB.
DMU	Diesel-powered multiple unit. See Multiple Unit.
DNL	See L_{dn}.
Electrification	A term used to describe the installation of overhead wire or third rail power distribution facilities to enable operation of trains.
Embankment	A bank of earth, rock, or other material constructed above the natural ground surface.
Equivalent level	The level of a steady sound, which, in a stated time period and at a stated location, has the same sound energy as the time-varying sound. Also, written as L_{eq}.
Event	A passby of a vehicle (e.g., train, bus, or car) of any size consist.
Ferry boat	A transit mode comprised of vessels to carry passengers and/or vehicles over a body of water.
Fixed-guideway	A public transportation facility with a separate ROW for the exclusive use of public transportation and other high-occupancy vehicles.
Flange	The vertical projection along the inner rim of a wheel that serves, together with the corresponding projection of the mating wheel of a wheel set, to keep the wheel set on the track.
Floating slab	A special track support system for vibration isolation, consisting of concrete slabs supported on resilient elements, usually rubber or similar elastomer.
Force density	Force density is the force per root distance along the track in $lb/ft^{1/2}$. The force density level is the level in decibels of the force density relative to 1 $lb/ft^{1/2}$ and describes the vehicle force that excites the soil/rock surrounding the transit structure.
Frequency	The number of times that a periodically occurring quantity repeats itself in a specified period. With reference to noise and vibration signals, the number of cycles per second.
Frequency spectrum	Distribution of frequency components of a noise or vibration signal.
Frog	A track structure used at the intersection of two running rails to provide support for wheels and passageways for their flanges, thus permitting wheels on either rail to cross the other.
Gage (of track)	The distance between the rails on a track.
Grade crossing	The point where a rail line and a motor vehicle road intersect at the same vertical elevation.
Guideway	Supporting structure to form a track for rolling or magnetically-levitated vehicles.
Head-End Power (HEP)	A system of furnishing electric power for a complete railway train from a single generating plant in the locomotive.
Heavy rail	See Rail Rapid Transit.
Hertz (Hz)	The unit of acoustic or vibration frequency representing cycles per second.
Hourly average sound level	The time-averaged A-weighted sound level, over a 1-hour period, usually calculated between integral hours. Abbreviated as $L_{(1h)}$.
Hybrid Bus	A rubber-tired vehicle that features a hybrid diesel-electric propulsion system. A diesel engine runs an electric generator that powers the entire vehicle including electric drive motors that deliver power to the wheels.
Idle	The speed at which an engine runs when it is not under load.
Intermediate Capacity Transit (ICT)	A transit system with less capacity than rail rapid transit (RRT), but more capacity than typical bus operations. Examples of ICT include bus rapid transit (BRT), automated guideway transit (AGT), monorails, and trolleys.
Intermodal facility	Junction of two or more modes of transportation where transfers may occur.
Jointed rail	A system of joining rails with steel members designed to unite the abutting ends of contiguous rails.

$L_{(1h)}$	See Hourly Average Sound Level.
L_{dn}	Day-Night Sound Level. The sound exposure level for a 24-hour day calculated by adding the sound exposure level obtained during the daytime (7 a.m. to 10 p.m.) to 10 times the sound exposure level obtained during the nighttime (10 p.m. to 7 a.m.). This unit is used throughout the United States for environmental impact assessment. Also, written as DNL.
$L_{eq(1hr)}$	Equivalent Sound Level. The metric for cumulative noise exposure over a specific time interval is the equivalent sound level
Light Rail Transit (LRT)	A mode of public transit with tracked vehicles in multiple units operating in mixed traffic conditions on streets as well as sections of exclusive ROW. Vehicles are generally powered by electricity from overhead lines.
Locomotive	A self-propelled, non-revenue rail vehicle designed to convert electrical or mechanical energy into tractive effort to haul railway cars. See also Power Unit.
Main line	The principal line or lines of a railway.
Maglev	Magnetically-levitated vehicle; a vehicle or train of vehicles with guidance and propulsion provided by magnetic forces. Support can be provided by either an electrodynamic system wherein a moving vehicle is lifted by magnetic forces induced in the guideway or an electromagnetic system wherein the magnetic lifting forces are actively energized in the guideway.
Maximum sound level	The highest exponential-time-average sound level, in decibels, that occurs during a stated time period. Abbreviated as L_{max}. The standardized time periods are 1 second for L_{max}, slow, and 0.125 second for L_{max}, fast.
Metric	Measurement value or a quantitative descriptor used to identify a specific measure of sound level.
Monorail	Guided transit vehicles operating on or suspended from a single rail, beam, or tube.
Multimodal Project	In this manual, the term multimodal project is used to describe a project that includes changes to both transit and highway components in segments of the project.
Multiple Unit (MU)	A term referring to the practice of coupling two or more diesel-powered or electric-powered passenger cars together with provision for controlling the traction motors on all units from a single controller.
Noise	Any disagreeable or undesired sound or other audible disturbance.
Octave band	A standardized division of a frequency spectrum in which the interval between two divisions is a frequency ratio of 2.
One-third octave band	A standardized division of a frequency spectrum in which the octave bands are divided into thirds for more detailed information. The interval between center frequencies is a ratio of 1.25.
Pantograph	A device for collecting current from an overhead conductor (catenary), consisting of a jointed frame held up by springs or compressed air and having a current collector at the top.
Park-and-ride facility	A parking garage and/or lot used for parking passengers' automobiles while they use transit agency facilities and vehicles.
Peak factor	See Crest factor.
Plan-and-profile	Mapping used by transportation planners that shows two-dimensional plan views (x- and y- axes) on the same page as two-dimensional profiles (x- and z-axes) of a road or track.
Peak Particle Velocity (PPV)	The peak signal value of an oscillating vibration velocity waveform. Usually expressed in inches/second in the United States.
Peak-to-Peak (P-P) Value	Of an oscillating quantity, the algebraic difference between the extreme values of the quantity.
Power unit	A self-propelled vehicle, running on rails and having one or more electric motors that drive the wheels and thereby propel the locomotive and train. The motors obtain electrical energy either from a rail laid near, but insulated from, the track rails, or from a wire suspended above the track. Contact with the overhead wire is made by a pantograph mounted on top of the unit.
Project segment	Portions of a project with similar characteristics.

Pure tone	Sound of a single frequency.
Radius of curvature	A measure of the severity of a curve in a track structure based on the length of the radius of a circle that would be formed if the curve were continued.
Rail	A rolled steel shape, commonly a T-section, designed to be laid end to end in two parallel lines on cross ties or other suitable supports to form a track for railway rolling stock.
Rail Rapid Transit (RRT)	Often called "Heavy Rail Transit." A mode of public transit with tracked vehicles in multiple units operating in exclusive rights-of-way. Trains are generally powered by electricity from a third rail alongside the track.
Receiver	A stationary far-field position at which noise or vibration levels are specified.
Relative Noise Impact	Noise increase above existing levels.
Resonance frequency	The phenomenon that occurs in a structure under conditions of forced vibration such that any change in frequency of excitation results in a decrease in response.
Right-of-Way	Abbreviated as ROW. Lands or rights used or held for railroad or transit operation.
Root Mean Square (rms)	The square root of the mean-square value of an oscillating waveform, where the mean-square value is obtained by squaring the value of amplitudes at each instant of time and then averaging these values over the sample time.
RMS Velocity Level (LV)	See Vibration Velocity Level.
SEL	See Sound Exposure Level.
Sound Exposure Level	The level of sound accumulated over a given time interval or event. Technically, the sound exposure level is the level of the time-integrated mean square A-weighted sound for a stated time interval or event, with a reference time of one second. Abbreviated as SEL.
Sound	A physical disturbance in a medium that is capable of being detected by the human ear.
Spectrum	See Frequency Spectrum.
Sub-ballast	Any material of a superior character, which is spread on the finished subgrade of the roadbed and below the top-ballast, to provide better drainage, prevent upheaval by frost, and better distribute the load over the roadbed.
Subgrade	The finished surface of the roadbed below the ballast and track.
Suburban bus	A bus similar to an intercity bus with high-backed seats but no luggage compartment, often used in express mode to city centers from suburban locations.
Switch	A track structure used to divert rolling stock from one track to another.
Tangent track	Track without curvature.
Track	An assembly of rail, ties, and fastenings over which cars, locomotives, and trains are moved.
Traction motor	A specially designed direct current series-wound motor mounted on the trucks of locomotives and self-propelled cars to drive the axles.
Trainset	A group of coupled cars including at least one power unit.
Transducer	Device designed to receive an input signal of a given kind (motion, pressure, heat, etc.) and to provide an output signal of a different kind (electrical voltage, amperage, etc.) in such a manner that desired characteristics of the input signal appear in the output signal for measurement purposes.
Transfer mobility	Transfer mobility is the complex velocity response produced by a point force as a function of frequency and represents the relationship between a vibration source that excites the ground and the resulting vibration of the ground surface.
Transit center	A fixed location where passengers interchange from one route or vehicle to another.
Trolley bus	A rubber-tired, electrically-powered bus operating on city streets drawing power from overhead lines.
Truck	The complete assembly of parts including wheels, axles, bearings, side frames, bolster, brake rigging, springs, and all associated connecting components, the function of which is to provide support, mobility, and guidance to a railroad car or locomotive.
Trunk line	See Mainline. The mainline of a commuter railroad where the branch line traffic is combined.

Turnout	An arrangement of a switch and a frog with closure rails, by means of which rolling stock may be diverted from one track to another.
VdB	See Vibration Velocity Level.
Vibration Velocity Level (LV)	Ten times the common logarithm of the ratio of the square of the amplitude of the RMS vibration velocity to the square of the amplitude of the reference RMS vibration velocity. The reference velocity in the United States is one micro-inch per second. Abbreviated as VdB.
Vibration	An oscillation wherein the quantity is a parameter that defines the motion of a mechanical system.
Wheel flat	A localized flat area on a steel wheel of a rail vehicle, usually caused by skidding on steel rails, causing a discontinuity in the wheel radius.
Wheel squeal	The noise produced by wheel-rail interaction, particularly on curves where the radius of curvature is smaller than allowed by the separation of the axles in a wheel set.

Additional, relevant acoustic terminology and formulas are defined in ANSI S1.1-1994 (49).

Appendix B: Fundamentals of Noise

Noise is generally considered to be unwanted sound. Sound is what we hear when our ears are exposed to small pressure fluctuations in the air. There are many ways in which pressure fluctuations are generated, but typically they are caused by vibrating movement of a solid object. This manual uses the terms noise and sound interchangeably because there is no physical difference between them. Noise can be described in terms of three variables: amplitude (loud or soft); frequency (pitch); and time pattern (variability).

B.1 Amplitude

The loudness of a sound is described by the sound wave's amplitude of pressure fluctuations above and below atmospheric pressure. Pressure is measured in Pascals. The mean value of the positive and negative pressure fluctuations is the static atmospheric pressure and is not a useful metric of sound. However, the effective magnitude of the sound pressure in a sound wave can be expressed by the rms of the oscillating pressure. See Figure B-1 for an illustration of the rms pressure.

The rms pressure is calculated according to Eq. B-1. The values of sound pressure are squared and time-averaged to smooth out variations. The rms pressure is the square root of this time-averaged value.

$$P_{rms} = \sqrt{\frac{1}{N}\sum_{i=1}^{N} P_i^2} \qquad \textbf{Eq. B-1}$$

where:

P_{rms} = sound pressure
P_i = individual sound pressure
N = number of samples
$i = 1$ = index of summation

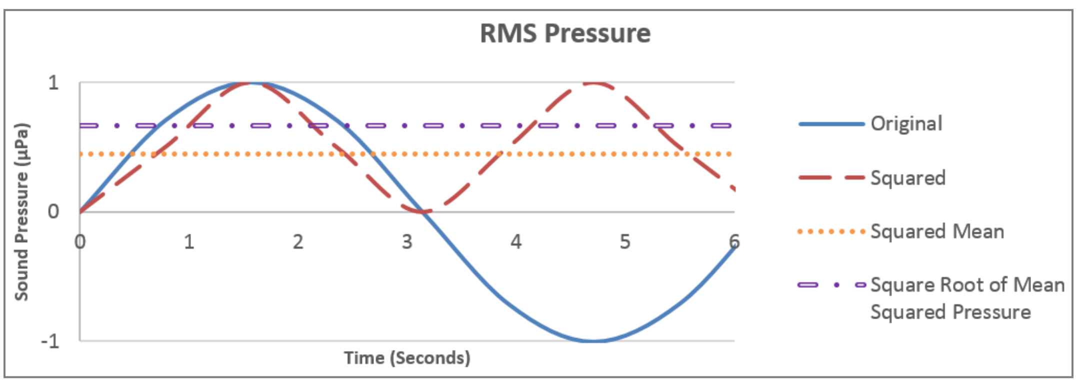

Figure B-1 RMS Pressure Illustration

Most humans with typical or average hearing can perceive sounds ranging from approximately 20 microPascals to 20 million microPascals or more. Because of the difficulty in dealing with such an extreme range of numbers, acousticians use a logarithmic scale to describe sound levels. Acousticians use a compressed scale based on logarithms of the ratios of the sound energy contained in the wave related to the square of sound pressures instead of the sound pressures themselves, resulting in the "sound pressure level" in decibels (dB). The 'B' in dB is always capitalized because the unit is named after Alexander Graham Bell, a leading 19th century innovator in communication.

Sound pressure level (L_p) is defined as:

$$L_p = 10log_{10}(\frac{p^2_{rms}}{p^2_{ref}}); or$$

$$L_p = 20log_{10}(\frac{P_{rms}}{P_{ref}})\ dB$$ **Eq. B-2**

where

L_P	= sound pressure level, dB
P_{rms}	= RMS sound pressure
P_{ref}	= 20 microPascals

Inserting the range of sound pressure values mentioned above into Eq. B-2 results in a typical quietest sound at 20 microPascals at 0 dB. A typical loudest sound of 20 million microPascals is 120 dB.

B.1.1 Decibel Addition

The combination of two or more sound pressure levels at a single location requires decibel addition, which is the addition of logarithmic quantities of sound energy (P^2_{rms}).

To add sound energy from multiple, unique sources, add the sound energy as shown Eq. B-3.

$$L_p = 10log_{10}(\frac{{P_1}^2 + {P_2}^2 + \cdots + {P_n}^2}{P^2_{ref}})$$ **Eq. B-3**

where

L_P	= sound pressure level, dB
$P_1, P_{2,} P_n$	= individual source RMS sound pressures to add
P_{ref}	= 20 microPascals

A doubling of identical sound sources results in a 3-dB increase, as shown mathematically below.

$$L_p = 10log_{10}(2\frac{p^2_{rms}}{p^2_{ref}})$$

$$= 10log_{10}(\frac{p^2_{rms}}{p^2_{ref}}) + 10log_{10}(2)$$

$$= 10log_{10}(\frac{p^2_{rms}}{p^2_{ref}}) + 3$$

To add decibel levels (instead of sound energy) use the following equation:

$$L_p = 10log_{10}(\sum_{i=1}^{N} 10^{(L_i/10)})$$

where

L_p = sound pressure level, dB
N = number of samples
i = index of summation
L_i = individual sound pressure levels, dB
L_P = sound pressure level, dB
$L_1, L_{2,} L_n$ = individual source sound pressure levels to add

The equation above can be rewritten as follows:

$$L_p = 10log_{10}(10^{\frac{L_1}{10}} + 10^{\frac{L_2}{10}} + \cdots + 10^{\frac{L_n}{10}}) \qquad \textbf{Eq. B-4}$$

where

$L_1, L_{2,} L_n$ = individual source sound pressure levels to add

Decibel addition can be quickly approximated using Figure B-2.

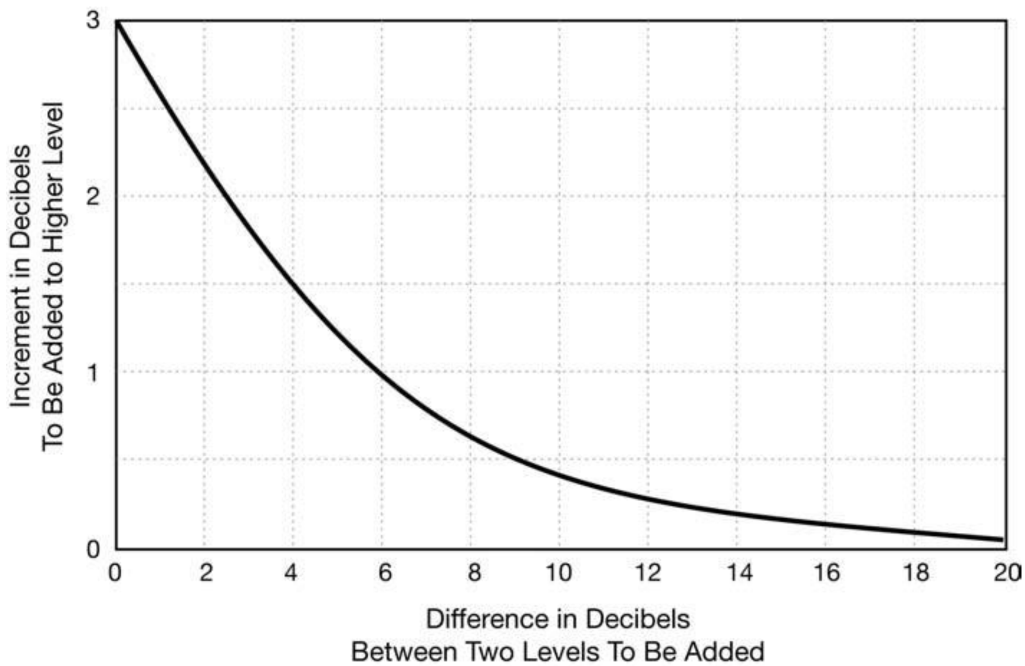

Figure B-2 Graph for Approximate Decibel Addition

Example B-1 Decibel Addition – Identical Buses

Decibel Addition

What is the combined sound pressure level of two identical buses if the noise from one bus resulted in a sound pressure level of 70 dB?

Since a doubling of identical sound sources results in a 3-dB increase:

$$
\begin{aligned}
L_p &= 70 + 3 \\
&= 73\ dB
\end{aligned}
$$

Example B-2 Decibel Addition – Two Sources

Decibel Addition

What is the combined sound pressure level of 64 dB and 60 dB?

Using Eq. B-4:

$$
\begin{aligned}
L_p &= 10log_{10}(10^{64/10} + 10^{60/10}) \\
&= 65.5\ dB
\end{aligned}
$$

Using Figure B-2:
The x-axis values represent the difference between the two sound levels, 64 and 60 dB. The difference between the sound levels in this example is 4. The point on the curve corresponding to 4 on the x-axis is 1.5. The y-axis values represent the increment that is added to the higher level.

$$
\begin{aligned}
L_p &= 64 + 1.5 \\
&= 65.5\ dB
\end{aligned}
$$

B.1.2 Frequency

Sound is a fluctuation of air pressure. The number of times the fluctuation occurs in one second is called its frequency. In acoustics, frequency is quantified in cycles per second, or Hertz (Hz). The hearing for a typical human covers the frequency range from 20 Hz to 20,000 Hz.

Some sounds, like whistles, are associated with a single frequency; this type of sound is called a pure tone. However, most often, noise is made up of many frequencies, called a spectrum. Analyzing a noise spectrum allows for identification of dominant frequency ranges and can assist in identifying noise sources. Often a frequency spectrum is divided into standardized frequency bands for analysis. Most commonly, the frequency bands for transit analyses are octave bands (where the interval between two divisions is a frequency ratio of 2) and one-third octave bands (where the interval between center frequencies is a ratio of 1.25).(73)

If the spectrum associated with a transit noise source is dominated by many low-frequency components, the noise will have a characteristic like the rumble of thunder; this is often associated with noise from a subway. Mid-range frequencies are often associated with wheel/rail noise, and high frequencies may be associated with wheel squeal due to sharp curves on a track.

The spectrum in Figure B-3 illustrates the full range of acoustical frequencies that can occur near a transit system. In this example, the noise spectrum was measured near a train on an elevated steel structure with a sharp curve.

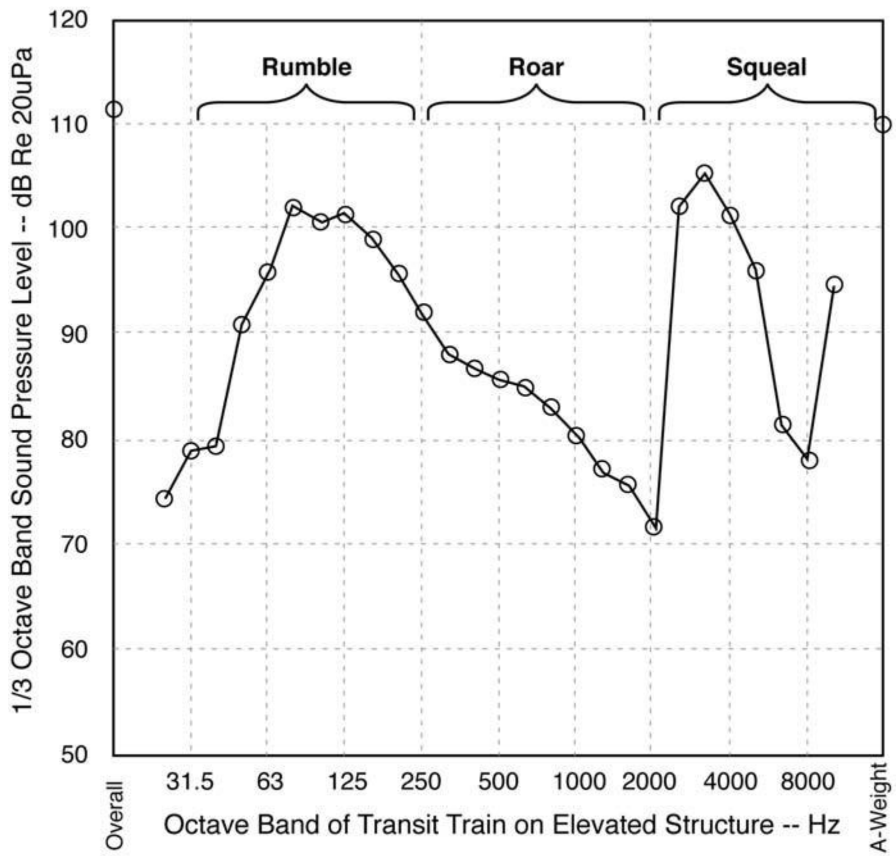

Figure B-3 Noise Spectrum of Transit Train on Curve and Elevated Structure

The human auditory system does not respond equally to all frequencies of sound. For sounds normally heard in our environment, low frequencies below 250 Hz and frequencies above 10,000 Hz are generally considered less audible than the frequencies in between. This is because our ears are less sensitive in those areas. To better represent human hearing, frequency response functions were developed to characterize the way people respond to different frequencies. These are referred to as A-, B-, and C-weighted curves and represent human auditory response to normal, very loud, and extremely loud sound levels, respectively. Environmental noise is generally considered to be in the normal sound level range; and, therefore, the A-weighted sound level is considered best to represent the human response.

The A-weighting curve is shown in Figure B-4. This curve illustrates that sounds at 50 Hz would have to be amplified by 30 dB to be perceived as loud as a sound at 1000 Hz at normal sound levels.

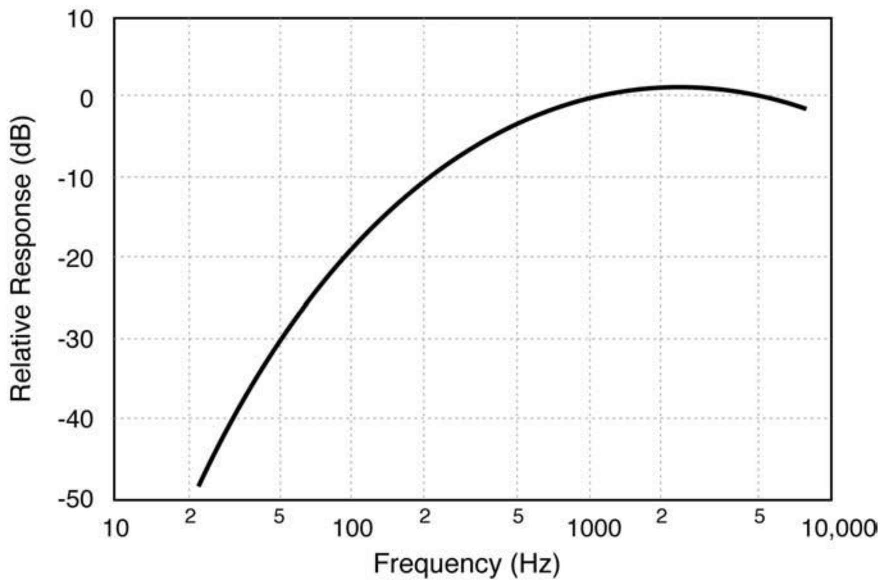

Figure B-4 A-Weighting Curve

Low frequencies have longer wavelengths of sound (cycles are less frequent) and, conversely, high frequencies have shorter wavelengths (cycles are more frequent). The size of the wavelength in feet is dependent on frequency and speed of sound as follows:

$$f\lambda = c \qquad \textbf{Eq. B-5}$$

where

f = frequency in cycles per second, Hz
λ = wavelength, ft
c = speed of sound, ft/sec

The speed of sound in air varies with temperature; but at standard conditions, it is approximately 1000 ft per second. Therefore, at standard conditions, a frequency of 1000 Hz has a wavelength of 1 foot and a frequency of 50 Hz has a wavelength of 20 ft. The scale of these waves explains, in part, the reason humans perceive sounds of 1000 Hz better than those of 50 Hz. A wavelength of 1 foot is similar to the size of a person's head; whereas, a wavelength of 20 ft is similar to dimensions associated with a house, which is why low-frequency sounds (such as those from an idling locomotive) are sometimes not attenuated by walls and windows of a home. These sounds transmit indoors with relatively little reduction in strength.

B.1.3 Time Pattern

The third important characteristic of noise is its variation in time. Environmental noise is considered to be a combination of all outdoor noise sources. When combined, sources such as distant traffic, wind in trees, and distant industrial or farming activities often create a low-level background noise in which no particular individual source is identifiable. Background noise is often relatively constant from moment to moment, but varies slowly over time as natural forces change or as human activity follows its daily cycle. In addition to this low-level, slowly varying background noise, a succession of identifiable noisy events of relatively brief duration may be added. These events may include single-vehicle passbys, aircraft flyovers, screeching of brakes, and other short-term events, which all cause the noise level to substantially fluctuate from moment to moment.

It is possible to describe these fluctuating noises in the environment using single-number metrics to allow for manageable measurements, computations, and impact assessment. The search for adequate single-number noise metrics has encompassed hundreds of attitudinal surveys and laboratory experiments in addition to decades of practical experience with many alternative metrics.

B.1.4 Noise Metrics

The noise metrics referred to in this manual are described in the sections below.

B.1.4.1 A-weighted Sound Level: The Basic Noise Unit

The basic noise unit for transit noise is the A-weighted sound level and is described in ANSI S1.1-1994 (49). It describes the noise level at the receiver at any moment in time and can be read directly from noise-monitoring equipment when frequency weighting is set to A-weighting. Figure B-5 shows examples of typical A-weighted sound levels for both transit and non-transit sources, ranging from approximately 30 dBA (very quiet) to 90 dBA (very loud).

The unit dBA denotes the decibel level is A-weighted. The letter "A" indicates that the sound has been filtered to reduce the strength of very low and very high-frequency sounds to emulate the human response to sound levels as described in Appendix B.1.2. This allows for events that are out of the range of human hearing, such as high-frequency dog whistles and low-frequency seismic disturbances, to be filtered out. On average, each A-weighted sound level increase of 10 dB corresponds to an approximate doubling of subjective loudness.

A-weighted sound levels are adopted as the basic noise unit for transit noise impact assessments because they:

- Can be measured easily,
- Approximate the human ear's sensitivity to sounds of different frequencies,
- Match attitudinal-survey tests of annoyance better than other basic units,
- Have been in use since the early 1930s, and
- Are endorsed as the proper basic unit for environmental noise by most agencies concerned with community noise throughout the world.

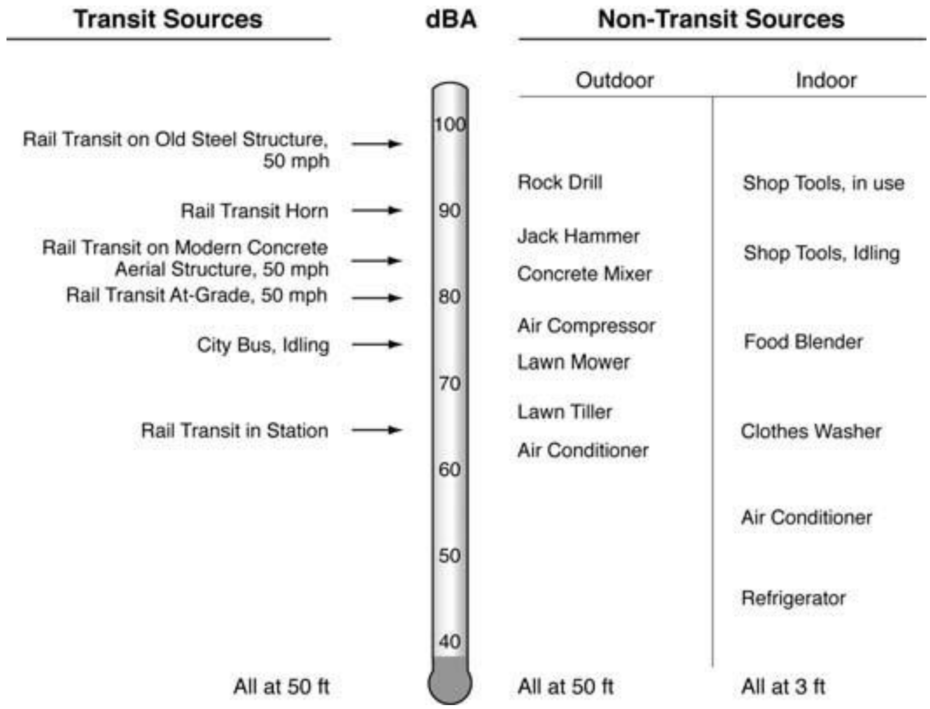

Figure B-5 Typical A-weighted Sound Levels

B.1.4.2 Maximum Sound Level (L_{max}) During a Single Noise Event

As a transit vehicle approaches, passes by, and then recedes into the distance, the A-weighted sound level rises, reaches a maximum, and then fades into the background noise. The maximum A-weighted sound level reached during this passby is called the maximum sound level, (49) abbreviated here as L_{max}. L_{max} is illustrated in Figure B-6 where time is plotted horizontally, and A-weighted sound level is plotted vertically.

Although L_{max} is commonly used in vehicle-noise specifications,[xvi] it is not used for transit environmental noise impact assessment. L_{max} does not include the number and duration of transit events, which are important for assessing people's reactions to noise. It also cannot be normalized to a one-hour or 24-hour cumulative measure of impact, and therefore, is not conducive to comparison among different transportation modes. For example, cumulative noise metrics commonly used in highway noise assessments are $L_{eq(1hr)}$ and L_{10}, the noise level exceeded for 10 percent of the peak hour.

[xvi] For noise compliance tests of transient sources, such as moving transit vehicles under controlled conditions with smooth wheel and rail conditions, L_{max} is typically measured with the sound level meter's time weighting set to "fast." However, for tests of continuous or stationary transit sources, it is usually more appropriate to use the "slow" setting. When set to "slow," sound level meters ignore some of the very-transient fluctuations, which are negligible when assessing the overall noise level.

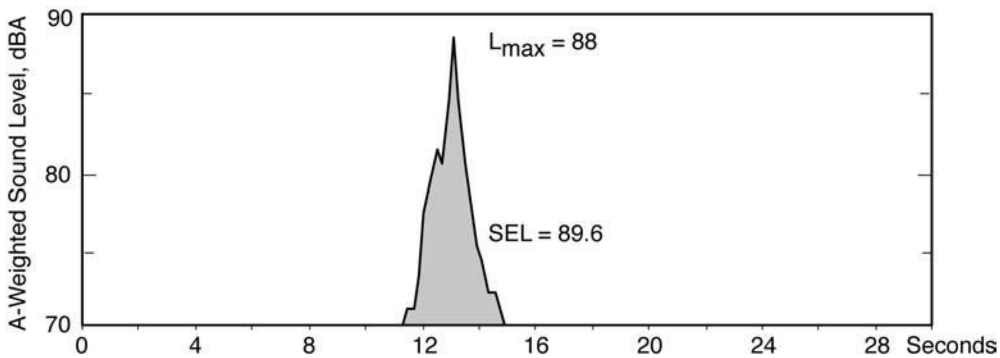

Figure B-6 Typical Transit-Vehicle Passby

B.1.4.3 Sound Exposure Level (SEL): Exposure from a Single Noise Event

Sound exposure level, abbreviated here as SEL, is the cumulative noise exposure from a single noise event, normalized to one second (49). SEL contains the same overall sound energy as the actual varying sound energy during the event. It is the primary metric for the measurement of transit vehicle noise emissions and an intermediate metric in the measurement and calculation of both $L_{eq(1hr)}$ and L_{dn}. The SEL metric is A-weighted and is expressed in the unit dBA.

This concept is illustrated in Figure B-6 and Figure B-7 where the shaded regions are the sound exposure during and event. The example in Figure B-6 is a transit-vehicle passby and Figure B-7 is an example of a fixed-transit facility as a transit bus is started, warmed up, and then driven away. For this event, the noise exposure is large due to duration of the event.

SEL is an A-weighted cumulative measure that is referenced to one second. Louder events have greater SELs than quieter events, and events of longer duration have greater SELs than shorter events. This is generally consistent with community response to noise. Noise events of longer duration are considered more disruptive than events of shorter duration with equal maximum A-weighted sound levels.

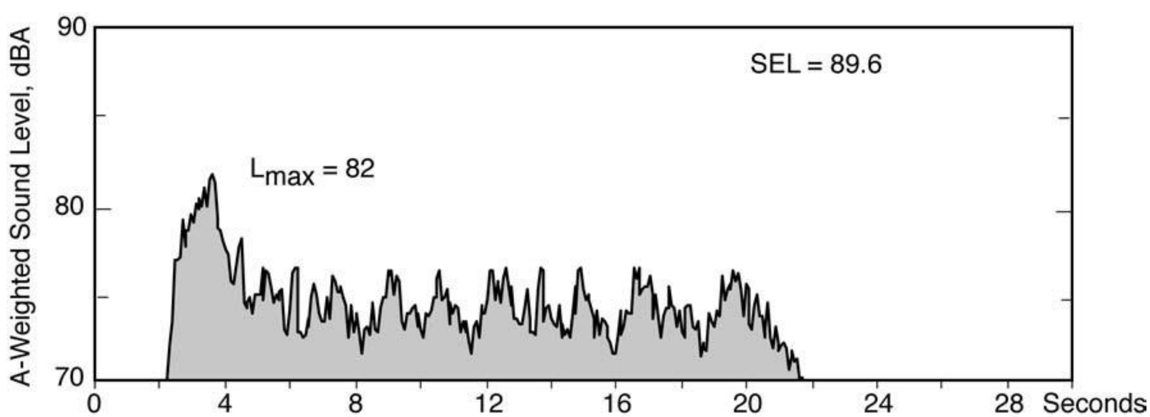

Figure B-7 Typical Fixed-Facility Noise Event

Conceptually, the sound exposure level can be expressed as:

$$SEL = 10log_{10}(\begin{matrix} Total\ sound\ energy \\ during\ the\ event \end{matrix})$$

Mathematically, the sound exposure level is computed as follows:

$$SEL = 10log_{10}(\sum_{i=1}^{N} 10^{(L_i/10)}) \qquad \textbf{Eq. B-6}$$

where

SEL = Sound exposure level, dBA
N = number of samples
i = index of summation
L_i = individual A-weighted sound level, dBA

The events shown in Figure B-6 and Figure B-7 are compared graphically in Figure B-8 using a logarithmic vertical scale. The shaded zones in these figures indicate noise exposure over time. The actual event shows the noise exposure over the time of the event, and the equivalent SEL shows the total noise exposure normalized to one second. Note that events 1 and 2 in Figure B-8 have different time periods and noise levels throughout the event, but the same resulting SEL.

SEL is used in transit noise analyses because it:

1. Accounts for both the duration and amplitude of an event,
2. Allows a uniform assessment method for both transit-vehicle passbys and fixed-facility noise events, and
3. Can be used to calculate the one-hour and 24-hour cumulative metrics for comparison across different transportation modes.

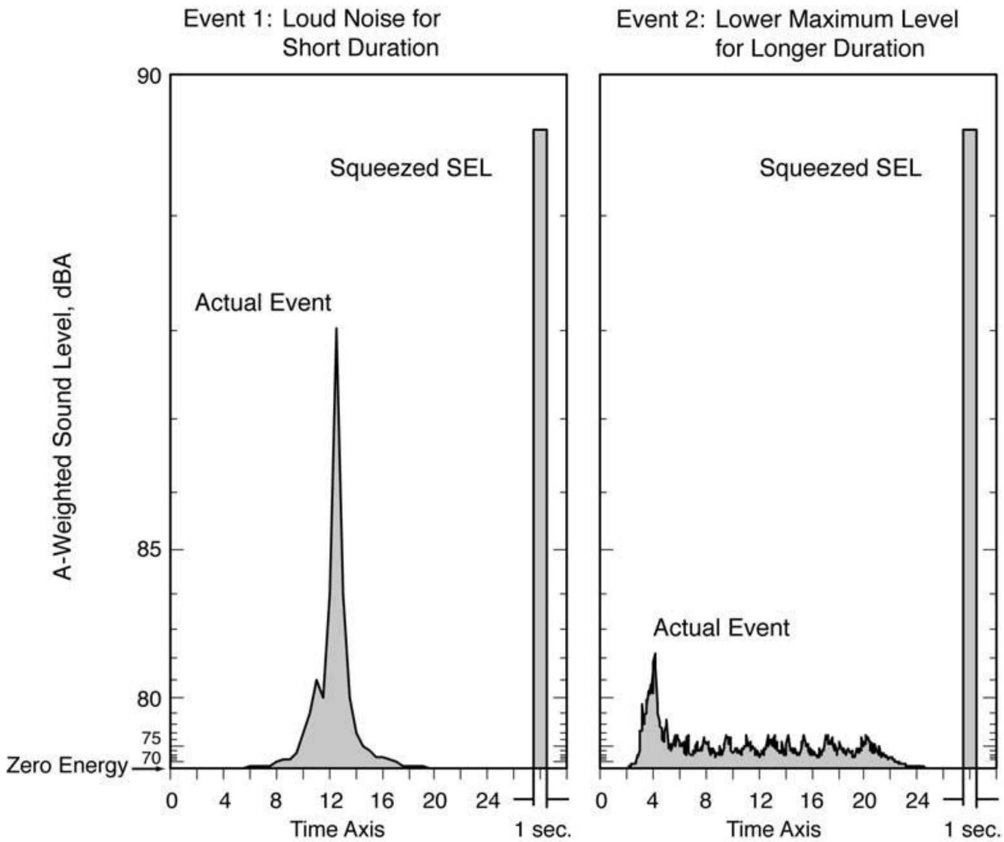

Figure B-8 An Energy View of Noise Events

B.1.4.4 Equivalent Sound Level ($L_{eq(t)}$)

The metric for cumulative noise exposure over a specific time interval is the equivalent sound level (49). It is a single decibel value that accounts for total sound energy from all sound levels over a specified time interval (or time period). The time period associated with the equivalent sound level metric can vary for different types of analyses. This metric is abbreviated as $L_{eq(t)}$, where “t” is the duration of the time period. $L_{eq(t)}$ represents a hypothetical constant sound level and contains the same overall sound energy as the actual varying sound energy during the time period “t”. For most transit noise analyses, an A-weighted, hourly equivalent sound level is used, abbreviated here as $L_{eq(1hr)}$. $L_{eq(1hr)}$ is expressed in the unit, dBA.

Figure B-9 shows examples of typical unmitigated hourly $L_{eq(1hr)}$'s, both for transit and non-transit sources ranging from 40 (quiet) to 80 dB (loud). Note that these $L_{eq(1hr)}$'s depend upon both the number of events during the hour as well as each event's duration, which is affected by vehicle speed. For example, doubling the number of events during the hour will increase the $L_{eq(1hr)}$ by 3 decibels, as will doubling the duration of each individual event.

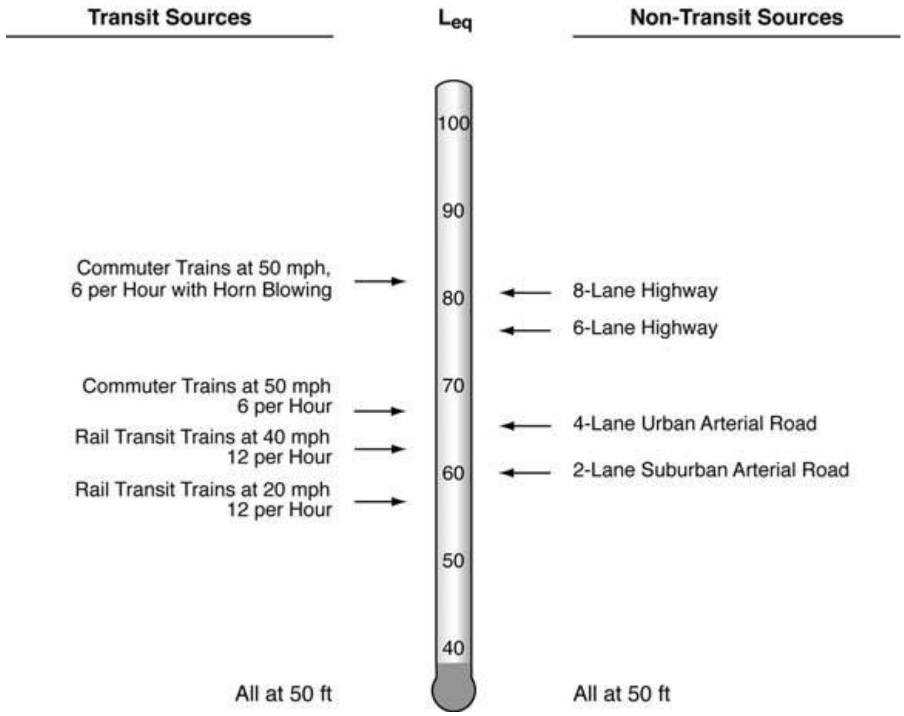

Figure B-9 Typical Hourly $L_{eq(1hr)}$'s

An example of sound levels over time for a single noise event such as a train passing on nearby tracks is illustrated in the top frame of Figure B-10. As the train approaches, passes by, and then recedes into the distance, the A-weighted sound level rises, reaches a maximum, and then fades into the background noise. The equivalent sound level is shown for three different time periods Figure B-10. The area under the curve in this top frame is the noise that reaches the receiver (noise exposure) over this five-minute period. The center frame of the figure shows sound levels over the one-hour period, including the five-minute period from the top frame. The area under the curve represents the noise exposure for one hour. The bottom frame shows sound levels over a full 24-hour period and is discussed in Appendix B.1.4.5.

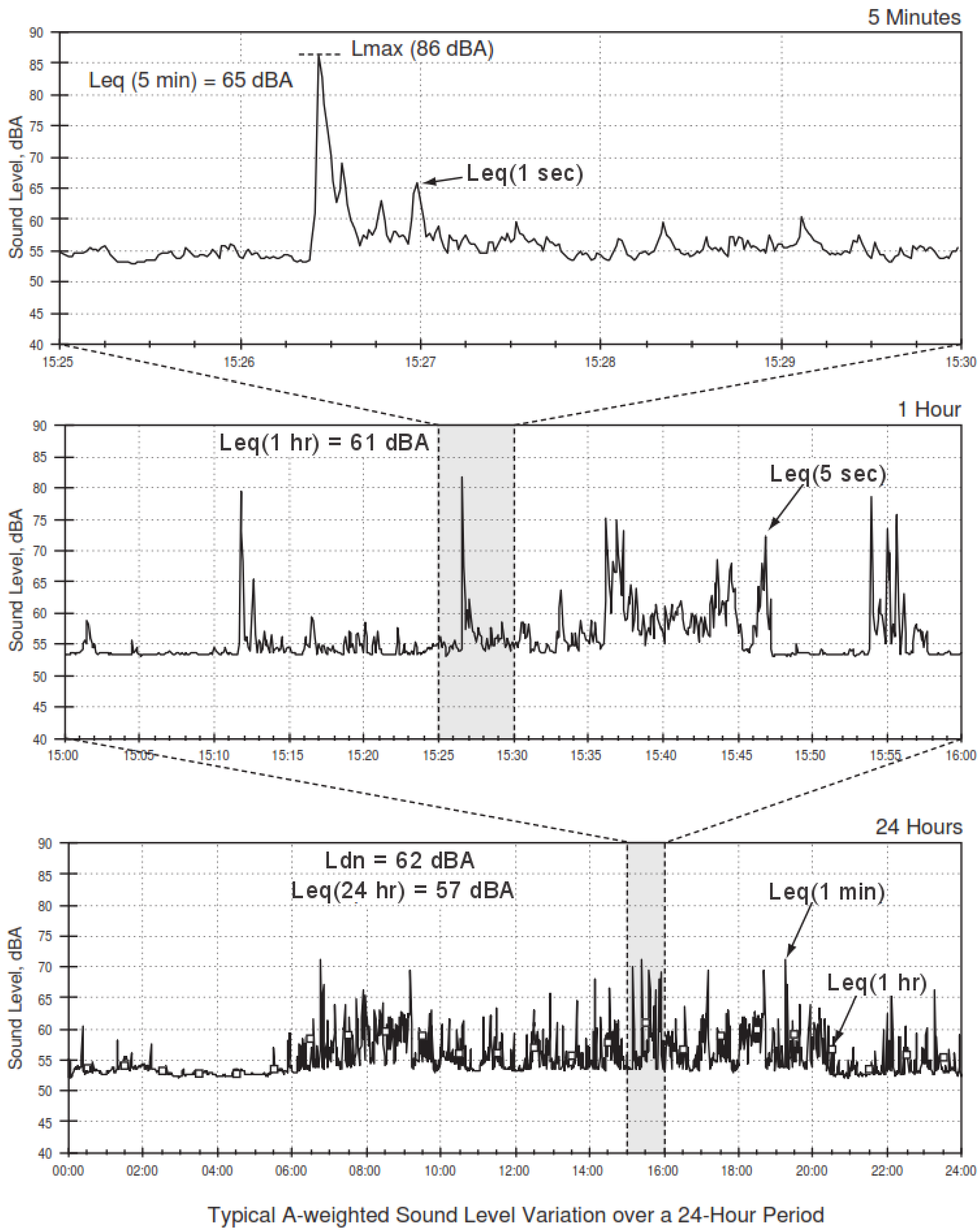

Figure B-10 Example A-weighted Sound Level Time Histories

Conceptually, the equivalent sound level can be expressed as:

$$L_{eq}(t) = 10log_{10}(\frac{Total\ Sound\ Energy}{Time\ Period})$$

Mathematically, the equation is as follows:

$$L_{eq}(t) = 10log_{10}(\frac{1}{T}\sum_{i=1}^{N} 10^{(L_i/10)})$$

where

$L_{eq(t)}$ = equivalent sound level of time period "t", dBA
T = time period, sec (3600 for an hourly $L_{eq(1hr)}$)
N = number of samples, sec (3600 for an hourly $L_{eq(1hr)}$)
i = index of summation
L_i = individual A-weighted sound level, dBA

The equation above can be rewritten as follows for a one-hour time period:

$$L_{eq}(1h) = 10log_{10}[Total\ Sound\ Energy\ in\ 1\ hr] - 35.6$$ **Eq. B-7**

where

35.6 = numerical adjustment for a time period of 1 hour ($10log_{10}(t)$)

The sound energy is totaled over a full hour (3600 seconds) and is accumulated for all noise events during that hour. When computing the equivalent sound level for a time period other than one hour, T is modified in the equation to the duration of the time period in seconds. The numerical adjustment (35.6) accounts for time period of interest, in this case, one hour.

An alternate way for computing $L_{eq(1hr)}$ for a series of transit-noise events using sound exposure levels can be expressed conceptually as follows:

$$L_{eq}(1h) = 10log_{10}(\begin{matrix} Energy\ Sum\ of \\ all\ SELs \end{matrix}) - 35.6$$

Mathematically, the equation is as follows:

$$L_{eq}(t) = 10log_{10}(\frac{1}{T}\sum_{i=1}^{N} 10^{(SEL_i/10)})$$ **Eq. B-8**

where

$L_{eq(t)}$ = equivalent sound level of time period "t", dBA
T = time period, sec (3600 for an hourly $L_{eq(1hr)}$)
N = number of sample, sec (3600 for an hourly $L_{eq(1hr)}$)
i = index of summation
SEL = individual sound exposure level, dBA

Hourly $L_{eq(1hr)}$ is adopted as the measure of cumulative noise impact for non-residential land uses (those not involving sleep) because $L_{eq(1hr)}$:

- Correlates well with speech interference in conversation and on the telephone – as well as interruption of TV, radio, and music enjoyment;
- Increases with the duration of transit events;
- Accounts for the number of transit events over the hour, which is also important to people's reactions; and

- Is used by the Federal Highway Administration in assessing highway-traffic noise impact.(Thus, this noise metric can be used for directly comparing and contrasting highway, transit, and multimodal alternatives).

B.1.4.5 Day-Night Sound Level (L_{dn}): 24-Hour Exposure from All Events

The metric for cumulative 24-hour exposure is the Day-Night Sound Level, (49) abbreviated here as L_{dn}. It is a single, A-weighted decibel value that accounts for total sound energy from all sound sources over 24 hours and is expressed in the unit, dBA. Events between 10 p.m. and 7 a.m. are increased by 10 dB to account for people's greater nighttime sensitivity to noise.

Figure B-11 shows examples of typical L_{dn}'s, both for transit and non-transit sources, ranging from 50 to 80 dB, where 50 is considered a quiet 24-hour period and 80 a loud 24-hour period. Note that these L_{dn}'s depend upon the number of events during day and night separately, including each event's duration, which is affected by vehicle speed.

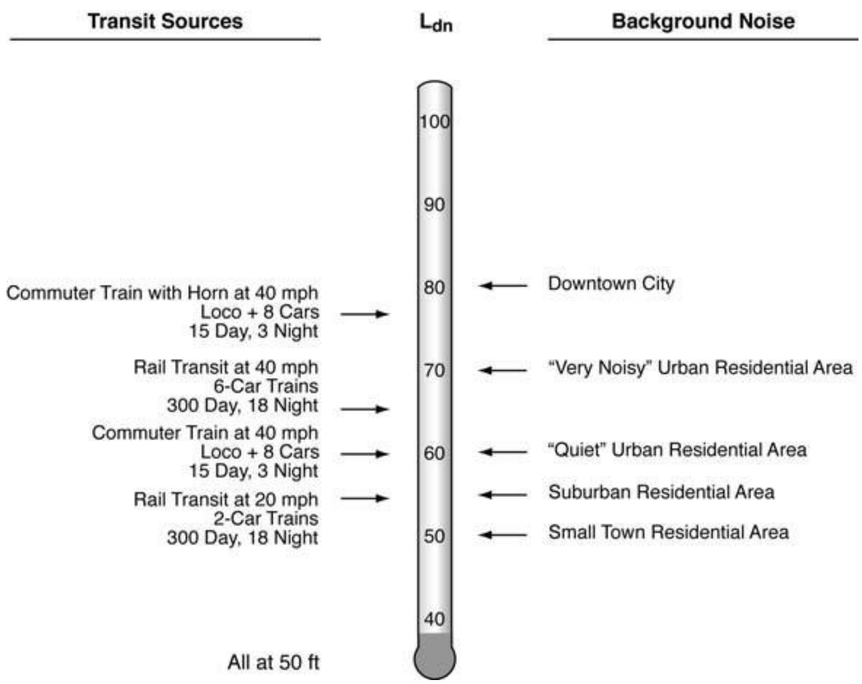

Figure B- 11 Typical L_{dn}'s

An example of sound level variation over 24 hours is visualized in the bottom frame of Figure B-10. The area under the curve represents the receiver's noise exposure over the 24 hours. Note that some vehicle passbys occur at night, when the background noise is typically lower and the 10 dB adjustment is applied.

Conceptually, the day-night level can be expressed as:

$$L_{dn} = 10log_{10}(\frac{Total\ Sound\ Energy_{Day}}{Time\ Period_{Day}\ (seconds)} + \frac{n_{adj,n} \times Total\ Sound\ Energy_{Night}}{Time\ Period_{Night}\ (seconds)})$$

Mathematically, the equation is as follows:

$$L_{dn} = 10log_{10}(\frac{1}{T_d}\sum_{i=1}^{N} t_i \times 10^{(L_{d,i}/10)} + \frac{1}{T_n}\sum_{j=1}^{M} t_j \times 10^{((L_{n,j}+n_{adj,n})/10)}) \qquad \textbf{Eq. B-9}$$

where

L_{dn} = cumulative 24-hour exposure (day-night sound level), dBA
T_d = time period during the daytime, between 7 a.m. and 10 p.m. sec (54,000)
N = number of samples during the daytime (54,000)
i = index of summation
t_i = time interval of measurements in seconds (1)
$L_{d,i}$ = individual A-weighted sound level during the daytime, dBA
T_n = time period during the nighttime, between 10 p.m. and 7 p.m. sec (32,400)
M = number of samples during the nighttime (32,400)
j = index of summation
t_j = time interval of measurements, sec (1)
$L_{n,j}$ = individual A-weighted sound level during the nighttime, dBA
$n_{adj,n}$ = nighttime noise adjustment (10 dB)

The equation above can be rewritten as follows:

$$L_{dn} = 10log_{10}\left[\left(15 * Total\ Sound\ Energy_{Day}\right) + \left(9 * n_{adj,n} * \ Total\ Sound\ Energy_{Night}\right)\right] - 49.4$$

The sound energy is totaled over a full 24 hours, and the sound energy is accumulated from all noise events during that time period. The numerical adjustment (49.4) accounts for time period of interest, in this case, 24 hours.

An alternative way of computing L_{dn} from twenty-four hourly $L_{eq(1hr)}$'s can be expressed conceptually as follows:

$$L_{dn} = 10log_{10}(\frac{\begin{matrix}Energy\ sum\ of\\ daytime, hourly\ Leqs\end{matrix} + (n_{adj,n} * \begin{matrix}Energy\ sum\ of\\ nighttime, hourly\ Leqs\end{matrix})}{Time\ period\ (seconds)})$$

The equation above can be rewritten as:

$$L_{dn} = 10log_{10}(\frac{\begin{matrix}Energy\ sum\ of\\ daytime, hourly\ Leqs\end{matrix} + (n_{adj,n} * \begin{matrix}Energy\ sum\ of\\ nighttime, hourly\ Leqs\end{matrix})}{(\frac{86400}{3600})})$$

The equation above can be reduced further and rewritten as:

$$L_{dn} = 10log_{10}(\begin{matrix}Energy\ sum\ of\\ daytime, hourly\ Leqs\end{matrix} + \ (n_{adj,n} * \begin{matrix}Energy\ sum\ of\\ nighttime, hourly\ Leqs\end{matrix})) - 13.8 \qquad \textbf{Eq. B-10}$$

L_{dn} due to a series of transit-noise events can also be computed in terms of SEL. The equation below assumes that transit noise dominates the 24-hour noise environment, where nighttime SELs are increased by 10 dB before totaling:

$$L_{dn} = 10log_{10}\left(\begin{matrix} Energy\ sum\ of \\ all\ daytime\ SELs \end{matrix} + \left(n_{adj,n} * \begin{matrix} Energy\ sum\ of \\ all\ nighttime\ SELs \end{matrix}\right)\right) - 49.4 \quad \textbf{Eq. B-11}$$

L_{dn} is adopted as the measure of cumulative noise impact for residential land uses (those involving sleep), because it:

- Correlates well with the results of attitudinal surveys of residential noise impact
- Increases with the duration of transit events
- Accounts for the number of transit events over the full twenty-four hours
- Accounts for the increased sensitivity to noise at night, when most people are asleep
- Allows composite measurements to capture all sources of community noise combined
- Allow quantitative comparison of transit noise with other community noises
- Is the designated metric of choice of other Federal agencies (e.g., HUD, FAA, and EPA) and has wide international acceptance

Appendix C: Background for Transit Noise Impact Criteria

The noise criteria presented in Section 4.1 of this manual have been developed based on well-documented criteria and research on human response to community noise. The primary goals in developing the noise criteria were to ensure that the impact limits are firmly founded in scientific studies, realistically based on noise levels associated with new transit projects, and represent a reasonable balance between community benefit and project costs. This appendix provides background information on the development of these criteria.

C.1 Relevant Literature

The following is an annotated list of the documents that are particularly relevant to the noise impact criteria:

1. **U.S. EPA's "Levels Document"**(74)
   This report identifies noise levels consistent with the protection of public health and welfare against hearing loss, annoyance, and activity interference. It has been used as the basis of numerous community noise standards and ordinances.

2. **Committee on Hearing, Bioacoustics and Biomechanics (CHABA) Working Group 69, "Guidelines for Preparing Environmental Impact Statements on Noise"**(75)
   This report was the result of deliberations by a group of leading acoustical scientists with the goal of developing a uniform national method for noise impact assessment. Although the CHABA's proposed approach has not been adopted, the report serves as an excellent resource documenting research in noise effects. It provides a strong scientific basis for quantifying impacts in terms of L_{dn}.

3. **American Public Transportation Association (APTA) Guidelines for Design of Rapid Transit Facilities**(76)
   The noise and vibration sections of the APTA Guidelines have been used successfully in the past for the design of rail transit facilities. The APTA Guidelines include criteria for acceptable community noise and vibration. Experience has shown that meeting the APTA Guidelines will usually result in acceptable noise levels; but the metric used in the APTA Guidelines is not appropriate for environmental assessment purposes.

   The APTA Guidelines criteria are in terms of L_{max} for conventional RRT vehicles, and they cannot be used to compare among different modes of transit. Since the APTA Guidelines are expressed in terms of maximum passby noise, they are not sensitive to the frequency or duration of noise events for transit modes other than conventional RRT operations with 5 to 10 minute headways. Therefore, the APTA criteria are questionable for assessing the noise impact of other transit modes that differ from conventional rapid transit with respect to source emission levels and operating characteristics (e.g., commuter rail, AGT, and a variety of bus projects).

4. **Synthesis of Social Surveys on Noise Annoyance**(77)
   In 1978, Theodore J. Schultz, an internationally known acoustical scientist, synthesized the results of a large number of social surveys concerning annoyance due to transportation noise. A group of these surveys were remarkably consistent, and the author proposed that their average

results be taken as the best available prediction of transportation noise annoyance. This synthesis has received essentially unanimous acceptance by acoustical scientists and engineers. The "universal" transportation response curve developed by Schultz (Figure 3-7) shows that the percent of the population highly annoyed by transportation noise increases from zero at an L_{dn} of approximately 50 dBA to 100% when L_{dn} is approximately 90 dBA. Most importantly, this curve indicates that for the same increase in L_{dn}, there is a greater increase in the number of people highly annoyed at high noise levels than at low noise levels. For example, a 5 dB increase at low ambient levels (40 - 50 dB) has less impact than at higher ambient levels (65 - 75 dB). A recent update of the original research containing several railroad, transit, and street traffic noise surveys, confirming the shape of the original Schultz curve [12].

5. **HUD's Standards**[19]
   HUD has developed noise standards, criteria, and guidelines to ensure that housing projects supported by HUD achieve the goal of a suitable living environment. The HUD acceptability standards define 65 dB (L_{dn}) as the threshold for a normally unacceptable living environment (moderate impact for FTA) and 75 dB (L_{dn}) as the threshold for an unacceptable living environment (severe impact for FTA).

C.2 Basis for Noise Impact Criteria Curves

The lower curve in Figure 4-2 represents the onset of moderate impact and is based on the following considerations:

- The EPA finding that a community noise level of L_{dn} less than or equal to 55 dBA is "requisite to protect public health and welfare with an adequate margin of safety."[72]
- The conclusion by EPA and others that a 5 dB increase in L_{dn} or $L_{eq(1hr)}$ is the minimum required for a change in community reaction.
- The research concludes that there are very few people highly annoyed when the L_{dn} is 50 dBA, and that an increase in L_{dn} from 50 dBA to 55 dBA results in an average of 2% more people highly annoyed (Figure 3-7).

The increase in noise level from an existing ambient level of 50 dBA to a cumulative level of 55 dBA because of a project is found to cause minimal impact, with 2% of people highly annoyed, as described in the bullets above. This is considered the lowest threshold where impact starts to occur. Therefore, for an existing ambient noise level of 50 dBA, the curve representing the onset of moderate impact is at 53 dBA, the combination of which yields a cumulative level of 55 dBA by decibel addition. The remainder of the lower curve in Figure 4-2 was determined from the annoyance curve (Figure 3-7) by allowing a fixed 2% increase in annoyance at other levels of existing ambient noise. As cumulative noise increases, the increment to attain the same 2% increase in highly annoyed people is smaller. While it takes a 5-dB noise increase to cause a 2% increase in highly annoyed people at an existing ambient noise level of 50 dB, an increase of only 1 dB causes a 2% increase of highly annoyed people at an existing ambient noise level of 70 dBA.

The upper curve in Figure 4-2 represents the onset of severe impact based on a total noise level, corresponding to a higher degree of impact. The severe noise impact curve is based on the following considerations:

- HUD defines an L_{dn} of 65 as the onset of a normally unacceptable noise zone (moderate impact for FTA) in its environmental noise standards [19]. FAA considers that residential land uses are not compatible with noise environments where L_{dn} is greater than 65 dBA (20).

- An increase of 5 dB in L_{dn} or $L_{eq(t)}$ is commonly assumed as the minimum required increase for a change in community reaction.
- The research concludes that an increase of 5 dB in L_{dn} or $L_{eq(t)}$ represents a 6.5% increase in the number of people highly annoyed (Figure 3-7).

The increase in noise level from an existing ambient level of 60 dBA to a cumulative level of 65 dBA caused by a project represents a change from an acceptable noise environment to the threshold of an unacceptable noise environment. This is considered the level at which severe impact starts to occur with a 6.5% increase in the number of people highly annoyed as described in the bullets above. Therefore, for an existing ambient noise level of 60 dBA, the curve representing the onset of severe impact is at 63 dBA, the combination of which yields a cumulative level of 65 dBA by decibel addition. The remainder of the upper curve in Figure 4-2 was determined from the annoyance curve (Figure 3-7) by allowing a fixed increase of the 6.5% increase in annoyance at all existing ambient noise levels.

Both curves incorporate a maximum limit for the transit project noise in noise-sensitive areas. Independent of existing noise levels, moderate impact for land use categories 1 and 2 is considered to occur whenever the transit L_{dn} equals or exceeds 65 dBA, and severe impact occurs whenever the transit L_{dn} equals or exceeds 75 dBA. These absolute limits are intended to restrict activity interference caused by the transit project alone.

Both curves also incorporate a maximum limit for cumulative noise increase at low existing noise levels (below approximately 45 dBA). This is a conservative limit that reflects the lack of social survey data on people's reactions to noise at such low ambient levels. Like the FHWA approach in assessing the relative impact of a highway project, the transit noise criteria include limits on noise increase of 10 dB and 15 dB for moderate impact and severe impact, respectively, relative to the existing noise level.

Note that due to the types of land use included in category 3, the criteria allow the project noise for category 3 sites to be 5 dB greater than for category 1 and category 2 sites. This difference is reflected by the offset in the vertical scale on the right side of Figure 4-2. Aside from active parks, which are clearly less sensitive to noise than category 1 and 2 sites, category 3 sites include primarily indoor activities. Therefore, the criteria account for some noise reduction from the building structure.

C.3 Equations for Noise Impact Criteria Curves

The equations for the noise impact criteria curves shown in Figure 4-2 are included in this section. These equations may be useful when performing the noise assessment methodology using spreadsheets, computer programs, or other analysis tools. Otherwise, such mathematical detail is generally not necessary to implement the criteria, and direct use of Figure 4-2 is adequate and less time-consuming.

A total of four continuous curves are included in the criteria, creating two threshold curves for moderate and severe impact for category 1 and 2, and two curves for category 3 (See Table C-1). Note that for each level of impact, the overall curves for categories 1 and 2 are offset by 5 dB from category 3. While each curve is graphically continuous, each one is defined by a set of three discrete equations. These equations are approximately continuous at the transition points. The following is a description of the three equations:

- The first equation in each set is a linear relationship, representing the portion of the curve in which the existing noise exposure is low, and the allowable increase is limited to 10 dB and 15 dB for moderate impact and severe impact, respectively.

- The second equation in each set represents the impact threshold over the range of existing noise exposure for which a fixed percentage of increase in annoyance is allowed, as described in Appendix C.2. This curve is a third-order, polynomial approximation derived from the Schultz curve(75) and covers the range of noise exposure encountered in most populated areas. This curve is used for determining noise impact in most cases for transit projects.
- The third equation represents the absolute limit of project noise imposed by the criteria for areas with high existing noise exposure. For land use category 1 and 2, the absolute limit is 65 dBA for moderate impact and 70 dBA for severe impact. For land use category 3, the absolute limit is 75 dBA for moderate impact and 80 dBA for severe impact.

Table C-1 Threshold of Moderate and Severe Impacts

Threshold of Moderate Impact

Category 1 and 2

$$L_p = \begin{cases} 11.450 + 0.953L_E, & L_E < 42 \\ 71.662 - 1.164L_E + 0.018{L_E}^2 - 4.088 \times 10^{-5}{L_E}^3, & 42 \le L_E \le 71 \\ 65, & L_E > 71 \end{cases} \quad \textbf{Eq. C- 12}$$

Category 3

$$L_p = \begin{cases} 16.450 + 0.953L_E, & L_E < 42 \\ 76.662 - 1.164L_E + 0.018{L_E}^2 - 4.088 \times 10^{-5}{L_E}^3, & 42 \le L_E \le 71 \\ 70, & L_E > 71 \end{cases} \quad \textbf{Eq. C- 13}$$

Threshold of Severe Impact

Category 1 and 2

$$L_p = \begin{cases} 17.322 + 0.940L_E, & L_E < 44 \\ 96.725 - 1.992L_E + 3.02 \times 10^{-2}{L_E}^2 - 1.043 \times 10^{-4}{L_E}^3, & 44 \le L_E \le 77 \\ 75, & L_E > 77 \end{cases} \quad \textbf{Eq. C- 14}$$

Category 3

$$L_p = \begin{cases} 22.322 + 0.940L_E, & L_E < 44 \\ 101.725 - 1.992L_E + 3.02 \times 10^{-2}{L_E}^2 - 1.043 \times 10^{-4}{L_E}^3, & 44 \le L_E \le 77 \\ 80, & L_E > 77 \end{cases} \quad \textbf{Eq. C- 15}$$

L_E = the existing noise exposure in terms of L_{dn} or $L_{eq(1hr)}$
L_p = the project noise exposure which determines impact in terms of L_{dn} or $L_{eq(1hr)}$)

Appendix D: Clustering Receivers of Interest

This appendix supplements the information in Section 4.5 on clustering receivers of interest.

The general approach to selecting noise-sensitive receivers in the study area is included in Section 4.5, Step 1. General guidelines are as follows:

- Select the following types of receivers to evaluate individually:
    - Every major noise-sensitive public building
    - Every isolated residence
    - Every relatively small outdoor noise-sensitive area
- Residential neighborhoods and relatively large outdoor noise-sensitive areas can often be clustered and represented by a single receiver.

Clustering similar receivers reduces the number of computations needed later, especially for large-scale projects where a greater number of noise-sensitive sites may be affected. For this approach to be effective, it is essential that the representative receiver accurately represents the noise environment of the cluster.

The major steps in clustering receivers include:

1. First, cluster receivers according to approximately equal exposure to the primary project noise source. These areas typically run parallel to a linear project or circle major stationary sources relative to the proposed project.
2. Next, cluster receivers according to major sources of ambient noise. These areas typically run parallel to or encircle major sources of ambient noise.
3. Then, cluster receivers according to changes in the project layout or operations along the corridor.
4. Finally, select a representative receiver for each cluster.

The major steps are expanded below and include instructions on how to draw cluster boundaries on a map.

1. **Boundaries along the proposed project** – Draw cluster boundaries along the proposed project as described below to separate clusters based on distance from the project. Draw these cluster boundaries for the project sources listed as major in Table 4-19.

    Within both residential and noise-sensitive outdoor areas:

    - **Primary project source**
      Draw cluster boundaries at the following distances from the near edge of the primary project source: 0 ft, 50 ft, 100 ft, 200 ft, 400 ft, and 800 ft. For linear sources, such as a rail line, draw these boundaries as lines parallel to the proposed ROW line. For stationary sources, draw these boundaries as approximate circles around the source, starting at the property line.

      Do not extend boundaries beyond the noise study area, identified in the Noise Screening Procedure in Section 4.3 or the General Noise Assessment of Section 4.4.

- **Remaining project sources** – Repeat the process for the primary project source for all other project listed as major in Table 4-19, such as substations and crossing signals. If several project sources are located approximately together, only consider one source, since the others would produce approximately the same boundary.

  It is good practice to optimize the number of clusters for a project to simplify the procedure.

Where rows of buildings parallel the transit corridor:

- Ensure that cluster boundaries fall between the following rows of buildings, counting back away from the proposed project:
  - Between rows 1 and 2
  - Between rows 2 and 3
  - Between rows 3 and 4
- Add cluster boundaries between these rows if not already included.

2. **Boundaries along sources of ambient noise** – Draw cluster boundaries along all major sources of ambient noise based upon distance from these sources, as described below.
   - Draw cluster boundaries along all interstates and major roadway arterials at the following distances from the near edge of the roadway: 0 ft, 100 ft, 200 ft, and 500 ft.
   - Draw cluster boundaries along all other roadways that have state or county numbering at 0 ft and 100 ft from the near edge of the roadway.
   - For all major industrial sources of noise, draw cluster boundaries that encircle the source at the following distances from the near property line of the source: 0 ft, 100 ft, 200 ft, and 400 ft.

3. **Boundaries based on changes in project layout or operations** – Further subdivision is needed to account for changes in project noise where proposed project layout or operating conditions change considerably along the corridor. Draw a cluster boundary perpendicular to the corridor extending straight outward to both sides at the following locations:
   - Where parallel tracks previously separated by more than approximately 100 ft are moved closer together
   - Approximately where speed and/or throttle are reduced when approaching stations and where steady service speed is reached after departing stations
   - Approximately 200 ft up and down the line from grade crossing bells
   - At transitions from jointed to welded rail
   - At transitions from one type of cross section to another including on structure, on fill, at-grade and in cut
   - At transitions from open terrain to heavily wooded terrain
   - At transitions between areas free of locomotive horn noise and areas subject to this noise source
   - Any other positions along the line where project noise is expected to change considerably, such as up and down the line from tight curves where wheels may squeal

4. **Selection of a representative receiver from each cluster** – Determine a representative receiver for each cluster boundary drawn in the steps above.
   - **Residential clusters**
     Select a representative receiver within the cluster at the house closest to the proposed project. If this receiver is not the clear choice, select the receiver furthest from major sources of ambient noise.
   - **Outdoor noise-sensitive clusters (e.g., urban park or amphitheater)**

Select a representative receiver within the cluster at the closest point of active noise-sensitive use. If this receiver is not the clear choice, select the receiver farther from major sources of ambient noise.

Note that some clusters may fall between areas with receivers of interest. This could occur when operational changes or track layouts change in an open, undeveloped area. Retain these clusters. Do not merge them with adjacent clusters. Do not select a representative receiver of interest from them.

Example D-1 Clustering Receivers

Receivers of Interest and Clustering Receivers

In this hypothetical situation, a new rail transit line, labeled "new rail line" in Figure D-1, is proposed along a major urban street with commercial land use. A residential area is located adjacent to the commercial strip, located approximately one-half block from the proposed transit alignment. A major arterial, labeled "highway," crosses the alignment.

Cluster Receivers Along the Primary Project Source

Primary Project Source

The primary project source in this example is the new rail line. Boundaries are first drawn at distances of 0 ft from the right-of- way line (edge of the street in this example), 50 ft, 100 ft, 200 ft, 400 ft, and 800 ft, (Figure D-1). Distances are labeled at the top of the figure.

This is proposed to be a constant speed section of track, so there are no changes in boundaries due to changes in operations along the corridor. Moreover, no other project sources are shown here, but if there had been a station with a parking lot, lines would have been drawn enveloping the station site at the specified distances from the property line.

Rows of Buildings Parallel to the Transit Corridor

This example includes rows of buildings parallel to the transit corridor. The first set of boundary lines satisfies the requirement that cluster boundaries fall between rows 1 and 2, and between rows 2 and 3, but there is no line between rows 4 and 5. Consequently, a cluster boundary labeled "R" at the top of the figure has been drawn between the 4th and 5th row of buildings.

Cluster Receivers Along the Primary Project Source

The roadway arterial (labeled "highway") is the only major source of ambient noise shown.

Cluster boundaries are drawn at 0 ft, 100 ft, 200 ft and 500 ft from the near edge of the roadway on both sides. These lines are shown with distances labeled at the side of the figure.

Select a Representative Receiver from Each Cluster

Representative receivers are shown as filled circles in Figure D-1. Note that the receivers labeled with “REC” are primarily for use in Appendix E.

Locate receiver, "REC 3". Note that this cluster is located at the outer edge of influence from the major source ("highway") where local street traffic is the dominant source for ambient noise (in practice, this would be verified by a measurement).

"REC 3" is chosen to represent this cluster because it is among the houses closest to the proposed project source in this cluster and it is in the middle of the block affected by the dominant local street. Ambient noise levels at one end of the cluster may be influenced more by the highway and the other end may be affected more by the cross street, but the majority of the cluster would be represented by receiver site "REC 3."

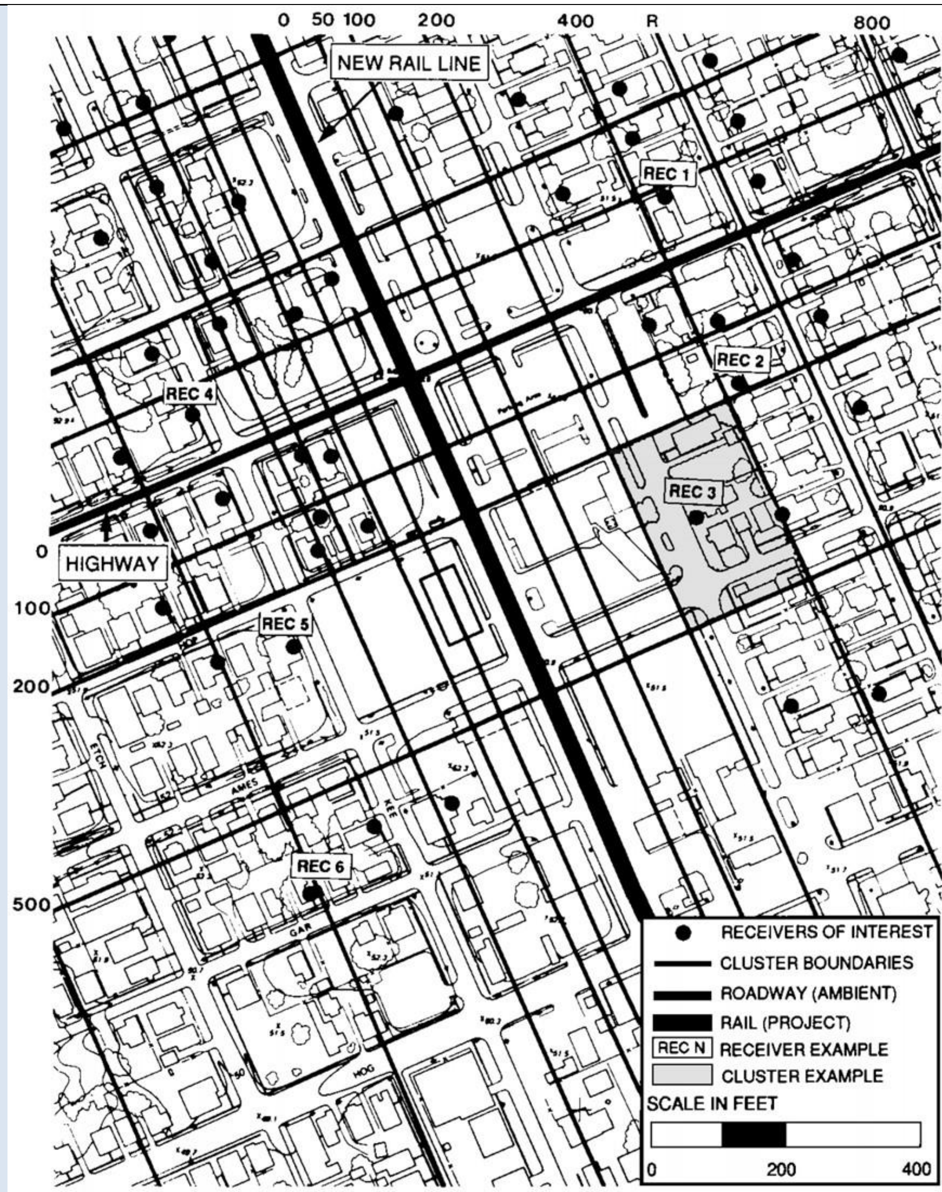

Figure D-1 Example of Receiver Map Showing Cluster Boundaries

Appendix E: Determining Existing Noise

Different options of determining existing noise, including full measurement, computation from partial measurements, and tabular look-up, are described in Section 4.5, Step 5. This appendix provides additional details associated with each method and examples of when each method could be used.

Additional details on the methods for estimating existing noise are provided below:

Option 1: $L_{eq(1hr)}$ measurement (non-residential) – Full one-hour measurements are recommended to determine existing noise for non-residential receivers of interest. These measurements are preferred over all other options and will accurately represent the $L_{eq(1hr)}$. The following procedures apply to these full-duration measurements:

- Measure $L_{eq(1hr)}$ at the receiver of interest during a typical hour of use on two non-successive days. Choose the hour in which maximum project activity will occur. The $L_{eq(1hr)}$ will be accurately represented using this method. Typically, measuring between noon Monday and noon Friday is recommended, but weekend days may be more appropriate for places of worship.
- Position the measurement microphone for all sites as shown in Figure 4-19, considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.

Option 2: L_{dn} measurement (residential) – Full 24-hour measurements are recommended to determine ambient noise for residential receivers of interest. These measurements are preferred over all other options and will accurately represent the L_{dn}. The following procedures apply to these full-duration measurements:

- Measure a full 24-hour L_{dn} at the receiver of interest for a single weekday (generally between noon Monday and noon Friday).
- Position the measurement microphone for all sites as shown in Figure 4-19 considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.

Option 3: L_{dn} computation of L_{dn} from 3 partial $L_{eq(1hr)}$ measurements (residential) – An alternative way to determine L_{dn} is to measure $L_{eq(1hr)}$ for three typical hours of the day, then compute the L_{dn} from these three $L_{eq(1hr)}$ measurements. This method is less precise than its full-duration measurement. The following procedures apply to this partial-duration measurement method for L_{dn}:

- Measure the $L_{eq(1hr)}$ during each of the following time periods:
  - During peak-hour roadway traffic
  - Midday, between the morning and afternoon roadway-traffic peak hours
  - During late night between midnight and 5 a.m.
- Position the measurement microphone for all sites as shown in Figure 4-19 considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.
- Compute the L_{dn} using the equation below

$$L_{dn} \approx 10\log(3 \times 10^{\frac{L_{eq.peakhour}-2}{10}} + 12 \times 10^{\frac{L_{eq.midday}-2}{10}} + 9 \times 10^{\frac{L_{eq.latenight}+8}{10}}) - 13.8 \qquad \textbf{Eq. E-1}$$

The resulting L_{dn} will be slightly underestimated due to the adjustment to the measured levels in these equations. This underestimation is intended to compensate for the reduced precision of the computed L_{dn}. If using this method, a minimum time duration of one hour should be used for each measurement period in computing an Ldn.

Option 4: Computation of L_{dn} from 1 partial $L_{eq(1hr)}$ measurement (residential) – L_{dn} can also be determined by measuring $L_{eq(1hr)}$ for one hour of the day, and then computing L_{dn} from the $L_{eq(1hr)}$. This method is less precise than computing L_{dn} from 3 $L_{eq(1hr)}$ measurements. This method may be useful for projects with are many sites assessed by the General Noise Assessment. This method may also be appropriate when determining if a particular receiver of interest represents a cluster in a Detailed Noise Analysis. The following procedures apply to this partial-duration measurement option for L_{dn}:

- Measure the $L_{eq(1hr)}$ for the loudest hour of project-related activity during hours of noise sensitivity. If this hour is not selected, other hours may be used with the understanding that the estimate is less precise.
- Position the measurement microphone for all sites as shown in Figure 4-19, considering relative orientation of project and ambient sources. Position the microphone in a location that is somewhat shielded from the ambient source to measure the ambient noise at these locations at the quietest area on the property.
- Conduct all measurements in accordance with good engineering practice.
- Convert the measured hourly $L_{eq(1hr)}$ to L_{dn} with the appropriate equation below.

For measurements between 7 a.m. and 7 p.m.:

$$L_{dn} \approx L_{eq} - 2 \qquad \textbf{Eq. E-2}$$

For measurements between 7 p.m. and 10 p.m.:

$$L_{dn} \approx L_{eq} + 3 \qquad \textbf{Eq. E-3}$$

For measurements between 10 p.m. and 7 a.m.:

$$L_{dn} \approx L_{eq} + 8 \qquad \textbf{Eq. E-4}$$

The resulting L_{dn} will be moderately underestimated due to the use of the adjustment constants in these equations. This underestimation is intended to compensate for the reduced precision of the computed L_{dn}. If using this method, a minimum time duration of one hour should be used for each measurement period in computing an Ldn.

Option 5: Computation of $L_{eq(1hr)}$ or L_{dn} from $L_{eq(1hr)}$ or L_{dn} of a comparable site (all land uses) – Computing $L_{eq(1hr)}$ or L_{dn} from the $L_{eq(1hr)}$ or L_{dn} of a comparable site where the ambient noise is dominated by the same source that is comparable in precision to Option 4. This method can be used to characterize noise in several neighborhoods by using a single representative receiver. It is critical that the measurement site has a similar noise environment to all areas represented. If measurements made by others are available and the sites are equivalent, the existing measurements can be used to reduce the amount of project noise monitoring. The following procedures apply to this method of determining of ambient noise:

- Choose another receiver that is comparable to the receiver (CompRec) of interest with the following:
  - The same source of dominant ambient noise

- The ambient level of the comparable receiver was measured according to Option 1 or Option 2 above
- The ambient measurement at the comparable receiver was made in direct view of the major source of ambient noise, unshielded by noise barriers, terrain, rows of buildings, or dense tree zones

- Determine the following from a plan or aerial photograph:
  - The distance ($D_{CompRec}$) from the comparable receiver to the near edge of the ambient source
  - The distance (D_{Rec}) from this receiver of interest to the near edge of the ambient source
- Determine the number of rows of buildings (N) that intervene between the receiver of interest and the ambient source.
- Compute the ambient level at the receiver of interest (Rec) with the appropriate equation below

If roadway sources dominate:

$$L_{Rec} \approx L_{CompRec} - 15\log(\frac{D_{Rec}}{D_{CompRec}}) - 3N \quad \textbf{Eq. E-5}$$

If other sources dominate:

$$L_{Rec} \approx L_{CompRec} - 25\log(\frac{D_{Rec}}{D_{CompRec}}) - 3N \quad \textbf{Eq. E-6}$$

The resulting L_{Rec} will be moderately underestimated. This underestimation is intended to compensate for the reduced precision of the computed L_{dn}.

Option 6: Estimation of L_{dn} by table look-up (all land uses) – The least precise way to determine the ambient noise is to estimate the level using a table. A tabular look-up can be used to establish baseline conditions for a General Noise Assessment if a noise measurement cannot be made. This method should not be used for a Detailed Noise Analysis. The following instruction applies to this method of determining of ambient noise:

Estimate either the $L_{eq(1hr)}$ or the L_{dn} using Table 4-17 based on distance from major roadways, rail lines, or upon population densities. In general, these tabulated values are substantially underestimated.

The underestimation is intended to compensate for the reduced precision of the estimated ambients.

Examples – Examples of when each method of determining existing noise may be appropriate are provided below using the example from Appendix D. Existing noise at the receivers labeled “REC” in Figure D-1 could be estimated as follows:

- **Option 1: $L_{eq(1hr)}$ measurement** – Existing noise at REC 1 is due to the highway at the side of this church. $L_{eq(1hr)}$ can be measured during a typical church hour.
- **Option 2: L_{dn} measurement –** Existing noise at the residence REC 2 is due to a combination of the highway and local streets. L_{dn} can be measured for a full 24-hours.
- **Option 3: L_{dn} computation of L_{dn} from 3 partial $L_{eq(1hr)}$ measurements** – Existing noise at the residence REC 3 is due to the street in front of this residence. L_{dn} can be computed from three $L_{eq(1hr)}$ measurements.

- **Option 4: Computation of L_{dn} from 1 partial $L_{eq(1hr)}$ measurement** – Existing noise at the residence REC 4 is due to the highway. Because the highway has a predictable diurnal pattern, L_{dn} can be computed from one $L_{eq(1hr)}$ measurement.
- **Option 5: Computation of L_{dn} from L_{dn} of a comparable site** – Existing noise at the residence REC 5 is due to Kee Street. REC 3 is also affected by local street traffic and is a comparable distance from the highway. L_{dn} for REC 5 can be computed based on the L_{dn} at REC-3.
- **Option 6: Estimation of L_{dn} by table look-up** – Existing noise at the residence REC 6 is due to local traffic. L_{dn} can be estimated by tables based on population density along this corridor.

Appendix F: Computing Source Levels from Measurements

This appendix contains the procedures for computing source reference levels (SEL_{ref}) from source measurements in cases where the source reference tables in Section 4.5, Step 2 indicate measurements are preferred, data are not available for the source of interest, or more precise data are required than available in the table.

Close-by source measurements for vehicle passbys may capture either the vehicle's sound exposure level (SEL) or maximum noise level (L_{max}). Both metrics can be measured directly by commonly available sound level meters. While the L_{max} metric is not used for transit noise impact assessments, it can be used to compute SEL source reference levels. L_{max} measurements are often available from transit-equipment manufacturers and some transit system equipment specifications may limit close-by L_{max} levels.

Close-by source measurements for stationary sources capture the source's SEL over one source event, where the event duration may be chosen based on measurement convenience. The duration will factor out of the computation when the measured value is converted to reference operating conditions.

This manual does not specify elaborate methods for undertaking the close-by source measurements, but rather, provides general processes. It is required that all measurements conform to good engineering practice, guided by the standards of the American National Standards Institute and other such organizations (27, 28, 29).

This appendix presents information according to noise source as follows:

- Appendix F.1: Highway and rail vehicle passbys for vehicles of the same type
- Appendix F.2: Stationary sources
- Appendix F.3: L_{max} for single train passbys (for trains of mixed consists)

F. 1 Highway and Rail Vehicle Passbys

This section provides information on appropriate conditions for vehicle passby measurements, instructions on converting measurements made under non-reference conditions to source reference levels, and examples of these computations.

The following conditions are required for vehicle passbys, in addition to good engineering practice:

- Measured vehicles must be representative of project vehicles in all aspects, including representative acceleration and speed conditions for buses.
- Track must be relatively free of corrugations and train wheels relatively free of flats, unless these conditions are typical of the proposed project.
- Road surfaces must be smooth and dry, unless these conditions are typical of the proposed project.
- Perpendicular distance between the measurement position and the source's centerline must be 100 ft or less.
- Vehicle speed must be 30 mph or greater, unless typical project speeds are less than that.
- No noise barriers, terrain, buildings, or dense tree zones may break the lines-of-sight between the source and the measurement position.

When close-by source measurements are made under non-reference conditions, use the instructions below and the equations in Table F-1 to convert the measured values to source reference levels. For rail vehicles, measure/convert a group of locomotives or a group of cars separately. This computation requires that all measured vehicles be of the same type. For trains of mixed consists, see Appendix F.3.

SEL measured for a highway-vehicle passby, or a passby of a group of identical rail vehicles

- Collect the following input information:
  - SEL_{meas}, the measured SEL for the vehicle passby
  - N, the consist of the measured group of rail cars or group of locomotives
  - T, the average throttle setting of the measured diesel-powered locomotive(s)
  - S_{meas}, the measured passby speed, in miles per hour
  - D_{meas}, the closest distance between the measurement position and the source, in feet
- Compute the Source Reference Level SEL_{ref}, using Eq. F-1.

L_{max} measured for a passby of a group of identical rail vehicles

- Collect the following input information:
  - L_{max}, measured for the group passby
  - N, the consist of the measured group of rail cars or group of locomotives
  - T, the average throttle setting of the measured diesel-powered locomotive(s)
  - S_{meas}, the measured passby speed, in miles per hour
  - D_{meas}, the closest distance between the measurement position and the source, in feet
  - L_{meas}, the total length of the measured group of locomotives or group of rail cars, in feet
- Compute the Source Reference Level SEL_{ref}, using either Eq. F-2 or Eq. F-3, as appropriate, for locomotives or rail cars.

L_{max} measured for a highway-vehicle passby

- Collect the following input information:
  - L_{max}, measured for the highway-vehicle passby
  - S_{meas}, the vehicle speed, in miles per hour
  - D_{meas}, the closest distance between the measurement position and the source, in feet
- Compute the Source Reference Level, SELref, using Eq. F-4.

Table F-1 Conversion to Source Reference Levels at 50 ft – Highway and Rail Sources

Measured	Source	Equation	
SEL	Vehicle passby	$SEL_{ref} = SEL_{meas} + 10\log(\frac{S_{meas}}{50}) + 10log(\frac{D_{meas}}{50}) + C_{consist} + C_{emissions}$	**Eq. F-1**
L_{max}	Rail-vehicle passby, locomotives only	$SEL_{ref} = L_{Amax} + 10\log(\frac{L_{meas}}{50}) + 10\log(\frac{D_{meas}}{50}) - 10\log(2\propto) + C_{consist}$ $+C_{emissions} + 3.3$	**Eq. F-2**
	Rail-vehicle passby, cars only	$SEL_{ref} = L_{Amax} + 10\log(\frac{L_{meas}}{50}) + 10\log(\frac{D_{meas}}{50}) - 10\log\ [2\propto + \sin(2\propto)]$ $+C_{consist} + C_{emissions} + 3.3$	**Eq. F-3**
	Highway-vehicle passby	$SEL_{ref} = L_{Amax} + 20\log(\frac{D_{meas}}{50}) + C_{emissions} + 3.3$	**Eq. F-4**

S_{meas} = speed of measured vehicle(s), mph

D_{meas} = closest distance between measurement position and source, ft

$C_{consist}$ = 0 for buses and automobiles
$-10\log(N_{Cars})$ for locomotives and rail cars
where N is the number of locomotives or rail cars in the measured group

$C_{emissions}$ = 0 for T < 6 for locomotives
-2 (T-5) for T ≥ 6
where T is average throttle setting of measured diesel – electric locomotive(s)

$-30\log(\frac{S_{meas}}{50})$ for rail cars

$-25\log(\frac{S_{meas}}{50})$ for buses

$-38.1\log(\frac{S_{meas}}{50})$ for automobiles

E_{meas} = event duration of measurement, sec

L_{meas} = total length of measured group of locomotives *or* rail cars, ft

$\propto$ = arctan($\frac{L_{meas}}{2D_{meas}}$), rad

Example F-1 Calculate SEL_{ref} – Locomotives

Computation of SEL_{ref} from SEL Measurement of Fixed-guideway Source

SEL was measured for a passby of two diesel-powered locomotives with the following conditions:

SEL_{meas} = 90 dBA
N_{Cars} = 2
T = 6
S_{meas} = 55 mph
D_{meas} = 65 ft

Compute the source reference level using Eq. F-1.

$$SEL_{ref} = SEL_{meas} + 10\log(\frac{S_{meas}}{50}) + 10log(\frac{D_{meas}}{50}) + C_{consist} + C_{emissions}$$
$$= 90 + 10\log\left(\frac{55}{50}\right) + 10\log\left(\frac{65}{50}\right) - 10\log(2) + (-2(6-5))$$
= 86.5 dBA

Example F-2 Calculate SEL_{ref} – Rail Cars

Computation of SEL_{ref} from L_{max} Measurement of Fixed-Guideway Source

L_{max} was measured for a passby of a 4-car consist of 70-ft long rail cars with the following conditions:

L_{max} = 90 dBA
N_{Cars} = 4
S_{meas} = 70 mph
D_{meas} = 65 ft
L_{meas} = 280 ft
$\propto$ = 1.14

Compute the source reference level using Eq. F-3.

$$SEL_{ref} = L_{Amax} + 10\log(\frac{L_{meas}}{50}) + 10\log(\frac{D_{meas}}{50}) - 10\log\ [2 \propto + \sin(2 \propto)] + C_{consist} + C_{emissions} + 3.3$$
$$= 90 + 10\log(\frac{280}{50}) + 10\log(\frac{65}{50}) - 10\log\ \left[2(1.14) + \sin\left(2(1.14)\right)\right] - 10\log(4) - 30\log(\frac{70}{50}) + 3.3$$
= 86.7 dBA

Example F-3 Calculate SEL_{ref} – Bus

Computation of SEL_{ref} from L_{max} Measurement of Highway Vehicle Source

L_{max} was measured for a bus with the following conditions:

L_{max} = 78 dBA
D_{meas} = 80 ft
S_{meas} = 40 mph

Compute the source reference level using Eq. F-4

$$SEL_{ref} = L_{max} + 20\log(\frac{D_{meas}}{50}) + C_{emissions} + 3.3$$
$$= 78 + 20\log(\frac{80}{50}) - 25\log(\frac{40}{50}) + 3.3$$
= 87.8 dBA

F.2 Stationary Sources

This section provides information on appropriate conditions for stationary source measurements, instructions on converting measurements made under non-reference conditions to source reference levels, and an example of this type of computation.

The following conditions are required for stationary sources, in addition to good engineering practice:

- Measured source operations must be representative of project operations in all aspects.
- The following ratio must be 2 or less, and the distance to the closest source component must be 200 ft or less.

$$\frac{Distance\ to\ the\ farthest\ source\ component}{Distance\ to\ the\ closest\ source\ component}$$

  If both conditions cannot simultaneously be met, separate close-by measurements of individual components of this source must be made, for which these distance conditions can be met.

- The following ratio must be 2 or less:

$$\frac{Lateral\ length\ of\ the\ source\ area}{Distance\ to\ the\ closest\ source\ component}$$

  The lateral length of the source area is measured perpendicular to the general line-of-sight between source and measurement positions.

  If this condition cannot be met, then make separate close-by measurements of individual components of this source, for which this condition can be met.

- No noise barriers, terrain, buildings, or dense tree zones may break the lines-of-sight between the source and the measurement position.

When close-by source measurements are made under non-reference conditions, use the instructions below and the equation in Table F- 2 to convert the measured values to source reference levels.

SEL was measured for a stationary noise source

- Collect the following input information:
  - SEL_{meas}, the measured SEL for the noise source, for whatever source "event" is convenient to measure
  - E_{meas}, the event duration, in seconds
  - D_{meas}, the closest distance between the measurement position and the source, in feet
- Compute the source reference level, SELref using Eq. F- 5.

Table F-2 Conversion to Source Reference Levels at 50 ft - Stationary Sources

Measured	Source	Equation
SEL	Stationary noise source	$SEL_{ref} = SEL_{meas} - 10\log(\frac{E_{meas}}{3600}) + 20\log(\frac{D_{meas}}{50})$ **Eq. F- 5**
S_{meas} = speed of measured vehicle(s), in miles per hour E_{meas} = event duration of measurement, in seconds D_{meas} = closest distance between measurement position and source, in feet		

Example F-4 Calculate SEL_{ref} – Signal Crossing

Computation of SEL_{ref} from SEL Measurement of Stationary Source

SEL was measured for a signal crossing with the following conditions:

SEL_{meas} = 70 dBA
E_{meas} = 10 sec
D_{meas} = 65 ft

Compute the source reference level using Eq. F-5.

$$SEL_{ref} = SEL_{meas} - 10\log(\frac{E_{meas}}{3600}) + 20\log(\frac{D_{meas}}{50})$$
$$= 70 - 10\log(\frac{10}{3600}) + 20\log(\frac{65}{50})$$
= 97.8 dBA

F.3 L_{max} for Single Train Passby

This section provides procedures for the computation of L_{max} for a single train passby. This procedure can be used to characterize trains of mixed consists using L_{max}. Follow the instructions below.

- Collect the following input information:
  - SEL_{ref}, from Section 4.5, specific to both the locomotive type and car type of the train
  - N_{loco}, the number of locomotives in the train
  - N_{cars}, the number of cars in the train
  - L_{loco}, the total length of the train's locomotive(s), in feet (or N_{loco} unit length)
  - L_{cars}, the total length of the train's set of rail car(s), in feet (or N_{cars} unit length)
  - S, the train speed, in miles per hour
  - D, the closest distance between the receiver of interest and the train, in feet

- Use the equations in Table F-3 to compute the following:
  - $L_{max.loco}$ for the locomotive(s) using Eq. F-6

- $L_{max.cars}$ for the rail car(s) using the Eq. F-7
- $L_{max.total}$, the larger L_{max} from the locomotives(s) and rail car(s) is the L_{max} for the total train passby, see Eq. F- 8.

Table F-3 Conversion to Lmax at the Receiver, for a Single Train Passby

Source	Equation	
Locomotives	$L_{max.Loco} = SEL_{locos} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2 \propto) - 3.3$	**Eq. F-6**
Rail Cars	$L_{max.Rcars} = SEL_{Rcars} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2 \propto + \sin(2 \propto)) - 3.3$	**Eq. F-7**
Total Train	$L_{max.total} = max(L_{max.Loco}\ or\ L_{max.RCars})$	**Eq. F-8**

L = total length of measured group of locomotive(s) or rail car(s), ft

S = vehicle speed, mph

$\propto$ = arctan $\left(\frac{L}{2D}\right)$, rad

D = closest distance between receiver and source, ft

Example F-5 Calculate L_{max} – Train Passby

Computation of L_{max} for Train Passby

Calculate the L_{max} of commuter train at receiver of interest according to the following conditions:

SEL_{ref} = 92 dBA for locomotives
= 82 dBA for rail cars
N_{Loco} = 1
N_{Cars} = 6
S = 43 miles per hour
D = 125 ft
$\propto_{locos}$ = 0.27
$\propto_{cars}$ = 1.03

The locomotive and rail cars each have a unit length (L) of 70 ft.

Determine the total length of the locomotive and rail cars.

L_{Loco} = 70 ft
L_{cars} = 420 ft

Compute L_{max} for the locomotive using Eq. F-6:

$$L_{max.Loco} = SEL_{loco} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2\propto) - 3.3$$

$$= 92 + 10log\left(\frac{43}{50}\right) - 10log\left(\frac{70}{50}\right) + 10\log(2 \times 0.27) - 3.3$$

= 84.0 dBA

Compute L_{max} for the rail cars using Eq. F-7:

$$L_{max.Rcars} = SEL_{Rcars} + 10log\left(\frac{S}{50}\right) - 10log\left(\frac{L}{50}\right) + 10\log(2\propto + \sin(2\propto)) - 3.3$$

$$= 82 + 10log\left(\frac{43}{50}\right) - 10log\left(\frac{420}{50}\right) + 10\log((2 \times 1.03) + \sin(2 \times 1.03)) - 3.3$$

= 73.5 dBA

Find the total L_{max} for the train passby using Eq. F-8.

$$L_{max.total} = max(L_{max.Loco}\ or\ L_{max.Rcars})$$

=84.0 dBA

Appendix G: Non-Standard Modeling Procedures and Methodology

This manual provides guidance for preparing and reviewing the noise and vibration sections of environmental documents, as well as FTA-approved methods and procedures to determine the level of noise and vibration impact resulting from most federally-funded transit projects. Situations may arise, however, that are not explicitly covered in this manual. Professional judgment may be used to extend the basic methods to cover these cases, when appropriate. It is important to note that each project is unique and must be evaluated on a case-by-case basis. This appendix provides procedures for the use of non-standard noise and vibration modeling procedures and methodologies on public transportation projects.

Submittal Procedure – The procedure for using non-standard modeling procedures and methodology is as follows:

1. The transit project manager should contact the FTA Regional office to discuss the proposed methods and/or data not described in this manual prior to use of the non-standard approach.
2. The non-standard methodology should be documented according to the guidelines below as part of the technical report described in Section 8.2.

Examples of Methods that Require Communication and Documentation – The following noise and vibration analysis methods and data require communication with the FTA Regional office and documentation:

- Non-standard transit noise and vibration modeling and analysis methods not described in this manual (including non-standard adjustments, computations, and assumptions). This includes modifications to standard FTA noise and vibration methods.
- Non-standard transit noise and vibration reference data not described in this manual (including measured data, substitution data, data at non-standard reference distances and/or speeds, new transit noise sources, and transit noise sources operating in non-standard conditions).
- Non-standard transit noise and vibration impact criteria not described in this manual, including the maximum sound pressure level metric.
- Non-standard methods of evaluating construction noise, including non-standard construction noise impact criteria.
- Other noise modeling tools besides the FTA Noise Impact Assessment Spreadsheet or Traffic Noise Model (TNM®) for highway noise modeling, such as the development of a finite element method model.
- Any transit noise and vibration analysis that involves an impact area or noise source that is controversial.

Documentation Guidelines – The use of non-standard noise and vibration analysis methods or data requires the following documentation components in a technical memorandum attached to the environmental document:

- **Background**
  Briefly describe the transit project for which non-default methods or data are needed. State the dominant noise sources, type of analysis, and the impact criteria. Include any additional relevant information.

- **Statement of Benefit**
  Briefly describe the benefit of the non-default noise and vibration methods or data to the transit project. Describe the appropriateness of the non-default methods or data, as well as why the standard method or data are insufficient or problematic.

- **Non-standard Data Description**
  Describe the non-standard noise or vibration data in detail. Include source type, manufacturer, reference conditions (speed, distance, and operational conditions), name of data supplier, and a date associated with data development/measurement. For measured noise or vibration data, provide corresponding data documentation (such as a data measurement or a development report). For substitution data, a comparison between the non-standard data and corresponding standard data should be provided. Furthermore, if outside sources recommend the use of the non-standard data (such as a technical society, a standards organization, or a vehicle manufacturer), references for those recommendations should be included.

- **Non-standard Methods Description**
  Describe the non-standard noise or vibration analysis method in detail. This should include a detailed description and derivation of the method (including data used in the development of the method), a description of the usage of the method, and a comparison between the non-standard method and the corresponding standard method in the context of the transit analysis. If the method has been validated against measurement data, a description of that validation analysis should be provided. If the method is derived from another source (such as a different transportation noise or vibration method), provide corresponding documentation for that source. A description of how the method is conservative (for example, estimating the worst-case scenario) or some discussion on the probability of exceeding the predicted level should be provided. Furthermore, if outside sources recommend the use of the non-standard method (such as a technical society or standards organization), references for those recommendations should be included.

- **Non-standard Tools Description**
  Describe in detail any non-standard noise or vibration models that have not been explicitly recommended in this manual. This should include a detailed description of the tool (including data used, the computations implemented in the tool, any modifications or adjustments to the tool or the corresponding data, and the usage of the tool), a description of the validation of the tool (including reference documentation and validation analyses), and a comparison between the non-standard tool and the equivalent standard tool in the context of the transit analysis. Quantitative comparisons, such as the standard deviation of the non-standard tool and an estimate of the least mean square of differences between the standard and non-standard tools, should be provided and explained. A description of how the method is conservative (for example, estimating the worst-case scenario) or some discussion on the probability of exceeding the predicted level should be provided. If outside sources recommend the use of the non-standard tool (such as a technical society or standards organization), references for those recommendations should be included.

ENDNOTES

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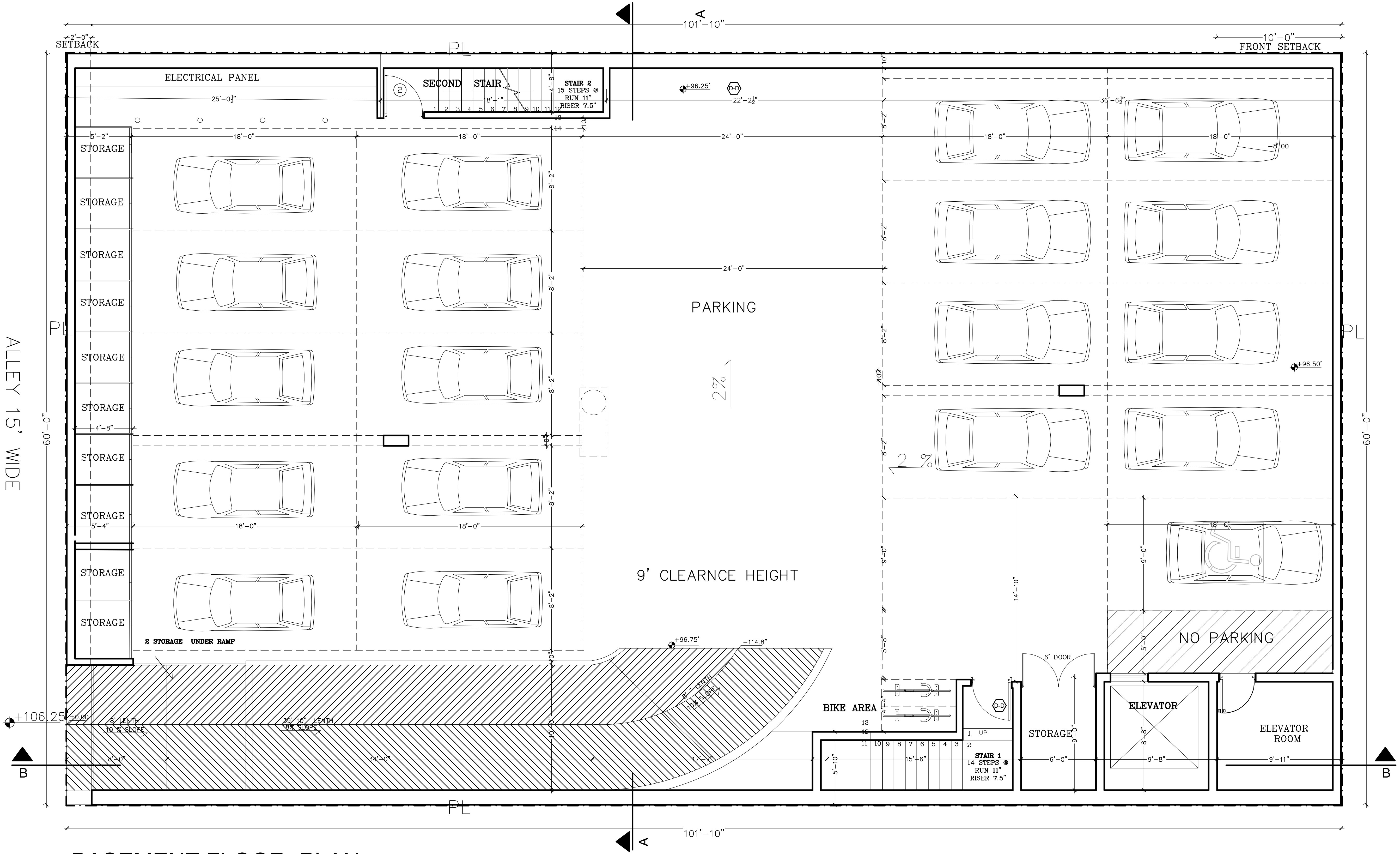
U.S. Department of Transportation
Federal Transit Administration

U.S. Department of Transportation
Federal Transit Administration
East Building
1200 New Jersey Avenue, SE
Washington, DC 20590
https://www.transit.dot.gov/about/research-innovation

EXHIBIT E

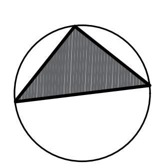
Project Architectural Plans



BASEMENT FLOOR PLAN

SCALE: 1/8"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232



NORTH

ALT 2
20% RAMP SLOPE

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

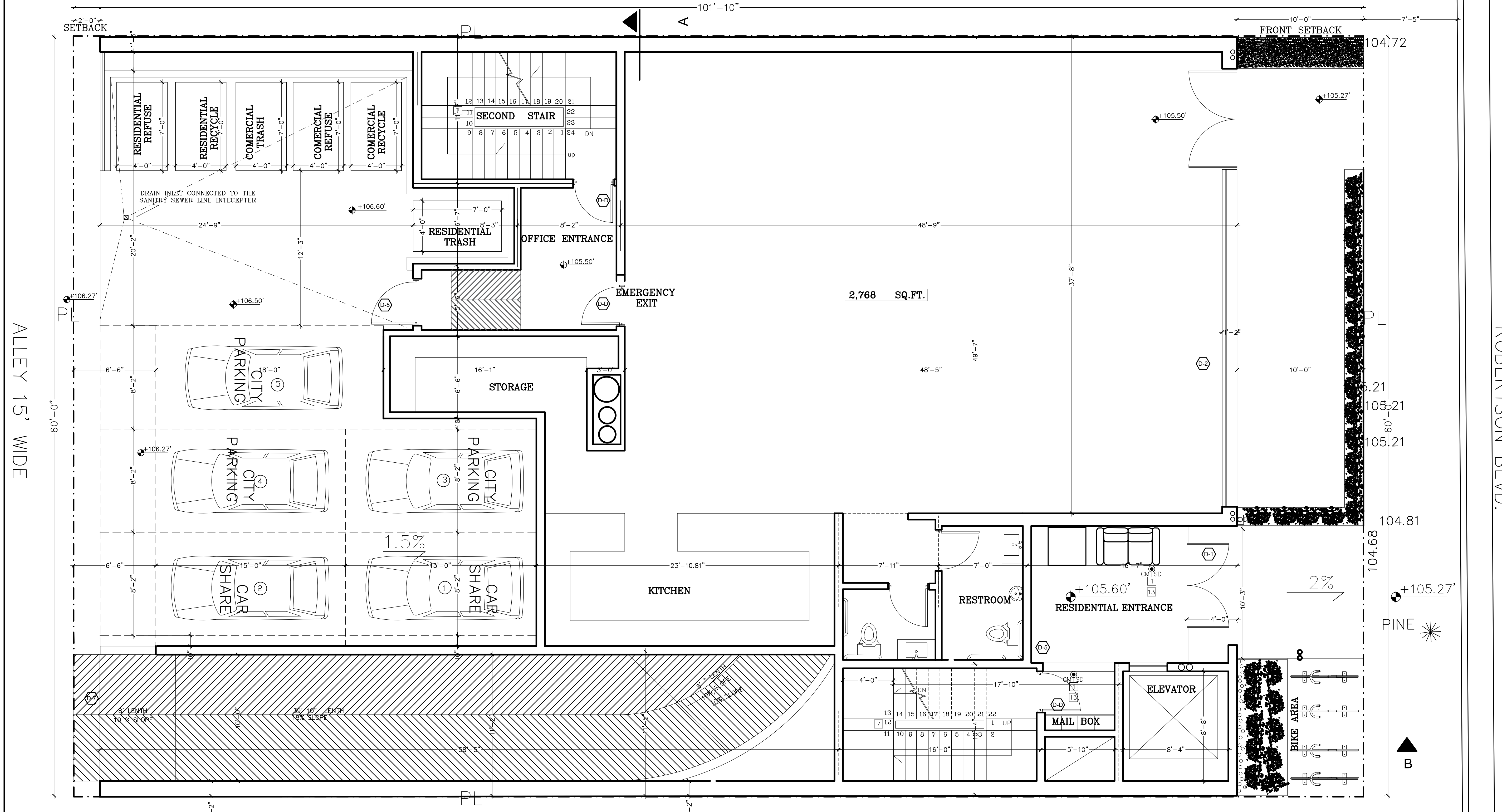
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: BASEMENT FLOOR

SHEET NUMBER: A 2

08/08/2019



FIRST FLOOR PLAN

SCALE: 1/8"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232

NORTH

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

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REVISIONS

PROJECT ADDRESS: 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

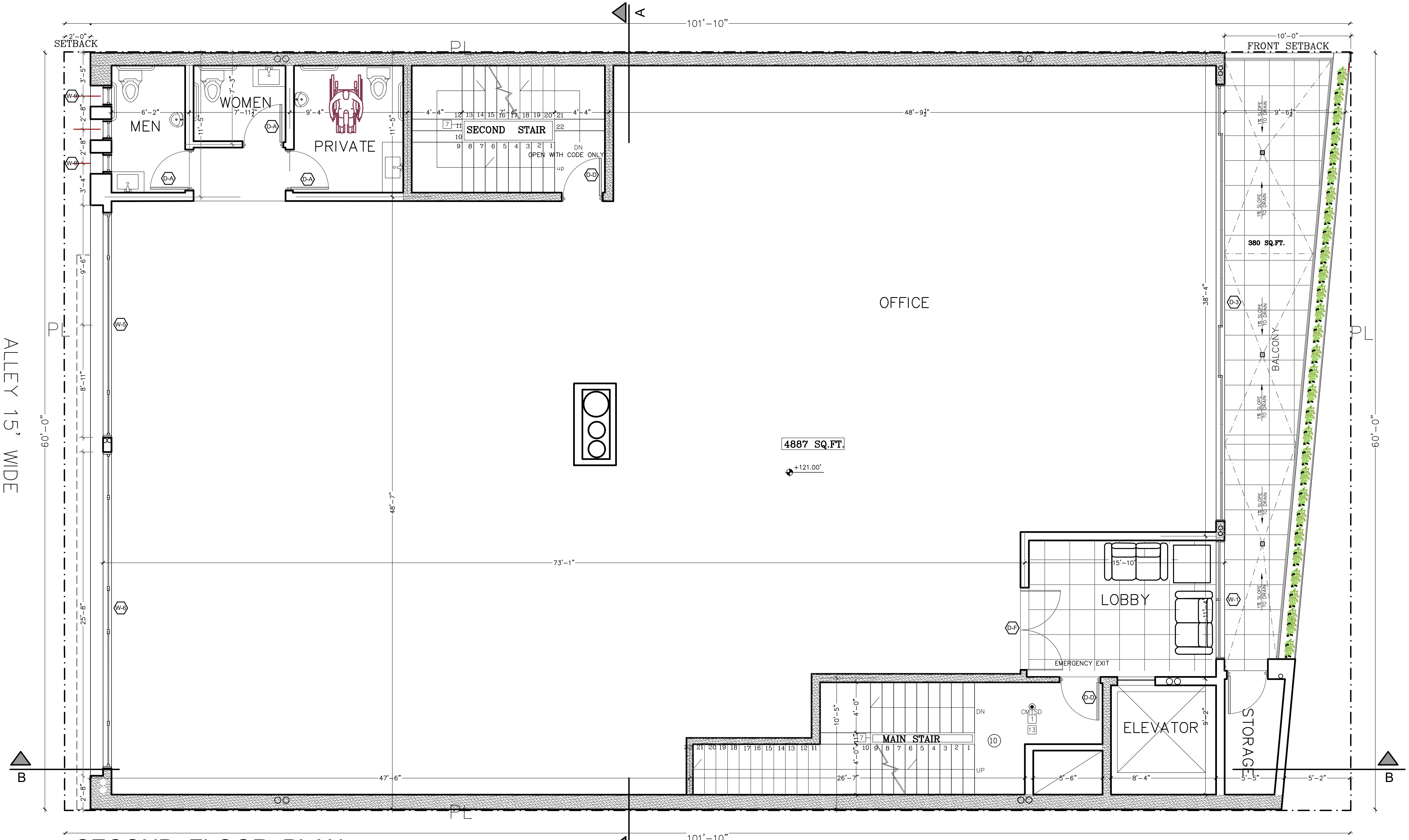
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: FIRST FLOOR

SHEET NUMBER: A3

08/13/2019

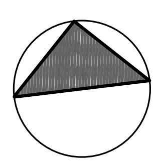


SECOND FLOOR PLAN

SCALE BAR1/8 FT

SCALE: 1/8"=1'-0"

4887 SQ.FT.



NORTH

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

PLAN KEY NOTES:

- DENOTES ONE-HR FIRE PROTECTION WALL AND CEILLING (5/8" TYPE "X" GYP. BOARD ON THE SIDE OF GARAGE OR UNDER THE STAIR)
- RECESSED HALOGEN DOWNLIGHT
- DOOR MUST OPEN OVER A LANDING NOT MORE THAN 1.5" BELOW THE THRESHOLD. EXCEPTION : THE DOOR DOES NOT SWING OVER THE LANDING SHALL BE NOT THAN MORE 7.75" BELOW THE THRESHOLD.

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REVISIONS

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PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

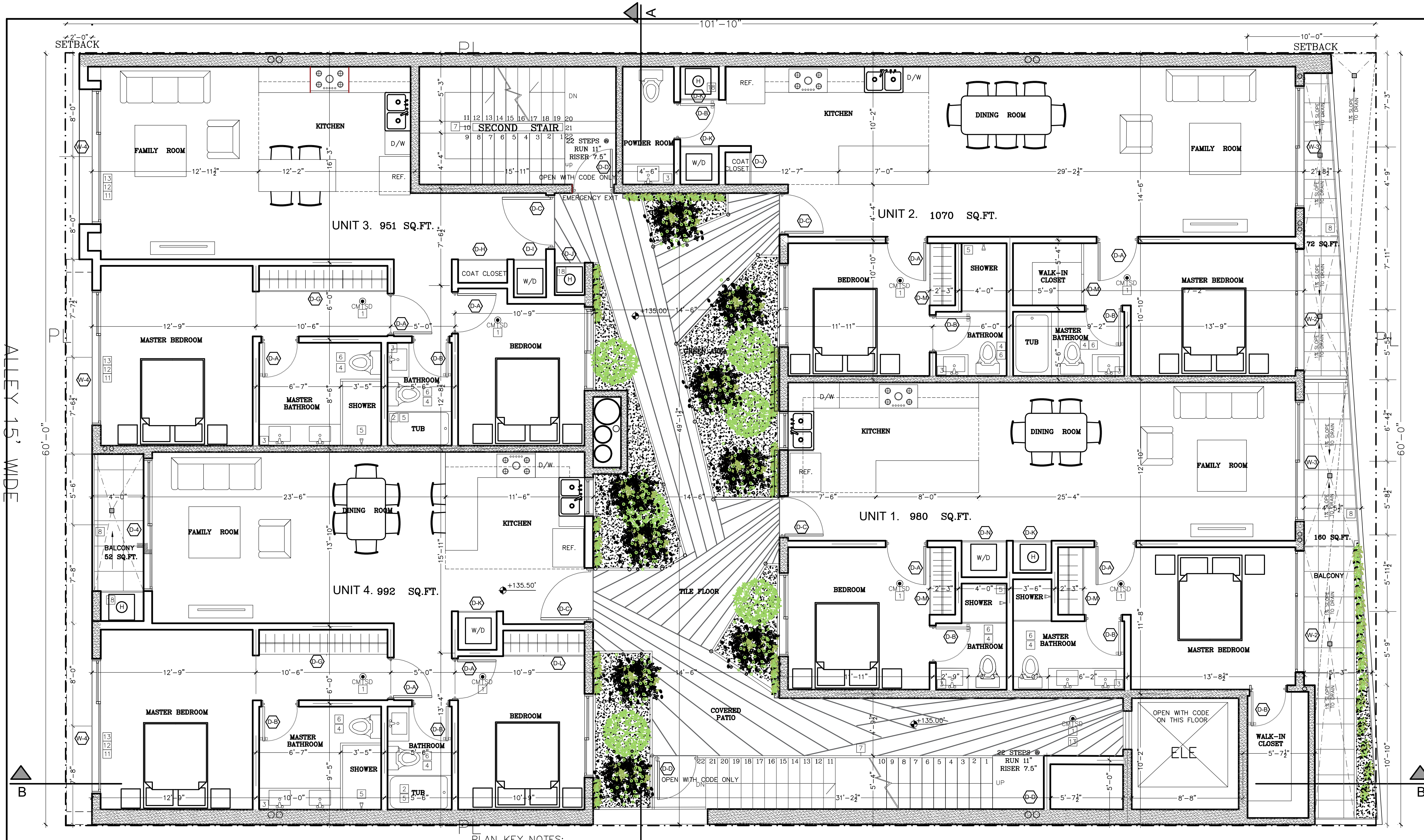
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: SECOND FLOOR

SHEET NUMBER: A 4

08/13/2019



PLAN KEY NOTES:

THIRD FLOOR PLAN

SCALE: 1/8"=1'-0"

SCALE BAR1/8

4307 SQ.FT.

3727 ROBERTSON
CULVER CITY CA 90232

NORTH

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER: 4206033057
TRACT: 3872
BLOCK: NONE
LOT: 42 & 43
ZONING: IG

DENOTES ONE–HR FIRE PROTECTION WALL AND CEILLING (5/8" TYPE "X" GYP. BOARD ON THE SIDE OF GARAGE OR UNDER THE STAIR)

RECESSED HALOGEN DOWNLIGHT

DOOR MUST OPEN OVER A LANDING NOT MORE THAN 1.5" BELOW THE THRESHOLD. EXCEPTION : THE DOOR DOES NOT SWING OVER THE LANDING SHALL BE NOT THAN MORE 7.75" BELOW THE THRESHOLD.

WALL OUTLET W/SENSOR

1 HARDWIRED SMOKE DETECTORS WITH BATTERY BACKUP

2 14"X14" ACCESS PANEL FOR ALL BATH TUBS

3 MEDICINE CABINET

4 PROVIDE EXHAUST FAN WITH MINIMUM 5 AIR EXCHANGES PER HOUR AND AS PER GREEN BUILDING REQUIREMENT REFER TO NOTE #25/H&I DWG. G–B FOR BATHROOMS CONTAINING BATHTUBS,SHOWER ,OR TUB/SHOWER COMBINATIONS . IT SHALL BE ENERGY STAR

5 PROVIDE 70 INCH HIGH NON–ABSORBENT WALL ADJACENT TO SHOWER AND APPROVED–RESISTANT MATERIALS FOR SHOWER ENCLOSURE. 91.807.1.3, 91.2406.4(5), 91.1115B.9.6,7,8

6 PROVIDE ULTRA FLUSH WATER CLOSETS FOR ALL NEW CONSTRUCTION. EXISTING SHOWER HEADS AND TOILETS MUST BE ADAPTED FOR LOW WATER CONSUMPTION.

8 HANDRAIL @ 36" ABOVE TREAD NOSING WITH LESS THAN 4" CLEAR SPACING BETWEEN INTERMEDIATE RAILS
GUARDRAIL @ 42" HIGH ABOVE THE ADJACENT FINISH FLOOR WITH LESS THAN 4" CLEAR SPACING BETWEEN INTERMEDIATE RAILS

9 DEX–OTEX DECK COATING LARR # 02306

10 ONE–HR FIRE RESISTIVE WALL, CEILING, POSTS AND BEAM ON THE SIDE OF GARAGE OR ENCLOSED USEABLE SPACE UNDER INTERIOR STAIRS (5/8" TYPE "X" GYPSUM BOARD)

11 EMERGENCY EGRESS TYPICAL TO ALL SLEEPING ROOMS MIN.24" CLEAR HT, 20" CLEAR WIDTH , 5.7 SQ.FT. MIN AREA (5.0 SQ. FT. AT GRADE) &42"MIN. –44" MAX. TO SILL

12 FLOOR TRANSITION STRIP

13 DOOR MUST OPEN OVER A LANDING NOT MORE THAN 0.5" BELOW THE THRESHOLD. EXCEPTION : THE DOOR DOES NOT SWING OVER THE LANDING SHALL BE NOT THAN MORE 7.75" BELOW THE THRESHOLD.

14 CARBON MONOXIDE DETECTORS

15 GAS FIREPLACE – HEAT & GLO, SL–550TR–IPI–E, DIRECT VENT W/SEAL COMBUSTION GAS FIREPLACE REFER TO SPEC #5 DWG A–10b "WOOD BURNING FIREPLACES ARE PROHIBITED PER AQMD RULE 445 (4.503.1, AQMD RULE 445) FOR MORE DETAIL CHECK A–13

FOR FUTURE INSTALLATION OF ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) IN ONE AND TWO FAMILY DWELLINGS AND TOWNHOUSES:

a. MIN. 1" (INSIDE DIAMETER) LISTED RACEWAY IS INSTALLED TO ACCOMMODATE A DEDICATED 208/240 VOLT BRANCH CIRCUIT. THE RACEWAY SHALL ORIGINATE AT THE MAIN SERVICE OR A SUBPANEL AND TERMINATE IN CLOSE PROXIMITY TO THE PROPOSED LOCATION OF THE CHARGING SYSTEM INTO A LISTED CABINET, BOX OR ENCLOSURE.
b. SUFFICIENT CONDUCTOR SIZING AND SERVICE CAPACITY TO INSTALL LEVEL 2 EVSE SHALL BE PROVIDED.
c. A LABEL STATING 'EV CAPABLE' SHALL BE POSTED IN A CONSPICUOUS PLACE AT THE SERVICE PANEL OR SUBPANEL AND NEXT TO THE RACEWAY TERMINATION POINT.

17 AUTOMATIC IRRIGATION SYSTEM CONTROLLER . MANUFACTURER'S SPECIFICATIONS. (RD–900–EXT– RAIN DIAL SERVICES 9 STATIONS CONTROLLER).

18 WATER HEATER MUST BE STRAPPED TO THE WALL

19 DOORS BETWEEN GARAGE AND THE DWELLING UNIT SHALL BE SELF–CLOSING AND SELF–LATCHING, SOLID WOOD OR SOLID OR HONEYCOMB CORE STEEL NOT LESS THAN 1⅜ INCHES THICK, OR HAVE A MINIMUM FIRE PROTECTION RATING OF 20 MINUTES (406.1.4)

20 TYPE OF CONSTRUCTIONS 1–B

21 ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH TAPE,PLASTIC,OR SHEET METAL UNTIL THE FINAL STARTUP OF THE HEATING,COOLING AND VENTILATING EQUIPMENT.

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REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

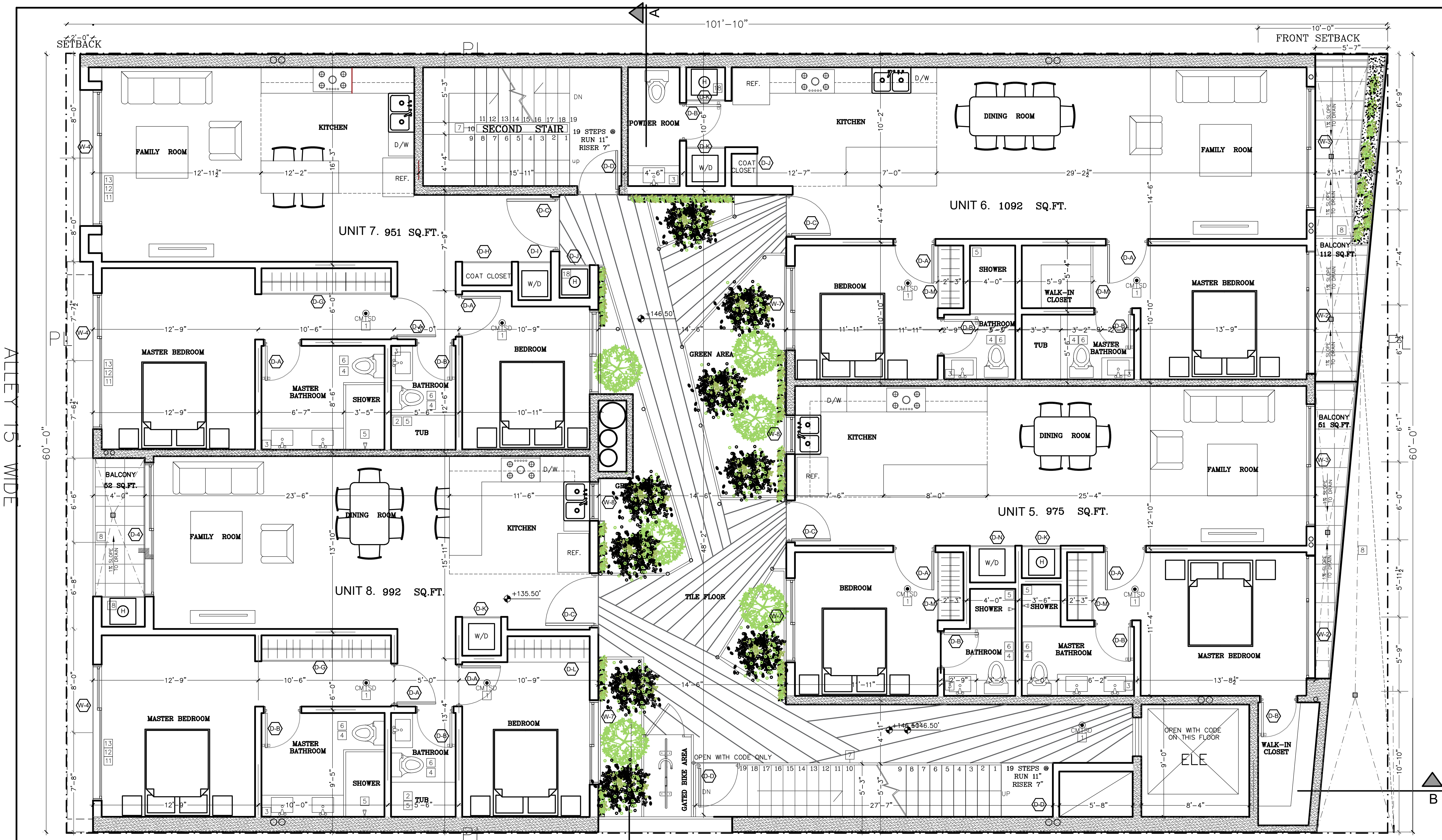
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: THIRD FLOOR

SHEET NUMBER: A 5

08/13/2019



FORTH FLOOR PLAN

SCALE BAR1/8 FT

SCALE: 1/4"=1'-0"

4307 SQ.FT.

3727 ROBERTSON
CULVER CITY CA 90232

NORTH

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

PLAN KEY NOTES:

DENOTES ONE-HR FIRE PROTECTION WALL AND CEILLING (5/8" TYPE "X" GYP. BOARD ON THE SIDE OF GARAGE OR UNDER THE STAIR)

RECESSED HALOGEN DOWNLIGHT

DOOR MUST OPEN OVER A LANDING NOT MORE THAN 1.5" BELOW THE THRESHOLD. EXCEPTION : THE DOOR DOES NOT SWING OVER THE LANDING SHALL BE NOT THAN MORE 7.75" BELOW THE THRESHOLD.

WALL OUTLET W/SENSOR

1. HARDWIRED SMOKE DETECTORS WITH BATTERY BACKUP
2. 14"X14" ACCESS PANEL FOR ALL BATH TUBS
3. MEDICINE CABINET
4. PROVIDE EXHAUST FAN WITH MINIMUM 5 AIR EXCHANGES PER HOUR AND AS PER GREEN BUILDING REQUIREMENT REFER TO NOTE #25/H&I DWG. G-B FOR BATHROOMS CONTAINING BATHTUBS,SHOWER ,OR TUB/SHOWER COMBINATIONS . IT SHALL BE ENERGY STAR
5. PROVIDE 70 INCH HIGH NON-ABSORBENT WALL ADJACENT TO SHOWER AND APPROVED-RESISTANT MATERIALS FOR SHOWER ENCLOSURE. 91.807.1.3, 91.2406.4(5), 91.1115B.9.6,7,8
6. PROVIDE ULTRA FLUSH WATER CLOSETS FOR ALL NEW CONSTRUCTION. EXISTING SHOWER HEADS AND TOILETS MUST BE ADAPTED FOR LOW WATER CONSUMPTION.
8. HANDRAIL @ 36" ABOVE TREAD NOSING WITH LESS THAN 4" CLEAR SPACING BETWEEN INTERMEDIATE RAILS GUARDRAIL @ 42" HIGH ABOVE THE ADJACENT FINISH FLOOR WITH LESS THAN 4" CLEAR SPACING BETWEEN INTERMEDIATE RAILS
9. DEX-OTEX DECK COATING LARR # 02306
10. ONE-HR FIRE RESISTIVE WALL, CEILING, POSTS AND BEAM ON THE SIDE OF GARAGE OR ENCLOSED USEABLE SPACE UNDER INTERIOR STAIRS (5/8" TYPE "X" GYPSUM BOARD)
11. EMERGENCY EGRESS TYPICAL TO ALL SLEEPING ROOMS MIN.24" CLEAR HT, 20" CLEAR WIDTH , 5.7 SQ.FT. MIN AREA (5.0 SQ. FT. AT GRADE) &42"MIN. -44" MAX. TO SILL
12. FLOOR TRANSITION STRIP
13. DOOR MUST OPEN OVER A LANDING NOT MORE THAN 0.5" BELOW THE THRESHOLD. EXCEPTION : THE DOOR DOES NOT SWING OVER THE LANDING SHALL BE NOT THAN MORE 7.75" BELOW THE THRESHOLD.
14. CARBON MONOXIDE DETECTORS
15. GAS FIREPLACE - HEAT & GLO, SL-550TR-IPI-E, DIRECT VENT W/SEAL COMBUSTION GAS FIREPLACE REFER TO SPEC #5 DWG A-10b "WOOD BURNING FIREPLACES ARE PROHIBITED PER AQMD RULE 445 (4.503.1, AQMD RULE 445) FOR MORE DETAIL CHECK A-13

FOR FUTURE INSTALLATION OF ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) IN ONE AND TWO FAMILY DWELLINGS AND TOWNHOUSES:

a. MIN. 1" (INSIDE DIAMETER) LISTED RACEWAY IS INSTALLED TO ACCOMMODATE A DEDICATED 208/240 VOLT BRANCH CIRCUIT. THE RACEWAY SHALL ORIGINATE AT THE MAIN SERVICE OR A SUBPANEL AND TERMINATE IN CLOSE PROXIMITY TO THE PROPOSED LOCATION OF THE CHARGING SYSTEM INTO A LISTED CABINET, BOX OR ENCLOSURE.
b. SUFFICIENT CONDUCTOR SIZING AND SERVICE CAPACITY TO INSTALL LEVEL 2 EVSE SHALL BE PROVIDED.
c. A LABEL STATING 'EV CAPABLE' SHALL BE POSTED IN A CONSPICUOUS PLACE AT THE SERVICE PANEL OR SUBPANEL AND NEXT TO THE RACEWAY TERMINATION POINT.

17. AUTOMATIC IRRIGATION SYSTEM CONTROLLER . MANUFACTURER'S SPECIFICATIONS. (RD-900-EXT- RAIN DIAL SERVICES 9 STATIONS CONTROLLER).
18. WATER HEATER MUST BE STRAPPED TO THE WALL
19. DOORS BETWEEN GARAGE AND THE DWELLING UNIT SHALL BE SELF-CLOSING AND SELF-LATCHING, SOLID WOOD OR SOLID OR HONEYCOMB CORE STEEL NOT LESS THAN 1⅜ INCHES THICK, OR HAVE A MINIMUM FIRE PROTECTION RATING OF 20 MINUTES (406.1.4)
20. TYPE OF CONSTRUCTIONS 1-B
21. ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH TAPE,PLASTIC,OR SHEET METAL UNTIL THE FINAL STARTUP OF THE HEATING,COOLING AND VENTILATING EQUIPMENT.

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

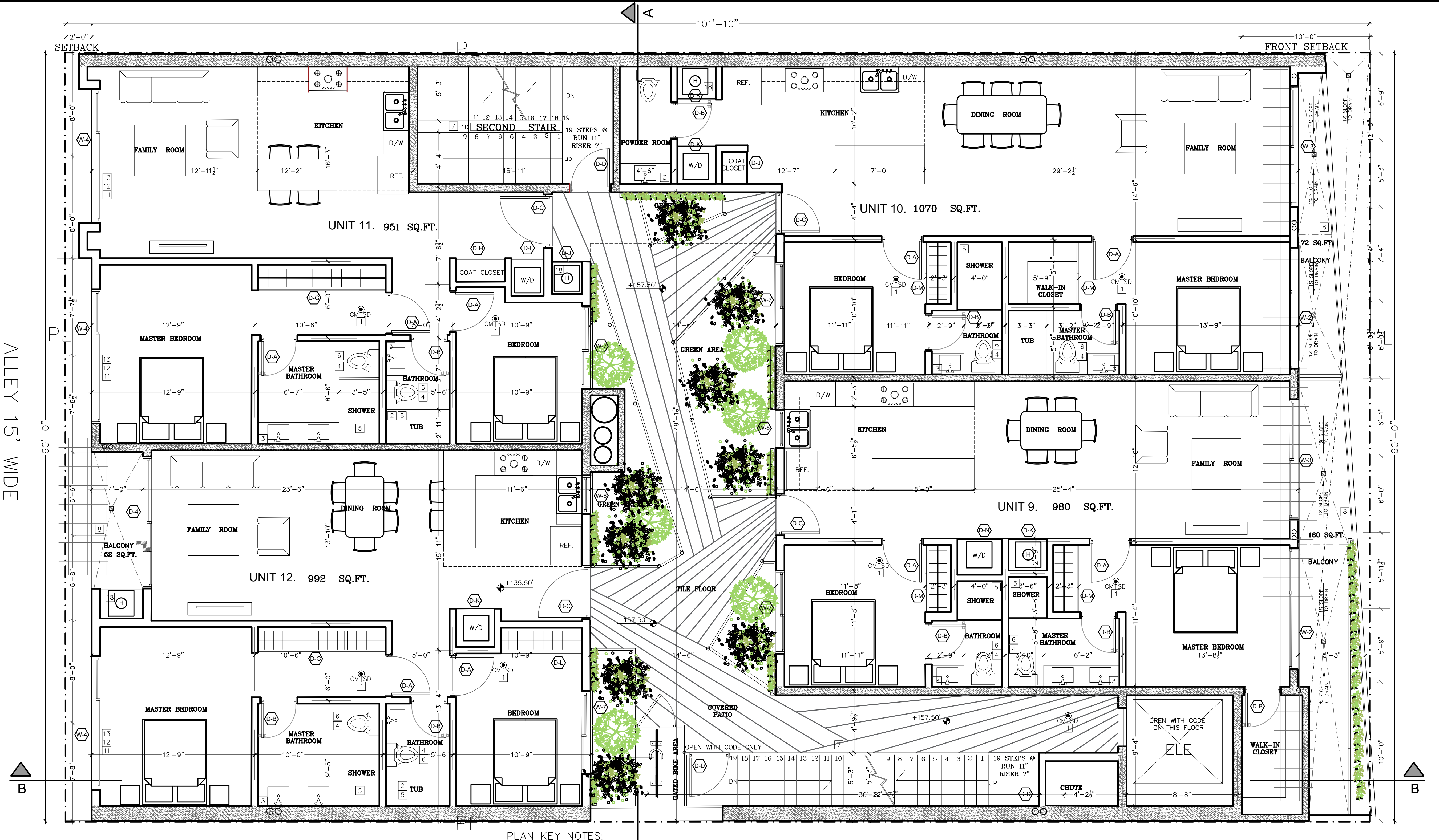
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: FORTH FLOOR

SHEET NUMBER: A 6

08/13/2019



FIFTH FLOOR PLAN

SCALE BAR1/8

SCALE: 1/4"=1'-0"

4307 SQ.FT.

3727 ROBERTSON
CULVER CITY CA 90232

NORTH

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

PLAN KEY NOTES:

DENOTES ONE-HR FIRE PROTECTION WALL AND CEILLING (5/8" TYPE "X" GYP. BOARD ON THE SIDE OF GARAGE OR UNDER THE STAIR)

RECESSED HALOGEN DOWNLIGHT

DOOR MUST OPEN OVER A LANDING NOT MORE THAN 1.5" BELOW THE THRESHOLD. EXCEPTION : THE DOOR DOES NOT SWING OVER THE LANDING SHALL BE NOT THAN MORE 7.75" BELOW THE THRESHOLD.

WALL OUTLET W/SENSOR

1 HARDWIRED SMOKE DETECTORS WITH BATTERY BACKUP

2 14"X14" ACCESS PANEL FOR ALL BATH TUBS

3 MEDICINE CABINET

4 PROVIDE EXHAUST FAN WITH MINIMUM 5 AIR EXCHANGES PER HOUR AND AS PER GREEN BUILDING REQUIREMENT REFER TO NOTE #25/H&I DWG. G-B FOR BATHROOMS CONTAINING BATHTUBS,SHOWER ,OR TUB/SHOWER COMBINATIONS . IT SHALL BE ENERGY STAR

5 PROVIDE 70 INCH HIGH NON-ABSORBENT WALL ADJACENT TO SHOWER AND APPROVED-RESISTANT MATERIALS FOR SHOWER ENCLOSURE. 91.807.1.3, 91.2406.4(5), 91.1115B.9.6,7,8

6 PROVIDE ULTRA FLUSH WATER CLOSETS FOR ALL NEW CONSTRUCTION. EXISTING SHOWER HEADS AND TOILETS MUST BE ADAPTED FOR LOW WATER CONSUMPTION.

8 HANDRAIL @ 36" ABOVE TREAD NOSING WITH LESS THAN 4" CLEAR SPACING BETWEEN INTERMEDIATE RAILS GUARDRAIL @ 42" HIGH ABOVE THE ADJACENT FINISH FLOOR WITH LESS THAN 4" CLEAR SPACING BETWEEN INTERMEDIATE RAILS

9 DEX-OTEX DECK COATING LARR # 02306

10 ONE-HR FIRE RESISTIVE WALL, CEILING, POSTS AND BEAM ON THE SIDE OF GARAGE OR ENCLOSED USEABLE SPACE UNDER INTERIOR STAIRS (5/8" TYPE "X" GYPSUM BOARD)

11 EMERGENCY EGRESS TYPICAL TO ALL SLEEPING ROOMS MIN.24" CLEAR HT, 20" CLEAR WIDTH , 5.7 SQ.FT. MIN AREA (5.0 SQ. FT. AT GRADE) &42"MIN. -44" MAX. TO SILL

12 FLOOR TRANSITION STRIP

13 DOOR MUST OPEN OVER A LANDING NOT MORE THAN 0.5" BELOW THE THRESHOLD. EXCEPTION : THE DOOR DOES NOT SWING OVER THE LANDING SHALL BE NOT THAN MORE 7.75" BELOW THE THRESHOLD.

14 CARBON MONOXIDE DETECTORS

15 GAS FIREPLACE - HEAT & GLO, SL-550TR-IPI-E, DIRECT VENT W/SEAL COMBUSTION GAS FIREPLACE REFER TO SPEC #5 DWG A-10b "WOOD BURNING FIREPLACES ARE PROHIBITED PER AQMD RULE 445 (4.503.1, AQMD RULE 445) FOR MORE DETAIL CHECK A-13

FOR FUTURE INSTALLATION OF ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) IN ONE AND TWO FAMILY DWELLINGS AND TOWNHOUSES:

a. MIN. 1" (INSIDE DIAMETER) LISTED RACEWAY IS INSTALLED TO ACCOMMODATE A DEDICATED 208/240 VOLT BRANCH CIRCUIT. THE RACEWAY SHALL ORIGINATE AT THE MAIN SERVICE OR A SUBPANEL AND TERMINATE IN CLOSE PROXIMITY TO THE PROPOSED LOCATION OF THE CHARGING SYSTEM INTO A LISTED CABINET, BOX OR ENCLOSURE.
b. SUFFICIENT CONDUCTOR SIZING AND SERVICE CAPACITY TO INSTALL LEVEL 2 EVSE SHALL BE PROVIDED.
c. A LABEL STATING 'EV CAPABLE' SHALL BE POSTED IN A CONSPICUOUS PLACE AT THE SERVICE PANEL OR SUBPANEL AND NEXT TO THE RACEWAY TERMINATION POINT.

17 AUTOMATIC IRRIGATION SYSTEM CONTROLLER . MANUFACTURER'S SPECIFICATIONS. (RD-900-EXT- RAIN DIAL SERVICES 9 STATIONS CONTROLLER).

18 WATER HEATER MUST BE STRAPPED TO THE WALL

19 DOORS BETWEEN GARAGE AND THE DWELLING UNIT SHALL BE SELF-CLOSING AND SELF-LATCHING, SOLID WOOD OR SOLID OR HONEYCOMB CORE STEEL NOT LESS THAN 1⅜ INCHES THICK, OR HAVE A MINIMUM FIRE PROTECTION RATING OF 20 MINUTES (406.1.4)

20 TYPE OF CONSTRUCTIONS 1-B

21 ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH TAPE,PLASTIC,OR SHEET METAL UNTIL THE FINAL STARTUP OF THE HEATING,COOLING AND VENTILATING EQUIPMENT.

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1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS
7

PROJECT ADDRESS :
3727 ROBERTSON ST.
CULVER CITY
CA 90232

PROJECT TITLE:
3727 ROBERTSON

DATE:
04/27/2016

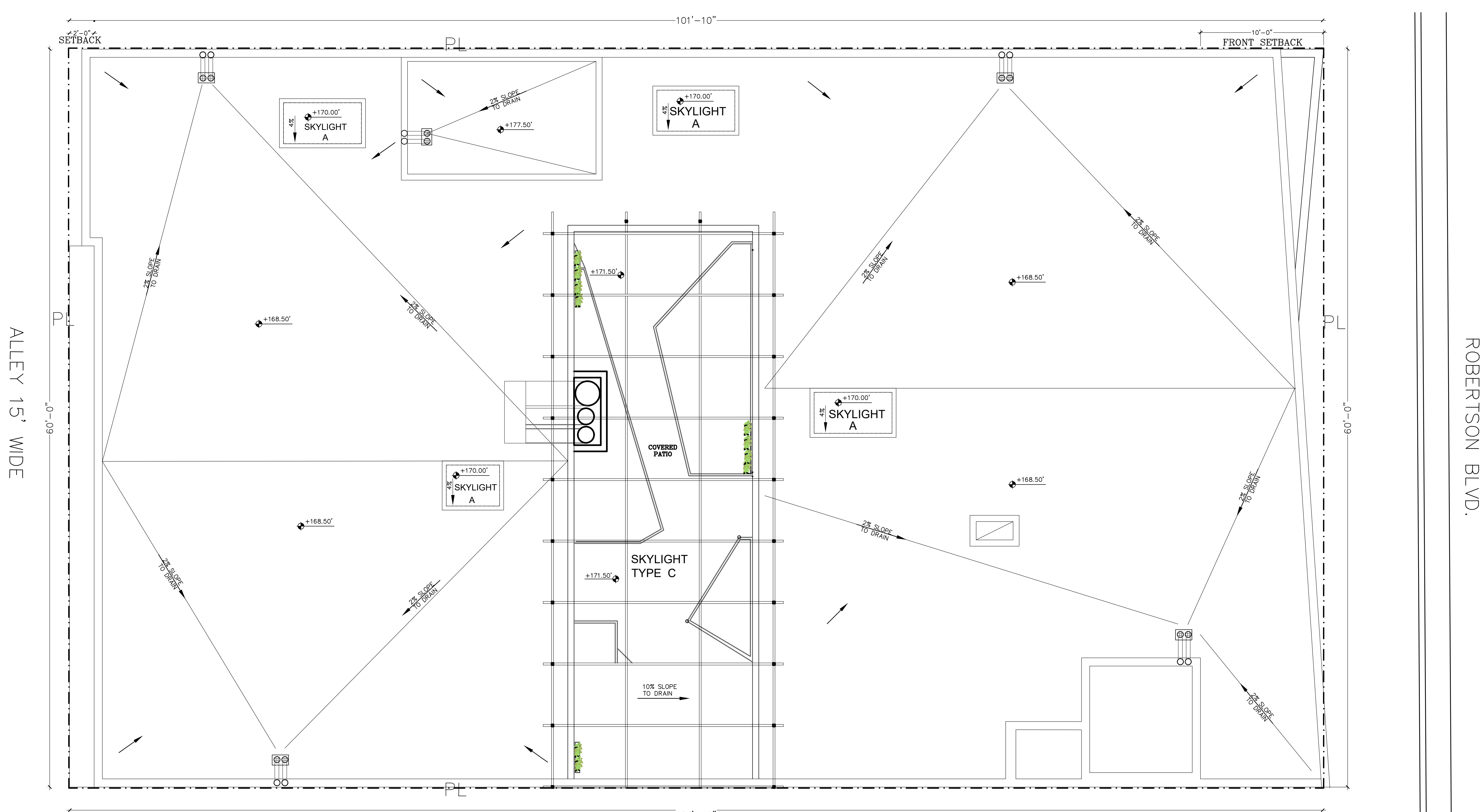
JOB NUMBER:

DRAWING PHASE:
P/CSUBMITTAL

SHEET TITLE:
FIFTH FLOOR

SHEET NUMBER:
A
7

08/13/2019



ROOF FLOOR PLAN

SCALE: 1/4"=1'-0"

SCALE BAR1/8

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

GENERAL NOTES:

A. THE CONSTRUCTION SHALL NOT RESTRICT A FIVE-FOOT CLEAR AND UNOBSTRUCTED ACCESS TO ANY WATER OR POWER DISTRIBUTION FACILITIES (POWER POLES, PULL-BOXES, TRANSFORMERS, VAULTS, PUMPS, VALVES, METERS, APPURTENANCES, ETC.) OR TO THE LOCATION OF THE HOOK-UP. THE CONSTRUCTION SHALL NOT BE WITHIN TEN FEET OF ANY POWER LINES-WHETHER OR NOT THE LINES ARE LOCATED ON THE PROPERTY. FAILURE TO COMPLY MAY CAUSE CONSTRUCTION DELAYS AND/OR ADDITIONAL EXPENSES.

B. AN APPROVED SEISMIC GAS SHUTOFF VALVE WILL BE INSTALLED ON THE FUEL GAS LINE ON THE DOWN STREAM SIDE OF THE UTILITY METER AND BE RIGIDLY CONNECTED TO THE EXTERIOR OF THE BUILDING OR STRUCTURE CONTAINING THE FUEL GAS PIPING."(PER ORDINANCE 170,158) (INCLUDES COMMERCIAL ADDITIONS AND TI WORK OVER $10,000.) SEPARATE PLUMBING PERMIT IS REQUIRED.

C. PLUMBING FIXTURES ARE REQUIRED TO BE CONNECTED TO A SANITARY SEWER OR TO AN APPROVED SEWAGE DISPOSAL SYSTEM (R306.3).

D. PROVIDE 70 INCH HIGH NON-ABSORBENT WALL ADJACENT TO SHOWER AND APPROVED SHATTER-RESISTANT MATERIALS FOR SHOWER ENCLOSURE."(1115B.2 AND 2406.3(5)

E. KITCHEN SINKS, LAVATORIES, BATHTUBS, SHOWERS,BIDETS, LANDRY TUBS AND WASHING MACHINE OUT LETS SHALL BE PROVIED WITH HOT AND COLD WATER AND CONNECTED TO AN APPROVED WATER SUPPLY (R306.4) .

F. WATER HEATER MUST BE STRAPPED TO WALL (SEC. 507.3, UPC)

G. BATHTUB AND SHOWER FLOOR, WALL ABOVE BATHTUBS WITH A SHOWERHEAD, AND SHOWER COMPARTMENT SHALL BE FINISHED WITH A NONABSORBENT SURFACE . SUCH WALL SURFACES SHALL EXTEND TO A HEIGHT OF NOT LESS THAN 6 FEET ABOVE THE FLOOR (R307.2)

H. DUCTS PENETRATING THE WALL OR CEILINGS SEPARATING THE DWELLING FROM THE GARAGE SHALL BE CONSTRUCTED OF A MINIMUM NO. 26 GAGE SHEET STEEL OR OTHER APPROVED MATERIAL AND THERE SHALL BE NO OPENINGS FROM THE DUCTS INTO THE GARAGE (R302.5.2).

I . OTHER PENETRATIONS OF GARAGE/DWELLING AND WALLS ARE TO BE PROTECTED AS REQUIRED BY SECTION R302.11,ITEM 4 9r309.1).

J. GARAGE FLOOR SURFACES SHALL BE OF AN APPROVED NONCOMBUSTIBLE MATERIAL, AND THE AREA USED TO PARK VEHICLES SHALL BE SLOPED TO A DRAIN OR TOWARD THE MAIN VEHICLE ENTRY (R309.1) .

K. AUTOMATIC GARAGE DOOR OPENERS, IF PROVIDED, SHALL BE LISTED IN ACCORDANCE WITH UL 325 .

L. VEHICULAR ACCESS DOORS SHALL COMPLY WITH SECTION R612.7 .

M. BUILDINGS SHALL HAVE APPROVED ADDRESS NUMBERS, BUILDING NUMBERS OR APPROVED BUILDING IDENTIFICATION PLACED IN APOSITION THAT IS PLAINLY LEGIBLE AND VISIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY . (R319) .

N. PROTECTION OF WOOD AND WOOD BASED PRODUCTS FROM DECAY SHALL BE PROVIDED IN THE LOCATIONS SPECIFIED PER SECTION R317 BY THE USE OF NATURALLY DURABLE WOOD OR WOOD THAT IS PRESERVATIVE-TREATED IN ACCORDANCE WITH AWPA UI FOR THE SPECIES, PRODUCT, PRESERVATIVE AND END USE . PRESERVATIVES SHALL BE LISTED IN SECTION 4 OF AWPA U1 .

O. I. A COPY OF THE EVALUATION REPORT AND/OR CONDITIONS OF LISTING SHALL BE MADE AVAILABLE AT THE JOB SITE

P. ANTI GRAFFITI FINISH MAINTENANCE OF BUILDING AFFIDAVIT IS RECORDED BY THE OWNER TO COVENANT AND AGREE W/THE CITY OF L.A. TO REMOVE ANY GRAFFITI W/IN 7-DAYS OF GRAFFITI BEING APPLIED (SEE SHEET A8-b) .

r. ALL WINDOWS TO BE TEMPERED GLAZING WHEN LOCATED IN VHFHSZ.

s. PROVIDE ULTRA-LOW FLUSH WATER CLOSETS FOR ALL NEW CONSTRUCTION, EXISTING SHOWER HEADS AND TOILETS MUST BE ADAPTED FOR LOW WATER CONSUMPTION .

t. A COPY OF THE EVALUTION REPORT AND/OR CONDITION OF LISITING SHALL BE MADE AVAILABLE AT THE JOB SITE .

SKYLIGHT
TYPE A

SKYLIGHT
TYPE B

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1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS :
3727 ROBERTSON ST.
CULVER CITY
CA 90232

PROJECT TITLE:
3727 ROBERTSON

DATE:
04/27/2016

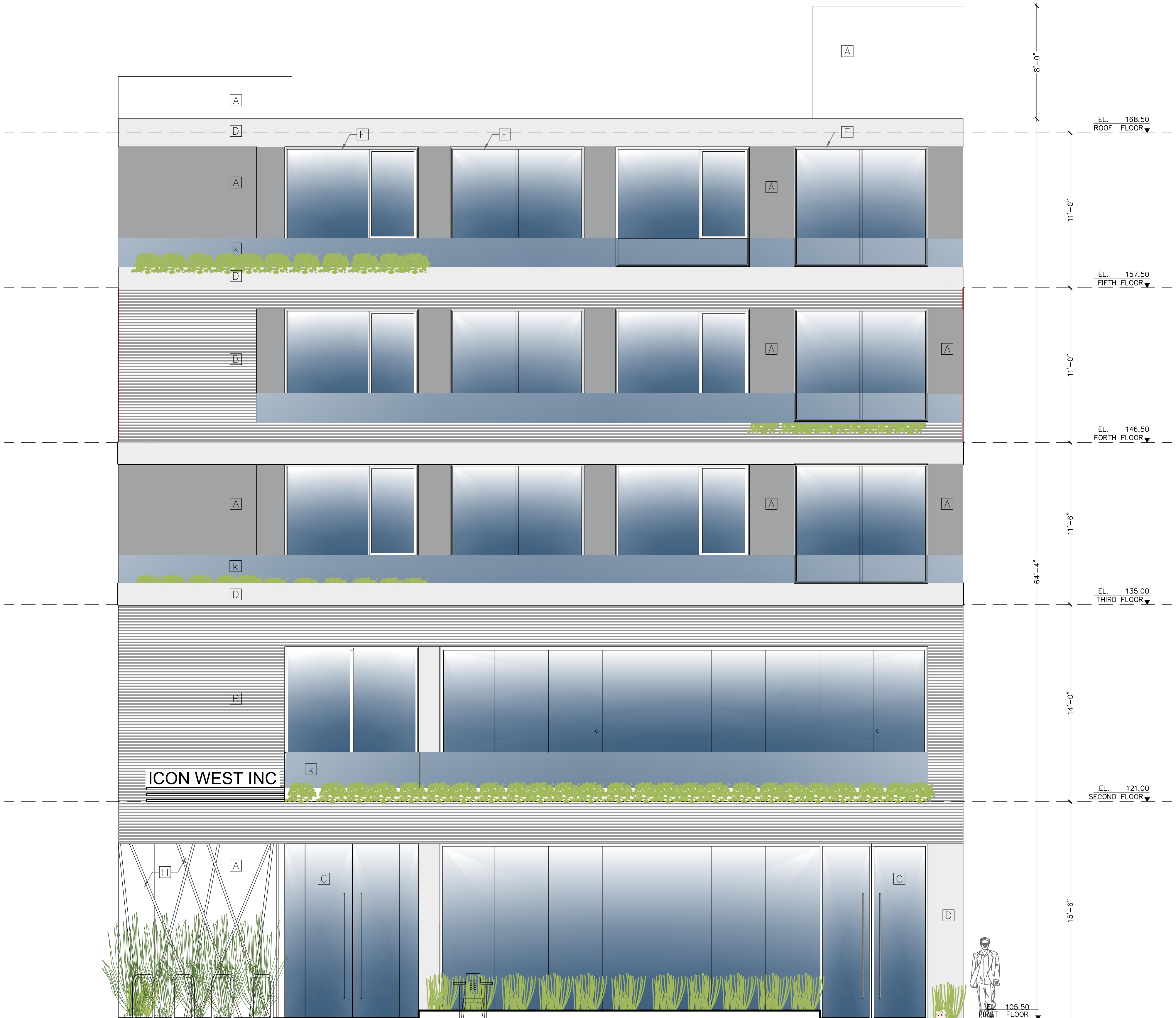
JOB NUMBER:

DRAWING PHASE:
P/CSUBMITTAL

SHEET TITLE:
ROOF FLOOR

SHEET NUMBER:
A
8

08/13/2019



WEST ELEVATION

SCALE: 1/4"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER: 4206033057
TRACT: 3872
BLOCK: NONE
LOT: 42 & 43
ZONING: IG

ELEVATION KEY NOTES:

- A — STUCCO FINISH FIREPLACE
- B — CORRUGATED METAL
- C — GLASS DOOR
- D — ALUMINUM COMPOSITE TILE
- F — ANODIZED ALUMINUM WINDOW
- G — PLEXIGLASS ROOF PANELS
- H — STAINLESS STEEL PIPE
- L — EMERGENCY EGRESS TYPICAL TO ALL SLEEPING ROOMS MIN.24" CLEAR HT, 20" CLEAR WIDTH , 5.7 SQ.FT. MIN AREA (5.0 SQ. FT. AT GRADE) &42"MIN. -44" MAX. TO SILL
- I — METAL RAILING
- K — GLASS GUARDRAIL

PROVIDE ANTI-GRAFFITI FINISH within THE FIRST 9', MEASURED FROM GRADE, AT EXTERIOR WALLS and DOORS PER SECTION 6306

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS: 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

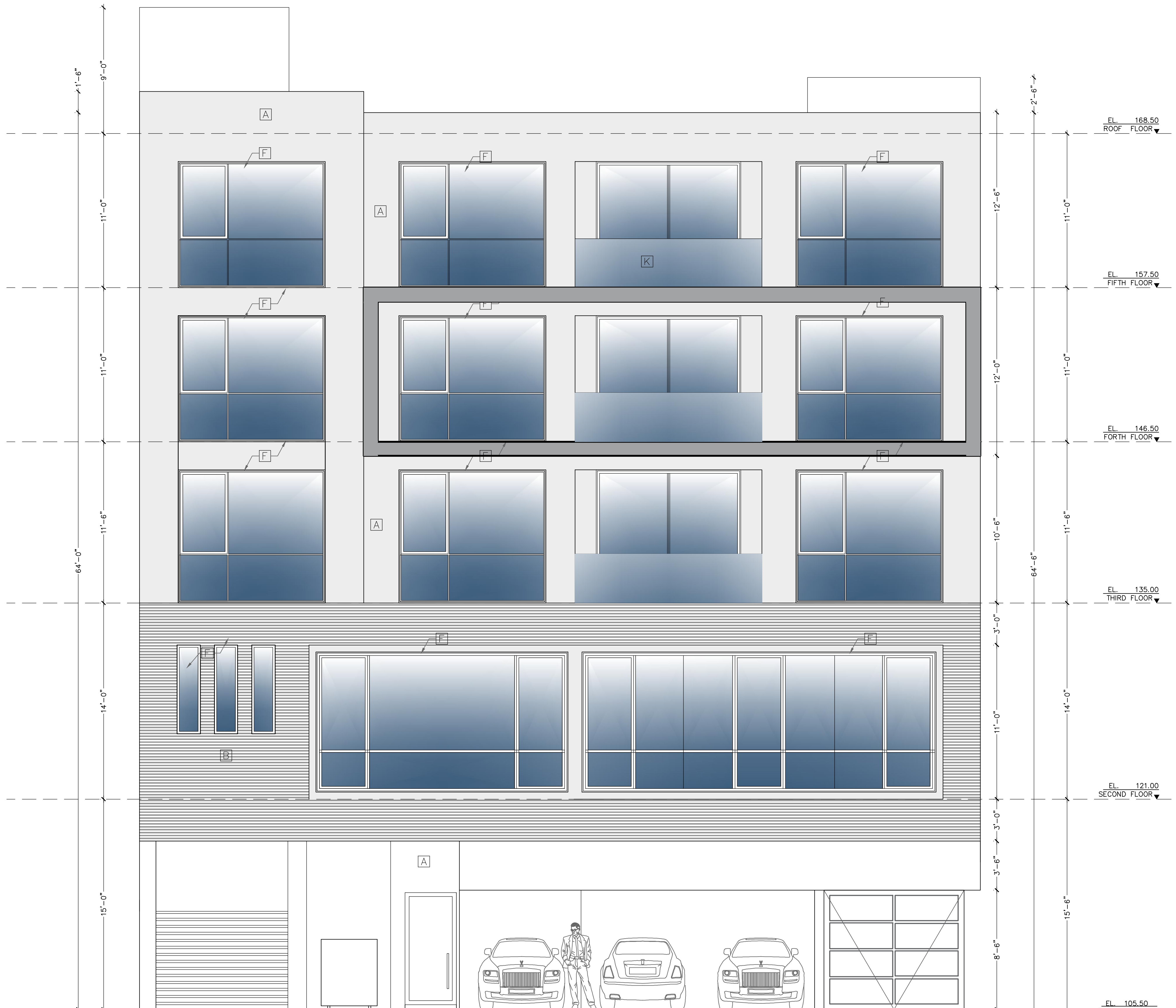
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: EAST ELEVATION

SHEET NUMBER: A 9

08/13/2019



WEST ELEVATION

SCALE BAR1/8 FT SCALE: 1/4"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

ELEVATION KEY NOTES:

- A — STUCCO FINISH FIREPLACE
- B — CORRUGATED METAL
- C — GLASS DOOR
- D — ALUMINUM COMPOSITE TILE
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PROVIDE ANTI-GRAFFITI FINISH within THE FIRST 9', MEASURED FROM GRADE, AT EXTERIOR WALLS and DOORS PER SECTION 6306

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

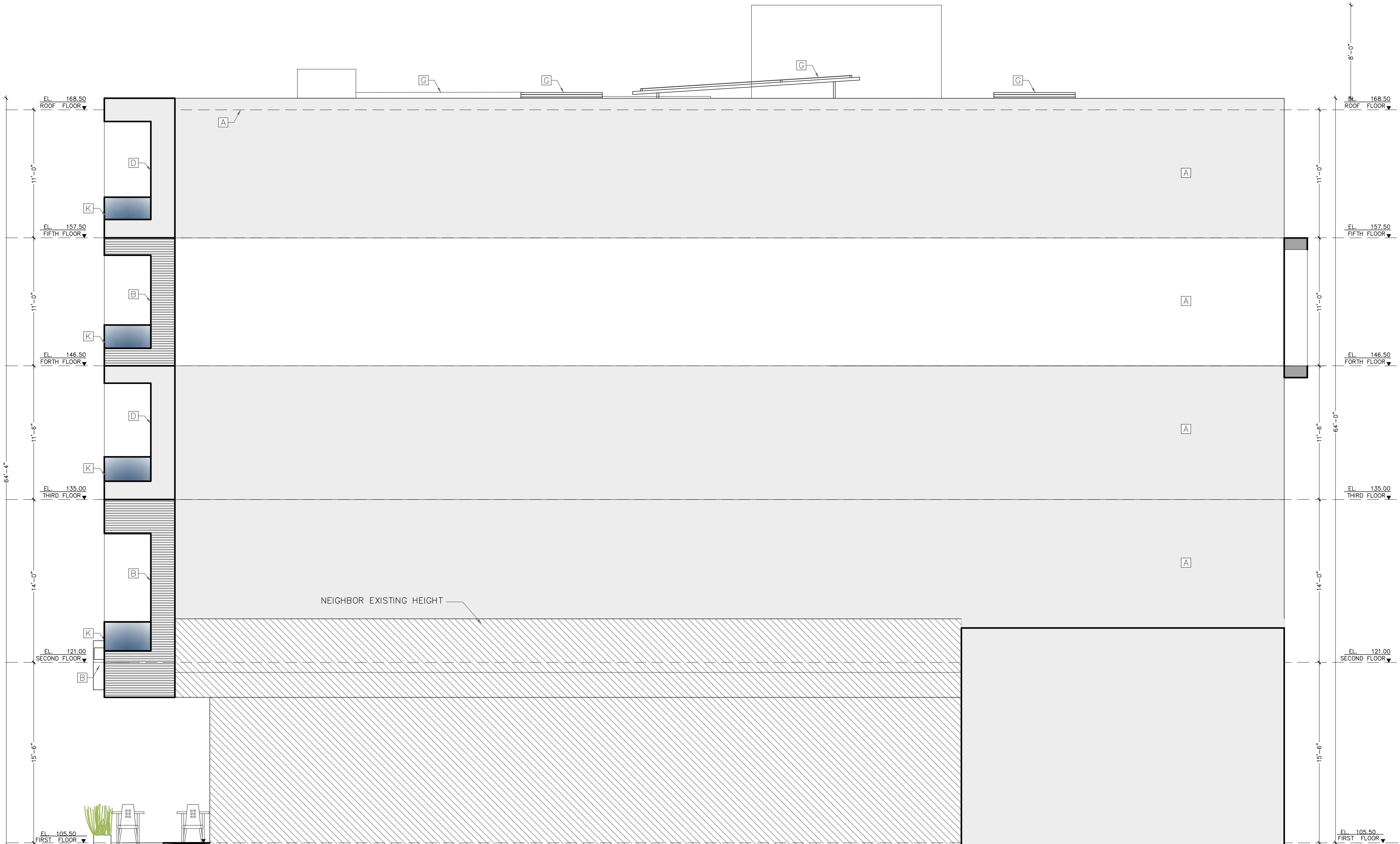
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: EAST ELEVATION

SHEET NUMBER: A 10

08/13/2019



NORTH ELEVATION

SCALE: 1/4"=1'-0"

SCALE BAR1/8

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

ELEVATION KEY NOTES:

- A — STUCCO FINISH FIREPLACE
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- C — GLASS DOOR
- D — ALUMINUM COMPOSITE TILE
- F — ANODIZED ALUMINUM WINDOW
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- K — GLASS GUARDRAIL

PROVIDE ANTI-GRAFFITI FINISH within THE FIRST 9', MEASURED FROM GRADE, AT EXTERIOR WALLS and DOORS PER SECTION 6306

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

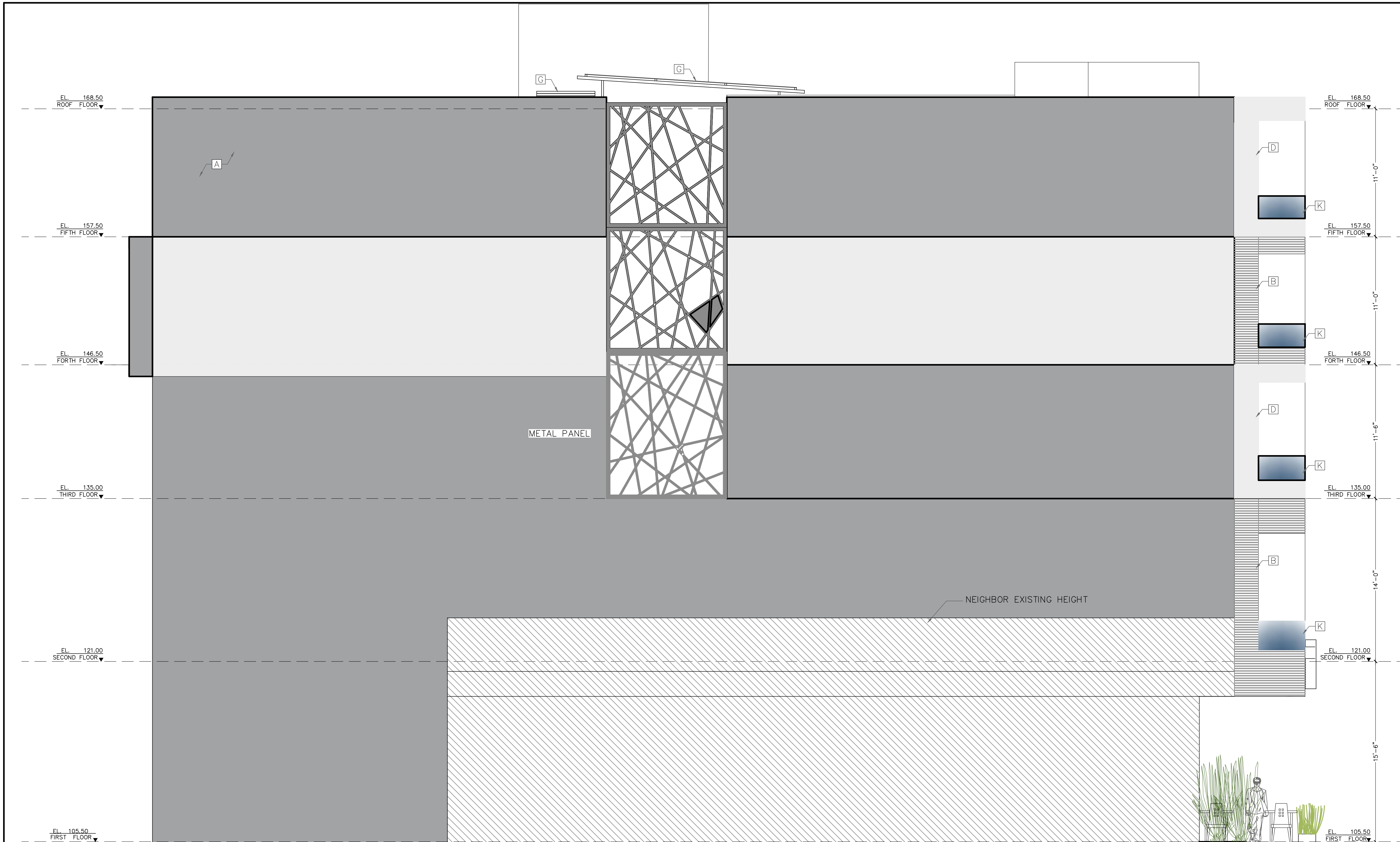
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: WEST ELEVATION

SHEET NUMBER: A 11

08/13/2019



SOUTH ELEVATION

SCALE BAR1/8 FT

SCALE: 1/4"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

ELEVATION KEY NOTES:

- A — STUCCO FINISH FIREPLACE
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architecture west inc.
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PROJECT TITLE:
3727 ROBERTSON

DATE:
04/27/2016

JOB NUMBER:

DRAWING PHASE:
P/CSUBMITTAL

SHEET TITLE:
WEST ELEVATION

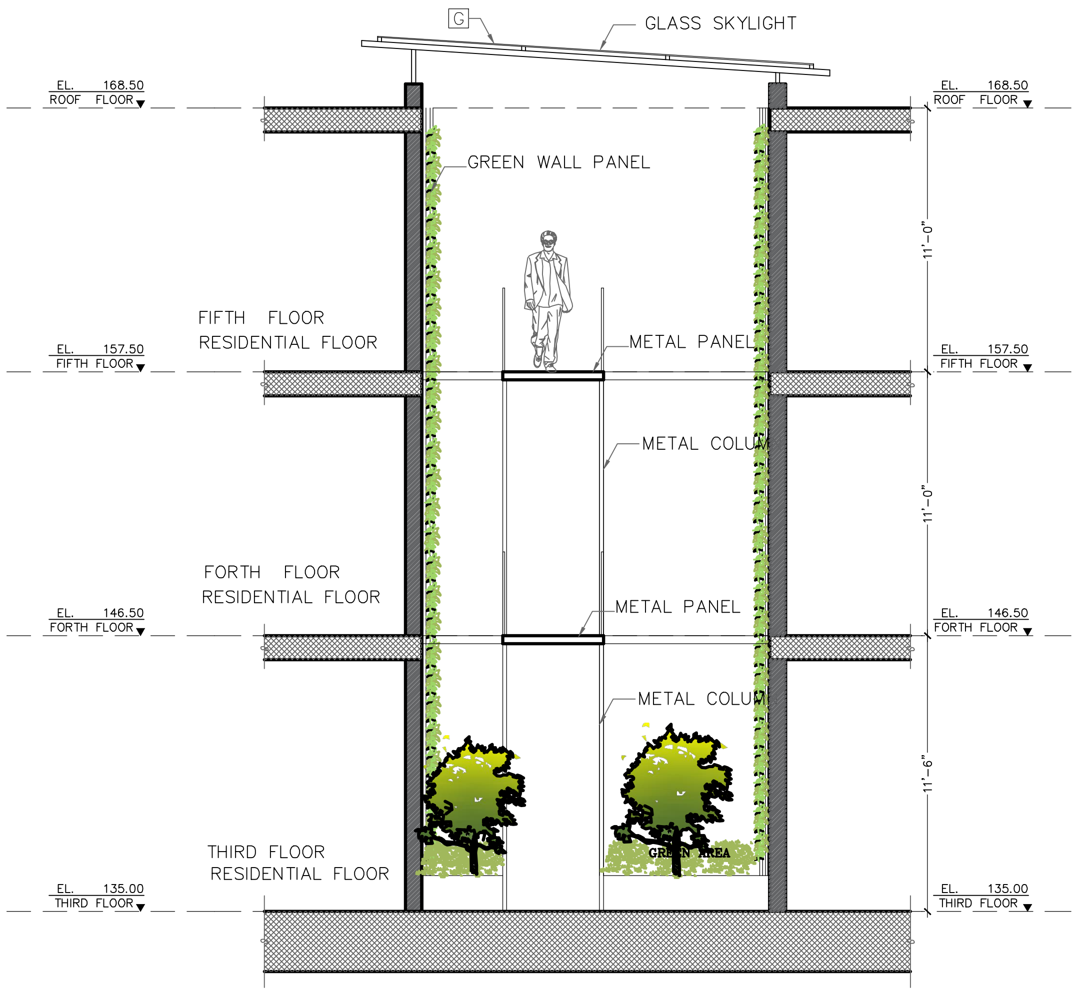
SHEET NUMBER:
A
12

08/13/2019

SECTION A - A

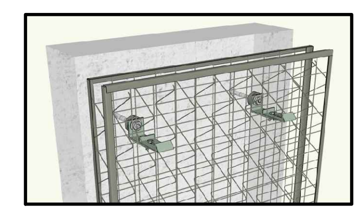
SCALE BAR1/8 FT

SCALE: 1/4"=1'-0"

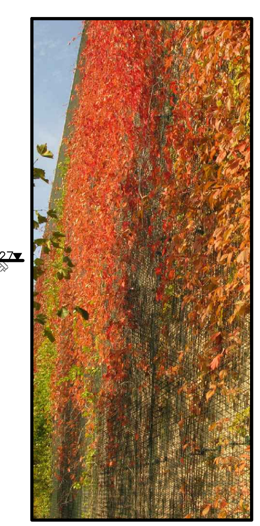


COURT YARD SECTION

SCALE: 1/4"=1'-0"



GREEN WALL PANEL



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PROJECT TITLE:
3727 ROBERTSON

DATE:
04/27/2016

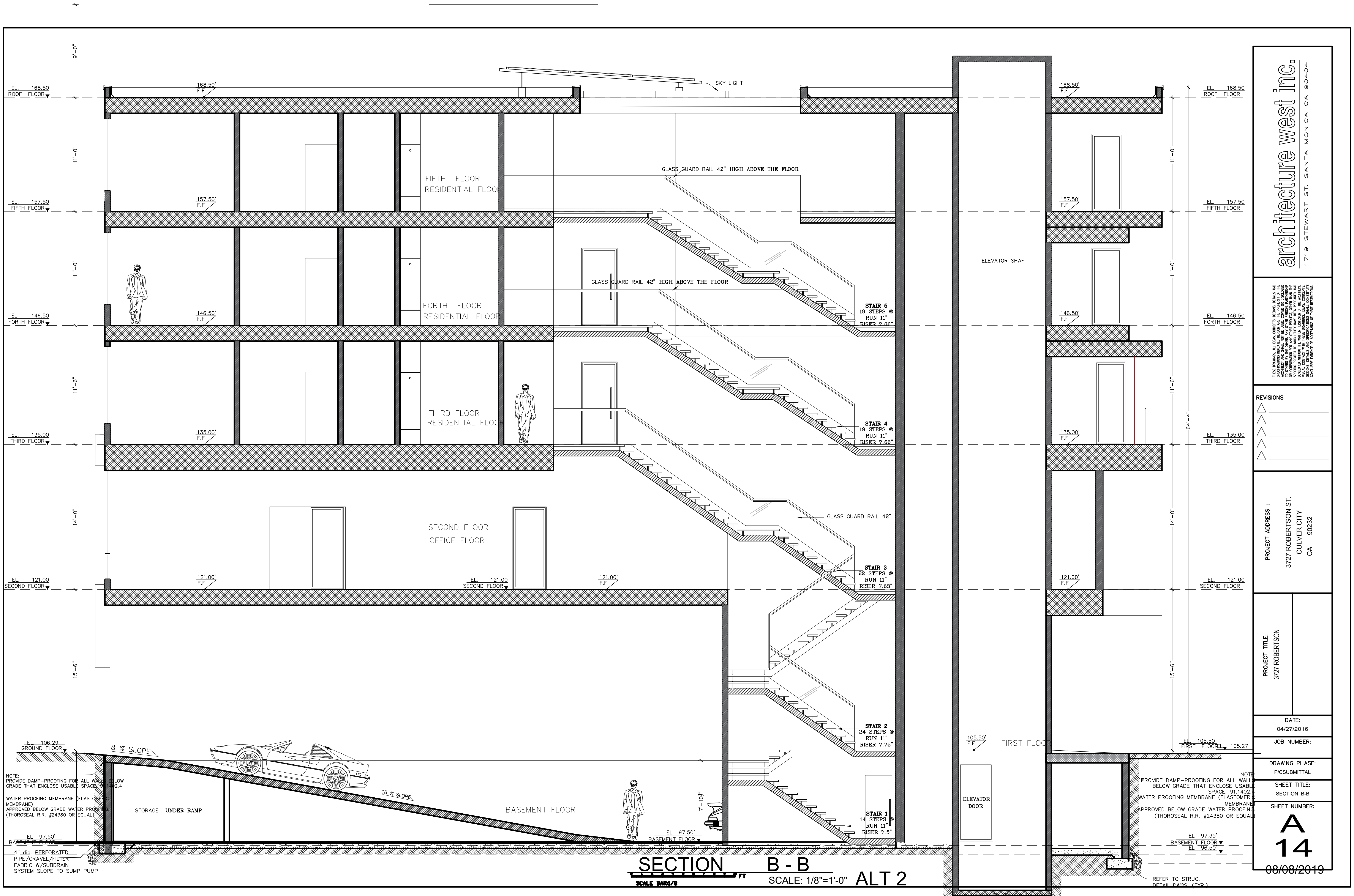
JOB NUMBER:

DRAWING PHASE:
P/CSUBMITTAL

SHEET TITLE:
SECTION A-A

SHEET NUMBER:
A
13

08/13/2019



SECTION B - B
SCALE: 1/8"=1'-0"
ALT 2
SCALE BAR1/8
SKY LIGHT
GLASS GUARD RAIL 42" HIGH ABOVE THE FLOOR
GLASS GUARD RAIL 42" HIGH ABOVE THE FLOOR
GLASS GUARD RAIL 42"
ELEVATOR SHAFT
ELEVATOR DOOR
FIFTH FLOOR RESIDENTIAL FLOOR
FORTH FLOOR RESIDENTIAL FLOOR
THIRD FLOOR RESIDENTIAL FLOOR
SECOND FLOOR OFFICE FLOOR
FIRST FLOOR
BASEMENT FLOOR
STORAGE UNDER RAMP
8 % SLOPE
18 % SLOPE
7'-10½"
STAIR 5 19 STEPS @ RUN 11" RISER 7.66"
STAIR 4 19 STEPS @ RUN 11" RISER 7.66"
STAIR 3 22 STEPS @ RUN 11" RISER 7.63"
STAIR 2 24 STEPS @ RUN 11" RISER 7.75"
STAIR 1 14 STEPS @ RUN 11" RISER 7.5"
EL. 168.50 ROOF FLOOR
168.50' F.F
EL. 157.50 FIFTH FLOOR
157.50' F.F
EL. 146.50 FORTH FLOOR
146.50' F.F
EL. 135.00 THIRD FLOOR
135.00' F.F
EL. 121.00 SECOND FLOOR
121.00' F.F
EL. 106.29 GROUND FLOOR
105.50' F.F
EL. 105.50 FIRST FLOOR
EL. 105.27
EL. 97.50' BASEMENT FLOOR
EL. 97.50' BASEMENT FLOOR
EL. 97.35' BASEMENT FLOOR
EL. 96.50'
9'-0"
11'-0"
11'-0"
11'-6"
14'-0"
15'-6"
64'-4"
NOTE: PROVIDE DAMP-PROOFING FOR ALL WALLS BELOW GRADE THAT ENCLOSE USABLE SPACE. 91.1402.4
WATER PROOFING MEMBRANE (ELASTOMERIC MEMBRANE) APPROVED BELOW GRADE WATER PROOFING (THOROSEAL R.R. #24380 OR EQUAL)
4" dia. PERFORATED PIPE/GRAVEL/FILTER FABRIC W/SUBDRAIN SYSTEM SLOPE TO SUMP PUMP
REFER TO STRUC. DETAIL DWGS. (TYP.)
architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404
REVISIONS
PROJECT ADDRESS :
3727 ROBERTSON ST. CULVER CITY CA 90232
PROJECT TITLE:
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DATE:
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DRAWING PHASE:
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SHEET TITLE:
SECTION B-B
SHEET NUMBER:
A 14
08/08/2019

EXTERIOR DOOR & WINDOW OPENING SCHEDULE & TYPES

MEASUREMENTS OF DOORS / WINDOWS ARE CLEAR LEAF SIZE

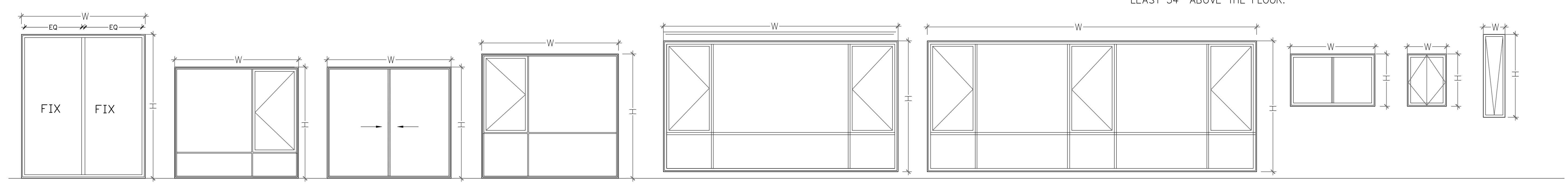
TYPE	FINISH DOOR LEAF SIZE W	FINISH DOOR LEAF SIZE H	SILL H	NUMBER	DOOR& WINDOW MATERIAL	COLOR	FRAME	COLOR	FINISH	MANUFACTURE	REMARKS	GLASSES
W - 1	8'-0"	8'-0"	1'-6"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 2	36'-5"	11'-6"	1'-0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 3	18'-0"	10'-6"	1'-0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 4	25'-3"	10'-6"	2'-0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 5	6'-6"	4'-0"	6'-0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 6	3'-0"	4'-0"	6'-0"		ALUMINIUM ANODIZED	DARK GRAY					AWINING	FROSTED
D - 1	7'-0"	12'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY						
D - 2	36'-5"	11'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY						
D - 3	7'-0"	11'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
D - 4	10'-0"	11'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
D - 5	7'-0"	11'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY					AWINING	FROSTED
D - 6	10'-0"	8'-6"	0"		METAL	DARK GRAY						FROSTED

GENERAL NOTES: GLAZING IN THE FOLLOWING LOCATIONS SHALL BE SAFETY GLAZING CONFORMING TO THE HUMAN IMPACT LOADS OF SECTION R308.3. (SEE DWG A-9-b FOR ADDITIONAL NOTES)

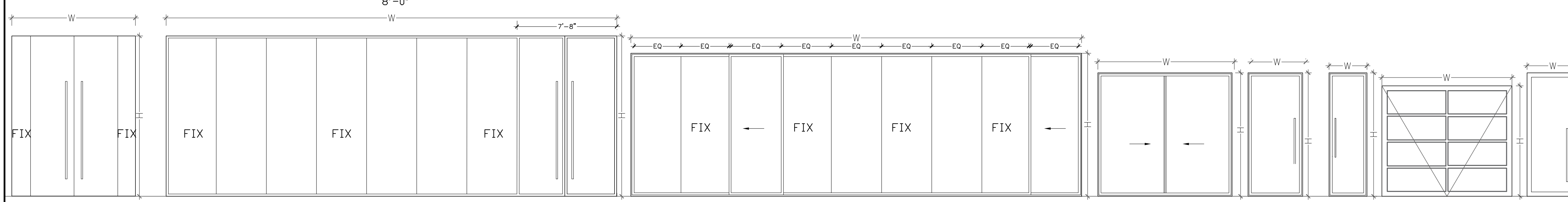
1. FIXED AND OPERABLE PANELS OF SWINGING, SLIDING AND BIFOLD DOOR ASSEMBLIES.
2. INDIVIDUAL FIXED OR OPERABLE PANEL ADJACENT TO A DOOR WHERE THE NEAREST VERTICAL EDGE IS WITHIN A 24-INCH ARC OF THE DOOR IN A CLOSED POSITION AND WHOSE BOTTOM EDGE IS LESS THAN 60 INCHES ABOVE THE FLOOR OR WALKING SURFACE
3. EXPOSED AREA OF AN INDIVIDUAL PANE GREATER THAN 9 SQ.FT.
4. BOTTOM EDGE HAS LESS THAN 18 IN. ABOVE THE FLOOR
5. TOP EDGE GREATER THAN 36 IN.ABOVE THE FLOOR
6. ONE OF MORE WALKING SURFACES WITHIN 36 IN. HORIZONTALLY OF THE GLAZING
7. GLAZING IN RAILINGS
8. ENCLOSURES FOR OR WALLS FACING HOT TUBS, WHIRLPOOLS, SAUNAS, STEAM ROOMS, BATHTUBS, AND SHOWERS WHERE THE BOTTOM EDGE OF THE GLAZING IS LESS THAN 60 IN. MEASURED VERTICALLY ABOVE ANY STANDING OR WALKING SURFACE.
9. WALLS AND FENCES ADJACENT TO INDOOR AND OUTDOOR SWIMMING POOLS, HOT TUBS AND SPAS WHERE THE BOTTOM EDGE OF THE GLAZING IS LESS THAN 60 IN. ABOVE A WALKING SURFACE AND WITHIN 60 IN., MEASURED HORIZONTALLY AND IN A STRAIGHT LINE, OF THE WATER'S EDGE.
10. GLAZING ADJACENT TO STAIRWAYS, LANDINGS AND RAMPS WITHIN 36 IN. HORIZONTALLY OF A WALKING SURFACE WHEN THE SURFACE OF THE GLAZING IS LESS THAN 60 IN. ABOVE THE PLANE OF THE ADJACENT WALKING SURFACE.
11. GLAZING ADJACENT TO STAIRWAYS WITHIN 60 IN. HORIZONTALLY OF THE BOTTOM TREAD OF A STAIRWAY IN ANY DIRECTION WHEN THE EXPOSED SURFACE OF THE GLAZING IS LESS THAN 60 IN. ABOVE THE NOSE OF THE TREAD.

PROVIDE AN ALARM FOR DOORS TO THE DWELLING THAT FORM A PART OF THE POOL ENCLOSURE.
THE ALARM SHALL SOUND CONTINUOUSLY FOR A MIN. OF 30 SECONDS IMMEDIATELY AFTER THE DOOR IS OPENED AND BE CAPABLE OF BEING HEARD THROUGHOUT THE HOUSE DURING NORMAL HOUSEHOLD ACTIVITIES. IT SHALL AUTOMATICALLY RESET AND SHALL BE EQ. WITH A MANUAL MEANS TO TEMP. DESACTIVIATE (FOR 15 SECS.MAX.) FOR SINGLE OPENING. THE DESACTIVATION SWITCH SHALL BE AT LEAST 54" ABOVE THE FLOOR.

EXTERIOR DOOR & WINDOW OPENING SCHEDULE & TYPES



W - 1 W=9'-6" H=11'-0"
W - 2 W=9'-6" H=8'-6" 8'-0"
W - 3 W=9'-6" H=8'-6" 8'-0"
W - 4 W=9'-6" H=8'-6" 8'-0"
W - 5 W=18'-0" H=10'-0"
W - 6 W=18'-0" H=10'-0"
W - 7 W=6'-6" H=4'-0"
W - 8 W=3'-0" H=8'-0"
W - 9 W=1'-8" H=6'-4"



D - 1 W=9'-6" H=12'-4"
D - 2 W=34'-7" H=12'-4"
D - 3 W=34'-8" H=11'-0"
D - 4 W=10'-4" H=9'-6"
D - 5 W=4'-2" H=9'-6"
D - 6 W=7'-0" H=9'-6"
D - 7 W=10'-0" H=8'-6"
D - 8 W=3'-8" H=9'-6"

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

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PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: EXTERIOR DOOR

SHEET NUMBER: A 15

08/13/2019

FINISH SCHEDULE

FLOOR

FLOOR		ROOM	MATERIAL: GLASS	CARPET	HARDWOOD	PORCELAIN TILE FLOOR	STONE	CONCRETE	RUBBER TILE	MARBLE	STAINLESS STEEL	FINISH: STAIN	CLEAR SEALER	EPOXY PAINT	NOT APPLICABLE
BASEMENT	1	PARKING						●							●
	2	STAIR						●							
	3	TRASH AREA						●							
	4	STORE						●							
	5	MECHANICAL ROOM						●							●
FIRST	6	ENTRANCE					●								
	7	EMERGENCY EXIT					●								
	8	OFFICE			●										
	9	REST ROOM				●									
	10	PARKING						●							●
SECOND	11	ENTRANCE			●										
	12	OFFICE			●										
	13	STORE				●									
	14	REST ROOM				●									
THIRD,FORTH,FIFTH FLOOR		MASTER BEDROOM		●										●	
		MASTER BATHROOM					●							●	
		MASTER BATH TUB					●							●	
		MASTER SHOWER					●							●	
		MASTER TOILET					●							●	
		MSTR WALK-IN CLOSET				●								●	
		BEDROOM				●								●	
		BATHROOM					●							●	
		SHOWER					●							●	
		KITCHEN		●											●
		LIVING ROOM		●											●
		FAMILY ROOM		●											●
		LAUNDRY						●							●
		BALCONY				●									●
		INTERIOR YARD						●							
		STAIR						●							

BASE

ROOM	MATERIAL: CARPET	HARDWOOD	TILE	STONE	METAL	NOTHING	FINISH: GLOSS ENAMEL PAINT	ACRYLIC FLAT FINISH	STAIN ENAMEL	ACRYLIC STAIN
1 PARKING						●				
2 STAIR					●					
3 TRASH AREA						●				
4 STORE						●				
5 MECHANICAL ROOM						●				
6 ENTRANCE				●						
7 EMERGENCY EXIT				●						
8 OFFICE		●								
9 REST ROOM			●							
10 PARKING						●				
11 ENTRANCE		●								
12 OFFICE		●								
13 STORE			●							
14 REST ROOM			●							
MASTER BEDROOM						●				
MASTER BATHROOM						●				
MASTER BATH TUB										
MASTER SHOWER						●				
MASTER TOILET						●				
MSTR WALK-IN CLOSET						●				
BEDROOM						●				
BATHROOM						●				
SHOWER						●				
KITCHEN		●								
LIVING ROOM		●								
FAMILY ROOM		●								
LAUNDRY							●			
BALCONY			●							
INTERIOR YARD								●		
STAIR					●					

WALLS

ROOM	MATERIAL: 5/8" TYPE X DRYWALL	GREEN BOARD	STUCCO	STONE/BRICK/CONCRETE	TILE /GREEN BOARD	WOOD PANEL/DRYWALL	FABRIC / DRYWALL	FINISH: ACRYLIC FLAT FINISH	ACRYLIC LOW SHEEN	ACRYLIC GLOSS FINISH	STAIN ENAMEL	ELASTOMERIC PAINT	CLEAR SEALER
1 PARKING				●									
2 STAIR			●					●					
3 TRASH AREA				●									
4 STORE			●					●					
5 MECHANICAL ROOM			●					●					
6 ENTRANCE	●							●					
7 EMERGENCY EXIT	●							●					
8 OFFICE	●							●					
9 REST ROOM					●				●				
10 PARKING				●									
11 ENTRANCE	●							●					
12 OFFICE	●							●					
13 STORE	●							●					
14 REST ROOM					●				●				
MASTER BEDROOM		●							●				
MASTER BATHROOM			●							●			
MASTER BATH TUB													
MASTER SHOWER			●							●			
MASTER TOILET			●							●			
MSTR WALK-IN CLOSET		●							●				
BEDROOM		●							●				
BATHROOM			●							●			
SHOWER			●							●			
KITCHEN				●							●		
LIVING ROOM			●							●			
FAMILY ROOM			●							●			
LAUNDRY					●					●			
BALCONY													
INTERIOR YARD			●					●					
STAIR			●					●					

CEILING

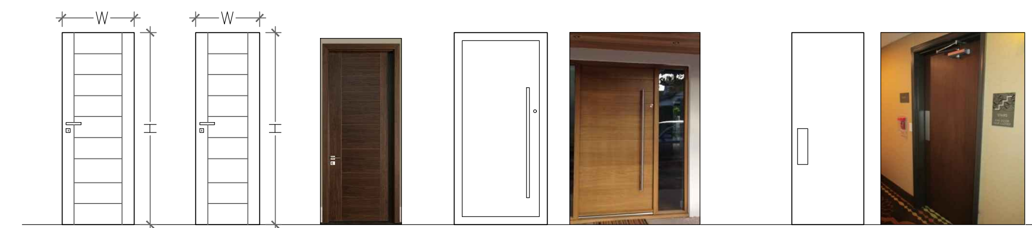
ROOM	MATERIAL: 5/8" TYPE X DRYWALL	GREEN BOARD	STUCCO	STONE	CERAMIC TILE	WOOD	FABRIC	FINISH: ACRYLIC FLAT FINISH	ACRYLIC LOW SHEEN	ACRYLIC GLOSS FINISH	STAIN ENAMEL	CLEAR SEALER	ELASTOMERIC PAINT	REMARKS
1 PARKING														
2 STAIR								●						
3 TRASH AREA								●						
4 STORE														
5 MECHANICAL ROOM														
6 ENTRANCE								●						
7 EMERGENCY EXIT								●						
8 OFFICE								●						
9 REST ROOM									●					
10 PARKING														
11 ENTRANCE								●						
12 OFFICE								●						
13 STORE								●						
14 REST ROOM									●					
MASTER BEDROOM		●							●					
MASTER BATHROOM			●							●				
MASTER BATH TUB														
MASTER SHOWER			●							●				
MASTER TOILET			●							●				
MSTR WALK-IN CLOSET		●							●					
BEDROOM		●							●					
BATHROOM			●							●				
SHOWER			●							●				
KITCHEN				●							●			
LIVING ROOM			●							●				
FAMILY ROOM			●							●				
LAUNDRY					●					●				
BALCONY			●					●						
INTERIOR YARD								●						
STAIR														

INTERIOR DOOR OPENING SCHEDULE & TYPES

MEASUREMENTS OF DOORS / WINDOWS ARE CLEAR LEAF SIZE

TYPE	FINISH DOOR LEAF SIZE W	H	SILL H	NUMBER	DOOR& WINDOW MATERIAL	COLOR	FRAME	COLOR	FINISH	MANUFACTURE	REMARKS	GLASSES
D - A	3'-0"	8'-0"	0		WOOD		WOOD				BED ROOM- LANDRY	
D - B	2'-8"	8'-0"	0		WOOD		WOOD				BED ROOM- BATH ROOM	
D - C	3'-10"	8'-0"	0		WOOD		WOOD					
D - D	3'-0"	8'-0"	0		WOOD		WOOD				FIRE-RESISTANT DOOR	
D - E	5'-2"	6'-6"	0'-6"		GLASS		METAL				TEMPERED SHOWER GLASS PANELS	CLEAR
D - F	6'-6"	8'-0"	0		GLASS		METAL				GLASS DOORS	CLEAR
D - G	10'-0"	8'-0"	0		GLASS		METAL				GLASS DOORS	
D - H	3'-10"	8'-0"	0		GLASS		METAL				GLASS DOORS	
D - I	2'-6"	8'-0"	0		GLASS		METAL				GLASS DOORS	
D - J	2'-4"	8'-0"	0		GLASS		METAL				GLASS DOORS	
D - K	3'-0"	8'-0"	0		GLASS		METAL				GLASS DOORS	
D - L	6'-4"	8'-0"	0		GLASS		METAL				GLASS DOORS	
D - M	4'-10"	8'-0"	0		GLASS		METAL				GLASS DOORS	
D - N	3'-6"	8'-0"	0		GLASS		METAL					

INTERIOR DOOR OPENING SCHEDULE & TYPES



D - A
W=3'-0"
H=8'-0"

D - B
W=2'-8"
H=8'-0"

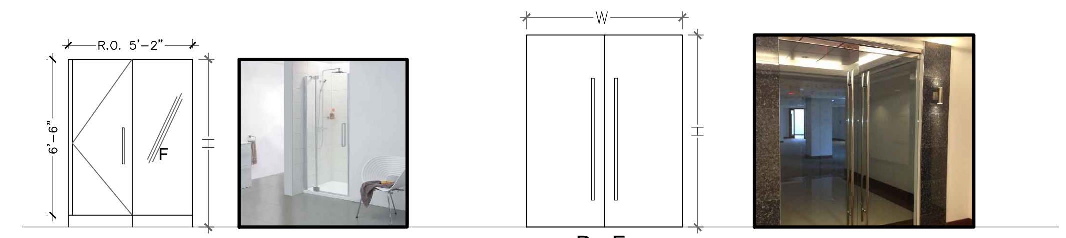
VIEW

D - C
W=3'-10"
H=7'-0"

VIEW

D - D
W=3'-0"
H=8'-0"

VIEW
FIRE-RESISTANT DOOR

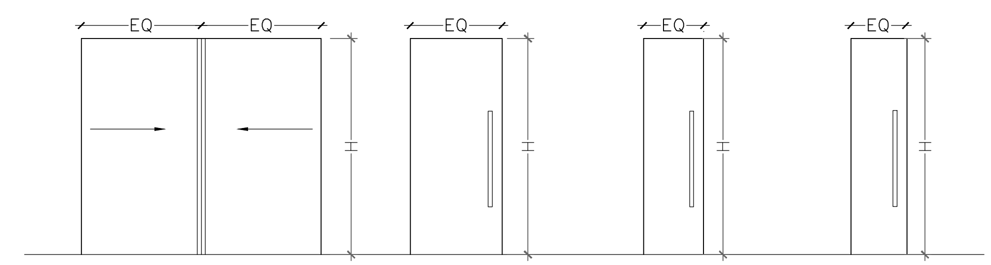


D - E
TEMPERED SHOWER GLASS PANELS

VIEW

D - F
W=6'-6"
H=8'-0"

VIEW
GLASS DOOR

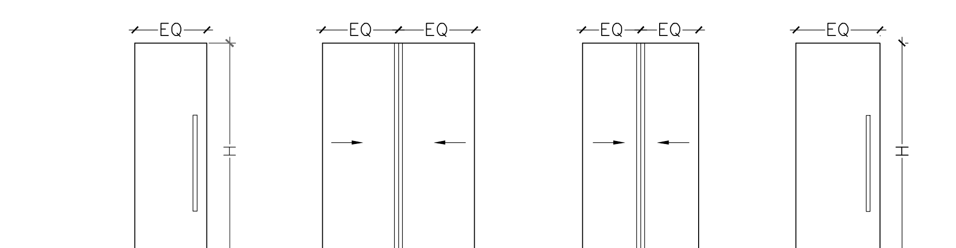


D - G
CLOSET

D - H
CLOSET

D - I
CLOSET

D - J
CLOSET



D - K
CLOSET

D - L
CLOSET

D - M
CLOSET

D - N
CLOSET

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DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: INTERIOR DOOR & SCHEDULE

SHEET NUMBER: A 16

08/13/2019

Attachment D-1

ESA, Air Quality Technical Report

3727 ROBERTSON PROJECT, CULVER CITY, CA

Air Quality Technical Report

Prepared for

Icon West, Inc.
520 South La Fayette Park Place, Suite 503
Los Angeles, CA 90057

January 2020

3727 ROBERTSON PROJECT, CULVER CITY, CA

Air Quality Technical Report

Prepared for

Icon West, Inc.
520 South La Fayette Park Place, Suite 503
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January 2020

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ESA

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Los Angeles	Sacramento	Tampa
Miami	San Diego	

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B. Existing Site Operational Emissions
C. Project Operational Emissions
D. Project Architectural Plans

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
Air Basin	South Coast Air Basin
AQMP	Air Quality Management Plan
ATCM	Airborne Toxics Control Measure
BACT	Best Available Control Technology
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CARB	California Air Resources Board
CCR	California Code of Regulations
CEC	California Energy Commission
CEUS	Commercial End-Use Survey
CEQA	California Environmental Quality Act
City	City of Culver City
CO	Carbon monoxide
EMFAC	On-road vehicle emissions factor model
hp	Horsepower
LOS	Level of Service
LST	Localized significance threshold
MATES IV	Multiple Air Toxics Exposure Study, May 2015
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NO	Nitric oxide
NO_2	Nitrogen dioxide
NO_X	Nitrogen oxides
OFFROAD	Off-road vehicle emissions model
OEHHA	Office of Environmental Health Hazard Assessment
Pb	Lead
PDF	Project design feature
PM2.5	Fine particulate matter

Acronym	Description
PM10	Respirable particulate matter
ppm	Parts per million
OFFROAD	Off-road vehicle emissions model
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SIP	State Implementation Plan
SO_2	Sulfur dioxide
TAC	Toxic air contaminant
$\mu g/m^3$	Micrograms per cubic meter
µm	Micrometers
USEPA	United States Environmental Protection Agency
VDECS	Verified Diesel Emission Control Strategies
VOC	Volatile organic compounds

EXECUTIVE SUMMARY

Icon West, Inc. proposes to develop a five-story, mixed-use building located at 3727 Robertson Boulevard (Project) in Culver City, California. In accordance with the requirements under the California Environmental Quality Act (CEQA), this Technical Report provides an estimate of air quality emissions for the Project and the potential impacts from associated construction and operational activities. The report includes the categories and types of emission sources resulting from the Project, the calculation procedures used in the analysis, and any assumptions or limitations.

The Project is located on an approximately 0.12 acre (5,100 square feet) rectangular parcel (Project Site). The Project would be designed to accommodate ground-floor retail/restaurant space, commercial office space on the second floor, and 12 two-bedroom apartment units on floors 3 through 5. Parking would be provided in a one-floor, 19-space subterranean parking garage as well as 6 surface parking space. Development of the Project would require the demolition of the existing low-rise commercial building and surface parking lot.

This report summarizes the potential for the Project to conflict with an applicable air quality plan, to violate an air quality standard or threshold, to result in a cumulatively net increase of criteria pollutant emissions, to expose sensitive receptors to substantial pollutant concentrations, or to create objectionable odors affecting a substantial number of people. The findings of the analyses are as follows:

- The incremental increase in emissions from construction and operation of the Project would not exceed the regional daily emission thresholds set forth by the South Coast Air Quality Management District (SCAQMD). Thus, the Project would not result in a regional violation of applicable air quality standards or jeopardize the timely attainment of such standards in the South Coast Air Basin (the Air Basin).
- The incremental increase in onsite emissions from construction and operation of the Project would not exceed the localized significance thresholds set forth by the SCAQMD. Thus, the Project would not result in a localized violation of applicable air quality standards or expose offsite receptors to substantial levels of regulated air contaminants resulting in a less than significant impact.
- Emissions from the increase in traffic due to operation of the Project would not have a significant impact upon 1-hour or 8-hour local carbon monoxide (CO) concentrations due to mobile source emissions.
- Project construction and operations would not expose off-site receptors to significant levels of toxic air contaminants and would result in less than significant health risk impacts.
- Project construction and operations would not result in significant levels of odors.
- The Project would be consistent with air quality policies set forth by the SCAQMD.
- The Project would result in a less than significant cumulative air quality impacts during construction and operations of the project.

SECTION 1
Introduction

1.1 Project Description

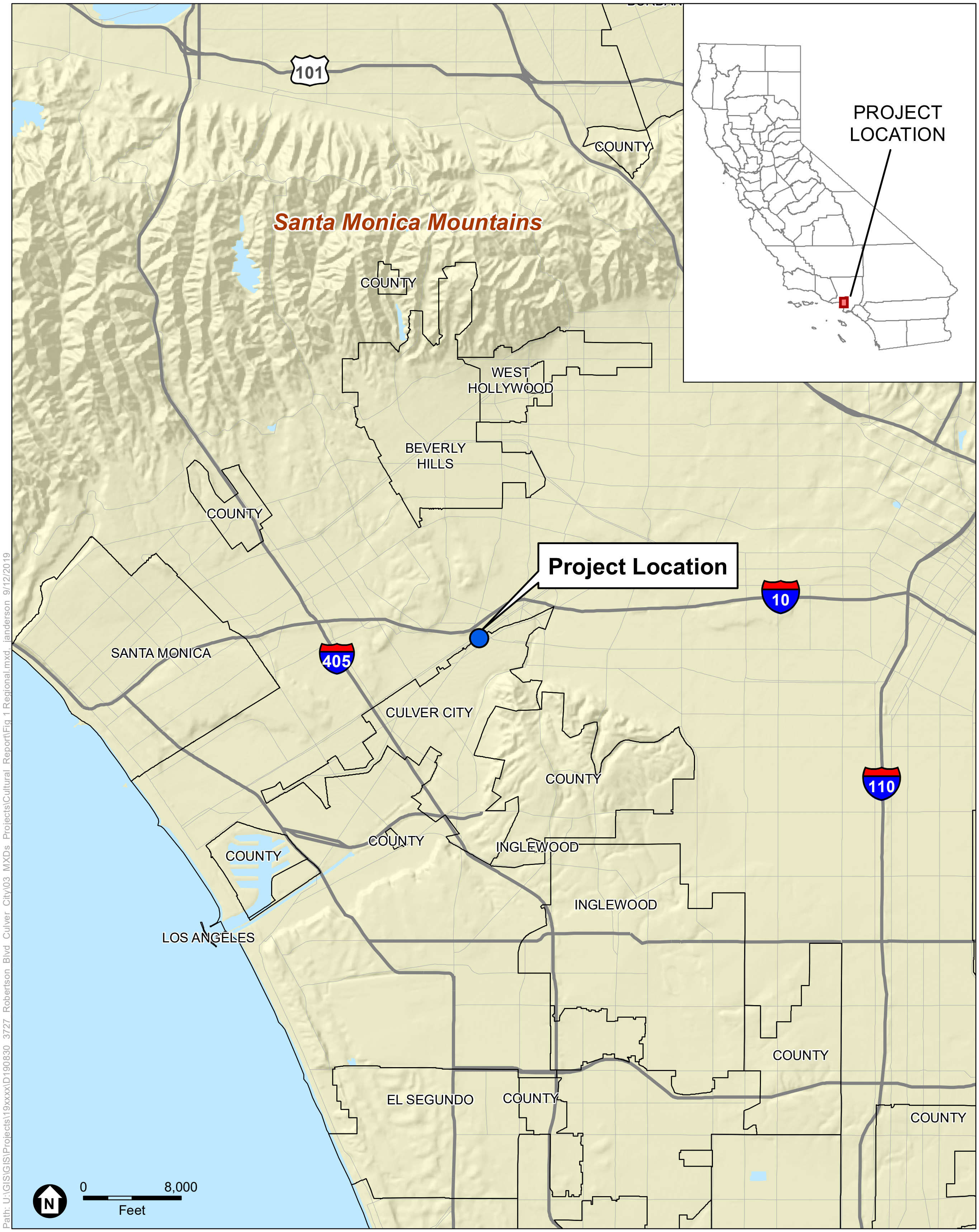
Icon West, Inc. proposes to develop a five-story, mixed-use building located at 3727 Robertson Boulevard (Project) in Culver City, California. In accordance with the requirements under the California Environmental Quality Act (CEQA), this Technical Report provides an estimate of air quality emissions for the Project and the potential impacts from associated construction and operational activities. The report includes the categories and types of emission sources resulting from the Project, the calculation procedures used in the analysis, and any assumptions or limitations.

The Project is located on an approximately 0.12 acre (5,100 square feet) rectangular parcel (Project Site). The Project would be designed to accommodate approximately 3,886 square feet of ground-floor retail/restaurant space, 5,455 square feet of commercial office space on the second floor, and 12 two-bedroom apartment units on floors 3 through 5. Parking would be provided in a one-floor, 19-space subterranean parking garage as well as 6 surface parking space.

1.2 Existing Site Conditions

The Project Site is located on Robertson Boulevard between Venice Boulevard and Washington Boulevard in Culver City, as shown in **Figure 1**, *Regional Location*. A single-lane service alley runs along the western side of the Project Site and the service alley serves as the western boundary of the Project Site. Existing surrounding uses include: business park/office building uses to the east across S. Robertson Boulevard; a construction company office/showroom immediately to the north; a per day care/grooming facility immediately to the south; and light-industrial/commercial/office uses to the west on Willat Avenue. There are no residential, park, hospital, or other environmentally sensitive uses in the immediate vicinity of the Project Site. **Figure 2**, *Aerial Photograph with Surrounding Land Uses*, shows the site and surrounding land uses. The Project Site is currently developed with a sound studio totaling 2,850 square feet and a surface parking lot, which would all be demolished and removed to support development of the Project.

The Project Site is well served by a network of regional transportation facilities. Various public transit stops operated by the Los Angeles County Metropolitan Transportation Authority (Metro), Los Angeles Department of Transportation (LADOT), City of Santa Monica's Big Blue Bus and Culver City Bus are located in close proximity to the Project Site. The Metro Expo Line Culver City light rail station is approximately 0.1 miles northeast of the Project Site.



SOURCE: ESRI

3727 S. Robertson Blvd, Culver City

Figure 1
Regional Location

ESA

Path: U:\GIS\GIS\Projects\19xxxx\D190830_3727_Robertson_Blvd_Culver_City\03_MXDs_Projects\Cultural_Report\Fig3_Aerial.aprx, janderson 9/12/2019

SOURCE: Mapbox, 2018.

3727 S. Robertson Blvd, Culver City

ESA

Figure 2
Aerial Photograph with Surrounding Land Uses

1.3 Project Land Use Characteristics

The Project would represent a mixed-use, urban infill development with residential, office and retail/restaurants uses since it would be undertaken on a currently developed property, and would be located near existing public transit stops, which would result in potential reduced vehicle trips and VMT compared to model default assumptions. The Project's Traffic Impact Analysis (TIA)[1] estimated Project trip rates that accounted for trip rate reductions due to the Project's characteristics, including reductions due to pass-by trips, internal trips and proximity to public transit/walk-in trips. The estimated trip rate reductions were provided by the Project's TIA.[2] These trip rates were used in the operational emissions modeling. At Project buildout, hours of operation and periods of peak activity would be similar to those currently existing uses on the Project Site, with A.M. and P.M. peak hours.

1.4 Existing Site Emissions

As discussed previously, the Project Site is currently developed with a sound studio totaling 2,850 square feet and a surface parking lot, all of which would be demolished and removed to support development of the Project.

Existing emissions are associated with vehicle trips to and from the Project Site, on-site combustion of natural gas for heating, and fugitive emissions of VOCs from consumer product usage and architectural coatings. Existing emissions were estimated using the California Emissions Estimator Model (CalEEMod), Version 2016.3.2 software, an emissions inventory software program recommended by the SCAQMD. CalEEMod is a Statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions from a variety of land use projects. CalEEMod was developed in collaboration with the air districts of California. Regional data (e.g., emission factors, trip lengths, meteorology, source inventory, etc.) have been provided by the various California air districts to account for local requirements and conditions. CalEEMod is considered to be an accurate and comprehensive tool for quantifying air quality and GHG impacts from land use projects throughout California.[3]

CalEEMod was used to estimate the existing site emissions from vehicle trips, natural gas combustion, consumer products usage, and architectural coatings. Building natural gas usage rates have been adjusted to account for prior Title 24 Building Energy Efficiency Standards.[4] Mobile source emissions were estimated based on CARB's on-road vehicle EMissions FACtor (EMFAC) model, EMFAC2017, which were generated and incorporated into CalEEMod and

1 Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.
2 Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.
3 See: http://www.caleemod.com.
4 CARB, CalEEMod User's Guide, Appendix E, Section 5, September 2016, http://www.aqmd.gov/docs/default-source/caleemod/upgrades/2016.3/06_appendix-e2016-3-1.pdf?sfvrsn=2. Accessed September 2019. Factors for the prior Title 24 standard are extrapolated based on the technical source documentation.

using trip rates from the Project's TIA[5,6] A detailed discussion of the methodology used to estimate the existing Project Site emissions is provided below. **Table 1**, *Existing Site Operational Emissions*, identifies the emissions from the site's existing usage and emissions removed due to the Project. The emissions removed from the existing conditions will be counted as credit for the proposed Project.

TABLE 1
EXISTING SITE OPERATIONAL EMISSIONS (POUNDS PER DAY)[a]

Source	VOC	NO_X	CO	SO_2	PM10	PM2.5
Existing Site Emissions						
Area	<1	<1	<1	<1	<1	<1
Energy (Natural Gas)	<1	<1	<1	<1	<1	<1
Mobile	<1	<1	<1	<1	<1	<1
Total	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**

[a] Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Exhibit B.

SOURCE: ESA, 2019

1.5 Existing Air Quality Conditions

Regional Air Quality

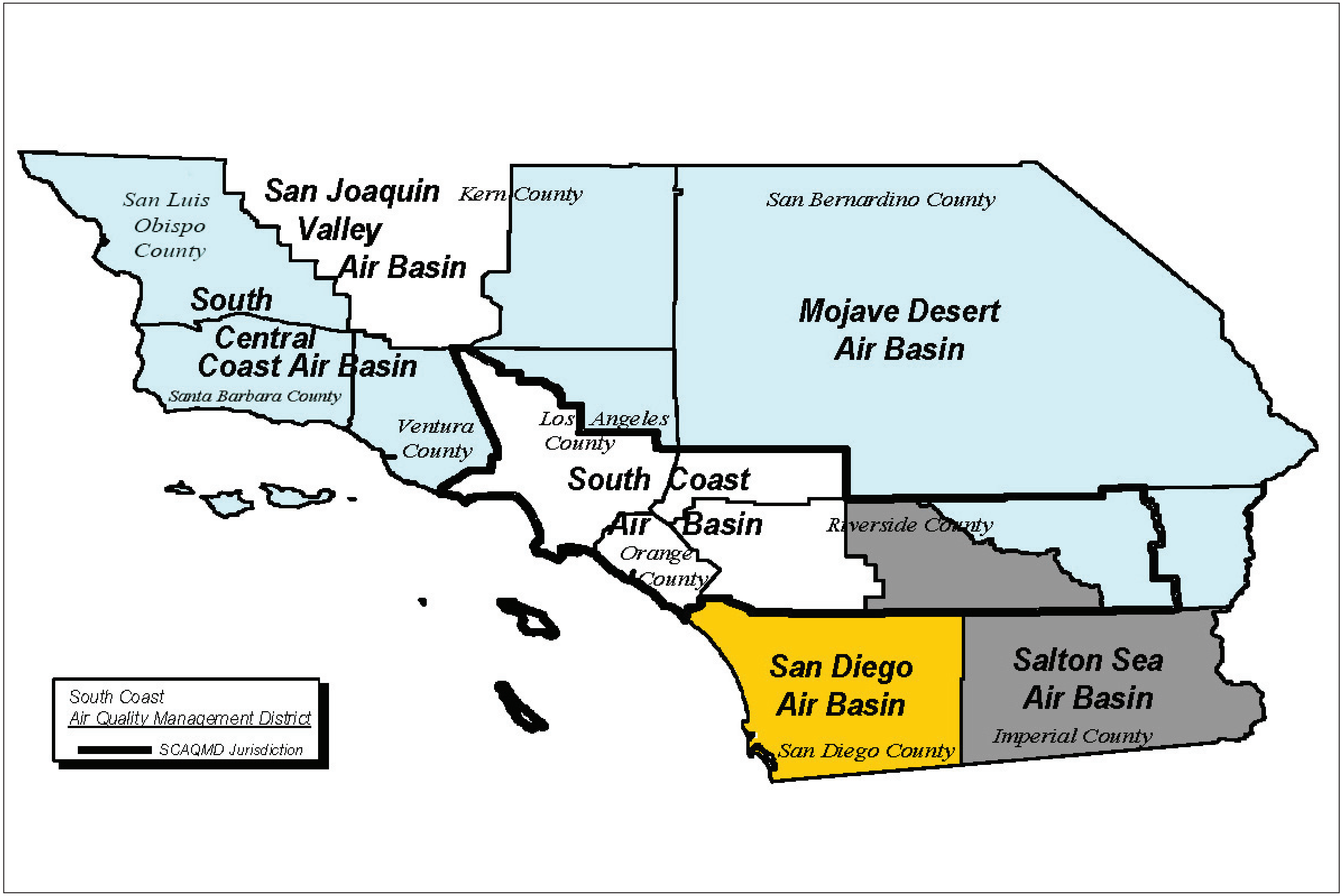
Criteria Pollutants

The Project Site is located within the South Coast Air Basin (Air Basin), which is shown in **Figure 3**, *Boundaries of the South Coast Air Quality Management District*. The Air Basin is an approximately 6,745-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 Air Basin consists of Orange County, Los Angeles County (excluding the Antelope Valley portion), and the western, non-desert portions of San Bernardino and Riverside counties, in addition to the San Gorgonio Pass area in Riverside County. The terrain and geographical location determine the

distinctive climate of the Air Basin, as it is a coastal plain with broad valleys and low hills. The Air Basin lies in the semi-permanent high-pressure zone of the eastern Pacific Ocean. The usually mild climatological pattern is interrupted by periods of hot weather, winter storms, or Santa Ana winds.

5 Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.

6 CalEEMod's default mobile emission factors are based on an internal database which utilizes EMFAC2014. EMFAC2017 is the most up-to-date version of EMFAC provided by CARB. EMFAC2017 emissions factors were generated outside of CalEEMod and then incorporated into CalEEMod's mobile emission factors database.



SOURCE: South Coast Air Quality Management District, 2014

3727 Robertson Project

Figure 3

Boundaries of the South Coast Air Quality Management District

ESA

The extent and severity of pollutant concentrations in the Air Basin is a function of the area's natural physical characteristics (weather and topography) and man-made influences (development patterns and lifestyle). Factors such as wind, sunlight, temperature, humidity, rainfall, and topography all affect the accumulation and dispersion of pollutants throughout the Air Basin, making it an area of high pollution potential. The Air Basin's meteorological conditions, in combination with regional topography, are conducive to the formation and retention of ozone, which is a secondary pollutant that forms through photochemical reactions in the atmosphere. Thus, the greatest air pollution impacts throughout the Air Basin typically occur from June through September. This condition is generally attributed to the emissions occurring in the Air Basin, light winds, and shallow vertical atmospheric mixing. These factors reduce the potential for pollutant dispersion causing elevated air pollutant levels. Pollutant concentrations in the Air Basin vary with location, season, and time of day. Concentrations of ozone, for example, tend to be lower along the coast, higher in the near inland valleys, and lower in the far inland areas of the Air Basin and adjacent desert.

Certain air pollutants have been recognized to cause notable health problems and consequential damage to the environment either directly or in reaction with other pollutants, due to their presence in elevated concentrations in the atmosphere. Such pollutants have been identified and regulated as part of the overall endeavor to prevent further deterioration and facilitate improvement in air quality. The following pollutants are regulated by the United States

Environmental Protection Agency (USEPA) and are subject to emissions control requirements adopted by federal, state and local regulatory agencies. These pollutants are referred to as "criteria air pollutants" as a result of the specific standards, or criteria, which have been adopted for them. A brief description of the health effects of these criteria air pollutants are provided below.

Ozone (O_3): Ozone is a secondary pollutant formed by the chemical reaction of volatile organic compounds (VOCs) and nitrogen oxides (NO_X) in the presence of sunlight under favorable meteorological conditions, such as high temperature and stagnation episodes. Ozone concentrations are generally highest during the summer months when direct sunlight, light wind, and warm temperature conditions are favorable. According to the USEPA, ozone can cause the muscles in the airways to constrict potentially leading to wheezing and shortness of breath.[7] Ozone can make it more difficult to breathe deeply and vigorously; cause shortness of breath and pain when taking a deep breath; cause coughing and sore or scratchy throat; inflame and damage the airways; aggravate lung diseases such as asthma, emphysema and chronic bronchitis; increase the frequency of asthma attacks; make the lungs more susceptible to infection; continue to damage the lungs even when the symptoms have disappeared; and cause chronic obstructive pulmonary disease.[8] Long-term exposure to ozone is linked to aggravation of asthma, and is likely to be one of many causes of asthma development and long-term exposures to higher

7 United States Environmental Protection Agency (USEPA), Health Effects of Ozone Pollution, https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution, last updated October 10, 2018. Accessed September 2019.

8 USEPA, Health Effects of Ozone Pollution.

concentrations of ozone may also be linked to permanent lung damage, such as abnormal lung development in children.[9] According to the California Air Resources Board (CARB), inhalation of ozone causes inflammation and irritation of the tissues lining human airways, causing and worsening a variety of symptoms and exposure to ozone can reduce the volume of air that the lungs breathe in and cause shortness of breath.[10] The USEPA states that people most at risk from breathing air containing ozone include people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers.[11] Children are at greatest risk from exposure to ozone because their lungs are still developing and they are more likely to be active outdoors when ozone levels are high, which increases their exposure.[12] According to CARB, studies show that children are no more or less likely to suffer harmful effects than adults; however, children and teens may be more susceptible to ozone and other pollutants because they spend nearly twice as much time outdoors and engaged in vigorous activities compared to adults.[13] Children breathe more rapidly than adults and inhale more pollution per pound of their body weight than adults and are less likely than adults to notice their own symptoms and avoid harmful exposures.[14] Further research may be able to better distinguish between health effects in children and adults.[15]

Volatile Organic Compounds (VOCs): VOCs are organic chemical compounds of carbon and are not "criteria" pollutants themselves; however, they contribute with NO_X to form ozone, and are regulated to prevent the formation of ozone.[16] According to CARB, some VOCs are highly reactive and play a critical role in the formation of ozone, other VOCs have adverse health effects, and in some cases, VOCs can be both highly reactive and have adverse health effects.[17] VOCs are typically formed from combustion of fuels and/or released through evaporation of organic liquids, internal combustion associated with motor vehicle usage, and consumer products (e.g., architectural coatings, etc.).[18]

Nitrogen Dioxide (NO_2) and Nitrogen Oxides (NO_X): NO_X is a term that refers to a group of compounds containing nitrogen and oxygen. The primary compounds of air quality concern include nitrogen dioxide (NO_2) and nitric oxide (NO). Ambient air quality standards have been promulgated for NO_2, which is a reddish-brown, reactive gas.[19] The principle form of NO_X produced by combustion is NO, but NO reacts quickly in the atmosphere to form NO_2, creating

9 USEPA, Health Effects of Ozone Pollution.

10 California Air Resources Board (CARB), Ozone & Health, Health Effects of Ozone, https://ww2.arb.ca.gov/resources/ozone-and-health. Accessed September 2019.

11 USEPA, Health Effects of Ozone Pollution.

12 USEPA, Health Effects of Ozone Pollution.

13 CARB, Ozone & Health, Health Effects of Ozone.

14 CARB, Ozone & Health, Health Effects of Ozone.

15 CARB, Ozone & Health, Health Effects of Ozone.

16 USEPA, Technical Overview of Volatile Organic Compounds, https://www.epa.gov/indoor-air-quality-iaq/technical-overview-volatile-organic-compounds, last updated April 12, 2017. Accessed September 2019.

17 CARB, Toxic Air Contaminants Monitoring, Toxic Air Contaminant Identification List, https://ww3.arb.ca.gov/toxics/toxics.htm, last reviewed June 9, 2016. Accessed March 2019.

18 CARB, Toxic Air Contaminants Monitoring, Toxic Air Contaminant Identification List.

19 CARB, Nitrogen Dioxide & Health, https://ww2.arb.ca.gov/resources/nitrogen-dioxide-and-health. Accessed September 2019.

the mixture of NO and NO_2 referred to as NO_X.[20] Major sources of NO_X include emissions from cars, trucks and buses, power plants, and off-road equipment.[21] The terms NO_X and NO_2 are sometimes used interchangeably. However, the term NO_X is typically used when discussing emissions, usually from combustion-related activities, and the term NO_2 is typically used when discussing ambient air quality standards. Where NO_X emissions are discussed in the context of the thresholds of significance or impact analyses, the discussions are based on the conservative assumption that all NO_X emissions would oxidize in the atmosphere to form NO_2. According to the USEPA, short-term exposures to NO_2 can potentially aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing), hospital admissions and visits to emergency rooms while longer exposures to elevated concentrations of NO_2 may contribute to the development of asthma and potentially increase susceptibility to respiratory infections.[22] According to CARB, controlled human exposure studies that show that NO_2 exposure can intensify responses to allergens in allergic asthmatics.[23] In addition, a number of epidemiological studies have demonstrated associations between NO_2 exposure and premature death, cardiopulmonary effects, decreased lung function growth in children, respiratory symptoms, emergency room visits for asthma, and intensified allergic responses.[24] Infants and children are particularly at risk from exposure to NO_2 because they have disproportionately higher exposure to NO_2 than adults due to their greater breathing rate for their body weight and their typically greater outdoor exposure duration while in adults, the greatest risk is to people who have chronic respiratory diseases, such as asthma and chronic obstructive pulmonary disease.[25] CARB states that much of the information on distribution in air, human exposure and dose, and health effects is specifically for NO_2 and there is only limited information for NO and NO_X, as well as large uncertainty in relating health effects to NO or NO_X exposure.[26]

Carbon Monoxide (CO): Carbon monoxide (CO) is primarily emitted from combustion processes and motor vehicles due to the incomplete combustion of fuel, such as natural gas, gasoline, or wood, with the majority of outdoor CO emissions from mobile sources.[27] According to the USEPA, breathing air with a high concentration of CO reduces the amount of oxygen that can be transported in the blood stream to critical organs like the heart and brain and at very high levels, which are possible indoors or in other enclosed environments, CO can cause dizziness, confusion, unconsciousness and death.[28] Very high levels of CO are not likely to occur outdoors; however, when CO levels are elevated outdoors, they can be of particular concern for people with some types of heart disease since these people already have a reduced ability for getting

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20 CARB, Nitrogen Dioxide & Health.

21 USEPA, Nitrogen Dioxide (NO_2) Pollution, https://www.epa.gov/no2-pollution/basic-information-about-no2, last updated September 8, 2016. Accessed September 2019.

22 USEPA, Nitrogen Dioxide (NO_2) Pollution.

23 CARB, Nitrogen Dioxide & Health.

24 CARB, Nitrogen Dioxide & Health.

25 CARB, Nitrogen Dioxide & Health.

26 CARB, Nitrogen Dioxide & Health.

27 CARB, Carbon Monoxide & Health, https://ww2.arb.ca.gov/resources/carbon-monoxide-and-health. Accessed September 2019.

28 USEPA, Carbon Monoxide (CO) Pollution in Outdoor Air, https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxide-co-outdoor-air-pollution, last updated September 8, 2016. Accessed September 2019.

oxygenated blood to their hearts and are especially vulnerable to the effects of CO when exercising or under increased stress.[29] In these situations, short-term exposure to elevated CO may result in reduced oxygen to the heart accompanied by chest pain also known as angina.[30] According to CARB, the most common effects of CO exposure are fatigue, headaches, confusion, and dizziness due to inadequate oxygen delivery to the brain.[31] For people with cardiovascular disease, short-term CO exposure can further reduce their body's already compromised ability to respond to the increased oxygen demands of exercise, exertion, or stress; inadequate oxygen delivery to the heart muscle leads to chest pain and decreased exercise tolerance.[32] Unborn babies, infants, elderly people, and people with anemia or with a history of heart or respiratory disease are most likely to experience health effects with exposure to elevated levels of CO.[33]

Sulfur Dioxide (SO_2): According to the USEPA, the largest source of sulfur dioxide (SO_2) emissions in the atmosphere is the burning of fossil fuels by power plants and other industrial facilities while smaller sources of SO_2 emissions include industrial processes such as extracting metal from ore; natural sources such as volcanoes; and locomotives, ships and other vehicles and heavy equipment that burn fuel with a high sulfur content.[34] In 2006, California phased-in the ultra-low-sulfur diesel regulation limiting vehicle diesel fuel to a sulfur content not exceeding 15 parts per million, down from the previous requirement of 500 parts per million, substantially reducing emissions of sulfur from diesel combustion.[35] According to the USEPA, short-term exposures to SO_2 can harm the human respiratory system and make breathing difficult.[36] According to CARB, health effects at levels near the State one-hour standard are those of asthma exacerbation, including bronchoconstriction accompanied by symptoms of respiratory irritation such as wheezing, shortness of breath and chest tightness, especially during exercise or physical activity and exposure at elevated levels of SO_2 (above 1 part per million (ppm)) results in increased incidence of pulmonary symptoms and disease, decreased pulmonary function, and increased risk of mortality.[37] Children, the elderly, and those with asthma, cardiovascular disease, or chronic lung disease (such as bronchitis or emphysema) are most likely to experience the adverse effects of SO_2.[38,39]

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29 USEPA, Carbon Monoxide (CO) Pollution in Outdoor Air

30 USEPA, Carbon Monoxide (CO) Pollution in Outdoor Air

31 CARB, Carbon Monoxide & Health.

32 CARB, Carbon Monoxide & Health.

33 CARB, Carbon Monoxide & Health.

34 USEPA, Sulfur Dioxide (SO_2) Pollution, https://www.epa.gov/so2-pollution/sulfur-dioxide-basics, last updated April 2, 2019. Accessed September 2019.

35 CARB, Final Regulation Order, Amendments to the California Diesel Fuel Regulations, Amend Section 2281, Title 13, California Code of Regulations, https://ww3.arb.ca.gov/regact/ulsd2003/fro2.pdf, approved July 15, 2004. Accessed September 2019.

36 USEPA, Sulfur Dioxide (SO_2) Pollution.

37 CARB, Sulfur Dioxide & Health, https://ww2.arb.ca.gov/resources/sulfur-dioxide-and-health. Accessed September 2019.

38 CARB, Sulfur Dioxide & Health.

39 USEPA, Sulfur Dioxide (SO_2) Pollution.

Particulate Matter (PM10 and PM2.5): Particulate matter air pollution is a mixture of solid particles and liquid droplets found in the air.[40] Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye while other particles are so small they can only be detected using an electron microscope.[41] Particles are defined by their diameter for air quality regulatory purposes: inhalable particles with diameters that are generally 10 micrometers and smaller (PM10); and fine inhalable particles with diameters that are generally 2.5 micrometers and smaller (PM2.5).[42] Thus, PM2.5 comprises a portion or a subset of PM10. Sources of PM10 emissions include dust from construction sites, landfills and agriculture, wildfires and brush/waste burning, industrial sources, and wind-blown dust from open lands.[43] Sources of PM2.5 emissions include combustion of gasoline, oil, diesel fuel, or wood.[44] PM10 and PM2.5 may be either directly emitted from sources (primary particles) or formed in the atmosphere through chemical reactions of gases (secondary particles) such as SO_2, NO_X, and certain organic compounds.[45] According to CARB, both PM10 and PM2.5 can be inhaled, with some depositing throughout the airways; PM_{10} is more likely to deposit on the surfaces of the larger airways of the upper region of the lung while PM2.5 is more likely to travel into and deposit on the surface of the deeper parts of the lung, which can induce tissue damage, and lung inflammation.[46] Short-term (up to 24 hours duration) exposure to PM10 has been associated primarily with worsening of respiratory diseases, including asthma and chronic obstructive pulmonary disease, leading to hospitalization and emergency department visits.[47] The effects of long-term (months or years) exposure to PM10 are less clear, although studies suggest a link between long-term PM10 exposure and respiratory mortality. The International Agency for Research on Cancer published a review in 2015 that concluded that particulate matter in outdoor air pollution causes lung cancer.[48] Short-term exposure to PM2.5 has been associated with premature mortality, increased hospital admissions for heart or lung causes, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, and restricted activity days and long-term exposure to PM2.5 has been linked to premature death, particularly in people who have chronic heart or lung diseases, and reduced lung function growth in children.[49] According to CARB, populations most likely to experience adverse health effects with exposure to PM10 and PM2.5 include older adults with chronic heart or lung disease, children, and asthmatics and children and infants are more susceptible to harm from inhaling pollutants such as

40 USEPA, Particulate Matter (PM) Pollution, https://www.epa.gov/pm-pollution/particulate-matter-pm-basics, last updated November 14, 2018. Accessed September 2019.

41 USEPA, Particulate Matter (PM) Pollution.

42 USEPA, Particulate Matter (PM) Pollution.

43 CARB, Inhalable Particulate Matter and Health (PM2.5 and PM10), https://ww3.arb.ca.gov/research/aaqs/common-pollutants/pm/pm.htm, last reviewed August 10, 2017. Accessed September 2019.

44 CARB, Inhalable Particulate Matter and Health (PM2.5 and PM10).

45 CARB, Inhalable Particulate Matter and Health (PM2.5 and PM10).

46 CARB, Inhalable Particulate Matter and Health (PM2.5 and PM10).

47 CARB, Inhalable Particulate Matter and Health (PM2.5 and PM10).

48 CARB, Inhalable Particulate Matter and Health (PM2.5 and PM10).

49 CARB, Inhalable Particulate Matter and Health (PM2.5 and PM10).

PM10 and PM2.5 compared to healthy adults because they inhale more air per pound of body weight than do adults, spend more time outdoors, and have developing immune systems.[50]

Lead (Pb): Major sources of lead emissions include ore and metals processing, piston-engine aircraft operating on leaded aviation fuel, waste incinerators, utilities, and lead-acid battery manufacturers.[51] In the past, leaded gasoline was a major source of lead emissions; however, the removal of lead from gasoline has resulted in a decrease of lead in the air by 98 percent between 1980 and 2014.[52] Lead can adversely affect the nervous system, kidney function, immune system, reproductive and developmental systems and the cardiovascular system, and affects the oxygen carrying capacity of blood.[53] The lead effects most commonly encountered in current populations are neurological effects in children, such as behavioral problems and reduced intelligence, anemia, and liver or kidney damage.[54] Excessive lead exposure in adults can cause reproductive problems in men and women, high blood pressure, kidney disease, digestive problems, nerve disorders, memory and concentration problems, and muscle and joint pain.[55]

Other Criteria Pollutants (California Only)

The California Ambient Air Quality Standards (CAAQS) regulate the same criteria pollutants as the NAAQS but in addition, regulate State-identified criteria pollutants, including sulfates, hydrogen sulfide, visibility-reducing particles, and vinyl chloride.[56] With respect to the State-identified criteria pollutants (i.e., sulfates, hydrogen sulfide, visibility reducing particles, and vinyl chloride), the Project would either not emit them (i.e., hydrogen sulfide and vinyl chloride), or they would be accounted for as part of the pollutants estimated in this analysis (i.e., sulfates and visibility reducing particles). For example, visibility reducing particles are associated with particulate matter emissions and sulfates are associated with SO_X emissions. Both particulate matter and SO_X are included in the emissions estimates for the Project. A description of the health effects of the State-identified criteria air pollutants is provided below.

Sulfates (SO_4^{2-}): Sulfates in the environment occur as a result of SO_2 (sulfur dioxide) being converted to SO_4^{2-} compounds in the atmosphere where sulfur is first oxidized to SO_2 during the combustion process of sulfur containing, petroleum-derived fuels (e.g., gasoline and diesel fuel).[57] Exposure to SO_4^{2-}, which are part of PM2.5, results in health effects similar to those from exposure to PM2.5 including reduced lung function, aggravated asthmatic symptoms, and increased risk of emergency department visits, hospitalizations, and death in people who have chronic heart or lung diseases.[58] Population groups with higher risks of experiencing adverse

50 CARB, Inhalable Particulate Matter and Health (PM2.5 and PM10).
51 USEPA, Lead Air Pollution, https://www.epa.gov/lead-air-pollution/basic-information-about-lead-air-pollution, last updated November 29, 2017. Accessed September 2019.
52 USEPA, Lead Air Pollution.
53 USEPA, Lead Air Pollution.
54 CARB, Lead & Health, https://ww2.arb.ca.gov/resources/lead-and-health. Accessed September 2019.
55 CARB, Lead & Health.
56 CARB, Vinyl Chloride, https://www.arb.ca.gov/research/aaqs/caaqs/vc/vc.htm, last review August 22, 2016. Accessed September 2019.
57 CARB, Sulfate & Health, https://ww2.arb.ca.gov/resources/sulfate-and-health. Accessed September 2019.
58 CARB, Sulfate & Health.

health effects with exposure to SO_4^{2-} include children, asthmatics, and older adults who have chronic heart or lung diseases.[59]

Hydrogen Sulfide (H_2S): H_2S is a colorless gas with a strong odor of rotten eggs. The most common sources of H_2S emissions are oil and natural gas extraction and processing, and natural emissions from geothermal fields. Industrial sources of H_2S include petrochemical plants and kraft paper mills. H_2S is also formed during bacterial decomposition of human and animal wastes, and is present in emissions from sewage treatment facilities and landfills.[60] Exposure to H_2S can induce tearing of the eyes and symptoms related to overstimulation of the sense of smell, including headache, nausea, or vomiting; additional health effects of eye irritation have only been reported with exposures greater than 50 ppm, which is considerably higher than the odor threshold.[61] H_2S is regulated as a nuisance based on its odor detection level; if the standard were based on adverse health effects, it would be set at a much higher level.[62] According to CARB, there are insufficient data available to determine whether or not some groups are at greater risk than others.[63]

Visibility-Reducing Particles: Visibility-reducing particles come from a variety of natural and manmade sources and can vary greatly in shape, size and chemical composition. Visibility reduction is caused by the absorption and scattering of light by the particles in the atmosphere before it reaches the observer. Certain visibility-reducing particles are directly emitted to the air such as windblown dust and soot, while others are formed in the atmosphere through chemical transformations of gaseous pollutants (e.g., sulfates, nitrates, organic carbon particles) which are the major constituents of particulate matter. As the number of visibility reducing particles increases, more light is absorbed and scattered, resulting in less clarity, color, and visual range.[64] Exposure to some haze-causing pollutants have been linked to adverse health impacts similar to PM10 and PM2.5 as discussed above.[65]

Vinyl Chloride: Vinyl chloride is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products and are generally emitted from industrial processes and other major sources of vinyl chloride have been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents.[66] Short-term health of effects of exposure to high levels of vinyl chloride in the air include central nervous system effects, such as dizziness, drowsiness, and headaches while long-term exposure to vinyl chloride through inhalation and oral exposure causes liver damage and has been shown to

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59 CARB, Sulfate & Health.

60 CARB, Hydrogen Sulfide & Health, https://ww2.arb.ca.gov/resources/hydrogen-sulfide-and-health. Accessed September 2019.

61 CARB, Hydrogen Sulfide & Health.

62 CARB, Hydrogen Sulfide & Health.

63 CARB, Hydrogen Sulfide & Health.

64 CARB, Visibility-Reducing Particles and Health, last reviewed October 11, 2016, https://www.arb.ca.gov/research/aaqs/common-pollutants/vrp/vrp.htm. Accessed September 2019.

65 CARB, Visibility-Reducing Particles and Health.

66 CARB, Vinyl Chloride & Health, https://ww2.arb.ca.gov/resources/vinyl-chloride-and-health. Accessed September 2019.

increase the risk of angiosarcoma, a rare form of liver cancer in humans.[67] Most health data on vinyl chloride relate to carcinogenicity; thus, the people most at risk are those who have long-term exposure to elevated levels, which is more likely to occur in occupational or industrial settings; however, control methodologies applied to industrial facilities generally prevent emissions to the ambient air.[68]

Toxic Air Contaminants (TACs)

In addition to criteria pollutants, the SCAQMD periodically assesses levels of toxic air contaminants (TACs) in the Air Basin. A TAC is defined by California Health and Safety Code Section 39655:

> *"Toxic air contaminant" means an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health. A substance that is listed as a hazardous air pollutant pursuant to subsection (b) of Section 112 of the federal act (42 U.S.C. Sec. 7412(b)) is a toxic air contaminant.*

Diesel particulate matter, which is emitted in the exhaust from diesel engines, was listed by the State as a toxic air contaminant in 1998. Most major sources of diesel emissions, such as ships, trains, and trucks operate in and around ports, railyards, and heavily traveled roadways. These areas are often located near highly populated areas resulting in greater health consequences for urban areas than rural areas.[69] Diesel particulate matter has historically been used as a surrogate measure of exposure for all diesel exhaust emissions. Diesel particulate matter consists of fine particles (fine particles have a diameter <2.5 μm), including a subgroup of ultrafine particles (ultrafine particles have a diameter <0.1 μm). Collectively, these particles have a large surface area which makes them an excellent medium for absorbing organics. The visible emissions in diesel exhaust include carbon particles or "soot." Diesel exhaust also contains a variety of harmful gases and cancer-causing substances.

Exposure to diesel particulate matter may be a health hazard, particularly to children whose lungs are still developing and the elderly who may have other serious health problems. Diesel particulate matter levels and resultant potential health effects may be higher in proximity to heavily traveled roadways with substantial truck traffic or near industrial facilities. According to CARB, diesel particulate matter exposure may lead to the following adverse health effects: (1) Aggravated asthma; (2) Chronic bronchitis; (3) Increased respiratory and cardiovascular hospitalizations; (4) Decreased lung function in children; (5) Lung cancer; and (6) Premature deaths for people with heart or lung disease.[70,71]

67 CARB, Vinyl Chloride & Health.
68 CARB, Vinyl Chloride & Health.
69 CARB, Overview: Diesel Exhaust and Health, https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health. Accessed September 2019.
70 CARB, Overview: Diesel Exhaust and Health
71 CARB, Diesel Particulate Matter Health Risk Assessment Study for the West Oakland Community: Preliminary Summary of Results, (2008), http://www.arb.ca.gov/ch/communities/ra/westoakland/documents/factsheet0308.pdf. Accessed September 2019.

Between July 2012 and June 2013, the SCAQMD conducted the Multiple Air Toxics Exposure Study (MATES IV), which is a follow-up to previous air toxics studies conducted in the Air Basin. The MATES IV Final Report was issued in May 2015. The study, based on actual monitored data throughout the Air Basin, consisted of several elements. These included a monitoring program, an updated emissions inventory of TACs, and a modeling effort to characterize carcinogenic risk across the Air Basin from exposure to TACs. The study concluded that the average of the modeled air toxics concentrations measured at each of the monitoring stations in the Air Basin equates to a background cancer risk from long-term inhalation exposure to TAC emissions of approximately 418 in one million based on the average of 10 fixed monitoring sites and 367 in one million based on a population-weighted average risk. The overall cancer risk was about 65 percent lower for the average of 10 fixed monitoring sites and 57 percent lower for the population-weighted risk than the previous MATES III cancer risks.[72]

Subsequent to the SCAQMD's risk calculations estimates performed for MATES IV, the Office of Environmental Health Hazard Assessment (OEHHA) updated its methods for estimating cancer risks, which utilizes higher estimates of cancer potency during early life exposures and uses different assumptions for breathing rates and length of residential exposures.[73] In March 2015, the Office of Environmental Health Hazard Assessment (OEHHA) adopted an updated guidance manual that incorporates advances in risk assessment with consideration of increased cancer potency for infants and children using Age Sensitivity Factors (ASF). The updated guidance manual also uses different assumptions for breathing rates and length of residential exposures. SCAQMD staff estimates that risks for the same long-term inhalation exposure level would be about 2.5 to 2.7 times higher using the updated methods, which would cause the average lifetime air toxics risk estimated from the monitoring sites data to change from 418 in one million to 1,023 in one million for the average of 10 fixed monitoring sites and from 367 in one million to 897 in one million for the population-weighted risk.[74] Under the updated OEHHA methodology, the relative reduction in the overall cancer risk from the MATES IV results compared to MATES III would be the same (about 65 percent and 57 percent reduction in risk, respectively).

Approximately 68 percent of the risk is attributed to diesel particulate matter (DPM) emissions, approximately 22 percent to other toxics associated with mobile sources (including benzene, butadiene, and formaldehyde), and approximately 10 percent of all airborne carcinogenic risk is attributed to stationary sources (which include industries and certain other businesses, such as dry cleaners and chrome plating operations).[75] The study also found lower ambient concentrations of most of the measured air toxics compared to the levels measured in the previous study conducted during 2004 and 2006. Specifically, benzene and 1,3-butadiene, pollutants generated mainly from

72 South Coast Air Quality Management District (SCAQMD), Final Report – Multiple Air Toxics Exposure Study in the South Coast Air Basin, (2015) ES-2-3, http://www.aqmd.gov/docs/default-source/air-quality/air-toxic-studies/mates-iv/mates-iv-final-draft-report-4-1-15.pdf?sfvrsn=7. Accessed September 2019.

73 California Environmental Protection Agency, Office of Health Hazard Assessment, Air Toxics Hot Spots Program, Guidance Manual for Preparation of Health Risk Assessments, 2015, http://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0. Accessed September 2019.

74 SCAQMD, Final Report – Multiple Air Toxics Exposure Study in the South Coast Air Basin, page 2-11.

75 SCAQMD, Final Report – Multiple Air Toxics Exposure Study in the South Coast Air Basin, page ES-2.

vehicles, were down 35 percent and 11 percent, respectively.[76] The reductions were attributed to air quality control regulations and improved emission control technologies. In addition to air toxics, MATES IV included continuous measurements of black carbon and ultrafine particles (particles smaller than 0.1 microns in size), which are emitted by the combustion of diesel fuels. Sampling sites located near heavily-trafficked freeways or near industrial areas were characterized by higher levels of black carbon and ultrafine particles compared to more rural sites.The SCAQMD has prepared a series of maps that show regional trends in estimated outdoor inhalation cancer risk from toxic emissions, as part of an ongoing effort to provide insight into relative risks. The maps represent the estimated number of potential cancers per million people associated with a lifetime of breathing air toxics (24 hours per day outdoors for 70 years). The background potential cancer risk per million people in the Project Site area using the updated OEHHA methodology is estimated at 955.21 in one million (compared to an overall Air Basin-wide risk of 1,023 in one million for the average of 10 fixed monitoring sites).[77] Generally, the risk from air toxics is lower near the coastline and increases inland, with higher risks concentrated near large diesel sources (e.g., freeways, airports, and ports).

Local Air Quality

The SCAQMD maintains a network of air quality monitoring stations located throughout the Air Basin to measure ambient pollutant concentrations. The Project Site is located in SCAQMD Source Receptor Area (SRA) 2; therefore, the monitoring station most representative of the Project Site is the Northwest Coastal LA County Monitoring Station. Criteria pollutants monitored at this station include ozone, NO_2, and CO. The Southwest Coastal LA County Monitoring Station was used to report data for SO_2, lead, and PM10. The Central LA station was used for PM2.5 monitoring data. The most recent data available from the SCAQMD for these monitoring stations are from years 2016 to 2018. The pollutant concentration data for these years are summarized in **Table 2,** *Ambient Air Quality Data*.

TABLE 2
AMBIENT AIR QUALITY DATA

Pollutant/Standard	2016	2017	2018
O_3 (1-hour)			
Maximum Concentration (ppm)	0.085	0.099	0.094
Days > CAAQS (0.09 ppm)	0	1	0
O_3 (8-hour)			
Maximum Concentration (ppm)	0.073	0.077	0.073
4th High 8-hour Concentration (ppm)	0.066	0.069	0.068
Days > CAAQS (0.070 ppm)	2	3	2
Days > NAAQS (0.075 ppm)	0	1	0

76 SCAQMD, Final Report – Multiple Air Toxics Exposure Study in the South Coast Air Basin, page 6-1.
77 South Coast Air Quality Management District, Multiple Air Toxics Exposure Study, MATES IV Carcinogenic Risk Interactive Map.

Pollutant/Standard	2016	2017	2018
NO_2 (1-hour)			
Maximum Concentration (ppm)	0.055	0.056	0.065
98th Percentile Concentration (ppm)	0.049	0.046	0.046
NO_2 (Annual)			
Annual Arithmetic Mean (0.030 ppm)	0.012	0.010	0.013
CO (1-hour)			
Maximum Concentration (ppm)	2.2	2.0	1.6
CO (8-hour)			
Maximum Concentration (ppm)	1.1	1.2	1.3
SO_2 (1-hour)			
Maximum Concentration (ppm)	0.010	0.010	0.012
99th Percentile Concentration (ppm)	0.006	0.007	0.005
SO_2 (24-hour)			
Maximum Concentration (ppm)	--	--	--
PM10 (24-hour)			
Maximum Concentration (μg/m^3)	43	46	45
Samples > CAAQS (50 μg/m^3)	0	0	0
Samples > NAAQS (150 μg/m^3)	0	0	0
PM10 (Annual Average)			
Annual Arithmetic Mean (20 μg/m^3)	21.6	19.8	20.5
PM2.5 (24-hour)			
Maximum Concentration (μg/m^3)	44.4	49.2	43.8
98th Percentile Concentration (μg/m^3)	27.3	27.8	30.5
Samples > NAAQS (35 μg/m^3)	2	5	3
PM2.5 (Annual)			
Annual Arithmetic Mean (12 μg/m^3)	11.83	11.94	12.58
Lead			
Maximum 30-day average (μg/m^3)	0.006	0.005	0.005

ppm = parts per million; μg/m^3 = micrograms per cubic meter

SOURCES: SCAQMD, 2019

1.6 Sensitive Receptors

Certain population groups, such as children, elderly, and acutely and chronically ill persons (especially those with cardio-respiratory diseases), are considered more sensitive to the potential effects of air pollution than others. There are no residential, park, hospital, or other environmentally sensitive uses in the immediate vicinity of the Project Site. The closest sensitive land use are exiting one- and two-story single located approximately 785 feet to the southeast of Project Site south of Lindblade Street. In addition, the Ivy Station mixed-use project is under construction approximately 450 feet to the north of the Project Site north of the Metro Expo Line. All other air quality sensitive receptors are located at greater distances from the Project Site, and would be less impacted by Project emissions. Impacts are quantified for the sensitive receptors discussed above.

SECTION 2
Regulatory Framework

A number of statutes, regulations, plans and policies have been adopted which address air quality concerns. The Project Site and vicinity is subject to air quality regulations developed and implemented at the federal, State, and local levels. At the federal level, the USEPA is responsible for implementation of the federal Clean Air Act (CAA). Some portions of the CAA (e.g., certain mobile source requirements and other requirements) are implemented directly by the USEPA. Other portions of the CAA (e.g., stationary source requirements) are implemented through delegation of authority to State and local agencies. A number of plans and policies have been adopted by various agencies that address air quality concerns. Those plans and policies that are relevant to the Project are discussed below.

2.1 Federal

The federal CAA was enacted in 1955 and has been amended numerous times in subsequent years, with the most recent amendments occurring in 1990.[78] The CAA is the comprehensive federal law that regulates air emissions in order to protect public health and welfare.[79] The USEPA is responsible for the implementation and enforcement of the CAA, which establishes federal National Ambient Air Quality Standards (NAAQS), specifies future dates for achieving compliance, and requires USEPA to designate areas as attainment, nonattainment, or maintenance. The CAA also mandates that each state submit and implement a State Implementation Plan (SIP) for each criteria pollutant for which the state has not achieved the applicable NAAQS. The SIP includes pollution control measures that demonstrate how the standards for those pollutants will be met. The sections of the CAA most applicable to the Project include Title I (Nonattainment Provisions) and Title II (Mobile Source Provisions).[80,81]

Title I requirements are implemented for the purpose of attaining NAAQS for criteria air pollutants. The NAAQS were amended in July 1997 to include an 8-hour standard for ozone and to adopt a NAAQS for PM2.5. The NAAQS were also amended in September 2006 to include an established methodology for calculating PM2.5, as well to revoke the annual PM10 threshold.

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[78] 42 United States Code §7401 et seq. (1970).

[79] Summary of the Clean Air Act, https://www.epa.gov/laws-regulations/summary-clean-air-act.

[80] U.S. Environmental Protection Agency, Clean Air Act Overview, Clean Air Act Table of Contents by Title, Last Updated January 3, 2017, https://www.epa.gov/clean-air-act-overview/clean-air-act-text. Accessed September 2019. As shown therein, Title I addresses nonattainment areas and Title II addresses mobile sources.

[81] Mobile sources include on-road vehicles (e.g. cars, buses, motorcycles) and non-road vehicles e.g. aircraft, trains, construction equipment). Stationary sources are comprised of both point and area sources. Point sources are stationary facilities that emit large amount of pollutants (e.g. municipal waste incinerators, power plants). Area sources are smaller stationary sources that alone are not large emitters, but combined can account for large amounts of pollutants (e.g. consumer products, residential heating, dry cleaners).

Table 3, *Ambient Air Quality Standards*, shows the NAAQS currently in effect for each criteria pollutant. The NAAQS and the CAAQS for the California criteria air pollutants (discussed below) have been set at levels considered safe to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly with a margin of safety; and to protect public welfare, including against decreased visibility and damage to animals, crops, vegetation, and buildings.[82]In addition to criteria pollutants, Title I also includes air toxics provisions which require USEPA to develop and enforce regulations to protect the public from exposure to airborne contaminants that are known to be hazardous to human health. In accordance with Section 112, USEPA establishes National Emission Standards for Hazardous Air Pollutants (NESHAPs). The list of hazardous air pollutants (HAPs), or air toxics, includes specific compounds that are known or suspected to cause cancer or other serious health effects.

Title II requirements pertain to mobile sources, such as cars, trucks, buses, and planes. Reformulated gasoline, automobile pollution control devices, and vapor recovery nozzles on gas pumps are a few of the mechanisms the USEPA uses to regulate mobile air emission sources. The provisions of Title II have resulted in tailpipe emission standards for vehicles, which have been strengthened in recent years to improve air quality. For example, the standards for NO_X emissions have been lowered substantially, and the specification requirements for cleaner burning gasoline are more stringent.

TABLE 3
AMBIENT AIR QUALITY STANDARDS

		California Standards[a]		National Standards[b]		
Pollutant	**Average Time**	**Concentration[c]**	**Method[d]**	**Primary[c,e]**	**Secondary [c,f]**	**Method[g]**
O_3[h]	1 Hour	0.09 ppm (180 μg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 μg/m^3)		0.070 ppm (137 μg/m^3)		
NO_2[i]	1 Hour	0.18 ppm (339 μg/m^3)	Gas Phase Chemi-luminescence	100 ppb (188 μg/m^3)	None	Gas Phase Chemi-luminescence
	Annual Arithmetic Mean	0.030 ppm (57 μg/m^3)		53 ppb (100 μg/m^3)	Same as Primary Standard	
CO	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10mg/m^3)		9 ppm (10 mg/m^3)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
SO_2[j]	1 Hour	0.25 ppm (655 μg/m^3)	Ultraviolet Fluorescence	75 ppb (196 μg/m^3)	—	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)9
	3 Hour	—		—	0.5 ppm (1300 μg/m^3)	

82 USEPA, NAAQS Table, https://www.epa.gov/criteria-air-pollutants/naaqs-table. Accessed September 2019.

Pollutant	Average Time	California Standards[a]		National Standards[b]		
		Concentration[c]	Method[d]	Primary[c,e]	Secondary[c,f]	Method[g]
	24 Hour	0.04 ppm ($105 \mu g/m^3$)		0.14 ppm (for certain areas)j	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas) j	—	
PM10[k]	24 Hour	$50 \mu g/m^3$	Gravimetric or Beta Attenuation	$150 \mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	$20 \mu g/m^3$		—		
PM2.[k]	24 Hour	No Separate State Standard		$35 \mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	$12 \mu g/m^3$	Gravimetric or Beta Attenuation	$12.0 \mu g/m^3$ k	$15 \mu g/m^3$	
Lead[l,m]	30 Day Average	$1.5 \mu g/m^3$	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		$1.5 \mu g/m^3$ (for certain areas)m	Same as Primary Standard	
	Rolling 3-Month Average[m]	--		$0.15 \mu g/m^3$		
Visibility Reducing Particles[n]	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of 10 miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates (SO_4)	24 Hour	$25 \mu g/m^3$	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm ($42 \mu g/m^3$)	Ultraviolet Fluorescence			
Vinyl Chloride[l]	24 Hour	0.01 ppm ($26 \mu g/m^3$)	Gas Chromatography			

a California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, 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.

b National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 micrograms/per cubic meter ($\mu g/m^3$) 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.

c 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 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

d Any equivalent procedure which can be shown to the satisfaction of the California Air Resources Board to give equivalent results at or near the level of the air quality standard may be used.

e National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

f National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

g Reference method as described by the USEPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the USEPA.

Pollutant	Average Time	California Standards[a]		National Standards[b]		
		Concentration[c]	Method[d]	Primary[c,e]	Secondary [c,f]	Method[g]

h On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
i To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
j 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 non-attainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
k On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3.
l The California Air Resources Board 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.
m The national standard for lead was revised on October 15, 2008 to a rolling three-month average. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated non-attainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
n In 1989, the California Air Resources Board 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, Ambient Air Quality Standards (5/4/16). Available: https://ww3.arb.ca.gov/research/aaqs/aaqs2.pdf. Accessed September 2019.

Table 4, *South Coast Air Basin Attainment Status (Los Angeles County)*, shows the attainment status of the Air Basin for each criteria pollutant. As shown in **Table 4**, the Air Basin is designated under federal or state ambient air quality standards as nonattainment for ozone (O_3), respirable particulate matter (PM10), and fine particulate matter (PM2.5). The Los Angeles County portion of the Air Basin is designated as nonattainment for the federal lead standard; however, this was due to localized emissions from 2 lead-acid battery recycling facilities in the city of Vernon and the city of Industry that are no longer operating.[83]

As shown in **Table 4**, the Air Basin is designated under federal or state ambient air quality standards as nonattainment for ozone, PM10, and fine particulate matter PM2.5. The Los Angeles County portion of the Air Basin is designated as nonattainment for the federal lead standard; however, this is due to localized emissions from two lead-acid battery recycling facilities in the City of Vernon and the City of Industry that are no longer operating. [84]

As detailed in the AQMP, the major sources of air pollution in the Air Basin are divided into four major source classifications: point, and area stationary sources, and on-road and off-road mobile sources. Point and area sources are the two major subcategories of stationary sources.[85] Point sources are permitted facilities that contain one or more emission sources at an identified location (e.g., power plants, refineries, emergency generator exhaust stacks). Area sources consist of many small emission sources (e.g., residential water heaters, architectural coatings, consumer products, restaurant charbroilers and permitted sources such as large boilers) which are distributed across

83 South Coast Air Quality Management District, Board Meeting, Agenda No. 30, Adopt the 2012 Lead State Implementation Plan for Los Angeles County, May 4, 2012.

84 SCAQMD, Board Meeting, Agenda No. 30, Adopt the 2012 Lead State Implementation Plan for Los Angeles County, May 4, 2012.

85 SCAQMD, 2016 AQMP, page 3-32.

the region. Mobile sources consist of two main subcategories: On-road sources (such as cars and trucks) and off-road sources (such as heavy construction equipment).

TABLE 4
SOUTH COAST AIR BASIN ATTAINMENT STATUS (LOS ANGELES COUNTY)

Pollutant	National Standards (NAAQS)	California Standards (CAAQS)
O_3 (1-hour standard)	N/A [a]	Non-attainment – Extreme
O_3 (8-hour standard)	Non-attainment – Extreme	Non-attainment
CO	Attainment	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
PM10	Attainment	Non-attainment
PM2.5	Non-attainment – Serious	Non-attainment
Lead (Pb)	Non-attainment (Partial) [b]	Attainment
Visibility Reducing Particles	N/A	Unclassified
Sulfates	N/A	Attainment
Hydrogen Sulfide	N/A	Unclassified
Vinyl Chloride [c]	N/A	N/A

N/A = not applicable

[a] The NAAQS for 1-hour ozone was revoked on June 15, 2005, for all areas except Early Action Compact areas.
[b] Partial Non-attainment designation – Los Angeles County portion of the Air Basin only for near-source monitors.
[c] In 1990, the California Air Resources Board identified vinyl chloride as a toxic air contaminant and determined that it does not have an identifiable threshold. Therefore, the California Air Resources Board does not monitor or make status designations for this pollutant.

SOURCE: USEPA, The Green Book Non-Attainment Areas for Criteria Pollutants, https://www.epa.gov/green-book; CARB, Area Designations Maps/State and National, https://ww3.arb.ca.gov/desig/adm/adm.htm. Accessed September 2019.

2.2 State

California Air Resources Board

The California Clean Air Act (CCAA), signed into law in 1988, requires all areas of California to achieve and maintain the CAAQS. CARB, a part of the California Environmental Protection Agency, is responsible for the coordination and administration of both federal and state air pollution control programs within California. In this capacity, CARB conducts research, sets the CAAQS, compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB establishes emissions standards for motor vehicles sold in California, consumer products (such as hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions. CARB has primary responsibility for the development of California's SIP, for which it works closely with the federal government and the local air districts. The SIP is required for the state to take over implementation of the federal CAA from USEPA.

California Clean Air Act

The California Clean Air Act, signed into law in 1988, requires all areas of the state to achieve and maintain the CAAQS by the earliest practical date. The CAAQS are established to protect the health of the most sensitive groups and apply to the same criteria pollutants as the federal Clean Air Act and also includes State-identified criteria pollutants, which are sulfates, visibility-reducing particles, hydrogen sulfide, and vinyl chloride.[86] CARB has primary responsibility for ensuring the implementation of the California Clean Air Act,[87] responding to the federal Clean Air Act planning requirements applicable to the state, and regulating emissions from motor vehicles and consumer products within the state.

Health and Safety Code Section 39607(e) requires CARB to establish and periodically review area designation criteria. Table 4 provides a summary of the attainment status of the Los Angeles County portion of the Air Basin with respect to the state standards. The Air Basin is designated as attainment for the California standards for sulfates and unclassified for hydrogen sulfide and visibility-reducing particles. The Air Basin is currently in non-attainment for O_3, PM10, and PM2.5 under the CAAQS. Since vinyl chloride is a carcinogenic toxic air contaminant, CARB does not classify attainment status for this pollutant.

California Code of Regulations

The California Code of Regulations (CCR) is the official compilation and publication of regulations adopted, amended or repealed by the state agencies pursuant to the Administrative Procedure Act. The CCR includes regulations that pertain to air quality emissions. Specifically, Section 2485 in Title 13 of the CCR states that the idling of all diesel-fueled commercial vehicles (weighing over 10,000 pounds) during construction shall be limited to five minutes at any location. In addition, Section 93115 in Title 17 of the CCR states that operations of any stationary, diesel-fueled, compression-ignition engines shall meet specified fuel and fuel additive requirements and emissions standards.

California Air Resources Board On-Road and Off-Road Vehicle Rules

In 2004, CARB adopted an Airborne Toxic Control Measure (ATCM) to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel PM and other TACs (Title 13 California Code of Regulations [CCR], Section 2485). The measure applies to diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds that are licensed to operate on highways, regardless of where they are registered. This measure does not allow diesel-fueled commercial vehicles to idle for more than five minutes at any given time.

In 2008 CARB approved the Truck and Bus regulation to reduce NO_X, PM10, and PM2.5 emissions from existing diesel vehicles operating in California (13 CCR, Section 2025). The requirements were amended to apply to nearly all diesel-fueled trucks and busses with a gross

[86] CARB, California Ambient Air Quality Standards (CAAQS), last reviewed August 10, 2017.
[87] Chapter 1568 of the Statutes of 1988.

vehicle weight rating (GVWR) greater than 14,000 pounds. For the largest trucks in the fleet, those with a GVWR greater than 26,000 pounds, there are 2 methods to comply with the requirements. The first method is for the fleet owner to retrofit or replace engines, starting with the oldest engine model year, to meet 2010 engine standards, or better. This is phased over 8 years, starting in 2015 and would be fully implemented by 2023, meaning that all trucks operating in the State subject to this option would meet or exceed the 2010 engine emission standards for NO_X and PM by 2023. The second method, if chosen, required fleet owners, starting in 2012, to retrofit a portion of their fleet with diesel particulate filters achieving at least 85 percent removal efficiency, with installation of DPFs for their entire fleet by January 1, 2016. However, DPFs do not typically lower NO_X emissions. Thus, fleet owners choosing the second option must still comply with the 2010 engine emission standards for their trucks and busses by 2020.

In addition to limiting exhaust from idling trucks, CARB also recently promulgated emission standards for off-road diesel construction equipment of greater than 25 horsepower such as bulldozers, loaders, backhoes and forklifts, as well as many other self-propelled off-road diesel vehicles. The regulation adopted by the CARB on July 26, 2007, aims to reduce emissions by the installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission controlled models (13 CCR, Section 2449). Implementation is staggered based on fleet size (which is the total of all off-road horsepower under common ownership or control), with the largest fleets to begin compliance in 2014, medium fleets in 2017, and small fleets in 2019. Each fleet must demonstrate compliance through one of two methods. The first option is to calculate and maintain fleet average emissions targets, which encourages the retirement or repowering of older equipment and rewards the introduction of newer cleaner units into the fleet. The second option is to meet the Best Available Control Technology (BACT) requirements by turning over or installing Verified Diesel Emission Control Strategies (VDECS) on a certain percentage of its total fleet horsepower. The compliance schedule requires that BACT turn overs or retrofits (VDECS installation) be fully implemented by 2023 in all equipment for large and medium fleets and by 2028 for small fleets.

Toxic Air Contaminants

The California Air Toxics Program was established in 1983, when the California Legislature adopted Assembly Bill (AB) 1807 to establish a two-step process of risk identification and risk management to address potential health effects from exposure to toxic substances in the air. In the risk identification step, CARB and OEHHA determine if a substance should be formally identified, or "listed", as a TAC in California. inception of the program, a number of such substances have been listed (www.arb.ca.gov/toxics.id/taclist.htm). In 1993, the California Legislature amended the program to identify the 189 federal hazardous air pollutants (HAPs) as TACs. The SCAQMD has not adopted guidance applicable to land use projects that requires a quantitative health risk assessments be performed for construction exposures to TAC emissions.[88]

88 SCAQMD, Final Environmental Assessment for: Proposed Amended Rule 307.1 – Alternative Fees for Air Toxics Emissions Inventory; Proposed Amended Rule 1401 – New Source Review of Toxic Air Contaminants; Proposed Amended Rule 1402 – Control of Toxic Air Contaminants from Existing Sources; SCAQMD Public Notification

The SCAQMD states that: "SCAQMD currently does not have guidance on construction Health Risk Assessments."[89]

In the risk management step, CARB reviews emission sources of an identified TAC to determine whether regulatory action is needed to reduce risk. Based on the results of that review, CARB has promulgated a number of ATCMs, both for mobile and stationary sources. As discussed above, in 2004, CARB adopted an ATCM to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to DPM and other TACs. The measure applies to diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds that are licensed to operate on highways, regardless of where they are registered. This measure does not allow diesel-fueled commercial vehicles to idle for more than five minutes at any given time.

In addition to limiting exhaust from idling trucks, as discussed above, CARB promulgated emission standards for off-road diesel construction equipment such as bulldozers, loaders, backhoes, and forklifts, as well as many other self-propelled off-road diesel vehicles. The regulation, adopted by CARB on July 26, 2007, aims to reduce emissions by the installation of diesel particulate filters and encouraging the replacement of older, dirtier engines with newer emission controlled models. Implementation is staggered based on fleet size, with the largest operators beginning compliance in 2014.

The AB 1807 program is supplemented by the AB 2588 Air Toxics "Hot Spots" program, which was established by the California Legislature in 1987. Under this program, facilities are required to report their air toxics emissions, assess health risks, and notify nearby residents and workers of significant risks if present. In 1992, the AB 2588 program was amended by Senate Bill (SB) 1731 to require facilities that pose a significant health risk to the community to reduce their risk through implementation of a risk management plan.

2.3 Regional

South Coast Air Quality Management District (SCAQMD)

The SCAQMD is primarily responsible for planning, implementing, and enforcing air quality standards for the South Coast Air Basin (Air Basin) which includes all of Orange County, Los Angeles County (excluding the Antelope Valley portion), the western, non-desert portion of San Bernardino County, and the western Coachella Valley and San Gorgonio Pass portions of Riverside County. The Air Basin is an approximately 6,745-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 Air Basin is a subregion within the western portion of the SCAQMD jurisdiction. While air quality in the Air Basin has improved, the Air Basin requires continued

Procedures for Facilities Under the Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) and Rule 1402.

89 SCAQMD Guidelines for Participating in the Rule 1402 Voluntary Risk, page 2-23, September 2016, http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2016/final-ea_par-307-1_1401_1402.pdf?sfvrsn=4. Accessed September 2019.

diligence to meet the air quality standards. While air quality in the Air Basin has improved, the Air Basin requires continued diligence to meet the air quality standards.

Air Quality Management Plan

The SCAQMD has adopted a series of Air Quality Management Plans (AQMPs) to meet the CAAQS and NAAQS. The 2012 AQMP incorporates scientific and technological information and planning assumptions, including regional growth projections[90] to achieve federal standards for air quality in the Air Basin. The 2012 AQMP incorporates a comprehensive strategy aimed at controlling pollution from all sources, including stationary sources, and on-road and off-road mobile sources. The 2012 AQMP includes new and changing federal requirements, implementation of new technology measures, and the continued development of economically sound, flexible compliance approaches. Additionally, the 2012 AQMP highlights the significant amount of emission reductions needed and the urgent need to identify additional strategies, especially in the area of mobile sources, to meet all federal criteria pollutant standards within the timeframes allowed under the federal CAA.

The key undertaking of the 2012 AQMP is to bring the Air Basin into attainment with the NAAQS for the 24-hour PM2.5 standard. The 2012 AQMP also intensifies the scope and pace of continued air quality improvement efforts toward meeting the 2024 8-hour O_3 standard deadline with new measures designed to reduce reliance on the federal CAA Section 182(e)(5) long-term measures for NO_X and VOC reductions. The SCAQMD expects exposure reductions to be achieved through implementation of new and advanced control technologies, as well as improvement of existing technologies.

The control measures in the 2012 AQMP consist of 4 components: (1) Basin-wide and Episodic Short-term PM2.5 Measures; (2) Contingency Measures; (3) 8-hour Ozone Implementation Measures; and (4) Transportation and Control Measures provided by the Southern California Association of Governments (SCAG). The Plan includes eight short-term $PM_{2.5}$ control measures, 16 stationary source 8-hour ozone measures, 10 early-action measures for mobile sources and 7 early-action measures to accelerate near-zero and zero emission technologies for goods movement-related sources, and 5 on-road and 5 off-road mobile source control measures. In general, SCAQMD's control strategy for stationary and mobile sources is based on the following approaches: (1) available cleaner technologies; (2) best management practices; (3) incentive programs; (4) development and implementation of zero- and near-zero technologies and vehicles and control methods; and (5) emission reductions from mobile sources. Control strategies in the AQMP with potential applicability to reducing short-term emissions from construction activities associated with the Project include strategies denoted in the AQMP as ONRD-04 and OFFRD-01, which are intended to reduce emissions from on-road and off-road heavy-duty vehicles and equipment.[91] Descriptions of measures ONRD-04 and OFFRD-01 are provided below:

> **ONRD-04 – Accelerated Retirement of Older On-Road Heavy-Duty Vehicles:** This measure seeks to replace up to 1,000 heavy-duty vehicles per year with newer or new

90 SCAQMD, 2012 Air Quality Management Plan (AQMP), 2013, http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan. Accessed March 2019.

91 SCAQMD, 2012 AQMP.

vehicles that at a minimum, meet the 2010 on-road heavy-duty NO_X exhaust emissions standard of 0.2 grams per brake horsepower-hour (g/bhp-hr).

OFFRD-01 – Extension of the Soon Provision for Construction/Industrial Equipment: This measure continues the Surplus Off-Road Option for NO_X (SOON) provision of the statewide In-Use Off-Road Fleet Vehicle Regulation beyond 2014 through the 2023 timeframe.

The SCAQMD Governing Board adopted the 2016 AQMP on March 3, 2017.[92] CARB approved the 2016 AQMP on March 23, 2017.[93] Key elements of the 2016 AQMP include implementing fair-share emissions reductions strategies at the federal, State, and local levels; establishing partnerships, funding, and incentives to accelerate deployment of zero and near-zero-emissions technologies; and taking credit from co-benefits from greenhouse gas, energy, transportation and other planning efforts.[94] The strategies included in the 2016 AQMP are intended to demonstrate attainment of the NAAQS, which are set at levels considered safe to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly with a margin of safety; and to protect public welfare, including against decreased visibility and damage to animals, crops, vegetation, and buildings,[95] for the federal non-attainment pollutants ozone and PM2.5 while accounting for regional growth, increasing development, and maintaining a healthy economy.[96] While the 2016 AQMP has been adopted by SCAQMD and CARB, it has not yet received USEPA approval for inclusion in the SIP. Therefore, until such time as the 2016 AQMP has been approved by USEPA, the 2012 AQMP remains the applicable AQMP for federal purposes; however, the 2016 AQMP is used in the analyses in this section, since it has been adopted by both SCAQMD and CARB. The 2016 AQMP incorporates the above-listed 2012 AQMP control strategies, which are designated as MOB-08 and MOB-10.[97]

SCAQMD Air Quality Guidance Documents

The SCAQMD published the *CEQA Air Quality Handbook* to provide local governments with guidance for analyzing and mitigating project-specific air quality impacts.[98] The *CEQA Air Quality Handbook* provides standards, methodologies, and procedures for conducting air quality analyses in EIRs and was used extensively in the preparation of this analysis. However, the SCAQMD is currently in the process of replacing the *CEQA Air Quality Handbook* with the *Air Quality Analysis Guidance Handbook*. While this process is underway, the SCAQMD recommends that lead agencies avoid using the screening tables in Chapter 6 (Determining the

92 SCAQMD, 2016 AQMP, http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan. Accessed September 2019.

93 CARB, News Release - CARB establishes next generation of emission controls needed to improve state's air quality, https://ww2.arb.ca.gov/news/carb-establishes-next-generation-emission-controls-needed-improve-states-air-quality. Accessed September 2019.

94 SCAQMD, 2016 AQMP.

95 USEPA, NAAQS Table, https://www.epa.gov/criteria-air-pollutants/naaqs-table. Accessed September 2019.

96 SCAQMD, NAAQS/CAAQS and Attainment Status for South Coast Air Basin, 2016, http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/naaqs-caaqs-feb2016.pdf?sfvrsn=2. Accessed September 2019.

97 SCAQMD, 2016 AQMP.

98 SCAQMD, CEQA Air Quality Handbook 1993, http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/ceqa-air-quality-handbook-(1993). Accessed September 2019.

Air Quality Significance of a Project) and the on-road mobile source emission factors in Table A9-5-J1 through A9-5 of the Handbook as they are outdated.

The SCAQMD instead recommends using other approved models to calculate emissions from land use projects, such as the California Emissions Estimator Model (CalEEMod) software, which is a model developed for CAPCOA in collaboration with the California Air Districts, which is a Statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions from a variety of land use projects.

The SCAQMD has also adopted land use planning guidelines in its *Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning*, which considers impacts to sensitive receptors from facilities that emit TAC emissions.[99] SCAQMD's general land use siting distance recommendations are the same as those provided by CARB (e.g., a 500-foot siting distance for sensitive land uses proposed in proximity to freeways and high-traffic roads, a 1,000-foot siting distance for sensitive land uses proposed in proximity to a major service and maintenance rail yard, and the same siting criteria for distribution centers and dry cleaning facilities). The SCAQMD's document introduces land use-related policies that rely on design and distance parameters to minimize emissions and lower potential health risk. SCAQMDs guidelines are voluntary initiatives recommended for consideration by local planning agencies.

The SCAQMD has published a guidance document called the *Final Localized Significance Threshold Methodology* for CEQA Evaluations that is intended to provide guidance when evaluating the localized effects from mass emissions during construction.[100] The SCAQMD adopted additional guidance regarding PM2.5 emissions in a document called *Final Methodology to Calculate Particulate Matter (PM)2.5 and PM2.5 Significance Thresholds*.[101] This latter document has been incorporated by the SCAQMD into its CEQA significance thresholds and *Final Localized Significance Threshold Methodology*.

SCAQMD has adopted two rules to limit cancer and non-cancer health risks from facilities located within its jurisdiction. Rule 1401 (New Source Review of Toxic Air Contaminants) regulates new or modified facilities, and Rule 1402 (Control of Toxic Air Contaminants from Existing Sources) regulates facilities that are already operating. Rule 1402 incorporates the requirements of the AB 2588 program, including implementation of risk reduction plans for significant risk facilities.

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99 SCAQMD, Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning, 2005, http://www.aqmd.gov/docs/default-source/planning/air-quality-guidance/complete-guidance-document.pdf?sfvrsn=4. Accessed September 2019.

100 SCAQMD, Final Localized Significance Threshold Methodology, 2008, http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds. Accessed September 2019.

101 SCAQMD, Final Methodology to Calculate Particulate Matter (PM)2.5 and PM2.5 Significance Thresholds, 2006, http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/pm-2-5-significance-thresholds-and-calculation-methodology. Accessed September 2019.

SCAQMD Rules and Regulations

The SCAQMD has adopted many rules and regulations to regulate sources of air pollution in the Air Basin and to help achieve air quality standards. The Project may be subject to the following SCAQMD rules and regulations:

Regulation IV – Prohibitions: This regulation sets forth the restrictions for visible emissions, odor nuisance, fugitive dust, various air emissions, fuel contaminants, start-up/shutdown exemptions and breakdown events. The following is a list of rules which apply to the Project:

> **Rule 401 – Visible Emissions:** This rule states that a person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than three minutes in any one hour which is as dark or darker in shade as that designated No. 1 on the Ringelmann Chart or of such opacity as to obscure an observer's view.
>
> **Rule 402 – Nuisance:** This rule states that a person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.
>
> **Rule 403 – Fugitive Dust:** This rule requires projects to prevent, reduce or mitigate fugitive dust emissions from a site. Rule 403 restricts visible fugitive dust to the project property line, restricts the net PM10 emissions to less than 50 micrograms per cubic meter ($\mu g/m^3$) and restricts the tracking out of bulk materials onto public roads. Additionally, projects must utilize one or more of the best available control measures (identified in the tables within the rule). Control measures may include adding freeboard to haul vehicles, covering loose material on haul vehicles, watering or using non-toxic chemical stabilizers to prevent the generation of visible dust plumes, limiting vehicle speeds to 15 miles per hour on unpaved surfaces, and/or ceasing all activities. Finally, a contingency plan may be required if so determined by USEPA.

Regulation XI – Source Specific Standards: Regulation XI sets emissions standards for specific sources. The following is a list of rules which may apply to the Project:

> **Rule 1113 – Architectural Coatings:** This rule requires manufacturers, distributors, and end users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.
>
> **Rule 1138 – Control of Emissions from Restaurant Operations:** This rule specifies PM and VOC emissions and odor control requirements for commercial cooking operations that use chain-driven charbroilers to cook meat.
>
> **Rule 1146.1 – Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters:** This rule requires manufacturers, distributors, retailers, refurbishers, installers, and operators of new and existing units to reduce NO_X emissions from natural gas-fired boilers, steam generators, and process heaters as defined in this rule.

Rule 1146.2 – Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters: This rule requires manufacturers, distributors, retailers, refurbishers, installers, and operators of new and existing units to reduce NO_X emissions from natural gas-fired water heaters, boilers, and process heaters as defined in this rule.

Rule 1186 – PM10 Emissions from Paved and Unpaved Roads, and Livestock Operations: This rule applies to owners and operators of paved and unpaved roads and livestock operations. The rule is intended to reduce PM10 emissions by requiring the cleanup of material deposited onto paved roads, use of certified street sweeping equipment, and treatment of high-use unpaved roads (see also Rule 403).

Regulation XIV – Toxics and Other Non-Criteria Pollutants: Regulation XIV sets requirements for new permit units, relocations, or modifications to existing permit units which emit toxic air contaminants or other non-criteria pollutants. The following is a list of rules which may apply to the Project:

Rule 1403 – Asbestos Emissions from Demolition/Renovation Activities: This rule requires owners and operators of any demolition or renovation activity and the associated disturbance of asbestos-containing materials, any asbestos storage facility, or any active waste disposal site to implement work practice requirements to limit asbestos emissions from building demolition and renovation activities, including the removal and associated disturbance of asbestos-containing materials.

Southern California Association of Governments

SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino and Imperial Counties, and addresses regional issues relating to transportation, the economy, community development and the environment. SCAG is the federally designated Metropolitan Planning Organization (MPO) for the majority of the Southern California region, and is the largest MPO in the nation.

Pursuant to Health & Safety Code Section 40460, SCAG is responsible for preparing and approving the portions of the AQMP relating to regional demographic projections and integrated regional land use, housing, employment and transportation programs, measures and strategies.[102] With regard to air quality planning, SCAG adopted the *2016 Regional Transportation Plan/Sustainable Communities Strategy* (2016 RTP/SCS) in April 2016, which contains such regional development and growth forecasts. These regional development and growth forecasts form the basis for the land use and transportation control portions of the 2016 AQMP, and its growth forecasts were utilized in the preparation of the air quality forecasts and consistency analysis included in the 2016 AQMP.[103] Both the RTP/SCS and the AQMP are based on projections that originate with local jurisdictions.

SCAG is required to adopt an SCS along with its RTP pursuant to Senate Bill (SB) 375 (Chapter 728, Statutes of 2008), which required the development of regional targets for reducing passenger vehicle greenhouse gas (GHG) emissions. Under SB 375, CARB is required, in consultation with the state's MPOs, to set regional GHG reduction targets for the passenger vehicle and light-duty

[102] SCAQMD, 2016 AQMP, page 4-42.
[103] SCAQMD, 2016 AQMP, page 4-42.

truck sector for 2020 and 2035. In February 2011, CARB adopted the final GHG emissions reduction targets for SCAG, within whose jurisdiction the City of Culver City is located. SCAG's target is a per capita reduction of 8 percent for 2020 and 13 percent for 2035 compared to the 2005 baseline.[104] SCAG's 2016 RTP/SCS meets or exceeds these targets, lowering GHG emissions (below 2005 levels) by eight percent by 2020; 18 percent by 2035; and 21 percent by 2040.[105] Of note, the proposed reduction targets explicitly exclude emission reductions expected from AB 1493 and the low carbon fuel standard regulations. Compliance with and implementation of 2016 RTP/SCS policies and strategies would also reduce per capita criteria air pollutant emissions due to reduced per capita vehicle miles traveled (VMT). However, in regards to per capita VMT, CARB determined that the currently adopted SCSs, including SCAG's 2016 RTP/SCS, in aggregate, would achieve a nearly 18 percent reduction in statewide per capita on-road light-duty transportation-related GHG emissions relative to 2005 by 2035, and would not be enough to reach the SB 375 reduction target. CARB determined the full reduction needed to meet the State's climate goals is an approximately 25 percent reduction in statewide per capita on-road light-duty transportation-related GHG emissions by 2035 relative to 2005 in order to reach the SB 375 reduction target in 2035.[106] The next iteration of the SCAG RTP/SCS would be expected to incorporate the updated per capita VMT targets.

SCAG's SCS is "built on a foundation of contributions from communities, cities, counties and other local agencies" and "based on local general plans as well as input from local governments."[107] The SCS provides specific strategies for successful implementation. These strategies include supporting projects that encourage infill development, diverse job opportunities for a variety of skills and education, recreation, cultures, and a full-range of shopping, entertainment and services all within a relatively short distance; encouraging employment development around current and planned transit stations and neighborhood commercial centers. The 2016 RTP/SCS emphasizes the importance of focusing on high density development in High Quality Transit Areas (HQTAs) that allows for high quality housing with consideration of urban design, construction and durability, and potential increased ridership on important public transit investments, and can help the region achieve greater mobility, an improved economy and sustainable growth.[108]

2.4 Local

Local jurisdictions, such as the City of Culver City, have the authority and responsibility to reduce air pollution through its police power and decision-making authority. The City reviews project plans for consistency with environmental regulations and other conditions applicable to proposed development. The City is also responsible for the implementation of transportation

104 Southern California Association of Governments (SCAG), 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS), 2016, page 8, http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf. Accessed September 2019.

105 SCAG, 2016 RTP/SCS, page 153.

106 CARB, California Air Resources Board 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals, 2019, page 3, https://ww2.arb.ca.gov/sites/default/files/2019-01/2017_sp_vmt_reductions_jan19.pdf.

107 SCAG, 2016 RTP/SCS, page 75.

108 SCAG, 2016 RTP/SCS, page 8.

control measures as outlined in the AQMP. Examples of such measures include bus turnouts, energy-efficient streetlights, and synchronized traffic signals. In accordance with CEQA, the City has the authority to obtain input from other local agencies and may consult with any person with special expertise relating to the Project environmental impacts to assess air quality impacts of new development projects. If significant impacts are found, the City has the authority to require mitigation of potentially significant air quality impacts by conditioning discretionary permits and monitors and enforces implementation of such mitigation measures.

The City's General Plan was originally adopted in 1995 and is periodically amended as the City grows in population and physical development. The current General Plan does not have an Air Quality Element. However, the Circulation Element of the General Plan contains objectives and policies focused on public transit (Objective #2), bikeways (Objective #3), pedestrian access (Objective #4), participating in regional system improvements (Implementation Measure #1), and roadway improvement (Implementation Measure #2). Consistency with these goals and policies have the potential to reduce single occupancy vehicle trips and vehicle miles traveled (VMT), thus reducing air pollutants from mobile sources. The growth projections within the General Plan inform the development of SCAQMD's AQMP.

In 2009, the City adopted the Green Building program which contains a number of features that would indirectly reduce air pollution emissions through features such as enhanced building insulation, low-flow fixtures, efficient lighting and HVAC systems.

SECTION 3
Thresholds of Significance

The significance thresholds below are derived from the Environmental Checklist question in Appendix G of the *State CEQA Guidelines*. Accordingly, a significant air quality impact would occur if the Project would:

a) **Conflict with or obstruct implementation of the applicable air quality plan;**

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

c) **Expose sensitive receptors to substantial pollutant concentrations; or**

d) **Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.**

Pursuant to the State CEQA Guidelines (Section 15064.7), a lead agency may consider using, when available, the significance criteria established by the applicable air quality management district or air pollution control district when making determinations of significance. The Project would be under the SCAQMD's jurisdiction. SCAQMD has established air quality significance thresholds in its CEQA Air Quality Handbook. These thresholds are based on the recognition that the Air Basin is a distinct geographic area with a critical air pollution problem for which ambient air quality standards have been promulgated to protect public health.[109] The potential air quality impacts of the Project are, therefore, evaluated according to the most recent thresholds adopted by the SCAQMD in connection with its CEQA Air Quality Handbook, Air Quality Analysis Guidance Handbook, and subsequent SCAQMD guidance as discussed previously.[110] As stated above, the SCAQMD has stated that these thresholds are based on the recognition that the Air Basin is a distinct geographic area with a critical air pollution problem for which ambient air quality standards have been promulgated to protect public health.[111]

[109] South Coast Air Quality Management District, CEQA Air Quality Handbook, p. 6-2, 1993.

[110] While the SCAQMD CEQA Air Quality Handbook contains significance thresholds for lead, Project construction and operation would not include sources of lead emissions and would not exceed the established thresholds for lead. Unleaded fuel and unleaded paints have virtually eliminated lead emissions from commercial and residential land use projects such as the Project. As a result, lead emissions are not further evaluated in this Draft EIR.

[111] South Coast Air Quality Management District, CEQA Air Quality Handbook, p. 6-2, 1993.

3.1 Consistency with Air Quality Plans and Policies

The Project would have a significant impact if it would:

- Substantially conflict with or obstruct implementation of relevant air quality policies in the AQMP or the General Plan or other adopted regional and local plans adopted for reducing air quality impacts.

Evaluating whether the Project would conflict with or obstruct implementation of the applicable air quality plan is based on consistency with applicable control measures and policies adopted for the purpose of reducing air pollutant emissions and associated impacts.

3.2 Construction Emissions

Based on the most recently adopted significance thresholds in the SCAQMD *CEQA Air Quality Handbook,* the Project would potentially cause or contribute to an exceedance of an air quality standard if the following would occur:

- Regional construction emissions from both direct and indirect sources would exceed any of the following SCAQMD prescribed daily regional emissions thresholds:[112]
  - 75 pounds a day for VOC;
  - 100 pounds per day for NO_X;
  - 550 pounds per day for CO;
  - 150 pounds per day for SO_2;
  - 150 pounds per day for PM10; or
  - 55 pounds per day for PM2.5.

In addition, the SCAQMD has developed a methodology to assess the potential for localized emissions to cause an exceedance of applicable ambient air quality standards or ambient concentration limits. Impacts would be considered significant if the following would occur:

- Maximum daily localized emissions of NO_X and/or CO during construction are greater than the applicable localized significance thresholds, resulting in predicted ambient concentrations in the vicinity of the Project Site greater than the most stringent ambient air quality standards for NO_2 and/or CO.[113]
- Maximum daily localized emissions of PM10 and/or PM2.5 during construction are greater than the applicable localized significance thresholds, resulting in predicted ambient

[112] South Coast Air Quality Management District, SCAQMD Air Quality Significance Thresholds, 2015, http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. Accessed September 2019.

[113] South Coast Air Quality Management District, Final Localized Significance Threshold Methodology, 2008. Available: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds. Accessed September 2019.

concentrations in the vicinity of the Project Site to exceed 10.4 $\mu g/m^3$ over 24 hours (SCAQMD Rule 403 control requirement).

As discussed previously, the SCAQMD has established screening criteria that can be used to determine the maximum allowable daily emissions that would satisfy the localized significance thresholds and therefore not cause or contribute to an exceedance of the applicable ambient air quality standards or ambient concentration limits without Project-specific dispersion modeling. This analysis uses these screening criteria to evaluate potential impacts from the Project's localized construction emissions.

3.3 Operational Emissions

The significance thresholds of significance, below, are the most recently adopted indicators in the SCAQMD *Air Quality Handbook* for determining the significance of operational emissions. The SCAQMD has established numerical indicators as significance thresholds based, in part, on Section 182(e) of the CAA, which sets 10 tons per year of VOC as a significance level for stationary source emissions in extreme non-attainment areas for ozone.[114] As shown in Table 4, the Air Basin is designated as extreme non-attainment for ozone. The SCAQMD converted this significance level to pounds per day for ozone precursor emissions (10 tons per year × 2,000 pounds per ton ÷ 365 days per year = 55 pounds per day). The significance thresholds for other pollutants are also based on federal stationary source significance levels. SCAQMD's numeric emission indicators are based on the recognition that the Air Basin is a distinct geographic area with a critical air pollution problem for which ambient air quality standards have been promulgated to protect public health.[115] Based on the indicators in the SCAQMD *CEQA Air Quality Handbook,* the Project would potentially cause or contribute to an exceedance of an air quality standard if the following would occur:

- Regional operational emissions exceed any of the following SCAQMD prescribed daily regional emissions thresholds:[116]
  - 55 pounds a day for VOC;
  - 55 pounds per day for NO_X;
  - 550 pounds per day for CO;
  - 150 pounds per day for SO_2;
  - 150 pounds per day for PM10; or
  - 55 pounds per day for PM2.5.

114 SCAQMD, CEQA Air Quality Handbook, p. 6-1, 1993.
115 SCAQMD, CEQA Air Quality Handbook, p. 6-2, 1993.
116 South Coast Air Quality Management District, SCAQMD Air Quality Significance Thresholds, 2015, http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. Accessed September 2019.

In addition, the SCAQMD has developed a methodology to assess the potential for localized emissions to cause an exceedance of applicable ambient air quality standards. Impacts would be considered significant if the following were to occur:

- Maximum daily localized emissions of NO_X and/or CO during operation are greater than the applicable localized significance thresholds, resulting in predicted ambient concentrations in the vicinity of the project site greater than the most stringent ambient air quality standards for NO_2 and/or CO.[117]
- Maximum daily localized emissions of PM10 and/or PM2.5 during operation are greater than the applicable localized significance thresholds, resulting in predicted ambient concentrations in the vicinity of the project site to exceed 2.5 $\mu g/m^3$ over 24 hours (SCAQMD Rule 1303 allowable change in concentration).

As discussed previously, the SCAQMD has established screening criteria that can be used to determine the maximum allowable daily emissions that would satisfy the localized significance thresholds and therefore not cause or contribute to an exceedance of the applicable ambient air quality standards or ambient concentration limits without Project-specific dispersion modeling. This analysis used the screening criteria to evaluate impacts from the Project's localized operational emissions.

3.4 Carbon Monoxide Hotspots

With respect to the formation of CO hotspots, the Project would be considered significant if the following would occur:

- The Project would cause or contribute to an exceedance of the CAAQS one-hour or eight-hour CO standards of 20 or 9.0 parts per million (ppm), respectively within one-quarter mile of a sensitive receptor.[118]

3.5 Toxic Air Contaminants

Based on criteria set forth by the SCAQMD, the project would expose sensitive receptors to substantial concentrations of toxic air contaminants if any of the following were to occur:[119]

- The Project would expose sensitive receptors to substantial concentrations of TACs if it emits carcinogenic materials or TACs that exceed the maximum incremental cancer risk of 10 in one million or a cancer burden greater than 0.5 excess cancer cases (in areas greater than or equal to one in one million) or an acute or chronic hazard index of 1.0.

As discussed further below in subsection 4, *Methodology,* construction and operational impacts from TACs are evaluated qualitatively due to the limited and minimal sources of TACs associated

117 South Coast Air Quality Management District, SCAQMD Air Quality Significance Thresholds, 2015.

118 The CAAQS are more conservative than the NAAQS (35 ppm for one-hour CO and 9.0 ppm for eight-hour CO).

119 South Coast Air Quality Management District, CEQA Air Quality Handbook, Chapter 6 (Determining the Air Quality Significance of a Project) and Chapter 10 (Assessing Toxic Air Pollutants), 1993; SCAQMD Air Quality Significance Thresholds, (March 2011), http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. Accessed September 2019.

with construction and operation of the proposed land uses and since there are no air quality-sensitive uses in the immediate vicinity of the Project Site.

3.6 Odors

With respect to odors, the Project would be considered significant if it created objectionable odors affecting a substantial number of people. Odor impacts are evaluated qualitatively due to the limited and minimal sources of odors associated with construction and operation of the proposed land uses and since there are no air quality-sensitive uses in the immediate vicinity of the Project Site.

SECTION 4
Methodology

The methodology to evaluate potential impacts to regional and local air quality that may result from the construction and long-term operations of the Project is conducted as follows. Detailed modeling calculations are provided in Appendices A through D provided at the end of this report.

4.1 Consistency with Air Quality Plan

The SCAQMD is required, pursuant to the CAA, to reduce emissions of criteria pollutants for which the Air Basin is in non-attainment of the NAAQS (e.g., ozone and PM2.5).[120] The SCAQMD's 2016 AQMP contains a comprehensive list of pollution control strategies directed at reducing emissions and achieving the five NAAQS related to these pollutants, including land use and transportation strategies from SCAG's 2016 RTP/SCS designed to reduce VMT.[121] The 2016 AQMP control strategies were developed, in part, based on regional growth projections prepared by SCAG.[122] For this reason, projects whose growth is consistent with the assumptions used in the 2016 AQMP will be deemed to be consistent with the 2016 AQMP because their growth has already been included in the growth projections utilized in the formulation of the control strategies in the 2016 AQMP. Thus, emissions from projects, uses, and activities that are consistent with the applicable growth projections and control strategies used in the development of the 2016 AQMP would not jeopardize attainment of the air pollutant reduction goals identified in the AQMP even if their emissions exceed the SCAQMD's significance thresholds.[123] As noted above, the 2016 AQMP has been adopted by the SCAQMD and CARB. Therefore, this analysis considers the Project's consistency with the 2016 AQMP. The Project's consistency with the 2016 AQMP is evaluated based on consistency with its applicable growth projections and emission control strategies.

120 The Los Angeles County portion of the Air Basin is designated as nonattainment for the federal lead standard; however, this was due to localized emissions from two lead-acid battery recycling facilities in the City of Vernon and the City of Industry that are no longer operating. For reference see South Coast Air Quality Management District, Board Meeting, Agenda No. 30, Adopt the 2012 Lead State Implementation Plan for Los Angeles County, May 4, 2012.

121 SCAQMD, 2016 AQMP, pages ES-6 and 4-42.

122 SCAQMD, 2016 AQMP, pages 4-42 to 4-44.

123 SCAQMD, CEQA Air Quality Handbook, p. 12-1, 1993.

4.2 Existing Site Emissions

Existing operational emissions (shown previously in **Table 1**, above) were estimated using CalEEMod, as described above. For mobile sources, the vehicle trips were obtained for the existing uses from the Project's TIA.[124]

Emissions from on-site natural gas combustion were based on usage data from the CEC's *California Commercial End Use Survey* (CEUS), which lists energy demand by building type.[125] Since 1978, the CEC has established building energy efficiency standards, which are updated periodically. The CEUS provides data on a limited statewide basis for different climate zones. Because CalEEMod applies correction factors to account for compliance with recent updates to the Title 24 Building Energy Efficiency Standards, energy demand is adjusted to account for assumed compliance with older Title 24 Building Energy Efficiency Standards, based on available conversion data.[126]

Other sources of emissions from existing uses include equipment used to maintain landscaping, such as lawnmowers and trimmers. The CalEEMod software uses landscaping equipment emission factors from the CARB off-road (OFFROAD) emissions factor model and the CARB *Technical Memo: Change in Population and Activity Factors for Lawn and Garden Equipment (6/13/2003)*.[127] The CalEEMod software assumes that landscaping equipment operates for 250 days per year in the Air Basin. Fugitive VOC emissions are based on consumer product usage factors provided by the SCAQMD within CalEEMod and architectural coating emission factors based on SCAQMD Rule 1113.

4.3 Construction Emissions

Construction of the Project has the potential to generate temporary criteria pollutant emissions through the use of heavy-duty construction equipment, such as excavators, and through vehicle trips generated from workers and haul trucks traveling to and from the Project Site. In addition, fugitive dust emissions would result from demolition and various soil-handling activities. Mobile source emissions, primarily NO_X, would result from the use of construction equipment such as dozers and loaders. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of construction activity, and prevailing weather conditions. The assessment of construction air quality impacts considers each of these potential sources.

Daily regional emissions during construction are forecasted by assuming a conservative estimate of construction activities (i.e., assuming all construction occurs at the earliest feasible date) and applying the mobile source and fugitive dust emissions factors. The emissions are estimated using CalEEMod, Version 2016.3.2 software, an emissions inventory software program recommended

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[124] Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.

[125] California Energy Commission, California Commercial End-Use Survey, http://capabilities.itron.com/CeusWeb/Chart.aspx. Accessed September 2019.

[126] CARB, CalEEMod User's Guide, Appendix E, Section 5, September 2016.

[127] CARB, OFFROAD Modeling Change Technical Memo: Change in Population and Activity Factors for Lawn and Garden Equipment, June 13, 2003, http://www.arb.ca.gov/msei/2001_residential_lawn_and_garden_changes_in_eqpt_pop_and_act.pdf. Accessed September 2019.

by the SCAQMD. CalEEMod is based on outputs from OFFROAD and EMFAC, which are emissions estimation models developed by CARB and used to calculate emissions from construction activities, including on- and off-road vehicles. The input values used in this analysis were adjusted to be Project-specific based on equipment types and the construction schedule. These values were then applied to the construction phasing assumptions used in the criteria pollutant analysis to generate criteria pollutant emissions values for each construction activity. Detailed construction equipment lists, construction scheduling, and emissions calculations are provided in **Exhibit A**. Criteria pollutant emissions from worker vehicles and haul trucks were estimated outside of CalEEMod using EMFAC2017. Worker vehicles consisted of emission factors for light-duty automobiles and light-duty trucks. Vendor, cement, and haul trucks were based on emission factors for medium heavy-duty trucks and heavy-duty trucks.

This analysis assumes construction of the Project is estimated to require up to 17 months, starting as early as the first quarter of 2020. If construction commences at a later date, construction emissions would be lower than those estimated in this technical report due to the use of a more energy-efficient and cleaner burning construction vehicle fleet mix, pursuant to State regulations that require vehicle fleet operators to phase-in less polluting trucks. As a result, should Project construction commence at a later date than analyzed in this technical report, air quality impacts would be lower than the impacts disclosed herein. Subphases of construction would include demolition of the existing structures and features on-site, grading/excavation, building construction, paving and architectural coating. Demolition activities would generate approximately 267 tons of demolition debris (asphalt and general construction debris). The Project would export approximately 2,400 cubic yards of soil during grading and excavation activities. The majority of soil excavation and export would be associated with the construction of the proposed subterranean parking structure. Heavy-duty equipment, vendor supply trucks and concrete trucks would be used during construction of foundations, parking structures, and buildings. Landscaping and architectural coating would occur during the finishing activities. The maximum daily regional emissions from these activities are estimated by construction phase and compared to the SCAQMD significance thresholds. The maximum daily regional emissions are predicted values for the worst-case day and do not represent the emissions that would occur for every day of Project construction.

The localized effects from the on-site portion of the construction emissions are evaluated at nearby sensitive receptor locations potentially impacted by the Project according to the SCAQMD's Localized Significance Threshold Methodology.[128] The localized significance thresholds are only applicable to NO_X, CO, PM10, and PM2.5. The SCAQMD has established screening criteria for projects that disturb five acres or less that can be used to determine the maximum allowable daily emissions that would satisfy the localized significance thresholds and therefore not cause or contribute to an exceedance of the applicable ambient air quality standards without project-specific dispersion modeling. The localized analysis is based on this SCAQMD screening criteria. The screening criteria depend on: (1) the area in which the Project is located, (2) the size of the Project Site, and (3) the distance between the Project Site and the nearest

[128] South Coast Air Quality Management District, Localized Significance Thresholds, 2008, http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds. Accessed September 2019.

sensitive receptor. The Project Site is located in the SCAQMD SRA 2 and would generally disturb up to 0.12 acres on a given day. The off-site air quality sensitive receptors would be the residential uses located approximately 785 feet southwest of the Project Site. Therefore, the SCAQMD localized significance threshold (LST) screening criteria for SRA 2 with sensitive receptors conservatively assumed to be located within 200 meters to the Project Site were used.

As stated above, fugitive dust emissions would result from demolition and various soil-handling activities during construction of the Project. Fugitive dust emissions are regulated by the SCAQMD in its Rule 403 (Fugitive Dust). As discussed in Section 2.3 above, SCAQMD Rule 403 requires construction activities to control fugitive dust emissions during construction by complying with best available control measures, such as ensuring sufficient freeboard height for haul vehicles, covering loose material on haul vehicles, applying water or non-toxic soil stabilizers in sufficient quantities to prevent the generation of visible dust plumes on disturbed or unpaved road surfaces, and limiting vehicle speeds to 15 miles per hour on unpaved surfaces. Construction contractors are required to comply with the applicable provision of SCAQMD Rule 403. Applicable fugitive dust control measures are incorporated into the construction emissions modeling within the SCAQMD-approved CalEEMod software and include the application of water (or non-toxic soil stabilizer) to disturbed areas and unpaved road surfaces and limiting vehicle speeds to 15 miles per hour on unpaved surfaces.

4.3 Operational Emissions

Operation of the Project has the potential to generate criteria pollutant emissions through vehicle trips traveling to and from the Project Site. In addition, emissions would result from on-site sources such as natural gas combustion, landscaping equipment, and use of consumer products. Operational impacts were assessed for the Project buildout year (i.e., as early as 2021 assuming construction begins at the earliest possible time in the second quarter of 2020).

The operational emissions are also estimated using the CalEEMod software. CalEEMod was used to forecast the Project's daily regional emissions from area and energy sources that would occur during long-term Project operations. Mobile source emissions were estimated based on CARB's EMFAC2017 and used to generate Air Basin-specific vehicle fleet emission factors in units of grams per mile, which are then converted to pounds per mile. Mobile source emissions were estimated based on CARB's EMFAC2017 emission factors which were generated and incorporated into CalEEMod and using trip rates from the Project's TIA.[129] As mentioned above, The Project's TIA estimated trip rates for the Project that accounted for trip rate reductions due to the Project's characteristics, including reductions due to pass-by trips, internal trips and proximity to public transit/walk-in trips. [130] In calculating mobile-source emissions, the trip length values were based on the distances provided in CalEEMod.

Area source emissions are landscaping equipment, and consumer product usage (including paints) rates provided in CalEEMod. Energy source emissions are based on natural gas combustion

[129] Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.
[130] Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.

(building heating and water heaters). Natural gas usage factors in CalEEMod are based on the California Energy Commission (CEC) California Commercial End Use Survey (CEUS) data set, which provides energy demand by building type and climate zone.[131] However, since the data from the CEUS is from 2002, correction factors are incorporated into CalEEMod to account for the appropriate version of the Title 24 Building Energy Efficiency Standards in effect.

Operational air quality impacts are assessed based on the incremental increase in emissions compared to baseline conditions. As discussed previously, the Project Site is currently developed a sound studio totaling 2,850 square feet and a surface parking lot which are currently in use and have existing operational emissions as shown previously in **Table 1**. Therefore, the Project's operational emissions analysis subtracts the emissions from the existing uses that would be removed as part of the Project to estimate the total net new emissions from the Project. The maximum daily net emissions from operation of the Project are compared to the SCAQMD daily regional significance thresholds.

The localized effects from the onsite portion of the operational emissions are evaluated at nearby sensitive receptor locations potentially impacted by the Project according to the SCAQMD's Localized Significance Threshold Methodology, which relies on on-site mass emission rate screening tables and project-specific dispersion modeling, where appropriate. Similar to construction, the SCAQMD LST screening criteria for SRA 2 with sensitive receptors conservatively assumed to be located within 200 meters to the Project Site were used.

4.4 Toxic Air Contaminants (TACs)

During short-term construction and long-term operations, TACs could be emitted from diesel-fueled construction equipment, from routine cleaning, from periodic painting, etc., and from periodic visits from delivery trucks and service vehicles. However, in the case of construction, these emissions would be temporary and would cease after completion of construction activities. For operations, these emissions are expected to be occasional and result in minimal emissions exposure to off-site sensitive receptors. As the Project consists of residential, office, and retail/restaurant uses the Project would not include operational sources of substantial TAC emissions identified by the SCAQMD or CARB siting recommendations.[132,133] Furthermore, there are no air quality-sensitive receptors in the immediate vicinity of the Project Site. Thus, a qualitative analysis is appropriate for assessing the Project's TAC emissions.

131 California Energy Commission, California Commercial End-Use Survey, http://capabilities.itron.com/CeusWeb/Chart.aspx. Accessed September 2019.

132 SCAQMD, Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning, 2005, Table 2-3.

133 CARB, Air Quality and Land Use Handbook: A Community Health Perspective, 2005, Table 1-1.

SECTION 5
Environmental Impacts

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

Impact Statement: The Project's short-term jobs during construction would not conflict the AQMP's long-term employment projections and Project construction would also comply with the applicable regulations for reducing criteria pollutant emissions during construction activities. The Project's employee growth would not exceed the expected regional growth projections and would be consistent with regulations for reducing criteria pollutants. Therefore, the Project's construction and operations would not conflict with implementation of the AQMP or relevant air quality-related policies in the General Plan or other adopted regional and local plans adopted for reducing air quality impacts and impacts would be less than significant.

5.1 Consistency with Air Quality Plan

Construction

Under this criterion, the SCAQMD recommends that lead agencies demonstrate that a project would not directly obstruct implementation of an applicable air quality plan and that a project be consistent with the assumptions (typically land-use related, such as resultant employment or residential units) upon which the air quality plan is based. The Project would result in an increase in short-term employment compared to existing conditions. Although the Project will require workers over the construction process, these jobs are temporary in nature. Construction jobs under the Project would not conflict with the long-term employment projections upon which the AQMP is based. Control strategies in the AQMP with potential applicability to short-term emissions from construction activities include strategies denoted in the AQMP as MOB-08 and MOB-10, which are intended to reduce emissions from on-road and off-road heavy-duty vehicles and equipment by accelerating replacement of older, emissions-prone engines with newer engines meeting more stringent emission standards. Consistent with the Project, trucks and other vehicles in loading and unloading queues would be parked with engines off to reduce vehicle emissions during construction activities. Additionally, the Project would comply with CARB requirements to minimize short-term emissions from on-road and off-road diesel equipment. The Project would also comply with SCAQMD regulations for controlling fugitive dust pursuant to SCAQMD Rule 403.

Compliance with these requirements is consistent with and meets or exceeds the AQMP requirements for control strategies intended to reduce emissions from construction equipment and activities. Because the Project would not conflict with the control strategies intended to reduce emissions from construction equipment, the Project would not conflict with or obstruct implementation of the AQMP, and impacts would be less than significant.

Operation

The AQMP was prepared to accommodate growth, reduce the levels of pollutants within the areas under the jurisdiction of SCAQMD, return clean air to the region, and minimize the impact on the economy. Projects that are considered consistent with the AQMP would not interfere with attainment because this growth is included in the projections used in the formulation of the AQMP.

The Project Site is located Culver City and the Project Site is currently designated as Commercial based on the City's General Plan Land Use Element Map.[134] The Project would be replacing the existing sound studio totaling 2,850 square feet and a surface parking lot and developing a five-story, mixed-use building that would be designed to accommodate a 3,886 square foot first level with retail/restaurant, 5,455 square feet of commercial office space on floor 2, and 12 two-bedroom apartment units on floors 3 through 5 where parking would be provided in a one-floor, 19-space subterranean parking garage as well as 6 surface parking spaces. Thus, the Project would be consistent with the current City's General Plan Land Use Element designation. In addition, the Project would be generally consistent with the Circulation Element of the City's General Plan due to its location in proximity to multiple modes of public transit. The Project Site is located approximately a third of a mile from Downtown Culver City and served by various bus routes operated by Metro, LADOT, City of Santa Monica's Big Blue Bus and Culver City Bus. The Metro Expo Line is located approximately 0.1 miles northeast of the Project Site. The Big Blue Bus Line 7 at the Robertson Transit Hub bus stop is approximately 80 feet west of the Project Site; the Big Blue Bus Line 17 at the Robertson Blvd/Venice Blvd bus stop is approximately 100 southeast of the Project Site; the Metro Bus Line 16 at the Robertson/Venice bus stop is approximately 130 feet northeast of the Project Site. The Culver City Bus Line 1 at the Venice Blvd/Robertson Blvd bus stop is approximately 195 feet northwest of the Project Site. The LADOT Commuter Express 437 Bus Line at the Washington Blvd and Robertson Boulevard bust stop is approximately 350 feet southeast of the Project Site.

The Project would generate direct population growth associated with the residents in the 12 apartment units and indirect population growth associated with office and retail/restaurant employees. Based on the average household size of Culver City, the Project would generate 28 direct residents.[135] Based on an office building area of approximately 5,455 gross square feet (0.13 acres) and an employment factor of 55.28 employees per acre and a retail/restaurant building area of approximately 3,886 gross square feet (0.09 acres) and an employment factor of 18.86 employees per acre,[136] the Project would generate approximately 9 employees, which

[134] City of Culver City, City of Culver City General Plan Land Use Element Map, https://www.culvercity.org/home/showdocument?id=122. Accessed September 2019.

[135] United States Census Bureau, QuickFacts, Culver City, Person in Households, 2013-2017. California. https://www.census.gov/quickfacts/culvercitycitycalifornia. Accessed September 2019.

[136] The Natelson Company, Table B-1, Employment Densities [employees per acre] by Anderson Code. Regional Office and Retail factors for Los Angeles County.

would in turn generate approximately 5 indirect residents. Indirect residents are one-quarter of the employees multiplied by 2.36 persons per household (average household size in Culver City). [137] According to SCAG, Culver City's forecast population, household, and employment growth of 1,600 persons, 700 households, and 8,900 jobs is predicted between 2012 and 2040, respectively. As such, the estimated 34 direct residents, 9 office and retail/restaurant employees and 5 indirect residents generated by the Project are within SCAG's employment growth assumptions of Culver City. As such, the Project would not generate growth beyond the range of development anticipated within the established SCAG regional forecast for Culver City.

The Project would concentrate residential uses, recreational uses and employment growth in an area served by the Culver City Metro Station and Metro Expo Line, and local and regional bus lines. As such, the Project would not conflict with SCAG's 2016 RTP/SCS policies for the concentration of growth in proximity to transit.

Therefore, based on the above analysis, the Project would not spur additional growth other than that already anticipated for Culver City and would not eliminate impediments to growth. Consequently, the Project would not foster growth inducing impacts in conflict with the assumptions in the AQMP. The Project would not conflict with the AQMP and impacts would be less than significant.

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

Impact Statement: The South Coast Air Basin is designated as non-attainment for ozone, PM10, and PM2.5 under federal and/or state ambient air quality standards. Construction and operation of the Project would generate emissions that would contribute to basin-wide air pollutant emissions, however, the Project's construction and operations regional emissions would not exceed the SCAQMD thresholds for any criteria pollutant, including ozone precursors (VOCs and NO_X), PM10, and PM2.5. Therefore, the Project's regional construction and operational emissions would not contribute to a cumulatively considerable net increase of criteria pollutants and impacts would be less than significant.

5.2 Cumulatively Considerable Non-Attainment Pollutants

The Project would result in emissions of criteria air pollutants for which the region is in non-attainment during both construction and operation. The Air Basin fails to meet the NAAQS for O_3 and $PM_{2.5}$, and therefore is considered a federal "non-attainment" area for these pollutants. The Air Basin also does not meet the CAAQS for PM10. SCAQMD has designed significance thresholds to assist the region in attaining the applicable CAAQS and NAAQS, apply to both primary (criteria and precursor) and secondary pollutants (ozone). An analysis of the Project's

[137] United States Census Bureau, QuickFacts, Culver City, Person in Households, 2013-2017. California. https://www.census.gov/quickfacts/culvercitycitycalifornia. Accessed September 2019.

construction and operational emission impacts is provided below based on the SCAQMD daily regional significance thresholds.

Construction Emissions

The Project's maximum daily construction emissions were calculated as pounds per day for each construction phase by year. Some Project construction phases would overlap and the maximum daily emissions account for the overlapping activities. In addition, construction contractors are required to comply with the applicable provision of SCAQMD Rule 403 for controlling fugitive dust emissions. Applicable fugitive dust control measures are incorporated into the construction emissions modeling within the SCAQMD-approved CalEEMod software and include the application of water (or non-toxic soil stabilizer) to disturbed areas and unpaved road surfaces and limiting vehicle speeds to 15 miles per hour on unpaved surfaces. The estimated maximum daily values do not represent the emissions that would occur for every day of construction. Due to variability in day-to-day construction activities, emissions could be lower on any given day, particularly on days when overlapping construction activities are not occurring. Results of the criteria pollutant calculations are presented in **Table 5**, *Maximum Regional Construction Emissions*. As shown therein, construction-related daily emissions for the criteria and precursor pollutants (VOC, NO_X, CO, SO_X, PM10, and PM2.5) would be below SCAQMD significance thresholds. Therefore, impacts related to regional construction emissions would be less than significant.

TABLE 5
MAXIMUM REGIONAL CONSTRUCTION EMISSIONS (POUNDS PER DAY)[a]

Source	VOC	NO_X	CO	SO_2	PM10[b]	PM2.5[b]
Demolition - 2020	3	28	13	<1	2	1
Grading/Excavation - 2020	1	16	14	<1	1	1
Building Construction - 2020	1	13	12	<1	1	1
Building Construction - 2021	1	11	12	<1	1	1
Paving - 2021	1	7	8	<1	1	<1
Architectural Coating - 2021	7	2	2	<1	<1	<1
2021						
Building Construction + Paving + Architectural Coating - 2021	2	19	19	<1	1	1
Maximum Daily Construction Emissions	**7**	**28**	**19**	<1	**2**	**1**
SCAQMD Regional Significance Threshold	75	100	550	150	150	55
Exceeds Threshold?	No	No	No	No	No	No

NOTES:
[a] Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Exhibit A.
[b] Emissions include fugitive dust control measures consistent with SCAQMD Rule 403.
[c] Analysis accounted for emissions from overlapping phases.

SOURCE: ESA, 2019

Operational Emissions

Operational criteria pollutant emissions were calculated for mobile, area, and stationary sources for the Project buildout year (2021). Daily trip generation rates for the Project were provided by the Project's TIA and include trips associated with the residential, office and retail/restaurant uses.[138] Results of the criteria pollutant calculations are presented in **Table 6**, *Maximum Regional Operational Emissions*. The net increase in operational-related daily emissions (Project emissions minus existing emissions) for the criteria and precursor pollutants (VOC, NO_X, CO, SO_X, PM10, and PM2.5) would be substantially below the SCAQMD thresholds of significance. Therefore, Project-related operational emissions would result in a less than significant impact.

TABLE 6
MAXIMUM REGIONAL OPERATIONAL EMISSIONS (POUNDS PER DAY)[a]

Source	VOC	NO_X	CO	SO_2	PM10	PM2.5
Area	1	<1	1	<1	<1	<1
Energy	<1	<1	<1	<1	<1	<1
Mobile	1	2	7	<1	2	<1
Total Project Operational Emissions	2	2	8	<1	2	<1
Existing Site Emissions Removed	<1	<1	<1	<1	<1	<1
Net Maximum Regional Operational Emissions	**1**	**2**	**8**	**<1**	**1**	**<1**
SCAQMD Significance Threshold	55	55	550	150	150	55
Exceeds Thresholds?	No	No	No	No	No	No

[a] Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Exhibit A.

SOURCE: ESA, 2019

The SCAQMD's approach for assessing cumulative impacts related to operations or long-term implementation is based on attainment of ambient air quality standards in accordance with the requirements of the CAA and California Clean Air Act. As discussed earlier, the SCAQMD has developed a comprehensive plan, the AQMP, which addresses the region's cumulative air quality condition.

A significant impact may occur if a project would add a cumulatively considerable contribution of a federal or California non-attainment pollutant. Because the Los Angeles County portion of the Air Basin is currently in non-attainment for ozone, NO_2, PM10, and $PM_{2.5}$, cumulative projects could exceed an air quality standard or contribute to an existing or projected air quality exceedance. Cumulative impacts to air quality are evaluated under two sets of thresholds for CEQA and the SCAQMD. In particular, Section 15064(h)(3) of the CEQA Guidelines provides guidance in determining the significance of cumulative impacts. Specifically, Section 15064(h)(3) states in part that:

> *A lead agency may determine that a project's incremental contribution to a*

[138] Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.

> *cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program which provides specific requirements that will avoid or substantially lessen the cumulative problem (e.g., water quality control plan, air quality plan, integrated waste management plan) within the geographic area in which the project is located. Such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency.*

For purposes of the cumulative air quality analysis with respect to CEQA Guidelines Section 15064(h)(3), the Project's incremental contribution to cumulative air quality impacts is determined based on compliance with the SCAQMD adopted the AQMP. As discussed above in Section 5.1, *Consistency with Air Quality Management Plan*, the Project would not conflict with or obstruct implementation of AQMP and would be consistent with the growth projections in the AQMP.

Nonetheless, SCAQMD no longer recommends relying solely upon consistency with the AQMP as an appropriate methodology for assessing cumulative air quality impacts. The SCAQMD recommends that project-specific air quality impacts be used to determine the potential cumulative impacts to regional air quality. The Project's regional emissions would be below SCAQMD significance thresholds as shown in **Table 5** and **Table 6**. In particular, non-attainment pollutant emissions of ozone precursors and particulate matter would not exceed the SCAQMD significance thresholds. The formation of ground-level ozone is a complex process due to photochemical reactions of precursor pollutants (i.e., VOC and NO_X emissions) in the atmosphere in the presence of sunlight. Meteorological factors, such as wind, would result in dispersive effects of pollutants, including ozone precursor and particulate matter emissions, that are dispersed horizontally downwind and through vertical mixing. It is unlikely that the Project's emissions, which would not exceed the SCAQMD significance thresholds, would result in a substantial measurable increase in the respective pollutant concentrations in the Air Basin to a degree that clearly predictable and identifiable heath impacts would specifically result from this Project's emissions. Therefore, the Project's incremental contribution to long-term emissions of non-attainment pollutants and ozone precursors, considered together with cumulative projects, would not be cumulatively considerable, and therefore the cumulative impact of the Project would be less than significant.

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

Impact Statement: The Project's maximum daily localized construction and operational emissions of criteria air pollutants would not exceed the applicable SCAQMD localized significance thresholds. Therefore, with respect to the Project's localized emissions, impacts would be less than significant

Project-generated traffic, together with other cumulative traffic in the area, would incrementally increase carbon monoxide levels at an intersection or roadway within one-

quarter mile of a sensitive receptor. However, the Project would not cause or contribute to an exceedance of the CAAQS one-hour or eight-hour CO standards of 20 or 9.0 parts per million, respectively. Therefore, CO hotspot impacts would be less than significant.

Construction of the Project would result in the exposure of TACs, specifically DPM, during construction activities. The cancer risk and non-cancer health impacts would be below the SCAQMD significance thresholds, therefore, impacts related to construction TACs would be less than significant. Based on the limited activity of TAC sources during operations, exposure would be limited and impacts related to TACs would be less than significant.

5.3 Substantial Pollutant Concentrations

Localized Construction Emissions

The localized construction air quality analysis was conducted using the methodology described in the SCAQMD Localized Significance Threshold Methodology.[139] The screening criteria provided in the Localized Significance Threshold Methodology were used to determine localized construction emissions thresholds for the Project. As previously discussed, SCAQMD recommends the evaluation of localized air quality impacts to sensitive receptors in the immediate vicinity of the Project. The thresholds are based on applicable short-term (24-hrs) CAAQS and NAAQS.

Using the Localized Significance Threshold Methodology, the results of the analysis determined localized Project-related construction emissions would be below the SCAQMD thresholds of significance. Results of the pollutant calculations are presented in **Table 7**, *Unmitigated Localized Construction Emissions*. The emissions for increase in construction-related daily emissions for the criteria and precursor pollutants (NO_X, CO, PM10, and PM2.5) would be substantially below the SCAQMD thresholds of significance. Therefore, Project-related localized construction emissions would result in a less than significant impact.

TABLE 7
MAXIMUM UNMITIGATED LOCALIZED CONSTRUCTION EMISSIONS (POUNDS PER DAY)[a]

Source	NO_X	CO	PM10[b]	PM2.5[b]
Demolition - 2020	27	12	1.5	1.3
Grading/Excavation - 2020	13	13	0.6	0.6
Building Construction - 2020	12	11	0.7	0.7
Building Construction - 2021	11	11	0.6	0.6
Paving - 2021	7	7	0.4	0.3
Architectural Coating - 2022	2	2	0.1	0.1
2021				

139 South Coast Air Quality Management District, Localized Significance Thresholds, 2008, http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds. Accessed March 2019.

Source	NO_X	CO	PM10[b]	PM2.5[b]
Building Construction + Paving + Architectural Coating	19	18	1.1	1.0
Maximum Daily Construction Emissions	**27**	**18**	**1.5**	**1.3**
SCAQMD Localized Significance Threshold	156	2,367	57	18
Exceeds Threshold?	No	No	No	No

NOTES:

[a] Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Exhibit A.

[b] Emissions include fugitive dust control measures consistent with SCAQMD Rule 403.

[c] Analysis accounted for emissions from overlapping phases.

SOURCE: ESA, 2019

Localized Operational Emissions

The Project's localized operational air quality analysis was conducted using the methodology described in the SCAQMD Localized Significance Threshold Methodology. The screening criteria provided in the Localized Significance Threshold Methodology were used to determine localized operational emissions thresholds for the Project. The maximum daily increase in localized emissions and localized significance thresholds are presented in **Table 8**, *Maximum Unmitigated Localized Operational Emissions*. As shown therein, the increase in maximum localized operational emissions for sensitive receptors would be substantially below the localized thresholds for NO_X, CO, PM10, and PM2.5. Therefore, with respect to localized operational emissions, impacts would be less than significant.

TABLE 8
MAXIMUM UNMITIGATED LOCALIZED OPERATIONAL EMISSIONS (POUNDS PER DAY)[a]

Source	NO_X	CO	PM10	PM2.5
Area	<1	1	<0.1	<0.1
Energy	<1	<1	<0.1	<0.1
Total Localized Project Operational Emissions	<1	1	<0.1	<0.1
Localized Existing Site Emissions Removed	<1	<1	<0.1	<0.1
Net Maximum Localized Operational Emissions	<1	1	<0.1	<0.1
SCAQMD Significance Threshold	156	2,367	14	5
Exceeds Thresholds?	No	No	No	No

[a] Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Exhibit C.

SOURCE: ESA, 2019

Carbon Monoxide Hotspots

The potential for the Project to cause or contribute to CO hotspots is evaluated by comparing Project intersections (both intersection geometry and traffic volumes) with prior studies conducted by SCAQMD in support of their AQMPs and considering existing background CO concentrations. As discussed below, this comparison demonstrates that the Project would not cause or contribute considerably to the formation of CO hotspots, that CO concentrations at Project impacted intersections would remain well below the ambient air quality standards, and that no further CO analysis is warranted or required.

As shown previously in **Table 2**, CO levels in the Project area are substantially below the federal and state standards. Maximum CO levels in recent years are 2.2 ppm (one-hour average) and 1.3 ppm (eight-hour average) compared to the thresholds of 20 ppm (one-hour average) and 9.0 ppm (eight-hour average). CO levels decreased dramatically in the Air Basin with the introduction of the catalytic converter in 1975. No exceedances of CO have been recorded at monitoring stations in the Air Basin for some time and the Air Basin is currently designated as a CO attainment area for both the CAAQS and NAAQS. Thus, it is not expected that CO levels at Project-impacted intersections would rise to the level of an exceedance of these standards.

Additionally, SCAQMD conducted CO modeling for the 2003 AQMP for the four worst-case intersections in the Air Basin: (1) Wilshire Boulevard and Veteran Avenue; (2) Sunset Boulevard and Highland Avenue; (3) La Cienega Boulevard and Century Boulevard; and (4) Long Beach Boulevard and Imperial Highway. In the 2003 AQMP, SCAQMD notes that the intersection of Wilshire Boulevard and Veteran Avenue is the most congested intersection in Los Angeles County, with an average daily traffic volume of approximately 100,000 vehicles per day. This intersection is located near the on- and off-ramps to Interstate 405 in West Los Angeles. The evidence provided in the 2003 AQMP (Table 4-10 of Appendix V) shows that the peak modeled CO concentration due to vehicle emissions at these four intersections was 4.6 ppm (one-hour average) and 3.2 (eight-hour average) at Wilshire Boulevard and Veteran Avenue. When added to the existing background CO concentrations, the screening values would be 7.6 ppm (one-hour average) and 5 ppm (eight-hour average).

Based on the Project's TIA, under future operational year plus Project conditions, the intersection of Robertson Boulevard and Venice Boulevard had the highest peak traffic volume with approximately 36,850 per day.[140] As a result, CO concentrations are expected to be less than those estimated in the 2003 AQMP, which would not exceed the thresholds. Thus, this comparison demonstrates that the Project would not contribute considerably to the formation of CO hotspots and no further CO analysis is required. The Project would result in less than significant impacts with respect to CO hotspots.

Toxic Air Contaminants

Construction

Temporary TAC emissions associated with DPM emissions from heavy construction equipment would occur during the construction phase of the Project. According to the Office of Environmental Health Hazard Assessment (OEHHA), health effects from TACs are described in terms of individual cancer risk based on a 30 year residential exposure duration or a lifetime (i.e.,

[140] Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.

70-year) exposure duration. Given the temporary and short-term construction schedule (17 months), the Project would not result in a long-term (i.e., 30-year residential or 70-year lifetime) exposure as a result of Project construction.

As discussed above, the Project would be consistent with the applicable 2016 AQMP requirements for control strategies intended to reduce emissions from construction equipment and activities. The Project would comply with the CARB Air Toxics Control Measure that limits diesel powered equipment and vehicle idling to no more than five minutes at a location, and the CARB In-Use Off-Road Diesel Vehicle Regulation; compliance with these would minimize emissions of TACs during construction. The Project would also comply with the requirements of SCAQMD Rule 1403 if asbestos is found during the demolition and construction activities. Should lead-based paint materials be identified, standard handling and disposal practices shall be implemented pursuant to OSHA regulations. The nearest existing air quality sensitive receptors are residential uses located approximately 785 feet southeast of the Project Site south of Lindblade Street.

As shown in **Table 7**, the Project's maximum localized PM2.5 emissions, which are correlated to DPM emissions, would be approximately 1.3 pounds per day during each day of Project demolition phase. For all other construction phases, the Project's localized PM2.5 emissions would be equal to or less than 1 pound per day. Additionally, since the sensitive receptors are located approximately 785 feet to the southeast of Project Site south of Lindblade Street, this buffer distance between the Project Site and the sensitive receptors would disperse air pollutants generated by the Project such that the sensitive receptors would not be exposed to substantial pollutant concentrations. As such, the Project's construction TAC emissions would result in less than significant short-term construction health risk impacts to sensitive receptors. Therefore, the proposed Project would result in a less than significant impact related to construction TAC emissions.

Operation

SCAQMD recommends that health risk assessments be conducted for substantial sources of DPM emissions (e.g., truck stops and warehouse distribution facilities) and has provided guidance for analyzing mobile source diesel emissions. The Project is not anticipated to generate a substantial number of daily truck trips. Furthermore, typical sources of hazardous TACs include industrial manufacturing processes and automotive repair facilities. The Project would not include any of these potential sources, although minimal emissions may result from the use of consumer products (e.g., aerosol sprays). Based on this, the Project is not expected to release substantial amounts of TACs.

Therefore, based on the limited activity of TAC sources and TAC concentrations at off-site sensitive receptors relative to existing conditions, the Project would not warrant the need for a health risk assessment associated with on-site activities, and potential TAC impacts would be less than significant.

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

Impact Statement: The Project's land uses are related to hotel uses and are not expected to result in other emissions or introduce substantial sources of odors and is not associated with any land uses or operations that are associated with odor complaints. Therefore, Project construction and operations would not result in other emissions or create objectionable odors affecting a substantial number of people and impacts would be less than significant.

5.4 Other Emissions (Such as Odors)

Construction

Potential sources that may emit odors during construction activities include the use of architectural coatings and solvents. SCAQMD Rule 1113 (Architectural Coatings) limits the amount of VOCs from architectural coatings and solvents. According to the SCAQMD CEQA Air Quality Handbook, construction equipment is not a typical source of odors. Odors from the combustion of diesel fuel would be minimized by complying with the CARB ATCM that limits diesel-fueled commercial vehicle idling to five minutes at any given location, which was adopted in 2004. The Project would also comply with SCAQMD Rule 402 (Nuisance), which prohibits the emissions of nuisance air contaminants or odorous compounds. Through adherence with mandatory compliance with SCAQMD Rules and State measures, construction activities and materials would not create objectionable odors. Construction of the Project's proposed uses would not be expected to generate nuisance odors at nearby sensitive receptors.

Results of the construction related criteria pollutant calculations are presented in **Table 5** (regional) and **Table 7** (localized). The daily emissions for criteria pollutants would be below SCAQMD significance thresholds. Since implementation of the Project would not exceed the regional or localized significance thresholds for attainment or non-attainment pollutants, the Project is not anticipated to contribute to health impacts related to these pollutants specifically because these thresholds were established at levels considered safe to protect public health, including the health of sensitive populations.

Operations

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 Project would not involve elements related to these types of uses. The Project would include various trash receptacles associated with the proposed development. On-site trash receptacles used by the Project would be covered and properly maintained to prevent adverse odors. With proper housekeeping practices, trash receptacles would be maintained in a manner that promotes odor control, and no adverse odor impacts are anticipated from the uses. Impacts with respect to odors would be less than significant.

Results of the operational related criteria pollutant calculations are presented in **Table 6** (regional) and **Table 8** (localized). The daily emissions for criteria pollutants would be below SCAQMD significance thresholds. Since implementation of the Project would not exceed the regional or local significance thresholds for attainment or non-attainment pollutants, the Project is not anticipated to contribute to health impacts related to these pollutants specifically because these thresholds were established at levels considered safe to protect public health, including the health of sensitive populations.

SECTION 6
Summary of Results

6.1 Construction

Construction of the Project has the potential to create air quality impacts through the use of heavy-duty construction equipment and through vehicle trips generated from construction workers traveling to and from the Project Site. In addition, fugitive dust emissions would result from grading and construction activities. However, use of typical construction equipment (in terms of size and age/emission standards) and compliance with Rule 403 requirements (regarding dust control measures such as watering three times per day and track out prevention measures), minimizes air emissions to the extent warranted.

As shown in **Table 5**, regional construction emissions would not exceed the SCAQMD significance thresholds. Therefore, impacts related to regional construction emissions would be less than significant. As shown in **Table 7**, localized emissions would not exceed the SCAQMD significance thresholds. Therefore, impacts related to localized construction emissions would be less than significant. As a result, Project-related construction impacts would be less than significant. In addition, as shown in **Table 7**, the Project's maximum localized PM2.5 emissions, which are correlated to DPM emissions, would be approximately 1.3 pounds per day during each day of Project demolition phase. For all other construction phases, the Project's localized PM2.5 emissions would be equal to or less than 1 pound per day. Additionally, since the sensitive receptors are located approximately 785 feet to the southeast of Project Site south of Lindblade Street, this buffer distance between the Project Site and the sensitive receptors would disperse air pollutants generated by the Project such that the sensitive receptors would not be exposed to substantial pollutant concentrations. As such, the Project's construction TAC emissions would result in less than significant potential short-term construction health risk impacts to sensitive receptors. Impacts from other emissions, such as odors, would be less than significant.

6.2 Operation

Air pollutant emissions associated with Project operations would be generated by the consumption of natural gas, use of consumer products, and by the operation of on-road vehicles. As shown in **Table 6** and **Table 8**, regional and localized operational emissions associated with the Project would not exceed the SCAQMD daily significance thresholds. In addition, the Project would not result in a CO hotspot, or emit unhealthy levels of TAC and odiferous emissions. Furthermore, the Project would be consistent with applicable air quality plans and policies. Therefore, impacts related to Project operational emissions and consistency with applicable air quality management plans, policies, or regulations would be less than significant.

Exhibit A

Project Construction Emissions

3727 Robertson Blvd. Mixed-Use Project

Existing Land Uses[1]

Land Use Type	CalEEMod LandUse Type	CalEEMod LandUse Subtype	Amount	Unit	Building SF
Sound Studio	Commercial	General Office Building	2.85	1000sqft	2,850

Environmental Site Assessment/info from client
2,850

Project Land Uses[1,2]

Land Use Type	CalEEMod LandUse Type	CalEEMod LandUse Subtype	Amount	Unit	Building SF	Acres	Population[6]
Apartment	Residential	Apartments Mid Rise	12	DU	12,921	0.03	28
Office	Commercial	General Office Building	5.455	1000sqft	5,455	0.02	
Restaurant/retail	Recreational	High turnover restaurant	3.886	1000sqft	3,886	0.02	
Parking Lot	Parking	Parking Lot	6.00	Spaces	2,400	0.02	
Subeterranean Parking	Parking	Enclosed Parking Structure with	19.00	Spaces	7,600	0.03	
				Total	**22,262**	0.12	5,100

sqft

Construction Data[2]

Start	End	Total Duration
1/1/2020	5/31/2021	17 months
Total Construction Site Area (acres)	0.78	

Construction Phase	CalEEMod Phase Type	Start Date	End Date	Total Calendar Days	Workdays (6 days/week)	Worker Trips/Day (In/Out)	Vendor Trips/Day (In/Out)	Total Haul (or Concrete) Trips (In/Out)	Total Haul (or Concrete) Trucks/Day	Haul (or Concrete) Trips/Day (In/Out)
Demolition	Demolition	1/1/2020	1/15/2020	14	13	10	0	92	4	8
Grading/Excavation	Grading	1/16/2020	2/15/2020	30	27	14	0	480	9	18
Building Construction	Building Construction	2/16/2020	5/31/2021	470	403	12	4	0	0	0
Building Construction - 2020		2/16/2020	12/31/2020	319	274					
Building Construction - 2021		1/1/2021	5/31/2021	150	129					
Paving	Paving	5/1/2021	5/15/2021	14	13	18	0	0	0	0
Architectural Coating	Architectural Coating	5/1/2021	5/31/2021	30	26	2	0	0	0	0

Demolition Quantities

Buildings	Amount	
Building Area (ft^2)[2]	2,850	
Building Height (ft)[4]	15	
Building Volume (ft^3)	42,750	
Building Waste Volume (CY)[3]	396	
Building Waste weight (tons)[3]	198	
Hardscape		
Hardscape Area (ft^2)[4]	3,130	
Thickness (ft)	0.50	
Hardscape Debris Volume (CY)	58	
Debris weight (lb):Volume (CY)[5]	2,400	
Hardscape Debris Weight (tons)	70	
Total Debris Weight (tons)	267	<--Enter in CalEEMod
Total Demolition Debris (CY)	**454**	<--Enter in CalEEMod
Haul Truck Capacity (CY)	10	
Total Haul Trucks Required	45	
Total Haul Truck Trips (In/Out)	**92**	<--Enter in CalEEMod
Total Haul Truck Trips (In/Out) per day	8	

Excavation Quantities

Parameters	Amount	
Excavation Volume (Export) (CY)	**2,400**	**<--Enter in CalEEMod**
Haul Truck Capacity (CY)	10	
Total Haul Trucks Required	240	
Total Haul Truck Trips (In/Out)	**480**	**<--Enter in CalEEMod**
Total Haul Truck Trips (In/Out) per day	18	

Notes:

1 Crain and Associates Traffic Impact Analysis. Matches trip assumptions of restaurant
2 Information received from client and Architectural Plan by Architecture West Inc.
3 CalEEMod User's Guide, Appendix A
4 Measured approximate height and lot size using Google Earth
5 CalRecycle Weights and Volumes
6 United States Census Bureau, Culver City Quick Facts.

Phase[4]	CalEEMod Phase Type	Equipment Type[4]	# of Equipment	Hours/day	HP	Load Factor	Notes
Demolition	Demolition	Dumper/Tenders	1	8	16	0.38	
Demolition	Demolition	Rubber Tired Dozers	2	8	247	0.4	
Demolition	Demolition	Generator Sets	1	8	84	0.74	Accounts for Jackhammer Use
Grading/Excavation	Grading	Tractors/Loaders/Backhoes	2	8	97	0.37	
Grading/Excavation	Grading	Excavators	2	8	158	0.38	
Grading/Excavation	Grading	Bore/Drill Rig	1	8	221	0.5	
Building Construction	Building Construction	Cranes	1	4	231	0.29	
Building Construction	Building Construction	Forklifts	2	6	89	0.2	
Building Construction	Building Construction	Tractors/Loaders/Backhoes	2	8	97	0.37	
Building Construction	Building Construction	Pump	1	8	84	0.74	For Cement Trucks
Paving	Paving	Pavers	1	7	130	0.42	
Paving	Paving	Cement and Mortar Mixers	4	6	9	0.56	
Paving	Paving	Rollers	1	7	80	0.38	
Paving	Paving	Tractors/Loaders/Backhoes	1	7	97	0.37	
Architectural Coating	Architectural Coating	Air Compressors	1	6	78	0.48	

Worker/Vendors Amounts

Phase	# of workers[1]	# of worker trips/day (In/Out)[2,3]	Vendor Trips/day (In/Out)[2]
Demolition	5	10	0
Grading/Excavation	6.25	14	0
Building Construction		12	4
Paving	9	18	0
Architectural Coating		2	0

Notes:

1 Worker trips for all construction phases except building construction and architectural coating is based on 1.25 workers per equipment in that phase resulting in one roundtrip per worker.

2 For building construction workers, the trip number is estimated using the trip generation rate from a survey conducted by SMAQMD.
Office/Inudstrial rates used for Project construction

3 Architectural coating worker trips are 20% of building construction phase trips. Vendor trips are only associated with building construction and is based on the land uses and trip rate indicated in the table above.

4 Information received from client and CalEEMod defaults

Building Construction Worker and Vendor Trip Rates

Land Use SubType	Rate Metric	Worker Trip Rate	Vendor Trip Rate
Single Family	Daily Trips per DU*	0.36	0.1069
Multi-Family	Daily Trips per DU*	0.72	0.1069
Commercial/Retail	Daily Trips per 1000 sq. ft.	0.32	0.1639
Office/Industrial	Daily Trips per 1000 sq. ft.	0.42	0.1639
Source: SCAQMD's analysis of SMAQMD Building Construction Worker and Vendor trip rates found in Appendix E.			

*DU = dwelling unit

3727 Robertson-Construction

South Coast AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	12.00	Dwelling Unit	0.03	12,921.00	34
General Office Building	5.46	1000sqft	0.02	5,455.00	0
High Turnover (Sit Down Restaurant)	3.89	1000sqft	0.02	3,886.00	0
Parking Lot	6.00	Space	0.02	2,400.00	0
Enclosed Parking with Elevator	19.00	Space	0.03	7,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	11			**Operational Year**	2021
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 - see construction assumptions

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment -

Off-road Equipment -

Grading -

Demolition -

Trips and VMT - construction mobile emissions calculations calculated outside of CalEEMod

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	5.00	26.00
tblConstructionPhase	NumDays	100.00	403.00
tblConstructionPhase	NumDays	10.00	13.00
tblConstructionPhase	NumDays	2.00	27.00
tblConstructionPhase	NumDays	5.00	13.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	PhaseEndDate	6/19/2020	5/31/2021
tblConstructionPhase	PhaseEndDate	6/5/2020	5/31/2021
tblConstructionPhase	PhaseEndDate	1/14/2020	1/15/2020
tblConstructionPhase	PhaseEndDate	1/17/2020	2/15/2020
tblConstructionPhase	PhaseEndDate	6/12/2020	5/15/2021
tblConstructionPhase	PhaseStartDate	6/13/2020	5/1/2021
tblConstructionPhase	PhaseStartDate	1/18/2020	2/16/2020
tblConstructionPhase	PhaseStartDate	6/6/2020	5/1/2021
tblGrading	MaterialExported	0.00	2,400.00
tblLandUse	LandUseSquareFeet	12,000.00	12,921.00
tblLandUse	LotAcreage	0.32	0.03

tblLandUse	LotAcreage	0.13	0.02
tblLandUse	LotAcreage	0.09	0.02
tblLandUse	LotAcreage	0.05	0.02
tblLandUse	LotAcreage	0.17	0.03
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	UsageHours	1.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripNumber	26.00	0.00
tblTripsAndVMT	HaulingTripNumber	300.00	0.00
tblTripsAndVMT	VendorTripNumber	4.00	0.00
tblTripsAndVMT	WorkerTripNumber	10.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblTripsAndVMT	WorkerTripNumber	16.00	0.00
tblTripsAndVMT	WorkerTripNumber	18.00	0.00
tblTripsAndVMT	WorkerTripNumber	3.00	0.00

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					
2020	2.6315	26.6081	13.2189	0.0260	0.4395	1.3239	1.7634	0.0665	1.2351	1.3016	0.0000	2,521.1310	2,521.1310	0.8154	0.0000	2,541.5156
2021	8.6469	19.4396	19.9117	0.0322	0.0000	1.0726	1.0726	0.0000	1.0120	1.0120	0.0000	3,043.0420	3,043.0420	0.7117	0.0000	3,060.8338
Maximum	**8.6469**	**26.6081**	**19.9117**	**0.0322**	**0.4395**	**1.3239**	**1.7634**	**0.0665**	**1.2351**	**1.3016**	**0.0000**	**3,043.0420**	**3,043.0420**	**0.8154**	**0.0000**	**3,060.8338**

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					
2020	2.6315	26.6081	13.2189	0.0260	0.1714	1.3239	1.4953	0.0260	1.2351	1.2610	0.0000	2,521.1310	2,521.1310	0.8154	0.0000	2,541.5156
2021	8.6469	19.4396	19.9117	0.0322	0.0000	1.0726	1.0726	0.0000	1.0120	1.0120	0.0000	3,043.0420	3,043.0420	0.7117	0.0000	3,060.8338
Maximum	**8.6469**	**26.6081**	**19.9117**	**0.0322**	**0.1714**	**1.3239**	**1.4953**	**0.0260**	**1.2351**	**1.2610**	**0.0000**	**3,043.0420**	**3,043.0420**	**0.8154**	**0.0000**	**3,060.8338**

	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**	**61.00**	**0.00**	**9.45**	**61.00**	**0.00**	**1.75**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	1/1/2020	1/15/2020	6	13	
2	Grading	Grading	1/16/2020	2/15/2020	6	27	
3	Building Construction	Building Construction	2/16/2020	5/31/2021	6	403	
4	Paving	Paving	5/1/2021	5/15/2021	6	13	
5	Architectural Coating	Architectural Coating	5/1/2021	5/31/2021	6	26	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.05

Residential Indoor: 26,165; Residential Outdoor: 8,722; Non-Residential Indoor: 14,012; Non-Residential Outdoor: 4,671; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Grading	Concrete/Industrial Saws	0	8.00	81	0.73
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Demolition	Dumpers/Tenders	1	8.00	16	0.38
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	0	1.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	0	6.00	97	0.37

Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Demolition	Generator Sets	1	8.00	84	0.74
Grading	Excavators	2	8.00	158	0.38
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Building Construction	Pumps	1	8.00	84	0.74

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	4	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	5	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	6	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 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					
Fugitive Dust					0.4395	0.0000	0.4395	0.0665	0.0000	0.0665			0.0000			0.0000
Off-Road	2.6315	26.6081	12.2196	0.0244		1.3239	1.3239		1.2351	1.2351		2,338.6599	2,338.6599	0.5768		2,353.0795
Total	**2.6315**	**26.6081**	**12.2196**	**0.0244**	**0.4395**	**1.3239**	**1.7634**	**0.0665**	**1.2351**	**1.3016**		**2,338.6599**	**2,338.6599**	**0.5768**		**2,353.0795**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

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					0.1714	0.0000	0.1714	0.0260	0.0000	0.0260			0.0000			0.0000
Off-Road	2.6315	26.6081	12.2196	0.0244		1.3239	1.3239		1.2351	1.2351	0.0000	2,338.6599	2,338.6599	0.5768		2,353.0795
Total	**2.6315**	**26.6081**	**12.2196**	**0.0244**	**0.1714**	**1.3239**	**1.4953**	**0.0260**	**1.2351**	**1.2610**	**0.0000**	**2,338.6599**	**2,338.6599**	**0.5768**		**2,353.0795**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Grading - 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					
Fugitive Dust					0.0101	0.0000	0.0101	1.5200e-003	0.0000	1.5200e-003			0.0000			0.0000
Off-Road	1.1903	12.5996	13.2189	0.0260		0.6031	0.6031		0.5549	0.5549		2,521.1310	2,521.1310	0.8154		2,541.5156
Total	**1.1903**	**12.5996**	**13.2189**	**0.0260**	**0.0101**	**0.6031**	**0.6132**	**1.5200e-003**	**0.5549**	**0.5564**		**2,521.1310**	**2,521.1310**	**0.8154**		**2,541.5156**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

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					
Fugitive Dust					3.9200e-003	0.0000	3.9200e-003	5.9000e-004	0.0000	5.9000e-004			0.0000			0.0000
Off-Road	1.1903	12.5996	13.2189	0.0260		0.6031	0.6031		0.5549	0.5549	0.0000	2,521.1310	2,521.1310	0.8154		2,541.5156
Total	**1.1903**	**12.5996**	**13.2189**	**0.0260**	**3.9200e-003**	**0.6031**	**0.6071**	**5.9000e-004**	**0.5549**	**0.5555**	**0.0000**	**2,521.1310**	**2,521.1310**	**0.8154**		**2,541.5156**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.4 Building Construction - 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	1.2849	12.3814	11.1500	0.0180		0.7296	0.7296		0.6878	0.6878		1,726.0127	1,726.0127	0.3940		1,735.8627
Total	**1.2849**	**12.3814**	**11.1500**	**0.0180**		**0.7296**	**0.7296**		**0.6878**	**0.6878**		**1,726.0127**	**1,726.0127**	**0.3940**		**1,735.8627**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

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	1.2849	12.3814	11.1500	0.0180		0.7296	0.7296		0.6878	0.6878	0.0000	1,726.0126	1,726.0126	0.3940		1,735.8627
Total	**1.2849**	**12.3814**	**11.1500**	**0.0180**		**0.7296**	**0.7296**		**0.6878**	**0.6878**	**0.0000**	**1,726.0126**	**1,726.0126**	**0.3940**		**1,735.8627**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.4 Building Construction - 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	1.1554	11.1950	11.0043	0.0180		0.6251	0.6251		0.5893	0.5893		1,726.2514	1,726.2514	0.3908		1,736.0211
Total	**1.1554**	**11.1950**	**11.0043**	**0.0180**		**0.6251**	**0.6251**		**0.5893**	**0.5893**		**1,726.2514**	**1,726.2514**	**0.3908**		**1,736.0211**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

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	1.1554	11.1950	11.0043	0.0180		0.6251	0.6251		0.5893	0.5893	0.0000	1,726.2514	1,726.2514	0.3908		1,736.0211
Total	**1.1554**	**11.1950**	**11.0043**	**0.0180**		**0.6251**	**0.6251**		**0.5893**	**0.5893**	**0.0000**	**1,726.2514**	**1,726.2514**	**0.3908**		**1,736.0211**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.5 Paving - 2021

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					
Off-Road	0.7214	6.7178	7.0899	0.0113		0.3534	0.3534		0.3286	0.3286		1,035.3425	1,035.3425	0.3016		1,042.8818
Paving	4.0300e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7254**	**6.7178**	**7.0899**	**0.0113**		**0.3534**	**0.3534**		**0.3286**	**0.3286**		**1,035.3425**	**1,035.3425**	**0.3016**		**1,042.8818**

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
	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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

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	0.7214	6.7178	7.0899	0.0113		0.3534	0.3534		0.3286	0.3286	0.0000	1,035.3425	1,035.3425	0.3016		1,042.8818
Paving	4.0300e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7254**	**6.7178**	**7.0899**	**0.0113**		**0.3534**	**0.3534**		**0.3286**	**0.3286**	**0.0000**	**1,035.3425**	**1,035.3425**	**0.3016**		**1,042.8818**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.6 Architectural Coating - 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	6.5472					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	**6.7661**	**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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

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					
Archit. Coating	6.5472					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	**6.7661**	**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

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3727 Robertson-Construction
South Coast AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	12.00	Dwelling Unit	0.03	12,921.00	34
General Office Building	5.46	1000sqft	0.02	5,455.00	0
High Turnover (Sit Down Restaurant)	3.89	1000sqft	0.02	3,886.00	0
Parking Lot	6.00	Space	0.02	2,400.00	0
Enclosed Parking with Elevator	19.00	Space	0.03	7,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	11			**Operational Year**	2021
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 - see construction assumptions

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment -

Off-road Equipment -

Grading -

Demolition -

Trips and VMT - construction mobile emissions calculations calculated outside of CalEEMod

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	5.00	26.00
tblConstructionPhase	NumDays	100.00	403.00
tblConstructionPhase	NumDays	10.00	13.00
tblConstructionPhase	NumDays	2.00	27.00
tblConstructionPhase	NumDays	5.00	13.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	PhaseEndDate	6/19/2020	5/31/2021
tblConstructionPhase	PhaseEndDate	6/5/2020	5/31/2021
tblConstructionPhase	PhaseEndDate	1/14/2020	1/15/2020
tblConstructionPhase	PhaseEndDate	1/17/2020	2/15/2020
tblConstructionPhase	PhaseEndDate	6/12/2020	5/15/2021
tblConstructionPhase	PhaseStartDate	6/13/2020	5/1/2021
tblConstructionPhase	PhaseStartDate	1/18/2020	2/16/2020
tblConstructionPhase	PhaseStartDate	6/6/2020	5/1/2021
tblGrading	MaterialExported	0.00	2,400.00
tblLandUse	LandUseSquareFeet	12,000.00	12,921.00
tblLandUse	LotAcreage	0.32	0.03

tblLandUse	LotAcreage	0.13	0.02
tblLandUse	LotAcreage	0.09	0.02
tblLandUse	LotAcreage	0.05	0.02
tblLandUse	LotAcreage	0.17	0.03
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	UsageHours	1.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripNumber	26.00	0.00
tblTripsAndVMT	HaulingTripNumber	300.00	0.00
tblTripsAndVMT	VendorTripNumber	4.00	0.00
tblTripsAndVMT	WorkerTripNumber	10.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblTripsAndVMT	WorkerTripNumber	16.00	0.00
tblTripsAndVMT	WorkerTripNumber	18.00	0.00
tblTripsAndVMT	WorkerTripNumber	3.00	0.00

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					
2020	2.6315	26.6081	13.2189	0.0260	0.4395	1.3239	1.7634	0.0665	1.2351	1.3016	0.0000	2,521.1310	2,521.1310	0.8154	0.0000	2,541.5156
2021	8.6469	19.4396	19.9117	0.0322	0.0000	1.0726	1.0726	0.0000	1.0120	1.0120	0.0000	3,043.0420	3,043.0420	0.7117	0.0000	3,060.8338
Maximum	**8.6469**	**26.6081**	**19.9117**	**0.0322**	**0.4395**	**1.3239**	**1.7634**	**0.0665**	**1.2351**	**1.3016**	**0.0000**	**3,043.0420**	**3,043.0420**	**0.8154**	**0.0000**	**3,060.8338**

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					
2020	2.6315	26.6081	13.2189	0.0260	0.1714	1.3239	1.4953	0.0260	1.2351	1.2610	0.0000	2,521.1310	2,521.1310	0.8154	0.0000	2,541.5156
2021	8.6469	19.4396	19.9117	0.0322	0.0000	1.0726	1.0726	0.0000	1.0120	1.0120	0.0000	3,043.0420	3,043.0420	0.7117	0.0000	3,060.8338
Maximum	**8.6469**	**26.6081**	**19.9117**	**0.0322**	**0.1714**	**1.3239**	**1.4953**	**0.0260**	**1.2351**	**1.2610**	**0.0000**	**3,043.0420**	**3,043.0420**	**0.8154**	**0.0000**	**3,060.8338**

	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**	**61.00**	**0.00**	**9.45**	**61.00**	**0.00**	**1.75**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	1/1/2020	1/15/2020	6	13	
2	Grading	Grading	1/16/2020	2/15/2020	6	27	
3	Building Construction	Building Construction	2/16/2020	5/31/2021	6	403	
4	Paving	Paving	5/1/2021	5/15/2021	6	13	
5	Architectural Coating	Architectural Coating	5/1/2021	5/31/2021	6	26	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.05

Residential Indoor: 26,165; Residential Outdoor: 8,722; Non-Residential Indoor: 14,012; Non-Residential Outdoor: 4,671; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Grading	Concrete/Industrial Saws	0	8.00	81	0.73
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Demolition	Dumpers/Tenders	1	8.00	16	0.38
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	0	1.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	0	6.00	97	0.37

Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Demolition	Generator Sets	1	8.00	84	0.74
Grading	Excavators	2	8.00	158	0.38
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Building Construction	Pumps	1	8.00	84	0.74

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	4	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	5	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	6	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 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					
Fugitive Dust					0.4395	0.0000	0.4395	0.0665	0.0000	0.0665			0.0000			0.0000
Off-Road	2.6315	26.6081	12.2196	0.0244		1.3239	1.3239		1.2351	1.2351		2,338.6599	2,338.6599	0.5768		2,353.0795
Total	**2.6315**	**26.6081**	**12.2196**	**0.0244**	**0.4395**	**1.3239**	**1.7634**	**0.0665**	**1.2351**	**1.3016**		**2,338.6599**	**2,338.6599**	**0.5768**		**2,353.0795**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

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					0.1714	0.0000	0.1714	0.0260	0.0000	0.0260			0.0000			0.0000
Off-Road	2.6315	26.6081	12.2196	0.0244		1.3239	1.3239		1.2351	1.2351	0.0000	2,338.6599	2,338.6599	0.5768		2,353.0795
Total	**2.6315**	**26.6081**	**12.2196**	**0.0244**	**0.1714**	**1.3239**	**1.4953**	**0.0260**	**1.2351**	**1.2610**	**0.0000**	**2,338.6599**	**2,338.6599**	**0.5768**		**2,353.0795**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Grading - 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					
Fugitive Dust					0.0101	0.0000	0.0101	1.5200e-003	0.0000	1.5200e-003			0.0000			0.0000
Off-Road	1.1903	12.5996	13.2189	0.0260		0.6031	0.6031		0.5549	0.5549		2,521.1310	2,521.1310	0.8154		2,541.5156
Total	**1.1903**	**12.5996**	**13.2189**	**0.0260**	**0.0101**	**0.6031**	**0.6132**	**1.5200e-003**	**0.5549**	**0.5564**		**2,521.1310**	**2,521.1310**	**0.8154**		**2,541.5156**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

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					3.9200e-003	0.0000	3.9200e-003	5.9000e-004	0.0000	5.9000e-004			0.0000			0.0000
Off-Road	1.1903	12.5996	13.2189	0.0260		0.6031	0.6031		0.5549	0.5549	0.0000	2,521.1310	2,521.1310	0.8154		2,541.5156
Total	**1.1903**	**12.5996**	**13.2189**	**0.0260**	**3.9200e-003**	**0.6031**	**0.6071**	**5.9000e-004**	**0.5549**	**0.5555**	**0.0000**	**2,521.1310**	**2,521.1310**	**0.8154**		**2,541.5156**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.4 Building Construction - 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	1.2849	12.3814	11.1500	0.0180		0.7296	0.7296		0.6878	0.6878		1,726.0127	1,726.0127	0.3940		1,735.8627
Total	**1.2849**	**12.3814**	**11.1500**	**0.0180**		**0.7296**	**0.7296**		**0.6878**	**0.6878**		**1,726.0127**	**1,726.0127**	**0.3940**		**1,735.8627**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

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	1.2849	12.3814	11.1500	0.0180		0.7296	0.7296		0.6878	0.6878	0.0000	1,726.0126	1,726.0126	0.3940		1,735.8627
Total	**1.2849**	**12.3814**	**11.1500**	**0.0180**		**0.7296**	**0.7296**		**0.6878**	**0.6878**	**0.0000**	**1,726.0126**	**1,726.0126**	**0.3940**		**1,735.8627**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.4 Building Construction - 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	1.1554	11.1950	11.0043	0.0180		0.6251	0.6251		0.5893	0.5893		1,726.2514	1,726.2514	0.3908		1,736.0211
Total	**1.1554**	**11.1950**	**11.0043**	**0.0180**		**0.6251**	**0.6251**		**0.5893**	**0.5893**		**1,726.2514**	**1,726.2514**	**0.3908**		**1,736.0211**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

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	1.1554	11.1950	11.0043	0.0180		0.6251	0.6251		0.5893	0.5893	0.0000	1,726.2514	1,726.2514	0.3908		1,736.0211
Total	**1.1554**	**11.1950**	**11.0043**	**0.0180**		**0.6251**	**0.6251**		**0.5893**	**0.5893**	**0.0000**	**1,726.2514**	**1,726.2514**	**0.3908**		**1,736.0211**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.5 Paving - 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	0.7214	6.7178	7.0899	0.0113		0.3534	0.3534		0.3286	0.3286		1,035.3425	1,035.3425	0.3016		1,042.8818
Paving	4.0300e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7254**	**6.7178**	**7.0899**	**0.0113**		**0.3534**	**0.3534**		**0.3286**	**0.3286**		**1,035.3425**	**1,035.3425**	**0.3016**		**1,042.8818**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

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	0.7214	6.7178	7.0899	0.0113		0.3534	0.3534		0.3286	0.3286	0.0000	1,035.3425	1,035.3425	0.3016		1,042.8818
Paving	4.0300e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7254**	**6.7178**	**7.0899**	**0.0113**		**0.3534**	**0.3534**		**0.3286**	**0.3286**	**0.0000**	**1,035.3425**	**1,035.3425**	**0.3016**		**1,042.8818**

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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.6 Architectural Coating - 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	6.5472					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	**6.7661**	**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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

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	6.5472					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	**6.7661**	**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	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Exhibit B

Existing Site Operational Emissions

3727 Robertson-Existing

South Coast AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	2.85	1000sqft	0.12	2,850.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	11			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	506.46	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - SCE CO2e intensity factor was linearly projected for year 2019 anticipated RPS based on SB 100 target of 44% RPS by 2024. See existing assumptions for more details

Land Use - see existing assumptions for more details.

Construction Phase - existing operational run only

Vehicle Trips - existing trip rate from project traffic impact analysis.

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Energy Use - Historical energy used since existing uses were built before 2005.

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	2.00
tblFleetMix	HHD	0.03	0.03
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD2	5.8700e-003	5.7655e-003
tblFleetMix	MCY	4.7240e-003	4.2102e-003
tblFleetMix	MDV	0.12	0.13
tblFleetMix	MH	9.9100e-004	9.9959e-004
tblFleetMix	MHD	0.02	0.02
tblFleetMix	OBUS	1.9990e-003	1.2392e-003
tblFleetMix	SBUS	7.0400e-004	6.4756e-004
tblFleetMix	UBUS	2.0270e-003	1.4619e-003
tblLandUse	LotAcreage	0.07	0.12
tblProjectCharacteristics	CH4IntensityFactor	0.029	0
tblProjectCharacteristics	CO2IntensityFactor	702.44	506.46
tblProjectCharacteristics	N2OIntensityFactor	0.006	0
tblVehicleEF	HHD	0.85	0.03
tblVehicleEF	HHD	0.08	0.08
tblVehicleEF	HHD	0.12	4.2653e-007
tblVehicleEF	HHD	3.14	5.53
tblVehicleEF	HHD	0.99	0.82
tblVehicleEF	HHD	3.18	9.5370e-003
tblVehicleEF	HHD	4,992.93	1,154.64
tblVehicleEF	HHD	1,647.55	1,537.04
tblVehicleEF	HHD	9.63	0.11
tblVehicleEF	HHD	25.01	6.67
tblVehicleEF	HHD	4.55	4.81

tblVehicleEF	HHD	19.77	1.52
tblVehicleEF	HHD	0.03	0.02
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.08
tblVehicleEF	HHD	1.1800e-004	4.2255e-006
tblVehicleEF	HHD	0.03	0.02
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8190e-003	8.8734e-003
tblVehicleEF	HHD	0.02	0.07
tblVehicleEF	HHD	1.1000e-004	3.9615e-006
tblVehicleEF	HHD	1.3200e-004	1.2385e-005
tblVehicleEF	HHD	5.9330e-003	5.8881e-004
tblVehicleEF	HHD	0.79	0.49
tblVehicleEF	HHD	9.1000e-005	8.1541e-006
tblVehicleEF	HHD	0.14	0.17
tblVehicleEF	HHD	4.8800e-004	2.6148e-003
tblVehicleEF	HHD	0.10	2.2417e-006
tblVehicleEF	HHD	0.05	0.01
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	1.4900e-004	1.1157e-006
tblVehicleEF	HHD	1.3200e-004	1.2385e-005
tblVehicleEF	HHD	5.9330e-003	5.8881e-004
tblVehicleEF	HHD	0.92	0.56
tblVehicleEF	HHD	9.1000e-005	8.1541e-006
tblVehicleEF	HHD	0.24	0.27
tblVehicleEF	HHD	4.8800e-004	2.6148e-003
tblVehicleEF	HHD	0.11	2.4543e-006
tblVehicleEF	HHD	0.80	0.03
tblVehicleEF	HHD	0.08	0.08

tblVehicleEF	HHD	0.11	4.0875e-007
tblVehicleEF	HHD	2.29	5.35
tblVehicleEF	HHD	0.99	0.82
tblVehicleEF	HHD	3.02	9.0529e-003
tblVehicleEF	HHD	5,285.68	1,158.03
tblVehicleEF	HHD	1,647.55	1,537.04
tblVehicleEF	HHD	9.63	0.11
tblVehicleEF	HHD	25.81	6.56
tblVehicleEF	HHD	4.30	4.55
tblVehicleEF	HHD	19.76	1.52
tblVehicleEF	HHD	0.03	0.02
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.08
tblVehicleEF	HHD	1.1800e-004	4.2255e-006
tblVehicleEF	HHD	0.02	0.02
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8190e-003	8.8734e-003
tblVehicleEF	HHD	0.02	0.07
tblVehicleEF	HHD	1.1000e-004	3.9615e-006
tblVehicleEF	HHD	2.1500e-004	2.0386e-005
tblVehicleEF	HHD	6.1900e-003	6.0457e-004
tblVehicleEF	HHD	0.75	0.50
tblVehicleEF	HHD	1.4700e-004	1.3636e-005
tblVehicleEF	HHD	0.14	0.17
tblVehicleEF	HHD	4.8400e-004	2.6080e-003
tblVehicleEF	HHD	0.10	2.1542e-006
tblVehicleEF	HHD	0.05	0.01
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	1.4700e-004	1.1081e-006

tblVehicleEF	HHD	2.1500e-004	2.0386e-005
tblVehicleEF	HHD	6.1900e-003	6.0457e-004
tblVehicleEF	HHD	0.87	0.58
tblVehicleEF	HHD	1.4700e-004	1.3636e-005
tblVehicleEF	HHD	0.24	0.27
tblVehicleEF	HHD	4.8400e-004	2.6080e-003
tblVehicleEF	HHD	0.11	2.3586e-006
tblVehicleEF	HHD	0.91	0.03
tblVehicleEF	HHD	0.08	0.08
tblVehicleEF	HHD	0.12	4.3011e-007
tblVehicleEF	HHD	4.32	5.79
tblVehicleEF	HHD	0.99	0.82
tblVehicleEF	HHD	3.20	9.5974e-003
tblVehicleEF	HHD	4,588.64	1,149.97
tblVehicleEF	HHD	1,647.55	1,537.04
tblVehicleEF	HHD	9.63	0.11
tblVehicleEF	HHD	23.92	6.82
tblVehicleEF	HHD	4.48	4.74
tblVehicleEF	HHD	19.77	1.52
tblVehicleEF	HHD	0.04	0.02
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.08
tblVehicleEF	HHD	1.1800e-004	4.2255e-006
tblVehicleEF	HHD	0.03	0.02
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8190e-003	8.8734e-003
tblVehicleEF	HHD	0.02	0.07
tblVehicleEF	HHD	1.1000e-004	3.9615e-006
tblVehicleEF	HHD	1.2900e-004	1.3087e-005

tblVehicleEF	HHD	6.7430e-003	7.2786e-004
tblVehicleEF	HHD	0.86	0.47
tblVehicleEF	HHD	8.9000e-005	8.3235e-006
tblVehicleEF	HHD	0.14	0.17
tblVehicleEF	HHD	5.2300e-004	2.7607e-003
tblVehicleEF	HHD	0.10	2.2588e-006
tblVehicleEF	HHD	0.04	0.01
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	1.5000e-004	1.1167e-006
tblVehicleEF	HHD	1.2900e-004	1.3087e-005
tblVehicleEF	HHD	6.7430e-003	7.2786e-004
tblVehicleEF	HHD	0.99	0.54
tblVehicleEF	HHD	8.9000e-005	8.3235e-006
tblVehicleEF	HHD	0.24	0.27
tblVehicleEF	HHD	5.2300e-004	2.7607e-003
tblVehicleEF	HHD	0.11	2.4731e-006
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tblVehicleEF	LDA	296.90	289.60
tblVehicleEF	LDA	63.02	57.92
tblVehicleEF	LDA	0.07	0.06
tblVehicleEF	LDA	0.10	0.22
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	8.0000e-003	8.0000e-003
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tblVehicleEF	LDA	2.0000e-003	2.0000e-003

tblVehicleEF	LDA	1.9670e-003	1.8006e-003
tblVehicleEF	LDA	2.1590e-003	1.9415e-003
tblVehicleEF	LDA	0.05	0.07
tblVehicleEF	LDA	0.12	0.12
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	0.24
tblVehicleEF	LDA	0.11	0.29
tblVehicleEF	LDA	2.9750e-003	2.8651e-003
tblVehicleEF	LDA	6.5600e-004	5.7318e-004
tblVehicleEF	LDA	0.05	0.07
tblVehicleEF	LDA	0.12	0.12
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.04	0.24
tblVehicleEF	LDA	0.12	0.32
tblVehicleEF	LDA	6.9190e-003	4.5647e-003
tblVehicleEF	LDA	6.9240e-003	0.06
tblVehicleEF	LDA	0.85	1.01
tblVehicleEF	LDA	1.31	1.95
tblVehicleEF	LDA	312.75	304.53
tblVehicleEF	LDA	63.02	57.29
tblVehicleEF	LDA	0.06	0.05
tblVehicleEF	LDA	0.09	0.21
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	8.0000e-003	8.0000e-003
tblVehicleEF	LDA	2.1320e-003	1.9540e-003
tblVehicleEF	LDA	2.3470e-003	2.1114e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	2.0000e-003	2.0000e-003

tblVehicleEF	LDA	1.9670e-003	1.8006e-003
tblVehicleEF	LDA	2.1590e-003	1.9415e-003
tblVehicleEF	LDA	0.08	0.11
tblVehicleEF	LDA	0.13	0.13
tblVehicleEF	LDA	0.07	0.09
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	0.23
tblVehicleEF	LDA	0.09	0.26
tblVehicleEF	LDA	3.1350e-003	3.0128e-003
tblVehicleEF	LDA	6.5300e-004	5.6692e-004
tblVehicleEF	LDA	0.08	0.11
tblVehicleEF	LDA	0.13	0.13
tblVehicleEF	LDA	0.07	0.09
tblVehicleEF	LDA	0.03	0.03
tblVehicleEF	LDA	0.04	0.23
tblVehicleEF	LDA	0.10	0.29
tblVehicleEF	LDA	6.3270e-003	4.1507e-003
tblVehicleEF	LDA	8.0020e-003	0.06
tblVehicleEF	LDA	0.74	0.87
tblVehicleEF	LDA	1.56	2.35
tblVehicleEF	LDA	291.73	284.71
tblVehicleEF	LDA	63.02	58.05
tblVehicleEF	LDA	0.06	0.06
tblVehicleEF	LDA	0.10	0.23
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	8.0000e-003	8.0000e-003
tblVehicleEF	LDA	2.1320e-003	1.9540e-003
tblVehicleEF	LDA	2.3470e-003	2.1114e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	2.0000e-003	2.0000e-003

tblVehicleEF	LDA	1.9670e-003	1.8006e-003
tblVehicleEF	LDA	2.1590e-003	1.9415e-003
tblVehicleEF	LDA	0.05	0.07
tblVehicleEF	LDA	0.14	0.13
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.05	0.27
tblVehicleEF	LDA	0.11	0.30
tblVehicleEF	LDA	2.9230e-003	2.8167e-003
tblVehicleEF	LDA	6.5700e-004	5.7447e-004
tblVehicleEF	LDA	0.05	0.07
tblVehicleEF	LDA	0.14	0.13
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.05	0.27
tblVehicleEF	LDA	0.12	0.33
tblVehicleEF	LDT1	0.02	0.01
tblVehicleEF	LDT1	0.02	0.10
tblVehicleEF	LDT1	1.99	2.00
tblVehicleEF	LDT1	3.80	2.55
tblVehicleEF	LDT1	357.64	340.52
tblVehicleEF	LDT1	74.91	69.18
tblVehicleEF	LDT1	0.19	0.18
tblVehicleEF	LDT1	0.23	0.34
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	3.6680e-003	3.2197e-003
tblVehicleEF	LDT1	3.9250e-003	3.2584e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003

tblVehicleEF	LDT1	3.3780e-003	2.9639e-003
tblVehicleEF	LDT1	3.6110e-003	2.9966e-003
tblVehicleEF	LDT1	0.16	0.18
tblVehicleEF	LDT1	0.33	0.27
tblVehicleEF	LDT1	0.13	0.14
tblVehicleEF	LDT1	0.05	0.05
tblVehicleEF	LDT1	0.20	0.91
tblVehicleEF	LDT1	0.27	0.50
tblVehicleEF	LDT1	3.6030e-003	3.3696e-003
tblVehicleEF	LDT1	8.1600e-004	6.8454e-004
tblVehicleEF	LDT1	0.16	0.18
tblVehicleEF	LDT1	0.33	0.27
tblVehicleEF	LDT1	0.13	0.14
tblVehicleEF	LDT1	0.07	0.07
tblVehicleEF	LDT1	0.20	0.91
tblVehicleEF	LDT1	0.30	0.55
tblVehicleEF	LDT1	0.02	0.01
tblVehicleEF	LDT1	0.02	0.08
tblVehicleEF	LDT1	2.18	2.20
tblVehicleEF	LDT1	3.24	2.18
tblVehicleEF	LDT1	375.39	355.78
tblVehicleEF	LDT1	74.91	68.38
tblVehicleEF	LDT1	0.17	0.16
tblVehicleEF	LDT1	0.21	0.31
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	3.6680e-003	3.2197e-003
tblVehicleEF	LDT1	3.9250e-003	3.2584e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003

tblVehicleEF	LDT1	3.3780e-003	2.9639e-003
tblVehicleEF	LDT1	3.6110e-003	2.9966e-003
tblVehicleEF	LDT1	0.27	0.30
tblVehicleEF	LDT1	0.36	0.29
tblVehicleEF	LDT1	0.20	0.21
tblVehicleEF	LDT1	0.05	0.05
tblVehicleEF	LDT1	0.19	0.85
tblVehicleEF	LDT1	0.24	0.44
tblVehicleEF	LDT1	3.7830e-003	3.5206e-003
tblVehicleEF	LDT1	8.0600e-004	6.7672e-004
tblVehicleEF	LDT1	0.27	0.30
tblVehicleEF	LDT1	0.36	0.29
tblVehicleEF	LDT1	0.20	0.21
tblVehicleEF	LDT1	0.07	0.08
tblVehicleEF	LDT1	0.19	0.85
tblVehicleEF	LDT1	0.26	0.48
tblVehicleEF	LDT1	0.02	0.01
tblVehicleEF	LDT1	0.02	0.10
tblVehicleEF	LDT1	1.93	1.93
tblVehicleEF	LDT1	3.91	2.63
tblVehicleEF	LDT1	351.73	335.40
tblVehicleEF	LDT1	74.91	69.34
tblVehicleEF	LDT1	0.19	0.17
tblVehicleEF	LDT1	0.23	0.34
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	3.6680e-003	3.2197e-003
tblVehicleEF	LDT1	3.9250e-003	3.2584e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003

tblVehicleEF	LDT1	3.3780e-003	2.9639e-003
tblVehicleEF	LDT1	3.6110e-003	2.9966e-003
tblVehicleEF	LDT1	0.16	0.18
tblVehicleEF	LDT1	0.38	0.30
tblVehicleEF	LDT1	0.12	0.13
tblVehicleEF	LDT1	0.05	0.05
tblVehicleEF	LDT1	0.24	1.07
tblVehicleEF	LDT1	0.28	0.51
tblVehicleEF	LDT1	3.5430e-003	3.3190e-003
tblVehicleEF	LDT1	8.1800e-004	6.8617e-004
tblVehicleEF	LDT1	0.16	0.18
tblVehicleEF	LDT1	0.38	0.30
tblVehicleEF	LDT1	0.12	0.13
tblVehicleEF	LDT1	0.07	0.07
tblVehicleEF	LDT1	0.24	1.07
tblVehicleEF	LDT1	0.31	0.56
tblVehicleEF	LDT2	8.6130e-003	6.5959e-003
tblVehicleEF	LDT2	9.5100e-003	0.08
tblVehicleEF	LDT2	1.00	1.30
tblVehicleEF	LDT2	1.89	2.97
tblVehicleEF	LDT2	406.62	374.80
tblVehicleEF	LDT2	85.85	76.50
tblVehicleEF	LDT2	0.11	0.12
tblVehicleEF	LDT2	0.17	0.38
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9950e-003	2.0175e-003
tblVehicleEF	LDT2	2.3030e-003	2.1081e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003

tblVehicleEF	LDT2	1.8350e-003	1.8570e-003
tblVehicleEF	LDT2	2.1180e-003	1.9387e-003
tblVehicleEF	LDT2	0.06	0.09
tblVehicleEF	LDT2	0.13	0.15
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.07	0.46
tblVehicleEF	LDT2	0.13	0.41
tblVehicleEF	LDT2	4.0750e-003	3.7082e-003
tblVehicleEF	LDT2	8.9100e-004	7.5703e-004
tblVehicleEF	LDT2	0.06	0.09
tblVehicleEF	LDT2	0.13	0.15
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.07	0.46
tblVehicleEF	LDT2	0.14	0.45
tblVehicleEF	LDT2	9.1950e-003	7.0670e-003
tblVehicleEF	LDT2	8.4280e-003	0.08
tblVehicleEF	LDT2	1.11	1.44
tblVehicleEF	LDT2	1.62	2.54
tblVehicleEF	LDT2	427.54	390.20
tblVehicleEF	LDT2	85.85	75.67
tblVehicleEF	LDT2	0.09	0.11
tblVehicleEF	LDT2	0.16	0.35
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9950e-003	2.0175e-003
tblVehicleEF	LDT2	2.3030e-003	2.1081e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003

tblVehicleEF	LDT2	1.8350e-003	1.8570e-003
tblVehicleEF	LDT2	2.1180e-003	1.9387e-003
tblVehicleEF	LDT2	0.09	0.14
tblVehicleEF	LDT2	0.14	0.16
tblVehicleEF	LDT2	0.08	0.13
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.07	0.43
tblVehicleEF	LDT2	0.11	0.36
tblVehicleEF	LDT2	4.2860e-003	3.8606e-003
tblVehicleEF	LDT2	8.8600e-004	7.4880e-004
tblVehicleEF	LDT2	0.09	0.14
tblVehicleEF	LDT2	0.14	0.16
tblVehicleEF	LDT2	0.08	0.13
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.07	0.43
tblVehicleEF	LDT2	0.12	0.40
tblVehicleEF	LDT2	8.4340e-003	6.4559e-003
tblVehicleEF	LDT2	9.7300e-003	0.09
tblVehicleEF	LDT2	0.96	1.25
tblVehicleEF	LDT2	1.94	3.06
tblVehicleEF	LDT2	399.66	369.64
tblVehicleEF	LDT2	85.85	76.68
tblVehicleEF	LDT2	0.10	0.12
tblVehicleEF	LDT2	0.17	0.38
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9950e-003	2.0175e-003
tblVehicleEF	LDT2	2.3030e-003	2.1081e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003

tblVehicleEF	LDT2	1.8350e-003	1.8570e-003
tblVehicleEF	LDT2	2.1180e-003	1.9387e-003
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.14	0.16
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.08	0.54
tblVehicleEF	LDT2	0.13	0.42
tblVehicleEF	LDT2	4.0050e-003	3.6571e-003
tblVehicleEF	LDT2	8.9200e-004	7.5878e-004
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.14	0.16
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.08	0.54
tblVehicleEF	LDT2	0.14	0.46
tblVehicleEF	LHD1	6.4120e-003	6.0565e-003
tblVehicleEF	LHD1	0.02	7.6280e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.16	0.19
tblVehicleEF	LHD1	1.13	0.93
tblVehicleEF	LHD1	3.23	1.26
tblVehicleEF	LHD1	8.98	9.12
tblVehicleEF	LHD1	628.01	695.72
tblVehicleEF	LHD1	35.68	13.22
tblVehicleEF	LHD1	0.07	0.06
tblVehicleEF	LHD1	1.53	1.13
tblVehicleEF	LHD1	1.14	0.38
tblVehicleEF	LHD1	8.1700e-004	7.0981e-004
tblVehicleEF	LHD1	0.08	0.08

tblVehicleEF	LHD1	9.8590e-003	9.5450e-003
tblVehicleEF	LHD1	0.01	8.3538e-003
tblVehicleEF	LHD1	1.1990e-003	3.3991e-004
tblVehicleEF	LHD1	7.8200e-004	6.7910e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.4650e-003	2.3863e-003
tblVehicleEF	LHD1	0.01	7.9614e-003
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tblVehicleEF	LHD1	3.5670e-003	3.1349e-003
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tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	2.0130e-003	1.7695e-003
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	0.32	0.63
tblVehicleEF	LHD1	0.33	0.10
tblVehicleEF	LHD1	9.1000e-005	8.8742e-005
tblVehicleEF	LHD1	6.1830e-003	6.8013e-003
tblVehicleEF	LHD1	4.1800e-004	1.3086e-004
tblVehicleEF	LHD1	3.5670e-003	3.1349e-003
tblVehicleEF	LHD1	0.11	0.10
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.0130e-003	1.7695e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.32	0.63
tblVehicleEF	LHD1	0.36	0.11
tblVehicleEF	LHD1	6.4120e-003	6.0699e-003
tblVehicleEF	LHD1	0.02	7.7595e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.16	0.19
tblVehicleEF	LHD1	1.14	0.94

tblVehicleEF	LHD1	3.08	1.20
tblVehicleEF	LHD1	8.98	9.12
tblVehicleEF	LHD1	628.01	695.75
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tblVehicleEF	LHD1	0.07	0.06
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tblVehicleEF	LHD1	1.10	0.37
tblVehicleEF	LHD1	8.1700e-004	7.0981e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	9.8590e-003	9.5450e-003
tblVehicleEF	LHD1	0.01	8.3538e-003
tblVehicleEF	LHD1	1.1990e-003	3.3991e-004
tblVehicleEF	LHD1	7.8200e-004	6.7910e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.4650e-003	2.3863e-003
tblVehicleEF	LHD1	0.01	7.9614e-003
tblVehicleEF	LHD1	1.1050e-003	3.1349e-004
tblVehicleEF	LHD1	5.5850e-003	4.8835e-003
tblVehicleEF	LHD1	0.12	0.10
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	3.0770e-003	2.6924e-003
tblVehicleEF	LHD1	0.08	0.07
tblVehicleEF	LHD1	0.31	0.62
tblVehicleEF	LHD1	0.32	0.10
tblVehicleEF	LHD1	9.1000e-005	8.8742e-005
tblVehicleEF	LHD1	6.1830e-003	6.8015e-003
tblVehicleEF	LHD1	4.1500e-004	1.2984e-004
tblVehicleEF	LHD1	5.5850e-003	4.8835e-003
tblVehicleEF	LHD1	0.12	0.10
tblVehicleEF	LHD1	0.03	0.03

tblVehicleEF	LHD1	3.0770e-003	2.6924e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.31	0.62
tblVehicleEF	LHD1	0.35	0.11
tblVehicleEF	LHD1	6.4120e-003	6.0545e-003
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tblVehicleEF	LHD1	0.16	0.19
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tblVehicleEF	LHD1	8.98	9.12
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tblVehicleEF	LHD1	0.07	0.06
tblVehicleEF	LHD1	1.50	1.11
tblVehicleEF	LHD1	1.15	0.38
tblVehicleEF	LHD1	8.1700e-004	7.0981e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	9.8590e-003	9.5450e-003
tblVehicleEF	LHD1	0.01	8.3538e-003
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tblVehicleEF	LHD1	7.8200e-004	6.7910e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.4650e-003	2.3863e-003
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tblVehicleEF	LHD1	3.6920e-003	3.2651e-003
tblVehicleEF	LHD1	0.13	0.11
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.9880e-003	1.7521e-003

tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	0.35	0.68
tblVehicleEF	LHD1	0.33	0.10
tblVehicleEF	LHD1	9.1000e-005	8.8742e-005
tblVehicleEF	LHD1	6.1830e-003	6.8012e-003
tblVehicleEF	LHD1	4.1800e-004	1.3099e-004
tblVehicleEF	LHD1	3.6920e-003	3.2651e-003
tblVehicleEF	LHD1	0.13	0.11
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	1.9880e-003	1.7521e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.35	0.68
tblVehicleEF	LHD1	0.36	0.11
tblVehicleEF	LHD2	4.7550e-003	4.3651e-003
tblVehicleEF	LHD2	6.4800e-003	5.2907e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.14	0.16
tblVehicleEF	LHD2	0.53	0.63
tblVehicleEF	LHD2	1.73	0.87
tblVehicleEF	LHD2	13.70	13.75
tblVehicleEF	LHD2	639.58	701.59
tblVehicleEF	LHD2	30.04	10.39
tblVehicleEF	LHD2	0.11	0.10
tblVehicleEF	LHD2	1.25	1.41
tblVehicleEF	LHD2	0.70	0.27
tblVehicleEF	LHD2	1.2000e-003	1.1885e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	5.7800e-004	1.8429e-004

tblVehicleEF	LHD2	1.1490e-003	1.1371e-003
tblVehicleEF	LHD2	0.04	0.04
tblVehicleEF	LHD2	2.6260e-003	2.6020e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	5.3200e-004	1.6946e-004
tblVehicleEF	LHD2	1.5870e-003	1.9467e-003
tblVehicleEF	LHD2	0.05	0.06
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	9.3200e-004	1.1036e-003
tblVehicleEF	LHD2	0.06	0.06
tblVehicleEF	LHD2	0.12	0.42
tblVehicleEF	LHD2	0.17	0.07
tblVehicleEF	LHD2	1.3400e-004	1.3203e-004
tblVehicleEF	LHD2	6.2420e-003	6.7994e-003
tblVehicleEF	LHD2	3.3300e-004	1.0286e-004
tblVehicleEF	LHD2	1.5870e-003	1.9467e-003
tblVehicleEF	LHD2	0.05	0.06
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	9.3200e-004	1.1036e-003
tblVehicleEF	LHD2	0.07	0.08
tblVehicleEF	LHD2	0.12	0.42
tblVehicleEF	LHD2	0.18	0.08
tblVehicleEF	LHD2	4.7550e-003	4.3747e-003
tblVehicleEF	LHD2	6.5770e-003	5.3568e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.14	0.16
tblVehicleEF	LHD2	0.54	0.64
tblVehicleEF	LHD2	1.65	0.83
tblVehicleEF	LHD2	13.70	13.75
tblVehicleEF	LHD2	639.58	701.60

tblVehicleEF	LHD2	30.04	10.32
tblVehicleEF	LHD2	0.11	0.10
tblVehicleEF	LHD2	1.17	1.33
tblVehicleEF	LHD2	0.67	0.26
tblVehicleEF	LHD2	1.2000e-003	1.1885e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	5.7800e-004	1.8429e-004
tblVehicleEF	LHD2	1.1490e-003	1.1371e-003
tblVehicleEF	LHD2	0.04	0.04
tblVehicleEF	LHD2	2.6260e-003	2.6020e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	5.3200e-004	1.6946e-004
tblVehicleEF	LHD2	2.4740e-003	3.0207e-003
tblVehicleEF	LHD2	0.05	0.07
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	1.4090e-003	1.6678e-003
tblVehicleEF	LHD2	0.06	0.06
tblVehicleEF	LHD2	0.12	0.40
tblVehicleEF	LHD2	0.16	0.07
tblVehicleEF	LHD2	1.3400e-004	1.3203e-004
tblVehicleEF	LHD2	6.2420e-003	6.7995e-003
tblVehicleEF	LHD2	3.3100e-004	1.0216e-004
tblVehicleEF	LHD2	2.4740e-003	3.0207e-003
tblVehicleEF	LHD2	0.05	0.07
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	1.4090e-003	1.6678e-003
tblVehicleEF	LHD2	0.07	0.08
tblVehicleEF	LHD2	0.12	0.40

tblVehicleEF	LHD2	0.18	0.07
tblVehicleEF	LHD2	4.7550e-003	4.3635e-003
tblVehicleEF	LHD2	6.4560e-003	5.2747e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.14	0.16
tblVehicleEF	LHD2	0.53	0.63
tblVehicleEF	LHD2	1.74	0.88
tblVehicleEF	LHD2	13.70	13.75
tblVehicleEF	LHD2	639.58	701.58
tblVehicleEF	LHD2	30.04	10.40
tblVehicleEF	LHD2	0.11	0.10
tblVehicleEF	LHD2	1.23	1.39
tblVehicleEF	LHD2	0.70	0.27
tblVehicleEF	LHD2	1.2000e-003	1.1885e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	5.7800e-004	1.8429e-004
tblVehicleEF	LHD2	1.1490e-003	1.1371e-003
tblVehicleEF	LHD2	0.04	0.04
tblVehicleEF	LHD2	2.6260e-003	2.6020e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	5.3200e-004	1.6946e-004
tblVehicleEF	LHD2	1.6010e-003	1.9864e-003
tblVehicleEF	LHD2	0.06	0.07
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	9.0400e-004	1.0706e-003
tblVehicleEF	LHD2	0.06	0.06
tblVehicleEF	LHD2	0.13	0.45
tblVehicleEF	LHD2	0.17	0.07

tblVehicleEF	LHD2	1.3400e-004	1.3203e-004
tblVehicleEF	LHD2	6.2420e-003	6.7993e-003
tblVehicleEF	LHD2	3.3300e-004	1.0296e-004
tblVehicleEF	LHD2	1.6010e-003	1.9864e-003
tblVehicleEF	LHD2	0.06	0.07
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	9.0400e-004	1.0706e-003
tblVehicleEF	LHD2	0.07	0.08
tblVehicleEF	LHD2	0.13	0.45
tblVehicleEF	LHD2	0.18	0.08
tblVehicleEF	MCY	0.49	0.37
tblVehicleEF	MCY	0.15	0.24
tblVehicleEF	MCY	19.79	20.12
tblVehicleEF	MCY	9.59	8.45
tblVehicleEF	MCY	180.67	218.58
tblVehicleEF	MCY	46.13	60.95
tblVehicleEF	MCY	1.13	1.13
tblVehicleEF	MCY	0.31	0.26
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.0830e-003	2.0705e-003
tblVehicleEF	MCY	4.0650e-003	3.4362e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	1.9510e-003	1.9400e-003
tblVehicleEF	MCY	3.8420e-003	3.2466e-003
tblVehicleEF	MCY	1.19	1.21
tblVehicleEF	MCY	0.72	0.75
tblVehicleEF	MCY	0.72	0.73
tblVehicleEF	MCY	2.52	2.54

tblVehicleEF	MCY	0.66	2.23
tblVehicleEF	MCY	2.09	1.85
tblVehicleEF	MCY	2.2050e-003	2.1630e-003
tblVehicleEF	MCY	6.8000e-004	6.0320e-004
tblVehicleEF	MCY	1.19	1.21
tblVehicleEF	MCY	0.72	0.75
tblVehicleEF	MCY	0.72	0.73
tblVehicleEF	MCY	3.11	3.12
tblVehicleEF	MCY	0.66	2.23
tblVehicleEF	MCY	2.28	2.01
tblVehicleEF	MCY	0.48	0.36
tblVehicleEF	MCY	0.14	0.21
tblVehicleEF	MCY	19.25	19.55
tblVehicleEF	MCY	8.85	7.77
tblVehicleEF	MCY	180.67	217.44
tblVehicleEF	MCY	46.13	59.16
tblVehicleEF	MCY	0.99	0.99
tblVehicleEF	MCY	0.29	0.25
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.0830e-003	2.0705e-003
tblVehicleEF	MCY	4.0650e-003	3.4362e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	1.9510e-003	1.9400e-003
tblVehicleEF	MCY	3.8420e-003	3.2466e-003
tblVehicleEF	MCY	2.00	2.03
tblVehicleEF	MCY	0.83	0.86
tblVehicleEF	MCY	1.28	1.29
tblVehicleEF	MCY	2.46	2.48

tblVehicleEF	MCY	0.63	2.12
tblVehicleEF	MCY	1.86	1.64
tblVehicleEF	MCY	2.1950e-003	2.1518e-003
tblVehicleEF	MCY	6.6100e-004	5.8548e-004
tblVehicleEF	MCY	2.00	2.03
tblVehicleEF	MCY	0.83	0.86
tblVehicleEF	MCY	1.28	1.29
tblVehicleEF	MCY	3.03	3.04
tblVehicleEF	MCY	0.63	2.12
tblVehicleEF	MCY	2.03	1.78
tblVehicleEF	MCY	0.49	0.37
tblVehicleEF	MCY	0.16	0.24
tblVehicleEF	MCY	19.80	20.14
tblVehicleEF	MCY	9.68	8.53
tblVehicleEF	MCY	180.67	218.64
tblVehicleEF	MCY	46.13	61.19
tblVehicleEF	MCY	1.11	1.11
tblVehicleEF	MCY	0.31	0.26
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.0830e-003	2.0705e-003
tblVehicleEF	MCY	4.0650e-003	3.4362e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	1.9510e-003	1.9400e-003
tblVehicleEF	MCY	3.8420e-003	3.2466e-003
tblVehicleEF	MCY	1.28	1.30
tblVehicleEF	MCY	0.93	0.96
tblVehicleEF	MCY	0.68	0.70
tblVehicleEF	MCY	2.53	2.55

tblVehicleEF	MCY	0.76	2.54
tblVehicleEF	MCY	2.13	1.88
tblVehicleEF	MCY	2.2060e-003	2.1636e-003
tblVehicleEF	MCY	6.8200e-004	6.0553e-004
tblVehicleEF	MCY	1.28	1.30
tblVehicleEF	MCY	0.93	0.96
tblVehicleEF	MCY	0.68	0.70
tblVehicleEF	MCY	3.12	3.13
tblVehicleEF	MCY	0.76	2.54
tblVehicleEF	MCY	2.31	2.05
tblVehicleEF	MDV	0.02	9.2638e-003
tblVehicleEF	MDV	0.02	0.10
tblVehicleEF	MDV	1.80	1.64
tblVehicleEF	MDV	3.45	3.61
tblVehicleEF	MDV	542.45	456.57
tblVehicleEF	MDV	112.95	93.04
tblVehicleEF	MDV	0.21	0.17
tblVehicleEF	MDV	0.33	0.46
tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.2450e-003	2.1942e-003
tblVehicleEF	MDV	2.6000e-003	2.3357e-003
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0720e-003	2.0250e-003
tblVehicleEF	MDV	2.3950e-003	2.1507e-003
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.18	0.17
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.05	0.04

tblVehicleEF	MDV	0.10	0.49
tblVehicleEF	MDV	0.28	0.53
tblVehicleEF	MDV	5.4410e-003	4.5149e-003
tblVehicleEF	MDV	1.1910e-003	9.2067e-004
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.18	0.17
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.07	0.06
tblVehicleEF	MDV	0.10	0.49
tblVehicleEF	MDV	0.30	0.58
tblVehicleEF	MDV	0.02	9.8235e-003
tblVehicleEF	MDV	0.02	0.09
tblVehicleEF	MDV	1.97	1.80
tblVehicleEF	MDV	2.97	3.09
tblVehicleEF	MDV	570.27	473.39
tblVehicleEF	MDV	112.95	92.01
tblVehicleEF	MDV	0.18	0.15
tblVehicleEF	MDV	0.31	0.43
tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.2450e-003	2.1942e-003
tblVehicleEF	MDV	2.6000e-003	2.3357e-003
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0720e-003	2.0250e-003
tblVehicleEF	MDV	2.3950e-003	2.1507e-003
tblVehicleEF	MDV	0.13	0.17
tblVehicleEF	MDV	0.19	0.18
tblVehicleEF	MDV	0.12	0.15
tblVehicleEF	MDV	0.05	0.05

tblVehicleEF	MDV	0.09	0.46
tblVehicleEF	MDV	0.24	0.47
tblVehicleEF	MDV	5.7220e-003	4.6813e-003
tblVehicleEF	MDV	1.1820e-003	9.1054e-004
tblVehicleEF	MDV	0.13	0.17
tblVehicleEF	MDV	0.19	0.18
tblVehicleEF	MDV	0.12	0.15
tblVehicleEF	MDV	0.07	0.06
tblVehicleEF	MDV	0.09	0.46
tblVehicleEF	MDV	0.27	0.52
tblVehicleEF	MDV	0.02	9.0927e-003
tblVehicleEF	MDV	0.02	0.11
tblVehicleEF	MDV	1.74	1.59
tblVehicleEF	MDV	3.54	3.71
tblVehicleEF	MDV	533.35	451.06
tblVehicleEF	MDV	112.95	93.25
tblVehicleEF	MDV	0.20	0.16
tblVehicleEF	MDV	0.33	0.47
tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.2450e-003	2.1942e-003
tblVehicleEF	MDV	2.6000e-003	2.3357e-003
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0720e-003	2.0250e-003
tblVehicleEF	MDV	2.3950e-003	2.1507e-003
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.20	0.18
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.05	0.04

tblVehicleEF	MDV	0.12	0.57
tblVehicleEF	MDV	0.28	0.54
tblVehicleEF	MDV	5.3500e-003	4.4603e-003
tblVehicleEF	MDV	1.1920e-003	9.2274e-004
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.20	0.18
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.07	0.06
tblVehicleEF	MDV	0.12	0.57
tblVehicleEF	MDV	0.31	0.60
tblVehicleEF	MH	0.04	0.02
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	3.92	2.17
tblVehicleEF	MH	7.32	2.40
tblVehicleEF	MH	1,112.23	1,539.05
tblVehicleEF	MH	63.76	20.57
tblVehicleEF	MH	1.51	1.47
tblVehicleEF	MH	0.92	0.24
tblVehicleEF	MH	0.13	0.13
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.7360e-003	3.5794e-004
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	3.2130e-003	3.2517e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.6140e-003	3.3066e-004
tblVehicleEF	MH	1.35	1.20
tblVehicleEF	MH	0.09	0.08
tblVehicleEF	MH	0.53	0.46
tblVehicleEF	MH	0.14	0.09

tblVehicleEF	MH	0.02	1.81
tblVehicleEF	MH	0.46	0.12
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	7.6700e-004	2.0358e-004
tblVehicleEF	MH	1.35	1.20
tblVehicleEF	MH	0.09	0.08
tblVehicleEF	MH	0.53	0.46
tblVehicleEF	MH	0.19	0.12
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tblVehicleEF	MH	0.50	0.13
tblVehicleEF	MH	0.04	0.02
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	3.97	2.21
tblVehicleEF	MH	6.92	2.26
tblVehicleEF	MH	1,112.23	1,539.12
tblVehicleEF	MH	63.76	20.33
tblVehicleEF	MH	1.39	1.36
tblVehicleEF	MH	0.88	0.23
tblVehicleEF	MH	0.13	0.13
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.7360e-003	3.5794e-004
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	3.2130e-003	3.2517e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.6140e-003	3.3066e-004
tblVehicleEF	MH	2.10	1.85
tblVehicleEF	MH	0.09	0.08
tblVehicleEF	MH	0.84	0.72
tblVehicleEF	MH	0.14	0.09

tblVehicleEF	MH	0.02	1.78
tblVehicleEF	MH	0.44	0.11
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	7.5900e-004	2.0123e-004
tblVehicleEF	MH	2.10	1.85
tblVehicleEF	MH	0.09	0.08
tblVehicleEF	MH	0.84	0.72
tblVehicleEF	MH	0.19	0.12
tblVehicleEF	MH	0.02	1.78
tblVehicleEF	MH	0.48	0.12
tblVehicleEF	MH	0.04	0.02
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	3.90	2.16
tblVehicleEF	MH	7.37	2.42
tblVehicleEF	MH	1,112.23	1,539.03
tblVehicleEF	MH	63.76	20.61
tblVehicleEF	MH	1.48	1.44
tblVehicleEF	MH	0.92	0.24
tblVehicleEF	MH	0.13	0.13
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.7360e-003	3.5794e-004
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	3.2130e-003	3.2517e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.6140e-003	3.3066e-004
tblVehicleEF	MH	1.51	1.34
tblVehicleEF	MH	0.11	0.09
tblVehicleEF	MH	0.55	0.47
tblVehicleEF	MH	0.14	0.09

tblVehicleEF	MH	0.02	1.91
tblVehicleEF	MH	0.46	0.12
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	7.6700e-004	2.0394e-004
tblVehicleEF	MH	1.51	1.34
tblVehicleEF	MH	0.11	0.09
tblVehicleEF	MH	0.55	0.47
tblVehicleEF	MH	0.19	0.12
tblVehicleEF	MH	0.02	1.91
tblVehicleEF	MH	0.50	0.13
tblVehicleEF	MHD	0.02	4.3757e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	0.06	0.01
tblVehicleEF	MHD	0.48	0.38
tblVehicleEF	MHD	0.73	0.92
tblVehicleEF	MHD	7.70	1.52
tblVehicleEF	MHD	141.46	68.61
tblVehicleEF	MHD	1,145.30	1,119.76
tblVehicleEF	MHD	63.16	12.27
tblVehicleEF	MHD	1.08	0.66
tblVehicleEF	MHD	2.52	3.03
tblVehicleEF	MHD	10.44	0.92
tblVehicleEF	MHD	4.2030e-003	2.7877e-003
tblVehicleEF	MHD	0.13	0.13
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	0.07	0.09
tblVehicleEF	MHD	9.6900e-004	1.5198e-004
tblVehicleEF	MHD	4.0210e-003	2.6671e-003
tblVehicleEF	MHD	0.06	0.06
tblVehicleEF	MHD	3.0000e-003	3.0000e-003

tblVehicleEF	MHD	0.07	0.09
tblVehicleEF	MHD	8.9200e-004	1.4008e-004
tblVehicleEF	MHD	1.4760e-003	7.7229e-004
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	8.6400e-004	4.5431e-004
tblVehicleEF	MHD	0.13	0.17
tblVehicleEF	MHD	0.02	0.15
tblVehicleEF	MHD	0.47	0.07
tblVehicleEF	MHD	1.3620e-003	6.5197e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.6700e-004	1.2141e-004
tblVehicleEF	MHD	1.4760e-003	7.7229e-004
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	8.6400e-004	4.5431e-004
tblVehicleEF	MHD	0.15	0.19
tblVehicleEF	MHD	0.02	0.15
tblVehicleEF	MHD	0.52	0.08
tblVehicleEF	MHD	0.02	4.1389e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	0.06	0.01
tblVehicleEF	MHD	0.35	0.30
tblVehicleEF	MHD	0.74	0.93
tblVehicleEF	MHD	7.32	1.44
tblVehicleEF	MHD	149.83	70.45
tblVehicleEF	MHD	1,145.30	1,119.78
tblVehicleEF	MHD	63.16	12.14
tblVehicleEF	MHD	1.11	0.67
tblVehicleEF	MHD	2.37	2.86

tblVehicleEF	MHD	10.39	0.92
tblVehicleEF	MHD	3.5430e-003	2.3522e-003
tblVehicleEF	MHD	0.13	0.13
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	0.07	0.09
tblVehicleEF	MHD	9.6900e-004	1.5198e-004
tblVehicleEF	MHD	3.3900e-003	2.2504e-003
tblVehicleEF	MHD	0.06	0.06
tblVehicleEF	MHD	3.0000e-003	3.0000e-003
tblVehicleEF	MHD	0.07	0.09
tblVehicleEF	MHD	8.9200e-004	1.4008e-004
tblVehicleEF	MHD	2.3150e-003	1.2043e-003
tblVehicleEF	MHD	0.06	0.03
tblVehicleEF	MHD	0.03	0.02
tblVehicleEF	MHD	1.3270e-003	6.9492e-004
tblVehicleEF	MHD	0.13	0.17
tblVehicleEF	MHD	0.02	0.14
tblVehicleEF	MHD	0.45	0.07
tblVehicleEF	MHD	1.4410e-003	6.6950e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.6000e-004	1.2014e-004
tblVehicleEF	MHD	2.3150e-003	1.2043e-003
tblVehicleEF	MHD	0.06	0.03
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	1.3270e-003	6.9492e-004
tblVehicleEF	MHD	0.16	0.20
tblVehicleEF	MHD	0.02	0.14
tblVehicleEF	MHD	0.50	0.07
tblVehicleEF	MHD	0.02	4.7143e-003
tblVehicleEF	MHD	0.01	0.01

tblVehicleEF	MHD	0.06	0.01
tblVehicleEF	MHD	0.67	0.50
tblVehicleEF	MHD	0.73	0.92
tblVehicleEF	MHD	7.77	1.53
tblVehicleEF	MHD	129.89	66.07
tblVehicleEF	MHD	1,145.30	1,119.76
tblVehicleEF	MHD	63.16	12.29
tblVehicleEF	MHD	1.03	0.64
tblVehicleEF	MHD	2.47	2.98
tblVehicleEF	MHD	10.45	0.92
tblVehicleEF	MHD	5.1140e-003	3.3891e-003
tblVehicleEF	MHD	0.13	0.13
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	0.07	0.09
tblVehicleEF	MHD	9.6900e-004	1.5198e-004
tblVehicleEF	MHD	4.8930e-003	3.2425e-003
tblVehicleEF	MHD	0.06	0.06
tblVehicleEF	MHD	3.0000e-003	3.0000e-003
tblVehicleEF	MHD	0.07	0.09
tblVehicleEF	MHD	8.9200e-004	1.4008e-004
tblVehicleEF	MHD	1.5100e-003	7.9835e-004
tblVehicleEF	MHD	0.06	0.03
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	8.4600e-004	4.4674e-004
tblVehicleEF	MHD	0.13	0.17
tblVehicleEF	MHD	0.03	0.16
tblVehicleEF	MHD	0.48	0.07
tblVehicleEF	MHD	1.2530e-003	6.2770e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.6800e-004	1.2164e-004

tblVehicleEF	MHD	1.5100e-003	7.9835e-004
tblVehicleEF	MHD	0.06	0.03
tblVehicleEF	MHD	0.05	0.04
tblVehicleEF	MHD	8.4600e-004	4.4674e-004
tblVehicleEF	MHD	0.15	0.19
tblVehicleEF	MHD	0.03	0.16
tblVehicleEF	MHD	0.52	0.08
tblVehicleEF	OBUS	0.01	9.2565e-003
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.29	0.58
tblVehicleEF	OBUS	0.78	1.44
tblVehicleEF	OBUS	6.56	2.62
tblVehicleEF	OBUS	99.62	93.05
tblVehicleEF	OBUS	1,254.62	1,476.08
tblVehicleEF	OBUS	70.18	20.60
tblVehicleEF	OBUS	0.62	0.72
tblVehicleEF	OBUS	2.16	2.78
tblVehicleEF	OBUS	2.53	0.56
tblVehicleEF	OBUS	3.3800e-004	4.0459e-003
tblVehicleEF	OBUS	0.13	0.13
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.01	0.07
tblVehicleEF	OBUS	8.2900e-004	2.1487e-004
tblVehicleEF	OBUS	3.2300e-004	3.8708e-003
tblVehicleEF	OBUS	0.06	0.06
tblVehicleEF	OBUS	3.0000e-003	3.0000e-003
tblVehicleEF	OBUS	0.01	0.06
tblVehicleEF	OBUS	7.6500e-004	1.9837e-004
tblVehicleEF	OBUS	1.6610e-003	2.0046e-003

tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.04	0.07
tblVehicleEF	OBUS	8.2500e-004	9.6621e-004
tblVehicleEF	OBUS	0.07	0.17
tblVehicleEF	OBUS	0.04	0.25
tblVehicleEF	OBUS	0.42	0.13
tblVehicleEF	OBUS	9.6300e-004	8.8560e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.1700e-004	2.0385e-004
tblVehicleEF	OBUS	1.6610e-003	2.0046e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.06	0.09
tblVehicleEF	OBUS	8.2500e-004	9.6621e-004
tblVehicleEF	OBUS	0.09	0.21
tblVehicleEF	OBUS	0.04	0.25
tblVehicleEF	OBUS	0.45	0.14
tblVehicleEF	OBUS	0.01	9.2345e-003
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.27	0.54
tblVehicleEF	OBUS	0.79	1.46
tblVehicleEF	OBUS	6.20	2.47
tblVehicleEF	OBUS	104.52	94.53
tblVehicleEF	OBUS	1,254.62	1,476.12
tblVehicleEF	OBUS	70.18	20.35
tblVehicleEF	OBUS	0.64	0.73
tblVehicleEF	OBUS	2.03	2.60
tblVehicleEF	OBUS	2.48	0.55
tblVehicleEF	OBUS	2.8500e-004	3.4149e-003
tblVehicleEF	OBUS	0.13	0.13

tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.01	0.07
tblVehicleEF	OBUS	8.2900e-004	2.1487e-004
tblVehicleEF	OBUS	2.7300e-004	3.2671e-003
tblVehicleEF	OBUS	0.06	0.06
tblVehicleEF	OBUS	3.0000e-003	3.0000e-003
tblVehicleEF	OBUS	0.01	0.06
tblVehicleEF	OBUS	7.6500e-004	1.9837e-004
tblVehicleEF	OBUS	2.5350e-003	3.0229e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.04	0.07
tblVehicleEF	OBUS	1.2540e-003	1.4532e-003
tblVehicleEF	OBUS	0.07	0.17
tblVehicleEF	OBUS	0.04	0.25
tblVehicleEF	OBUS	0.40	0.13
tblVehicleEF	OBUS	1.0100e-003	8.9955e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.1100e-004	2.0138e-004
tblVehicleEF	OBUS	2.5350e-003	3.0229e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.06	0.09
tblVehicleEF	OBUS	1.2540e-003	1.4532e-003
tblVehicleEF	OBUS	0.09	0.21
tblVehicleEF	OBUS	0.04	0.25
tblVehicleEF	OBUS	0.44	0.14
tblVehicleEF	OBUS	0.01	9.3062e-003
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.31	0.64
tblVehicleEF	OBUS	0.78	1.44

tblVehicleEF	OBUS	6.62	2.65
tblVehicleEF	OBUS	92.85	91.01
tblVehicleEF	OBUS	1,254.62	1,476.07
tblVehicleEF	OBUS	70.18	20.65
tblVehicleEF	OBUS	0.59	0.71
tblVehicleEF	OBUS	2.12	2.73
tblVehicleEF	OBUS	2.54	0.56
tblVehicleEF	OBUS	4.1100e-004	4.9172e-003
tblVehicleEF	OBUS	0.13	0.13
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.01	0.07
tblVehicleEF	OBUS	8.2900e-004	2.1487e-004
tblVehicleEF	OBUS	3.9300e-004	4.7045e-003
tblVehicleEF	OBUS	0.06	0.06
tblVehicleEF	OBUS	3.0000e-003	3.0000e-003
tblVehicleEF	OBUS	0.01	0.06
tblVehicleEF	OBUS	7.6500e-004	1.9837e-004
tblVehicleEF	OBUS	1.7090e-003	2.1077e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.04	0.07
tblVehicleEF	OBUS	8.1300e-004	9.6248e-004
tblVehicleEF	OBUS	0.07	0.17
tblVehicleEF	OBUS	0.05	0.27
tblVehicleEF	OBUS	0.42	0.13
tblVehicleEF	OBUS	8.9800e-004	8.6634e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.1800e-004	2.0430e-004
tblVehicleEF	OBUS	1.7090e-003	2.1077e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.06	0.09

tblVehicleEF	OBUS	8.1300e-004	9.6248e-004
tblVehicleEF	OBUS	0.09	0.21
tblVehicleEF	OBUS	0.05	0.27
tblVehicleEF	OBUS	0.46	0.14
tblVehicleEF	SBUS	0.88	0.06
tblVehicleEF	SBUS	0.02	9.7864e-003
tblVehicleEF	SBUS	0.08	6.1944e-003
tblVehicleEF	SBUS	7.58	2.56
tblVehicleEF	SBUS	0.94	0.87
tblVehicleEF	SBUS	7.88	0.88
tblVehicleEF	SBUS	1,175.17	354.94
tblVehicleEF	SBUS	1,116.42	1,146.90
tblVehicleEF	SBUS	49.91	5.17
tblVehicleEF	SBUS	11.44	3.64
tblVehicleEF	SBUS	5.41	5.86
tblVehicleEF	SBUS	13.16	0.65
tblVehicleEF	SBUS	0.01	5.8373e-003
tblVehicleEF	SBUS	0.74	0.74
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.8700e-004	4.5738e-005
tblVehicleEF	SBUS	0.01	5.5848e-003
tblVehicleEF	SBUS	0.32	0.32
tblVehicleEF	SBUS	2.7100e-003	2.6888e-003
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.3100e-004	4.2055e-005
tblVehicleEF	SBUS	3.8950e-003	1.1088e-003
tblVehicleEF	SBUS	0.03	8.9260e-003
tblVehicleEF	SBUS	0.92	0.30
tblVehicleEF	SBUS	1.7890e-003	5.1837e-004

tblVehicleEF	SBUS	0.13	0.12
tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.42	0.04
tblVehicleEF	SBUS	0.01	3.3844e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.3600e-004	5.1112e-005
tblVehicleEF	SBUS	3.8950e-003	1.1088e-003
tblVehicleEF	SBUS	0.03	8.9260e-003
tblVehicleEF	SBUS	1.32	0.43
tblVehicleEF	SBUS	1.7890e-003	5.1837e-004
tblVehicleEF	SBUS	0.15	0.15
tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.46	0.04
tblVehicleEF	SBUS	0.88	0.06
tblVehicleEF	SBUS	0.02	9.9062e-003
tblVehicleEF	SBUS	0.07	5.4353e-003
tblVehicleEF	SBUS	7.44	2.52
tblVehicleEF	SBUS	0.95	0.89
tblVehicleEF	SBUS	6.27	0.69
tblVehicleEF	SBUS	1,230.37	365.42
tblVehicleEF	SBUS	1,116.42	1,146.93
tblVehicleEF	SBUS	49.91	4.86
tblVehicleEF	SBUS	11.80	3.74
tblVehicleEF	SBUS	5.10	5.53
tblVehicleEF	SBUS	13.13	0.64
tblVehicleEF	SBUS	0.01	4.9270e-003
tblVehicleEF	SBUS	0.74	0.74
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.8700e-004	4.5738e-005

tblVehicleEF	SBUS	0.01	4.7139e-003
tblVehicleEF	SBUS	0.32	0.32
tblVehicleEF	SBUS	2.7100e-003	2.6888e-003
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.3100e-004	4.2055e-005
tblVehicleEF	SBUS	5.9980e-003	1.6969e-003
tblVehicleEF	SBUS	0.03	9.1386e-003
tblVehicleEF	SBUS	0.91	0.30
tblVehicleEF	SBUS	2.7960e-003	7.9994e-004
tblVehicleEF	SBUS	0.13	0.12
tblVehicleEF	SBUS	0.02	0.06
tblVehicleEF	SBUS	0.37	0.03
tblVehicleEF	SBUS	0.01	3.4835e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.0900e-004	4.8095e-005
tblVehicleEF	SBUS	5.9980e-003	1.6969e-003
tblVehicleEF	SBUS	0.03	9.1386e-003
tblVehicleEF	SBUS	1.32	0.43
tblVehicleEF	SBUS	2.7960e-003	7.9994e-004
tblVehicleEF	SBUS	0.15	0.15
tblVehicleEF	SBUS	0.02	0.06
tblVehicleEF	SBUS	0.40	0.03
tblVehicleEF	SBUS	0.88	0.06
tblVehicleEF	SBUS	0.02	9.7588e-003
tblVehicleEF	SBUS	0.08	6.3489e-003
tblVehicleEF	SBUS	7.78	2.63
tblVehicleEF	SBUS	0.93	0.87
tblVehicleEF	SBUS	8.15	0.91
tblVehicleEF	SBUS	1,098.95	340.46
tblVehicleEF	SBUS	1,116.42	1,146.90

tblVehicleEF	SBUS	49.91	5.22
tblVehicleEF	SBUS	10.93	3.51
tblVehicleEF	SBUS	5.33	5.77
tblVehicleEF	SBUS	13.17	0.65
tblVehicleEF	SBUS	0.02	7.0944e-003
tblVehicleEF	SBUS	0.74	0.74
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.8700e-004	4.5738e-005
tblVehicleEF	SBUS	0.02	6.7875e-003
tblVehicleEF	SBUS	0.32	0.32
tblVehicleEF	SBUS	2.7100e-003	2.6888e-003
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.3100e-004	4.2055e-005
tblVehicleEF	SBUS	4.0560e-003	1.1541e-003
tblVehicleEF	SBUS	0.03	9.9783e-003
tblVehicleEF	SBUS	0.92	0.30
tblVehicleEF	SBUS	1.7640e-003	5.1819e-004
tblVehicleEF	SBUS	0.13	0.12
tblVehicleEF	SBUS	0.02	0.09
tblVehicleEF	SBUS	0.43	0.04
tblVehicleEF	SBUS	0.01	3.2476e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.4000e-004	5.1608e-005
tblVehicleEF	SBUS	4.0560e-003	1.1541e-003
tblVehicleEF	SBUS	0.03	9.9783e-003
tblVehicleEF	SBUS	1.32	0.43
tblVehicleEF	SBUS	1.7640e-003	5.1819e-004
tblVehicleEF	SBUS	0.15	0.15
tblVehicleEF	SBUS	0.02	0.09

tblVehicleEF	SBUS	0.47	0.04
tblVehicleEF	UBUS	2.82	6.37
tblVehicleEF	UBUS	0.06	0.02
tblVehicleEF	UBUS	12.54	35.61
tblVehicleEF	UBUS	10.71	0.94
tblVehicleEF	UBUS	1,986.82	1,937.47
tblVehicleEF	UBUS	99.14	11.89
tblVehicleEF	UBUS	10.84	2.26
tblVehicleEF	UBUS	15.55	0.12
tblVehicleEF	UBUS	0.61	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.14	4.2635e-003
tblVehicleEF	UBUS	1.1020e-003	2.8939e-005
tblVehicleEF	UBUS	0.26	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.13	4.0767e-003
tblVehicleEF	UBUS	1.0160e-003	2.6609e-005
tblVehicleEF	UBUS	5.5290e-003	9.5825e-004
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	2.9760e-003	7.4208e-004
tblVehicleEF	UBUS	0.94	0.25
tblVehicleEF	UBUS	0.02	0.08
tblVehicleEF	UBUS	0.81	0.07
tblVehicleEF	UBUS	0.01	2.3921e-003
tblVehicleEF	UBUS	1.1840e-003	1.1771e-004
tblVehicleEF	UBUS	5.5290e-003	9.5825e-004
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	2.9760e-003	7.4208e-004
tblVehicleEF	UBUS	3.87	6.68
tblVehicleEF	UBUS	0.02	0.08

tblVehicleEF	UBUS	0.88	0.07
tblVehicleEF	UBUS	2.82	6.37
tblVehicleEF	UBUS	0.05	0.01
tblVehicleEF	UBUS	12.61	35.61
tblVehicleEF	UBUS	9.31	0.83
tblVehicleEF	UBUS	1,986.82	1,937.47
tblVehicleEF	UBUS	99.14	11.69
tblVehicleEF	UBUS	10.21	2.25
tblVehicleEF	UBUS	15.49	0.12
tblVehicleEF	UBUS	0.61	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.14	4.2635e-003
tblVehicleEF	UBUS	1.1020e-003	2.8939e-005
tblVehicleEF	UBUS	0.26	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.13	4.0767e-003
tblVehicleEF	UBUS	1.0160e-003	2.6609e-005
tblVehicleEF	UBUS	8.3230e-003	1.4315e-003
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	4.5310e-003	1.0810e-003
tblVehicleEF	UBUS	0.95	0.25
tblVehicleEF	UBUS	0.02	0.07
tblVehicleEF	UBUS	0.74	0.06
tblVehicleEF	UBUS	0.01	2.3921e-003
tblVehicleEF	UBUS	1.1600e-003	1.1572e-004
tblVehicleEF	UBUS	8.3230e-003	1.4315e-003
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	4.5310e-003	1.0810e-003
tblVehicleEF	UBUS	3.88	6.68
tblVehicleEF	UBUS	0.02	0.07

tblVehicleEF	UBUS	0.81	0.07
tblVehicleEF	UBUS	2.82	6.37
tblVehicleEF	UBUS	0.06	0.02
tblVehicleEF	UBUS	12.53	35.61
tblVehicleEF	UBUS	10.92	0.96
tblVehicleEF	UBUS	1,986.82	1,937.47
tblVehicleEF	UBUS	99.14	11.93
tblVehicleEF	UBUS	10.64	2.25
tblVehicleEF	UBUS	15.56	0.12
tblVehicleEF	UBUS	0.61	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.14	4.2635e-003
tblVehicleEF	UBUS	1.1020e-003	2.8939e-005
tblVehicleEF	UBUS	0.26	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.13	4.0767e-003
tblVehicleEF	UBUS	1.0160e-003	2.6609e-005
tblVehicleEF	UBUS	6.0970e-003	9.3075e-004
tblVehicleEF	UBUS	0.11	0.01
tblVehicleEF	UBUS	3.0990e-003	7.1395e-004
tblVehicleEF	UBUS	0.94	0.25
tblVehicleEF	UBUS	0.03	0.09
tblVehicleEF	UBUS	0.82	0.07
tblVehicleEF	UBUS	0.01	2.3921e-003
tblVehicleEF	UBUS	1.1880e-003	1.1801e-004
tblVehicleEF	UBUS	6.0970e-003	9.3075e-004
tblVehicleEF	UBUS	0.11	0.01
tblVehicleEF	UBUS	3.0990e-003	7.1395e-004
tblVehicleEF	UBUS	3.87	6.68
tblVehicleEF	UBUS	0.03	0.09

tblVehicleEF	UBUS	0.90	0.07
tblVehicleTrips	ST_TR	2.46	4.62
tblVehicleTrips	SU_TR	1.05	4.62
tblVehicleTrips	WD_TR	11.03	4.62

2.0 Emissions Summary

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	0.0637	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.2000e-004	6.2000e-004	0.0000		6.7000e-004
Energy	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004		11.4276	11.4276	2.2000e-004	2.1000e-004	11.4955
Mobile	0.0422	0.0932	0.4199	1.0500e-003	0.0899	1.6600e-003	0.0915	0.0240	1.5700e-003	0.0256		108.1626	108.1626	6.7900e-003		108.3323
Total	**0.1070**	**0.1027**	**0.4282**	**1.1100e-003**	**0.0899**	**2.3800e-003**	**0.0923**	**0.0240**	**2.2900e-003**	**0.0263**		**119.5908**	**119.5908**	**7.0100e-003**	**2.1000e-004**	**119.8284**

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	0.0637	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.2000e-004	6.2000e-004	0.0000		6.7000e-004
Energy	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004		11.4276	11.4276	2.2000e-004	2.1000e-004	11.4955
Mobile	0.0422	0.0932	0.4199	1.0500e-003	0.0899	1.6600e-003	0.0915	0.0240	1.5700e-003	0.0256		108.1626	108.1626	6.7900e-003		108.3323
Total	**0.1070**	**0.1027**	**0.4282**	**1.1100e-003**	**0.0899**	**2.3800e-003**	**0.0923**	**0.0240**	**2.2900e-003**	**0.0263**		**119.5908**	**119.5908**	**7.0100e-003**	**2.1000e-004**	**119.8284**

	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**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	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	0.0422	0.0932	0.4199	1.0500e-003	0.0899	1.6600e-003	0.0915	0.0240	1.5700e-003	0.0256		108.1626	108.1626	6.7900e-003		108.3323
Unmitigated	0.0422	0.0932	0.4199	1.0500e-003	0.0899	1.6600e-003	0.0915	0.0240	1.5700e-003	0.0256		108.1626	108.1626	6.7900e-003		108.3323

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	13.17	13.17	13.17	42,417	42,417
Total	13.17	13.17	13.17	42,417	42,417

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
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Office Building	0.553045	0.055446	0.182004	0.125273	0.023413	0.005765	0.018938	0.027556	0.001239	0.001462	0.004210	0.000648	0.001000

5.0 Energy Detail

Historical Energy Use: Y

5.1 Mitigation Measures Energy

	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	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004		11.4276	11.4276	2.2000e-004	2.1000e-004	11.4955
NaturalGas Unmitigated	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004		11.4276	11.4276	2.2000e-004	2.1000e-004	11.4955

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					
General Office Building	97.1342	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004		11.4276	11.4276	2.2000e-004	2.1000e-004	11.4955
Total		**1.0500e-003**	**9.5200e-003**	**8.0000e-003**	**6.0000e-005**		**7.2000e-004**	**7.2000e-004**		**7.2000e-004**	**7.2000e-004**		**11.4276**	**11.4276**	**2.2000e-004**	**2.1000e-004**	**11.4955**

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					
General Office Building	0.0971342	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004		11.4276	11.4276	2.2000e-004	2.1000e-004	11.4955
Total		**1.0500e-003**	**9.5200e-003**	**8.0000e-003**	**6.0000e-005**		**7.2000e-004**	**7.2000e-004**		**7.2000e-004**	**7.2000e-004**		**11.4276**	**11.4276**	**2.2000e-004**	**2.1000e-004**	**11.4955**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	0.0637	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.2000e-004	6.2000e-004	0.0000		6.7000e-004
Unmitigated	0.0637	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.2000e-004	6.2000e-004	0.0000		6.7000e-004

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	7.2400e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0564					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.2000e-004	6.2000e-004	0.0000		6.7000e-004
Total	**0.0637**	**0.0000**	**2.9000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.2000e-004**	**6.2000e-004**	**0.0000**		**6.7000e-004**

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	7.2400e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0564					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.2000e-004	6.2000e-004	0.0000		6.7000e-004
Total	**0.0637**	**0.0000**	**2.9000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.2000e-004**	**6.2000e-004**	**0.0000**		**6.7000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

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

3727 Robertson-Existing

South Coast AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	2.85	1000sqft	0.12	2,850.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	11			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	506.46	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - SCE CO2e intensity factor was linearly projected for year 2019 anticipated RPS based on SB 100 target of 44% RPS by 2024. See existing assumptions for more details

Land Use - see existing assumptions for more details.

Construction Phase - existing operational run only

Vehicle Trips - existing trip rate from project traffic impact analysis.

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Energy Use - Historical energy used since existing uses were built before 2005.

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	2.00
tblFleetMix	HHD	0.03	0.03
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD2	5.8700e-003	5.7655e-003
tblFleetMix	MCY	4.7240e-003	4.2102e-003
tblFleetMix	MDV	0.12	0.13
tblFleetMix	MH	9.9100e-004	9.9959e-004
tblFleetMix	MHD	0.02	0.02
tblFleetMix	OBUS	1.9990e-003	1.2392e-003
tblFleetMix	SBUS	7.0400e-004	6.4756e-004
tblFleetMix	UBUS	2.0270e-003	1.4619e-003
tblLandUse	LotAcreage	0.07	0.12
tblProjectCharacteristics	CH4IntensityFactor	0.029	0
tblProjectCharacteristics	CO2IntensityFactor	702.44	506.46
tblProjectCharacteristics	N2OIntensityFactor	0.006	0
tblVehicleEF	HHD	0.85	0.03
tblVehicleEF	HHD	0.08	0.08
tblVehicleEF	HHD	0.12	4.2653e-007
tblVehicleEF	HHD	3.14	5.53
tblVehicleEF	HHD	0.99	0.82
tblVehicleEF	HHD	3.18	9.5370e-003
tblVehicleEF	HHD	4,992.93	1,154.64
tblVehicleEF	HHD	1,647.55	1,537.04
tblVehicleEF	HHD	9.63	0.11
tblVehicleEF	HHD	25.01	6.67
tblVehicleEF	HHD	4.55	4.81

tblVehicleEF	HHD	19.77	1.52
tblVehicleEF	HHD	0.03	0.02
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.08
tblVehicleEF	HHD	1.1800e-004	4.2255e-006
tblVehicleEF	HHD	0.03	0.02
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8190e-003	8.8734e-003
tblVehicleEF	HHD	0.02	0.07
tblVehicleEF	HHD	1.1000e-004	3.9615e-006
tblVehicleEF	HHD	1.3200e-004	1.2385e-005
tblVehicleEF	HHD	5.9330e-003	5.8881e-004
tblVehicleEF	HHD	0.79	0.49
tblVehicleEF	HHD	9.1000e-005	8.1541e-006
tblVehicleEF	HHD	0.14	0.17
tblVehicleEF	HHD	4.8800e-004	2.6148e-003
tblVehicleEF	HHD	0.10	2.2417e-006
tblVehicleEF	HHD	0.05	0.01
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	1.4900e-004	1.1157e-006
tblVehicleEF	HHD	1.3200e-004	1.2385e-005
tblVehicleEF	HHD	5.9330e-003	5.8881e-004
tblVehicleEF	HHD	0.92	0.56
tblVehicleEF	HHD	9.1000e-005	8.1541e-006
tblVehicleEF	HHD	0.24	0.27
tblVehicleEF	HHD	4.8800e-004	2.6148e-003
tblVehicleEF	HHD	0.11	2.4543e-006
tblVehicleEF	HHD	0.80	0.03
tblVehicleEF	HHD	0.08	0.08

tblVehicleEF	HHD	0.11	4.0875e-007
tblVehicleEF	HHD	2.29	5.35
tblVehicleEF	HHD	0.99	0.82
tblVehicleEF	HHD	3.02	9.0529e-003
tblVehicleEF	HHD	5,285.68	1,158.03
tblVehicleEF	HHD	1,647.55	1,537.04
tblVehicleEF	HHD	9.63	0.11
tblVehicleEF	HHD	25.81	6.56
tblVehicleEF	HHD	4.30	4.55
tblVehicleEF	HHD	19.76	1.52
tblVehicleEF	HHD	0.03	0.02
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.08
tblVehicleEF	HHD	1.1800e-004	4.2255e-006
tblVehicleEF	HHD	0.02	0.02
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8190e-003	8.8734e-003
tblVehicleEF	HHD	0.02	0.07
tblVehicleEF	HHD	1.1000e-004	3.9615e-006
tblVehicleEF	HHD	2.1500e-004	2.0386e-005
tblVehicleEF	HHD	6.1900e-003	6.0457e-004
tblVehicleEF	HHD	0.75	0.50
tblVehicleEF	HHD	1.4700e-004	1.3636e-005
tblVehicleEF	HHD	0.14	0.17
tblVehicleEF	HHD	4.8400e-004	2.6080e-003
tblVehicleEF	HHD	0.10	2.1542e-006
tblVehicleEF	HHD	0.05	0.01
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	1.4700e-004	1.1081e-006

tblVehicleEF	HHD	2.1500e-004	2.0386e-005
tblVehicleEF	HHD	6.1900e-003	6.0457e-004
tblVehicleEF	HHD	0.87	0.58
tblVehicleEF	HHD	1.4700e-004	1.3636e-005
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tblVehicleEF	HHD	0.91	0.03
tblVehicleEF	HHD	0.08	0.08
tblVehicleEF	HHD	0.12	4.3011e-007
tblVehicleEF	HHD	4.32	5.79
tblVehicleEF	HHD	0.99	0.82
tblVehicleEF	HHD	3.20	9.5974e-003
tblVehicleEF	HHD	4,588.64	1,149.97
tblVehicleEF	HHD	1,647.55	1,537.04
tblVehicleEF	HHD	9.63	0.11
tblVehicleEF	HHD	23.92	6.82
tblVehicleEF	HHD	4.48	4.74
tblVehicleEF	HHD	19.77	1.52
tblVehicleEF	HHD	0.04	0.02
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.08
tblVehicleEF	HHD	1.1800e-004	4.2255e-006
tblVehicleEF	HHD	0.03	0.02
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8190e-003	8.8734e-003
tblVehicleEF	HHD	0.02	0.07
tblVehicleEF	HHD	1.1000e-004	3.9615e-006
tblVehicleEF	HHD	1.2900e-004	1.3087e-005

tblVehicleEF	HHD	6.7430e-003	7.2786e-004
tblVehicleEF	HHD	0.86	0.47
tblVehicleEF	HHD	8.9000e-005	8.3235e-006
tblVehicleEF	HHD	0.14	0.17
tblVehicleEF	HHD	5.2300e-004	2.7607e-003
tblVehicleEF	HHD	0.10	2.2588e-006
tblVehicleEF	HHD	0.04	0.01
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	1.5000e-004	1.1167e-006
tblVehicleEF	HHD	1.2900e-004	1.3087e-005
tblVehicleEF	HHD	6.7430e-003	7.2786e-004
tblVehicleEF	HHD	0.99	0.54
tblVehicleEF	HHD	8.9000e-005	8.3235e-006
tblVehicleEF	HHD	0.24	0.27
tblVehicleEF	HHD	5.2300e-004	2.7607e-003
tblVehicleEF	HHD	0.11	2.4731e-006
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tblVehicleEF	LDA	0.10	0.22
tblVehicleEF	LDA	0.04	0.04
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tblVehicleEF	LDA	2.1320e-003	1.9540e-003
tblVehicleEF	LDA	2.3470e-003	2.1114e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	2.0000e-003	2.0000e-003

tblVehicleEF	LDA	1.9670e-003	1.8006e-003
tblVehicleEF	LDA	2.1590e-003	1.9415e-003
tblVehicleEF	LDA	0.05	0.07
tblVehicleEF	LDA	0.12	0.12
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	0.24
tblVehicleEF	LDA	0.11	0.29
tblVehicleEF	LDA	2.9750e-003	2.8651e-003
tblVehicleEF	LDA	6.5600e-004	5.7318e-004
tblVehicleEF	LDA	0.05	0.07
tblVehicleEF	LDA	0.12	0.12
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.04	0.24
tblVehicleEF	LDA	0.12	0.32
tblVehicleEF	LDA	6.9190e-003	4.5647e-003
tblVehicleEF	LDA	6.9240e-003	0.06
tblVehicleEF	LDA	0.85	1.01
tblVehicleEF	LDA	1.31	1.95
tblVehicleEF	LDA	312.75	304.53
tblVehicleEF	LDA	63.02	57.29
tblVehicleEF	LDA	0.06	0.05
tblVehicleEF	LDA	0.09	0.21
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	8.0000e-003	8.0000e-003
tblVehicleEF	LDA	2.1320e-003	1.9540e-003
tblVehicleEF	LDA	2.3470e-003	2.1114e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	2.0000e-003	2.0000e-003

tblVehicleEF	LDA	1.9670e-003	1.8006e-003
tblVehicleEF	LDA	2.1590e-003	1.9415e-003
tblVehicleEF	LDA	0.08	0.11
tblVehicleEF	LDA	0.13	0.13
tblVehicleEF	LDA	0.07	0.09
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	0.23
tblVehicleEF	LDA	0.09	0.26
tblVehicleEF	LDA	3.1350e-003	3.0128e-003
tblVehicleEF	LDA	6.5300e-004	5.6692e-004
tblVehicleEF	LDA	0.08	0.11
tblVehicleEF	LDA	0.13	0.13
tblVehicleEF	LDA	0.07	0.09
tblVehicleEF	LDA	0.03	0.03
tblVehicleEF	LDA	0.04	0.23
tblVehicleEF	LDA	0.10	0.29
tblVehicleEF	LDA	6.3270e-003	4.1507e-003
tblVehicleEF	LDA	8.0020e-003	0.06
tblVehicleEF	LDA	0.74	0.87
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tblVehicleEF	LDA	291.73	284.71
tblVehicleEF	LDA	63.02	58.05
tblVehicleEF	LDA	0.06	0.06
tblVehicleEF	LDA	0.10	0.23
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	8.0000e-003	8.0000e-003
tblVehicleEF	LDA	2.1320e-003	1.9540e-003
tblVehicleEF	LDA	2.3470e-003	2.1114e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	2.0000e-003	2.0000e-003

tblVehicleEF	LDA	1.9670e-003	1.8006e-003
tblVehicleEF	LDA	2.1590e-003	1.9415e-003
tblVehicleEF	LDA	0.05	0.07
tblVehicleEF	LDA	0.14	0.13
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.05	0.27
tblVehicleEF	LDA	0.11	0.30
tblVehicleEF	LDA	2.9230e-003	2.8167e-003
tblVehicleEF	LDA	6.5700e-004	5.7447e-004
tblVehicleEF	LDA	0.05	0.07
tblVehicleEF	LDA	0.14	0.13
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.05	0.27
tblVehicleEF	LDA	0.12	0.33
tblVehicleEF	LDT1	0.02	0.01
tblVehicleEF	LDT1	0.02	0.10
tblVehicleEF	LDT1	1.99	2.00
tblVehicleEF	LDT1	3.80	2.55
tblVehicleEF	LDT1	357.64	340.52
tblVehicleEF	LDT1	74.91	69.18
tblVehicleEF	LDT1	0.19	0.18
tblVehicleEF	LDT1	0.23	0.34
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	3.6680e-003	3.2197e-003
tblVehicleEF	LDT1	3.9250e-003	3.2584e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003

tblVehicleEF	LDT1	3.3780e-003	2.9639e-003
tblVehicleEF	LDT1	3.6110e-003	2.9966e-003
tblVehicleEF	LDT1	0.16	0.18
tblVehicleEF	LDT1	0.33	0.27
tblVehicleEF	LDT1	0.13	0.14
tblVehicleEF	LDT1	0.05	0.05
tblVehicleEF	LDT1	0.20	0.91
tblVehicleEF	LDT1	0.27	0.50
tblVehicleEF	LDT1	3.6030e-003	3.3696e-003
tblVehicleEF	LDT1	8.1600e-004	6.8454e-004
tblVehicleEF	LDT1	0.16	0.18
tblVehicleEF	LDT1	0.33	0.27
tblVehicleEF	LDT1	0.13	0.14
tblVehicleEF	LDT1	0.07	0.07
tblVehicleEF	LDT1	0.20	0.91
tblVehicleEF	LDT1	0.30	0.55
tblVehicleEF	LDT1	0.02	0.01
tblVehicleEF	LDT1	0.02	0.08
tblVehicleEF	LDT1	2.18	2.20
tblVehicleEF	LDT1	3.24	2.18
tblVehicleEF	LDT1	375.39	355.78
tblVehicleEF	LDT1	74.91	68.38
tblVehicleEF	LDT1	0.17	0.16
tblVehicleEF	LDT1	0.21	0.31
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	3.6680e-003	3.2197e-003
tblVehicleEF	LDT1	3.9250e-003	3.2584e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003

tblVehicleEF	LDT1	3.3780e-003	2.9639e-003
tblVehicleEF	LDT1	3.6110e-003	2.9966e-003
tblVehicleEF	LDT1	0.27	0.30
tblVehicleEF	LDT1	0.36	0.29
tblVehicleEF	LDT1	0.20	0.21
tblVehicleEF	LDT1	0.05	0.05
tblVehicleEF	LDT1	0.19	0.85
tblVehicleEF	LDT1	0.24	0.44
tblVehicleEF	LDT1	3.7830e-003	3.5206e-003
tblVehicleEF	LDT1	8.0600e-004	6.7672e-004
tblVehicleEF	LDT1	0.27	0.30
tblVehicleEF	LDT1	0.36	0.29
tblVehicleEF	LDT1	0.20	0.21
tblVehicleEF	LDT1	0.07	0.08
tblVehicleEF	LDT1	0.19	0.85
tblVehicleEF	LDT1	0.26	0.48
tblVehicleEF	LDT1	0.02	0.01
tblVehicleEF	LDT1	0.02	0.10
tblVehicleEF	LDT1	1.93	1.93
tblVehicleEF	LDT1	3.91	2.63
tblVehicleEF	LDT1	351.73	335.40
tblVehicleEF	LDT1	74.91	69.34
tblVehicleEF	LDT1	0.19	0.17
tblVehicleEF	LDT1	0.23	0.34
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	3.6680e-003	3.2197e-003
tblVehicleEF	LDT1	3.9250e-003	3.2584e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003

tblVehicleEF	LDT1	3.3780e-003	2.9639e-003
tblVehicleEF	LDT1	3.6110e-003	2.9966e-003
tblVehicleEF	LDT1	0.16	0.18
tblVehicleEF	LDT1	0.38	0.30
tblVehicleEF	LDT1	0.12	0.13
tblVehicleEF	LDT1	0.05	0.05
tblVehicleEF	LDT1	0.24	1.07
tblVehicleEF	LDT1	0.28	0.51
tblVehicleEF	LDT1	3.5430e-003	3.3190e-003
tblVehicleEF	LDT1	8.1800e-004	6.8617e-004
tblVehicleEF	LDT1	0.16	0.18
tblVehicleEF	LDT1	0.38	0.30
tblVehicleEF	LDT1	0.12	0.13
tblVehicleEF	LDT1	0.07	0.07
tblVehicleEF	LDT1	0.24	1.07
tblVehicleEF	LDT1	0.31	0.56
tblVehicleEF	LDT2	8.6130e-003	6.5959e-003
tblVehicleEF	LDT2	9.5100e-003	0.08
tblVehicleEF	LDT2	1.00	1.30
tblVehicleEF	LDT2	1.89	2.97
tblVehicleEF	LDT2	406.62	374.80
tblVehicleEF	LDT2	85.85	76.50
tblVehicleEF	LDT2	0.11	0.12
tblVehicleEF	LDT2	0.17	0.38
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9950e-003	2.0175e-003
tblVehicleEF	LDT2	2.3030e-003	2.1081e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003

tblVehicleEF	LDT2	1.8350e-003	1.8570e-003
tblVehicleEF	LDT2	2.1180e-003	1.9387e-003
tblVehicleEF	LDT2	0.06	0.09
tblVehicleEF	LDT2	0.13	0.15
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.07	0.46
tblVehicleEF	LDT2	0.13	0.41
tblVehicleEF	LDT2	4.0750e-003	3.7082e-003
tblVehicleEF	LDT2	8.9100e-004	7.5703e-004
tblVehicleEF	LDT2	0.06	0.09
tblVehicleEF	LDT2	0.13	0.15
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.07	0.46
tblVehicleEF	LDT2	0.14	0.45
tblVehicleEF	LDT2	9.1950e-003	7.0670e-003
tblVehicleEF	LDT2	8.4280e-003	0.08
tblVehicleEF	LDT2	1.11	1.44
tblVehicleEF	LDT2	1.62	2.54
tblVehicleEF	LDT2	427.54	390.20
tblVehicleEF	LDT2	85.85	75.67
tblVehicleEF	LDT2	0.09	0.11
tblVehicleEF	LDT2	0.16	0.35
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9950e-003	2.0175e-003
tblVehicleEF	LDT2	2.3030e-003	2.1081e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003

tblVehicleEF	LDT2	1.8350e-003	1.8570e-003
tblVehicleEF	LDT2	2.1180e-003	1.9387e-003
tblVehicleEF	LDT2	0.09	0.14
tblVehicleEF	LDT2	0.14	0.16
tblVehicleEF	LDT2	0.08	0.13
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.07	0.43
tblVehicleEF	LDT2	0.11	0.36
tblVehicleEF	LDT2	4.2860e-003	3.8606e-003
tblVehicleEF	LDT2	8.8600e-004	7.4880e-004
tblVehicleEF	LDT2	0.09	0.14
tblVehicleEF	LDT2	0.14	0.16
tblVehicleEF	LDT2	0.08	0.13
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.07	0.43
tblVehicleEF	LDT2	0.12	0.40
tblVehicleEF	LDT2	8.4340e-003	6.4559e-003
tblVehicleEF	LDT2	9.7300e-003	0.09
tblVehicleEF	LDT2	0.96	1.25
tblVehicleEF	LDT2	1.94	3.06
tblVehicleEF	LDT2	399.66	369.64
tblVehicleEF	LDT2	85.85	76.68
tblVehicleEF	LDT2	0.10	0.12
tblVehicleEF	LDT2	0.17	0.38
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9950e-003	2.0175e-003
tblVehicleEF	LDT2	2.3030e-003	2.1081e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003

tblVehicleEF	LDT2	1.8350e-003	1.8570e-003
tblVehicleEF	LDT2	2.1180e-003	1.9387e-003
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.14	0.16
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.08	0.54
tblVehicleEF	LDT2	0.13	0.42
tblVehicleEF	LDT2	4.0050e-003	3.6571e-003
tblVehicleEF	LDT2	8.9200e-004	7.5878e-004
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.14	0.16
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.08	0.54
tblVehicleEF	LDT2	0.14	0.46
tblVehicleEF	LHD1	6.4120e-003	6.0565e-003
tblVehicleEF	LHD1	0.02	7.6280e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.16	0.19
tblVehicleEF	LHD1	1.13	0.93
tblVehicleEF	LHD1	3.23	1.26
tblVehicleEF	LHD1	8.98	9.12
tblVehicleEF	LHD1	628.01	695.72
tblVehicleEF	LHD1	35.68	13.22
tblVehicleEF	LHD1	0.07	0.06
tblVehicleEF	LHD1	1.53	1.13
tblVehicleEF	LHD1	1.14	0.38
tblVehicleEF	LHD1	8.1700e-004	7.0981e-004
tblVehicleEF	LHD1	0.08	0.08

tblVehicleEF	LHD1	9.8590e-003	9.5450e-003
tblVehicleEF	LHD1	0.01	8.3538e-003
tblVehicleEF	LHD1	1.1990e-003	3.3991e-004
tblVehicleEF	LHD1	7.8200e-004	6.7910e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.4650e-003	2.3863e-003
tblVehicleEF	LHD1	0.01	7.9614e-003
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tblVehicleEF	LHD1	3.5670e-003	3.1349e-003
tblVehicleEF	LHD1	0.11	0.10
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	2.0130e-003	1.7695e-003
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	0.32	0.63
tblVehicleEF	LHD1	0.33	0.10
tblVehicleEF	LHD1	9.1000e-005	8.8742e-005
tblVehicleEF	LHD1	6.1830e-003	6.8013e-003
tblVehicleEF	LHD1	4.1800e-004	1.3086e-004
tblVehicleEF	LHD1	3.5670e-003	3.1349e-003
tblVehicleEF	LHD1	0.11	0.10
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.0130e-003	1.7695e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.32	0.63
tblVehicleEF	LHD1	0.36	0.11
tblVehicleEF	LHD1	6.4120e-003	6.0699e-003
tblVehicleEF	LHD1	0.02	7.7595e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.16	0.19
tblVehicleEF	LHD1	1.14	0.94

tblVehicleEF	LHD1	3.08	1.20
tblVehicleEF	LHD1	8.98	9.12
tblVehicleEF	LHD1	628.01	695.75
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tblVehicleEF	LHD1	0.07	0.06
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tblVehicleEF	LHD1	1.10	0.37
tblVehicleEF	LHD1	8.1700e-004	7.0981e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	9.8590e-003	9.5450e-003
tblVehicleEF	LHD1	0.01	8.3538e-003
tblVehicleEF	LHD1	1.1990e-003	3.3991e-004
tblVehicleEF	LHD1	7.8200e-004	6.7910e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.4650e-003	2.3863e-003
tblVehicleEF	LHD1	0.01	7.9614e-003
tblVehicleEF	LHD1	1.1050e-003	3.1349e-004
tblVehicleEF	LHD1	5.5850e-003	4.8835e-003
tblVehicleEF	LHD1	0.12	0.10
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	3.0770e-003	2.6924e-003
tblVehicleEF	LHD1	0.08	0.07
tblVehicleEF	LHD1	0.31	0.62
tblVehicleEF	LHD1	0.32	0.10
tblVehicleEF	LHD1	9.1000e-005	8.8742e-005
tblVehicleEF	LHD1	6.1830e-003	6.8015e-003
tblVehicleEF	LHD1	4.1500e-004	1.2984e-004
tblVehicleEF	LHD1	5.5850e-003	4.8835e-003
tblVehicleEF	LHD1	0.12	0.10
tblVehicleEF	LHD1	0.03	0.03

tblVehicleEF	LHD1	3.0770e-003	2.6924e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.31	0.62
tblVehicleEF	LHD1	0.35	0.11
tblVehicleEF	LHD1	6.4120e-003	6.0545e-003
tblVehicleEF	LHD1	0.02	7.5971e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.16	0.19
tblVehicleEF	LHD1	1.12	0.93
tblVehicleEF	LHD1	3.25	1.27
tblVehicleEF	LHD1	8.98	9.12
tblVehicleEF	LHD1	628.01	695.72
tblVehicleEF	LHD1	35.68	13.24
tblVehicleEF	LHD1	0.07	0.06
tblVehicleEF	LHD1	1.50	1.11
tblVehicleEF	LHD1	1.15	0.38
tblVehicleEF	LHD1	8.1700e-004	7.0981e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	9.8590e-003	9.5450e-003
tblVehicleEF	LHD1	0.01	8.3538e-003
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tblVehicleEF	LHD1	7.8200e-004	6.7910e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.4650e-003	2.3863e-003
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tblVehicleEF	LHD1	3.6920e-003	3.2651e-003
tblVehicleEF	LHD1	0.13	0.11
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.9880e-003	1.7521e-003

tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	0.35	0.68
tblVehicleEF	LHD1	0.33	0.10
tblVehicleEF	LHD1	9.1000e-005	8.8742e-005
tblVehicleEF	LHD1	6.1830e-003	6.8012e-003
tblVehicleEF	LHD1	4.1800e-004	1.3099e-004
tblVehicleEF	LHD1	3.6920e-003	3.2651e-003
tblVehicleEF	LHD1	0.13	0.11
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	1.9880e-003	1.7521e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.35	0.68
tblVehicleEF	LHD1	0.36	0.11
tblVehicleEF	LHD2	4.7550e-003	4.3651e-003
tblVehicleEF	LHD2	6.4800e-003	5.2907e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.14	0.16
tblVehicleEF	LHD2	0.53	0.63
tblVehicleEF	LHD2	1.73	0.87
tblVehicleEF	LHD2	13.70	13.75
tblVehicleEF	LHD2	639.58	701.59
tblVehicleEF	LHD2	30.04	10.39
tblVehicleEF	LHD2	0.11	0.10
tblVehicleEF	LHD2	1.25	1.41
tblVehicleEF	LHD2	0.70	0.27
tblVehicleEF	LHD2	1.2000e-003	1.1885e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	5.7800e-004	1.8429e-004

tblVehicleEF	LHD2	1.1490e-003	1.1371e-003
tblVehicleEF	LHD2	0.04	0.04
tblVehicleEF	LHD2	2.6260e-003	2.6020e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	5.3200e-004	1.6946e-004
tblVehicleEF	LHD2	1.5870e-003	1.9467e-003
tblVehicleEF	LHD2	0.05	0.06
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	9.3200e-004	1.1036e-003
tblVehicleEF	LHD2	0.06	0.06
tblVehicleEF	LHD2	0.12	0.42
tblVehicleEF	LHD2	0.17	0.07
tblVehicleEF	LHD2	1.3400e-004	1.3203e-004
tblVehicleEF	LHD2	6.2420e-003	6.7994e-003
tblVehicleEF	LHD2	3.3300e-004	1.0286e-004
tblVehicleEF	LHD2	1.5870e-003	1.9467e-003
tblVehicleEF	LHD2	0.05	0.06
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	9.3200e-004	1.1036e-003
tblVehicleEF	LHD2	0.07	0.08
tblVehicleEF	LHD2	0.12	0.42
tblVehicleEF	LHD2	0.18	0.08
tblVehicleEF	LHD2	4.7550e-003	4.3747e-003
tblVehicleEF	LHD2	6.5770e-003	5.3568e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.14	0.16
tblVehicleEF	LHD2	0.54	0.64
tblVehicleEF	LHD2	1.65	0.83
tblVehicleEF	LHD2	13.70	13.75
tblVehicleEF	LHD2	639.58	701.60

tblVehicleEF	LHD2	30.04	10.32
tblVehicleEF	LHD2	0.11	0.10
tblVehicleEF	LHD2	1.17	1.33
tblVehicleEF	LHD2	0.67	0.26
tblVehicleEF	LHD2	1.2000e-003	1.1885e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	5.7800e-004	1.8429e-004
tblVehicleEF	LHD2	1.1490e-003	1.1371e-003
tblVehicleEF	LHD2	0.04	0.04
tblVehicleEF	LHD2	2.6260e-003	2.6020e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	5.3200e-004	1.6946e-004
tblVehicleEF	LHD2	2.4740e-003	3.0207e-003
tblVehicleEF	LHD2	0.05	0.07
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	1.4090e-003	1.6678e-003
tblVehicleEF	LHD2	0.06	0.06
tblVehicleEF	LHD2	0.12	0.40
tblVehicleEF	LHD2	0.16	0.07
tblVehicleEF	LHD2	1.3400e-004	1.3203e-004
tblVehicleEF	LHD2	6.2420e-003	6.7995e-003
tblVehicleEF	LHD2	3.3100e-004	1.0216e-004
tblVehicleEF	LHD2	2.4740e-003	3.0207e-003
tblVehicleEF	LHD2	0.05	0.07
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	1.4090e-003	1.6678e-003
tblVehicleEF	LHD2	0.07	0.08
tblVehicleEF	LHD2	0.12	0.40

tblVehicleEF	LHD2	0.18	0.07
tblVehicleEF	LHD2	4.7550e-003	4.3635e-003
tblVehicleEF	LHD2	6.4560e-003	5.2747e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.14	0.16
tblVehicleEF	LHD2	0.53	0.63
tblVehicleEF	LHD2	1.74	0.88
tblVehicleEF	LHD2	13.70	13.75
tblVehicleEF	LHD2	639.58	701.58
tblVehicleEF	LHD2	30.04	10.40
tblVehicleEF	LHD2	0.11	0.10
tblVehicleEF	LHD2	1.23	1.39
tblVehicleEF	LHD2	0.70	0.27
tblVehicleEF	LHD2	1.2000e-003	1.1885e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	5.7800e-004	1.8429e-004
tblVehicleEF	LHD2	1.1490e-003	1.1371e-003
tblVehicleEF	LHD2	0.04	0.04
tblVehicleEF	LHD2	2.6260e-003	2.6020e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	5.3200e-004	1.6946e-004
tblVehicleEF	LHD2	1.6010e-003	1.9864e-003
tblVehicleEF	LHD2	0.06	0.07
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	9.0400e-004	1.0706e-003
tblVehicleEF	LHD2	0.06	0.06
tblVehicleEF	LHD2	0.13	0.45
tblVehicleEF	LHD2	0.17	0.07

tblVehicleEF	LHD2	1.3400e-004	1.3203e-004
tblVehicleEF	LHD2	6.2420e-003	6.7993e-003
tblVehicleEF	LHD2	3.3300e-004	1.0296e-004
tblVehicleEF	LHD2	1.6010e-003	1.9864e-003
tblVehicleEF	LHD2	0.06	0.07
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	9.0400e-004	1.0706e-003
tblVehicleEF	LHD2	0.07	0.08
tblVehicleEF	LHD2	0.13	0.45
tblVehicleEF	LHD2	0.18	0.08
tblVehicleEF	MCY	0.49	0.37
tblVehicleEF	MCY	0.15	0.24
tblVehicleEF	MCY	19.79	20.12
tblVehicleEF	MCY	9.59	8.45
tblVehicleEF	MCY	180.67	218.58
tblVehicleEF	MCY	46.13	60.95
tblVehicleEF	MCY	1.13	1.13
tblVehicleEF	MCY	0.31	0.26
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.0830e-003	2.0705e-003
tblVehicleEF	MCY	4.0650e-003	3.4362e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	1.9510e-003	1.9400e-003
tblVehicleEF	MCY	3.8420e-003	3.2466e-003
tblVehicleEF	MCY	1.19	1.21
tblVehicleEF	MCY	0.72	0.75
tblVehicleEF	MCY	0.72	0.73
tblVehicleEF	MCY	2.52	2.54

tblVehicleEF	MCY	0.66	2.23
tblVehicleEF	MCY	2.09	1.85
tblVehicleEF	MCY	2.2050e-003	2.1630e-003
tblVehicleEF	MCY	6.8000e-004	6.0320e-004
tblVehicleEF	MCY	1.19	1.21
tblVehicleEF	MCY	0.72	0.75
tblVehicleEF	MCY	0.72	0.73
tblVehicleEF	MCY	3.11	3.12
tblVehicleEF	MCY	0.66	2.23
tblVehicleEF	MCY	2.28	2.01
tblVehicleEF	MCY	0.48	0.36
tblVehicleEF	MCY	0.14	0.21
tblVehicleEF	MCY	19.25	19.55
tblVehicleEF	MCY	8.85	7.77
tblVehicleEF	MCY	180.67	217.44
tblVehicleEF	MCY	46.13	59.16
tblVehicleEF	MCY	0.99	0.99
tblVehicleEF	MCY	0.29	0.25
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.0830e-003	2.0705e-003
tblVehicleEF	MCY	4.0650e-003	3.4362e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	1.9510e-003	1.9400e-003
tblVehicleEF	MCY	3.8420e-003	3.2466e-003
tblVehicleEF	MCY	2.00	2.03
tblVehicleEF	MCY	0.83	0.86
tblVehicleEF	MCY	1.28	1.29
tblVehicleEF	MCY	2.46	2.48

tblVehicleEF	MCY	0.63	2.12
tblVehicleEF	MCY	1.86	1.64
tblVehicleEF	MCY	2.1950e-003	2.1518e-003
tblVehicleEF	MCY	6.6100e-004	5.8548e-004
tblVehicleEF	MCY	2.00	2.03
tblVehicleEF	MCY	0.83	0.86
tblVehicleEF	MCY	1.28	1.29
tblVehicleEF	MCY	3.03	3.04
tblVehicleEF	MCY	0.63	2.12
tblVehicleEF	MCY	2.03	1.78
tblVehicleEF	MCY	0.49	0.37
tblVehicleEF	MCY	0.16	0.24
tblVehicleEF	MCY	19.80	20.14
tblVehicleEF	MCY	9.68	8.53
tblVehicleEF	MCY	180.67	218.64
tblVehicleEF	MCY	46.13	61.19
tblVehicleEF	MCY	1.11	1.11
tblVehicleEF	MCY	0.31	0.26
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.0830e-003	2.0705e-003
tblVehicleEF	MCY	4.0650e-003	3.4362e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	1.9510e-003	1.9400e-003
tblVehicleEF	MCY	3.8420e-003	3.2466e-003
tblVehicleEF	MCY	1.28	1.30
tblVehicleEF	MCY	0.93	0.96
tblVehicleEF	MCY	0.68	0.70
tblVehicleEF	MCY	2.53	2.55

tblVehicleEF	MCY	0.76	2.54
tblVehicleEF	MCY	2.13	1.88
tblVehicleEF	MCY	2.2060e-003	2.1636e-003
tblVehicleEF	MCY	6.8200e-004	6.0553e-004
tblVehicleEF	MCY	1.28	1.30
tblVehicleEF	MCY	0.93	0.96
tblVehicleEF	MCY	0.68	0.70
tblVehicleEF	MCY	3.12	3.13
tblVehicleEF	MCY	0.76	2.54
tblVehicleEF	MCY	2.31	2.05
tblVehicleEF	MDV	0.02	9.2638e-003
tblVehicleEF	MDV	0.02	0.10
tblVehicleEF	MDV	1.80	1.64
tblVehicleEF	MDV	3.45	3.61
tblVehicleEF	MDV	542.45	456.57
tblVehicleEF	MDV	112.95	93.04
tblVehicleEF	MDV	0.21	0.17
tblVehicleEF	MDV	0.33	0.46
tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.2450e-003	2.1942e-003
tblVehicleEF	MDV	2.6000e-003	2.3357e-003
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0720e-003	2.0250e-003
tblVehicleEF	MDV	2.3950e-003	2.1507e-003
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.18	0.17
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.05	0.04

tblVehicleEF	MDV	0.10	0.49
tblVehicleEF	MDV	0.28	0.53
tblVehicleEF	MDV	5.4410e-003	4.5149e-003
tblVehicleEF	MDV	1.1910e-003	9.2067e-004
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.18	0.17
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.07	0.06
tblVehicleEF	MDV	0.10	0.49
tblVehicleEF	MDV	0.30	0.58
tblVehicleEF	MDV	0.02	9.8235e-003
tblVehicleEF	MDV	0.02	0.09
tblVehicleEF	MDV	1.97	1.80
tblVehicleEF	MDV	2.97	3.09
tblVehicleEF	MDV	570.27	473.39
tblVehicleEF	MDV	112.95	92.01
tblVehicleEF	MDV	0.18	0.15
tblVehicleEF	MDV	0.31	0.43
tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.2450e-003	2.1942e-003
tblVehicleEF	MDV	2.6000e-003	2.3357e-003
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0720e-003	2.0250e-003
tblVehicleEF	MDV	2.3950e-003	2.1507e-003
tblVehicleEF	MDV	0.13	0.17
tblVehicleEF	MDV	0.19	0.18
tblVehicleEF	MDV	0.12	0.15
tblVehicleEF	MDV	0.05	0.05

tblVehicleEF	MDV	0.09	0.46
tblVehicleEF	MDV	0.24	0.47
tblVehicleEF	MDV	5.7220e-003	4.6813e-003
tblVehicleEF	MDV	1.1820e-003	9.1054e-004
tblVehicleEF	MDV	0.13	0.17
tblVehicleEF	MDV	0.19	0.18
tblVehicleEF	MDV	0.12	0.15
tblVehicleEF	MDV	0.07	0.06
tblVehicleEF	MDV	0.09	0.46
tblVehicleEF	MDV	0.27	0.52
tblVehicleEF	MDV	0.02	9.0927e-003
tblVehicleEF	MDV	0.02	0.11
tblVehicleEF	MDV	1.74	1.59
tblVehicleEF	MDV	3.54	3.71
tblVehicleEF	MDV	533.35	451.06
tblVehicleEF	MDV	112.95	93.25
tblVehicleEF	MDV	0.20	0.16
tblVehicleEF	MDV	0.33	0.47
tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.2450e-003	2.1942e-003
tblVehicleEF	MDV	2.6000e-003	2.3357e-003
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0720e-003	2.0250e-003
tblVehicleEF	MDV	2.3950e-003	2.1507e-003
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.20	0.18
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.05	0.04

tblVehicleEF	MDV	0.12	0.57
tblVehicleEF	MDV	0.28	0.54
tblVehicleEF	MDV	5.3500e-003	4.4603e-003
tblVehicleEF	MDV	1.1920e-003	9.2274e-004
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.20	0.18
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.07	0.06
tblVehicleEF	MDV	0.12	0.57
tblVehicleEF	MDV	0.31	0.60
tblVehicleEF	MH	0.04	0.02
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	3.92	2.17
tblVehicleEF	MH	7.32	2.40
tblVehicleEF	MH	1,112.23	1,539.05
tblVehicleEF	MH	63.76	20.57
tblVehicleEF	MH	1.51	1.47
tblVehicleEF	MH	0.92	0.24
tblVehicleEF	MH	0.13	0.13
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.7360e-003	3.5794e-004
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	3.2130e-003	3.2517e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.6140e-003	3.3066e-004
tblVehicleEF	MH	1.35	1.20
tblVehicleEF	MH	0.09	0.08
tblVehicleEF	MH	0.53	0.46
tblVehicleEF	MH	0.14	0.09

tblVehicleEF	MH	0.02	1.81
tblVehicleEF	MH	0.46	0.12
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	7.6700e-004	2.0358e-004
tblVehicleEF	MH	1.35	1.20
tblVehicleEF	MH	0.09	0.08
tblVehicleEF	MH	0.53	0.46
tblVehicleEF	MH	0.19	0.12
tblVehicleEF	MH	0.02	1.81
tblVehicleEF	MH	0.50	0.13
tblVehicleEF	MH	0.04	0.02
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	3.97	2.21
tblVehicleEF	MH	6.92	2.26
tblVehicleEF	MH	1,112.23	1,539.12
tblVehicleEF	MH	63.76	20.33
tblVehicleEF	MH	1.39	1.36
tblVehicleEF	MH	0.88	0.23
tblVehicleEF	MH	0.13	0.13
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.7360e-003	3.5794e-004
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	3.2130e-003	3.2517e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.6140e-003	3.3066e-004
tblVehicleEF	MH	2.10	1.85
tblVehicleEF	MH	0.09	0.08
tblVehicleEF	MH	0.84	0.72
tblVehicleEF	MH	0.14	0.09

tblVehicleEF	MH	0.02	1.78
tblVehicleEF	MH	0.44	0.11
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	7.5900e-004	2.0123e-004
tblVehicleEF	MH	2.10	1.85
tblVehicleEF	MH	0.09	0.08
tblVehicleEF	MH	0.84	0.72
tblVehicleEF	MH	0.19	0.12
tblVehicleEF	MH	0.02	1.78
tblVehicleEF	MH	0.48	0.12
tblVehicleEF	MH	0.04	0.02
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	3.90	2.16
tblVehicleEF	MH	7.37	2.42
tblVehicleEF	MH	1,112.23	1,539.03
tblVehicleEF	MH	63.76	20.61
tblVehicleEF	MH	1.48	1.44
tblVehicleEF	MH	0.92	0.24
tblVehicleEF	MH	0.13	0.13
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.7360e-003	3.5794e-004
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	3.2130e-003	3.2517e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.6140e-003	3.3066e-004
tblVehicleEF	MH	1.51	1.34
tblVehicleEF	MH	0.11	0.09
tblVehicleEF	MH	0.55	0.47
tblVehicleEF	MH	0.14	0.09

tblVehicleEF	MH	0.02	1.91
tblVehicleEF	MH	0.46	0.12
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	7.6700e-004	2.0394e-004
tblVehicleEF	MH	1.51	1.34
tblVehicleEF	MH	0.11	0.09
tblVehicleEF	MH	0.55	0.47
tblVehicleEF	MH	0.19	0.12
tblVehicleEF	MH	0.02	1.91
tblVehicleEF	MH	0.50	0.13
tblVehicleEF	MHD	0.02	4.3757e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	0.06	0.01
tblVehicleEF	MHD	0.48	0.38
tblVehicleEF	MHD	0.73	0.92
tblVehicleEF	MHD	7.70	1.52
tblVehicleEF	MHD	141.46	68.61
tblVehicleEF	MHD	1,145.30	1,119.76
tblVehicleEF	MHD	63.16	12.27
tblVehicleEF	MHD	1.08	0.66
tblVehicleEF	MHD	2.52	3.03
tblVehicleEF	MHD	10.44	0.92
tblVehicleEF	MHD	4.2030e-003	2.7877e-003
tblVehicleEF	MHD	0.13	0.13
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	0.07	0.09
tblVehicleEF	MHD	9.6900e-004	1.5198e-004
tblVehicleEF	MHD	4.0210e-003	2.6671e-003
tblVehicleEF	MHD	0.06	0.06
tblVehicleEF	MHD	3.0000e-003	3.0000e-003

tblVehicleEF	MHD	0.07	0.09
tblVehicleEF	MHD	8.9200e-004	1.4008e-004
tblVehicleEF	MHD	1.4760e-003	7.7229e-004
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	8.6400e-004	4.5431e-004
tblVehicleEF	MHD	0.13	0.17
tblVehicleEF	MHD	0.02	0.15
tblVehicleEF	MHD	0.47	0.07
tblVehicleEF	MHD	1.3620e-003	6.5197e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.6700e-004	1.2141e-004
tblVehicleEF	MHD	1.4760e-003	7.7229e-004
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	8.6400e-004	4.5431e-004
tblVehicleEF	MHD	0.15	0.19
tblVehicleEF	MHD	0.02	0.15
tblVehicleEF	MHD	0.52	0.08
tblVehicleEF	MHD	0.02	4.1389e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	0.06	0.01
tblVehicleEF	MHD	0.35	0.30
tblVehicleEF	MHD	0.74	0.93
tblVehicleEF	MHD	7.32	1.44
tblVehicleEF	MHD	149.83	70.45
tblVehicleEF	MHD	1,145.30	1,119.78
tblVehicleEF	MHD	63.16	12.14
tblVehicleEF	MHD	1.11	0.67
tblVehicleEF	MHD	2.37	2.86

tblVehicleEF	MHD	10.39	0.92
tblVehicleEF	MHD	3.5430e-003	2.3522e-003
tblVehicleEF	MHD	0.13	0.13
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	0.07	0.09
tblVehicleEF	MHD	9.6900e-004	1.5198e-004
tblVehicleEF	MHD	3.3900e-003	2.2504e-003
tblVehicleEF	MHD	0.06	0.06
tblVehicleEF	MHD	3.0000e-003	3.0000e-003
tblVehicleEF	MHD	0.07	0.09
tblVehicleEF	MHD	8.9200e-004	1.4008e-004
tblVehicleEF	MHD	2.3150e-003	1.2043e-003
tblVehicleEF	MHD	0.06	0.03
tblVehicleEF	MHD	0.03	0.02
tblVehicleEF	MHD	1.3270e-003	6.9492e-004
tblVehicleEF	MHD	0.13	0.17
tblVehicleEF	MHD	0.02	0.14
tblVehicleEF	MHD	0.45	0.07
tblVehicleEF	MHD	1.4410e-003	6.6950e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.6000e-004	1.2014e-004
tblVehicleEF	MHD	2.3150e-003	1.2043e-003
tblVehicleEF	MHD	0.06	0.03
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	1.3270e-003	6.9492e-004
tblVehicleEF	MHD	0.16	0.20
tblVehicleEF	MHD	0.02	0.14
tblVehicleEF	MHD	0.50	0.07
tblVehicleEF	MHD	0.02	4.7143e-003
tblVehicleEF	MHD	0.01	0.01

tblVehicleEF	MHD	0.06	0.01
tblVehicleEF	MHD	0.67	0.50
tblVehicleEF	MHD	0.73	0.92
tblVehicleEF	MHD	7.77	1.53
tblVehicleEF	MHD	129.89	66.07
tblVehicleEF	MHD	1,145.30	1,119.76
tblVehicleEF	MHD	63.16	12.29
tblVehicleEF	MHD	1.03	0.64
tblVehicleEF	MHD	2.47	2.98
tblVehicleEF	MHD	10.45	0.92
tblVehicleEF	MHD	5.1140e-003	3.3891e-003
tblVehicleEF	MHD	0.13	0.13
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	0.07	0.09
tblVehicleEF	MHD	9.6900e-004	1.5198e-004
tblVehicleEF	MHD	4.8930e-003	3.2425e-003
tblVehicleEF	MHD	0.06	0.06
tblVehicleEF	MHD	3.0000e-003	3.0000e-003
tblVehicleEF	MHD	0.07	0.09
tblVehicleEF	MHD	8.9200e-004	1.4008e-004
tblVehicleEF	MHD	1.5100e-003	7.9835e-004
tblVehicleEF	MHD	0.06	0.03
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	8.4600e-004	4.4674e-004
tblVehicleEF	MHD	0.13	0.17
tblVehicleEF	MHD	0.03	0.16
tblVehicleEF	MHD	0.48	0.07
tblVehicleEF	MHD	1.2530e-003	6.2770e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.6800e-004	1.2164e-004

tblVehicleEF	MHD	1.5100e-003	7.9835e-004
tblVehicleEF	MHD	0.06	0.03
tblVehicleEF	MHD	0.05	0.04
tblVehicleEF	MHD	8.4600e-004	4.4674e-004
tblVehicleEF	MHD	0.15	0.19
tblVehicleEF	MHD	0.03	0.16
tblVehicleEF	MHD	0.52	0.08
tblVehicleEF	OBUS	0.01	9.2565e-003
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.29	0.58
tblVehicleEF	OBUS	0.78	1.44
tblVehicleEF	OBUS	6.56	2.62
tblVehicleEF	OBUS	99.62	93.05
tblVehicleEF	OBUS	1,254.62	1,476.08
tblVehicleEF	OBUS	70.18	20.60
tblVehicleEF	OBUS	0.62	0.72
tblVehicleEF	OBUS	2.16	2.78
tblVehicleEF	OBUS	2.53	0.56
tblVehicleEF	OBUS	3.3800e-004	4.0459e-003
tblVehicleEF	OBUS	0.13	0.13
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.01	0.07
tblVehicleEF	OBUS	8.2900e-004	2.1487e-004
tblVehicleEF	OBUS	3.2300e-004	3.8708e-003
tblVehicleEF	OBUS	0.06	0.06
tblVehicleEF	OBUS	3.0000e-003	3.0000e-003
tblVehicleEF	OBUS	0.01	0.06
tblVehicleEF	OBUS	7.6500e-004	1.9837e-004
tblVehicleEF	OBUS	1.6610e-003	2.0046e-003

tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.04	0.07
tblVehicleEF	OBUS	8.2500e-004	9.6621e-004
tblVehicleEF	OBUS	0.07	0.17
tblVehicleEF	OBUS	0.04	0.25
tblVehicleEF	OBUS	0.42	0.13
tblVehicleEF	OBUS	9.6300e-004	8.8560e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.1700e-004	2.0385e-004
tblVehicleEF	OBUS	1.6610e-003	2.0046e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.06	0.09
tblVehicleEF	OBUS	8.2500e-004	9.6621e-004
tblVehicleEF	OBUS	0.09	0.21
tblVehicleEF	OBUS	0.04	0.25
tblVehicleEF	OBUS	0.45	0.14
tblVehicleEF	OBUS	0.01	9.2345e-003
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.27	0.54
tblVehicleEF	OBUS	0.79	1.46
tblVehicleEF	OBUS	6.20	2.47
tblVehicleEF	OBUS	104.52	94.53
tblVehicleEF	OBUS	1,254.62	1,476.12
tblVehicleEF	OBUS	70.18	20.35
tblVehicleEF	OBUS	0.64	0.73
tblVehicleEF	OBUS	2.03	2.60
tblVehicleEF	OBUS	2.48	0.55
tblVehicleEF	OBUS	2.8500e-004	3.4149e-003
tblVehicleEF	OBUS	0.13	0.13

tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.01	0.07
tblVehicleEF	OBUS	8.2900e-004	2.1487e-004
tblVehicleEF	OBUS	2.7300e-004	3.2671e-003
tblVehicleEF	OBUS	0.06	0.06
tblVehicleEF	OBUS	3.0000e-003	3.0000e-003
tblVehicleEF	OBUS	0.01	0.06
tblVehicleEF	OBUS	7.6500e-004	1.9837e-004
tblVehicleEF	OBUS	2.5350e-003	3.0229e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.04	0.07
tblVehicleEF	OBUS	1.2540e-003	1.4532e-003
tblVehicleEF	OBUS	0.07	0.17
tblVehicleEF	OBUS	0.04	0.25
tblVehicleEF	OBUS	0.40	0.13
tblVehicleEF	OBUS	1.0100e-003	8.9955e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.1100e-004	2.0138e-004
tblVehicleEF	OBUS	2.5350e-003	3.0229e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.06	0.09
tblVehicleEF	OBUS	1.2540e-003	1.4532e-003
tblVehicleEF	OBUS	0.09	0.21
tblVehicleEF	OBUS	0.04	0.25
tblVehicleEF	OBUS	0.44	0.14
tblVehicleEF	OBUS	0.01	9.3062e-003
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.31	0.64
tblVehicleEF	OBUS	0.78	1.44

tblVehicleEF	OBUS	6.62	2.65
tblVehicleEF	OBUS	92.85	91.01
tblVehicleEF	OBUS	1,254.62	1,476.07
tblVehicleEF	OBUS	70.18	20.65
tblVehicleEF	OBUS	0.59	0.71
tblVehicleEF	OBUS	2.12	2.73
tblVehicleEF	OBUS	2.54	0.56
tblVehicleEF	OBUS	4.1100e-004	4.9172e-003
tblVehicleEF	OBUS	0.13	0.13
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.01	0.07
tblVehicleEF	OBUS	8.2900e-004	2.1487e-004
tblVehicleEF	OBUS	3.9300e-004	4.7045e-003
tblVehicleEF	OBUS	0.06	0.06
tblVehicleEF	OBUS	3.0000e-003	3.0000e-003
tblVehicleEF	OBUS	0.01	0.06
tblVehicleEF	OBUS	7.6500e-004	1.9837e-004
tblVehicleEF	OBUS	1.7090e-003	2.1077e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.04	0.07
tblVehicleEF	OBUS	8.1300e-004	9.6248e-004
tblVehicleEF	OBUS	0.07	0.17
tblVehicleEF	OBUS	0.05	0.27
tblVehicleEF	OBUS	0.42	0.13
tblVehicleEF	OBUS	8.9800e-004	8.6634e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.1800e-004	2.0430e-004
tblVehicleEF	OBUS	1.7090e-003	2.1077e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.06	0.09

tblVehicleEF	OBUS	8.1300e-004	9.6248e-004
tblVehicleEF	OBUS	0.09	0.21
tblVehicleEF	OBUS	0.05	0.27
tblVehicleEF	OBUS	0.46	0.14
tblVehicleEF	SBUS	0.88	0.06
tblVehicleEF	SBUS	0.02	9.7864e-003
tblVehicleEF	SBUS	0.08	6.1944e-003
tblVehicleEF	SBUS	7.58	2.56
tblVehicleEF	SBUS	0.94	0.87
tblVehicleEF	SBUS	7.88	0.88
tblVehicleEF	SBUS	1,175.17	354.94
tblVehicleEF	SBUS	1,116.42	1,146.90
tblVehicleEF	SBUS	49.91	5.17
tblVehicleEF	SBUS	11.44	3.64
tblVehicleEF	SBUS	5.41	5.86
tblVehicleEF	SBUS	13.16	0.65
tblVehicleEF	SBUS	0.01	5.8373e-003
tblVehicleEF	SBUS	0.74	0.74
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.8700e-004	4.5738e-005
tblVehicleEF	SBUS	0.01	5.5848e-003
tblVehicleEF	SBUS	0.32	0.32
tblVehicleEF	SBUS	2.7100e-003	2.6888e-003
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.3100e-004	4.2055e-005
tblVehicleEF	SBUS	3.8950e-003	1.1088e-003
tblVehicleEF	SBUS	0.03	8.9260e-003
tblVehicleEF	SBUS	0.92	0.30
tblVehicleEF	SBUS	1.7890e-003	5.1837e-004

tblVehicleEF	SBUS	0.13	0.12
tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.42	0.04
tblVehicleEF	SBUS	0.01	3.3844e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.3600e-004	5.1112e-005
tblVehicleEF	SBUS	3.8950e-003	1.1088e-003
tblVehicleEF	SBUS	0.03	8.9260e-003
tblVehicleEF	SBUS	1.32	0.43
tblVehicleEF	SBUS	1.7890e-003	5.1837e-004
tblVehicleEF	SBUS	0.15	0.15
tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.46	0.04
tblVehicleEF	SBUS	0.88	0.06
tblVehicleEF	SBUS	0.02	9.9062e-003
tblVehicleEF	SBUS	0.07	5.4353e-003
tblVehicleEF	SBUS	7.44	2.52
tblVehicleEF	SBUS	0.95	0.89
tblVehicleEF	SBUS	6.27	0.69
tblVehicleEF	SBUS	1,230.37	365.42
tblVehicleEF	SBUS	1,116.42	1,146.93
tblVehicleEF	SBUS	49.91	4.86
tblVehicleEF	SBUS	11.80	3.74
tblVehicleEF	SBUS	5.10	5.53
tblVehicleEF	SBUS	13.13	0.64
tblVehicleEF	SBUS	0.01	4.9270e-003
tblVehicleEF	SBUS	0.74	0.74
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.8700e-004	4.5738e-005

tblVehicleEF	SBUS	0.01	4.7139e-003
tblVehicleEF	SBUS	0.32	0.32
tblVehicleEF	SBUS	2.7100e-003	2.6888e-003
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.3100e-004	4.2055e-005
tblVehicleEF	SBUS	5.9980e-003	1.6969e-003
tblVehicleEF	SBUS	0.03	9.1386e-003
tblVehicleEF	SBUS	0.91	0.30
tblVehicleEF	SBUS	2.7960e-003	7.9994e-004
tblVehicleEF	SBUS	0.13	0.12
tblVehicleEF	SBUS	0.02	0.06
tblVehicleEF	SBUS	0.37	0.03
tblVehicleEF	SBUS	0.01	3.4835e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.0900e-004	4.8095e-005
tblVehicleEF	SBUS	5.9980e-003	1.6969e-003
tblVehicleEF	SBUS	0.03	9.1386e-003
tblVehicleEF	SBUS	1.32	0.43
tblVehicleEF	SBUS	2.7960e-003	7.9994e-004
tblVehicleEF	SBUS	0.15	0.15
tblVehicleEF	SBUS	0.02	0.06
tblVehicleEF	SBUS	0.40	0.03
tblVehicleEF	SBUS	0.88	0.06
tblVehicleEF	SBUS	0.02	9.7588e-003
tblVehicleEF	SBUS	0.08	6.3489e-003
tblVehicleEF	SBUS	7.78	2.63
tblVehicleEF	SBUS	0.93	0.87
tblVehicleEF	SBUS	8.15	0.91
tblVehicleEF	SBUS	1,098.95	340.46
tblVehicleEF	SBUS	1,116.42	1,146.90

tblVehicleEF	SBUS	49.91	5.22
tblVehicleEF	SBUS	10.93	3.51
tblVehicleEF	SBUS	5.33	5.77
tblVehicleEF	SBUS	13.17	0.65
tblVehicleEF	SBUS	0.02	7.0944e-003
tblVehicleEF	SBUS	0.74	0.74
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.8700e-004	4.5738e-005
tblVehicleEF	SBUS	0.02	6.7875e-003
tblVehicleEF	SBUS	0.32	0.32
tblVehicleEF	SBUS	2.7100e-003	2.6888e-003
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.3100e-004	4.2055e-005
tblVehicleEF	SBUS	4.0560e-003	1.1541e-003
tblVehicleEF	SBUS	0.03	9.9783e-003
tblVehicleEF	SBUS	0.92	0.30
tblVehicleEF	SBUS	1.7640e-003	5.1819e-004
tblVehicleEF	SBUS	0.13	0.12
tblVehicleEF	SBUS	0.02	0.09
tblVehicleEF	SBUS	0.43	0.04
tblVehicleEF	SBUS	0.01	3.2476e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.4000e-004	5.1608e-005
tblVehicleEF	SBUS	4.0560e-003	1.1541e-003
tblVehicleEF	SBUS	0.03	9.9783e-003
tblVehicleEF	SBUS	1.32	0.43
tblVehicleEF	SBUS	1.7640e-003	5.1819e-004
tblVehicleEF	SBUS	0.15	0.15
tblVehicleEF	SBUS	0.02	0.09

tblVehicleEF	SBUS	0.47	0.04
tblVehicleEF	UBUS	2.82	6.37
tblVehicleEF	UBUS	0.06	0.02
tblVehicleEF	UBUS	12.54	35.61
tblVehicleEF	UBUS	10.71	0.94
tblVehicleEF	UBUS	1,986.82	1,937.47
tblVehicleEF	UBUS	99.14	11.89
tblVehicleEF	UBUS	10.84	2.26
tblVehicleEF	UBUS	15.55	0.12
tblVehicleEF	UBUS	0.61	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.14	4.2635e-003
tblVehicleEF	UBUS	1.1020e-003	2.8939e-005
tblVehicleEF	UBUS	0.26	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.13	4.0767e-003
tblVehicleEF	UBUS	1.0160e-003	2.6609e-005
tblVehicleEF	UBUS	5.5290e-003	9.5825e-004
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	2.9760e-003	7.4208e-004
tblVehicleEF	UBUS	0.94	0.25
tblVehicleEF	UBUS	0.02	0.08
tblVehicleEF	UBUS	0.81	0.07
tblVehicleEF	UBUS	0.01	2.3921e-003
tblVehicleEF	UBUS	1.1840e-003	1.1771e-004
tblVehicleEF	UBUS	5.5290e-003	9.5825e-004
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	2.9760e-003	7.4208e-004
tblVehicleEF	UBUS	3.87	6.68
tblVehicleEF	UBUS	0.02	0.08

tblVehicleEF	UBUS	0.88	0.07
tblVehicleEF	UBUS	2.82	6.37
tblVehicleEF	UBUS	0.05	0.01
tblVehicleEF	UBUS	12.61	35.61
tblVehicleEF	UBUS	9.31	0.83
tblVehicleEF	UBUS	1,986.82	1,937.47
tblVehicleEF	UBUS	99.14	11.69
tblVehicleEF	UBUS	10.21	2.25
tblVehicleEF	UBUS	15.49	0.12
tblVehicleEF	UBUS	0.61	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.14	4.2635e-003
tblVehicleEF	UBUS	1.1020e-003	2.8939e-005
tblVehicleEF	UBUS	0.26	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.13	4.0767e-003
tblVehicleEF	UBUS	1.0160e-003	2.6609e-005
tblVehicleEF	UBUS	8.3230e-003	1.4315e-003
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	4.5310e-003	1.0810e-003
tblVehicleEF	UBUS	0.95	0.25
tblVehicleEF	UBUS	0.02	0.07
tblVehicleEF	UBUS	0.74	0.06
tblVehicleEF	UBUS	0.01	2.3921e-003
tblVehicleEF	UBUS	1.1600e-003	1.1572e-004
tblVehicleEF	UBUS	8.3230e-003	1.4315e-003
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	4.5310e-003	1.0810e-003
tblVehicleEF	UBUS	3.88	6.68
tblVehicleEF	UBUS	0.02	0.07

tblVehicleEF	UBUS	0.81	0.07
tblVehicleEF	UBUS	2.82	6.37
tblVehicleEF	UBUS	0.06	0.02
tblVehicleEF	UBUS	12.53	35.61
tblVehicleEF	UBUS	10.92	0.96
tblVehicleEF	UBUS	1,986.82	1,937.47
tblVehicleEF	UBUS	99.14	11.93
tblVehicleEF	UBUS	10.64	2.25
tblVehicleEF	UBUS	15.56	0.12
tblVehicleEF	UBUS	0.61	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.14	4.2635e-003
tblVehicleEF	UBUS	1.1020e-003	2.8939e-005
tblVehicleEF	UBUS	0.26	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.13	4.0767e-003
tblVehicleEF	UBUS	1.0160e-003	2.6609e-005
tblVehicleEF	UBUS	6.0970e-003	9.3075e-004
tblVehicleEF	UBUS	0.11	0.01
tblVehicleEF	UBUS	3.0990e-003	7.1395e-004
tblVehicleEF	UBUS	0.94	0.25
tblVehicleEF	UBUS	0.03	0.09
tblVehicleEF	UBUS	0.82	0.07
tblVehicleEF	UBUS	0.01	2.3921e-003
tblVehicleEF	UBUS	1.1880e-003	1.1801e-004
tblVehicleEF	UBUS	6.0970e-003	9.3075e-004
tblVehicleEF	UBUS	0.11	0.01
tblVehicleEF	UBUS	3.0990e-003	7.1395e-004
tblVehicleEF	UBUS	3.87	6.68
tblVehicleEF	UBUS	0.03	0.09

tblVehicleEF	UBUS	0.90	0.07
tblVehicleTrips	ST_TR	2.46	4.62
tblVehicleTrips	SU_TR	1.05	4.62
tblVehicleTrips	WD_TR	11.03	4.62

2.0 Emissions Summary

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	0.0637	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.2000e-004	6.2000e-004	0.0000		6.7000e-004
Energy	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004		11.4276	11.4276	2.2000e-004	2.1000e-004	11.4955
Mobile	0.0426	0.0985	0.3939	1.0100e-003	0.0899	1.6700e-003	0.0915	0.0240	1.5700e-003	0.0256		103.3920	103.3920	6.9300e-003		103.5652
Total	**0.1073**	**0.1080**	**0.4022**	**1.0700e-003**	**0.0899**	**2.3900e-003**	**0.0923**	**0.0240**	**2.2900e-003**	**0.0263**		**114.8202**	**114.8202**	**7.1500e-003**	**2.1000e-004**	**115.0614**

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	0.0637	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.2000e-004	6.2000e-004	0.0000		6.7000e-004
Energy	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004		11.4276	11.4276	2.2000e-004	2.1000e-004	11.4955
Mobile	0.0426	0.0985	0.3939	1.0100e-003	0.0899	1.6700e-003	0.0915	0.0240	1.5700e-003	0.0256		103.3920	103.3920	6.9300e-003		103.5652
Total	**0.1073**	**0.1080**	**0.4022**	**1.0700e-003**	**0.0899**	**2.3900e-003**	**0.0923**	**0.0240**	**2.2900e-003**	**0.0263**		**114.8202**	**114.8202**	**7.1500e-003**	**2.1000e-004**	**115.0614**

	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**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	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	0.0426	0.0985	0.3939	1.0100e-003	0.0899	1.6700e-003	0.0915	0.0240	1.5700e-003	0.0256		103.3920	103.3920	6.9300e-003		103.5652
Unmitigated	0.0426	0.0985	0.3939	1.0100e-003	0.0899	1.6700e-003	0.0915	0.0240	1.5700e-003	0.0256		103.3920	103.3920	6.9300e-003		103.5652

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	13.17	13.17	13.17	42,417	42,417
Total	13.17	13.17	13.17	42,417	42,417

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
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Office Building	0.553045	0.055446	0.182004	0.125273	0.023413	0.005765	0.018938	0.027556	0.001239	0.001462	0.004210	0.000648	0.001000

5.0 Energy Detail

Historical Energy Use: Y

5.1 Mitigation Measures Energy

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					
NaturalGas Mitigated	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004		11.4276	11.4276	2.2000e-004	2.1000e-004	11.4955
NaturalGas Unmitigated	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004		11.4276	11.4276	2.2000e-004	2.1000e-004	11.4955

5.2 Energy by Land Use - NaturalGas

Unmitigated

Land Use	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
	kBTU/yr	lb/day										lb/day					
General Office Building	97.1342	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004		11.4276	11.4276	2.2000e-004	2.1000e-004	11.4955
Total		**1.0500e-003**	**9.5200e-003**	**8.0000e-003**	**6.0000e-005**		**7.2000e-004**	**7.2000e-004**		**7.2000e-004**	**7.2000e-004**		**11.4276**	**11.4276**	**2.2000e-004**	**2.1000e-004**	**11.4955**

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					
General Office Building	0.0971342	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004		11.4276	11.4276	2.2000e-004	2.1000e-004	11.4955
Total		**1.0500e-003**	**9.5200e-003**	**8.0000e-003**	**6.0000e-005**		**7.2000e-004**	**7.2000e-004**		**7.2000e-004**	**7.2000e-004**		**11.4276**	**11.4276**	**2.2000e-004**	**2.1000e-004**	**11.4955**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	0.0637	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.2000e-004	6.2000e-004	0.0000		6.7000e-004
Unmitigated	0.0637	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.2000e-004	6.2000e-004	0.0000		6.7000e-004

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	7.2400e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0564					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.2000e-004	6.2000e-004	0.0000		6.7000e-004
Total	**0.0637**	**0.0000**	**2.9000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.2000e-004**	**6.2000e-004**	**0.0000**		**6.7000e-004**

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	7.2400e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0564					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.2000e-004	6.2000e-004	0.0000		6.7000e-004
Total	**0.0637**	**0.0000**	**2.9000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.2000e-004**	**6.2000e-004**	**0.0000**		**6.7000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

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

Exhibit C
Project Operational Emissions

ESA

3727 Robertson Blvd. Mixed-Use Project

Project Land Uses

Land Use Type	CalEEMod LandUse Type	CalEEMod LandUse Subtype	Amount	Unit	Building SF	Acres	Raw Trip Rate	Trip Rate Reduction (Internal Trips)	Trip Rate Reduction (Transit/walk in trips)	Trip Rate Reduction (Pass-by trips)	Adjusted Trip Rates
Apartment	Residential	Apartments Mid Rise	12	DU		0.03	5.44	10%	15%	0%	4.16
Office	Commercial	General Office Building	5.45	1000sqft	5,450	0.02	9.74	10%	15%	0%	7.45
Restaurant/retail[1]	Recreational	High turnover restaurant	3.89	1000sqft	3,886	0.02	112.18	0%	15%	20%	76.28
Parking Lot	Parking	Parking Lot	6.00	Spaces	2,400	0.02					
Subterranean Parking	Parking	Enclosed Parking Structure with Elevator	19.00	Spaces	7,600	0.03					

Existing Land Uses

Land Use Type	CalEEMod LandUse Type	CalEEMod LandUse Subtype	Amount	Unit	Building SF	Acres	Raw Trip Rate	Trip Rate Reduction (Internal Trips)	Trip Rate Reduction (Transit/walk in trips)	Trip Rate Reduction (Pass-by trips)	Adjusted Trip Rates
Sound Studio	Commercial	General Office Building	2.85	1000sqft	2,850	0.06	5.44	0%	15%	0%	4.62

1 Crain and Associates Traffic Impact Analysis. Matches trip assumptions of restaurant

3727 Robertson-Operations

South Coast AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	5.46	1000sqft	0.02	5,455.00	0
Enclosed Parking with Elevator	19.00	Space	0.03	7,600.00	0
Parking Lot	6.00	Space	0.02	2,400.00	0
High Turnover (Sit Down Restaurant)	3.89	1000sqft	0.02	3,886.00	0
Apartments Mid Rise	12.00	Dwelling Unit	0.03	12,921.00	28

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	11			**Operational Year**	2021
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	483.27	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2e intensity factor was linearly projected for year 2021 anticipated RPS based on SB 100 target of 44% RPS by 2024. See operational assumptions for more details.

Land Use - see operational assumptions

Construction Phase - operational run only

Vehicle Trips - trip rates from project traffic impact analysis.

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Woodstoves - see operational assumptions

Energy Use -

Energy Mitigation - see operational assumptions for solar pv system assumptions.

Waste Mitigation - in compliance with 75% waste diversion by state by 2020.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	2.00
tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	10.20	0.00
tblFireplaces	NumberNoFireplace	1.20	0.00
tblFireplaces	NumberWood	0.60	0.00
tblFleetMix	HHD	0.03	0.03
tblFleetMix	HHD	0.03	0.03
tblFleetMix	HHD	0.03	0.03
tblFleetMix	HHD	0.03	0.03
tblFleetMix	HHD	0.03	0.03
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT2	0.20	0.18

tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
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tblFleetMix	LHD2	5.8510e-003	6.0308e-003
tblFleetMix	MCY	4.8170e-003	4.3394e-003
tblFleetMix	MCY	4.8170e-003	4.3394e-003
tblFleetMix	MCY	4.8170e-003	4.3394e-003
tblFleetMix	MCY	4.8170e-003	4.3394e-003
tblFleetMix	MCY	4.8170e-003	4.3394e-003
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MH	9.2500e-004	9.7507e-004
tblFleetMix	MH	9.2500e-004	9.7507e-004
tblFleetMix	MH	9.2500e-004	9.7507e-004
tblFleetMix	MH	9.2500e-004	9.7507e-004
tblFleetMix	MH	9.2500e-004	9.7507e-004
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tblFleetMix	MHD	0.02	0.02
tblFleetMix	MHD	0.02	0.02
tblFleetMix	MHD	0.02	0.02
tblFleetMix	MHD	0.02	0.02
tblFleetMix	OBUS	2.0700e-003	1.2248e-003
tblFleetMix	OBUS	2.0700e-003	1.2248e-003
tblFleetMix	OBUS	2.0700e-003	1.2248e-003
tblFleetMix	OBUS	2.0700e-003	1.2248e-003
tblFleetMix	OBUS	2.0700e-003	1.2248e-003
tblFleetMix	SBUS	7.0700e-004	6.6259e-004
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tblFleetMix	UBUS	1.8770e-003	1.4541e-003
tblFleetMix	UBUS	1.8770e-003	1.4541e-003
tblFleetMix	UBUS	1.8770e-003	1.4541e-003
tblFleetMix	UBUS	1.8770e-003	1.4541e-003
tblLandUse	LandUseSquareFeet	5,460.00	5,455.00
tblLandUse	LandUseSquareFeet	3,890.00	3,886.00
tblLandUse	LandUseSquareFeet	12,000.00	12,921.00
tblLandUse	LotAcreage	0.13	0.02
tblLandUse	LotAcreage	0.17	0.03
tblLandUse	LotAcreage	0.05	0.02
tblLandUse	LotAcreage	0.09	0.02
tblLandUse	LotAcreage	0.32	0.03
tblLandUse	Population	34.00	28.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0
tblProjectCharacteristics	CO2IntensityFactor	702.44	483.27

tblProjectCharacteristics	N2OIntensityFactor	0.006	0
tblVehicleEF	HHD	0.75	0.03
tblVehicleEF	HHD	0.09	0.08
tblVehicleEF	HHD	0.09	4.2401e-007
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tblVehicleEF	HHD	3.79	3.84
tblVehicleEF	HHD	19.75	1.92
tblVehicleEF	HHD	0.02	9.3832e-003
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.05
tblVehicleEF	HHD	7.7000e-005	1.3833e-006
tblVehicleEF	HHD	0.02	8.9773e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8180e-003	8.8729e-003
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tblVehicleEF	HHD	7.1000e-005	1.2719e-006
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tblVehicleEF	HHD	3.6200e-004	1.2685e-003
tblVehicleEF	HHD	0.08	2.2266e-006

tblVehicleEF	HHD	0.05	0.01
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	1.3900e-004	7.0406e-007
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tblVehicleEF	HHD	8.8180e-003	8.8729e-003

tblVehicleEF	HHD	0.02	0.05
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tblVehicleEF	HHD	0.01	0.01
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tblVehicleEF	HHD	1.1700e-004	7.2292e-006
tblVehicleEF	HHD	0.23	0.20
tblVehicleEF	HHD	3.5600e-004	1.2608e-003
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tblVehicleEF	HHD	3.70	6.39
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tblVehicleEF	HHD	2.92	8.0434e-003
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tblVehicleEF	HHD	1,610.72	1,479.86
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tblVehicleEF	HHD	3.74	3.79

tblVehicleEF	HHD	19.75	1.92
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tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.05
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tblVehicleEF	HHD	8.8180e-003	8.8729e-003
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tblVehicleEF	HHD	7.1000e-005	1.2719e-006
tblVehicleEF	HHD	1.0000e-004	6.7124e-006
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tblVehicleEF	HHD	7.2000e-005	4.4165e-006
tblVehicleEF	HHD	0.13	0.11
tblVehicleEF	HHD	3.9100e-004	1.3430e-003
tblVehicleEF	HHD	0.08	2.2436e-006
tblVehicleEF	HHD	0.04	0.01
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	1.3900e-004	7.0493e-007
tblVehicleEF	HHD	1.0000e-004	6.7124e-006
tblVehicleEF	HHD	4.6100e-003	2.7310e-004
tblVehicleEF	HHD	0.85	0.52
tblVehicleEF	HHD	7.2000e-005	4.4165e-006
tblVehicleEF	HHD	0.23	0.20
tblVehicleEF	HHD	3.9100e-004	1.3430e-003
tblVehicleEF	HHD	0.09	2.4564e-006
tblVehicleEF	LDA	5.2110e-003	3.1429e-003
tblVehicleEF	LDA	5.8420e-003	0.05

tblVehicleEF	LDA	0.65	0.74
tblVehicleEF	LDA	1.21	2.15
tblVehicleEF	LDA	275.32	274.11
tblVehicleEF	LDA	58.96	54.77
tblVehicleEF	LDA	0.05	0.04
tblVehicleEF	LDA	0.08	0.19
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	8.0000e-003	8.0000e-003
tblVehicleEF	LDA	2.0440e-003	1.7838e-003
tblVehicleEF	LDA	2.2900e-003	1.9372e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	2.0000e-003	2.0000e-003
tblVehicleEF	LDA	1.8840e-003	1.6434e-003
tblVehicleEF	LDA	2.1060e-003	1.7813e-003
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.11	0.10
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.04	0.22
tblVehicleEF	LDA	0.08	0.24
tblVehicleEF	LDA	2.7580e-003	2.7118e-003
tblVehicleEF	LDA	6.1000e-004	5.4200e-004
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.11	0.10
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	0.22
tblVehicleEF	LDA	0.09	0.26
tblVehicleEF	LDA	5.5820e-003	3.3871e-003
tblVehicleEF	LDA	5.1760e-003	0.05

tblVehicleEF	LDA	0.73	0.83
tblVehicleEF	LDA	1.04	1.84
tblVehicleEF	LDA	290.06	288.26
tblVehicleEF	LDA	58.96	54.19
tblVehicleEF	LDA	0.05	0.04
tblVehicleEF	LDA	0.07	0.18
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	8.0000e-003	8.0000e-003
tblVehicleEF	LDA	2.0440e-003	1.7838e-003
tblVehicleEF	LDA	2.2900e-003	1.9372e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	2.0000e-003	2.0000e-003
tblVehicleEF	LDA	1.8840e-003	1.6434e-003
tblVehicleEF	LDA	2.1060e-003	1.7813e-003
tblVehicleEF	LDA	0.07	0.09
tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.06	0.08
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.04	0.21
tblVehicleEF	LDA	0.07	0.21
tblVehicleEF	LDA	2.9060e-003	2.8517e-003
tblVehicleEF	LDA	6.0700e-004	5.3628e-004
tblVehicleEF	LDA	0.07	0.09
tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.06	0.08
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	0.21
tblVehicleEF	LDA	0.08	0.23
tblVehicleEF	LDA	5.0990e-003	3.0732e-003
tblVehicleEF	LDA	5.9770e-003	0.05

tblVehicleEF	LDA	0.63	0.71
tblVehicleEF	LDA	1.25	2.21
tblVehicleEF	LDA	270.53	269.50
tblVehicleEF	LDA	58.96	54.89
tblVehicleEF	LDA	0.05	0.04
tblVehicleEF	LDA	0.08	0.20
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	8.0000e-003	8.0000e-003
tblVehicleEF	LDA	2.0440e-003	1.7838e-003
tblVehicleEF	LDA	2.2900e-003	1.9372e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	2.0000e-003	2.0000e-003
tblVehicleEF	LDA	1.8840e-003	1.6434e-003
tblVehicleEF	LDA	2.1060e-003	1.7813e-003
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.05	0.25
tblVehicleEF	LDA	0.08	0.25
tblVehicleEF	LDA	2.7100e-003	2.6661e-003
tblVehicleEF	LDA	6.1100e-004	5.4318e-004
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.05	0.25
tblVehicleEF	LDA	0.09	0.27
tblVehicleEF	LDT1	0.01	8.2654e-003
tblVehicleEF	LDT1	0.02	0.08

tblVehicleEF	LDT1	1.65	1.56
tblVehicleEF	LDT1	3.08	2.36
tblVehicleEF	LDT1	339.89	323.15
tblVehicleEF	LDT1	71.61	65.44
tblVehicleEF	LDT1	0.16	0.13
tblVehicleEF	LDT1	0.18	0.28
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	3.3000e-003	2.7341e-003
tblVehicleEF	LDT1	3.5610e-003	2.8287e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003
tblVehicleEF	LDT1	3.0390e-003	2.5162e-003
tblVehicleEF	LDT1	3.2750e-003	2.6011e-003
tblVehicleEF	LDT1	0.14	0.15
tblVehicleEF	LDT1	0.29	0.22
tblVehicleEF	LDT1	0.11	0.12
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	0.18	0.76
tblVehicleEF	LDT1	0.21	0.40
tblVehicleEF	LDT1	3.4200e-003	3.1978e-003
tblVehicleEF	LDT1	7.7000e-004	6.4755e-004
tblVehicleEF	LDT1	0.14	0.15
tblVehicleEF	LDT1	0.29	0.22
tblVehicleEF	LDT1	0.11	0.12
tblVehicleEF	LDT1	0.05	0.05
tblVehicleEF	LDT1	0.18	0.76
tblVehicleEF	LDT1	0.24	0.44
tblVehicleEF	LDT1	0.02	8.8396e-003
tblVehicleEF	LDT1	0.01	0.07

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tblVehicleEF	LDT1	2.63	2.02
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tblVehicleEF	LDT1	71.61	64.74
tblVehicleEF	LDT1	0.14	0.12
tblVehicleEF	LDT1	0.17	0.26
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	3.3000e-003	2.7341e-003
tblVehicleEF	LDT1	3.5610e-003	2.8287e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003
tblVehicleEF	LDT1	3.0390e-003	2.5162e-003
tblVehicleEF	LDT1	3.2750e-003	2.6011e-003
tblVehicleEF	LDT1	0.24	0.24
tblVehicleEF	LDT1	0.31	0.24
tblVehicleEF	LDT1	0.17	0.18
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	0.17	0.71
tblVehicleEF	LDT1	0.19	0.35
tblVehicleEF	LDT1	3.5920e-003	3.3399e-003
tblVehicleEF	LDT1	7.6200e-004	6.4062e-004
tblVehicleEF	LDT1	0.24	0.24
tblVehicleEF	LDT1	0.31	0.24
tblVehicleEF	LDT1	0.17	0.18
tblVehicleEF	LDT1	0.06	0.06
tblVehicleEF	LDT1	0.17	0.71
tblVehicleEF	LDT1	0.21	0.39
tblVehicleEF	LDT1	0.01	8.0953e-003
tblVehicleEF	LDT1	0.02	0.08

tblVehicleEF	LDT1	1.59	1.51
tblVehicleEF	LDT1	3.17	2.44
tblVehicleEF	LDT1	334.24	318.34
tblVehicleEF	LDT1	71.61	65.58
tblVehicleEF	LDT1	0.15	0.13
tblVehicleEF	LDT1	0.18	0.29
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	3.3000e-003	2.7341e-003
tblVehicleEF	LDT1	3.5610e-003	2.8287e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003
tblVehicleEF	LDT1	3.0390e-003	2.5162e-003
tblVehicleEF	LDT1	3.2750e-003	2.6011e-003
tblVehicleEF	LDT1	0.14	0.15
tblVehicleEF	LDT1	0.33	0.25
tblVehicleEF	LDT1	0.11	0.11
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	0.21	0.90
tblVehicleEF	LDT1	0.22	0.41
tblVehicleEF	LDT1	3.3630e-003	3.1501e-003
tblVehicleEF	LDT1	7.7200e-004	6.4900e-004
tblVehicleEF	LDT1	0.14	0.15
tblVehicleEF	LDT1	0.33	0.25
tblVehicleEF	LDT1	0.11	0.11
tblVehicleEF	LDT1	0.05	0.05
tblVehicleEF	LDT1	0.21	0.90
tblVehicleEF	LDT1	0.24	0.45
tblVehicleEF	LDT2	7.0440e-003	5.0887e-003
tblVehicleEF	LDT2	7.1880e-003	0.07

tblVehicleEF	LDT2	0.84	1.06
tblVehicleEF	LDT2	1.49	2.74
tblVehicleEF	LDT2	382.63	349.24
tblVehicleEF	LDT2	81.02	71.19
tblVehicleEF	LDT2	0.08	0.09
tblVehicleEF	LDT2	0.12	0.31
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9920e-003	1.8561e-003
tblVehicleEF	LDT2	2.3200e-003	1.9489e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003
tblVehicleEF	LDT2	1.8320e-003	1.7082e-003
tblVehicleEF	LDT2	2.1330e-003	1.7921e-003
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.11	0.13
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.06	0.42
tblVehicleEF	LDT2	0.10	0.34
tblVehicleEF	LDT2	3.8330e-003	3.4552e-003
tblVehicleEF	LDT2	8.3500e-004	7.0452e-004
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.11	0.13
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.03	0.03
tblVehicleEF	LDT2	0.06	0.42
tblVehicleEF	LDT2	0.11	0.37
tblVehicleEF	LDT2	7.5350e-003	5.4660e-003
tblVehicleEF	LDT2	6.3730e-003	0.06

tblVehicleEF	LDT2	0.94	1.18
tblVehicleEF	LDT2	1.28	2.34
tblVehicleEF	LDT2	402.38	363.41
tblVehicleEF	LDT2	81.02	70.44
tblVehicleEF	LDT2	0.07	0.08
tblVehicleEF	LDT2	0.11	0.29
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9920e-003	1.8561e-003
tblVehicleEF	LDT2	2.3200e-003	1.9489e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003
tblVehicleEF	LDT2	1.8320e-003	1.7082e-003
tblVehicleEF	LDT2	2.1330e-003	1.7921e-003
tblVehicleEF	LDT2	0.08	0.13
tblVehicleEF	LDT2	0.12	0.14
tblVehicleEF	LDT2	0.07	0.12
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.06	0.40
tblVehicleEF	LDT2	0.09	0.30
tblVehicleEF	LDT2	4.0320e-003	3.5954e-003
tblVehicleEF	LDT2	8.3200e-004	6.9709e-004
tblVehicleEF	LDT2	0.08	0.13
tblVehicleEF	LDT2	0.12	0.14
tblVehicleEF	LDT2	0.07	0.12
tblVehicleEF	LDT2	0.03	0.03
tblVehicleEF	LDT2	0.06	0.40
tblVehicleEF	LDT2	0.09	0.33
tblVehicleEF	LDT2	6.8940e-003	4.9777e-003
tblVehicleEF	LDT2	7.3550e-003	0.07

tblVehicleEF	LDT2	0.81	1.02
tblVehicleEF	LDT2	1.53	2.82
tblVehicleEF	LDT2	376.06	344.49
tblVehicleEF	LDT2	81.02	71.35
tblVehicleEF	LDT2	0.08	0.09
tblVehicleEF	LDT2	0.12	0.31
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9920e-003	1.8561e-003
tblVehicleEF	LDT2	2.3200e-003	1.9489e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003
tblVehicleEF	LDT2	1.8320e-003	1.7082e-003
tblVehicleEF	LDT2	2.1330e-003	1.7921e-003
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.12	0.14
tblVehicleEF	LDT2	0.05	0.07
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.07	0.49
tblVehicleEF	LDT2	0.10	0.35
tblVehicleEF	LDT2	3.7670e-003	3.4081e-003
tblVehicleEF	LDT2	8.3600e-004	7.0609e-004
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.12	0.14
tblVehicleEF	LDT2	0.05	0.07
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.07	0.49
tblVehicleEF	LDT2	0.11	0.38
tblVehicleEF	LHD1	5.8640e-003	5.6691e-003
tblVehicleEF	LHD1	0.01	6.0175e-003

tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.15	0.19
tblVehicleEF	LHD1	0.91	0.71
tblVehicleEF	LHD1	2.81	1.13
tblVehicleEF	LHD1	9.00	9.05
tblVehicleEF	LHD1	610.88	671.68
tblVehicleEF	LHD1	33.50	12.37
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	1.31	0.90
tblVehicleEF	LHD1	1.05	0.35
tblVehicleEF	LHD1	8.5300e-004	7.7068e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.6787e-003
tblVehicleEF	LHD1	0.01	7.5768e-003
tblVehicleEF	LHD1	1.0090e-003	2.8117e-004
tblVehicleEF	LHD1	8.1600e-004	7.3734e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5040e-003	2.4197e-003
tblVehicleEF	LHD1	0.01	7.2207e-003
tblVehicleEF	LHD1	9.2800e-004	2.5852e-004
tblVehicleEF	LHD1	3.3200e-003	2.7392e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.9270e-003	1.5952e-003
tblVehicleEF	LHD1	0.07	0.05
tblVehicleEF	LHD1	0.31	0.55
tblVehicleEF	LHD1	0.28	0.08
tblVehicleEF	LHD1	9.0000e-005	8.7938e-005
tblVehicleEF	LHD1	6.0020e-003	6.5586e-003
tblVehicleEF	LHD1	3.8800e-004	1.2242e-004

tblVehicleEF	LHD1	3.3200e-003	2.7392e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	1.9270e-003	1.5952e-003
tblVehicleEF	LHD1	0.09	0.07
tblVehicleEF	LHD1	0.31	0.55
tblVehicleEF	LHD1	0.31	0.09
tblVehicleEF	LHD1	5.8640e-003	5.6816e-003
tblVehicleEF	LHD1	0.01	6.1375e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.15	0.19
tblVehicleEF	LHD1	0.92	0.72
tblVehicleEF	LHD1	2.68	1.08
tblVehicleEF	LHD1	9.00	9.05
tblVehicleEF	LHD1	610.88	671.71
tblVehicleEF	LHD1	33.50	12.28
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	1.23	0.84
tblVehicleEF	LHD1	1.01	0.33
tblVehicleEF	LHD1	8.5300e-004	7.7068e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.6787e-003
tblVehicleEF	LHD1	0.01	7.5768e-003
tblVehicleEF	LHD1	1.0090e-003	2.8117e-004
tblVehicleEF	LHD1	8.1600e-004	7.3734e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5040e-003	2.4197e-003
tblVehicleEF	LHD1	0.01	7.2207e-003
tblVehicleEF	LHD1	9.2800e-004	2.5852e-004
tblVehicleEF	LHD1	5.1880e-003	4.2555e-003

tblVehicleEF	LHD1	0.11	0.09
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	2.9140e-003	2.4001e-003
tblVehicleEF	LHD1	0.07	0.05
tblVehicleEF	LHD1	0.30	0.54
tblVehicleEF	LHD1	0.27	0.08
tblVehicleEF	LHD1	9.0000e-005	8.7938e-005
tblVehicleEF	LHD1	6.0030e-003	6.5588e-003
tblVehicleEF	LHD1	3.8500e-004	1.2152e-004
tblVehicleEF	LHD1	5.1880e-003	4.2555e-003
tblVehicleEF	LHD1	0.11	0.09
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	2.9140e-003	2.4001e-003
tblVehicleEF	LHD1	0.09	0.07
tblVehicleEF	LHD1	0.30	0.54
tblVehicleEF	LHD1	0.30	0.09
tblVehicleEF	LHD1	5.8640e-003	5.6673e-003
tblVehicleEF	LHD1	0.01	5.9900e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.15	0.19
tblVehicleEF	LHD1	0.91	0.70
tblVehicleEF	LHD1	2.82	1.14
tblVehicleEF	LHD1	9.00	9.05
tblVehicleEF	LHD1	610.88	671.68
tblVehicleEF	LHD1	33.50	12.38
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	1.28	0.88
tblVehicleEF	LHD1	1.06	0.35
tblVehicleEF	LHD1	8.5300e-004	7.7068e-004
tblVehicleEF	LHD1	0.08	0.08

tblVehicleEF	LHD1	0.01	9.6787e-003
tblVehicleEF	LHD1	0.01	7.5768e-003
tblVehicleEF	LHD1	1.0090e-003	2.8117e-004
tblVehicleEF	LHD1	8.1600e-004	7.3734e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5040e-003	2.4197e-003
tblVehicleEF	LHD1	0.01	7.2207e-003
tblVehicleEF	LHD1	9.2800e-004	2.5852e-004
tblVehicleEF	LHD1	3.3910e-003	2.8163e-003
tblVehicleEF	LHD1	0.12	0.09
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.8940e-003	1.5726e-003
tblVehicleEF	LHD1	0.07	0.05
tblVehicleEF	LHD1	0.33	0.60
tblVehicleEF	LHD1	0.28	0.08
tblVehicleEF	LHD1	9.0000e-005	8.7938e-005
tblVehicleEF	LHD1	6.0020e-003	6.5585e-003
tblVehicleEF	LHD1	3.8800e-004	1.2254e-004
tblVehicleEF	LHD1	3.3910e-003	2.8163e-003
tblVehicleEF	LHD1	0.12	0.09
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	1.8940e-003	1.5726e-003
tblVehicleEF	LHD1	0.09	0.07
tblVehicleEF	LHD1	0.33	0.60
tblVehicleEF	LHD1	0.31	0.09
tblVehicleEF	LHD2	4.2390e-003	4.0130e-003
tblVehicleEF	LHD2	4.8300e-003	4.2072e-003
tblVehicleEF	LHD2	9.6290e-003	0.01
tblVehicleEF	LHD2	0.13	0.15
tblVehicleEF	LHD2	0.41	0.49

tblVehicleEF	LHD2	1.43	0.76
tblVehicleEF	LHD2	13.72	13.73
tblVehicleEF	LHD2	622.17	675.94
tblVehicleEF	LHD2	28.08	9.60
tblVehicleEF	LHD2	0.10	0.10
tblVehicleEF	LHD2	0.93	1.09
tblVehicleEF	LHD2	0.60	0.24
tblVehicleEF	LHD2	1.2010e-003	1.2468e-003
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tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	4.7800e-004	1.5922e-004
tblVehicleEF	LHD2	1.1490e-003	1.1928e-003
tblVehicleEF	LHD2	0.04	0.04
tblVehicleEF	LHD2	2.6500e-003	2.6300e-003
tblVehicleEF	LHD2	9.6020e-003	0.01
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tblVehicleEF	LHD2	1.3010e-003	1.6722e-003
tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	8.0500e-004	9.8876e-004
tblVehicleEF	LHD2	0.05	0.05
tblVehicleEF	LHD2	0.09	0.35
tblVehicleEF	LHD2	0.13	0.06
tblVehicleEF	LHD2	1.3400e-004	1.3167e-004
tblVehicleEF	LHD2	6.0640e-003	6.5428e-003
tblVehicleEF	LHD2	3.0700e-004	9.4991e-005
tblVehicleEF	LHD2	1.3010e-003	1.6722e-003
tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	0.02	0.03

tblVehicleEF	LHD2	8.0500e-004	9.8876e-004
tblVehicleEF	LHD2	0.06	0.06
tblVehicleEF	LHD2	0.09	0.35
tblVehicleEF	LHD2	0.14	0.06
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tblVehicleEF	LHD2	9.2930e-003	0.01
tblVehicleEF	LHD2	0.13	0.15
tblVehicleEF	LHD2	0.41	0.49
tblVehicleEF	LHD2	1.37	0.73
tblVehicleEF	LHD2	13.72	13.73
tblVehicleEF	LHD2	622.17	675.95
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tblVehicleEF	LHD2	0.58	0.23
tblVehicleEF	LHD2	1.2010e-003	1.2468e-003
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tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	4.7800e-004	1.5922e-004
tblVehicleEF	LHD2	1.1490e-003	1.1928e-003
tblVehicleEF	LHD2	0.04	0.04
tblVehicleEF	LHD2	2.6500e-003	2.6300e-003
tblVehicleEF	LHD2	9.6020e-003	0.01
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tblVehicleEF	LHD2	2.0260e-003	2.5915e-003
tblVehicleEF	LHD2	0.04	0.06
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	1.2020e-003	1.4788e-003

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tblVehicleEF	LHD2	0.09	0.34
tblVehicleEF	LHD2	0.13	0.06
tblVehicleEF	LHD2	1.3400e-004	1.3167e-004
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tblVehicleEF	LHD2	2.0260e-003	2.5915e-003
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tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	1.2020e-003	1.4788e-003
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tblVehicleEF	LHD2	9.6860e-003	0.01
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tblVehicleEF	LHD2	622.17	675.94
tblVehicleEF	LHD2	28.08	9.61
tblVehicleEF	LHD2	0.10	0.10
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tblVehicleEF	LHD2	0.60	0.24
tblVehicleEF	LHD2	1.2010e-003	1.2468e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	4.7800e-004	1.5922e-004

tblVehicleEF	LHD2	1.1490e-003	1.1928e-003
tblVehicleEF	LHD2	0.04	0.04
tblVehicleEF	LHD2	2.6500e-003	2.6300e-003
tblVehicleEF	LHD2	9.6020e-003	0.01
tblVehicleEF	LHD2	4.3900e-004	1.4640e-004
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tblVehicleEF	LHD2	0.05	0.06
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	7.7600e-004	9.5349e-004
tblVehicleEF	LHD2	0.05	0.05
tblVehicleEF	LHD2	0.10	0.38
tblVehicleEF	LHD2	0.13	0.06
tblVehicleEF	LHD2	1.3400e-004	1.3167e-004
tblVehicleEF	LHD2	6.0640e-003	6.5428e-003
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tblVehicleEF	LHD2	1.2850e-003	1.6760e-003
tblVehicleEF	LHD2	0.05	0.06
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	7.7600e-004	9.5349e-004
tblVehicleEF	LHD2	0.06	0.06
tblVehicleEF	LHD2	0.10	0.38
tblVehicleEF	LHD2	0.14	0.06
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tblVehicleEF	MCY	19.08	19.33
tblVehicleEF	MCY	9.63	8.50
tblVehicleEF	MCY	182.36	218.96
tblVehicleEF	MCY	45.23	60.14
tblVehicleEF	MCY	1.13	1.13
tblVehicleEF	MCY	0.31	0.26

tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.2250e-003	2.2167e-003
tblVehicleEF	MCY	3.8410e-003	3.2543e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	2.0810e-003	2.0731e-003
tblVehicleEF	MCY	3.6200e-003	3.0666e-003
tblVehicleEF	MCY	1.18	1.20
tblVehicleEF	MCY	0.69	0.71
tblVehicleEF	MCY	0.70	0.72
tblVehicleEF	MCY	2.49	2.50
tblVehicleEF	MCY	0.63	2.04
tblVehicleEF	MCY	2.06	1.83
tblVehicleEF	MCY	2.2100e-003	2.1668e-003
tblVehicleEF	MCY	6.7000e-004	5.9514e-004
tblVehicleEF	MCY	1.18	1.20
tblVehicleEF	MCY	0.69	0.71
tblVehicleEF	MCY	0.70	0.72
tblVehicleEF	MCY	3.08	3.10
tblVehicleEF	MCY	0.63	2.04
tblVehicleEF	MCY	2.24	1.99
tblVehicleEF	MCY	0.49	0.36
tblVehicleEF	MCY	0.14	0.21
tblVehicleEF	MCY	18.59	18.81
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tblVehicleEF	MCY	182.36	217.93
tblVehicleEF	MCY	45.23	58.33
tblVehicleEF	MCY	0.99	0.99
tblVehicleEF	MCY	0.29	0.25

tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.2250e-003	2.2167e-003
tblVehicleEF	MCY	3.8410e-003	3.2543e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	2.0810e-003	2.0731e-003
tblVehicleEF	MCY	3.6200e-003	3.0666e-003
tblVehicleEF	MCY	1.98	2.00
tblVehicleEF	MCY	0.80	0.83
tblVehicleEF	MCY	1.25	1.26
tblVehicleEF	MCY	2.43	2.44
tblVehicleEF	MCY	0.59	1.93
tblVehicleEF	MCY	1.84	1.62
tblVehicleEF	MCY	2.2010e-003	2.1566e-003
tblVehicleEF	MCY	6.5100e-004	5.7722e-004
tblVehicleEF	MCY	1.98	2.00
tblVehicleEF	MCY	0.80	0.83
tblVehicleEF	MCY	1.25	1.26
tblVehicleEF	MCY	3.02	3.03
tblVehicleEF	MCY	0.59	1.93
tblVehicleEF	MCY	2.00	1.76
tblVehicleEF	MCY	0.51	0.37
tblVehicleEF	MCY	0.15	0.24
tblVehicleEF	MCY	19.10	19.35
tblVehicleEF	MCY	9.72	8.59
tblVehicleEF	MCY	182.36	219.02
tblVehicleEF	MCY	45.23	60.39
tblVehicleEF	MCY	1.10	1.10
tblVehicleEF	MCY	0.31	0.27

tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.2250e-003	2.2167e-003
tblVehicleEF	MCY	3.8410e-003	3.2543e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	2.0810e-003	2.0731e-003
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tblVehicleEF	MCY	0.72	2.33
tblVehicleEF	MCY	2.10	1.86
tblVehicleEF	MCY	2.2110e-003	2.1674e-003
tblVehicleEF	MCY	6.7300e-004	5.9762e-004
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tblVehicleEF	MDV	0.01	7.0561e-003
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tblVehicleEF	MDV	515.44	429.05
tblVehicleEF	MDV	107.59	87.05
tblVehicleEF	MDV	0.16	0.13
tblVehicleEF	MDV	0.26	0.38

tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.1880e-003	2.0176e-003
tblVehicleEF	MDV	2.5060e-003	2.1338e-003
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0180e-003	1.8612e-003
tblVehicleEF	MDV	2.3060e-003	1.9635e-003
tblVehicleEF	MDV	0.08	0.10
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tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.04	0.03
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tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.05	0.05
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tblVehicleEF	MDV	0.14	0.11
tblVehicleEF	MDV	0.24	0.36

tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.1880e-003	2.0176e-003
tblVehicleEF	MDV	2.5060e-003	2.1338e-003
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0180e-003	1.8612e-003
tblVehicleEF	MDV	2.3060e-003	1.9635e-003
tblVehicleEF	MDV	0.13	0.16
tblVehicleEF	MDV	0.18	0.16
tblVehicleEF	MDV	0.11	0.14
tblVehicleEF	MDV	0.04	0.03
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tblVehicleEF	MDV	0.18	0.16
tblVehicleEF	MDV	0.11	0.14
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tblVehicleEF	MDV	1.43	1.28
tblVehicleEF	MDV	2.92	3.36
tblVehicleEF	MDV	506.79	424.01
tblVehicleEF	MDV	107.59	87.24
tblVehicleEF	MDV	0.16	0.12
tblVehicleEF	MDV	0.26	0.39

tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.1880e-003	2.0176e-003
tblVehicleEF	MDV	2.5060e-003	2.1338e-003
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
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tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.05	0.04
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tblVehicleEF	MH	0.03	0.02
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tblVehicleEF	MH	0.84	0.24

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tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.1510e-003	2.7879e-004
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	3.2170e-003	3.2632e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.0590e-003	2.5634e-004
tblVehicleEF	MH	1.15	0.99
tblVehicleEF	MH	0.08	0.06
tblVehicleEF	MH	0.46	0.39
tblVehicleEF	MH	0.10	0.06
tblVehicleEF	MH	0.02	1.51
tblVehicleEF	MH	0.35	0.10
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	7.0200e-004	1.9081e-004
tblVehicleEF	MH	1.15	0.99
tblVehicleEF	MH	0.08	0.06
tblVehicleEF	MH	0.46	0.39
tblVehicleEF	MH	0.14	0.09
tblVehicleEF	MH	0.02	1.51
tblVehicleEF	MH	0.38	0.11
tblVehicleEF	MH	0.03	0.01
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	2.69	1.44
tblVehicleEF	MH	5.74	2.05
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tblVehicleEF	MH	59.52	19.07
tblVehicleEF	MH	1.22	1.23
tblVehicleEF	MH	0.80	0.23

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tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.1510e-003	2.7879e-004
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	3.2170e-003	3.2632e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.0590e-003	2.5634e-004
tblVehicleEF	MH	1.78	1.52
tblVehicleEF	MH	0.08	0.07
tblVehicleEF	MH	0.72	0.61
tblVehicleEF	MH	0.10	0.07
tblVehicleEF	MH	0.02	1.49
tblVehicleEF	MH	0.34	0.09
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	6.9500e-004	1.8871e-004
tblVehicleEF	MH	1.78	1.52
tblVehicleEF	MH	0.08	0.07
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tblVehicleEF	MH	0.14	0.09
tblVehicleEF	MH	0.02	1.49
tblVehicleEF	MH	0.37	0.10
tblVehicleEF	MH	0.03	0.01
tblVehicleEF	MH	0.03	0.02
tblVehicleEF	MH	2.59	1.39
tblVehicleEF	MH	6.16	2.19
tblVehicleEF	MH	1,106.44	1,502.38
tblVehicleEF	MH	59.52	19.32
tblVehicleEF	MH	1.30	1.30
tblVehicleEF	MH	0.84	0.24

tblVehicleEF	MH	0.13	0.13
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.1510e-003	2.7879e-004
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	3.2170e-003	3.2632e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.0590e-003	2.5634e-004
tblVehicleEF	MH	1.27	1.08
tblVehicleEF	MH	0.09	0.08
tblVehicleEF	MH	0.47	0.40
tblVehicleEF	MH	0.10	0.06
tblVehicleEF	MH	0.02	1.59
tblVehicleEF	MH	0.35	0.10
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	7.0300e-004	1.9114e-004
tblVehicleEF	MH	1.27	1.08
tblVehicleEF	MH	0.09	0.08
tblVehicleEF	MH	0.47	0.40
tblVehicleEF	MH	0.14	0.09
tblVehicleEF	MH	0.02	1.59
tblVehicleEF	MH	0.39	0.11
tblVehicleEF	MHD	0.02	4.2432e-003
tblVehicleEF	MHD	4.8740e-003	6.7473e-003
tblVehicleEF	MHD	0.05	0.01
tblVehicleEF	MHD	0.37	0.38
tblVehicleEF	MHD	0.37	0.62
tblVehicleEF	MHD	6.44	1.34
tblVehicleEF	MHD	139.10	66.57
tblVehicleEF	MHD	1,139.95	1,077.13

tblVehicleEF	MHD	61.46	11.49
tblVehicleEF	MHD	0.55	0.55
tblVehicleEF	MHD	1.18	2.23
tblVehicleEF	MHD	10.45	1.13
tblVehicleEF	MHD	3.6300e-004	1.8182e-003
tblVehicleEF	MHD	0.13	0.13
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	5.7190e-003	0.06
tblVehicleEF	MHD	8.4000e-004	1.2621e-004
tblVehicleEF	MHD	3.4700e-004	1.7396e-003
tblVehicleEF	MHD	0.06	0.06
tblVehicleEF	MHD	3.0000e-003	3.0000e-003
tblVehicleEF	MHD	5.4680e-003	0.06
tblVehicleEF	MHD	7.7200e-004	1.1604e-004
tblVehicleEF	MHD	1.2630e-003	6.3990e-004
tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	0.03	0.02
tblVehicleEF	MHD	7.7200e-004	3.9325e-004
tblVehicleEF	MHD	0.04	0.11
tblVehicleEF	MHD	0.02	0.13
tblVehicleEF	MHD	0.40	0.06
tblVehicleEF	MHD	1.3390e-003	6.3252e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.2800e-004	1.1367e-004
tblVehicleEF	MHD	1.2630e-003	6.3990e-004
tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	7.7200e-004	3.9325e-004
tblVehicleEF	MHD	0.05	0.13
tblVehicleEF	MHD	0.02	0.13

tblVehicleEF	MHD	0.43	0.07
tblVehicleEF	MHD	0.02	4.0192e-003
tblVehicleEF	MHD	4.9460e-003	6.7968e-003
tblVehicleEF	MHD	0.05	0.01
tblVehicleEF	MHD	0.27	0.31
tblVehicleEF	MHD	0.37	0.63
tblVehicleEF	MHD	6.12	1.27
tblVehicleEF	MHD	147.32	67.79
tblVehicleEF	MHD	1,139.95	1,077.14
tblVehicleEF	MHD	61.46	11.37
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tblVehicleEF	MHD	10.41	1.12
tblVehicleEF	MHD	3.0600e-004	1.5351e-003
tblVehicleEF	MHD	0.13	0.13
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	5.7190e-003	0.06
tblVehicleEF	MHD	8.4000e-004	1.2621e-004
tblVehicleEF	MHD	2.9300e-004	1.4687e-003
tblVehicleEF	MHD	0.06	0.06
tblVehicleEF	MHD	3.0000e-003	3.0000e-003
tblVehicleEF	MHD	5.4680e-003	0.06
tblVehicleEF	MHD	7.7200e-004	1.1604e-004
tblVehicleEF	MHD	1.9740e-003	9.9194e-004
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	1.1660e-003	5.9016e-004
tblVehicleEF	MHD	0.04	0.11
tblVehicleEF	MHD	0.02	0.12
tblVehicleEF	MHD	0.38	0.06

tblVehicleEF	MHD	1.4170e-003	6.4425e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.2200e-004	1.1256e-004
tblVehicleEF	MHD	1.9740e-003	9.9194e-004
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.03	0.03
tblVehicleEF	MHD	1.1660e-003	5.9016e-004
tblVehicleEF	MHD	0.05	0.13
tblVehicleEF	MHD	0.02	0.12
tblVehicleEF	MHD	0.42	0.06
tblVehicleEF	MHD	0.02	4.5651e-003
tblVehicleEF	MHD	4.8520e-003	6.7314e-003
tblVehicleEF	MHD	0.05	0.01
tblVehicleEF	MHD	0.51	0.48
tblVehicleEF	MHD	0.37	0.62
tblVehicleEF	MHD	6.50	1.35
tblVehicleEF	MHD	127.72	64.87
tblVehicleEF	MHD	1,139.95	1,077.13
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tblVehicleEF	MHD	1.16	2.19
tblVehicleEF	MHD	10.46	1.13
tblVehicleEF	MHD	4.4200e-004	2.2092e-003
tblVehicleEF	MHD	0.13	0.13
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	5.7190e-003	0.06
tblVehicleEF	MHD	8.4000e-004	1.2621e-004
tblVehicleEF	MHD	4.2300e-004	2.1137e-003
tblVehicleEF	MHD	0.06	0.06
tblVehicleEF	MHD	3.0000e-003	3.0000e-003

tblVehicleEF	MHD	5.4680e-003	0.06
tblVehicleEF	MHD	7.7200e-004	1.1604e-004
tblVehicleEF	MHD	1.2610e-003	6.4610e-004
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.03	0.02
tblVehicleEF	MHD	7.4700e-004	3.8266e-004
tblVehicleEF	MHD	0.04	0.11
tblVehicleEF	MHD	0.02	0.14
tblVehicleEF	MHD	0.40	0.06
tblVehicleEF	MHD	1.2320e-003	6.1624e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.2900e-004	1.1388e-004
tblVehicleEF	MHD	1.2610e-003	6.4610e-004
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	7.4700e-004	3.8266e-004
tblVehicleEF	MHD	0.05	0.13
tblVehicleEF	MHD	0.02	0.14
tblVehicleEF	MHD	0.44	0.07
tblVehicleEF	OBUS	0.01	8.8894e-003
tblVehicleEF	OBUS	8.7600e-003	9.7062e-003
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.28	0.58
tblVehicleEF	OBUS	0.59	1.02
tblVehicleEF	OBUS	5.80	2.47
tblVehicleEF	OBUS	101.23	91.74
tblVehicleEF	OBUS	1,241.90	1,424.87
tblVehicleEF	OBUS	68.87	19.84
tblVehicleEF	OBUS	0.52	0.58
tblVehicleEF	OBUS	1.61	2.00

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tblVehicleEF	OBUS	1.8000e-004	2.2610e-003
tblVehicleEF	OBUS	0.13	0.13
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.1890e-003	0.04
tblVehicleEF	OBUS	8.1000e-004	1.9695e-004
tblVehicleEF	OBUS	1.7300e-004	2.1631e-003
tblVehicleEF	OBUS	0.06	0.06
tblVehicleEF	OBUS	3.0000e-003	3.0000e-003
tblVehicleEF	OBUS	7.8190e-003	0.04
tblVehicleEF	OBUS	7.4400e-004	1.8109e-004
tblVehicleEF	OBUS	1.5730e-003	1.9706e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.04	0.06
tblVehicleEF	OBUS	8.0200e-004	9.7278e-004
tblVehicleEF	OBUS	0.06	0.11
tblVehicleEF	OBUS	0.04	0.26
tblVehicleEF	OBUS	0.36	0.12
tblVehicleEF	OBUS	9.7800e-004	8.7302e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	7.9100e-004	1.9634e-004
tblVehicleEF	OBUS	1.5730e-003	1.9706e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.05	0.08
tblVehicleEF	OBUS	8.0200e-004	9.7278e-004
tblVehicleEF	OBUS	0.08	0.13
tblVehicleEF	OBUS	0.04	0.26
tblVehicleEF	OBUS	0.40	0.13
tblVehicleEF	OBUS	0.01	8.9089e-003
tblVehicleEF	OBUS	8.9130e-003	9.8457e-003

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tblVehicleEF	OBUS	5.48	2.33
tblVehicleEF	OBUS	106.24	92.40
tblVehicleEF	OBUS	1,241.90	1,424.90
tblVehicleEF	OBUS	68.87	19.61
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tblVehicleEF	OBUS	1.52	1.88
tblVehicleEF	OBUS	2.42	0.64
tblVehicleEF	OBUS	1.5200e-004	1.9106e-003
tblVehicleEF	OBUS	0.13	0.13
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.1890e-003	0.04
tblVehicleEF	OBUS	8.1000e-004	1.9695e-004
tblVehicleEF	OBUS	1.4600e-004	1.8280e-003
tblVehicleEF	OBUS	0.06	0.06
tblVehicleEF	OBUS	3.0000e-003	3.0000e-003
tblVehicleEF	OBUS	7.8190e-003	0.04
tblVehicleEF	OBUS	7.4400e-004	1.8109e-004
tblVehicleEF	OBUS	2.3950e-003	2.9676e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.04	0.06
tblVehicleEF	OBUS	1.2060e-003	1.4483e-003
tblVehicleEF	OBUS	0.06	0.11
tblVehicleEF	OBUS	0.04	0.25
tblVehicleEF	OBUS	0.35	0.11
tblVehicleEF	OBUS	1.0260e-003	8.7927e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	7.8500e-004	1.9401e-004

tblVehicleEF	OBUS	2.3950e-003	2.9676e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.05	0.08
tblVehicleEF	OBUS	1.2060e-003	1.4483e-003
tblVehicleEF	OBUS	0.08	0.13
tblVehicleEF	OBUS	0.04	0.25
tblVehicleEF	OBUS	0.38	0.12
tblVehicleEF	OBUS	0.01	8.8830e-003
tblVehicleEF	OBUS	8.7200e-003	9.6690e-003
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.30	0.62
tblVehicleEF	OBUS	0.59	1.02
tblVehicleEF	OBUS	5.86	2.50
tblVehicleEF	OBUS	94.31	90.82
tblVehicleEF	OBUS	1,241.90	1,424.86
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tblVehicleEF	OBUS	1.59	1.97
tblVehicleEF	OBUS	2.47	0.65
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tblVehicleEF	OBUS	0.13	0.13
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.1890e-003	0.04
tblVehicleEF	OBUS	8.1000e-004	1.9695e-004
tblVehicleEF	OBUS	2.1000e-004	2.6260e-003
tblVehicleEF	OBUS	0.06	0.06
tblVehicleEF	OBUS	3.0000e-003	3.0000e-003
tblVehicleEF	OBUS	7.8190e-003	0.04
tblVehicleEF	OBUS	7.4400e-004	1.8109e-004
tblVehicleEF	OBUS	1.5900e-003	2.0387e-003

tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.04	0.06
tblVehicleEF	OBUS	7.8500e-004	9.6217e-004
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tblVehicleEF	OBUS	0.04	0.28
tblVehicleEF	OBUS	0.37	0.12
tblVehicleEF	OBUS	9.1200e-004	8.6440e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	7.9200e-004	1.9677e-004
tblVehicleEF	OBUS	1.5900e-003	2.0387e-003
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tblVehicleEF	OBUS	0.06	0.08
tblVehicleEF	OBUS	7.8500e-004	9.6217e-004
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tblVehicleEF	OBUS	0.04	0.28
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tblVehicleEF	SBUS	0.07	6.6492e-003
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tblVehicleEF	SBUS	1,098.65	1,119.95
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tblVehicleEF	SBUS	10.06	3.44
tblVehicleEF	SBUS	4.64	5.26
tblVehicleEF	SBUS	12.63	0.76
tblVehicleEF	SBUS	0.01	4.7705e-003
tblVehicleEF	SBUS	0.74	0.74

tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.03
tblVehicleEF	SBUS	7.2300e-004	5.0385e-005
tblVehicleEF	SBUS	0.01	4.5641e-003
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tblVehicleEF	SBUS	2.6920e-003	2.6700e-003
tblVehicleEF	SBUS	0.02	0.03
tblVehicleEF	SBUS	6.6400e-004	4.6327e-005
tblVehicleEF	SBUS	3.6480e-003	1.0930e-003
tblVehicleEF	SBUS	0.03	8.9369e-003
tblVehicleEF	SBUS	0.94	0.33
tblVehicleEF	SBUS	1.8170e-003	5.4744e-004
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tblVehicleEF	SBUS	0.01	0.06
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tblVehicleEF	SBUS	6.5600e-004	5.5117e-005
tblVehicleEF	SBUS	3.6480e-003	1.0930e-003
tblVehicleEF	SBUS	0.03	8.9369e-003
tblVehicleEF	SBUS	1.36	0.47
tblVehicleEF	SBUS	1.8170e-003	5.4744e-004
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tblVehicleEF	SBUS	0.44	0.04
tblVehicleEF	SBUS	0.86	0.07
tblVehicleEF	SBUS	0.01	8.4259e-003
tblVehicleEF	SBUS	0.06	5.8398e-003
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tblVehicleEF	SBUS	1,098.65	1,119.97
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tblVehicleEF	SBUS	12.59	0.76
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tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.03
tblVehicleEF	SBUS	7.2300e-004	5.0385e-005
tblVehicleEF	SBUS	8.7620e-003	3.8540e-003
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tblVehicleEF	SBUS	2.6920e-003	2.6700e-003
tblVehicleEF	SBUS	0.02	0.03
tblVehicleEF	SBUS	6.6400e-004	4.6327e-005
tblVehicleEF	SBUS	5.6470e-003	1.6880e-003
tblVehicleEF	SBUS	0.03	9.1687e-003
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tblVehicleEF	SBUS	2.8110e-003	8.4298e-004
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tblVehicleEF	SBUS	5.6470e-003	1.6880e-003
tblVehicleEF	SBUS	0.03	9.1687e-003
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tblVehicleEF	SBUS	2.8110e-003	8.4298e-004
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tblVehicleEF	SBUS	0.39	0.04
tblVehicleEF	SBUS	0.86	0.07
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tblVehicleEF	SBUS	1,098.65	1,119.94
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tblVehicleEF	SBUS	4.57	5.17
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tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.03
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tblVehicleEF	SBUS	2.6920e-003	2.6700e-003
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tblVehicleEF	SBUS	6.6400e-004	4.6327e-005
tblVehicleEF	SBUS	3.6250e-003	1.0870e-003
tblVehicleEF	SBUS	0.03	9.5228e-003
tblVehicleEF	SBUS	0.95	0.33
tblVehicleEF	SBUS	1.7640e-003	5.3514e-004

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tblVehicleEF	SBUS	0.02	0.07
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tblVehicleEF	SBUS	0.01	3.2785e-003
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tblVehicleEF	SBUS	3.6250e-003	1.0870e-003
tblVehicleEF	SBUS	0.03	9.5228e-003
tblVehicleEF	SBUS	1.37	0.47
tblVehicleEF	SBUS	1.7640e-003	5.3514e-004
tblVehicleEF	SBUS	0.14	0.13
tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.45	0.04
tblVehicleEF	UBUS	2.51	5.87
tblVehicleEF	UBUS	0.06	0.02
tblVehicleEF	UBUS	11.01	39.42
tblVehicleEF	UBUS	10.46	0.95
tblVehicleEF	UBUS	1,940.83	1,945.19
tblVehicleEF	UBUS	106.77	11.70
tblVehicleEF	UBUS	9.09	1.22
tblVehicleEF	UBUS	14.93	0.12
tblVehicleEF	UBUS	0.59	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.11	3.6015e-003
tblVehicleEF	UBUS	1.1160e-003	5.2582e-005
tblVehicleEF	UBUS	0.25	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.11	3.4412e-003
tblVehicleEF	UBUS	1.0260e-003	4.8347e-005
tblVehicleEF	UBUS	5.1810e-003	9.4034e-004

tblVehicleEF	UBUS	0.08	0.01
tblVehicleEF	UBUS	2.8830e-003	7.3606e-004
tblVehicleEF	UBUS	0.80	0.09
tblVehicleEF	UBUS	0.02	0.08
tblVehicleEF	UBUS	0.79	0.06
tblVehicleEF	UBUS	9.6900e-003	2.3326e-003
tblVehicleEF	UBUS	1.2560e-003	1.1578e-004
tblVehicleEF	UBUS	5.1810e-003	9.4034e-004
tblVehicleEF	UBUS	0.08	0.01
tblVehicleEF	UBUS	2.8830e-003	7.3606e-004
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tblVehicleEF	UBUS	0.02	0.08
tblVehicleEF	UBUS	0.87	0.07
tblVehicleEF	UBUS	2.52	5.87
tblVehicleEF	UBUS	0.05	0.01
tblVehicleEF	UBUS	11.06	39.42
tblVehicleEF	UBUS	9.07	0.83
tblVehicleEF	UBUS	1,940.83	1,945.19
tblVehicleEF	UBUS	106.77	11.50
tblVehicleEF	UBUS	8.56	1.21
tblVehicleEF	UBUS	14.87	0.11
tblVehicleEF	UBUS	0.59	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.11	3.6015e-003
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tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.11	3.4412e-003
tblVehicleEF	UBUS	1.0260e-003	4.8347e-005
tblVehicleEF	UBUS	7.7250e-003	1.3858e-003

tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	4.3230e-003	1.0574e-003
tblVehicleEF	UBUS	0.81	0.09
tblVehicleEF	UBUS	0.02	0.07
tblVehicleEF	UBUS	0.73	0.06
tblVehicleEF	UBUS	9.6910e-003	2.3326e-003
tblVehicleEF	UBUS	1.2320e-003	1.1379e-004
tblVehicleEF	UBUS	7.7250e-003	1.3858e-003
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	4.3230e-003	1.0574e-003
tblVehicleEF	UBUS	3.42	5.99
tblVehicleEF	UBUS	0.02	0.07
tblVehicleEF	UBUS	0.80	0.07
tblVehicleEF	UBUS	2.51	5.87
tblVehicleEF	UBUS	0.06	0.02
tblVehicleEF	UBUS	11.00	39.42
tblVehicleEF	UBUS	10.67	0.97
tblVehicleEF	UBUS	1,940.83	1,945.19
tblVehicleEF	UBUS	106.77	11.73
tblVehicleEF	UBUS	8.92	1.22
tblVehicleEF	UBUS	14.95	0.12
tblVehicleEF	UBUS	0.59	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.11	3.6015e-003
tblVehicleEF	UBUS	1.1160e-003	5.2582e-005
tblVehicleEF	UBUS	0.25	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.11	3.4412e-003
tblVehicleEF	UBUS	1.0260e-003	4.8347e-005
tblVehicleEF	UBUS	5.7050e-003	9.1790e-004

tblVehicleEF	UBUS	0.10	0.01
tblVehicleEF	UBUS	2.9930e-003	7.0556e-004
tblVehicleEF	UBUS	0.80	0.09
tblVehicleEF	UBUS	0.03	0.09
tblVehicleEF	UBUS	0.80	0.07
tblVehicleEF	UBUS	9.6890e-003	2.3326e-003
tblVehicleEF	UBUS	1.2600e-003	1.1608e-004
tblVehicleEF	UBUS	5.7050e-003	9.1790e-004
tblVehicleEF	UBUS	0.10	0.01
tblVehicleEF	UBUS	2.9930e-003	7.0556e-004
tblVehicleEF	UBUS	3.40	5.99
tblVehicleEF	UBUS	0.03	0.09
tblVehicleEF	UBUS	0.88	0.07
tblVehicleTrips	ST_TR	6.39	4.16
tblVehicleTrips	ST_TR	2.46	7.45
tblVehicleTrips	ST_TR	158.37	76.28
tblVehicleTrips	SU_TR	5.86	4.16
tblVehicleTrips	SU_TR	1.05	7.45
tblVehicleTrips	SU_TR	131.84	76.28
tblVehicleTrips	WD_TR	6.65	4.16
tblVehicleTrips	WD_TR	11.03	7.45
tblVehicleTrips	WD_TR	127.15	76.28
tblWoodstoves	NumberCatalytic	0.60	0.00
tblWoodstoves	NumberNoncatalytic	0.60	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

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	0.5214	0.0115	0.9957	5.0000e-005		5.4800e-003	5.4800e-003		5.4800e-003	5.4800e-003	0.0000	1.7902	1.7902	1.7500e-003	0.0000	1.8338
Energy	0.0314	0.2840	0.2270	1.7100e-003		0.0217	0.0217		0.0217	0.0217		342.9889	342.9889	6.5700e-003	6.2900e-003	345.0272
Mobile	0.9355	1.4455	6.7552	0.0170	1.4963	0.0222	1.5185	0.3996	0.0209	0.4205		1,746.5371	1,746.5371	0.1192		1,749.5174
Total	**1.4883**	**1.7410**	**7.9779**	**0.0187**	**1.4963**	**0.0494**	**1.5457**	**0.3996**	**0.0481**	**0.4477**	**0.0000**	**2,091.3161**	**2,091.3161**	**0.1275**	**6.2900e-003**	**2,096.3784**

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	0.5214	0.0115	0.9957	5.0000e-005		5.4800e-003	5.4800e-003		5.4800e-003	5.4800e-003	0.0000	1.7902	1.7902	1.7500e-003	0.0000	1.8338
Energy	0.0314	0.2840	0.2270	1.7100e-003		0.0217	0.0217		0.0217	0.0217		342.9889	342.9889	6.5700e-003	6.2900e-003	345.0272
Mobile	0.9355	1.4455	6.7552	0.0170	1.4963	0.0222	1.5185	0.3996	0.0209	0.4205		1,746.5371	1,746.5371	0.1192		1,749.5174
Total	**1.4883**	**1.7410**	**7.9779**	**0.0187**	**1.4963**	**0.0494**	**1.5457**	**0.3996**	**0.0481**	**0.4477**	**0.0000**	**2,091.3161**	**2,091.3161**	**0.1275**	**6.2900e-003**	**2,096.3784**

	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**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	0.9355	1.4455	6.7552	0.0170	1.4963	0.0222	1.5185	0.3996	0.0209	0.4205		1,746.5371	1,746.5371	0.1192		1,749.5174
Unmitigated	0.9355	1.4455	6.7552	0.0170	1.4963	0.0222	1.5185	0.3996	0.0209	0.4205		1,746.5371	1,746.5371	0.1192		1,749.5174

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	49.92	49.92	49.92	170,584	170,584
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	40.68	40.68	40.68	131,039	131,039
High Turnover (Sit Down Restaurant)	296.73	296.73	296.73	404,392	404,392
Parking Lot	0.00	0.00	0.00		
Total	387.33	387.33	387.33	706,015	706,015

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 Mid Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
High Turnover (Sit Down Restaurant)	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
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 Mid Rise	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975
Enclosed Parking with Elevator	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975
General Office Building	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975
High Turnover (Sit Down Restaurant)	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975
Parking Lot	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Kilowatt Hours of Renewable Electricity Generated

	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	0.0314	0.2840	0.2270	1.7100e-003		0.0217	0.0217		0.0217	0.0217		342.9889	342.9889	6.5700e-003	6.2900e-003	345.0272
NaturalGas Unmitigated	0.0314	0.2840	0.2270	1.7100e-003		0.0217	0.0217		0.0217	0.0217		342.9889	342.9889	6.5700e-003	6.2900e-003	345.0272

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 Mid Rise	303.023	3.2700e-003	0.0279	0.0119	1.8000e-004		2.2600e-003	2.2600e-003		2.2600e-003	2.2600e-003		35.6497	35.6497	6.8000e-004	6.5000e-004	35.8616
Enclosed Parking with Elevator	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
General Office Building	155.58	1.6800e-003	0.0153	0.0128	9.0000e-005		1.1600e-003	1.1600e-003		1.1600e-003	1.1600e-003		18.3035	18.3035	3.5000e-004	3.4000e-004	18.4123
High Turnover (Sit Down Restaurant)	2456.8	0.0265	0.2409	0.2023	1.4500e-003		0.0183	0.0183		0.0183	0.0183		289.0357	289.0357	5.5400e-003	5.3000e-003	290.7533
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		**0.0314**	**0.2840**	**0.2270**	**1.7200e-003**		**0.0217**	**0.0217**		**0.0217**	**0.0217**		**342.9889**	**342.9889**	**6.5700e-003**	**6.2900e-003**	**345.0272**

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 Mid Rise	0.303023	3.2700e-003	0.0279	0.0119	1.8000e-004		2.2600e-003	2.2600e-003		2.2600e-003	2.2600e-003		35.6497	35.6497	6.8000e-004	6.5000e-004	35.8616
Enclosed Parking with Elevator	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
General Office Building	0.15558	1.6800e-003	0.0153	0.0128	9.0000e-005		1.1600e-003	1.1600e-003		1.1600e-003	1.1600e-003		18.3035	18.3035	3.5000e-004	3.4000e-004	18.4123
High Turnover (Sit Down Restaurant)	2.4568	0.0265	0.2409	0.2023	1.4500e-003		0.0183	0.0183		0.0183	0.0183		289.0357	289.0357	5.5400e-003	5.3000e-003	290.7533
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		**0.0314**	**0.2840**	**0.2270**	**1.7200e-003**		**0.0217**	**0.0217**		**0.0217**	**0.0217**		**342.9889**	**342.9889**	**6.5700e-003**	**6.2900e-003**	**345.0272**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	0.5214	0.0115	0.9957	5.0000e-005		5.4800e-003	5.4800e-003		5.4800e-003	5.4800e-003	0.0000	1.7902	1.7902	1.7500e-003	0.0000	1.8338
Unmitigated	0.5214	0.0115	0.9957	5.0000e-005		5.4800e-003	5.4800e-003		5.4800e-003	5.4800e-003	0.0000	1.7902	1.7902	1.7500e-003	0.0000	1.8338

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	0.0466					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4443					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	0.0304	0.0115	0.9957	5.0000e-005		5.4800e-003	5.4800e-003		5.4800e-003	5.4800e-003		1.7902	1.7902	1.7500e-003		1.8338
Total	**0.5214**	**0.0115**	**0.9957**	**5.0000e-005**		**5.4800e-003**	**5.4800e-003**		**5.4800e-003**	**5.4800e-003**	**0.0000**	**1.7902**	**1.7902**	**1.7500e-003**	**0.0000**	**1.8338**

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	0.0466					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4443					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	0.0304	0.0115	0.9957	5.0000e-005		5.4800e-003	5.4800e-003		5.4800e-003	5.4800e-003		1.7902	1.7902	1.7500e-003		1.8338
Total	**0.5214**	**0.0115**	**0.9957**	**5.0000e-005**		**5.4800e-003**	**5.4800e-003**		**5.4800e-003**	**5.4800e-003**	**0.0000**	**1.7902**	**1.7902**	**1.7500e-003**	**0.0000**	**1.8338**

7.0 Water Detail

7.1 Mitigation Measures Water

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

3727 Robertson-Operations - South Coast AQMD Air District, Winter

3727 Robertson-Operations
South Coast AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	5.46	1000sqft	0.02	5,455.00	0
Enclosed Parking with Elevator	19.00	Space	0.03	7,600.00	0
Parking Lot	6.00	Space	0.02	2,400.00	0
High Turnover (Sit Down Restaurant)	3.89	1000sqft	0.02	3,886.00	0
Apartments Mid Rise	12.00	Dwelling Unit	0.03	12,921.00	28

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	11			**Operational Year**	2021
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	483.27	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2e intensity factor was linearly projected for year 2021 anticipated RPS based on SB 100 target of 44% RPS by 2024. See operational assumptions for more details.

Land Use - see operational assumptions

Construction Phase - operational run only

Vehicle Trips - trip rates from project traffic impact analysis.

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Woodstoves - see operational assumptions

Energy Use -

Energy Mitigation - see operational assumptions for solar pv system assumptions.

Waste Mitigation - in compliance with 75% waste diversion by state by 2020.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	2.00
tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	10.20	0.00
tblFireplaces	NumberNoFireplace	1.20	0.00
tblFireplaces	NumberWood	0.60	0.00
tblFleetMix	HHD	0.03	0.03
tblFleetMix	HHD	0.03	0.03
tblFleetMix	HHD	0.03	0.03
tblFleetMix	HHD	0.03	0.03
tblFleetMix	HHD	0.03	0.03
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT2	0.20	0.18

tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD2	5.8510e-003	6.0308e-003
tblFleetMix	LHD2	5.8510e-003	6.0308e-003
tblFleetMix	LHD2	5.8510e-003	6.0308e-003
tblFleetMix	LHD2	5.8510e-003	6.0308e-003
tblFleetMix	LHD2	5.8510e-003	6.0308e-003
tblFleetMix	MCY	4.8170e-003	4.3394e-003
tblFleetMix	MCY	4.8170e-003	4.3394e-003
tblFleetMix	MCY	4.8170e-003	4.3394e-003
tblFleetMix	MCY	4.8170e-003	4.3394e-003
tblFleetMix	MCY	4.8170e-003	4.3394e-003
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MH	9.2500e-004	9.7507e-004
tblFleetMix	MH	9.2500e-004	9.7507e-004
tblFleetMix	MH	9.2500e-004	9.7507e-004
tblFleetMix	MH	9.2500e-004	9.7507e-004
tblFleetMix	MH	9.2500e-004	9.7507e-004
tblFleetMix	MHD	0.02	0.02

tblFleetMix	MHD	0.02	0.02
tblFleetMix	MHD	0.02	0.02
tblFleetMix	MHD	0.02	0.02
tblFleetMix	MHD	0.02	0.02
tblFleetMix	OBUS	2.0700e-003	1.2248e-003
tblFleetMix	OBUS	2.0700e-003	1.2248e-003
tblFleetMix	OBUS	2.0700e-003	1.2248e-003
tblFleetMix	OBUS	2.0700e-003	1.2248e-003
tblFleetMix	OBUS	2.0700e-003	1.2248e-003
tblFleetMix	SBUS	7.0700e-004	6.6259e-004
tblFleetMix	SBUS	7.0700e-004	6.6259e-004
tblFleetMix	SBUS	7.0700e-004	6.6259e-004
tblFleetMix	SBUS	7.0700e-004	6.6259e-004
tblFleetMix	SBUS	7.0700e-004	6.6259e-004
tblFleetMix	UBUS	1.8770e-003	1.4541e-003
tblFleetMix	UBUS	1.8770e-003	1.4541e-003
tblFleetMix	UBUS	1.8770e-003	1.4541e-003
tblFleetMix	UBUS	1.8770e-003	1.4541e-003
tblFleetMix	UBUS	1.8770e-003	1.4541e-003
tblLandUse	LandUseSquareFeet	5,460.00	5,455.00
tblLandUse	LandUseSquareFeet	3,890.00	3,886.00
tblLandUse	LandUseSquareFeet	12,000.00	12,921.00
tblLandUse	LotAcreage	0.13	0.02
tblLandUse	LotAcreage	0.17	0.03
tblLandUse	LotAcreage	0.05	0.02
tblLandUse	LotAcreage	0.09	0.02
tblLandUse	LotAcreage	0.32	0.03
tblLandUse	Population	34.00	28.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0
tblProjectCharacteristics	CO2IntensityFactor	702.44	483.27

tblProjectCharacteristics	N2OIntensityFactor	0.006	0
tblVehicleEF	HHD	0.75	0.03
tblVehicleEF	HHD	0.09	0.08
tblVehicleEF	HHD	0.09	4.2401e-007
tblVehicleEF	HHD	2.69	6.18
tblVehicleEF	HHD	0.97	0.65
tblVehicleEF	HHD	2.90	7.9879e-003
tblVehicleEF	HHD	4,950.31	1,194.39
tblVehicleEF	HHD	1,610.72	1,479.86
tblVehicleEF	HHD	9.10	0.07
tblVehicleEF	HHD	22.19	6.50
tblVehicleEF	HHD	3.79	3.84
tblVehicleEF	HHD	19.75	1.92
tblVehicleEF	HHD	0.02	9.3832e-003
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.05
tblVehicleEF	HHD	7.7000e-005	1.3833e-006
tblVehicleEF	HHD	0.02	8.9773e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8180e-003	8.8729e-003
tblVehicleEF	HHD	0.02	0.05
tblVehicleEF	HHD	7.1000e-005	1.2719e-006
tblVehicleEF	HHD	1.0500e-004	6.4524e-006
tblVehicleEF	HHD	4.2950e-003	2.3933e-004
tblVehicleEF	HHD	0.67	0.48
tblVehicleEF	HHD	7.5000e-005	4.3624e-006
tblVehicleEF	HHD	0.13	0.11
tblVehicleEF	HHD	3.6200e-004	1.2685e-003
tblVehicleEF	HHD	0.08	2.2266e-006

tblVehicleEF	HHD	0.05	0.01
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	1.3900e-004	7.0406e-007
tblVehicleEF	HHD	1.0500e-004	6.4524e-006
tblVehicleEF	HHD	4.2950e-003	2.3933e-004
tblVehicleEF	HHD	0.79	0.55
tblVehicleEF	HHD	7.5000e-005	4.3624e-006
tblVehicleEF	HHD	0.23	0.20
tblVehicleEF	HHD	3.6200e-004	1.2685e-003
tblVehicleEF	HHD	0.09	2.4378e-006
tblVehicleEF	HHD	0.71	0.03
tblVehicleEF	HHD	0.09	0.08
tblVehicleEF	HHD	0.08	4.0633e-007
tblVehicleEF	HHD	1.96	6.03
tblVehicleEF	HHD	0.97	0.65
tblVehicleEF	HHD	2.75	7.5843e-003
tblVehicleEF	HHD	5,242.63	1,192.05
tblVehicleEF	HHD	1,610.72	1,479.86
tblVehicleEF	HHD	9.10	0.07
tblVehicleEF	HHD	22.90	6.33
tblVehicleEF	HHD	3.59	3.63
tblVehicleEF	HHD	19.74	1.92
tblVehicleEF	HHD	0.01	8.7457e-003
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.05
tblVehicleEF	HHD	7.7000e-005	1.3833e-006
tblVehicleEF	HHD	0.01	8.3673e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8180e-003	8.8729e-003

tblVehicleEF	HHD	0.02	0.05
tblVehicleEF	HHD	7.1000e-005	1.2719e-006
tblVehicleEF	HHD	1.7000e-004	1.0657e-005
tblVehicleEF	HHD	4.5010e-003	2.4949e-004
tblVehicleEF	HHD	0.64	0.50
tblVehicleEF	HHD	1.1700e-004	7.2292e-006
tblVehicleEF	HHD	0.13	0.11
tblVehicleEF	HHD	3.5600e-004	1.2608e-003
tblVehicleEF	HHD	0.07	2.1397e-006
tblVehicleEF	HHD	0.05	0.01
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	1.3600e-004	6.9772e-007
tblVehicleEF	HHD	1.7000e-004	1.0657e-005
tblVehicleEF	HHD	4.5010e-003	2.4949e-004
tblVehicleEF	HHD	0.74	0.57
tblVehicleEF	HHD	1.1700e-004	7.2292e-006
tblVehicleEF	HHD	0.23	0.20
tblVehicleEF	HHD	3.5600e-004	1.2608e-003
tblVehicleEF	HHD	0.08	2.3427e-006
tblVehicleEF	HHD	0.81	0.03
tblVehicleEF	HHD	0.09	0.08
tblVehicleEF	HHD	0.09	4.2756e-007
tblVehicleEF	HHD	3.70	6.39
tblVehicleEF	HHD	0.97	0.65
tblVehicleEF	HHD	2.92	8.0434e-003
tblVehicleEF	HHD	4,546.63	1,197.61
tblVehicleEF	HHD	1,610.72	1,479.86
tblVehicleEF	HHD	9.10	0.07
tblVehicleEF	HHD	21.21	6.74
tblVehicleEF	HHD	3.74	3.79

tblVehicleEF	HHD	19.75	1.92
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.05
tblVehicleEF	HHD	7.7000e-005	1.3833e-006
tblVehicleEF	HHD	0.02	9.8196e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8180e-003	8.8729e-003
tblVehicleEF	HHD	0.02	0.05
tblVehicleEF	HHD	7.1000e-005	1.2719e-006
tblVehicleEF	HHD	1.0000e-004	6.7124e-006
tblVehicleEF	HHD	4.6100e-003	2.7310e-004
tblVehicleEF	HHD	0.73	0.45
tblVehicleEF	HHD	7.2000e-005	4.4165e-006
tblVehicleEF	HHD	0.13	0.11
tblVehicleEF	HHD	3.9100e-004	1.3430e-003
tblVehicleEF	HHD	0.08	2.2436e-006
tblVehicleEF	HHD	0.04	0.01
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	1.3900e-004	7.0493e-007
tblVehicleEF	HHD	1.0000e-004	6.7124e-006
tblVehicleEF	HHD	4.6100e-003	2.7310e-004
tblVehicleEF	HHD	0.85	0.52
tblVehicleEF	HHD	7.2000e-005	4.4165e-006
tblVehicleEF	HHD	0.23	0.20
tblVehicleEF	HHD	3.9100e-004	1.3430e-003
tblVehicleEF	HHD	0.09	2.4564e-006
tblVehicleEF	LDA	5.2110e-003	3.1429e-003
tblVehicleEF	LDA	5.8420e-003	0.05

tblVehicleEF	LDA	0.65	0.74
tblVehicleEF	LDA	1.21	2.15
tblVehicleEF	LDA	275.32	274.11
tblVehicleEF	LDA	58.96	54.77
tblVehicleEF	LDA	0.05	0.04
tblVehicleEF	LDA	0.08	0.19
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	8.0000e-003	8.0000e-003
tblVehicleEF	LDA	2.0440e-003	1.7838e-003
tblVehicleEF	LDA	2.2900e-003	1.9372e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	2.0000e-003	2.0000e-003
tblVehicleEF	LDA	1.8840e-003	1.6434e-003
tblVehicleEF	LDA	2.1060e-003	1.7813e-003
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.11	0.10
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.04	0.22
tblVehicleEF	LDA	0.08	0.24
tblVehicleEF	LDA	2.7580e-003	2.7118e-003
tblVehicleEF	LDA	6.1000e-004	5.4200e-004
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.11	0.10
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	0.22
tblVehicleEF	LDA	0.09	0.26
tblVehicleEF	LDA	5.5820e-003	3.3871e-003
tblVehicleEF	LDA	5.1760e-003	0.05

tblVehicleEF	LDA	0.73	0.83
tblVehicleEF	LDA	1.04	1.84
tblVehicleEF	LDA	290.06	288.26
tblVehicleEF	LDA	58.96	54.19
tblVehicleEF	LDA	0.05	0.04
tblVehicleEF	LDA	0.07	0.18
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	8.0000e-003	8.0000e-003
tblVehicleEF	LDA	2.0440e-003	1.7838e-003
tblVehicleEF	LDA	2.2900e-003	1.9372e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	2.0000e-003	2.0000e-003
tblVehicleEF	LDA	1.8840e-003	1.6434e-003
tblVehicleEF	LDA	2.1060e-003	1.7813e-003
tblVehicleEF	LDA	0.07	0.09
tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.06	0.08
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.04	0.21
tblVehicleEF	LDA	0.07	0.21
tblVehicleEF	LDA	2.9060e-003	2.8517e-003
tblVehicleEF	LDA	6.0700e-004	5.3628e-004
tblVehicleEF	LDA	0.07	0.09
tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.06	0.08
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	0.21
tblVehicleEF	LDA	0.08	0.23
tblVehicleEF	LDA	5.0990e-003	3.0732e-003
tblVehicleEF	LDA	5.9770e-003	0.05

tblVehicleEF	LDA	0.63	0.71
tblVehicleEF	LDA	1.25	2.21
tblVehicleEF	LDA	270.53	269.50
tblVehicleEF	LDA	58.96	54.89
tblVehicleEF	LDA	0.05	0.04
tblVehicleEF	LDA	0.08	0.20
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	8.0000e-003	8.0000e-003
tblVehicleEF	LDA	2.0440e-003	1.7838e-003
tblVehicleEF	LDA	2.2900e-003	1.9372e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	2.0000e-003	2.0000e-003
tblVehicleEF	LDA	1.8840e-003	1.6434e-003
tblVehicleEF	LDA	2.1060e-003	1.7813e-003
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.05	0.25
tblVehicleEF	LDA	0.08	0.25
tblVehicleEF	LDA	2.7100e-003	2.6661e-003
tblVehicleEF	LDA	6.1100e-004	5.4318e-004
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.05	0.25
tblVehicleEF	LDA	0.09	0.27
tblVehicleEF	LDT1	0.01	8.2654e-003
tblVehicleEF	LDT1	0.02	0.08

tblVehicleEF	LDT1	1.65	1.56
tblVehicleEF	LDT1	3.08	2.36
tblVehicleEF	LDT1	339.89	323.15
tblVehicleEF	LDT1	71.61	65.44
tblVehicleEF	LDT1	0.16	0.13
tblVehicleEF	LDT1	0.18	0.28
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	3.3000e-003	2.7341e-003
tblVehicleEF	LDT1	3.5610e-003	2.8287e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003
tblVehicleEF	LDT1	3.0390e-003	2.5162e-003
tblVehicleEF	LDT1	3.2750e-003	2.6011e-003
tblVehicleEF	LDT1	0.14	0.15
tblVehicleEF	LDT1	0.29	0.22
tblVehicleEF	LDT1	0.11	0.12
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	0.18	0.76
tblVehicleEF	LDT1	0.21	0.40
tblVehicleEF	LDT1	3.4200e-003	3.1978e-003
tblVehicleEF	LDT1	7.7000e-004	6.4755e-004
tblVehicleEF	LDT1	0.14	0.15
tblVehicleEF	LDT1	0.29	0.22
tblVehicleEF	LDT1	0.11	0.12
tblVehicleEF	LDT1	0.05	0.05
tblVehicleEF	LDT1	0.18	0.76
tblVehicleEF	LDT1	0.24	0.44
tblVehicleEF	LDT1	0.02	8.8396e-003
tblVehicleEF	LDT1	0.01	0.07

tblVehicleEF	LDT1	1.81	1.73
tblVehicleEF	LDT1	2.63	2.02
tblVehicleEF	LDT1	356.82	337.51
tblVehicleEF	LDT1	71.61	64.74
tblVehicleEF	LDT1	0.14	0.12
tblVehicleEF	LDT1	0.17	0.26
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	3.3000e-003	2.7341e-003
tblVehicleEF	LDT1	3.5610e-003	2.8287e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003
tblVehicleEF	LDT1	3.0390e-003	2.5162e-003
tblVehicleEF	LDT1	3.2750e-003	2.6011e-003
tblVehicleEF	LDT1	0.24	0.24
tblVehicleEF	LDT1	0.31	0.24
tblVehicleEF	LDT1	0.17	0.18
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	0.17	0.71
tblVehicleEF	LDT1	0.19	0.35
tblVehicleEF	LDT1	3.5920e-003	3.3399e-003
tblVehicleEF	LDT1	7.6200e-004	6.4062e-004
tblVehicleEF	LDT1	0.24	0.24
tblVehicleEF	LDT1	0.31	0.24
tblVehicleEF	LDT1	0.17	0.18
tblVehicleEF	LDT1	0.06	0.06
tblVehicleEF	LDT1	0.17	0.71
tblVehicleEF	LDT1	0.21	0.39
tblVehicleEF	LDT1	0.01	8.0953e-003
tblVehicleEF	LDT1	0.02	0.08

tblVehicleEF	LDT1	1.59	1.51
tblVehicleEF	LDT1	3.17	2.44
tblVehicleEF	LDT1	334.24	318.34
tblVehicleEF	LDT1	71.61	65.58
tblVehicleEF	LDT1	0.15	0.13
tblVehicleEF	LDT1	0.18	0.29
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	3.3000e-003	2.7341e-003
tblVehicleEF	LDT1	3.5610e-003	2.8287e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003
tblVehicleEF	LDT1	3.0390e-003	2.5162e-003
tblVehicleEF	LDT1	3.2750e-003	2.6011e-003
tblVehicleEF	LDT1	0.14	0.15
tblVehicleEF	LDT1	0.33	0.25
tblVehicleEF	LDT1	0.11	0.11
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	0.21	0.90
tblVehicleEF	LDT1	0.22	0.41
tblVehicleEF	LDT1	3.3630e-003	3.1501e-003
tblVehicleEF	LDT1	7.7200e-004	6.4900e-004
tblVehicleEF	LDT1	0.14	0.15
tblVehicleEF	LDT1	0.33	0.25
tblVehicleEF	LDT1	0.11	0.11
tblVehicleEF	LDT1	0.05	0.05
tblVehicleEF	LDT1	0.21	0.90
tblVehicleEF	LDT1	0.24	0.45
tblVehicleEF	LDT2	7.0440e-003	5.0887e-003
tblVehicleEF	LDT2	7.1880e-003	0.07

tblVehicleEF	LDT2	0.84	1.06
tblVehicleEF	LDT2	1.49	2.74
tblVehicleEF	LDT2	382.63	349.24
tblVehicleEF	LDT2	81.02	71.19
tblVehicleEF	LDT2	0.08	0.09
tblVehicleEF	LDT2	0.12	0.31
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9920e-003	1.8561e-003
tblVehicleEF	LDT2	2.3200e-003	1.9489e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003
tblVehicleEF	LDT2	1.8320e-003	1.7082e-003
tblVehicleEF	LDT2	2.1330e-003	1.7921e-003
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.11	0.13
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.06	0.42
tblVehicleEF	LDT2	0.10	0.34
tblVehicleEF	LDT2	3.8330e-003	3.4552e-003
tblVehicleEF	LDT2	8.3500e-004	7.0452e-004
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.11	0.13
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.03	0.03
tblVehicleEF	LDT2	0.06	0.42
tblVehicleEF	LDT2	0.11	0.37
tblVehicleEF	LDT2	7.5350e-003	5.4660e-003
tblVehicleEF	LDT2	6.3730e-003	0.06

tblVehicleEF	LDT2	0.94	1.18
tblVehicleEF	LDT2	1.28	2.34
tblVehicleEF	LDT2	402.38	363.41
tblVehicleEF	LDT2	81.02	70.44
tblVehicleEF	LDT2	0.07	0.08
tblVehicleEF	LDT2	0.11	0.29
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9920e-003	1.8561e-003
tblVehicleEF	LDT2	2.3200e-003	1.9489e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003
tblVehicleEF	LDT2	1.8320e-003	1.7082e-003
tblVehicleEF	LDT2	2.1330e-003	1.7921e-003
tblVehicleEF	LDT2	0.08	0.13
tblVehicleEF	LDT2	0.12	0.14
tblVehicleEF	LDT2	0.07	0.12
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.06	0.40
tblVehicleEF	LDT2	0.09	0.30
tblVehicleEF	LDT2	4.0320e-003	3.5954e-003
tblVehicleEF	LDT2	8.3200e-004	6.9709e-004
tblVehicleEF	LDT2	0.08	0.13
tblVehicleEF	LDT2	0.12	0.14
tblVehicleEF	LDT2	0.07	0.12
tblVehicleEF	LDT2	0.03	0.03
tblVehicleEF	LDT2	0.06	0.40
tblVehicleEF	LDT2	0.09	0.33
tblVehicleEF	LDT2	6.8940e-003	4.9777e-003
tblVehicleEF	LDT2	7.3550e-003	0.07

tblVehicleEF	LDT2	0.81	1.02
tblVehicleEF	LDT2	1.53	2.82
tblVehicleEF	LDT2	376.06	344.49
tblVehicleEF	LDT2	81.02	71.35
tblVehicleEF	LDT2	0.08	0.09
tblVehicleEF	LDT2	0.12	0.31
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9920e-003	1.8561e-003
tblVehicleEF	LDT2	2.3200e-003	1.9489e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003
tblVehicleEF	LDT2	1.8320e-003	1.7082e-003
tblVehicleEF	LDT2	2.1330e-003	1.7921e-003
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.12	0.14
tblVehicleEF	LDT2	0.05	0.07
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.07	0.49
tblVehicleEF	LDT2	0.10	0.35
tblVehicleEF	LDT2	3.7670e-003	3.4081e-003
tblVehicleEF	LDT2	8.3600e-004	7.0609e-004
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.12	0.14
tblVehicleEF	LDT2	0.05	0.07
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.07	0.49
tblVehicleEF	LDT2	0.11	0.38
tblVehicleEF	LHD1	5.8640e-003	5.6691e-003
tblVehicleEF	LHD1	0.01	6.0175e-003

tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.15	0.19
tblVehicleEF	LHD1	0.91	0.71
tblVehicleEF	LHD1	2.81	1.13
tblVehicleEF	LHD1	9.00	9.05
tblVehicleEF	LHD1	610.88	671.68
tblVehicleEF	LHD1	33.50	12.37
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	1.31	0.90
tblVehicleEF	LHD1	1.05	0.35
tblVehicleEF	LHD1	8.5300e-004	7.7068e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.6787e-003
tblVehicleEF	LHD1	0.01	7.5768e-003
tblVehicleEF	LHD1	1.0090e-003	2.8117e-004
tblVehicleEF	LHD1	8.1600e-004	7.3734e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5040e-003	2.4197e-003
tblVehicleEF	LHD1	0.01	7.2207e-003
tblVehicleEF	LHD1	9.2800e-004	2.5852e-004
tblVehicleEF	LHD1	3.3200e-003	2.7392e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.9270e-003	1.5952e-003
tblVehicleEF	LHD1	0.07	0.05
tblVehicleEF	LHD1	0.31	0.55
tblVehicleEF	LHD1	0.28	0.08
tblVehicleEF	LHD1	9.0000e-005	8.7938e-005
tblVehicleEF	LHD1	6.0020e-003	6.5586e-003
tblVehicleEF	LHD1	3.8800e-004	1.2242e-004

tblVehicleEF	LHD1	3.3200e-003	2.7392e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	1.9270e-003	1.5952e-003
tblVehicleEF	LHD1	0.09	0.07
tblVehicleEF	LHD1	0.31	0.55
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tblVehicleEF	LHD1	0.01	6.1375e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.15	0.19
tblVehicleEF	LHD1	0.92	0.72
tblVehicleEF	LHD1	2.68	1.08
tblVehicleEF	LHD1	9.00	9.05
tblVehicleEF	LHD1	610.88	671.71
tblVehicleEF	LHD1	33.50	12.28
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	1.23	0.84
tblVehicleEF	LHD1	1.01	0.33
tblVehicleEF	LHD1	8.5300e-004	7.7068e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.6787e-003
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tblVehicleEF	LHD1	8.1600e-004	7.3734e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5040e-003	2.4197e-003
tblVehicleEF	LHD1	0.01	7.2207e-003
tblVehicleEF	LHD1	9.2800e-004	2.5852e-004
tblVehicleEF	LHD1	5.1880e-003	4.2555e-003

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tblVehicleEF	LHD1	0.02	0.02
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tblVehicleEF	LHD1	0.30	0.54
tblVehicleEF	LHD1	0.27	0.08
tblVehicleEF	LHD1	9.0000e-005	8.7938e-005
tblVehicleEF	LHD1	6.0030e-003	6.5588e-003
tblVehicleEF	LHD1	3.8500e-004	1.2152e-004
tblVehicleEF	LHD1	5.1880e-003	4.2555e-003
tblVehicleEF	LHD1	0.11	0.09
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	2.9140e-003	2.4001e-003
tblVehicleEF	LHD1	0.09	0.07
tblVehicleEF	LHD1	0.30	0.54
tblVehicleEF	LHD1	0.30	0.09
tblVehicleEF	LHD1	5.8640e-003	5.6673e-003
tblVehicleEF	LHD1	0.01	5.9900e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.15	0.19
tblVehicleEF	LHD1	0.91	0.70
tblVehicleEF	LHD1	2.82	1.14
tblVehicleEF	LHD1	9.00	9.05
tblVehicleEF	LHD1	610.88	671.68
tblVehicleEF	LHD1	33.50	12.38
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	1.28	0.88
tblVehicleEF	LHD1	1.06	0.35
tblVehicleEF	LHD1	8.5300e-004	7.7068e-004
tblVehicleEF	LHD1	0.08	0.08

tblVehicleEF	LHD1	0.01	9.6787e-003
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tblVehicleEF	LHD1	1.0090e-003	2.8117e-004
tblVehicleEF	LHD1	8.1600e-004	7.3734e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5040e-003	2.4197e-003
tblVehicleEF	LHD1	0.01	7.2207e-003
tblVehicleEF	LHD1	9.2800e-004	2.5852e-004
tblVehicleEF	LHD1	3.3910e-003	2.8163e-003
tblVehicleEF	LHD1	0.12	0.09
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.8940e-003	1.5726e-003
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tblVehicleEF	LHD1	0.33	0.60
tblVehicleEF	LHD1	0.28	0.08
tblVehicleEF	LHD1	9.0000e-005	8.7938e-005
tblVehicleEF	LHD1	6.0020e-003	6.5585e-003
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tblVehicleEF	LHD1	3.3910e-003	2.8163e-003
tblVehicleEF	LHD1	0.12	0.09
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	1.8940e-003	1.5726e-003
tblVehicleEF	LHD1	0.09	0.07
tblVehicleEF	LHD1	0.33	0.60
tblVehicleEF	LHD1	0.31	0.09
tblVehicleEF	LHD2	4.2390e-003	4.0130e-003
tblVehicleEF	LHD2	4.8300e-003	4.2072e-003
tblVehicleEF	LHD2	9.6290e-003	0.01
tblVehicleEF	LHD2	0.13	0.15
tblVehicleEF	LHD2	0.41	0.49

tblVehicleEF	LHD2	1.43	0.76
tblVehicleEF	LHD2	13.72	13.73
tblVehicleEF	LHD2	622.17	675.94
tblVehicleEF	LHD2	28.08	9.60
tblVehicleEF	LHD2	0.10	0.10
tblVehicleEF	LHD2	0.93	1.09
tblVehicleEF	LHD2	0.60	0.24
tblVehicleEF	LHD2	1.2010e-003	1.2468e-003
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tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	4.7800e-004	1.5922e-004
tblVehicleEF	LHD2	1.1490e-003	1.1928e-003
tblVehicleEF	LHD2	0.04	0.04
tblVehicleEF	LHD2	2.6500e-003	2.6300e-003
tblVehicleEF	LHD2	9.6020e-003	0.01
tblVehicleEF	LHD2	4.3900e-004	1.4640e-004
tblVehicleEF	LHD2	1.3010e-003	1.6722e-003
tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	8.0500e-004	9.8876e-004
tblVehicleEF	LHD2	0.05	0.05
tblVehicleEF	LHD2	0.09	0.35
tblVehicleEF	LHD2	0.13	0.06
tblVehicleEF	LHD2	1.3400e-004	1.3167e-004
tblVehicleEF	LHD2	6.0640e-003	6.5428e-003
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tblVehicleEF	LHD2	1.3010e-003	1.6722e-003
tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	0.02	0.03

tblVehicleEF	LHD2	8.0500e-004	9.8876e-004
tblVehicleEF	LHD2	0.06	0.06
tblVehicleEF	LHD2	0.09	0.35
tblVehicleEF	LHD2	0.14	0.06
tblVehicleEF	LHD2	4.2390e-003	4.0218e-003
tblVehicleEF	LHD2	4.8960e-003	4.2547e-003
tblVehicleEF	LHD2	9.2930e-003	0.01
tblVehicleEF	LHD2	0.13	0.15
tblVehicleEF	LHD2	0.41	0.49
tblVehicleEF	LHD2	1.37	0.73
tblVehicleEF	LHD2	13.72	13.73
tblVehicleEF	LHD2	622.17	675.95
tblVehicleEF	LHD2	28.08	9.54
tblVehicleEF	LHD2	0.10	0.10
tblVehicleEF	LHD2	0.88	1.03
tblVehicleEF	LHD2	0.58	0.23
tblVehicleEF	LHD2	1.2010e-003	1.2468e-003
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tblVehicleEF	LHD2	0.01	0.01
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tblVehicleEF	LHD2	4.7800e-004	1.5922e-004
tblVehicleEF	LHD2	1.1490e-003	1.1928e-003
tblVehicleEF	LHD2	0.04	0.04
tblVehicleEF	LHD2	2.6500e-003	2.6300e-003
tblVehicleEF	LHD2	9.6020e-003	0.01
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tblVehicleEF	LHD2	2.0260e-003	2.5915e-003
tblVehicleEF	LHD2	0.04	0.06
tblVehicleEF	LHD2	0.01	0.02
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tblVehicleEF	LHD2	0.09	0.34
tblVehicleEF	LHD2	0.13	0.06
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tblVehicleEF	LHD2	6.0640e-003	6.5429e-003
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tblVehicleEF	LHD2	2.0260e-003	2.5915e-003
tblVehicleEF	LHD2	0.04	0.06
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	1.2020e-003	1.4788e-003
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tblVehicleEF	LHD2	0.09	0.34
tblVehicleEF	LHD2	0.14	0.06
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tblVehicleEF	LHD2	9.6860e-003	0.01
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tblVehicleEF	LHD2	622.17	675.94
tblVehicleEF	LHD2	28.08	9.61
tblVehicleEF	LHD2	0.10	0.10
tblVehicleEF	LHD2	0.92	1.07
tblVehicleEF	LHD2	0.60	0.24
tblVehicleEF	LHD2	1.2010e-003	1.2468e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
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tblVehicleEF	LHD2	4.7800e-004	1.5922e-004

tblVehicleEF	LHD2	1.1490e-003	1.1928e-003
tblVehicleEF	LHD2	0.04	0.04
tblVehicleEF	LHD2	2.6500e-003	2.6300e-003
tblVehicleEF	LHD2	9.6020e-003	0.01
tblVehicleEF	LHD2	4.3900e-004	1.4640e-004
tblVehicleEF	LHD2	1.2850e-003	1.6760e-003
tblVehicleEF	LHD2	0.05	0.06
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	7.7600e-004	9.5349e-004
tblVehicleEF	LHD2	0.05	0.05
tblVehicleEF	LHD2	0.10	0.38
tblVehicleEF	LHD2	0.13	0.06
tblVehicleEF	LHD2	1.3400e-004	1.3167e-004
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tblVehicleEF	LHD2	1.2850e-003	1.6760e-003
tblVehicleEF	LHD2	0.05	0.06
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	7.7600e-004	9.5349e-004
tblVehicleEF	LHD2	0.06	0.06
tblVehicleEF	LHD2	0.10	0.38
tblVehicleEF	LHD2	0.14	0.06
tblVehicleEF	MCY	0.50	0.37
tblVehicleEF	MCY	0.15	0.24
tblVehicleEF	MCY	19.08	19.33
tblVehicleEF	MCY	9.63	8.50
tblVehicleEF	MCY	182.36	218.96
tblVehicleEF	MCY	45.23	60.14
tblVehicleEF	MCY	1.13	1.13
tblVehicleEF	MCY	0.31	0.26

tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.2250e-003	2.2167e-003
tblVehicleEF	MCY	3.8410e-003	3.2543e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	2.0810e-003	2.0731e-003
tblVehicleEF	MCY	3.6200e-003	3.0666e-003
tblVehicleEF	MCY	1.18	1.20
tblVehicleEF	MCY	0.69	0.71
tblVehicleEF	MCY	0.70	0.72
tblVehicleEF	MCY	2.49	2.50
tblVehicleEF	MCY	0.63	2.04
tblVehicleEF	MCY	2.06	1.83
tblVehicleEF	MCY	2.2100e-003	2.1668e-003
tblVehicleEF	MCY	6.7000e-004	5.9514e-004
tblVehicleEF	MCY	1.18	1.20
tblVehicleEF	MCY	0.69	0.71
tblVehicleEF	MCY	0.70	0.72
tblVehicleEF	MCY	3.08	3.10
tblVehicleEF	MCY	0.63	2.04
tblVehicleEF	MCY	2.24	1.99
tblVehicleEF	MCY	0.49	0.36
tblVehicleEF	MCY	0.14	0.21
tblVehicleEF	MCY	18.59	18.81
tblVehicleEF	MCY	8.86	7.79
tblVehicleEF	MCY	182.36	217.93
tblVehicleEF	MCY	45.23	58.33
tblVehicleEF	MCY	0.99	0.99
tblVehicleEF	MCY	0.29	0.25

tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.2250e-003	2.2167e-003
tblVehicleEF	MCY	3.8410e-003	3.2543e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	2.0810e-003	2.0731e-003
tblVehicleEF	MCY	3.6200e-003	3.0666e-003
tblVehicleEF	MCY	1.98	2.00
tblVehicleEF	MCY	0.80	0.83
tblVehicleEF	MCY	1.25	1.26
tblVehicleEF	MCY	2.43	2.44
tblVehicleEF	MCY	0.59	1.93
tblVehicleEF	MCY	1.84	1.62
tblVehicleEF	MCY	2.2010e-003	2.1566e-003
tblVehicleEF	MCY	6.5100e-004	5.7722e-004
tblVehicleEF	MCY	1.98	2.00
tblVehicleEF	MCY	0.80	0.83
tblVehicleEF	MCY	1.25	1.26
tblVehicleEF	MCY	3.02	3.03
tblVehicleEF	MCY	0.59	1.93
tblVehicleEF	MCY	2.00	1.76
tblVehicleEF	MCY	0.51	0.37
tblVehicleEF	MCY	0.15	0.24
tblVehicleEF	MCY	19.10	19.35
tblVehicleEF	MCY	9.72	8.59
tblVehicleEF	MCY	182.36	219.02
tblVehicleEF	MCY	45.23	60.39
tblVehicleEF	MCY	1.10	1.10
tblVehicleEF	MCY	0.31	0.27

tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.2250e-003	2.2167e-003
tblVehicleEF	MCY	3.8410e-003	3.2543e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	2.0810e-003	2.0731e-003
tblVehicleEF	MCY	3.6200e-003	3.0666e-003
tblVehicleEF	MCY	1.26	1.28
tblVehicleEF	MCY	0.89	0.91
tblVehicleEF	MCY	0.67	0.69
tblVehicleEF	MCY	2.49	2.51
tblVehicleEF	MCY	0.72	2.33
tblVehicleEF	MCY	2.10	1.86
tblVehicleEF	MCY	2.2110e-003	2.1674e-003
tblVehicleEF	MCY	6.7300e-004	5.9762e-004
tblVehicleEF	MCY	1.26	1.28
tblVehicleEF	MCY	0.89	0.91
tblVehicleEF	MCY	0.67	0.69
tblVehicleEF	MCY	3.09	3.11
tblVehicleEF	MCY	0.72	2.33
tblVehicleEF	MCY	2.28	2.02
tblVehicleEF	MDV	0.01	7.0561e-003
tblVehicleEF	MDV	0.02	0.09
tblVehicleEF	MDV	1.48	1.33
tblVehicleEF	MDV	2.84	3.27
tblVehicleEF	MDV	515.44	429.05
tblVehicleEF	MDV	107.59	87.05
tblVehicleEF	MDV	0.16	0.13
tblVehicleEF	MDV	0.26	0.38

tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.1880e-003	2.0176e-003
tblVehicleEF	MDV	2.5060e-003	2.1338e-003
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0180e-003	1.8612e-003
tblVehicleEF	MDV	2.3060e-003	1.9635e-003
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.17	0.15
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.04	0.03
tblVehicleEF	MDV	0.10	0.45
tblVehicleEF	MDV	0.22	0.44
tblVehicleEF	MDV	5.1660e-003	4.2422e-003
tblVehicleEF	MDV	1.1260e-003	8.6147e-004
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.17	0.15
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.05	0.05
tblVehicleEF	MDV	0.10	0.45
tblVehicleEF	MDV	0.24	0.48
tblVehicleEF	MDV	0.01	7.5222e-003
tblVehicleEF	MDV	0.01	0.08
tblVehicleEF	MDV	1.63	1.46
tblVehicleEF	MDV	2.45	2.79
tblVehicleEF	MDV	541.84	444.43
tblVehicleEF	MDV	107.59	86.14
tblVehicleEF	MDV	0.14	0.11
tblVehicleEF	MDV	0.24	0.36

tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.1880e-003	2.0176e-003
tblVehicleEF	MDV	2.5060e-003	2.1338e-003
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0180e-003	1.8612e-003
tblVehicleEF	MDV	2.3060e-003	1.9635e-003
tblVehicleEF	MDV	0.13	0.16
tblVehicleEF	MDV	0.18	0.16
tblVehicleEF	MDV	0.11	0.14
tblVehicleEF	MDV	0.04	0.03
tblVehicleEF	MDV	0.09	0.43
tblVehicleEF	MDV	0.19	0.39
tblVehicleEF	MDV	5.4320e-003	4.3943e-003
tblVehicleEF	MDV	1.1190e-003	8.5241e-004
tblVehicleEF	MDV	0.13	0.16
tblVehicleEF	MDV	0.18	0.16
tblVehicleEF	MDV	0.11	0.14
tblVehicleEF	MDV	0.06	0.05
tblVehicleEF	MDV	0.09	0.43
tblVehicleEF	MDV	0.21	0.43
tblVehicleEF	MDV	0.01	6.9155e-003
tblVehicleEF	MDV	0.02	0.09
tblVehicleEF	MDV	1.43	1.28
tblVehicleEF	MDV	2.92	3.36
tblVehicleEF	MDV	506.79	424.01
tblVehicleEF	MDV	107.59	87.24
tblVehicleEF	MDV	0.16	0.12
tblVehicleEF	MDV	0.26	0.39

tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.1880e-003	2.0176e-003
tblVehicleEF	MDV	2.5060e-003	2.1338e-003
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0180e-003	1.8612e-003
tblVehicleEF	MDV	2.3060e-003	1.9635e-003
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.18	0.16
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.04	0.03
tblVehicleEF	MDV	0.11	0.53
tblVehicleEF	MDV	0.23	0.45
tblVehicleEF	MDV	5.0790e-003	4.1922e-003
tblVehicleEF	MDV	1.1270e-003	8.6332e-004
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.18	0.16
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.05	0.04
tblVehicleEF	MDV	0.11	0.53
tblVehicleEF	MDV	0.25	0.49
tblVehicleEF	MH	0.03	0.01
tblVehicleEF	MH	0.03	0.02
tblVehicleEF	MH	2.61	1.40
tblVehicleEF	MH	6.11	2.17
tblVehicleEF	MH	1,106.44	1,502.39
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tblVehicleEF	MH	1.32	1.32
tblVehicleEF	MH	0.84	0.24

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tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.1510e-003	2.7879e-004
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	3.2170e-003	3.2632e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.0590e-003	2.5634e-004
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tblVehicleEF	MH	0.08	0.06
tblVehicleEF	MH	0.46	0.39
tblVehicleEF	MH	0.10	0.06
tblVehicleEF	MH	0.02	1.51
tblVehicleEF	MH	0.35	0.10
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	7.0200e-004	1.9081e-004
tblVehicleEF	MH	1.15	0.99
tblVehicleEF	MH	0.08	0.06
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tblVehicleEF	MH	0.14	0.09
tblVehicleEF	MH	0.02	1.51
tblVehicleEF	MH	0.38	0.11
tblVehicleEF	MH	0.03	0.01
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	2.69	1.44
tblVehicleEF	MH	5.74	2.05
tblVehicleEF	MH	1,106.44	1,502.46
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tblVehicleEF	MH	1.22	1.23
tblVehicleEF	MH	0.80	0.23

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tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.1510e-003	2.7879e-004
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	3.2170e-003	3.2632e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.0590e-003	2.5634e-004
tblVehicleEF	MH	1.78	1.52
tblVehicleEF	MH	0.08	0.07
tblVehicleEF	MH	0.72	0.61
tblVehicleEF	MH	0.10	0.07
tblVehicleEF	MH	0.02	1.49
tblVehicleEF	MH	0.34	0.09
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	6.9500e-004	1.8871e-004
tblVehicleEF	MH	1.78	1.52
tblVehicleEF	MH	0.08	0.07
tblVehicleEF	MH	0.72	0.61
tblVehicleEF	MH	0.14	0.09
tblVehicleEF	MH	0.02	1.49
tblVehicleEF	MH	0.37	0.10
tblVehicleEF	MH	0.03	0.01
tblVehicleEF	MH	0.03	0.02
tblVehicleEF	MH	2.59	1.39
tblVehicleEF	MH	6.16	2.19
tblVehicleEF	MH	1,106.44	1,502.38
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tblVehicleEF	MH	1.30	1.30
tblVehicleEF	MH	0.84	0.24

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tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.1510e-003	2.7879e-004
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	3.2170e-003	3.2632e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.0590e-003	2.5634e-004
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tblVehicleEF	MH	0.09	0.08
tblVehicleEF	MH	0.47	0.40
tblVehicleEF	MH	0.10	0.06
tblVehicleEF	MH	0.02	1.59
tblVehicleEF	MH	0.35	0.10
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	7.0300e-004	1.9114e-004
tblVehicleEF	MH	1.27	1.08
tblVehicleEF	MH	0.09	0.08
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tblVehicleEF	MH	0.14	0.09
tblVehicleEF	MH	0.02	1.59
tblVehicleEF	MH	0.39	0.11
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tblVehicleEF	MHD	0.37	0.38
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tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	5.7190e-003	0.06
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tblVehicleEF	MHD	3.4700e-004	1.7396e-003
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tblVehicleEF	MHD	3.0000e-003	3.0000e-003
tblVehicleEF	MHD	5.4680e-003	0.06
tblVehicleEF	MHD	7.7200e-004	1.1604e-004
tblVehicleEF	MHD	1.2630e-003	6.3990e-004
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tblVehicleEF	MHD	0.03	0.02
tblVehicleEF	MHD	7.7200e-004	3.9325e-004
tblVehicleEF	MHD	0.04	0.11
tblVehicleEF	MHD	0.02	0.13
tblVehicleEF	MHD	0.40	0.06
tblVehicleEF	MHD	1.3390e-003	6.3252e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.2800e-004	1.1367e-004
tblVehicleEF	MHD	1.2630e-003	6.3990e-004
tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	7.7200e-004	3.9325e-004
tblVehicleEF	MHD	0.05	0.13
tblVehicleEF	MHD	0.02	0.13

tblVehicleEF	MHD	0.43	0.07
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tblVehicleEF	MHD	4.9460e-003	6.7968e-003
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tblVehicleEF	MHD	0.27	0.31
tblVehicleEF	MHD	0.37	0.63
tblVehicleEF	MHD	6.12	1.27
tblVehicleEF	MHD	147.32	67.79
tblVehicleEF	MHD	1,139.95	1,077.14
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tblVehicleEF	MHD	0.57	0.55
tblVehicleEF	MHD	1.11	2.10
tblVehicleEF	MHD	10.41	1.12
tblVehicleEF	MHD	3.0600e-004	1.5351e-003
tblVehicleEF	MHD	0.13	0.13
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	5.7190e-003	0.06
tblVehicleEF	MHD	8.4000e-004	1.2621e-004
tblVehicleEF	MHD	2.9300e-004	1.4687e-003
tblVehicleEF	MHD	0.06	0.06
tblVehicleEF	MHD	3.0000e-003	3.0000e-003
tblVehicleEF	MHD	5.4680e-003	0.06
tblVehicleEF	MHD	7.7200e-004	1.1604e-004
tblVehicleEF	MHD	1.9740e-003	9.9194e-004
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tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	1.1660e-003	5.9016e-004
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tblVehicleEF	MHD	0.02	0.12
tblVehicleEF	MHD	0.38	0.06

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tblVehicleEF	MHD	0.03	0.03
tblVehicleEF	MHD	1.1660e-003	5.9016e-004
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tblVehicleEF	MHD	0.02	4.5651e-003
tblVehicleEF	MHD	4.8520e-003	6.7314e-003
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tblVehicleEF	MHD	0.51	0.48
tblVehicleEF	MHD	0.37	0.62
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tblVehicleEF	MHD	4.4200e-004	2.2092e-003
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tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	5.7190e-003	0.06
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tblVehicleEF	MHD	4.2300e-004	2.1137e-003
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tblVehicleEF	MHD	3.0000e-003	3.0000e-003

tblVehicleEF	MHD	5.4680e-003	0.06
tblVehicleEF	MHD	7.7200e-004	1.1604e-004
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tblVehicleEF	MHD	7.4700e-004	3.8266e-004
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tblVehicleEF	MHD	1.2610e-003	6.4610e-004
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tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	7.4700e-004	3.8266e-004
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tblVehicleEF	OBUS	0.13	0.13
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.1890e-003	0.04
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tblVehicleEF	OBUS	0.06	0.06
tblVehicleEF	OBUS	3.0000e-003	3.0000e-003
tblVehicleEF	OBUS	7.8190e-003	0.04
tblVehicleEF	OBUS	7.4400e-004	1.8109e-004
tblVehicleEF	OBUS	1.5730e-003	1.9706e-003
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tblVehicleEF	OBUS	3.0000e-003	3.0000e-003
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tblVehicleEF	OBUS	1.5900e-003	2.0387e-003
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tblVehicleEF	OBUS	7.8500e-004	9.6217e-004
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tblVehicleEF	SBUS	12.63	0.76
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tblVehicleEF	SBUS	0.03	0.03
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tblVehicleEF	SBUS	0.01	4.5641e-003
tblVehicleEF	SBUS	0.32	0.32
tblVehicleEF	SBUS	2.6920e-003	2.6700e-003
tblVehicleEF	SBUS	0.02	0.03
tblVehicleEF	SBUS	6.6400e-004	4.6327e-005
tblVehicleEF	SBUS	3.6480e-003	1.0930e-003
tblVehicleEF	SBUS	0.03	8.9369e-003
tblVehicleEF	SBUS	0.94	0.33
tblVehicleEF	SBUS	1.8170e-003	5.4744e-004
tblVehicleEF	SBUS	0.11	0.11
tblVehicleEF	SBUS	0.01	0.06
tblVehicleEF	SBUS	0.40	0.04
tblVehicleEF	SBUS	0.01	3.3993e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.5600e-004	5.5117e-005
tblVehicleEF	SBUS	3.6480e-003	1.0930e-003
tblVehicleEF	SBUS	0.03	8.9369e-003
tblVehicleEF	SBUS	1.36	0.47
tblVehicleEF	SBUS	1.8170e-003	5.4744e-004
tblVehicleEF	SBUS	0.14	0.13
tblVehicleEF	SBUS	0.01	0.06
tblVehicleEF	SBUS	0.44	0.04
tblVehicleEF	SBUS	0.86	0.07
tblVehicleEF	SBUS	0.01	8.4259e-003
tblVehicleEF	SBUS	0.06	5.8398e-003
tblVehicleEF	SBUS	7.73	2.78
tblVehicleEF	SBUS	0.82	0.73

tblVehicleEF	SBUS	6.01	0.73
tblVehicleEF	SBUS	1,199.32	365.47
tblVehicleEF	SBUS	1,098.65	1,119.97
tblVehicleEF	SBUS	52.57	5.25
tblVehicleEF	SBUS	10.38	3.52
tblVehicleEF	SBUS	4.37	4.95
tblVehicleEF	SBUS	12.59	0.76
tblVehicleEF	SBUS	9.1580e-003	4.0282e-003
tblVehicleEF	SBUS	0.74	0.74
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.03
tblVehicleEF	SBUS	7.2300e-004	5.0385e-005
tblVehicleEF	SBUS	8.7620e-003	3.8540e-003
tblVehicleEF	SBUS	0.32	0.32
tblVehicleEF	SBUS	2.6920e-003	2.6700e-003
tblVehicleEF	SBUS	0.02	0.03
tblVehicleEF	SBUS	6.6400e-004	4.6327e-005
tblVehicleEF	SBUS	5.6470e-003	1.6880e-003
tblVehicleEF	SBUS	0.03	9.1687e-003
tblVehicleEF	SBUS	0.94	0.33
tblVehicleEF	SBUS	2.8110e-003	8.4298e-004
tblVehicleEF	SBUS	0.11	0.11
tblVehicleEF	SBUS	0.01	0.05
tblVehicleEF	SBUS	0.35	0.03
tblVehicleEF	SBUS	0.01	3.4868e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.3100e-004	5.1967e-005
tblVehicleEF	SBUS	5.6470e-003	1.6880e-003
tblVehicleEF	SBUS	0.03	9.1687e-003
tblVehicleEF	SBUS	1.36	0.47

tblVehicleEF	SBUS	2.8110e-003	8.4298e-004
tblVehicleEF	SBUS	0.14	0.13
tblVehicleEF	SBUS	0.01	0.05
tblVehicleEF	SBUS	0.39	0.04
tblVehicleEF	SBUS	0.86	0.07
tblVehicleEF	SBUS	0.01	8.3036e-003
tblVehicleEF	SBUS	0.07	6.8163e-003
tblVehicleEF	SBUS	8.03	2.88
tblVehicleEF	SBUS	0.81	0.72
tblVehicleEF	SBUS	7.81	0.95
tblVehicleEF	SBUS	1,073.80	343.43
tblVehicleEF	SBUS	1,098.65	1,119.94
tblVehicleEF	SBUS	52.57	5.62
tblVehicleEF	SBUS	9.61	3.32
tblVehicleEF	SBUS	4.57	5.17
tblVehicleEF	SBUS	12.63	0.76
tblVehicleEF	SBUS	0.01	5.7955e-003
tblVehicleEF	SBUS	0.74	0.74
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.03
tblVehicleEF	SBUS	7.2300e-004	5.0385e-005
tblVehicleEF	SBUS	0.01	5.5448e-003
tblVehicleEF	SBUS	0.32	0.32
tblVehicleEF	SBUS	2.6920e-003	2.6700e-003
tblVehicleEF	SBUS	0.02	0.03
tblVehicleEF	SBUS	6.6400e-004	4.6327e-005
tblVehicleEF	SBUS	3.6250e-003	1.0870e-003
tblVehicleEF	SBUS	0.03	9.5228e-003
tblVehicleEF	SBUS	0.95	0.33
tblVehicleEF	SBUS	1.7640e-003	5.3514e-004

tblVehicleEF	SBUS	0.11	0.11
tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.41	0.04
tblVehicleEF	SBUS	0.01	3.2785e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.6100e-004	5.5645e-005
tblVehicleEF	SBUS	3.6250e-003	1.0870e-003
tblVehicleEF	SBUS	0.03	9.5228e-003
tblVehicleEF	SBUS	1.37	0.47
tblVehicleEF	SBUS	1.7640e-003	5.3514e-004
tblVehicleEF	SBUS	0.14	0.13
tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.45	0.04
tblVehicleEF	UBUS	2.51	5.87
tblVehicleEF	UBUS	0.06	0.02
tblVehicleEF	UBUS	11.01	39.42
tblVehicleEF	UBUS	10.46	0.95
tblVehicleEF	UBUS	1,940.83	1,945.19
tblVehicleEF	UBUS	106.77	11.70
tblVehicleEF	UBUS	9.09	1.22
tblVehicleEF	UBUS	14.93	0.12
tblVehicleEF	UBUS	0.59	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.11	3.6015e-003
tblVehicleEF	UBUS	1.1160e-003	5.2582e-005
tblVehicleEF	UBUS	0.25	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.11	3.4412e-003
tblVehicleEF	UBUS	1.0260e-003	4.8347e-005
tblVehicleEF	UBUS	5.1810e-003	9.4034e-004

tblVehicleEF	UBUS	0.08	0.01
tblVehicleEF	UBUS	2.8830e-003	7.3606e-004
tblVehicleEF	UBUS	0.80	0.09
tblVehicleEF	UBUS	0.02	0.08
tblVehicleEF	UBUS	0.79	0.06
tblVehicleEF	UBUS	9.6900e-003	2.3326e-003
tblVehicleEF	UBUS	1.2560e-003	1.1578e-004
tblVehicleEF	UBUS	5.1810e-003	9.4034e-004
tblVehicleEF	UBUS	0.08	0.01
tblVehicleEF	UBUS	2.8830e-003	7.3606e-004
tblVehicleEF	UBUS	3.40	5.99
tblVehicleEF	UBUS	0.02	0.08
tblVehicleEF	UBUS	0.87	0.07
tblVehicleEF	UBUS	2.52	5.87
tblVehicleEF	UBUS	0.05	0.01
tblVehicleEF	UBUS	11.06	39.42
tblVehicleEF	UBUS	9.07	0.83
tblVehicleEF	UBUS	1,940.83	1,945.19
tblVehicleEF	UBUS	106.77	11.50
tblVehicleEF	UBUS	8.56	1.21
tblVehicleEF	UBUS	14.87	0.11
tblVehicleEF	UBUS	0.59	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.11	3.6015e-003
tblVehicleEF	UBUS	1.1160e-003	5.2582e-005
tblVehicleEF	UBUS	0.25	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.11	3.4412e-003
tblVehicleEF	UBUS	1.0260e-003	4.8347e-005
tblVehicleEF	UBUS	7.7250e-003	1.3858e-003

tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	4.3230e-003	1.0574e-003
tblVehicleEF	UBUS	0.81	0.09
tblVehicleEF	UBUS	0.02	0.07
tblVehicleEF	UBUS	0.73	0.06
tblVehicleEF	UBUS	9.6910e-003	2.3326e-003
tblVehicleEF	UBUS	1.2320e-003	1.1379e-004
tblVehicleEF	UBUS	7.7250e-003	1.3858e-003
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	4.3230e-003	1.0574e-003
tblVehicleEF	UBUS	3.42	5.99
tblVehicleEF	UBUS	0.02	0.07
tblVehicleEF	UBUS	0.80	0.07
tblVehicleEF	UBUS	2.51	5.87
tblVehicleEF	UBUS	0.06	0.02
tblVehicleEF	UBUS	11.00	39.42
tblVehicleEF	UBUS	10.67	0.97
tblVehicleEF	UBUS	1,940.83	1,945.19
tblVehicleEF	UBUS	106.77	11.73
tblVehicleEF	UBUS	8.92	1.22
tblVehicleEF	UBUS	14.95	0.12
tblVehicleEF	UBUS	0.59	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.11	3.6015e-003
tblVehicleEF	UBUS	1.1160e-003	5.2582e-005
tblVehicleEF	UBUS	0.25	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.11	3.4412e-003
tblVehicleEF	UBUS	1.0260e-003	4.8347e-005
tblVehicleEF	UBUS	5.7050e-003	9.1790e-004

tblVehicleEF	UBUS	0.10	0.01
tblVehicleEF	UBUS	2.9930e-003	7.0556e-004
tblVehicleEF	UBUS	0.80	0.09
tblVehicleEF	UBUS	0.03	0.09
tblVehicleEF	UBUS	0.80	0.07
tblVehicleEF	UBUS	9.6890e-003	2.3326e-003
tblVehicleEF	UBUS	1.2600e-003	1.1608e-004
tblVehicleEF	UBUS	5.7050e-003	9.1790e-004
tblVehicleEF	UBUS	0.10	0.01
tblVehicleEF	UBUS	2.9930e-003	7.0556e-004
tblVehicleEF	UBUS	3.40	5.99
tblVehicleEF	UBUS	0.03	0.09
tblVehicleEF	UBUS	0.88	0.07
tblVehicleTrips	ST_TR	6.39	4.16
tblVehicleTrips	ST_TR	2.46	7.45
tblVehicleTrips	ST_TR	158.37	76.28
tblVehicleTrips	SU_TR	5.86	4.16
tblVehicleTrips	SU_TR	1.05	7.45
tblVehicleTrips	SU_TR	131.84	76.28
tblVehicleTrips	WD_TR	6.65	4.16
tblVehicleTrips	WD_TR	11.03	7.45
tblVehicleTrips	WD_TR	127.15	76.28
tblWoodstoves	NumberCatalytic	0.60	0.00
tblWoodstoves	NumberNoncatalytic	0.60	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

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					
Area	0.5214	0.0115	0.9957	5.0000e-005		5.4800e-003	5.4800e-003		5.4800e-003	5.4800e-003	0.0000	1.7902	1.7902	1.7500e-003	0.0000	1.8338
Energy	0.0314	0.2840	0.2270	1.7100e-003		0.0217	0.0217		0.0217	0.0217		342.9889	342.9889	6.5700e-003	6.2900e-003	345.0272
Mobile	0.9484	1.5289	6.5665	0.0162	1.4963	0.0222	1.5185	0.3996	0.0209	0.4206		1,672.8484	1,672.8484	0.1240		1,675.9491
Total	**1.5012**	**1.8245**	**7.7892**	**0.0180**	**1.4963**	**0.0494**	**1.5457**	**0.3996**	**0.0481**	**0.4478**	**0.0000**	**2,017.6275**	**2,017.6275**	**0.1324**	**6.2900e-003**	**2,022.8101**

Mitigated Operational

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					
Area	0.5214	0.0115	0.9957	5.0000e-005		5.4800e-003	5.4800e-003		5.4800e-003	5.4800e-003	0.0000	1.7902	1.7902	1.7500e-003	0.0000	1.8338
Energy	0.0314	0.2840	0.2270	1.7100e-003		0.0217	0.0217		0.0217	0.0217		342.9889	342.9889	6.5700e-003	6.2900e-003	345.0272
Mobile	0.9484	1.5289	6.5665	0.0162	1.4963	0.0222	1.5185	0.3996	0.0209	0.4206		1,672.8484	1,672.8484	0.1240		1,675.9491
Total	**1.5012**	**1.8245**	**7.7892**	**0.0180**	**1.4963**	**0.0494**	**1.5457**	**0.3996**	**0.0481**	**0.4478**	**0.0000**	**2,017.6275**	**2,017.6275**	**0.1324**	**6.2900e-003**	**2,022.8101**

	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**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	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	0.9484	1.5289	6.5665	0.0162	1.4963	0.0222	1.5185	0.3996	0.0209	0.4206		1,672.8484	1,672.8484	0.1240		1,675.9491
Unmitigated	0.9484	1.5289	6.5665	0.0162	1.4963	0.0222	1.5185	0.3996	0.0209	0.4206		1,672.8484	1,672.8484	0.1240		1,675.9491

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	49.92	49.92	49.92	170,584	170,584
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	40.68	40.68	40.68	131,039	131,039
High Turnover (Sit Down Restaurant)	296.73	296.73	296.73	404,392	404,392
Parking Lot	0.00	0.00	0.00		
Total	387.33	387.33	387.33	706,015	706,015

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 Mid Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
High Turnover (Sit Down Restaurant)	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
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 Mid Rise	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975
Enclosed Parking with Elevator	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975
General Office Building	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975
High Turnover (Sit Down Restaurant)	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975
Parking Lot	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Kilowatt Hours of Renewable Electricity Generated

	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	0.0314	0.2840	0.2270	1.7100e-003		0.0217	0.0217		0.0217	0.0217		342.9889	342.9889	6.5700e-003	6.2900e-003	345.0272
NaturalGas Unmitigated	0.0314	0.2840	0.2270	1.7100e-003		0.0217	0.0217		0.0217	0.0217		342.9889	342.9889	6.5700e-003	6.2900e-003	345.0272

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 Mid Rise	303.023	3.2700e-003	0.0279	0.0119	1.8000e-004		2.2600e-003	2.2600e-003		2.2600e-003	2.2600e-003		35.6497	35.6497	6.8000e-004	6.5000e-004	35.8616
Enclosed Parking with Elevator	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
General Office Building	155.58	1.6800e-003	0.0153	0.0128	9.0000e-005		1.1600e-003	1.1600e-003		1.1600e-003	1.1600e-003		18.3035	18.3035	3.5000e-004	3.4000e-004	18.4123
High Turnover (Sit Down Restaurant)	2456.8	0.0265	0.2409	0.2023	1.4500e-003		0.0183	0.0183		0.0183	0.0183		289.0357	289.0357	5.5400e-003	5.3000e-003	290.7533
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		**0.0314**	**0.2840**	**0.2270**	**1.7200e-003**		**0.0217**	**0.0217**		**0.0217**	**0.0217**		**342.9889**	**342.9889**	**6.5700e-003**	**6.2900e-003**	**345.0272**

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 Mid Rise	0.303023	3.2700e-003	0.0279	0.0119	1.8000e-004		2.2600e-003	2.2600e-003		2.2600e-003	2.2600e-003		35.6497	35.6497	6.8000e-004	6.5000e-004	35.8616
Enclosed Parking with Elevator	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
General Office Building	0.15558	1.6800e-003	0.0153	0.0128	9.0000e-005		1.1600e-003	1.1600e-003		1.1600e-003	1.1600e-003		18.3035	18.3035	3.5000e-004	3.4000e-004	18.4123
High Turnover (Sit Down Restaurant)	2.4568	0.0265	0.2409	0.2023	1.4500e-003		0.0183	0.0183		0.0183	0.0183		289.0357	289.0357	5.5400e-003	5.3000e-003	290.7533
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		**0.0314**	**0.2840**	**0.2270**	**1.7200e-003**		**0.0217**	**0.0217**		**0.0217**	**0.0217**		**342.9889**	**342.9889**	**6.5700e-003**	**6.2900e-003**	**345.0272**

6.0 Area Detail

6.1 Mitigation Measures Area

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	0.5214	0.0115	0.9957	5.0000e-005		5.4800e-003	5.4800e-003		5.4800e-003	5.4800e-003	0.0000	1.7902	1.7902	1.7500e-003	0.0000	1.8338
Unmitigated	0.5214	0.0115	0.9957	5.0000e-005		5.4800e-003	5.4800e-003		5.4800e-003	5.4800e-003	0.0000	1.7902	1.7902	1.7500e-003	0.0000	1.8338

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	0.0466					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4443					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	0.0304	0.0115	0.9957	5.0000e-005		5.4800e-003	5.4800e-003		5.4800e-003	5.4800e-003		1.7902	1.7902	1.7500e-003		1.8338
Total	**0.5214**	**0.0115**	**0.9957**	**5.0000e-005**		**5.4800e-003**	**5.4800e-003**		**5.4800e-003**	**5.4800e-003**	**0.0000**	**1.7902**	**1.7902**	**1.7500e-003**	**0.0000**	**1.8338**

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	0.0466					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4443					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	0.0304	0.0115	0.9957	5.0000e-005		5.4800e-003	5.4800e-003		5.4800e-003	5.4800e-003		1.7902	1.7902	1.7500e-003		1.8338
Total	**0.5214**	**0.0115**	**0.9957**	**5.0000e-005**		**5.4800e-003**	**5.4800e-003**		**5.4800e-003**	**5.4800e-003**	**0.0000**	**1.7902**	**1.7902**	**1.7500e-003**	**0.0000**	**1.8338**

7.0 Water Detail

7.1 Mitigation Measures Water

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

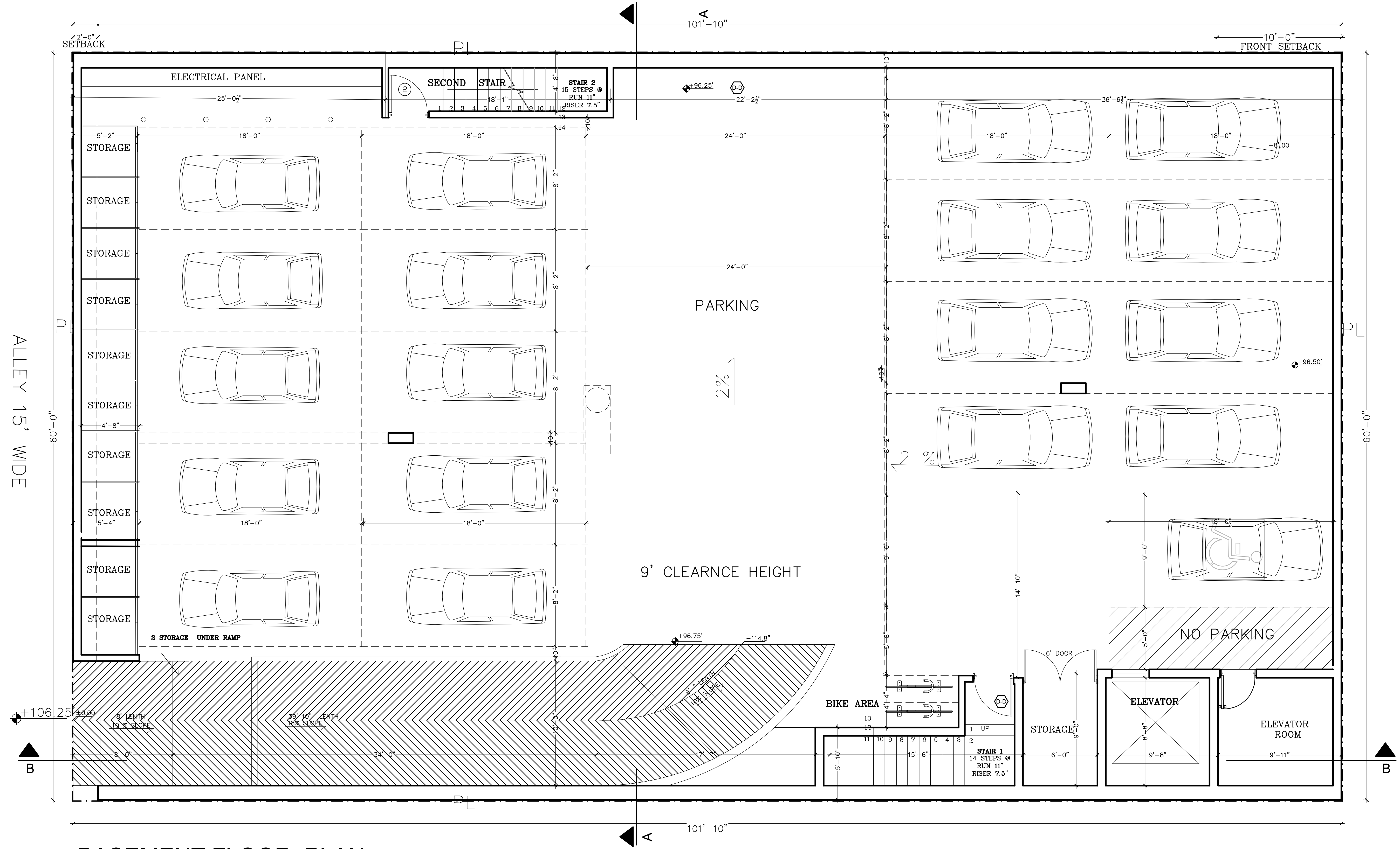
User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Exhibit D
Project Architectural Plans

ESA



BASEMENT FLOOR PLAN

SCALE: 1/8"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232

NORTH

ALT 2
20% RAMP SLOPE

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

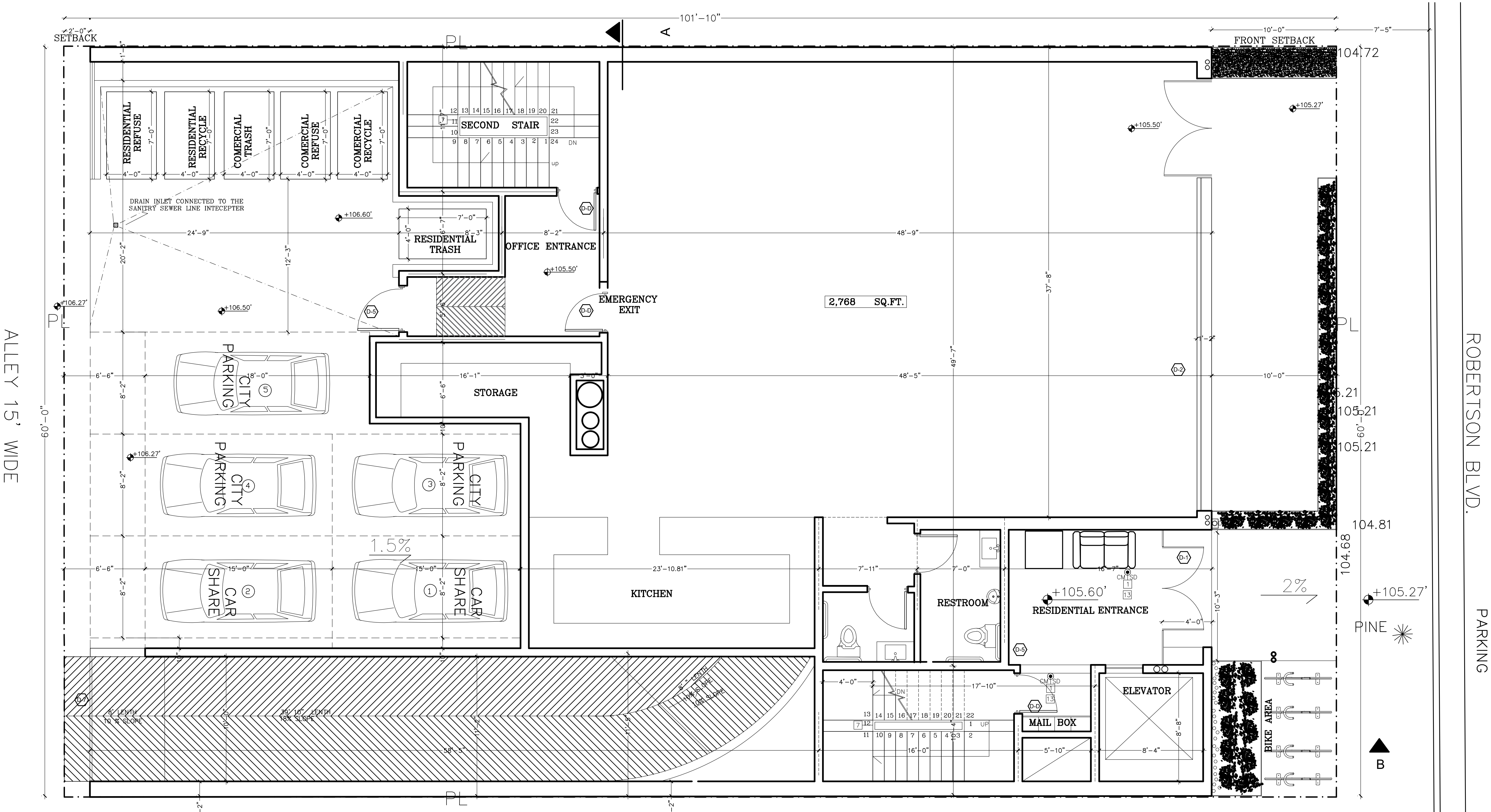
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: BASEMENT FLOOR

SHEET NUMBER: A 2

08/08/2019



FIRST FLOOR PLAN

SCALE BAR1/8 FT SCALE: 1/8"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232

NORTH

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

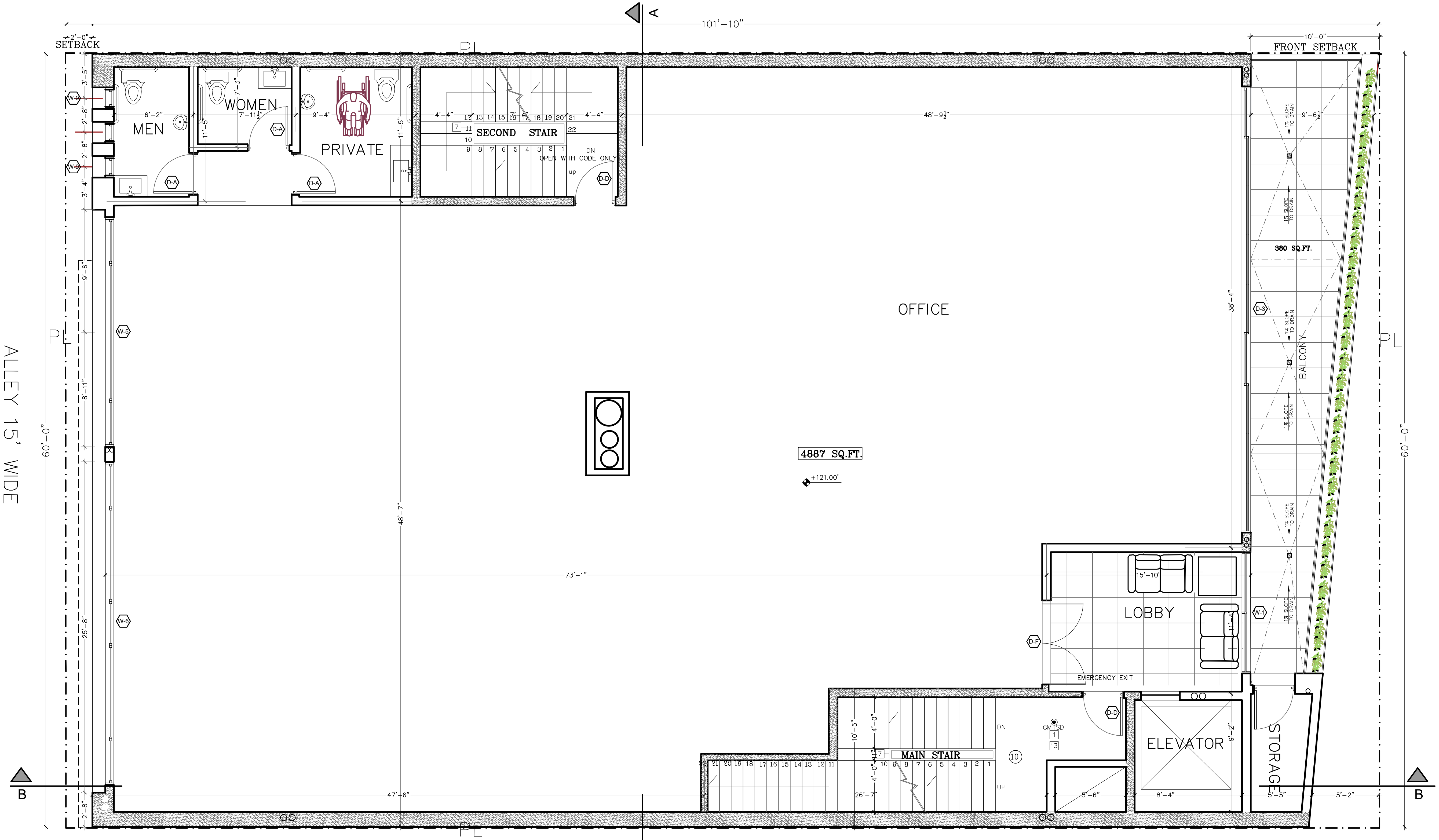
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: FIRST FLOOR

SHEET NUMBER: A3

08/13/2019



SECOND FLOOR PLAN

SCALE BAR1/8

SCALE: 1/8"=1'-0"

4887 SQ.FT.

3727 ROBERTSON
CULVER CITY CA 90232

NORTH

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

PLAN KEY NOTES:

DENOTES ONE-HR FIRE PROTECTION WALL AND CEILLING (5/8" TYPE "X" GYP. BOARD ON THE SIDE OF GARAGE OR UNDER THE STAIR)

RECESSED HALOGEN DOWNLIGHT

DOOR MUST OPEN OVER A LANDING NOT MORE THAN 1.5" BELOW THE THRESHOLD. EXCEPTION : THE DOOR DOES NOT SWING OVER THE LANDING SHALL BE NOT THAN MORE 7.75" BELOW THE THRESHOLD.

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1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

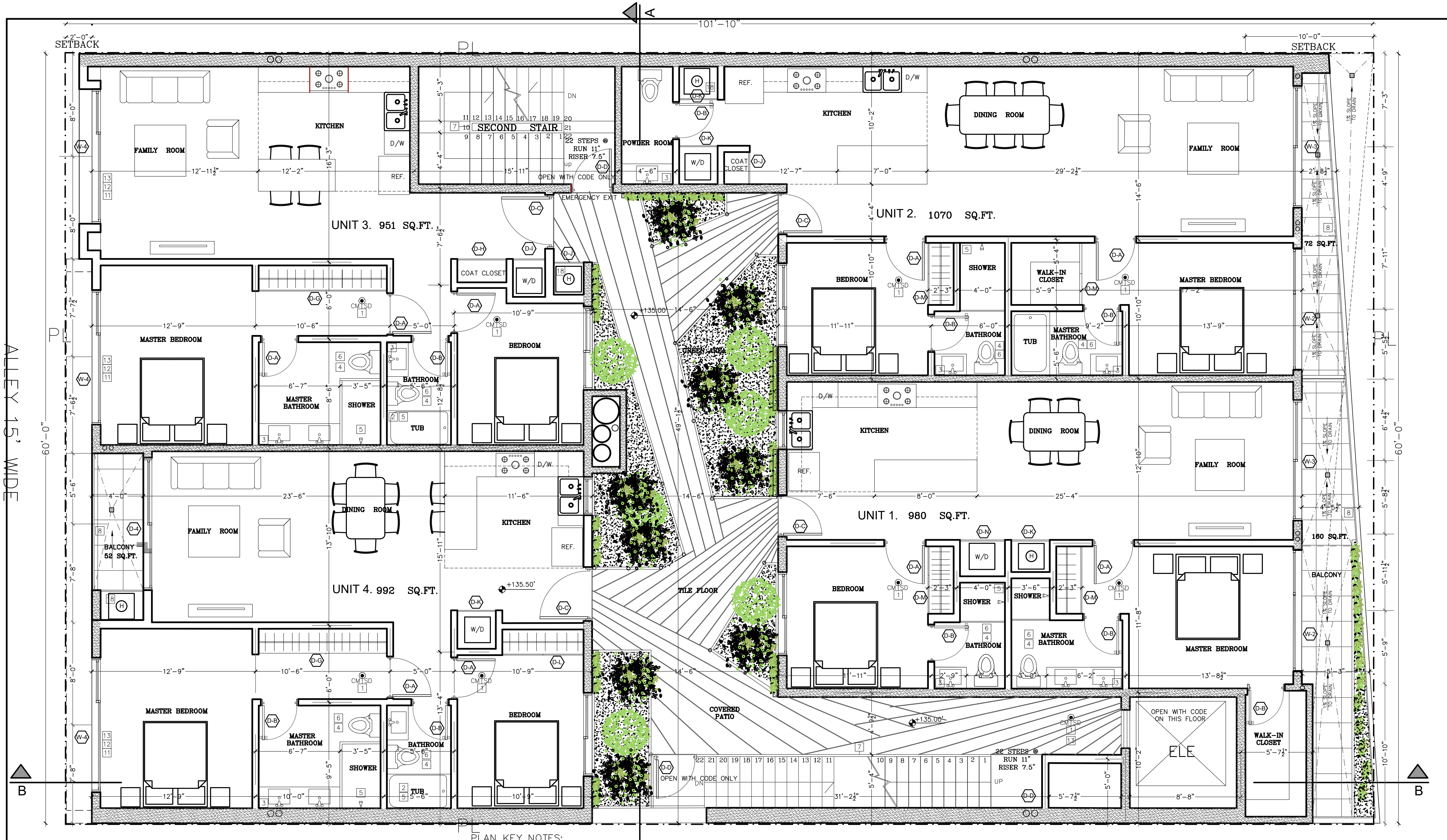
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: SECOND FLOOR

SHEET NUMBER: A 4

08/13/2019



PLAN KEY NOTES:

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WALL OUTLET W/SENSOR

1 HARDWIRED SMOKE DETECTORS WITH BATTERY BACKUP

2 14"X14" ACCESS PANEL FOR ALL BATH TUBS

3 MEDICINE CABINET

4 PROVIDE EXHAUST FAN WITH MINIMUM 5 AIR EXCHANGES PER HOUR AND AS PER GREEN BUILDING REQUIREMENT REFER TO NOTE #25/H&I DWG. G-B FOR BATHROOMS CONTAINING BATHTUBS,SHOWER ,OR TUB/SHOWER COMBINATIONS . IT SHALL BE ENERGY STAR

5 PROVIDE 70 INCH HIGH NON-ABSORBENT WALL ADJACENT TO SHOWER AND APPROVED-RESISTANT MATERIALS FOR SHOWER ENCLOSURE. 91.807.1.3, 91.2406.4(5), 91.1115B.9.6,7,8

6 PROVIDE ULTRA FLUSH WATER CLOSETS FOR ALL NEW CONSTRUCTION. EXISTING SHOWER HEADS AND TOILETS MUST BE ADAPTED FOR LOW WATER CONSUMPTION.

8 HANDRAIL @ 36" ABOVE TREAD NOSING WITH LESS THAN 4" CLEAR SPACING BETWEEN INTERMEDIATE RAILS GUARDRAIL @ 42" HIGH ABOVE THE ADJACENT FINISH FLOOR WITH LESS THAN 4" CLEAR SPACING BETWEEN INTERMEDIATE RAILS

9 DEX-OTEX DECK COATING LARR # 02306

10 ONE-HR FIRE RESISTIVE WALL, CEILING, POSTS AND BEAM ON THE SIDE OF GARAGE OR ENCLOSED USEABLE SPACE UNDER INTERIOR STAIRS (5/8" TYPE "X" GYPSUM BOARD)

11 EMERGENCY EGRESS TYPICAL TO ALL SLEEPING ROOMS MIN.24" CLEAR HT, 20" CLEAR WIDTH , 5.7 SQ.FT. MIN AREA (5.0 SQ. FT. AT GRADE) &42"MIN. -44" MAX. TO SILL

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13 DOOR MUST OPEN OVER A LANDING NOT MORE THAN 0.5" BELOW THE THRESHOLD. EXCEPTION : THE DOOR DOES NOT SWING OVER THE LANDING SHALL BE NOT THAN MORE 7.75" BELOW THE THRESHOLD.

14 CARBON MONOXIDE DETECTORS

15 GAS FIREPLACE - HEAT & GLO, SL-550TR-IPI-E, DIRECT VENT W/SEAL COMBUSTION GAS FIREPLACE REFER TO SPEC #5 DWG A-10b "WOOD BURNING FIREPLACES ARE PROHIBITED PER AQMD RULE 445 (4.503.1, AQMD RULE 445) FOR MORE DETAIL CHECK A-13

FOR FUTURE INSTALLATION OF ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) IN ONE AND TWO FAMILY DWELLINGS AND TOWNHOUSES:

a. MIN. 1" (INSIDE DIAMETER) LISTED RACEWAY IS INSTALLED TO ACCOMMODATE A DEDICATED 208/240 VOLT BRANCH CIRCUIT. THE RACEWAY SHALL ORIGINATE AT THE MAIN SERVICE OR A SUBPANEL AND TERMINATE IN CLOSE PROXIMITY TO THE PROPOSED LOCATION OF THE CHARGING SYSTEM INTO A LISTED CABINET, BOX OR ENCLOSURE.
b. SUFFICIENT CONDUCTOR SIZING AND SERVICE CAPACITY TO INSTALL LEVEL 2 EVSE SHALL BE PROVIDED.
c. A LABEL STATING 'EV CAPABLE' SHALL BE POSTED IN A CONSPICUOUS PLACE AT THE SERVICE PANEL OR SUBPANEL AND NEXT TO THE RACEWAY TERMINATION POINT.

17 AUTOMATIC IRRIGATION SYSTEM CONTROLLER . MANUFACTURER'S SPECIFICATIONS. (RD-900-EXT- RAIN DIAL SERVICES 9 STATIONS CONTROLLER).

18 WATER HEATER MUST BE STRAPPED TO THE WALL

19 DOORS BETWEEN GARAGE AND THE DWELLING UNIT SHALL BE SELF-CLOSING AND SELF-LATCHING, SOLID WOOD OR SOLID OR HONEYCOMB CORE STEEL NOT LESS THAN 1⅜ INCHES THICK, OR HAVE A MINIMUM FIRE PROTECTION RATING OF 20 MINUTES (406.1.4)

20 TYPE OF CONSTRUCTIONS 1-B

21 ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH TAPE,PLASTIC,OR SHEET METAL UNTIL THE FINAL STARTUP OF THE HEATING,COOLING AND VENTILATING EQUIPMENT.

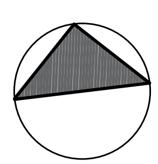
THIRD FLOOR PLAN

SCALE BAR1/8 FT

SCALE: 1/8"=1'-0"

4307 SQ.FT.

3727 ROBERTSON
CULVER CITY CA 90232



NORTH

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

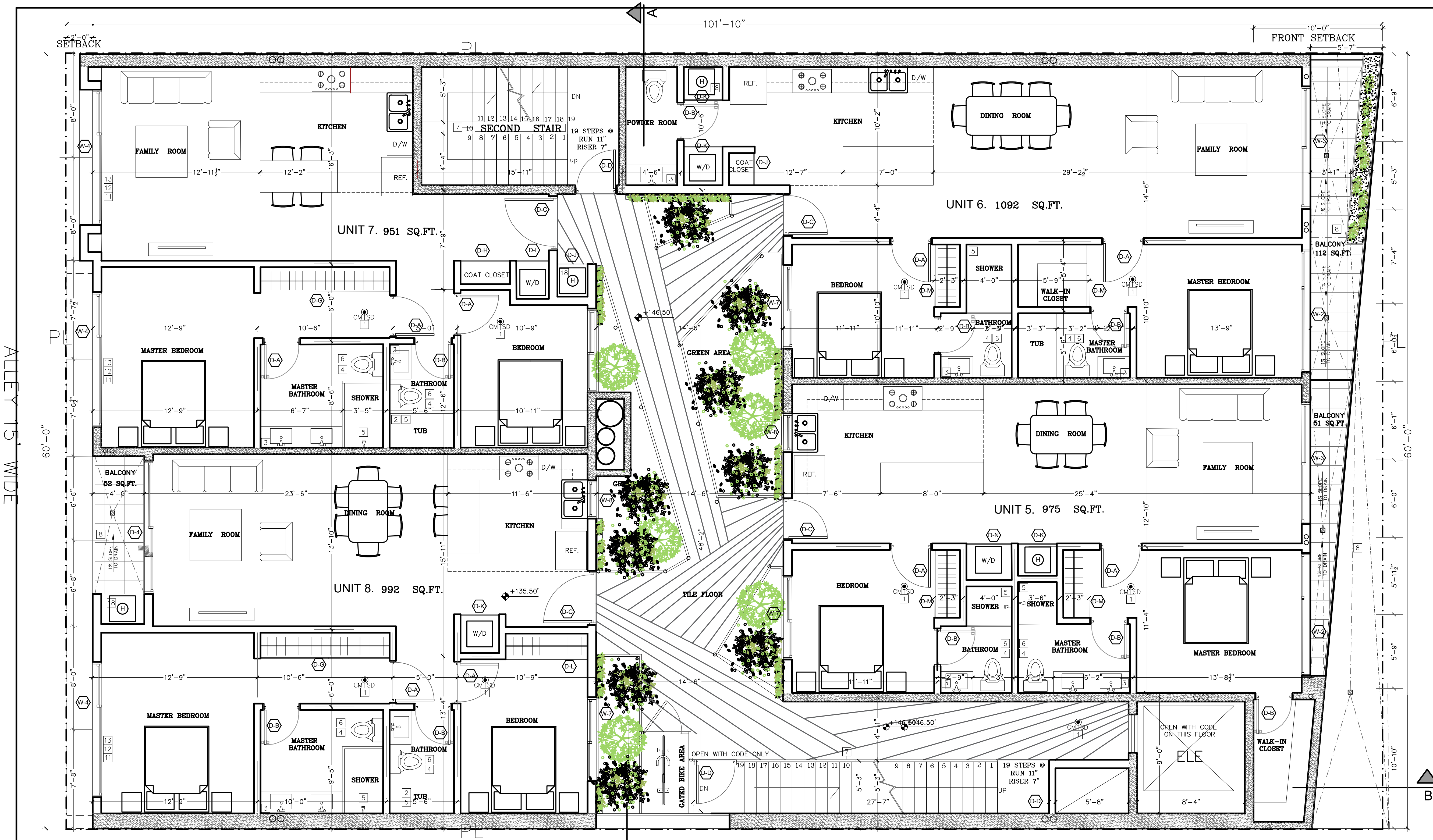
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: THIRD FLOOR

SHEET NUMBER: A 5

~~08/13/2019~~



PLAN KEY NOTES:

DENOTES ONE-HR FIRE PROTECTION WALL AND CEILLING (5/8" TYPE "X" GYP. BOARD ON THE SIDE OF GARAGE OR UNDER THE STAIR)

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8. HANDRAIL @ 36" ABOVE TREAD NOSING WITH LESS THAN 4" CLEAR SPACING BETWEEN INTERMEDIATE RAILS GUARDRAIL @ 42" HIGH ABOVE THE ADJACENT FINISH FLOOR WITH LESS THAN 4" CLEAR SPACING BETWEEN INTERMEDIATE RAILS
9. DEX-OTEX DECK COATING LARR # 02306
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20. TYPE OF CONSTRUCTIONS 1-B
21. ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH TAPE,PLASTIC,OR SHEET METAL UNTIL THE FINAL STARTUP OF THE HEATING,COOLING AND VENTILATING EQUIPMENT.

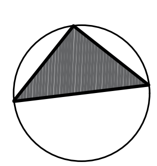
FORTH FLOOR PLAN

SCALE BAR1/8 FT

SCALE: 1/4"=1'-0"

4307 SQ.FT.

3727 ROBERTSON
CULVER CITY CA 90232



LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS :
3727 ROBERTSON ST.
CULVER CITY
CA 90232

PROJECT TITLE:
3727 ROBERTSON

DATE:
04/27/2016

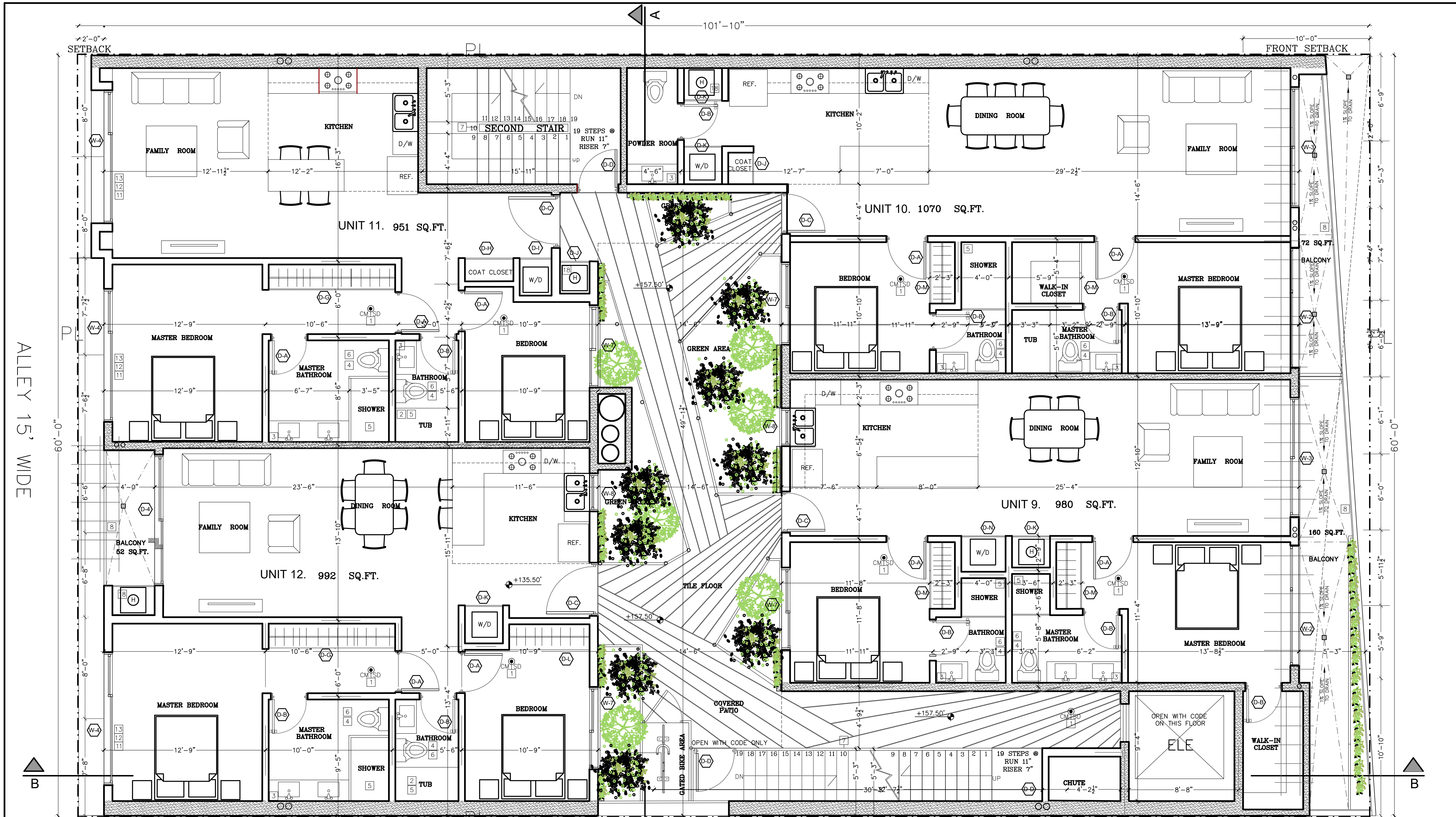
JOB NUMBER:

DRAWING PHASE:
P/CSUBMITTAL

SHEET TITLE:
FORTH FLOOR

SHEET NUMBER:
A
6

08/13/2019



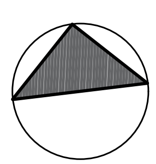
FIFTH FLOOR PLAN

SCALE BAR1/8

SCALE: 1/4"=1'-0"

4307 SQ.FT.

3727 ROBERTSON
CULVER CITY CA 90232



LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

PLAN KEY NOTES:

DENOTES ONE-HR FIRE PROTECTION WALL AND CEILLING (5/8" TYPE "X" GYP. BOARD ON THE SIDE OF GARAGE OR UNDER THE STAIR)

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architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS
7

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

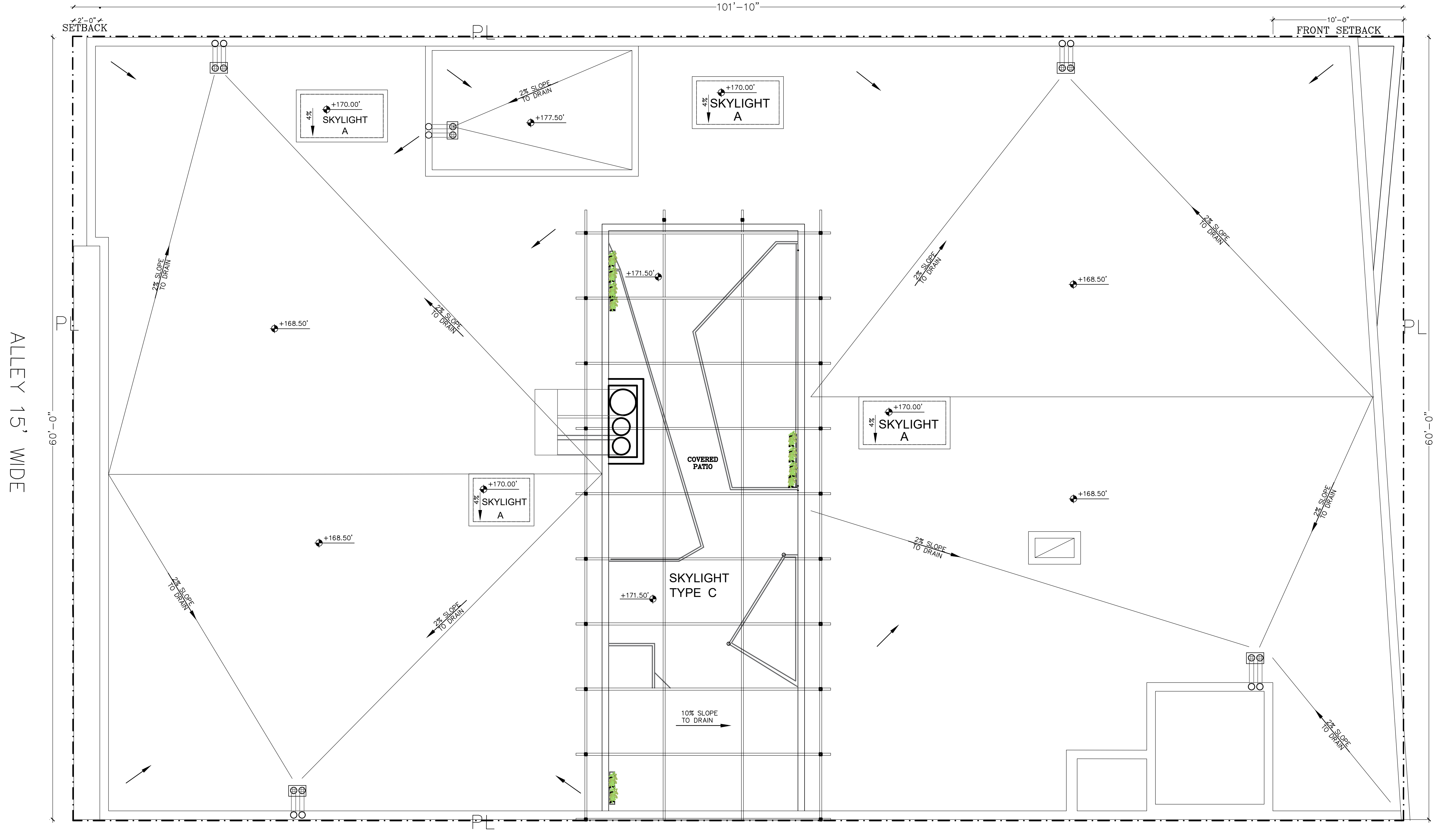
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: FIFTH FLOOR

SHEET NUMBER: A 7

08/13/2019



ROOF FLOOR PLAN

SCALE: 1/4"=1'-0"

SCALE BAR1/8

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

GENERAL NOTES:

A. THE CONSTRUCTION SHALL NOT RESTRICT A FIVE-FOOT CLEAR AND UNOBSTRUCTED ACCESS TO ANY WATER OR POWER DISTRIBUTION FACILITIES (POWER POLES, PULL-BOXES, TRANSFORMERS, VAULTS, PUMPS, VALVES, METERS, APPURTENANCES, ETC.) OR TO THE LOCATION OF THE HOOK-UP. THE CONSTRUCTION SHALL NOT BE WITHIN TEN FEET OF ANY POWER LINES-WHETHER OR NOT THE LINES ARE LOCATED ON THE PROPERTY. FAILURE TO COMPLY MAY CAUSE CONSTRUCTION DELAYS AND/OR ADDITIONAL EXPENSES.

B. AN APPROVED SEISMIC GAS SHUTOFF VALVE WILL BE INSTALLED ON THE FUEL GAS LINE ON THE DOWN STREAM SIDE OF THE UTILITY METER AND BE RIGIDLY CONNECTED TO THE EXTERIOR OF THE BUILDING OR STRUCTURE CONTAINING THE FUEL GAS PIPING."(PER ORDINANCE 170,158) (INCLUDES COMMERCIAL ADDITIONS AND TI WORK OVER $10,000.) SEPARATE PLUMBING PERMIT IS REQUIRED.

C. PLUMBING FIXTURES ARE REQUIRED TO BE CONNECTED TO A SANITARY SEWER OR TO AN APPROVED SEWAGE DISPOSAL SYSTEM (R306.3).

D. PROVIDE 70 INCH HIGH NON-ABSORBENT WALL ADJACENT TO SHOWER AND APPROVED SHATTER-RESISTANT MATERIALS FOR SHOWER ENCLOSURE."(1115B.2 AND 2406.3(5)

E. KITCHEN SINKS, LAVATORIES, BATHTUBS, SHOWERS,BIDETS, LANDRY TUBS AND WASHING MACHINE OUT LETS SHALL BE PROVIED WITH HOT AND COLD WATER AND CONNECTED TO AN APPROVED WATER SUPPLY (R306.4) .

F. WATER HEATER MUST BE STRAPPED TO WALL (SEC. 507.3, UPC)

G. BATHTUB AND SHOWER FLOOR, WALL ABOVE BATHTUBS WITH A SHOWERHEAD, AND SHOWER COMPARTMENT SHALL BE FINISHED WITH A NONABSORBENT SURFACE . SUCH WALL SURFACES SHALL EXTEND TO A HEIGHT OF NOT LESS THAN 6 FEET ABOVE THE FLOOR (R307.2)

H. DUCTS PENETRATING THE WALL OR CEILINGS SEPARATING THE DWELLING FROM THE GARAGE SHALL BE CONSTRUCTED OF A MINIMUM NO. 26 GAGE SHEET STEEL OR OTHER APPROVED MATERIAL AND THERE SHALL BE NO OPENINGS FROM THE DUCTS INTO THE GARAGE (R302.5.2).

I . OTHER PENETRATIONS OF GARAGE/DWELLING AND WALLS ARE TO BE PROTECTED AS REQUIRED BY SECTION R302.11,ITEM 4 9r309.1).

J. GARAGE FLOOR SURFACES SHALL BE OF AN APPROVED NONCOMBUSTIBLE MATERIAL, AND THE AREA USED TO PARK VEHICLES SHALL BE SLOPED TO A DRAIN OR TOWARD THE MAIN VEHICLE ENTRY (R309.1) .

K. AUTOMATIC GARAGE DOOR OPENERS, IF PROVIDED, SHALL BE LISTED IN ACCORDANCE WITH UL 325 .

L. VEHICULAR ACCESS DOORS SHALL COMPLY WITH SECTION R612.7 .

M. BUILDINGS SHALL HAVE APPROVED ADDRESS NUMBERS, BUILDING NUMBERS OR APPROVED BUILDING IDENTIFICATION PLACED IN APOSITION THAT IS PLAINLY LEGIBLE AND VISIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY . (R319) .

N. PROTECTION OF WOOD AND WOOD BASED PRODUCTS FROM DECAY SHALL BE PROVIDED IN THE LOCATIONS SPECIFIED PER SECTION R317 BY THE USE OF NATURALLY DURABLE WOOD OR WOOD THAT IS PRESERVATIVE-TREATED IN ACCORDANCE WITH AWPA UI FOR THE SPECIES, PRODUCT, PRESERVATIVE AND END USE . PRESERVATIVES SHALL BE LISTED IN SECTION 4 OF AWPA U1 .

O. I. A COPY OF THE EVALUATION REPORT AND/OR CONDITIONS OF LISTING SHALL BE MADE AVAILABLE AT THE JOB SITE

P. ANTI GRAFFITI FINISH MAINTENANCE OF BUILDING AFFIDAVIT IS RECORDED BY THE OWNER TO COVENANT AND AGREE W/THE CITY OF L.A. TO REMOVE ANY GRAFFITI W/IN 7-DAYS OF GRAFFITI BEING APPLIED (SEE SHEET A8-b) .

r. ALL WINDOWS TO BE TEMPERED GLAZING WHEN LOCATED IN VHFHSZ.

s. PROVIDE ULTRA-LOW FLUSH WATER CLOSETS FOR ALL NEW CONSTRUCTION, EXISTING SHOWER HEADS AND TOILETS MUST BE ADAPTED FOR LOW WATER CONSUMPTION .

t. A COPY OF THE EVALUTION REPORT AND/OR CONDITION OF LISITING SHALL BE MADE AVAILABLE AT THE JOB SITE .

SKYLIGHT TYPE A

SKYLIGHT TYPE B

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

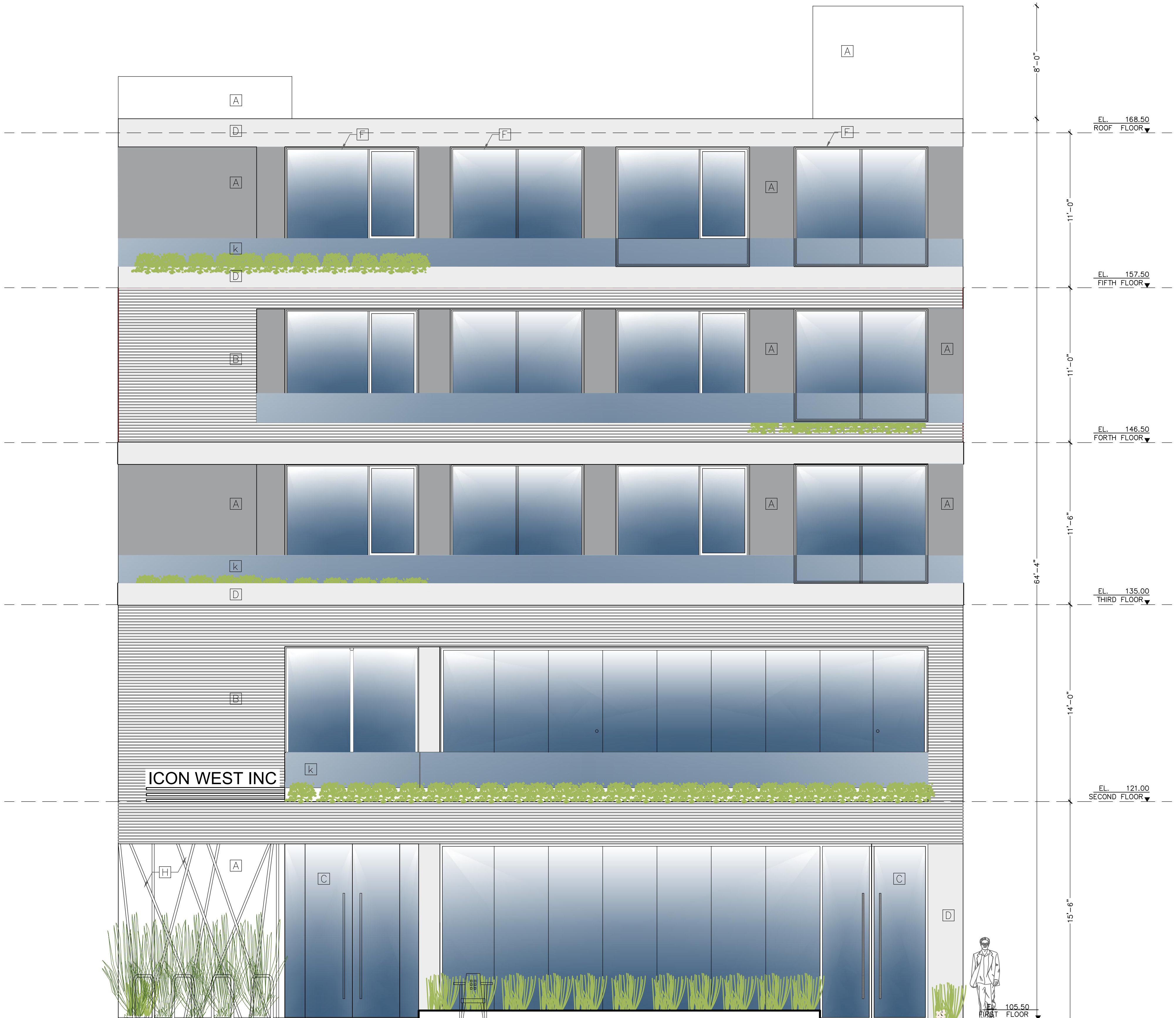
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: ROOF FLOOR

SHEET NUMBER: A 8

08/13/2019



WEST ELEVATION

SCALE: 1/4"=1'-0"

SCALE BAR1/8 FT

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

ELEVATION KEY NOTES:

- A — STUCCO FINISH FIREPLACE
- B — CORRUGATED METAL
- C — GLASS DOOR
- D — ALUMINUM COMPOSITE TILE
- F — ANODIZED ALUMINUM WINDOW
- G — PLEXIGLASS ROOF PANELS
- H — STAINLESS STEEL PIPE
- L — EMERGENCY EGRESS TYPICAL TO ALL SLEEPING ROOMS MIN.24" CLEAR HT, 20" CLEAR WIDTH , 5.7 SQ.FT. MIN AREA (5.0 SQ. FT. AT GRADE) &42"MIN. -44" MAX. TO SILL
- I — METAL RAILING
- K — GLASS GUARDRAIL

PROVIDE ANTI-GRAFFITI FINISH within THE FIRST 9', MEASURED FROM GRADE, AT EXTERIOR WALLS and DOORS PER SECTION 6306

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1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS :
3727 ROBERTSON ST.
CULVER CITY
CA 90232

PROJECT TITLE:
3727 ROBERTSON

DATE:
04/27/2016

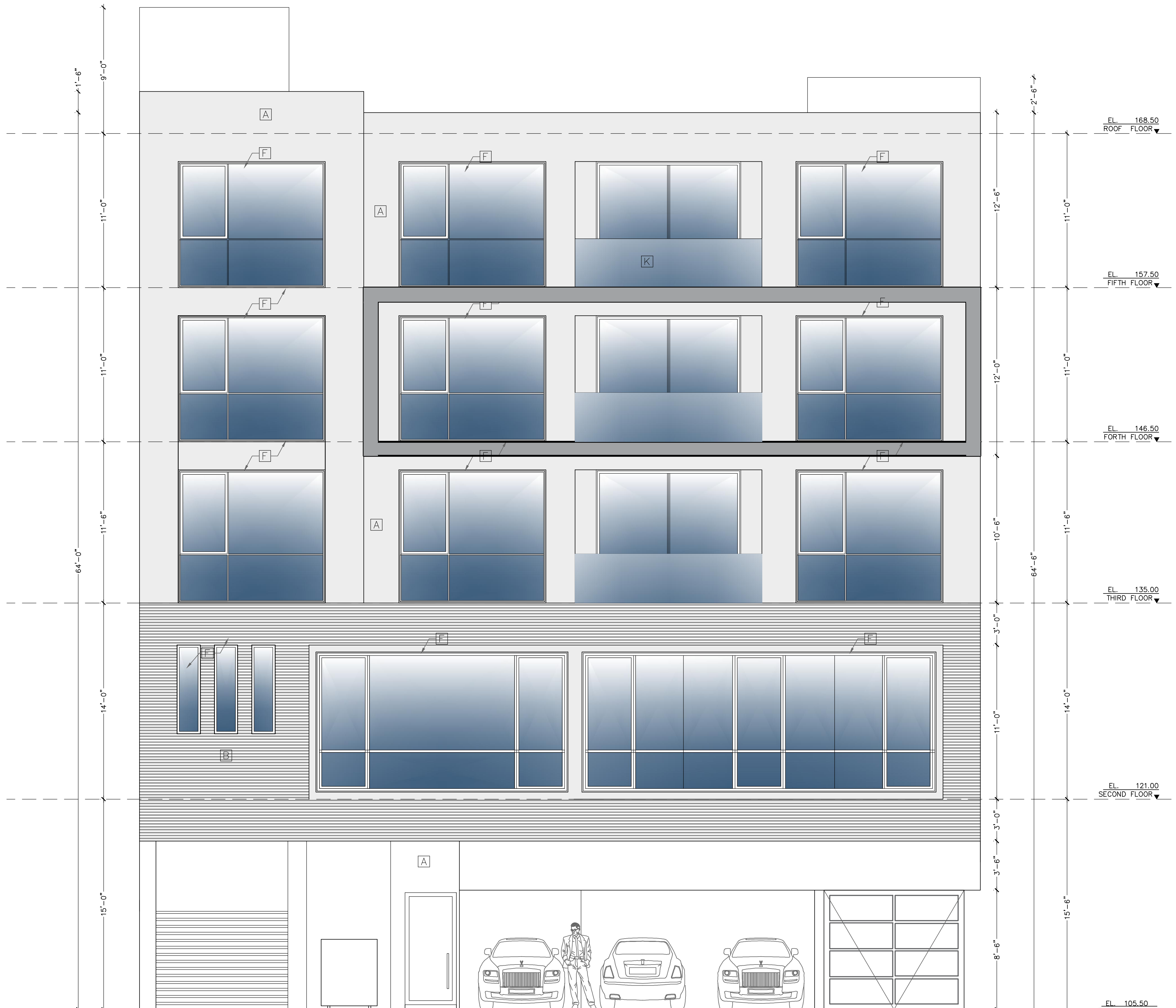
JOB NUMBER:

DRAWING PHASE:
P/CSUBMITTAL

SHEET TITLE:
EAST ELEVATION

SHEET NUMBER:
A
9

08/13/2019



WEST ELEVATION

SCALE BAR1/8 FT SCALE: 1/4"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

ELEVATION KEY NOTES:

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- I — METAL RAILING
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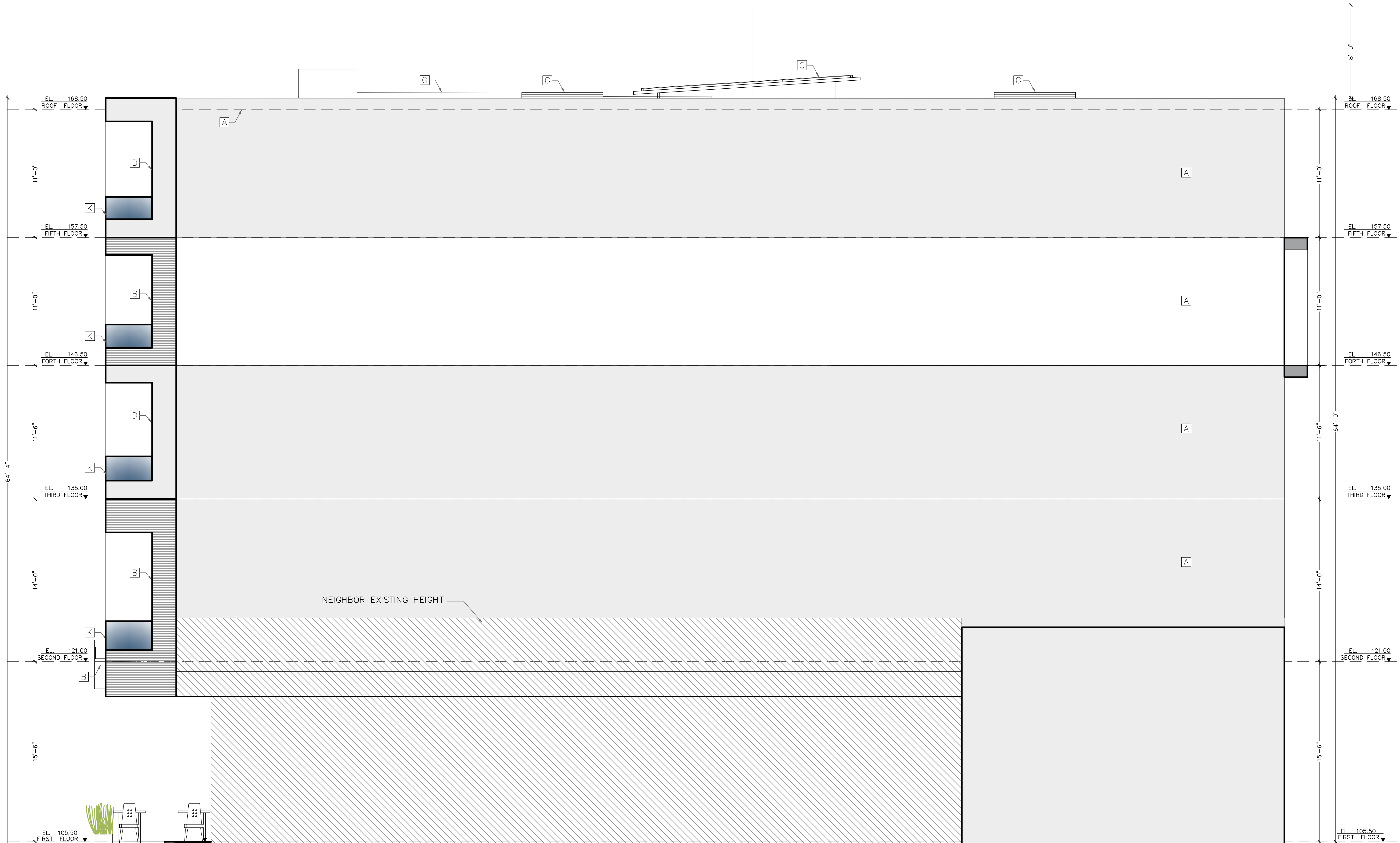
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: EAST ELEVATION

SHEET NUMBER: A 10

08/13/2019



NORTH ELEVATION

SCALE: 1/4"=1'-0"

SCALE BAR1/8

FT

**3727 ROBERTSON
CULVER CITY CA 90232**

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

ELEVATION KEY NOTES:

- A — STUCCO FINISH FIREPLACE
- B — CORRUGATED METAL
- C — GLASS DOOR
- D — ALUMINUM COMPOSITE TILE
- F — ANODIZED ALUMINUM WINDOW
- G — PLEXIGLASS ROOF PANELS
- H — STAINLESS STEEL PIPE
- L — EMERGENCY EGRESS TYPICAL TO ALL SLEEPING ROOMS MIN.24" CLEAR HT, 20" CLEAR WIDTH , 5.7 SQ.FT. MIN AREA (5.0 SQ. FT. AT GRADE) &42"MIN. -44" MAX. TO SILL
- I — METAL RAILING
- K — GLASS GUARDRAIL

PROVIDE ANTI-GRAFFITI FINISH within THE FIRST 9', MEASURED FROM GRADE, AT EXTERIOR WALLS and DOORS PER SECTION 6306

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CLIENT:

DATE: 04/27/2016

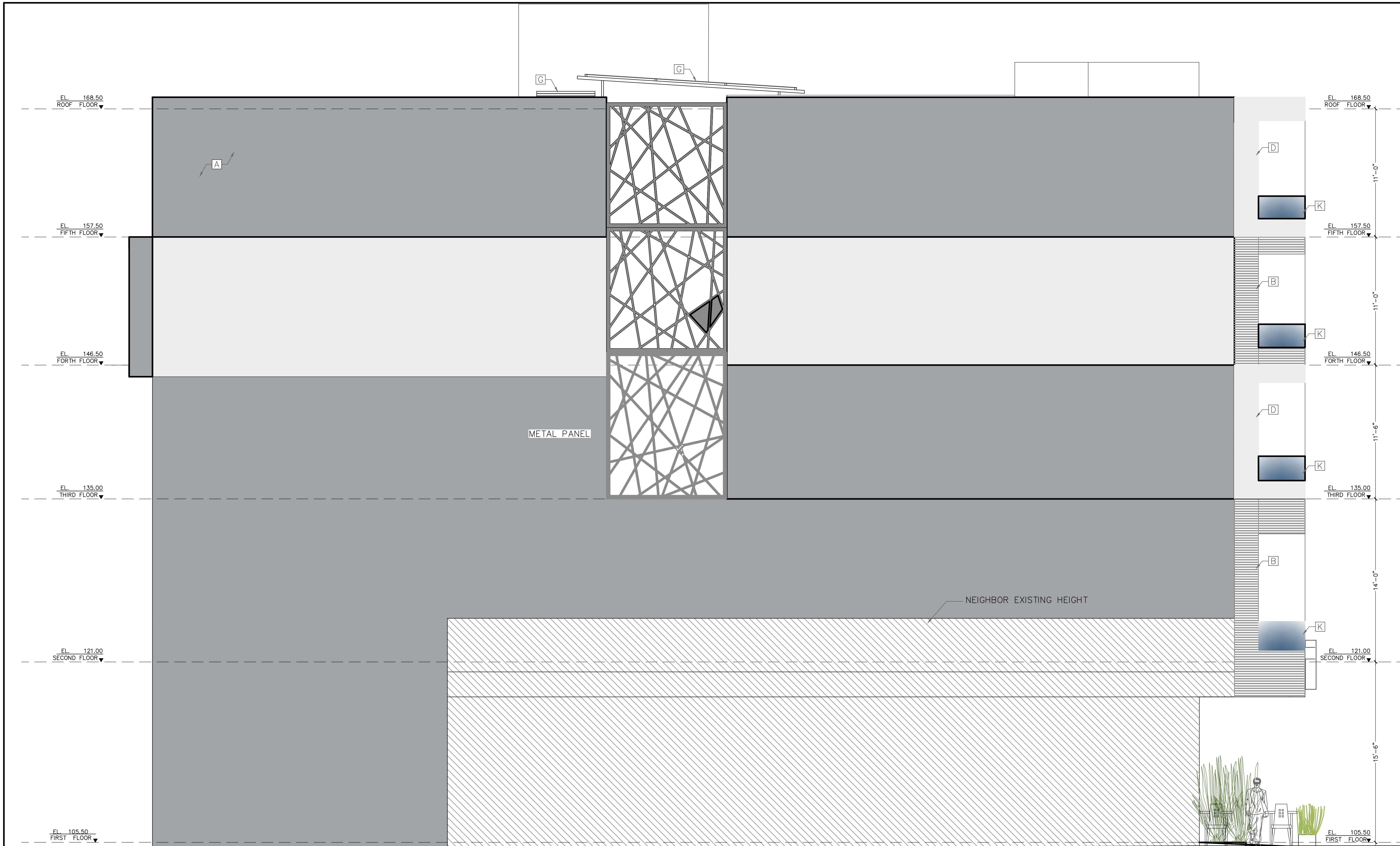
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: WEST ELEVATION

SHEET NUMBER: A 11

08/13/2019



SOUTH ELEVATION

SCALE BAR1/8 FT

SCALE: 1/4"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

ELEVATION KEY NOTES:

- A — STUCCO FINISH FIREPLACE
- B — CORRUGATED METAL
- C — GLASS DOOR
- D — ALUMINUM COMPOSITE TILE
- F — ANODIZED ALUMINUM WINDOW
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- I — METAL RAILING
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PROVIDE ANTI-GRAFFITI FINISH within THE FIRST 9', MEASURED FROM GRADE, AT EXTERIOR WALLS and DOORS PER SECTION 6306

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DATE:
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JOB NUMBER:

DRAWING PHASE:
P/CSUBMITTAL

SHEET TITLE:
WEST ELEVATION

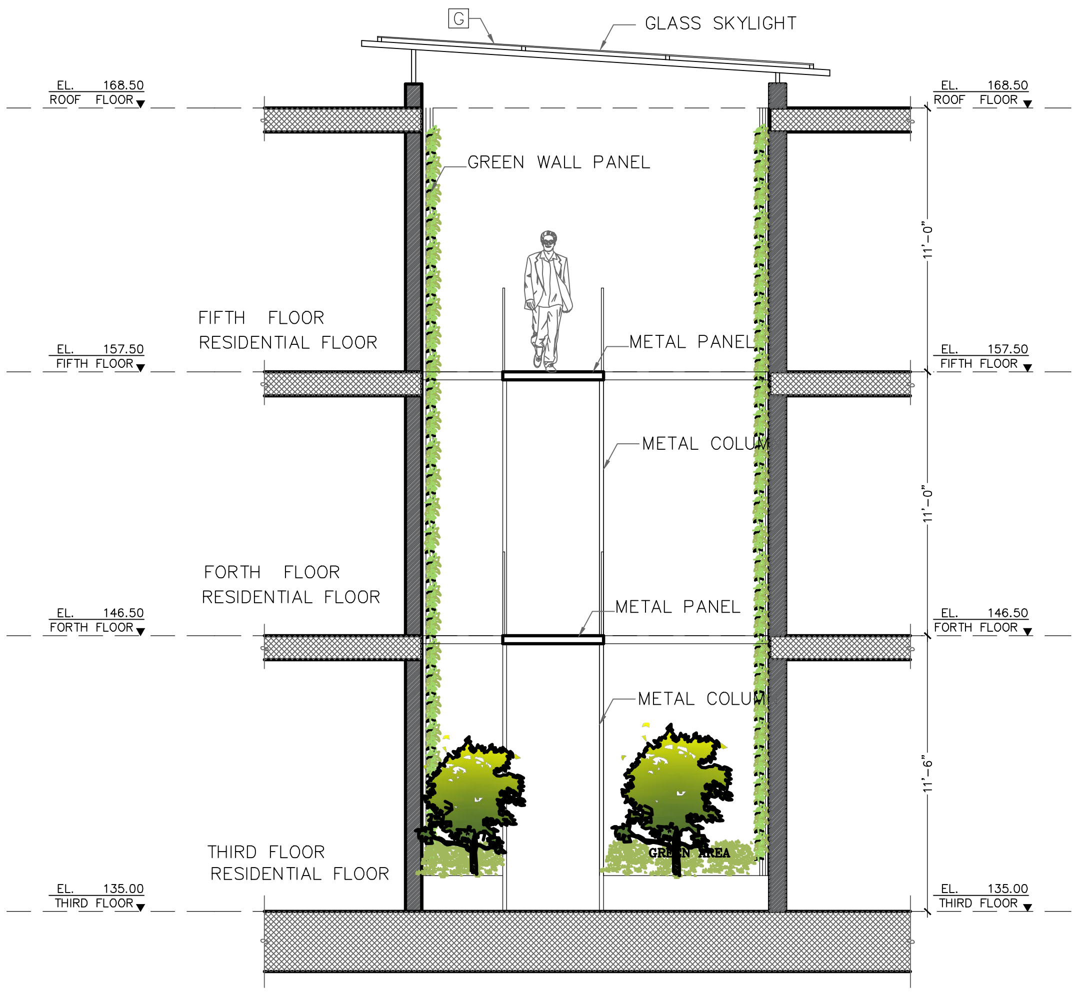
SHEET NUMBER:
A
12

08/13/2019

SECTION A - A

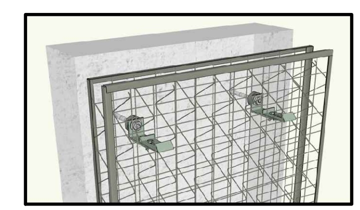
SCALE: 1/4"=1'-0"

SCALE BAR1/8



COURT YARD SECTION

SCALE: 1/4"=1'-0"



GREEN WALL PANEL

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PROJECT TITLE:
3727 ROBERTSON

DATE:
04/27/2016

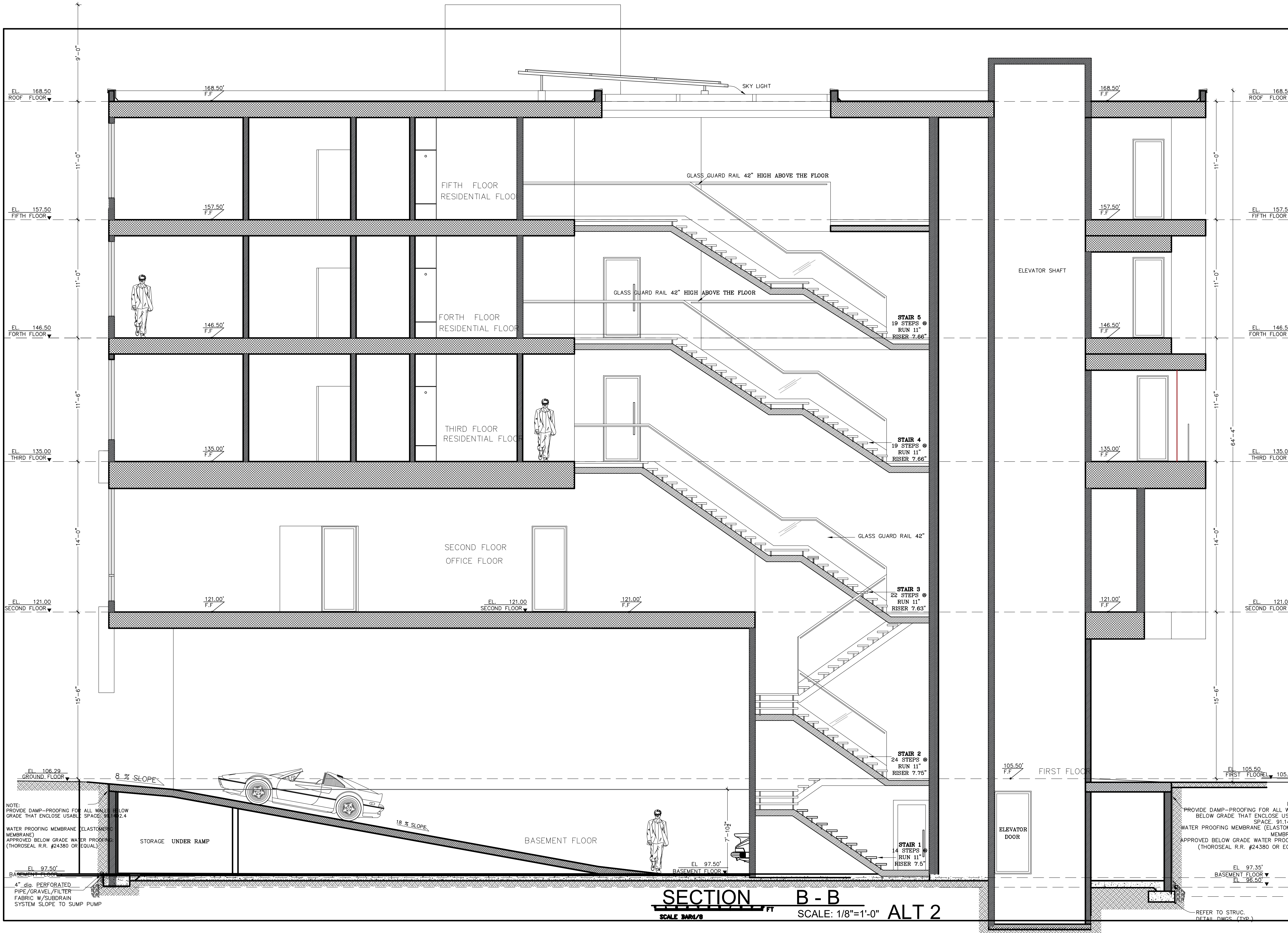
JOB NUMBER:

DRAWING PHASE:
P/CSUBMITTAL

SHEET TITLE:
SECTION A-A

SHEET NUMBER:
A
13

08/13/2019



SECTION B - B
SCALE: 1/8"=1'-0" ALT 2

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PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: SECTION B-B

SHEET NUMBER: A 14

08/08/2019

EXTERIOR DOOR & WINDOW OPENING SCHEDULE & TYPES

MEASUREMENTS OF DOORS / WINDOWS ARE CLEAR LEAF SIZE

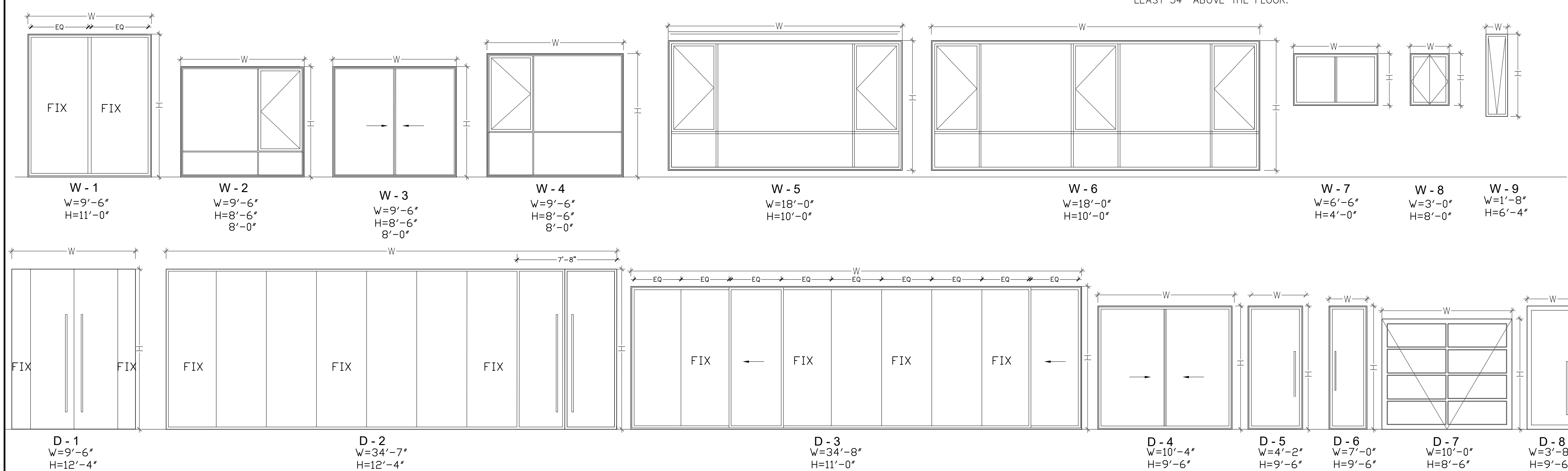
TYPE	FINISH DOOR LEAF SIZE W	H	SILL H	NUMBER	DOOR& WINDOW MATERIAL	COLOR	FRAME	COLOR	FINISH	MANUFACTURE	REMARKS	GLASSES
W - 1	8'-0"	8'-0"	1'-6"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 2	36'-5"	11'-6"	1'-0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 3	18'-0"	10'-6"	1'-0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 4	25'-3"	10'-6"	2'-0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 5	6'-6"	4'-0"	6'-0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 6	3'-0"	4'-0"	6'-0"		ALUMINIUM ANODIZED	DARK GRAY					AWINING	FROSTED
D - 1	7'-0"	12'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY						
D - 2	36'-5"	11'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY						
D - 3	7'-0"	11'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
D - 4	10'-0"	11'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
D - 5	7'-0"	11'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY					AWINING	FROSTED
D - 6	10'-0"	8'-6"	0"		METAL	DARK GRAY						FROSTED

GENERAL NOTES: GLAZING IN THE FOLLOWING LOCATIONS SHALL BE SAFETY GLAZING CONFORMING TO THE HUMAN IMPACT LOADS OF SECTION R308.3. (SEE DWG A-9-b FOR ADDITIONAL NOTES)

1. FIXED AND OPERABLE PANELS OF SWINGING, SLIDING AND BIFOLD DOOR ASSEMBLIES.
2. INDIVIDUAL FIXED OR OPERABLE PANEL ADJACENT TO A DOOR WHERE THE NEAREST VERTICAL EDGE IS WITHIN A 24-INCH ARC OF THE DOOR IN A CLOSED POSITION AND WHOSE BOTTOM EDGE IS LESS THAN 60 INCHES ABOVE THE FLOOR OR WALKING SURFACE
3. EXPOSED AREA OF AN INDIVIDUAL PANE GREATER THAN 9 SQ.FT.
4. BOTTOM EDGE HAS LESS THAN 18 IN. ABOVE THE FLOOR
5. TOP EDGE GREATER THAN 36 IN.ABOVE THE FLOOR
6. ONE OF MORE WALKING SURFACES WITHIN 36 IN. HORIZONTALLY OF THE GLAZING
7. GLAZING IN RAILINGS
8. ENCLOSURES FOR OR WALLS FACING HOT TUBS, WHIRLPOOLS, SAUNAS, STEAM ROOMS, BATHTUBS, AND SHOWERS WHERE THE BOTTOM EDGE OF THE GLAZING IS LESS THAN 60 IN. MEASURED VERTICALLY ABOVE ANY STANDING OR WALKING SURFACE.
9. WALLS AND FENCES ADJACENT TO INDOOR AND OUTDOOR SWIMMING POOLS, HOT TUBS AND SPAS WHERE THE BOTTOM EDGE OF THE GLAZING IS LESS THAN 60 IN. ABOVE A WALKING SURFACE AND WITHIN 60 IN., MEASURED HORIZONTALLY AND IN A STRAIGHT LINE, OF THE WATER'S EDGE.
10. GLAZING ADJACENT TO STAIRWAYS, LANDINGS AND RAMPS WITHIN 36 IN. HORIZONTALLY OF A WALKING SURFACE WHEN THE SURFACE OF THE GLAZING IS LESS THAN 60 IN. ABOVE THE PLANE OF THE ADJACENT WALKING SURFACE.
11. GLAZING ADJACENT TO STAIRWAYS WITHIN 60 IN. HORIZONTALLY OF THE BOTTOM TREAD OF A STAIRWAY IN ANY DIRECTION WHEN THE EXPOSED SURFACE OF THE GLAZING IS LESS THAN 60 IN. ABOVE THE NOSE OF THE TREAD.

PROVIDE AN ALARM FOR DOORS TO THE DWELLING THAT FORM A PART OF THE POOL ENCLOSURE.
THE ALARM SHALL SOUND CONTINUOUSLY FOR A MIN. OF 30 SECONDS IMMEDIATELY AFTER THE DOOR IS OPENED AND BE CAPABLE OF BEING HEARD THROUGHOUT THE HOUSE DURING NORMAL HOUSEHOLD ACTIVITIES. IT SHALL AUTOMATICALLY RESET AND SHALL BE EQ. WITH A MANUAL MEANS TO TEMP. DESACTIVIATE (FOR 15 SECS.MAX.) FOR SINGLE OPENING. THE DESACTIVATION SWITCH SHALL BE AT LEAST 54" ABOVE THE FLOOR.

EXTERIOR DOOR & WINDOW OPENING SCHEDULE & TYPES



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REVISIONS

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PROJECT TITLE:
3727 ROBERTSON

CLIENT:

DATE:
04/27/2016

JOB NUMBER:

DRAWING PHASE:
P/CSUBMITTAL

SHEET TITLE:
EXTERIOR DOOR

SHEET NUMBER:
A
15

08/13/2019

FINISH SCHEDULE

FLOOR

FLOOR	No.	ROOM	MATERIAL: GLASS	CARPET	HARDWOOD	PORCELAIN TILE FLOOR	STONE	CONCRETE	RUBBER TILE	MARBLE	STAINLESS STEEL	FINISH: STAIN	CLEAR SEALER	EPOXY PAINT	NOT APPLICABLE
BASEMENT	1	PARKING						●							●
	2	STAIR						●							
	3	TRASH AREA						●							
	4	STORE						●							
	5	MECHANICAL ROOM						●							●
FIRST	6	ENTRANCE					●								
	7	EMERGENCY EXIT					●								
	8	OFFICE			●										
	9	REST ROOM				●									
	10	PARKING						●							●
SECOND	11	ENTRANCE			●										
	12	OFFICE			●										
	13	STORE				●									
	14	REST ROOM				●									
THIRD,FORTH,FIFTH FLOOR		MASTER BEDROOM		●										●	
		MASTER BATHROOM					●							●	
		MASTER BATH TUB					●							●	
		MASTER SHOWER					●							●	
		MASTER TOILET					●							●	
		MSTR WALK-IN CLOSET				●								●	
		BEDROOM				●								●	
		BATHROOM					●							●	
		SHOWER					●							●	
		KITCHEN		●											●
		LIVING ROOM		●											●
		FAMILY ROOM		●											●
		LAUNDRY						●							●
		BALCONY				●									●
		INTERIOR YARD						●							
		STAIR						●							

BASE

FLOOR	No.	ROOM	MATERIAL: CARPET	HARDWOOD	TILE	STONE	METAL	NOTHING	FINISH: GLOSS ENAMEL PAINT	ACRYLIC FLAT FINISH	STAIN ENAMEL	ACRYLIC STAIN
BASEMENT	1	PARKING						●				
	2	STAIR					●					
	3	TRASH AREA						●				
	4	STORE						●				
	5	MECHANICAL ROOM						●				
FIRST	6	ENTRANCE				●						
	7	EMERGENCY EXIT				●						
	8	OFFICE		●								
	9	REST ROOM			●							
	10	PARKING						●				
SECOND	11	ENTRANCE		●								
	12	OFFICE		●								
	13	STORE			●							
	14	REST ROOM			●							
THIRD,FORTH,FIFTH FLOOR		MASTER BEDROOM						●				
		MASTER BATHROOM						●				
		MASTER BATH TUB										
		MASTER SHOWER						●				
		MASTER TOILET						●				
		MSTR WALK-IN CLOSET						●				
		BEDROOM						●				
		BATHROOM						●				
		SHOWER						●				
		KITCHEN		●								
		LIVING ROOM		●								
		FAMILY ROOM		●								
		LAUNDRY							●			
		BALCONY			●							
		INTERIOR YARD								●		
		STAIR					●					

WALLS

FLOOR	No.	ROOM	MATERIAL: 5/8" TYPE X DRYWALL	GREEN BOARD	STUCCO	STONE/BRICK/CONCRETE	TILE /GREEN BOARD.	WOOD PANEL/DRYWALL	FABRIC / DRYWALL	FINISH: ACRYLIC FLAT FINISH	ACRYLIC LOW SHEEN	ACRYLIC GLOSS FINISH	STAIN ENAMEL	ELASTOMERIC PAINT	CLEAR SEALER
BASEMENT	1	PARKING				●									
	2	STAIR			●					●					
	3	TRASH AREA				●									
	4	STORE			●					●					
	5	MECHANICAL ROOM			●					●					
FIRST	6	ENTRANCE	●							●					
	7	EMERGENCY EXIT	●							●					
	8	OFFICE	●							●					
	9	REST ROOM					●				●				
	10	PARKING				●									
SECOND	11	ENTRANCE	●							●					
	12	OFFICE	●							●					
	13	STORE	●							●					
	14	REST ROOM					●				●				
THIRD,FORTH,FIFTH FLOOR		MASTER BEDROOM		●							●				
		MASTER BATHROOM			●							●			
		MASTER BATH TUB													
		MASTER SHOWER			●							●			
		MASTER TOILET			●							●			
		MSTR WALK-IN CLOSET		●							●				
		BEDROOM		●							●				
		BATHROOM			●							●			
		SHOWER			●							●			
		KITCHEN				●							●		
		LIVING ROOM			●							●			
		FAMILY ROOM			●							●			
		LAUNDRY					●					●			
		BALCONY													
		INTERIOR YARD			●					●					
		STAIR			●					●					

CEILING

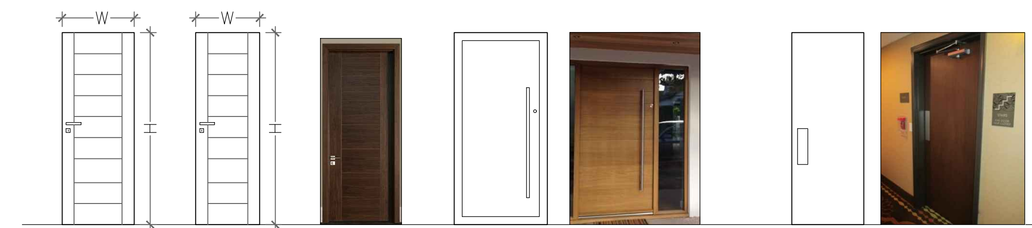
FLOOR	No.	ROOM	MATERIAL: 5/8" TYPE X DRYWALL	GREEN BOARD	STUCCO	STONE	CERAMIC TILE	WOOD	FABRIC	FINISH: ACRYLIC FLAT FINISH	ACRYLIC LOW SHEEN	ACRYLIC GLOSS FINISH	STAIN ENAMEL	CLEAR SEALER	ELASTOMERIC PAINT	REMARKS
BASEMENT	1	PARKING														
	2	STAIR								●						
	3	TRASH AREA								●						
	4	STORE														
	5	MECHANICAL ROOM														
FIRST	6	ENTRANCE								●						
	7	EMERGENCY EXIT								●						
	8	OFFICE								●						
	9	REST ROOM									●					
	10	PARKING														
SECOND	11	ENTRANCE								●						
	12	OFFICE								●						
	13	STORE								●						
	14	REST ROOM									●					
THIRD,FORTH,FIFTH FLOOR		MASTER BEDROOM		●							●					
		MASTER BATHROOM			●							●				
		MASTER BATH TUB														
		MASTER SHOWER			●							●				
		MASTER TOILET			●							●				
		MSTR WALK-IN CLOSET		●							●					
		BEDROOM		●							●					
		BATHROOM			●							●				
		SHOWER			●							●				
		KITCHEN				●							●			
		LIVING ROOM			●							●				
		FAMILY ROOM			●							●				
		LAUNDRY					●					●				
		BALCONY			●					●						
		INTERIOR YARD								●						
		STAIR														

INTERIOR DOOR OPENING SCHEDULE & TYPES

MEASUREMENTS OF DOORS / WINDOWS ARE CLEAR LEAF SIZE

TYPE	FINISH DOOR LEAF SIZE W	H	SILL H	NUMBER	DOOR& WINDOW MATERIAL	COLOR	FRAME	COLOR	FINISH	MANUFACTURE	REMARKS	GLASSES
D - A	3′-0″	8′-0″	0		WOOD		WOOD				BED ROOM- LANDRY	
D - B	2′-8″	8′-0″	0		WOOD		WOOD				BED ROOM- BATH ROOM	
D - C	3′-10″	8′-0″	0		WOOD		WOOD					
D - D	3′-0″	8′-0″	0		WOOD		WOOD				FIRE-RESISTANT DOOR	
D - E	5′-2″	6′-6″	0′-6″		GLASS		METAL				TEMPERED SHOWER GLASS PANELS	CLEAR
D - F	6′-6″	8′-0″	0		GLASS		METAL				GLASS DOORS	CLEAR
D - G	10′-0″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - H	3′-10″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - I	2′-6″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - J	2′-4″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - K	3′-0″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - L	6′-4″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - M	4′-10″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - N	3′-6″	8′-0″	0		GLASS		METAL					

INTERIOR DOOR OPENING SCHEDULE & TYPES



D - A
W=3′-0″
H=8′-0″

D - B
W=2′-8″
H=8′-0″

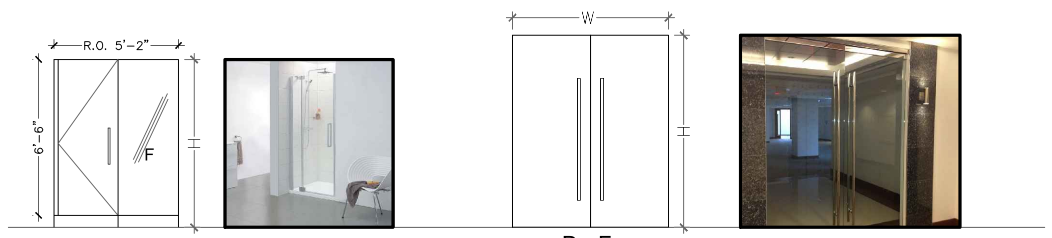
VIEW

D - C
W=3′-10″
H=7′-0″

VIEW

D - D
W=3′-0″
H=8′-0″

VIEW
FIRE-RESISTANT DOOR

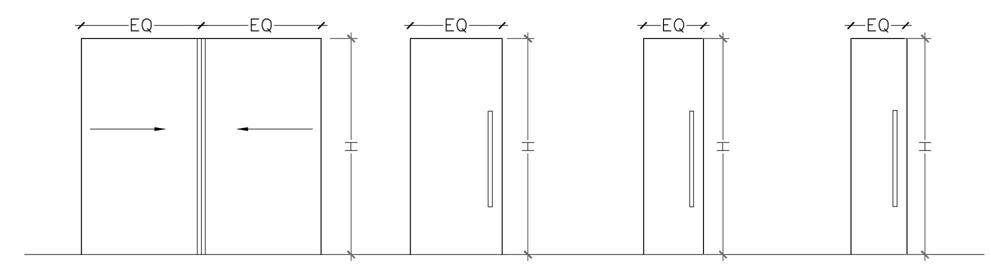


D - E
TEMPERED SHOWER
GLASS PANELS

VIEW

D - F
W=6′-6″
H=8′-0″

VIEW
GLASS DOOR

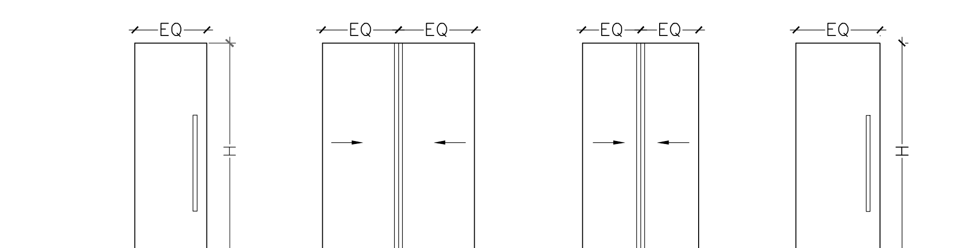


D - G
CLOSET

D - H
CLOSET

D - I
CLOSET

D - J
CLOSET



D - K
CLOSET

D - L
CLOSET

D - M
CLOSET

D - N
CLOSET

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS :
3727 ROBERTSON ST.
CULVER CITY
CA 90232

PROJECT TITLE:
3727 ROBERTSON

CLIENT:

DATE:
04/27/2016

JOB NUMBER:

DRAWING PHASE:
P/CSUBMITTAL

SHEET TITLE:
INTERIOR DOOR & SCHEDULE

SHEET NUMBER:
A
16

~~08/13/2019~~

Attachment D-2

ESA, Greenhouse Technical Report

3727 ROBERTSON PROJECT, CULVER CITY, CA

Greenhouse Gas Technical Report

Prepared for

Icon West, Inc.
520 South La Fayette Park Place, Suite 503
Los Angeles, CA 90057

January 2020

3727 ROBERTSON PROJECT, CULVER CITY, CA

Greenhouse Gas Technical Report

Prepared for
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January 2020

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Greenhouse Gas Technical Report

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
AB 32	California Global Warming Solutions Act of 2006
Basin	South Coast Air Basin
BAU	Business as Usual
BPMP	Bicycle & Pedestrian Master Plan
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CALGreen Code	California Green Building Standards Code
CAFE	Corporate Average Fuel Economy
CAPCOA	California Air Pollution Control Officer's Association
CARB	California Air Resources Board
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CEUS	Commercial End-Use Survey
CH_4	Methane
City	City of Culver City
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalents
CPUC	California Public Utilities Commission
DPM	Diesel Particulate Matter
EMFAC	On-road vehicle emissions factor model
GHG	Greenhouse Gas
GWP	Global Warming Potential
HFCs	Hydrofluorocarbons
HVAC	Heating, Ventilating and Air Conditioning
IPCC	Intergovernmental Panel on Climate Change
LCFS	Low Carbon Fuel Standard
$MTCO_2e$	Metric ton of carbon dioxide equivalent

Acronym	Description
$MMTCO_2e$	Million metric tons of carbon dioxide equivalent
N_2O	Nitrous Oxide
PFCs	Perfluorocarbons
RPS	Renewable Portfolio Standard
SF_6	Sulfur Hexafluoride
OPR	California Office of Planning and Research
VMT	Vehicle miles travelled
EMFAC	On-road vehicle emissions factor model
Hp	Horsepower
LOS	Level of Service
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
OFFROAD	Off-road vehicle emissions model
PDF	Project design feature
ppm	Parts per million
RPS	Renewables Portfolio Standard
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SIP	State Implementation Plan
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency

EXECUTIVE SUMMARY

Icon West, Inc. proposes to develop a five-story, mixed-use building located at 3727 Robertson Boulevard (Project) in Culver City, California. In accordance with the requirements under the California Environmental Quality Act (CEQA), this Technical Report provides an estimate of greenhouse gas (GHG) emissions for the Project and the potential impacts from associated construction and operational GHG emissions. The report includes the categories and types of emission sources resulting from the Project, the calculation procedures used in the analysis, and any assumptions or limitations.

The Project is located on an approximately 0.12 acre (5,100 square feet) rectangular parcel (Project Site). The Project would be designed to accommodate ground-floor retail/restaurant space, commercial office space on the second floor, and 12 two-bedroom apartment units on floors 3 through 5. Parking would be provided in a one-floor, 19-space subterranean parking garage as well as 6 surface parking space. Development of the Project would require the demolition of the existing low-rise commercial building and surface parking lot.

The proposed Project would introduce short-term and temporary GHG emissions from construction, and long-term GHG emissions from operation. The following emission sources, associated with the Project, have been evaluated:

- *Construction* – Activities associated with construction of the Project, such as burning of fossil fuels for demolition, grading, building construction, paving and painting, would result in temporary and incremental increases in GHG emissions.

- *Operation* – Activities from the operation of the Project, such as heating, cooling, electricity, lawn care and maintenance activities, and the treatment and conveyance of water, would result in permanent increases in GHG emissions.

Greenhouse gas emissions associated with the Project would be consistent with applicable portions of Culver City's Green Building Program. In addition, the Project would be consistent with the applicable Southern California Association of Governments (SCAG) Regional Transportation Plan (RTP)/Sustainable Communities Strategy (SCS) policies intended to meet the regions' GHG reduction targets as assigned by the California Air Resources Board (CARB). Thus the Project's GHG emissions would be consistent with regulatory schemes intended to reduce GHG emissions. Therefore, the Project would result in less than significant GHG emissions based on applicable thresholds of significance as evaluated in this GHG Technical Report. Furthermore, the Project would implement green building measures that would reduce the Project's direct and indirect GHG emissions. With the implementation of the Projects' green building measures, the Project would achieve substantial GHG reductions and would achieve reductions consistent with the statewide GHG reduction target.

SECTION 1
Introduction

1.1 Project Description

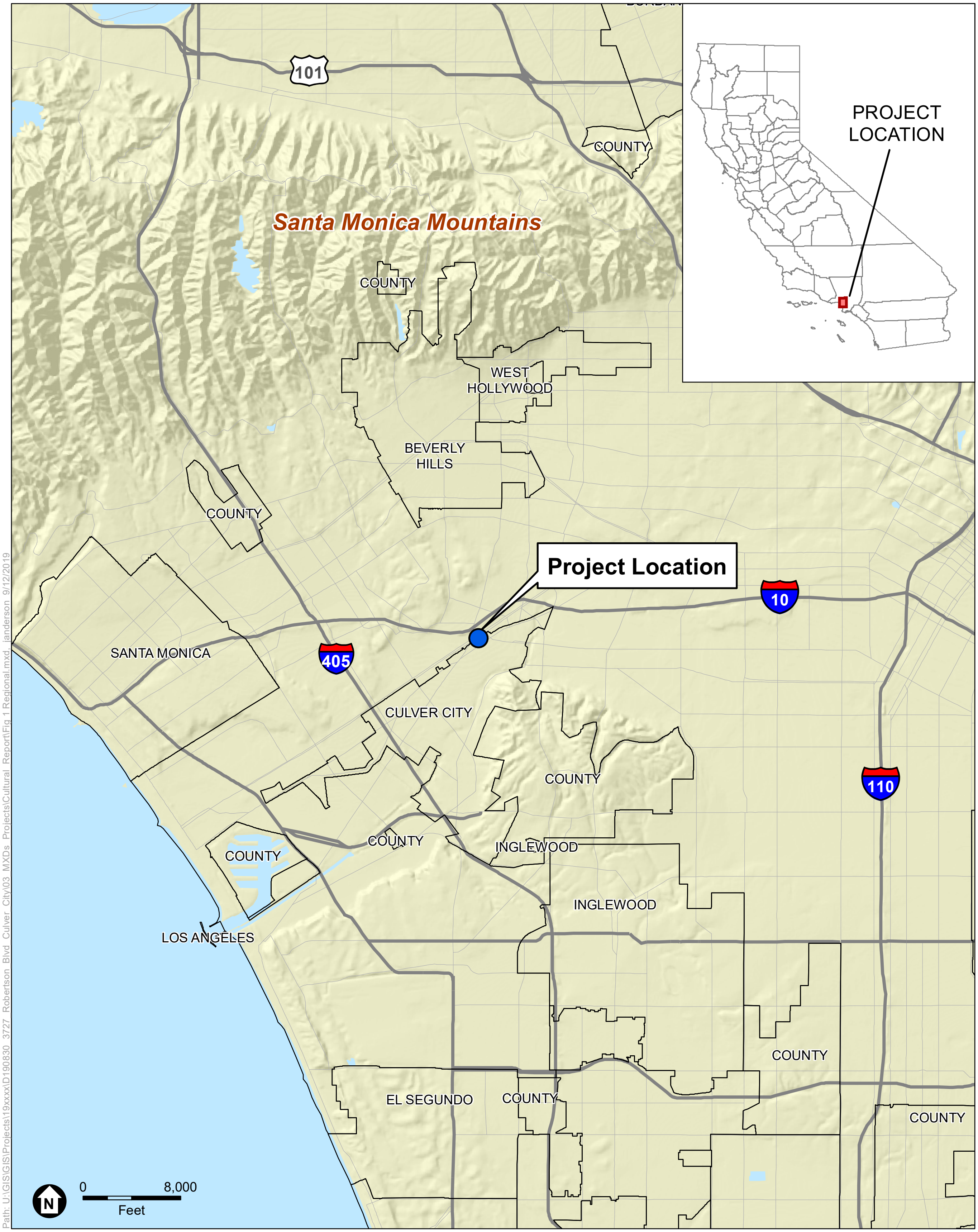
Icon West, Inc. proposes to develop a five-story, mixed-use building located at 3727 Robertson Boulevard (Project) in Culver City, California. In accordance with the requirements under the California Environmental Quality Act (CEQA), this Technical Report provides an estimate of air quality emissions for the Project and the potential impacts from associated construction and operational activities. The report includes the categories and types of emission sources resulting from the Project, the calculation procedures used in the analysis, and any assumptions or limitations.

The Project is located on an approximately 0.12 acre (5,100 square feet) rectangular parcel (Project Site). The Project would be designed to accommodate approximately 3,886 square feet of ground-floor retail/restaurant space, 5,455 square feet of commercial office space on the second floor, and 12 two-bedroom apartment units on floors 3 through 5. Parking would be provided in a one-floor, 19-space subterranean parking garage as well as 6 surface parking space.

1.2 Existing Conditions

The Project Site is located on Robertson Boulevard between Venice Boulevard and Washington Boulevard in Culver City, as shown in **Figure 1**, *Regional Location*. A single-lane service alley runs along the western side of the Project Site and the service alley serves as the western boundary of the Project Site. Existing surrounding uses include: business park/office building uses to the east across S. Robertson Boulevard; a construction company office/showroom immediately to the north; a per day care/grooming facility immediately to the south; and light-industrial/commercial/office uses to the west on Willat Avenue. There are no residential, park, hospital, or other environmentally sensitive uses in the immediate vicinity of the Project Site. **Figure 2**, *Aerial Photograph with Surrounding Land Uses*, shows the site and surrounding land uses. The Project Site is currently developed with a sound studio totaling 2,850 square feet and a surface parking lot, which would all be demolished and removed to support development of the Project.

The Project Site is well served by a network of regional transportation facilities. Various public transit stops operated by the Los Angeles County Metropolitan Transportation Authority (Metro), Los Angeles Department of Transportation (LADOT), City of Santa Monica's Big Blue Bus and Culver City Bus are located in close proximity to the Project Site. The Metro Expo Line Culver City light rail station is approximately 0.1 miles northeast of the Project Site.



SOURCE: ESRI

3727 S. Robertson Blvd, Culver City

Figure 1
Regional Location

ESA

Path: U:\GIS\GIS\Projects\19xxxx\D190830_3727_Robertson_Blvd_Culver_City\03_MXDs_Projects\Cultural_Report\Fig3_Aerial.aprx, janderson 9/12/2019

SOURCE: Mapbox, 2018.

3727 S. Robertson Blvd, Culver City

ESA

Figure 2
Aerial Photograph with Surrounding Land Uses

1.3 Project Land Use Characteristics

The Project would represent a mixed-use, urban infill development with residential, office and retail/restaurants uses since it would be undertaken on a currently developed property, and would be located near existing public transit stops, which would result in reduced vehicle trips and VMT compared to model default assumptions. The Project's Traffic Impact Analysis (TIA)[1] estimated trip rates for the Project that accounted for trip rate reductions due to the Project's characteristics, including reductions due to pass-by trips, internal trips and proximity to public transit/walk-in trips. The estimated trip rate reductions were provided by the Project's TIA.[2] These trip rates were used in the operational emissions modeling. At Project buildout, hours of operation and periods of peak activity would be similar to those currently existing uses on the Project Site, with A.M. and P.M. peak hours.

1.4 Project Design Features

The Project will incorporate Project Design Features (PDFs) that will reduce construction emissions and target sustainable site development, water savings, energy efficiency, green-oriented materials selection, and improved indoor environmental quality. PDFs are part of the Project design, and are not mitigation measures. The PDFs that will be included in the Project design include the following:

PDF-GHG-1: Design Elements: In accordance with CALGreen Building Standards, the project shall incorporate the following mandatory energy and emission saving features:

- The Project shall recycle and/or salvage at least 65 percent of non–hazardous construction and demolition debris.
- The Project shall include easily accessible recycling areas dedicated to the collection and storage of non-hazardous materials such as paper, corrugated cardboard, glass, plastics, metals, and landscaping debris (trimmings).
- The Project shall include energy efficient heating, ventilation, and air conditioning (HVAC) systems that meet the ASHRAE 90.1-2013 Appendix G standards and the Title 24 Building Energy Efficiency Standards and CALGreen Code, or applicable version of these standards at the time of building permit issuance.
- The Project shall install low-flow water fixtures that meet U.S. Environmental Protection Agency WaterSense specifications or applicable standards as specified in the Title 24 Building Energy Efficiency Standards and CALGreen Code at the time of building permit issuance.
- The Project shall install a solar photovoltaic power system equivalent to at least 1 percent of the Project's electricity demand and at least 1 kilowatt (kW) of solar photovoltaics per 10,000 square feet of new development or shall provide in-lieu fees

1 Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.

2 Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.

or alternate location of solar consistent with applicable provisions of Culver City Municipal Code Sections 15.02.1000-15.02.1015.

- In accordance with the City's adopted Green Building program, for Project with new construction totaling up to 49,999 square feet, the Project will comply with 80 percent of the applicable Green Building Program Category 1 Project checklist items.[3] Project applicants for Category I Projects are required to submit a filled checklist with the construction permit application drawings and all items checked must be indicated in the construction permit application drawings

1.5 Existing Greenhouse Gas Environment

Global Climate Change

Global climate change refers to changes in average climatic conditions on Earth as a whole, including changes in temperature, wind patterns, precipitation and storms. Historical records indicate that global climate changes have occurred in the past due to natural phenomena; however, current data increasingly indicate that the current global conditions differ from past climate changes in rate and magnitude. Global climate change attributable to anthropogenic (human) GHG emissions is currently one of the most important and widely debated scientific, economic and political issues in the United States and the world. The extent to which increased concentrations of GHGs have caused or will cause climate change and the appropriate actions to limit and/or respond to climate change are the subject of significant and rapidly evolving regulatory efforts at the federal and state levels of government.

GHGs are those compounds in the Earth's atmosphere which play a critical role in determining temperature near the Earth's surface. More specifically, these gases allow high-frequency shortwave solar radiation to enter the Earth's atmosphere, but retain some of the low frequency infrared energy which is radiated back from the Earth towards space, resulting in a warming of the atmosphere. Not all GHGs possess the same ability to induce climate change; as a result, GHG contributions are commonly quantified in the units of equivalent mass of carbon dioxide (CO_2e). Mass emissions are calculated by converting pollutant specific emissions to CO_2e emissions by applying the proper global warming potential (GWP) value.[4] These GWP ratios are available from the Intergovernmental Panel on Climate Change (IPCC). Historically, GHG emission inventories have been calculated using the GWPs from the IPCC's Second Assessment Report (SAR). The IPCC updated the GWP values based on the latest science in its Fourth Assessment Report (AR4). The updated GWPs in the IPCC AR4 have begun to be used in recent GHG emissions inventories. By applying the GWP ratios, Project-related CO_2e emissions can be tabulated in metric tons per year. Typically, the GWP ratio corresponding to the warming

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3 Culver City Building Safety Division Mandatory Green Building Program, Category 1 Qualifying Projects, https://www.culvercity.org/Home/ShowDocument?id=902. Accessed September 2019.

4 GWPs and associated CO_2e values were developed by the Intergovernmental Panel on Climate Change (IPCC), and published in its Second Assessment Report (SAR) in 1996. Historically, GHG emission inventories have been calculated using the GWPs from the IPCC's SAR. The IPCC updated the GWP values based on the latest science in its Fourth Assessment Report (AR4). The California Air Resources Board (CARB) has begun reporting GHG emission inventories for California using the GWP values from the IPCC AR4.

potential of CO_2 over a 100-year period is used as a baseline. The CO_2e values are calculated for construction years as well as existing and Project build-out conditions in order to generate a net change in GHG emissions for construction and operation. Compounds that are regulated as GHGs are discussed below.[5,6]

- **Carbon Dioxide (CO_2):** CO_2 is the most abundant GHG in the atmosphere and is primarily generated from fossil fuel combustion from stationary and mobile sources. CO_2 is the reference gas (GWP of 1) for determining the GWPs of other GHGs.[7]
- **Methane (CH_4):** CH_4 is emitted from biogenic sources (i.e., resulting from the activity of living organisms), incomplete combustion in forest fires, landfills, manure management, and leaks in natural gas pipelines. The GWP of CH_4 is 21 in the IPCC SAR and 25 in the IPCC AR4.[8]
- **Nitrous Oxide (N_2O):** N_2O produced by human-related sources including agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic acid production, and nitric acid production. The GWP of N_2O is 310 in the IPCC SAR and 298 in the IPCC AR4.[9]
- **Hydrofluorocarbons (HFCs):** HFCs are fluorinated compounds consisting of hydrogen, carbon, and fluorine. They are typically used as refrigerants in both stationary refrigeration and mobile air conditioning systems. The GWP of HFCs ranges from 140 for HFC-152a to 11,700 for HFC-23 in the IPCC SAR and 124 for HFC-152a to 14,800 for HFC-23 in the IPCC AR4.[10]
- **Perfluorocarbons (PFCs):** PFCs are fluorinated compounds consisting of carbon and fluorine. They are primarily created as a byproduct of aluminum production and semiconductor manufacturing. The GWPs of PFCs range from 6,500 to 9,200 in the IPCC SAR and 7,390 to 17,700 in the IPCC AR4.[11]
- **Sulfur Hexafluoride (SF_6):** SF_6 is a fluorinated compound consisting of sulfur and fluoride. It is a colorless, odorless, nontoxic, nonflammable gas. It is most commonly used

5 Intergovernmental Panel on Climate Change (IPCC), Second Assessment Report, Working Group I: The Science of Climate Change, 1995, https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_sar_wg_I_full_report.pdf. Accessed September 2019.

6 IPCC, Fourth Assessment Report (AR4), Working Group I Report: The Physical Science Basis, Table 2.14, 2007, https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg1-chapter2-1.pdf. Accessed September 2019.

7 IPCC, AR4, Working Group I Report: The Physical Science Basis, Table 2.14.

8 IPCC, AR4, Working Group I Report: The Physical Science Basis, Table 2.14.

9 IPCC, AR4, Working Group I Report: The Physical Science Basis, Table 2.14.

10 IPCC, AR4, Working Group I Report: The Physical Science Basis, Table 2.14.

11 IPCC, AR4, Working Group I Report: The Physical Science Basis, Table 2.14.

as an electrical insulator in high voltage equipment that transmits and distributes electricity. SF_6 has a GWP of 23,900 in the IPCC SAR and 22,800 in the IPCC AR4.[12]

Worldwide man-made emissions of GHGs are approximately 49,000 $MMTCO_2e$ annually including ongoing emissions from industrial and agricultural sources and emissions from land use changes (e.g., deforestation).[13] Emissions of CO_2 from fossil fuel use and industrial processes account for 65 percent of the total while CO_2 emissions from all sources accounts for 76 percent of the total. Methane emissions account for 16 percent and N_2O emissions for 6.2 percent. In 2016, the United States was the world's second largest emitter of carbon dioxide at 5,000 $MMTCO_2e$ (China was the largest emitter of carbon dioxide at 10,500 $MMTCO_2e$).[14]

CARB compiles GHG inventories for the State of California. Based on the 2017 GHG inventory data (i.e., the latest year for which data are available from CARB), California emitted 429.1 $MMTCO_2e$ including emissions resulting from imported electrical power.[15] Between 1990 and 2017, the population of California grew by approximately 9.7 million (from 29.8 to 39.5 million).[16,17] This represents an increase of approximately 33 percent from 1990 population levels. In addition, the California economy, measured as gross state product, grew from $773 billion in 1990 to $2.75 trillion in 2017 representing an increase of over three times the 1990 gross state product.[18] Despite the population and economic growth, California's net GHG emissions were reduced to below 1990 levels in 2016. According to CARB, the declining trend coupled with the state's GHG reduction programs (such as the Renewables Portfolio Standard, Low Carbon Fuel Standard (LCFS), vehicle efficiency standards, and declining caps under the Cap and Trade Program) demonstrate that California is on track to meet the 2020 GHG reduction target codified in HSC, Division 25.5, also known as AB 32.[19] **Table 1**, *State of California Greenhouse Gas Emissions,* identifies and quantifies Statewide anthropogenic GHG emissions and sinks (e.g., carbon sequestration due to forest growth) in 1990 and 2017. As shown in **Table 1**, the transportation sector is the largest contributor to Statewide GHG emissions at approximately 40 percent in 2017.

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12 IPCC, AR4, Working Group I Report: The Physical Science Basis, Table 2.14.

13 IPCC, Climate Change 2014: Synthesis Report, 2014, page 45, http://www.ipcc.ch/report/ar5/syr/. Accessed September 2019.

14 PBL Netherlands Environmental Assessment Agency and the European Commission Joint Research Center, Trends in Global CO2 Emissions 2017 Report, pp. 20 and 24 (2017).

15 CARB, California Greenhouse Gas Inventory for 2000-2017– by Category as Defined in the 2008 Scoping Plan, https://ww3.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_sum_2000-17.pdf. Accessed September 2019.

16 U.S. Census Bureau, National and State Population Estimates: 1990-1994, 1995, https://www.census.gov/library/publications/1995/demo/p25-1127.html. Accessed September 2019.

17 California Department of Finance, American Community Survey, 2018, http://www.dof.ca.gov/Reports/Demographic_Reports/American_Community_Survey/documents/Web_ACS2017_Pop-Race.xlsx. Accessed September 2019.

18 California Department of Finance, Gross State Product, 2019, http://www.dof.ca.gov/Forecasting/Economics/Indicators/Gross_State_Product/documents/BBStateGDP_000.xls. Accessed September 2019. Amounts are based on values as of May 4, 2018.

19 CARB, Frequently Asked Questions for the 2016 Edition California Greenhouse Gas Emission Inventory, 2016, https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2014/ghg_inventory_faq_20160617.pdf. Accessed September 2019.

TABLE 1
STATE OF CALIFORNIA GREENHOUSE GAS EMISSIONS

Category	Total 1990 Emissions using IPCC SAR ($MMTCO_2e$)	Percent of Total 1990 Emissions	Total 2017 Emissions using IPCC AR4 ($MMTCO_2e$)	Percent of Total 2017 Emissions
Transportation	150.7	35%	169.9	40%
Electric Power	110.6	26%	62.4	15%
Commercial	14.4	3%	15.1	4%
Residential	29.7	7%	26.0	6%
Industrial	103.0	24%	89.4	21%
Recycling and Waste [a]	–	–	8.9	2%
High-GWP/Non-Specified [b]	1.3	<1%	20.0	5%
Agriculture/Forestry	23.6	6%	32.4	8%
Forestry Sinks	-6.7		-- c	--
Net Total (IPCC AR4) [d]	**431**	**100%**	**429.1**	**100%**

[a] Included in other categories for the 1990 emissions inventory.
[b] High-GWP gases are not specifically called out in the 1990 emissions inventory.
[c] Revised methodology under development (not reported for 2016).
[d] CARB revised the State's 1990 level GHG emissions using GWPs from the IPCC AR4.

Sources: California Air Resources Board, Staff Report: California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit, 2007; California Air Resources Board, California Greenhouse Gas Inventory for 2000-2017– by Category as Defined in the 2008 Scoping Plan, https://ww3.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_sum_2000-17.pdf. Accessed September 2019.

Effects of Global Climate Change

The scientific community's understanding of the fundamental processes responsible for global climate change has improved over the past decade, and its predictive capabilities are advancing. However, there remain significant scientific uncertainties in, for example, predictions of local effects of climate change, occurrence, frequency, and magnitude of extreme weather events, effects of aerosols, changes in clouds, shifts in the intensity and distribution of precipitation, and changes in oceanic circulation. Due to the complexity of the Earth's climate system and inability to accurately model it, the uncertainty surrounding climate change may never be completely eliminated. Nonetheless, the IPCC's *Fifth Assessment Report, Summary for Policy Makers* states that, "it is *extremely likely* that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in greenhouse gas concentrations and other anthropogenic forces [*sic*] together."[20] A report from the National Academy of Sciences concluded that 97 to 98 percent of the climate researchers most actively

[20] IPCC, Climate Change 2014: Synthesis Report, Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policy Makers, 2014, page 5, http://ipcc.ch/report/ar5/syr/. Accessed September 2019.

publishing in the field support the tenets of the IPCC in that climate change is very likely caused by human (i.e., anthropogenic) activity.[21]

According to the California EPA, the potential impacts in California due to global climate change may include: loss in snow pack; sea level rise; more extreme heat days per year; more high ozone days; more large forest fires; more drought years; increased erosion of California's coastlines and sea water intrusion into the Sacramento and San Joaquin Deltas and associated levee systems; and increased pest infestation.[22] Data regarding potential future climate change impacts are available from the California Natural Resources Agency (CNRA), which in 2009 published the *California Climate Adaptation Strategy*[23] as a response to Executive Order S-13-2008. The CNRA report lists specific recommendations for state and local agencies to best adapt to the anticipated risks posed by a changing climate. In accordance with the *California Climate Adaptation Strategy*, the CEC was directed to develop a website on climate change scenarios and impacts that would be beneficial for local decision makers.[24] The website, known as Cal-Adapt, became operational in 2011.[25] The information provided by the Cal-Adapt website represents a projection of potential future climate scenarios. The data are comprised of the average values from a variety of scenarios and models, and are meant to illustrate how the climate may change based on a variety of different potential social and economic factors. Below is a summary of some of the potential climate change effects and relevant Cal-Adapt data, reported by an array of studies that could be experienced in California as a result of global warming and climate change.

Air Quality

Higher temperatures, conducive to air pollution formation, could worsen air quality in California. Climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore, its indirect effects, are uncertain. If higher temperatures are accompanied by drier conditions, the potential for large wildfires could increase, which, in turn, would further worsen air quality. However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains would tend to temporarily clear the air of particulate pollution and reduce the incidence of large wildfires, thus ameliorating the pollution associated with wildfires. Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the state.[26]

21 Anderegg, William R. L., J.W. Prall, J. Harold, S.H., Schneider, Expert Credibility in Climate Change, Proceedings of the National Academy of Sciences of the United States of America, 2010, 107:12107-12109.

22 California Environmental Protection Agency, Climate Action Team, Climate Action Team Report to Governor Schwarzenegger and the Legislature, 2006.

23 California Natural Resources Agency, Climate Action Team, 2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008, 2009.

24 California Natural Resources Agency, Climate Action Team, 2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008.

25 The Cal-Adapt website address is: http://cal-adapt.org.

26 California Energy Commission, Scenarios of Climate Change in California: An Overview, February 2006, https://ww2.energy.ca.gov/2005publications/CEC-500-2005-186/CEC-500-2005-186-SF.PDF. Accessed September 2019.

According to the Cal-Adapt website, the portion of the City of Culver City in which the Project Site is located could result in an average increase in temperature of approximately 6 to 9 percent (from an annual average of 71.4°F to 75.4-78.1°F) by 2070-2099, compared to the baseline 1961-1990 period.[27] Data suggests that the predicted future increase in temperatures as a result of climate change could potentially interfere with efforts to control and reduce ground-level ozone in the region.

Water Supply

Uncertainty remains with respect to the overall impact of global climate change on future water supplies in California. Studies have found that, "Considerable uncertainty about precise impacts of climate change on California hydrology and water resources will remain until we have more precise and consistent information about how precipitation patterns, timing, and intensity will change."[28] For example, some studies identify little change in total annual precipitation in projections for California while others show significantly more precipitation.[29] Warmer, wetter winters would increase the amount of runoff available for groundwater recharge; however, this additional runoff would occur at a time when some basins are either being recharged at their maximum capacity or are already full.[30] Conversely, reductions in spring runoff and higher evapotranspiration because of higher temperatures could reduce the amount of water available for recharge.[31]

The California Department of Water Resources report on climate change and effects on the State Water Project (SWP), the Central Valley Project, and the Sacramento-San Joaquin Delta, concludes that "climate change will likely have a significant effect on California's future water resources…[and] future water demand." It also reports that "much uncertainty about future water demand [remains], especially [for] those aspects of future demand that will be directly affected by climate change and warming. While climate change is expected to continue through at least the end of this century, the magnitude and, in some cases, the nature of future changes is uncertain." It also reports that the relationship between climate change and its potential effect on water demand is not well understood, but "[i]t is unlikely that this level of uncertainty will diminish significantly in the foreseeable future." Still, changes in water supply are expected to occur, and many regional studies have shown that large changes in the reliability of water yields from

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27 Cal-Adapt, Annual Average Maximum Temperatures for the Downtown Los Angeles area of the City of Los Angeles, 2017, http://cal-adapt.org/tools/annual-averages/#climatevar=tasmax&scenario=rcp45&lat=34.03125&lng=-118.28125&boundary=locagrid&units=fahrenheit. Accessed September 2019.

28 Pacific Institute for Studies in Development, Environment and Security, Climate Change and California Water Resources: A Survey and Summary of the Literature, July 2003, https://pacinst.org/wp-content/uploads/2003/07/climate_change_and_california_water_resources.pdf. Accessed September 2019.

29 Pacific Institute for Studies in Development, Environment and Security, Climate Change and California Water Resources: A Survey and Summary of the Literature.

30 Pacific Institute for Studies in Development, Environment and Security, Climate Change and California Water Resources: A Survey and Summary of the Literature.

31 Pacific Institute for Studies in Development, Environment and Security, Climate Change and California Water Resources: A Survey and Summary of the Literature.

reservoirs could result from only small changes in inflows.[32] In its *Fifth Assessment Report*, the IPCC states "Changes in the global water cycle in response to the warming over the 21st century will not be uniform. The contrast in precipitation between wet and dry regions and between wet and dry seasons will increase, although there may be regional exceptions."[33]

Hydrology and Sea Level Rise

As discussed above, climate changes could potentially affect: the amount of snowfall, rainfall and snow pack; the intensity and frequency of storms; flood hydrographs (flash floods, rain or snow events, coincidental high tide and high runoff events); sea level rise and coastal flooding; coastal erosion; and the potential for salt water intrusion. Sea level rise can be a product of global warming through two main processes: expansion of seawater as the oceans warm, and melting of ice over land. Absent planning and preparation, a rise in sea levels could result in coastal flooding and erosion and could jeopardize California's water supply, and increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events.

Agriculture

California has a $30 billion agricultural industry that produces one half of the country's fruits and vegetables. Higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, water demand could increase; without planning and preparations. Crop-yield could be threatened by a less reliable water supply. Also, greater ozone pollution could render plants more susceptible to pest and disease outbreaks. In addition, temperature increases could change the time of year certain crops, such as wine grapes, bloom or ripen, and thus affect their quality.[34]

Ecosystems and Wildlife

Increases in global temperatures and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. Increasing concentrations of GHGs are likely to accelerate the rate of climate change. Scientists expect that the average global surface temperature could rise by 2 to 11.5°F (1.1 to 6.4°C) by 2100, with significant regional variation.[35] Soil moisture is likely to decline in many regions, and intense rainstorms are likely to become more frequent. Sea level could rise as much as 2 feet along most of the U.S. coast. Rising temperatures could have four major impacts on plants and animals: (1) timing of ecological events; (2) geographic range; (3) species' composition within communities; and (4) ecosystem processes such as carbon cycling and storage.[36,37]

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32 California Department of Water Resources Climate Change Report, Progress on Incorporating Climate Change into Planning and Management of California's Water Resources, July 2006, https://www.water.ca.gov/LegacyFiles/climatechange/docs/DWRClimateChangeJuly06.pdf. Accessed September 2019.

33 IPCC, Fifth Assessment Report, Summary for Policy Makers, 2013, page 20.

34 California Climate Change Center, Our Changing Climate: Assessing the Risks to California, 2006.

35 National Research Council, Advancing the Science of Climate Change, 2010.

36 Parmesan, C., Ecological and Evolutionary Response to Recent Climate Change, 2004.

37 Parmesan, C and Galbraith, H, Observed Ecological Impacts of Climate Change in North America. Arlington, VA: Pew. Cent. Glob. Clim. Change, 2004.

Existing Site Greenhouse Gas Emissions

As previously stated, the Project Site is located in Culver City, and is currently developed with a sound studio totaling 2,850 square feet and a surface parking lot, all of which would be demolished and removed to support development of the Project.

The current site usage generates GHG emissions from vehicle trips to the Project site and daily operations activities of the commercial buildings at the site. When evaluating the Project's operational GHG impacts, it would be based on the Project-related incremental increase in GHG emissions compared to existing conditions. **Table 2**, *Existing Site GHG Emissions*, identifies the GHG emissions of the existing Project Site. As shown, the primary source of emissions is from mobile sources.

TABLE 2
EXISTING SITE GHG EMISSIONS

Source	CO_2e (Metric Tons per Year)[a, b]
Area (Landscaping Equipment)	<1
Electricity & Natural Gas	12
Mobile Sources	17
Waste	1
Water	3
Total Existing Emissions	**33**

[a] Totals may not add up exactly due to rounding in the modeling calculations Detailed emissions calculations are provided in Exhibit B.
[b] CO_2e emissions are calculated using the global warming potential values from the Intergovernmental Panel on Climate Change Fourth Assessment Report.

SOURCE: ESA, 2019.

SECTION 2
Regulatory Framework

2.1 Federal

Federal Clean Air Act

The United States Environmental Protection Agency (USEPA) is responsible for implementing federal policy to address GHGs. The federal government administers a wide array of public-private partnerships to reduce the GHG intensity generated in the United States. These programs focus on energy efficiency, renewable energy, methane and other non-CO_2 gases, agricultural practices, and implementation of technologies to achieve GHG reductions. USEPA implements numerous voluntary programs that contribute to the reduction of GHG emissions. These programs (e.g., the ENERGY STAR® labeling system for energy-efficient products) play a significant role in encouraging voluntary reductions from large corporations, consumers, industrial and commercial buildings, and many major industrial sectors.

In *Massachusetts v. Environmental Protection Agency* (Docket No. 05–1120), the United States Supreme Court held in April of 2007 that the USEPA has statutory authority under Section 202 of the Clean Air Act (CAA) to regulate GHGs. The Court did not hold that the USEPA was required to regulate GHG emissions; however, it indicated that the agency must decide whether GHGs cause or contribute to air pollution that is reasonably anticipated to endanger public health or welfare. On December 7, 2009, the USEPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the CAA. The USEPA adopted a Final Endangerment Finding for the six defined GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) on December 7, 2009. The Endangerment Finding is required before USEPA can regulate GHG emissions under Section 202(a)(1) of the CAA consistently with the United States Supreme Court decision. The USEPA also adopted a Cause or Contribute Finding in which the USEPA Administrator found that GHG emissions from new motor vehicle and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare. These findings do not, by themselves, impose any requirements on industry or other entities. However, these actions were a prerequisite for implementing GHG emissions standards for vehicles.

Energy Independence and Security Act

The Energy Independence and Security Act of 2007 (EISA) facilitates the reduction of national GHG emissions by requiring the following:

- Increasing the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) that requires fuel producers to use at least 36 billion gallons of biofuel in 2022;

- Prescribing or revising standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances;

- Requiring approximately 25 percent greater efficiency for light bulbs by phasing out incandescent light bulbs between 2012 and 2014; requiring approximately 200 percent greater efficiency for light bulbs, or similar energy savings, by 2020; and

- While superseded by the USEPA and NHTSA actions described above, (i) establishing miles per gallon targets for cars and light trucks and (ii) directing the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for trucks.

Additional provisions of EISA address energy savings in government and public institutions, promote research for alternative energy, additional research in carbon capture, international energy programs, and the creation of green jobs.[38]

Executive Order 13432

In response to the *Massachusetts v. Environmental Protection Agency* ruling, the President signed Executive Order 13432 on May 14, 2007, directing the USEPA, along with the Departments of Transportation, Energy, and Agriculture, to initiate a regulatory process that responds to the Supreme Court's decision. Executive Order 13432 was codified into law by the 2009 Omnibus Appropriations Law signed on February 17, 2009. The order sets goals in the areas of energy efficiency, acquisition, renewable energy, toxics reductions, recycling, sustainable buildings, electronics stewardship, fleets, and water conservation. Light-Duty Vehicle Greenhouse Gas and Corporate Average Fuel Economy Standards

On May 19, 2009, President Obama announced a national policy for fuel efficiency and emissions standards in the United States auto industry. The adopted federal standard applies to passenger cars and light-duty trucks for model years 2012 through 2016. The rule surpasses the prior Corporate Average Fuel Economy standards (CAFE)[39] and requires an average fuel economy standard of 35.5 miles per gallon (mpg) and 250 grams of CO_2 per mile by model year 2016, based on USEPA calculation methods. These standards were formally adopted on April 1, 2010. In August 2012, standards were adopted for model year 2017 through 2025 for passenger cars and light-duty trucks. By 2025, vehicles are required to achieve 54.5 mpg (if GHG reductions are achieved exclusively through fuel economy improvements) and 163 grams of CO_2 per mile. According to the USEPA, a model year 2025 vehicle would emit one-half of the GHG emissions

[38] A green job, as defined by the United States Department of Labor, is a job in business that produces goods or provides services that benefit the environment or conserve natural resources.

[39] The Corporate Average Fuel Economy standards are regulations in the United States, first enacted by Congress in 1975, to improve the average fuel economy of cars and light trucks. The U.S Department of Transportation has delegated the National Highway Traffic Safety Administration as the regulatory agency for the Corporate Average Fuel Economy standards.

from a model year 2010 vehicle.[40] In 2017, the USEPA recommended no change to the GHG standards for light-duty vehicles for model years 2022-2025.

In August 2018, the USEPA and NHTSA proposed the Safer Affordable Fuel-Efficient Vehicles Rule that would, if adopted, maintain the CAFE and CO_2 standards applicable in model year 2020 for model years 2021 through 2026. The estimated CAFE and CO_2 standards for model year 2020 are 43.7 mpg and 204 grams of CO_2 per mile for passenger cars and 31.3 mpg and 284 grams of CO_2 per mile for light trucks, projecting an overall industry average of 37 mpg, as compared to 46.7 mpg under the standards issued in 2012. The proposal, if adopted, would also exclude CO_2-equivalent emission improvements associated with air conditioning refrigerants and leakage (and, optionally, offsets for nitrous oxide and methane emissions) after model year 2020.[41]

2.2 State

California has promulgated a series of executive orders, laws, and regulations aimed at reducing both the level of GHGs in the atmosphere and emissions of GHGs from commercial and private activities within the State.

Executive Order S-3-05, Executive Order B-30-15, and Executive Order B-55-18

In June, 2005, through Executive Order S-3-05,[42] the following GHG emission reduction targets were established:

- By 2010, California shall reduce GHG emissions to 2000 levels;
- By 2020, California shall reduce GHG emissions to 1990 levels; and
- By 2050, California shall reduce GHG emissions to 80 percent below 1990 levels.

In April, 2015, Governor Brown issued Executive Order B-30-15 that:[43]

- Established a new interim Statewide reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030.

[40] United States Environmental Protection Agency, EPA and NHTSA Set Standards to Reduce Greenhouse Gases and Improve Fuel Economy for Model Years 2017-2025 Cars and Light Trucks, August 2012, https://nepis.epa.gov/Exe/ZyPDF.cgi/P100EZ7C.PDF?Dockey=P100EZ7C.PDF. Accessed September 2019.

[41] National Highway Traffic Safety Administration (NHTSA) and U.S. Environmental Protection Agency (USEPA), 2018. Federal Register / Vol. 83, No. 165 / Friday, August 24, 2018 / Proposed Rules, The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks 2018. Available at: https://www.gpo.gov/fdsys/pkg/FR-2018-08-24/pdf/2018-16820.pdf. Accessed September 2019.

[42] California Climate Change, Executive Orders, 2018, http://www.climatechange.ca.gov/state/executive_orders.html. Accessed September 2019.

[43] Office of Governor Edmund G. Brown Jr., Governor Brown Establishes Most Ambitious Greenhouse Gas Reduction Target in North America, 2015, https://www.ca.gov/archive/gov39/2015/04/29/news18938/index.html Accessed: September 2019.

- Ordered all state agencies with jurisdiction over sources of GHG emissions to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 reduction targets.
- Directed CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent.

In September 2018, Governor Brown issued Executive Order B-55-18, which establishes a statewide goal of achieving carbon neutrality as soon as possible and no later than 2045.[44]

Health and Safety Code, Division 25.5 – California Global Warming Solutions Act of 2006 (AB 32) and Emissions Limit (SB 32 / AB 197)

In 2006, the California State Legislature adopted Assembly Bill (AB) 32 (codified in the California Health and Safety Code (HSC), Division 25.5 – California Global Warming Solutions Act of 2006), which focuses on reducing GHG emissions in California to 1990 levels by 2020. HSC Division 25.5 defines regulated GHGs as CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 and represents the first enforceable Statewide program to limit emissions of these GHGs from all major industries, with penalties for noncompliance. The law further requires that reduction measures be technologically feasible and cost effective. Under HSC Division 25.5, CARB has the primary responsibility for reducing GHG emissions. CARB is required to adopt rules and regulations directing state actions that would achieve GHG emissions reductions equivalent to 1990 Statewide levels by 2020.

In 2016, the California State Legislature adopted Senate Bill (SB) 32 and its companion bill AB 197, and both were signed by Governor Brown. SB 32 and AB 197 amend HSC Division 25.5, establish a new climate pollution reduction target of 40 percent below 1990 levels by 2030 and include provisions to ensure that the benefits of state climate policies reach into disadvantaged communities.

California Assembly Bill No. 1493 (AB 1493, Pavley) (Chapter 200, Statutes of 2002)

In response to the transportation sector accounting for more than half of California's CO_2 emissions, AB 1493 (Chapter 200, Statutes of 2002), enacted on July 22, 2002, required CARB to set GHG emission standards for passenger vehicles, light duty trucks, and other vehicles whose primary use is non-commercial personal transportation manufactured in and after 2009. In setting these standards, CARB must consider cost effectiveness, technological feasibility, economic impacts, and provide maximum flexibility to manufacturers.[45] As discussed previously, the USEPA and USDOT have adopted federal standards for model year 2012 through 2016 light-duty

[44] California State Government, Executive Order B-55-18 to Achieve Carbon Neutrality, https://www.ca.gov/archive/gov39/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf Accessed September 2019.

[45] CARB, Regulations to Control Greenhouse Gas Emissions from Motor Vehicles, Final Statement of Reasons, 2005, https://ww3.arb.ca.gov/regact/grnhsgas/fsor.pdf. Accessed September 2019.

vehicles. In light of the USEPA and USDOT standards, California - and states adopting California emissions standards - have agreed to defer to the proposed national standard through model year 2016. The 2016 endpoint of the federal and state standards is similar, although the federal standard ramps up slightly more slowly than required under the state standard. The state standards (called the Pavley standards) require additional reductions in CO_2 emissions beyond model year 2016 (referred to as Pavley Phase II standards).[46] As noted above, the USEPA and USDOT have adopted GHG emission standards for model year 2017 through 2025 vehicles. These standards are slightly different from the Pavley Phase II standards, but the State of California has agreed not to contest these standards, in part due to the fact that while the national standard would achieve slightly lower reductions in California, it would achieve greater reductions nationally and is stringent enough to meet state GHG emission reduction goals.[47] On November 15, 2012, CARB approved an amendment that allows manufacturers to comply with the 2017-2025 national standards to meet state law.

Executive Order S-01-07

Executive Order S-01-07 was enacted on January 18, 2007.[48] The order mandates the following: (1) that a Statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020; and (2) that a LCFS for transportation fuels be established in California. In September 2015, CARB approved the re-adoption of the LCFS, which became effective on January 1, 2016, to address procedural deficiencies in the way the original regulation was adopted.[49] In the proposed 2017 Climate Change Scoping Plan Update, CARB's preferred recommendation includes increasing the stringency of the LCFS by reducing the carbon intensity of transportation fuels by 18 percent by 2030, up from the current target of 10 percent by 2020.[50] In April 2017, the LCFS was brought before the Court of Appeal challenging the analysis of potential nitrogen dioxide impacts from biodiesel fuels. The Court directed CARB to conduct an analysis of nitrogen dioxide impacts from biodiesel fuels and froze the carbon intensity targets for diesel and biodiesel fuel provisions at 2017 levels until CARB has completed this analysis. On March 6, 2018 CARB issued its *Draft Supplemental Disclosure Discussion of Oxides of Nitrogen Potentially Caused by the Low Carbon Fuel Standard Regulation*.[51] CARB posted modifications to the amendments on August 13, 2018, with a public comment period

46 On March 24, 2017, CARB voted unanimously to uphold the State's model year 2017-2025 cars and light truck emissions standards. See: CARB, CARB finds vehicle standards are achievable and cost-effective, March 24, 2017, https://ww2.arb.ca.gov/news/carb-finds-vehicle-standards-are-achievable-and-cost-effective. Accessed September 2019.

47 CARB, Advanced Clean Cars Summary, http://www.arb.ca.gov/msprog/clean_cars/acc%20summary-final.pdf. Accessed September 2019.

48 Office of the Governor Arnold Schwarzenegger, Executive Order S-01-07, 2007, https://www.arb.ca.gov/fuels/lcfs/eos0107.pdf. Accessed September 2019.

49 CARB, Low Carbon Fuel Standard, 2018, https://www.arb.ca.gov/fuels/lcfs/lcfs.htm. Accessed September 2019.

50 CARB, AB 32 Scoping Plan, 2017, https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm. Accessed September 2019.

51 CARB, Low Carbon Fuel Standard and Alternative Diesel Fuels Regulation 2018, https://ww2.arb.ca.gov/rulemaking/2018/low-carbon-fuel-standard-and-alternative-diesel-fuels-regulation-2018. Accessed September 2019.

through August 30, 2018. Final approval of regulatory changes from CARB's analysis of nitrogen dioxide impacts from biodiesel fuels was made on January 4, 2019.[52]

Senate Bill 97 (SB 97, Dutton) (Chapter 185, Statutes of 2007)

Senate Bill (SB) 97 (Chapter 185, Statutes of 2007), enacted in 2007, amended CEQA to clearly establish that GHG emissions and the effects of GHG emissions are appropriate subjects for CEQA analysis. It directed the California Office of Planning and Research (OPR) to develop revisions to the State CEQA Guidelines "for the mitigation of GHG emissions or the effects of GHG emissions" and directed the Resources Agency to certify and adopt these revised State CEQA Guidelines by January 2010. The revisions were completed in March 2010 and codified into the California Code of Regulations and became effective within 120 days pursuant to CEQA. The amendments provide regulatory guidance for the analysis and mitigation of the potential effects of GHG emissions. The CEQA Guidelines require:

- Inclusion of GHG analyses in CEQA documents;
- Determination of significance of GHG emissions; and
- If significant GHG emissions would occur, adoption of mitigation to address significant emissions.

Senate Bill 375 (SB 375, Steinberg) (Chapter 728, Statutes of 2008)

SB 375 (Chapter 728, Statutes of 2008), which establishes mechanisms for the development of regional targets for reducing passenger vehicle greenhouse gas emissions, was adopted by the State on September 30, 2008. SB 375 finds that the "transportation sector is the single largest contributor of greenhouse gases of any sector."[53] Under SB 375, CARB is required, in consultation with the Metropolitan Planning Organizations, to set regional GHG reduction targets for the passenger vehicle and light-duty truck sector for 2020 and 2035. In February 2011, CARB adopted GHG emissions reduction targets for the SCAG, which is the Metropolitan Planning Organization for the region in which the City of Los Angeles is located.[54]

In March 2018, the CARB updated the SB 375 targets to require an 8 percent reduction by 2020 and a 19 percent reduction by 2035 in per capita passenger vehicle GHG emissions.[55] As these reduction targets were updated after the *2016-2040 Regional Transportation Plan/Sustainable*

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52 California Air Resources Board, Low Carbon Fuel Standard and Alternative Diesel Fuels Regulation 2019.

53 State of California, Senate Bill No. 375, September 30, 2008, https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200720080SB375. Accessed September 2019.

54 CARB, Sustainable Communities, March 28, 2017, https://ww2.arb.ca.gov/our-work/topics/sustainable-communities. Accessed September 2019.

55 CARB, SB 375 Regional Greenhouse Gas Emissions Reduction Targets, https://ww3.arb.ca.gov/cc/sb375/finaltargets2018.pdf. Accessed September 2019.

Communities Strategy (2016 RTP/SCS) was adopted, it is expected that the next iteration of the RTP/SCS will be updated to meet them.

Meeting SB 375 goals and targets is crucial for the State to meet its climate goals and to reduce GHG emissions as it supports coordinated transportation and land use planning with the goal of more sustainable communities.[56] Under SB 375, the target must be incorporated within that region's RTP, which is used for long-term transportation planning, in a SCS. Certain transportation planning and programming activities would then need to be consistent with the SCS; however, SB 375 expressly provides that the SCS does not regulate the use of land, and further provides that local land use plans and policies (e.g., general plans) are not required to be consistent with either the RTP or SCS.

Title 24, Building Standards Code and CALGreen Code

The California Energy Commission first adopted the Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations, Title 24, Part 6) in 1978 in response to a legislative mandate to reduce energy consumption in the state. Although not originally intended to reduce GHG emissions, increased energy efficiency, and reduced consumption of electricity, natural gas, and other fuels would result in fewer GHG emissions from residential and nonresidential buildings subject to the standard. The standards are updated periodically to allow for the consideration and inclusion of new energy efficiency technologies and methods.

Part 11 of the Title 24 Building Standards is referred to as the California Green Building Standards (CALGreen) Code. The purpose of the CALGreen Code is to "improve public health, safety and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in the following categories: (1) Planning and design; (2) Energy efficiency; (3) Water efficiency and conservation; (4) Material conservation and resource efficiency; and (5) Environmental air quality."[57] The CALGreen Code is not intended to substitute for or be identified as meeting the certification requirements of any green building program that is not established and adopted by the California Building Standards Commission. When the CALGreen Code went into effect in 2009, compliance through 2010 was voluntary. As of January 1, 2011, the CALGreen Code is mandatory for all new buildings constructed in the state. The CALGreen Code establishes mandatory measures for new residential and non-residential buildings. Such mandatory measures include energy efficiency, water conservation, material conservation, planning and design and overall environmental quality.[58]

Renewables Portfolio Standard

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

[56] CARB, Sustainable Communities, https://ww3.arb.ca.gov/cc/sb375/sb375-rd.htm. Accessed September 2019.

[57] California Building Standards Commission, 2010 California Green Building Standards Code, 2010.

[58] California Building Standards Commission, 2010 California Green Building Standards Code.

from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008, Executive Order S-14-08 was signed, which expands the State's Renewables Portfolio Standard (RPS) to 33 percent renewable power by 2020. Pursuant to Executive Order S-21-09, CARB was also preparing regulations to supplement the RPS with a Renewable Energy Standard that would result in a total renewable energy requirement for utilities of 33 percent by 2020. On April 12, 2011, SB X1-2 was signed to increase California's RPS to 33 percent by 2020. SB 350 (Chapter 547, Statues of 2015) further increased the RPS to 50 percent by 2030. The legislation also included interim targets of 40 percent by 2024 and 45 percent by 2027. SB 350 was signed into law on October 7, 2015.

On September 10, 2018, Governor Jerry Brown signed SB 100, which further increased California's Renewables Portfolio Standard and requires retail sellers and local publicly owned electric utilities to procure eligible renewable electricity for 44 percent of retail sales by December 31, 2024, 52 percent by December 31, 2027, and 60 percent by December 31, 2030, and that CARB should plan for 100 percent eligible renewable energy resources and zero-carbon resources by December 31, 2045.[59]

Cap-and-Trade Program

The Climate Change Scoping Plan identifies a Cap-and-Trade Program as one of the strategies California would employ to reduce GHG emissions. CARB asserts that this program will help put California on the path to meet its goal of reducing GHG emissions to 1990 levels by the year 2020, and ultimately achieving an 80 percent reduction from 1990 levels by 2050. Under Cap-and-Trade, an overall limit on GHG emissions from capped sectors is established and facilities subject to the cap will be able to trade permits to emit GHGs. On July 26, 2017, former California Governor Jerry Brown signed into law Assembly Bill 398 that extends the state's cap-and-trade program to 2030 citing it as a key part of California's plan to reduce greenhouse gas emissions 40 percent below 1990 levels by 2030. AB 398 made design changes and amendments to the post-2020 carbon market incorporating features such as a price ceiling, price containment points, additional limits to the number and location of offset credits, limits on who can set greenhouse gas emission requirements, and specifics on industry assistance factors in order to streamline implementation and contain costs through 2030.[60,61]

CARB designed and adopted a California Cap-and-Trade Program[62] pursuant to its authority under AB 32. The development of this Program included a multi-year stakeholder process and consideration of potential impacts on disproportionately impacted communities. The Cap-and-Trade Program is designed to reduce GHG emissions from major sources (deemed "covered

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59 California Legislative Information, SB-100 California Renewables Portfolio Standard Program: Emissions of Greenhouse Gases.

60 California Legislative Information, Assembly Bill No. 398, https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB398. Accessed September 2019.

61 Center for Climate and Energy Solutions, Summary of California's Extension of its Cap-And-Trade Program, https://www.c2es.org/site/assets/uploads/2017/09/summary-californias-extension-its-cap-trade-program.pdf. Accessed September 2019.

62 17 California Code of Regulation (CCR) Section 95800 to 96023.

entities") by setting a firm cap on Statewide GHG emissions and employing market mechanisms to achieve AB 32's emission-reduction mandate of returning to 1990 levels of emissions by 2020. The Statewide cap for GHG emissions from the capped sectors[63] (e.g., electricity generation, petroleum refining, and cement production) commenced in 2013 and will decline over time, achieving GHG emission reductions throughout the Program's duration.

Under the Cap-and-Trade Program, CARB issues allowances equal to the total amount of allowable emissions over a given compliance period and distributes these to regulated entities. Covered entities that emit more than 25,000 $MTCO_2e$ per year must comply with the Cap-and-Trade Program.[64] Triggering of the 25,000 $MTCO_2e$ per year "inclusion threshold" is measured against a subset of emissions reported and verified under the California Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (Mandatory Reporting Rule or "MRR").[65]

Each covered entity with a compliance obligation is required to surrender "compliance instruments"[66] for each $MTCO_2e$ of GHG they emit. Covered entities are allocated free allowances in whole or part (if eligible), buy allowances at auction, purchase allowances from others, or purchase offset credits. A "compliance period" is the time frame during which the compliance obligation is calculated. The years 2013 and 2014 are the first compliance period, the years 2015–2017 are the second compliance period, and the third compliance period is from 2018–2020. At the end of each compliance period, each facility will be required to surrender compliance instruments to CARB equivalent to their total GHG emissions throughout the compliance period. There also are requirements to surrender compliance instruments covering 30 percent of the prior year's compliance obligation by November of each year. For example, in November 2014, a covered entity was required to submit compliance instruments to cover 30 percent of its 2013 GHG emissions.

The Cap-and-Trade Regulation provides a firm cap, ensuring that the 2020 Statewide emission limit will not be exceeded. An inherent feature of the Cap-and-Trade Program is that it does not guarantee GHG emissions reductions in any discrete location or by any particular source. Rather, GHG emissions reductions are only guaranteed on an accumulative basis. As summarized by CARB in its First Update to the Climate Change Scoping Plan:

> *The Cap-and-Trade Regulation gives companies the flexibility to trade allowances with others or take steps to cost-effectively reduce emissions at their own facilities. Companies that emit more have to turn in more allowances or other compliance instruments. Companies that can cut their GHG emissions have to turn in fewer allowances.* ***But as the cap declines, aggregate emissions must be reduced.***[67]

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63 See generally 17 CCR Sections 95811 and 95812.

64 17 CCR Section 95812.

65 17 CCR Sections 95100-95158.

66 Compliance instruments are permits to emit, the majority of which will be "allowances," but entities also are allowed to use CARB-approved offset credits to meet up to 8% of their compliance obligations.

67 CARB, First Update to the Climate Change Scoping Plan: Building on the Framework, May 2014, page 86.

In other words, a covered entity theoretically could increase its GHG emissions every year and still comply with the Cap-and-Trade Program. However, as climate change is a global phenomenon and the effects of GHG emissions are considered cumulative in nature, a focus on aggregate GHG emissions reductions is warranted.

Further, the reductions in GHG emissions that will be achieved by the Cap-and-Trade Program inherently are variable and, therefore, impossible to quantify with precision:

> *The Cap-and-Trade Regulation is different from most of the other measures in the Scoping Plan. The [R]egulation sets a hard cap, instead of an emission limit, so the emission reductions from the program vary as our estimates of "business as usual" emissions in the future are updated. In addition, the Cap-and-Trade Program works in concert with many of the direct regulatory measures—providing an additional economic incentive to reduce emissions. Actions taken to comply with direct regulations reduce an entity's compliance obligation under the Cap-and-Trade Regulation. So, for example, increased deployment of renewable electricity sources reduces a utility's compliance obligation under the Cap-and-Trade Regulation.*[68]

If California's direct regulatory measures reduce GHG emissions more than expected, then the Cap-and-Trade Program will be responsible for relatively fewer emissions reductions. If California's direct regulatory measures reduce GHG emissions less than expected, then the Cap-and-Trade Program will be responsible for relatively more emissions reductions. In other words, the Cap-and-Trade Program functions sort of like an insurance policy for meeting California 2020's GHG emissions reduction mandate:

> *The Cap-and-Trade Program establishes an overall limit on GHG emissions from most of the California economy—the "capped sectors." Within the capped sectors, some of the reductions are being accomplished through direct regulations, such as improved building and appliance efficiency standards, the [Low Carbon Fuel Standard] LCFS, and the 33 percent [Renewables Portfolio Standard] RPS. Whatever additional reductions are needed to bring emissions within the cap is accomplished through price incentives posed by emissions allowance prices. Together, direct regulation and price incentives assure that emissions are brought down cost-effectively to the level of the overall cap.*[69]
>
> *[T]he Cap-and-Trade Regulation provides assurance that California's 2020 limit will be met because the regulation sets a firm limit on 85 percent of California's GHG emissions.*[70]

In sum, the Cap-and-Trade Program will achieve aggregate, rather than site-specific or project-level, GHG emissions reductions. Also, due to the regulatory architecture adopted by CARB

68 CARB, First Update to the Climate Change Scoping Plan: Building on the Framework, page 86.
69 CARB, First Update to the Climate Change Scoping Plan: Building on the Framework, page 88.
70 CARB, First Update to the Climate Change Scoping Plan: Building on the Framework, pages 86 and 87.

under AB 32, the reductions attributed to the Cap-and-Trade Program can change over time depending on the State's emissions forecasts and the effectiveness of direct regulatory measures.

The Cap-and-Trade Program covers the GHG emissions associated with electricity consumed in California, whether generated in-state or imported.[71] Accordingly, for projects that are subject to the California Environmental Quality Act (CEQA), GHG emissions from electricity consumption are covered by the Cap-and-Trade Program.

The Cap-and-Trade Program also covers fuel suppliers (natural gas and propane fuel providers and transportation fuel providers) to address emissions from such fuels and from combustion of other fossil fuels not directly covered at large sources in the Program's first compliance period.[72] While the Cap-and-Trade Program technically covered fuel suppliers as early as 2012, they did not have a compliance obligation (i.e., they were not fully regulated) until 2015:

> *Suppliers of natural gas, suppliers of RBOB [Reformulated Gasoline Blendstock for Oxygenate Blending] and distillate fuel oils, suppliers of liquefied petroleum gas, and suppliers of liquefied natural gas specified in sections 95811(c), (d), (e), (f), and (g) that meet or exceed the annual threshold in section 95812(d)* ***will have a compliance obligation beginning with the second compliance period****.*[73]

As of January 1, 2015, the Cap-and-Trade Program covered approximately 85 percent of California's GHG emissions.

The Cap-and-Trade Program covers the GHG emissions associated with the combustion of transportation fuels in California, whether refined in-state or imported. Since 2015, fuels, such as gasoline, diesel, and natural gas, have been covered under the Cap-and-Trade Program. Fuel suppliers are required to reduce GHG emissions by supplying low carbon fuels or purchasing pollution permits, called "allowances," to cover the GHGs produced when the conventional petroleum-based fuel they supply is combusted.[74]

Demonstrating the efficacy of the Cap-and-Trade Program, based on the year 2016 GHG emissions inventory, California's GHG emissions were approximately 429 $MMTCO_2e$, approximately 12 $MMTCO_2e$ below 2015 levels and just below the 2020 target of 431 $MMTCO_2e$.[75] The largest reductions were the result of increased renewable electricity in the electricity sector, which is a covered sector in the Cap-and-Trade Program. State *CEQA Guidelines* Section 15064(h)(3) allows a Lead Agency to make a finding of non-significance for

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[71] 17 CCR Section 95811(b).

[72] 17 CCR Sections 95811 and 95812(d).

[73] 17 CCR Sections 95851(b).

[74] CARB, California's Cap-and-Trade Program: Fuel Facts, https://ww3.arb.ca.gov/cc/capandtrade/guidance/facts_fuels_under_the_cap.pdf.

[75] CARB, California Greenhouse Gas Emissions for 2000 to 2016, Trends of Emissions and Other Indicators, 2018 Edition, https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2016/ghg_inventory_trends_00-16.pdf. Accessed September 2019.

GHG emissions if a project complies with a program and/or other regulatory schemes to reduce GHG emissions.[76]

California Air Resources Board

The California Air Resources Board (CARB), a part of the California Environmental Protection Agency (CalEPA), is responsible for the coordination and administration of both federal and state air pollution control programs within California. In this capacity, CARB conducts research, sets the California Ambient Air Quality Standards (CAAQS), compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB establishes emissions standards for motor vehicles sold in California, consumer products (such as hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions. CARB has primary responsibility for the development of California's State Implementation Plan (SIP), for which it works closely with the federal government and the local air districts. The SIP is required for the State to take over implementation of the federal Clean Air Act. In addition, CARB also has primary responsibility for adopting and implementing California's legislative policies and programs, including the Climate Change Scoping Plan discussed below, to reduce the State's greenhouse gas emissions to meet the State's goal of reducing GHG emissions to 1990 levels by 2020 and 40 percent below 1990 levels by 2030.

Climate Change Scoping Plan

As discussed above, AB 32 and SB 32 require CARB to prepare a Climate Change Scoping Plan for achieving the maximum technologically feasible and cost-effective GHG emission reduction by 2020 for AB 32 and 2030 for SB 32 (Health and Safety Code section 38561 (h)). CARB developed its initial Scoping Plan, which was approved in 2008; it contained a mix of recommended strategies to achieve the 2020 emissions cap that combined direct regulations, market-based approaches, voluntary measures, policies, and other emission reduction programs calculated to meet the 2020 Statewide GHG emission limit and initiate the transformations needed to achieve the State's long-range climate objectives.[77]

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[76] See, for example, San Joaquin Valley Air Pollution Control District (SJVAPCD), CEQA Determinations of Significance for Projects Subject to ARB's GHG Cap-and-Trade Regulation, APR-2025 (June 25, 2014), in which the SJVAPCD "determined that GHG emissions increases that are covered under ARB's Cap-and-Trade regulation cannot constitute significant increases under CEQA…" Furthermore, the SCAQMD has taken this position in CEQA documents it has produced as a Lead Agency. The SCAQMD has prepared 3 Negative Declarations and one Draft Environmental Impact Report that demonstrate the SCAQMD has applied its 10,000 $MTCO_2e$/yr significance threshold in such a way that GHG emissions covered by the Cap-and-Trade Program do not constitute emissions that must be measured against the threshold. See SCAQMD, Final Negative Declaration for Ultramar Inc. Wilmington Refinery Cogeneration Project, SHC No. 2012041014 (October 2014); SCAQMD Final Negative Declaration for Phillips 99 Los Angeles Refinery Carson Plant—Crude Oil Storage Capacity Project, SCH No. 2013091029 (December 2014); SCAQMD Final Mitigated Negative Declaration for Toxic Air Contaminant Reduction for Compliance with SCAQMD Rules 1420.1 and 1402 at the Exide Technologies Facility in Vernon, CA, SCH No. 2014101040 (December 2014); and SCAQMD Final Environmental Impact Report for the Breitburn Santa Fe Springs Blocks 400/700 Upgrade Project, SCH No. 2014121014 (August 2015).

[77] Office of Governor Edmund G. Brown Jr., Governor Brown Establishes Most Ambitious Greenhouse Gas Reduction Target in North America.

As required by HSC Division 25.5, CARB approved the 1990 GHG emissions inventory, thereby establishing the emissions reduction target for 2020. The 2020 emissions reduction target was originally set at 427 million metric tons (MMT) of CO_2e using the GWP values from the IPCC SAR. CARB also projected the state's 2020 GHG emissions under no-action-taken (NAT) conditions – that is, emissions that would occur without any plans, policies, or regulations to reduce GHG emissions. CARB originally used an average of the state's GHG emissions from 2002 through 2004 and projected the 2020 levels at approximately 596 $MMTCO_2e$ (using GWP values from the IPCC SAR). Therefore, under the original projections, the state would have had to reduce its 2020 NAT emissions by 28.4 percent in order to meet the 1990 target of 427 $MMTCO_2e$.

First Update to the Climate Change Scoping Plan

The First Update to the Scoping Plan was approved by CARB in May 2014 and built upon the initial Scoping Plan with new strategies and recommendations.[78] In 2014, CARB revised the target using the GWP values from the IPCC AR4 and determined the 1990 GHG emissions inventory and 2020 GHG emissions limit to be 431 $MMTCO_2e$. CARB also updated the State's 2020 NAT emissions estimate to account for the effect of the 2007–2009 economic recession, new estimates for future fuel and energy demand, and the reductions required by regulation that had recently been adopted for motor vehicles and renewable energy. CARB's projected Statewide 2020 emissions estimate using the GWP values from the IPCC AR4 is 509.4 $MMTCO_2e$.

Therefore, under the first update to the Scoping Plan, the emission reductions necessary to achieve the 2020 emissions target of 431 $MMTCO_2e$ would have been 78.4 $MMTCO_2e$, or a reduction of GHG emissions by approximately 15.4 percent.

2017 Climate Change Scoping Plan

In response to the passage of SB 32 and the identification of the 2030 GHG reduction target, CARB adopted the 2017 Climate Change Scoping Plan at a public meeting held in December 2017.[79] The 2017 Scoping Plan outlines the strategies the State will implement to achieve the 2030 GHG reduction target of 40 percent below 1990 levels, which build on the Cap-and-Trade Regulation, the Low Carbon Fuel Standard, improved vehicle, truck and freight movement emissions standards, increasing renewable energy, and strategies to reduce methane emissions from agricultural and other wastes by using it to meet California's energy needs. Accounting for all GHG emissions sectors in the State, statewide population forecasts, and the statewide reductions necessary to achieve the 2030 statewide target under SB 32, CARB recommends statewide targets of no more than six metric tons CO2e per capita by 2030.[80] CARB's projected

[78] California Air Resources Board (CARB), First Update to the AB 32 Scoping Plan https://ww3.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf. Accessed September 2019.

[79] CARB, California's 2017 Climate Change Scoping Plan, November 2017, https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed September 2019.

[80] CARB, California's 2017 Climate Change Scoping Plan, November 2017, https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed September 2019.

Statewide 2030 emissions takes into account 2020 GHG reduction policies and programs.[81] The 2017 Scoping Plan also addresses GHG emissions from natural and working lands of California, including the agriculture and forestry sectors.

CARB states that the approved Scoping Plan "is the best choice to achieve the State's climate and clean air goals."[82] Under the Scoping Plan, the majority of the reductions would result from the continuation of the Cap-and-Trade regulation. Additional reductions would be achieved from electricity sector standards (i.e., utility providers to supply 50 percent renewable electricity by 2030), doubling the energy efficiency savings at end uses, additional reductions from the Low Carbon Fuel Standard (LCFS), implementing the short-lived GHG strategy (e.g., hydrofluorocarbons), and implementing the mobile source strategy and sustainable freight action plan. In July 2017, the California Legislature voted to extend the Cap-and-Trade regulation to 2030.

The 2017 Scoping Plan discusses the role of local governments in meeting the State's greenhouse gas reductions goals because local governments have jurisdiction and land use authority related to: community-scale planning and permitting processes, local codes and actions, outreach and education programs, and municipal operations.[83] Furthermore, local governments may have the ability to incentivize renewable energy, energy efficiency, and water efficiency measures.[84]

For individual projects under CEQA, the 2017 Scoping Plan states that local governments can support climate action when considering discretionary approvals and entitlements. According to the 2017 Scoping Plan, lead agencies have the discretion to develop evidence-based numeric thresholds consistent with the Scoping Plan, the State's long-term goals, and climate change science.[85]

A summary of the GHG emissions reductions required under HSC Division 25.5 is provided in **Table 3**, *Estimated Greenhouse Gas Emissions Reductions Required by HSC Division 25.5*.

TABLE 3
ESTIMATED GREENHOUSE GAS EMISSIONS REDUCTIONS REQUIRED BY HSC DIVISION 25.5

Emissions Scenario	GHG Emissions ($MMTCO_2e$)
2008 Scoping Plan (IPCC SAR)	
2020 BAU Forecast (CARB 2008 Scoping Plan Estimate)	596
2020 Emissions Target Set by AB 32 (i.e., 1990 level)	427
Reduction below Business-As-Usual necessary to achieve 1990 levels by 2020	169 (28.4%) [a]
2011 Scoping Plan (IPCC AR4)	
2020 BAU Forecast (CARB 2011 Scoping Plan Estimate)	509.4

81 CARB, California's 2017 Climate Change Scoping Plan.
82 CARB, California's 2017 Climate Change Scoping Plan.
83 CARB, California's 2017 Climate Change Scoping Plan, page 97.
84 CARB, California's 2017 Climate Change Scoping Plan, page 97.
85 CARB, California's 2017 Climate Change Scoping Plan, page 100.

2020 Emissions Target Set by AB 32 (i.e., 1990 level)	431
Reduction below Business-As-Usual necessary to achieve 1990 levels by 2020	78.4 (15.4%) [b]
2017 Scoping Plan Update	
2030 BAU Forecast ("Reference Scenario" which includes 2020 GHG reduction policies and programs)	389
2030 Emissions Target Set by HSC Division 25.5 (i.e., 40% below 1990 Level)	260
Reduction below Business-As-Usual Necessary to Achieve 40% below 1990 Level by 2030	129 (33.2%) [c]

MMTCO2e = million metric tons of carbon dioxide equivalents

a 596 – 427 = 169 / 596 = 28.4%
b 509.4 – 431 = 78.4 / 509.4 = 15.4%
c 389 – 260 = 129 / 389 = 33.2%

SOURCE: CARB, Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document (FED), Attachment D, August 19, 2011; CARB, 2020 Business-as-Usual (BAU) Emissions Projection, 2014 Edition, 2017, https://ww3.arb.ca.gov/cc/inventory/data/bau.htm. Accessed September 2019; CARB, California's 2017 Climate Change Scoping Plan, November 2017, https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed September 2019.

Under the Scoping Plan Scenario, continuation of the Cap-and-Trade regulation (or carbon tax) is expected to cover approximately 34 to 79 $MMTCO_2$ of the 2030 reduction obligation.[86] The State's short-lived climate pollutants strategy, which is for GHGs that remain in the atmosphere for shorter periods of time compared to longer-lived GHGs like CO_2, is expected to cover approximately 17 to 35 $MMTCO_2e$. The Renewables Portfolio Standard with 50 percent renewable electricity by 2030 is expected to cover approximately 3 $MMTCO_2$. The mobile source strategy and sustainable freight action plan includes maintaining the existing vehicle GHG emissions standards, increasing the number of zero emission vehicles and improving the freight system efficiency, and is expected to cover approximately 11 to 13 $MMTCO_2$. Under the Scoping Plan Scenario, CARB expects that the reduction in GHGs from doubling of the energy efficiency savings in natural gas and electricity end uses in the CEC 2015 Integrated Energy Policy Report by 2030 would cover approximately 7 to 9 $MMTCO_2$ of the 2030 reduction obligation. The other strategies would be expected to cover the remaining 2030 reduction obligations.

2.3 Regional

South Coast Air Quality Management District

The Project site is located in the South Coast Air Basin (Air Basin), which consists of Orange County, Los Angeles County (excluding the Antelope Valley portion), and the western, non-desert portions of San Bernardino and Riverside Counties, in addition to the San Gorgonio Pass area in Riverside County. The South Coast Air Quality Management District (SCAQMD) is responsible for air quality planning in the Air Basin and developing rules and regulations to bring the area into attainment of the ambient air quality standards. This is accomplished though air quality monitoring, evaluation, education, implementation of control measures to reduce emissions from stationary sources, permitting and inspection of pollution sources, enforcement of

86 CARB, California's 2017 Climate Change Scoping Plan, Appendix G, November 2017, https://ww3.arb.ca.gov/cc/scopingplan/2030sp_appg_alt-ab197aq-health_final.pdf. Accessed September 2019.

air quality regulations, and by supporting and implementing measures to reduce emissions from motor vehicles.

SCAQMD adopted a "Policy on Global Warming and Stratospheric Ozone Depletion" on April 6, 1990.[87] The policy commits SCAQMD to consider global impacts in rulemaking and in drafting revisions to the Air Quality Management Plan. In March 1992, the SCAQMD Governing Board reaffirmed this policy and adopted amendments to the policy to include the following directives:[88]

- Phase out the use and corresponding emissions of chlorofluorocarbons, methyl chloroform (1,1,1-trichloroethane or TCA), carbon tetrachloride, and halons by December 1995;
- Phase out the large quantity use and corresponding emissions of hydrochlorofluorocarbons by the year 2000;
- Develop recycling regulations for hydrochlorofluorocarbons (e.g., SCAQMD Rules 1411 and 1415);
- Develop an emissions inventory and control strategy for methyl bromide; and
- Support the adoption of a California GHG emission reduction goal.

In 2008, SCAQMD released draft guidance regarding interim CEQA GHG significance thresholds.[89] On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold for stationary source/industrial projects where SCAQMD is the Lead Agency. However, SCAQMD has not adopted a GHG significance threshold for land use development projects (e.g., mixed-use/commercial projects). A GHG Significance Threshold Working Group was formed to further evaluate potential GHG significance thresholds.[90] The aforementioned Working Group has been inactive since 2011, however, and SCAQMD has not formally adopted any GHG significance threshold for land use development projects.

SCAG Regional Transportation Plan/Sustainable Communities Strategy (RTP/STS)

In February 2011, CARB adopted the final GHG emissions reduction targets for the SCAG, which is the Metropolitan Planning Organization for the region in which the City of Los Angeles is located.[91] The target includes a per capita reduction of 8 percent for 2020 and 13 percent for 2035 compared to the 2005 baseline. On April 7, 2016, SCAG adopted the 2016-2040 Regional

[87] South Coast Air Quality Management District (SCAQMD), SCAQMD's Historical Activity on Climate Change, 2014, http://www.aqmd.gov/nav/about/initiatives/climate-change. Accessed September 2019.

[88] SCAQMD, CEQA Air Quality Handbook, April 1993, pages 3-7.

[89] SCAQMD, Board Meeting, December 5, 2008, Agenda No. 31, http://www3.aqmd.gov/hb/2008/December/0812ag.html. Accessed September 2019.

[90] SCAQMD, Greenhouse Gases CEQA Significance Thresholds, http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/ghg-significance-thresholds. Accessed September 2019.

[91] CARB, Sustainable Communities, https://ww2.arb.ca.gov/our-work/topics/sustainable-communities. September 2019.

Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS), which is an update to the previous 2012 RTP/SCS.[92] Using growth forecasts and economic trends, the 2016 RTP/SCS provides a vision for transportation throughout the region for the next 25 years. It considers the role of transportation in the broader context of economic, environmental, and quality-of-life goals for the future, identifying regional transportation strategies to address mobility needs. The SCAG RTP/SCS goals and objectives implement SB 375 in order to reduce GHG emissions from the land use and transportation sectors through "smart growth." The 2016 RTP/SCS describes how the region can attain the GHG emission-reduction targets set by CARB by achieving an 8 percent reduction by 2020, 18 percent reduction by 2035, and 21 percent reduction by 2040 compared to the 2005 level on a per capita basis.[93] Compliance with and implementation of 2016 RTP/SCS policies and strategies would have co-benefits of reducing per capita criteria air pollutant emissions associated with reduced per capita vehicle miles traveled (VMT).

The 2016 RTP/SCS states that the SCAG region is home to approximately 18.3 million people in 2012 and currently includes approximately 5.9 million homes and 7.4 million jobs. By 2040, the integrated growth forecast projects that these figures will increase by 3.8 million people, with nearly 1.5 million more homes and 2.4 million more jobs. High Quality Transit Areas (HQTAs), which are defined by the 2016 RTP/SCS as generally walkable transit villages or corridors that are within 0.5 mile of a well-serviced transit stop or a transit corridor with 15-minute or less service frequency during peak commute hours, will account for 3 percent of regional total land, but are projected to accommodate 46 percent and 55 percent of future household and employment growth respectively between 2012 and 2040.[94] The 2016 RTP/SCS overall land use pattern reinforces the trend of focusing new housing and employment in the region's HQTAs. HQTAs are a cornerstone of land use planning best practice in the SCAG region because they concentrate roadway repair investments, leverage transit and active transportation investments, reduce regional life cycle infrastructure costs, improve accessibility, create local jobs, and have the potential to improve public health and housing affordability.

SCAG's 2016 RTP/SCS provides specific strategies for implementation. These strategies include supporting projects that encourage a diverse job opportunities for a variety of skills and education, recreation and cultures and a full-range of shopping, entertainment and services all within a relatively short distance; encouraging employment development around current and planned transit stations and neighborhood commercial centers; encouraging the implementation of a "Complete Streets" policy that meets the needs of all users of the streets, roads and highways including bicyclists, children, persons with disabilities, motorists, electric vehicles, movers of commercial goods, pedestrians, users of public transportation, and seniors; and supporting alternative fueled vehicles. [95]

In addition, the 2016 RTP/SCS includes strategies to promote active transportation, support local planning and projects that serve short trips, expand understanding and consideration of public health in the development of local plans and projects, and supports improvements in sidewalk

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92 SCAG, 2016 RTP/SCS, http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx. Accessed September 2019.
93 SCAG, 2016 RTP/SCS.
94 SCAG, 2016 RTP/SCS, pages 20, 75-77.
95 SCAG, 2016 RTP/SCS, pages 170-181.

quality, local bike networks, and neighborhood mobility areas. It also proposes increasing access to the California Coast Trail, light rail and bus stations, and promoting corridors that support biking and walking, such as through a regional greenway network and local bike networks. The 2016 RTP/SCS proposes to better align active transportation investments with land use and transportation strategies, increase competitiveness of local agencies for federal and state funding, and to expand the potential for all people to use active transportation. CARB has accepted the SCAG GHG quantification determination in the 2016 RTP/SCS and that the 2016 RTP/SCS, if implemented, would achieve the 2020 and 2035 GHG emission reduction targets established by CARB.[96,97]

Although there are no per capita GHG emission reduction targets for passenger vehicles set by CARB for 2040, the 2016 RTP/SCS GHG emission reduction trajectory shows that more aggressive GHG emission reductions are projected for 2040. By meeting and exceeding the SB 375 targets for 2020 and 2035, as well as achieving an approximately 21-percent decrease in per capita GHG emissions by 2040 (an additional 3-percent reduction in the five years between 2035 [18 percent] and 2040 [21 percent]), the 2016 RTP/SCS is expected to fulfill and exceed its portion of SB 375 compliance with respect to meeting the state's GHG emission reduction goals.

In March 2018, the CARB updated the SB 375 targets to require 8 percent reduction by 2020 and a 19 percent reduction by 2035 in per capita passenger vehicle GHG emissions.[98] As this reduction target was updated after the 2016-2040 RTP/SCS, it is expected that the next iteration of the RTP/SCS will be updated to include this target.

2.4 Local

City of Culver City

The City of Culver City has not developed per capita GHG targets for 2030 or 2050 and has not adopted a GHG significance threshold applicable to the project. However, the City recognizes that GHG emissions reductions are necessary in the public and private sectors. The City has taken the initiative in combatting climate change by developing programs such as *Green Building Program*, as discussed further below.

The City also participates in an environmental recognition program, California Green Communities. The program helps cities develop strategies to reduce carbon emissions and increase energy efficiency in their community. In addition, the City has adopted green building ordinances to reduce GHG emissions for new development. The City has adopted a Photovoltaic

96 SCAG, 2016 RTP/SCS, pages 170-181.

97 CARB, Southern California Association of Governments' (SCAG) 2016 Sustainable Communities Strategy (SCS) ARB Acceptance of GHG Quantification Determination, June 2016, https://www.arb.ca.gov/cc/sb375/scag_executive_order_g_16_066.pdf. Accessed September 2019.

98 CARB, SB 375 Regional Greenhouse Gas Emissions Reduction Targets, https://ww3.arb.ca.gov/cc/sb375/finaltargets2018.pdf.Accessed September 2019.

Requirement which requires 1 kilowatt (kw) of photovoltaic power installed per 10,000 square feet of new development.[99]

In 2009, the City adopted the Green Building program which for new construction totaling up to 49,999 square feet must comply with 80 percent of the applicable Green Building Program Category 1 Project checklist items.[100] Project applicants for Category I Projects are required to submit a filled checklist with the construction permit application drawings and all items checked must be indicated in the construction permit application drawings

The General Plan Land Use Element designation of the Project Site is Commercial. Adjacent designations to the north, south, east and west are also Commercial.[101] In the Land Use Element, the Land Use designation of Commercial is further specified into five subcategories: Neighborhood Serving Corridor, General Corridor, Downtown, Community Serving Center and Regional Center. The Project Site is designated subcategory General Corridor and has a corresponding Zone of C-3 for medium-scale commercial, automotive, hotel, restaurant, office, and retail and services development, with medium-density housing opportunities compatible with adjacent residential neighborhoods.[102] Furthermore, the General Plan Housing Element also states that residential land uses as well as mixed-use projects are permitted in the General Corridor land use designation.[103] The Project is therefore consistent with the long-standing zoning designation of the site as determined in the City's Land Use Element and Housing Element. The Project Site is located within the Lucerne-Higuera Neighborhood in the northeast portion of the City. As indicated in the Land Use Element, Figure LU-12, the Project Site is located within the Eastern Sub-Area of the City. Issues specific to the Southern Eastern Central Sub-Area pertain to maximizing neighborhood services and support by increasing neighborhood-supporting retail services, such as a supermarket, shoe repair or appliance repair services, maintaining the low-density, single family character of the McManus neighborhood, creating a local neighborhood park for the Lucerne-Higuera Neighborhood, as well as updating and requiring new studies with respect to the Alquist-Priolo Earthquake Fault Zone that a portion of the McManus neighborhood is located within and has experienced foundation problems and sewer line ruptures. No specific objectives or policies were identified for or are directly applicable to this Project.

The Circulation Element provides an overview of regulatory policies, transportation agencies, and local conditions; presents a vision for mobility in the Culver City area; presents a Street System Classification; discusses the Culver CityBus system; presents Bikeway Classifications; and provides goals, objectives, and policies to improve the local and regional transportation system. The City has also adopted its first comprehensive plan for bicycling and walking. The Bicycle & Pedestrian Master Plan (adopted November 8, 2010), including existing and proposed bicycle and pedestrian facilities, is discussed below. The City has also adopted the concept of Complete

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99 Culver City Municipal Code 2017. Solar Photovoltaic Systems, Chapter 15.02.1005. Accessed September 2019.

100 Culver City Building Safety Division Mandatory Green Building Program, Category 1 Qualifying Projects, https://www.culvercity.org/Home/ShowDocument?id=902. Accessed September 2019.

101 City of Culver City General Plan, Land Use Element, adopted 1996, amended through 2000, page LU-20.

102 City of Culver City General Plan, Land Use Element, adopted 1996, amended through 2000, page LU-20.

103 City of Culver City General Plan, Housing Element, adopted 2014, page IV-1 and B-5.

Streets, which emphasizes a balanced transportation system that considers all users of the road (cyclists, pedestrians, transit riders, and vehicles) while planning development and transportation projects.[104] The goal of this concept is to transform the City into a place with an extensive bicycle and pedestrian network that allows travelers of all levels and abilities to feel comfortable walking and biking to their destinations.[105]

The Culver City Bicycle & Pedestrian Master Plan (BPMP) is a comprehensive plan for bicycling and walking in Culver City that considers all users of the road (cyclists, pedestrians, transit riders, and vehicles) while planning development and transportation projects. The BPMP provides an inventory and evaluation of the City's existing bicycle and pedestrian facilities, identifies opportunities and constraints associated with these facilities, and provides recommendations for the future development of bicycle and pedestrian facilities.[106] The BPMP also includes a stated goal of transforming the City into a place with an extensive bicycle and pedestrian network for travelers of all levels and abilities, and in so doing encourage more people to forgo car trips in favor of alternative forms of transportation. The BPMP identifies specific objectives, policies, and actions directed towards the City in order to achieve this goal.

As presented in the BPMP, the closest existing bicycle facility to the Project Site is the Venice Boulevard Class II Bike Lanes, with access off of Robertson Boulevard.[107] As updated on the City's website, other bicycle facilities near the Project Site include Class III Bike Route/Shared Lane Markings on Wesley Street, Higuera Street, Lucerne Avenue, Irving Place, A Street, and Van Buren Place installed in June and July 2011.[108,109] As identified in the BPMP, proposed bikeways in the vicinity of the Project Site include Class II Bike Lanes and Class III Bike Route/Shared Lane Markings on Washington Boulevard, Bicycle Friendly Street designations on Wesley Street, Jacobs Street and a Class I Bike Path on National Boulevard.[110] As also shown in the BPMP, a proposed pedestrian corridor is identified along Washington Boulevard from Fairfax to Lincoln.[111]

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104 Alta Planning + Design, Culver City Bicycle & Pedestrian Master Plan, adopted by City Council, November 8, 2010, page 8.

105 Alta Planning + Design, Culver City Bicycle & Pedestrian Master Plan, adopted by City Council, November 8, 2010, page 136.

106 Alta Planning + Design, Culver City Bicycle & Pedestrian Master Plan, adopted by City Council, November 8, 2010, pages 1 and 2.

107 Culver City Bicycle & Pedestrian Master Plan, op. cit., Table 3-1, Figure 3-1, and Map 3-1. Class II Bike Route provides a striped, signed, and stenciled lane for one-way travel on a street or highway.

108 A Class III Bike Lane provides for shared use with bicycle or motor vehicle traffic and uses only signage identification

109 Biking in Culver City, http://www.culvercity.org/enjoy/getting-around/biking-in-culver-city. Accessed September 2019.

110 Culver City Bicycle & Pedestrian Master Plan, op. cit., Map 5-1. A Bicycle Friendly Street designation is for predominately residential streets with relatively low traffic volumes and includes Class III Bike Route signage or Shared Roadway Bicycle Marking (sharrows), and may include custom signage and traffic calming features. Class I Bike Path provides bicycle travel on a paved right-of-way completely separated from any street or highway.

111 Culver City Bicycle & Pedestrian Master Plan, op. cit., Map 5-2. Pedestrian Improvement Corridors are streets in Culver City significant to pedestrian travel. As pedestrian corridors, these streets will receive priority attention with respect to maintenance, amenities and improvements.

In February 2019 for residential customers and May 2019 for non-residential customers, Clean Power Alliance became the new electricity supplier for Culver City. With this change, Clean Power Alliance purchases the renewable energy resources for electricity and Southern California Edison (SCE) delivers it to Culver City customers. The Clean Power Alliance is a Joint Powers Authority made up of public agencies across Los Angeles and Ventura counties working together to bring clean, renewable power to Southern California. With the recent switch in energy providers, electricity customers in Culver City are automatically defaulted to have 100% renewable energy serving their electricity needs. Alternatively, customers can opt to have their electricity power consisting of 50% renewable content or 36%, or opt out of the Clean Power Alliance to remain with SCE as their provider. The Project's GHG analysis conservatively assumes the Project will remain with SCE as their electricity provider and does not take additional credit for renewable energy beyond the expected SCE renewable energy percentage for year 2021 based on the required renewables by year 2024 under SB 100.[112]

[112] For the purposes of estimating GHG emissions in this Technical Report, the emissions analysis conservatively assumes Project would not switch electricity providers from SCE to the Clean Power Alliance (i.e., does not take any credit for 36%, 50%, or 100% renewable electricity, depending on the selected Clean Power Alliance plan). Should the Project switch electricity providers from SCE to the Clean Power Alliance, the Project's electricity-related emissions would likely be lower than disclosed in this Technical Report.

SECTION 3
Thresholds of Significance

3.1 Greenhouse Gas Emissions and Reduction Plan Considerations

The significance thresholds below are derived from the Environmental Checklist questions in Appendix G of the State *CEQA Guidelines*. Accordingly, a significant impact associated with GHGs would occur if the Project were to:

a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or

b) Conflict with any applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

The City has not yet adopted a numerical significance threshold for assessing impacts related to GHG emissions and has not formally adopted a local plan for reducing GHG emission. When no guidance exists under CEQA, the lead agency may look to and assess general compliance with comparable regulatory schemes.[113] In its January 2008 CEQA and Climate Change white paper, the California Air Pollution Control Officer's Association (CAPCOA) identified a number of potential approaches for determining the significance of GHG emissions in CEQA documents. In its white paper, CAPCOA suggests making significance determinations on a case-by-case basis when no significance thresholds have been formally adopted by a lead agency.

The Office of Planning and Research released a technical advisory on CEQA and climate change that provided some guidance on assessing the significance of GHG emissions, and states that "lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice," and that while "climate change is ultimately a cumulative impact, not every individual project that emits GHGs must necessarily be found to contribute to a significant cumulative impact on the environment."[114] Furthermore, the technical advisory states that "CEQA authorizes reliance on previously approved plans and mitigation programs that have

[113] See Protect Historic Amador Waterways v. Amador Water Agency (2004) 116 Cal. App. 4th 1099, 1107 ["'[A] lead agency's use of existing environmental standards in determining the significance of a project's environmental impacts is an effective means of promoting consistency in significance determinations and integrating CEQA environmental review activities with other environmental program planning and resolution."'"]. Lead agencies can, and often do, use regulatory agencies' performance standards. A project's compliance with these standards usually is presumed to provide an adequate level of protection for environmental resources. See, e.g., Cadiz Land Co. v. Rail Cycle (2000) 83 Cal.App.4th 74, 99 (upholding use of regulatory agency performance standard).

[114] Governor's Office of Planning and Research, Technical Advisory – CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review, (2008).

adequately analyzed and mitigated GHG emissions to a less than significant level as a means to avoid or substantially reduce the cumulative impact of a project."[115]

Amendments to Section 15064.4 of the CEQA Guidelines were adopted to assist lead agencies in determining the significance of the impacts of GHG emissions. Consistent with existing CEQA practice, Section 15064.4 gives lead agencies the discretion to determine whether to assess those emissions quantitatively or qualitatively. If a qualitative analysis is used, in addition to quantification, this section recommends certain qualitative factors that may be used in the determination of significance (i.e., extent to which the project may increase or reduce GHG emissions compared to the existing environment; whether the project exceeds an applicable significance threshold; and extent to which the project complies with regulations or requirements adopted to implement a reduction or mitigation of GHGs). The amendments do not establish a threshold of significance; rather, lead agencies are granted discretion to establish significance thresholds for their respective jurisdictions, including looking to thresholds developed by other public agencies, or suggested by other experts, such as the California Air Pollution Control Officers Association (CAPCOA), so long as any threshold chosen is supported by substantial evidence (see Section 15064.7(c)). The California Natural Resources Agency has also clarified that the CEQA Guidelines amendments focus on the effects of GHG emissions as cumulative impacts, and that they should be analyzed in the context of CEQA's requirements for cumulative impact analysis (see Section 15064(h)(3)).[116]

Although GHG emissions can be quantified, CARB, SCAQMD, and the City of Culver City have not adopted project-level significance thresholds for GHG emissions that would be applicable to the Project. The Governor's Office of Planning and Research (OPR) released a technical advisory on CEQA and climate change that provided some guidance on assessing the significance of GHG emissions, and states that "lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice," and that while "climate change is ultimately a cumulative impact, not every individual project that emits GHGs must necessarily be found to contribute to a significant cumulative impact on the environment."[117] Furthermore, the technical advisory states that "CEQA authorizes reliance on previously approved plans and mitigation programs that have adequately analyzed and mitigated GHG emissions to a less than significant level as a means to avoid or substantially reduce the cumulative impact of a project."[118]

Per CEQA Guidelines Section 15064(h)(3), a project's incremental contribution to a cumulative impact can be found not cumulatively considerable if the project would comply with an approved

[115] Ibid.

[116] See generally California Natural Resources Agency, Final Statement of Reasons for Regulatory Action (December 2009), pp. 11-13, 14, 16. http://resources.ca.gov/ceqa/docs/Final_Statement_of_Reasons.pdf. Accessed February 2017; see also Letter from Cynthia Bryant, Director of the Office of Planning and Research to Mike Chrisman, Secretary for Natural Resources, April 13, 2009. Available at http://opr.ca.gov/docs/Transmittal_Letter.pdf. Accessed February 2017.

[117] Governor's Office of Planning and Research, Technical Advisory – CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review, (2008).

[118] Governor's Office of Planning and Research, Technical Advisory – CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review, (2008).

plan or mitigation program that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area of the project.[119] To qualify, such a plan or program must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency.[120] Examples of such programs include a "water quality control plan, air quality attainment or maintenance plan, integrated waste management plan, habitat conservation plan, natural community conservation plan, [and] plans or regulations for the reduction of greenhouse gas emissions."[121] Thus, CEQA Guidelines Section 15064(h)(3) allows a lead agency to make a finding of non-significance for GHG emissions if a project complies with a program and/or other regulatory schemes to reduce GHG emissions.[122]

In the absence of any adopted, quantitative threshold, the Project would not have a significant effect on the environment if the Project is found to be consistent with the applicable regulatory plans and policies to reduce GHG emissions, including the emissions reduction measures discussed within CARB's Climate Change Scoping Plan, SCAG's 2016 RTP/SCS, and City of Culver City polices established for the purpose of increasing energy efficiency and reducing GHG emissions for new developments and the City's Green Building Code.

3.2 Newhall Ranch Ruling

The California Supreme Court recently considered the CEQA issue of determining the significance of GHG emissions in its decision, Center for Biological Diversity v. California Department of Fish and Wildlife and Newhall Land and Farming (CBD vs. CDFW). The Court questioned a common CEQA approach to GHG analyses for development projects that compares project emissions to the reductions from BAU that will be needed statewide to reduce emissions to 1990 levels by 2020, as required by AB 32. The court upheld the BAU method as valid in theory, but concluded that the BAU method was improperly applied in the case of the Newhall project because the target for the project was incorrectly deemed consistent with the statewide emission target of a percent below BAU for the year 2020 as specified in the AB 32 Scoping Plan. In other words, the court said that the percent below BAU target specified in the AB 32 Scoping Plan is intended as a measure of the GHG reduction effort required by the State as a whole, and it cannot necessarily be applied to the impacts of a specific project in a specific

[119] 14 CCR § 15064(h)(3).

[120] 14 CCR § 15064(h)(3).

[121] 14 CCR § 15064(h)(3).

[122] See, for example, San Joaquin Valley Air Pollution Control District (SJVAPCD), CEQA Determinations of Significance for Projects Subject to ARB's GHG Cap-and-Trade Regulation, APR-2025 (June 25, 2014), in which the SJVAPCD "determined that GHG emissions increases that are covered under ABR's Cap-and-Trade regulation cannot constitute significant increases under CEQA…" Furthermore, the SCAQMD has taken this position in CEQA documents it has produced as a lead agency. The SCAQMD has prepared three Negative Declarations and one Draft Environmental Impact Report that demonstrate the SCAQMD has applied its 10,000 $MTCO_2e$/yr significance threshold in such a way that GHG emissions covered by the Cap-and-Trade Program do not constitute emissions that must be measured against the threshold. See SCAQMD, Final Negative Declaration for Ultramar Inc. Wilmington Refinery Cogeneration Project, SHC No. 2012041014 (October 2014); SCAQMD Final Negative Declaration for Phillips 99 Los Angeles Refinery Carson Plant—Crude Oil Storage Capacity Project, SCH No. 2013091029 (December 2014); SCAQMD Final Mitigated Negative Declaration for Toxic Air Contaminant Reduction for Compliance with SCAQMD Rules 1420.1 and 1402 at the Exide Technologies Facility in Vernon, CA, SCH No. 2014101040 (December 2014); and SCAQMD Final Environmental Impact Report for the Breitburn Santa Fe Springs Blocks 400/700 Upgrade Project, SCH No. 2014121014 (August 2015).

location. The Court provided some guidance to evaluating the cumulative significance of a proposed land use project's GHG emissions, but noted that none of the approaches could be guaranteed to satisfy CEQA for a particular project. The Court's suggested "pathways to compliance" include:

1. Use a geographically specific GHG emission reduction plan (e.g., climate action plan) that outlines how the jurisdiction will reduce emissions consistent with State reduction targets, to provide the basis for streamlining project-level CEQA analysis, as described in CEQA § 15183.5.

2. Utilize the Scoping Plan's business-as-usual reduction goal, but provide substantial evidence to bridge the gap between the statewide goal and the project's emissions reductions;

3. Assess consistency with AB 32's goal in whole or part by looking to compliance with regulatory programs designed to reduce GHG emissions from particular activities; as an example, the Court points out that projects consistent with an SB 375 Sustainable Communities Strategy (SCS) may need to re-evaluate GHG emissions from cars and light trucks.

4. Rely on existing numerical thresholds of significance for GHG emissions, such as those developed by an air district.

As described earlier, the City does not currently have an adopted GHG emission reduction plan. Thus, the Project could not meet the requirements of a CEQA-qualified CAP as described in CEQA § 15183.5 (pathway #1, referenced above).

Regarding compliance pathway #2, the Court acknowledged that "a business-as-usual comparison based on the Scoping Plan's methodology may be possible," and that "a lead agency might be able to determine what level of reduction from business as usual a new land use development at the proposed location must contribute in order to comply with statewide goals."[123]

Compliance pathway #3 could work if it can be shown how regulatory programs or performance-based standards apply to a project's emissions. The Project would not have a significant effect on the environment if the Project is found to be consistent with the applicable regulatory plans and policies to reduce GHG emissions, including the emissions reduction measures discussed within CARB's Climate Change Scoping Plan, SCAG's 2016 RTP/SCS, and City of Culver City polices established for the purpose of increasing energy efficiency and reducing GHG emissions for new developments and the City's Green Building Code.

Compliance path #4 is the most straightforward approach to analysis, since the SCAQMD has developed the significance thresholds for GHG emissions, which include a "bright-line" project threshold of 3,000 $MTCO_2e$/year or a per-service population threshold of 4.8 $MTCO_2e$ per service population per year (see discussion below). Service population is defined as the total count of residents plus jobs statewide. Since the Project is a commercial enterprise, for which the majority of the GHG emissions are created by the actions of guests, who are counted neither as residents or employees, the City has determined that the service population threshold is not appropriate or applicable.

The Court did not list the above pathways in order of importance or intentional sequence, nor require that they be relied upon in an analysis. However, this report considers the potential GHG emissions associated with the Project within the context of the Court's suggested pathways to compliance.

SECTION 4
Methodology

The analysis of the Project's construction and operation GHG emissions has been conducted as follows.

4.1 Emissions Estimates

To provide additional information to decision makers and the public, this GHG Technical Report provides an estimate of the GHG emissions from Project construction and operation. The following Project-related emission sources have been evaluated:

- Scope 1: Direct, on-site and off-site combustion of fossil fuels (e.g., natural gas, propane, gasoline, diesel, and transportation fuels).
- Scope 2: Indirect, off-site emissions associated with purchased electricity or purchased steam.
- Scope 3: Indirect emissions associated with other emissions sources, such as third-party vehicles and embodied energy.[124]

For purposes of this analysis, it was considered reasonable, and consistent with criteria pollutant calculations, to consider GHG emissions resulting from direct Project-related activities, including, e.g., use of vehicles, electricity, and natural gas, to be new emissions. These emissions include Project construction activities such as demolition, hauling, and construction worker trips, as well as operational emissions. This analysis also considers indirect GHG emissions from water conveyance, wastewater generation, and solid waste handling. Since potential impacts resulting from GHG emissions are long-term rather than acute, GHG emissions were calculated on an annual basis. As previously discussed, the Project would remove existing structures and associated GHG emissions. Emissions removed would be applied as a credit toward the new emissions and the Project would be evaluated on its net (Project minus Existing) increase.

GHG emissions are estimated using the California Emissions Estimator Model (CalEEMod) (Version 2016.3.2), which is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions from a variety of land use projects. CalEEMod was developed in collaboration with the air districts of California. Regional data (e.g., emission factors, trip lengths, meteorology, source inventory, etc.) have been provided by the various California air districts to account for local requirements and conditions. The model is

[124] Embodied energy includes energy required for water pumping and treatment for end-uses.

considered to be an accurate and comprehensive tool for quantifying air quality and GHG impacts from land use projects throughout California.[125]

As discussed previously, the City of Culver City has adopted and implemented a range of GHG reduction activities and strategies that would reduce GHG emissions. In addition, SCAG has adopted the 2016-2040 RTP/SCS applicable to the region, which outlines SCAG's plan for integrating the transportation network and related strategies with an overall land use pattern that responds to projected growth, housing needs, changing demographics, and transportation demands. The SCS focuses the majority of new housing and job growth in high-quality transit areas and other opportunity areas in existing main streets, downtowns, and commercial corridors, resulting in an improved jobs-housing balance and more opportunity for transit-oriented development and demonstrates a reduction in per capita GHG emissions relative to 2005 of nine percent in 2020 and 16 percent in 2035. The project-level analysis describes the consistency of the Project's GHG emission sources with local and regional GHG emissions reduction strategies.

Construction

Construction emissions are forecasted by assuming a conservative estimate of construction activities from each phase of the Project. Construction emissions are estimated using the CalEEMod (Version 2016.3.2) software, an emissions inventory software program recommended by the SCAQMD. CalEEMod is based on outputs from OFFROAD and the on-road vehicle emissions factor (EMFAC) model, which are emissions estimation models developed by CARB and used to calculate emissions from construction activities, including off- and on-road vehicles. CalEEMod outputs construction-related GHG emissions of CO_2, CH_4, and CO_2e.

The output values used in this analysis were adjusted to be Project-specific based on equipment types and the construction schedule. These values were then applied to the same construction subphasing assumptions used in the criteria pollutant analysis (see Air Quality Technical Report) to generate GHG emissions values for each construction year.

SCAQMD's *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold*, recognizes that construction-related GHG emissions from projects "occur over a relatively short-term period of time" and that "they contribute a relatively small portion of the overall lifetime project GHG emissions."[126] The guidance recommends that construction project GHG emissions should be "amortized over a 30-year project lifetime, so that GHG reduction measures will address construction GHG emissions as part of the operational GHG reduction

[125] See: http://www.caleemod.com.

[126] South Coast Air Quality Management District, Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold, October 2008. Available at http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-6/ghg-meeting-6-guidance-document-discussion.pdf?sfvrsn=2. Accessed September 2019.

strategies."[127] In accordance with that SCAQMD guidance, GHG emissions from Project construction have been amortized over the 30-year lifetime of the Project.

Operations

Operational impacts were assessed for the Project buildout year (i.e., as early as 2021 assuming construction begins at the earliest possible time in the first quarter of 2020). CalEEMod was used to estimate operational GHG emissions from electricity, natural gas, solid waste, water and wastewater, and landscaping equipment. CalEEMod was used to estimate mobile source emissions where emissions factors from CARB's EMFAC model were input into CalEEMod to calculate mobile GHG emissions. The most recent version is EMFAC2017, which "represents CARB's current understanding of motor vehicle travel activities and their associated emission levels."[128] CalEEMod generated the vehicle miles traveled (VMT) from Project uses based on the trip rates in the Project's TIA.[129] As described above, the Project's TIA estimated trip rates for the Project that accounted for trip rate reductions due to the Project's characteristics, including reductions due to pass-by trips, internal trips and proximity to public transit/walk-in trips. [130] The estimated trip rate reductions were provided by the Project Project's TIA.[131]

With regard to energy demand, the consumption of fossil fuels to generate electricity and to provide heating and hot water generates GHG emissions. Energy demand rates were estimated based on specific square footage of the new commercial uses, as well as predicted water supply needs for these uses. The Project electricity demands are supplied by SCE. CalEEMod provides default intensity factors for CO_2, CH_4, and N_2O for SCE and calculates an overall CO_2e intensity factor. For year 2017, SCE reported an average CO_2e intensity factor for its total electricity mix as 511.47 lbs/MWh with an RPS of 32.0 percent.[132] And, as described above, SB 100 requires local publicly owned electric utilities to procure eligible renewable electricity for 44 percent of retail sales by December 31, 2024. Since the Project's first operational year is anticipated to be 2021, the reported 2017 SCE reported CO_2e intensity factor was linearly adjusted from required renewables from year 2020 of 33 percent under SB 100 to account for 35.8 percent renewable energy for 2021 based on the required renewables from year 2024 under SB 100 of 44 percent. For 2017, SCE had 32.0 percent renewables and this was used to back calculate a CO_2e intensity factor where SCE had zero percent renewable. This value was then adjusted to reflect a CO_2e intensity factor with 35.8 percent renewables.

[127] South Coast Air Quality Management District, Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold, October 2008. Available at http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-6/ghg-meeting-6-guidance-document-discussion.pdf?sfvrsn=2. Accessed September 2019.

[128] California Air Resources Board, Mobile Source Emissions Inventory. Available at https://ww3.arb.ca.gov/msei/categories.htm#emfac2017Accessed March 2010.

[129] Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.

[130] Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.

[131] Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.

[132] Southern California Edison, 2018. ESG/Sustainability Template. Report date: September 27, 2018. Available: https://www.edison.com/content/dam/eix/documents/sustainability/eix-esg-pilot-quantitative-section-sce.pdf. Accessed September 2019.

Emissions of GHGs from solid waste disposal were also calculated using CalEEMod software. The emissions are based on the waste disposal rate for the land uses, the waste diversion rate, and the GHG emission factors for solid waste decomposition. The GHG emission factors, particularly for CH_4, depend on characteristics of the landfill, such as the presence of a landfill gas capture system and subsequent flaring or energy recovery. In addition, it was assumed 75 percent of solid waste will be diverted from landfills as AB 341 directs CalRecycle to develop and adopt regulations for mandatory commercial recycling and sets a Statewide goal for 75 percent disposal reduction by the year 2020.[133]

Emissions of GHGs from water and wastewater result from the required energy to supply and distribute the water and treat the wastewater. Wastewater also results in emissions of GHGs from wastewater treatment systems. Emissions were calculated using CalEEMod and were based on the water usage rate for the land uses, the electrical intensity factors for water supply, treatment, and distribution and for wastewater treatment, the GHG emission factors for the electricity utility provider, and the emission factors for the wastewater treatment process.

Other sources of GHG emissions from operation of the Project include equipment used to maintain landscaping, such as lawnmowers and trimmers. The CalEEMod software uses landscaping equipment GHG emission factors from the CARB OFFROAD model and the CARB Technical Memo: Change in Population and Activity Factors for Lawn and Garden Equipment (6/13/2003).

Emissions calculations for the Project include credits or reductions for GHG reducing measures that are required by regulation, such as reductions in energy and water demand from the current Title 24 standards and the California Green Building Standards (CALGreen) Code as well as the Project's compliance with the portions of the City's Green Building Code and mandatory Green Building Program applicable to new developments. Physical and operational Project characteristics for which sufficient data is available to quantify the reductions from building energy and resource consumption have been included in the quantitative analysis, and include but are not limited to the following features: the City has adopted a Photovoltaic Requirement which requires 1 kilowatt (kw) of photovoltaic power installed per 10,000 square feet of new development.[134] Based on the Project's estimated floor area, the Project's photovoltaic system is estimated to generate 3,350 kwh of electricity annually.[135] As described above, the analysis assumes 75 percent of solid waste would be diverted from landfills.

As previously stated operational GHG impacts are assessed based on the Project-related incremental increase in GHG emissions compared to baseline conditions and incorporation of emissions reduction strategies.

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133 California Legislative Information, Assembly Bill No. 341, https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201120120AB341. Accessed September 2019.

134 Culver City Municipal Code 2017. Solar Photovoltaic Systems, Chapter 15.02.1005. Accessed September 2019.

135 National Renewable Energy Laboratory, PVWatts Calculator, https://pvwatts.nrel.gov/pvwatts.php. Accessed September 2019. See Exhibit C of this technical report for more details.

Comparison to Project without GHG Reduction Characteristics, Features, and Measures

In order to evaluate the efficacy of the GHG reduction characteristics, features, and measures that would be implemented as part of the Project, this analysis compares the Project's GHG emissions to the emissions that would be generated by the Project without implementation of GHG reduction characteristics, features, and measures. This approach mirrors the concepts used in CARB's Climate Change Scoping Plan, which demonstrates GHG reductions compared to a BAU scenario. This comparison is provided only to evaluate the Project's efficiency with respect to GHG emissions but is not a threshold of significance. As detailed in the CARB Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document (FED), the updated projected 2020 emissions estimate in the absence of GHG reduction measures in the Climate Change Scoping Plan is based on statewide data from the 2009 to 2011 period and accounts for the effect of the 2007–2009 economic recession on future growth, updated estimates for future fuel and energy demand, and the reductions required by regulation that were adopted for motor vehicles and renewable energy.[136] The Project's GHG emissions in comparison to the emissions that would be generated by the Project without implementation of GHG reduction characteristics, features, and measures is consistent with CARB's approach in the Scoping Plan FED. Furthermore, the specific Project Site characteristics are not included as they encompass GHG reduction strategies and features that would be consistent with state, regional, and local GHG reduction plans and policies or would go above and beyond regulatory requirements. These Project Site characteristics include Project GHG reductions from energy efficiency measures that would exceed the Title 24 Building Standards Code and trip rate reductions due to the Project Site-specific characteristics including reductions due to pass-by trips, internal trips and proximity to public transit/walk-in trips.[137] The emissions are estimated using the CalEEMod software, and the model inputs are adjusted to account for the specific and defined circumstances and described above. The analysis assumes the Project without implementation of GHG reduction characteristics, features, and measures would incorporate the same land uses and building square footage as the proposed Project.

4.2 Consistency with Greenhouse Gas Reduction Plan, Policies, and Actions

The Project's GHG emissions are also evaluated by assessing the Project's consistency with applicable GHG reduction strategies and actions adopted by the State and City. As discussed previously, the City has adopted strategies and polices to reduce GHG emissions through its Green Building Program.

In the latest CEQA Guidelines amendments, which went into effect on March 18, 2010, the Office of Planning and Research encourages lead agencies to make use of programmatic mitigation plans and programs from which to tier when they perform individual project analyses. The City does not have a programmatic mitigation plan to tier from, such as a Greenhouse Gas

136 California Air Resources Board, Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document (FED), Attachment D, August 19, 2011.

137 Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.

Emissions Reduction Plan as recommended in the relevant amendments to the CEQA Guidelines. However, the City has adopted the Green Building Program and Green Building Code that encourage and require applicable projects to implement energy efficiency measures. In addition, the California CAT Report provides recommendations for specific emission reduction strategies for reducing GHG emissions and reaching the targets established in HSC Division 25.5. Thus, if the Project is designed in accordance with these policies and regulations, it would result in a less than significant impact, because it would be consistent with the overarching State regulations on GHG reductions.

SECTION 5
Environmental Impacts

Threshold a) A significant impact would occur if the Project would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

Threshold b): A significant impact would occur if the Project would conflict with any applicable plan, policy, regulation, or recommendation of an agency adopted for the purpose of reducing the emissions of GHGs.

Impact Statement a) and b): The Project would generate GHG emissions due to construction and operational activities. The Project's annual direct and indirect GHG emissions would be generated from development that is located and designed to be consistent with relevant goals and actions to reduce Project emissions as much as feasibly possible, as well as consistent with the HSC Division 25.5 goals and CARB guidelines for assessing GHG emissions. Therefore, the Project's GHG emissions and associated impacts would be less than significant.

5.1 Construction Emissions

As explained above, the emissions of GHGs associated with construction of the Project were calculated for each year of construction activity. Results of the Project's construction phase GHG emissions calculations are presented in **Table 4**, *Project Construction Greenhouse Gas Emissions*. Although construction-related GHGs are one-time emissions, any assessment of Project emissions should include construction emissions. The SCAQMD recommends that a project's construction-related GHG emissions be amortized over the project's 30-year lifetime in order to include these emissions as part of the project's annualized lifetime total emissions, so that GHG reduction measures will address construction GHG emissions as part of the operational GHG reduction strategies. As indicated in **Table 4**, Project construction emissions during the three-year construction period would generate an estimated 433 $MTCO_2e$, or 14 $MTCO_2e$ amortized over a 30-year period. A complete listing of the equipment by phase, emission factors, and calculation parameters used in this analysis is included within the emissions calculation worksheets that are provided in **Exhibit A** of this report.

TABLE 4
PROJECT CONSTRUCTION GREENHOUSE GAS EMISSIONS

Emission Source	CO_2e (Metric Tons) [a,b]
Construction Year 2020	308
Construction Year 2021	124
Total Construction Emissions	**433**
Amortized Construction Emissions (30-years)	**14**

[a] Totals may not add up exactly due to rounding in the modeling calculations Detailed emissions calculations are provided in Exhibit A.
[b] CO_2e emissions are calculated using the GWP values from the IPCC Fourth Assessment Report.

SOURCE: ESA, 2019.

5.2 Operational Emissions

As previously stated, the Project would demolish existing uses. **Table 5**, *Existing Site GHG Emissions to be Removed*, summarizes the emissions to be applied as a credit to evaluate the Project's net increase in GHG emissions. As indicated therein, the GHG emissions associated with the existing on-site uses to be removed under the Project would be an estimated 33 metric tons of CO_2e.

TABLE 5
EXISTING SITE GHG EMISSIONS TO BE REMOVED

Emissions Sources	CO_2e (Metric Tons per Year) a
Area (Landscaping Equipment)	<1
Electricity and Natural Gas	12
Mobile Sources	17
Waste	1
Water	3
Total Existing Emissions	**33**

[a] Totals may not add up exactly due to rounding in the modeling calculations Detailed emissions calculations are provided in Exhibit C.

SOURCE: ESA, 2019.

As explained above, the emissions of GHGs associated with operation of the Project were calculated using CalEEMod, taking into account the Project's compliance with the portions of the City's Green Building Code and mandatory Green Building Program applicable to new developments. Physical and operational Project characteristics for which sufficient data is available to quantify the reductions from building energy and resource consumption have been included in the quantitative analysis, and include but are not limited to the following features: generation of photovoltaic power, diversion of approximately 75 percent of solid waste from landfills, and trip rate reductions due to the Project Site-specific characteristics including reductions due to pass-by trips, internal trips and proximity to public transit/walk-in trips.[138]

Maximum annual net GHG emissions resulting from motor vehicles, energy (i.e., electricity, natural gas), water conveyance, and waste sources were calculated for the expected first operating year, 2021. The maximum first operating year GHG emissions from operation of the Project are shown in **Table 6**, *Estimated Annualized Unmitigated Project Greenhouse Gas Emissions*. With the implementation of the Project's green building measures, the Project would achieve GHG reductions for electricity and water as compared to a scenario without GHG reducing features and measures.

TABLE 6
ESTIMATED ANNUALIZED UNMITIGATED PROJECT GREENHOUSE GAS EMISSIONS

	Operational Emissions CO_2e (Metric Tons per Year) [a]	
Emissions Sources	**Proposed Project**	**Project Without GHG Reduction Characteristics, Features, and Measures**
Opening Operational Year (2022)		
Electricity [b]	73	107
Natural Gas	57	57
Mobile Sources	279	392
Solid Waste	7	7
Water	15	20
Area	<1	<1
Amortized Construction Emissions	14	14
Project Emissions	446	598
Existing Site Emissions	33	33
Total Net Project Emissions	**413**	**565**

[a] Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Exhibit C.

[b] For the purposes of estimating GHG emissions in this Technical Report, the emissions analysis conservatively assumes Project would not switch electricity providers from SCE to the Clean Power Alliance (i.e., does not take any credit for 36%, 50%, or 100% renewable electricity, depending on the selected Clean Power Alliance plan). Should the Project switch electricity providers from SCE to the Clean Power Alliance, the Project's electricity-related emissions would be lower than disclosed in this Technical Report.

SOURCE: ESA, 2019.

Project operational-related GHG emissions would decline in future years as emissions reductions from the State's Cap-and-Trade program are fully realized. Emissions reductions from the Project's two highest GHG-emitting sources, mobile and electricity, would occur over the next

[138] Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.

decade, and beyond, ensuring that the Project's total GHG emissions would be further reduced. Emissions from electricity would decline as utility providers, including SCE, meet their Renewables Portfolio Standard obligations to provide 60 percent of their electricity from renewable electricity sources by 2030 consistent with SB 100, which would achieve additional reductions in emissions from electricity demand although the actual reduction will depend on the mix of fossil fuels that SCE will replace with renewables and the relative CO_2 intensities of those fossil fuels. Project emissions from mobile sources would also decline in future years as older vehicles are replaced with newer vehicles resulting in a greater percentage of the vehicle fleet meeting more stringent combustion emissions standards, such as the model year 2017-2025 Pavley Phase II standards.

5.3 Consistency with State Plans, Policies, or Regulations

Consistency with AB 32

In support of AB 32, the state has promulgated specific laws aimed at GHG reductions at a statewide level. While AB 32 does not establish specific requirements for individual land use development projects, it establishes GHG reduction strategies, some of which are relevant to the Project. The Project Site is located in an established commercial area with access to public transportation, which minimizes trips and trip lengths reducing mobile source GHG emissions. Therefore, the Project would be consistent with State efforts to reduce motor vehicle emissions and congestion. The Project would generate GHG emissions due to construction and operational activities; however, its annual GHG emissions, would be generated due to development located and designed to be consistent with relevant goals and actions designed to encourage development that results in the efficient use of public and private resources. Consistent with the City's Municipal Code and Statewide strategies to increase renewable energy, the Project would meet the applicable solar requirements in Sections 15.02.1000-15.02.1015 increasing renewable electricity generation and reducing grid-supplied electricity demand. Consistent with Statewide strategies to reduce energy demand, the Project would be designed with an HVAC system that meets the ASHRAE 90.1-2013 Appendix G and the Title 24 Building Energy Efficiency Standards and CALGreen Code, or applicable version of these standards at the time of building permit issuance. Consistent with Statewide strategies to reduce energy demand, the Project will install low-flow water fixtures that meet U.S. Environmental Protection Agency WaterSense specifications or applicable standards as specified in the Title 24 Building Energy Efficiency Standards and CALGreen Code at the time of building permit issuance. Therefore, the Project's GHG emissions and associated impacts would not conflict with State plans, policies, and regulations to reduce GHG emissions.

Project Consistency with Regional and Local Trip and VMT Reduction Goals, Actions, and Recommendations

The significance of the Project's GHG emissions was first evaluated based on whether the emissions would be generated in connection with development located and designed consistent with relevant regional and local goals, actions, and recommendations designed to encourage development to reduce trips and VMTs. Transportation-related GHG emissions are the largest source of GHG emissions from the Project. This Project characteristic is consistent with the assumption in many regional plans, such as the SCAG RTP/SCS, which recognizes that the transportation sector is the largest contributor to the State's GHG emissions.

Consistent with SCAG's RTP/SCS alignment of transportation, land use, and housing strategies, the Project would accommodate projected increases in travel demand by implementing smart land use strategies. As discussed previously, the Project would result in a mixed-use, infill development that would co-locate complementary residential, office, retail/restaurant land uses, which would be in close to proximity to existing off-site commercial uses and Downtown Culver City. In addition, the Project is located in close proximity to existing public transit stops, which would result in reduced VMT, as well as being within a reasonable walking distance from Downtown Culver City. The Project Site is located approximately a third of a mile from Downtown Culver City and served by various bus routes operated by Metro, LADOT, City of Santa Monica's Big Blue Bus and Culver City Bus. The Metro Expo Line is located approximately 0.1 miles northeast of the Project Site. The Big Blue Bus Line 7 at the Robertson Transit Hub bus stop is approximately 80 feet west of the Project Site; the Big Blue Bus Line 17 at the Robertson Blvd/Venice Blvd bus stop is approximately 100 southeast of the Project Site; the Metro Bus Line 16 at the Robertson/Venice bus stop is approximately 130 feet northeast of the Project Site. The Culver City Bus Line 1 at the Venice Blvd/Robertson Blvd bus stop is approximately 195 feet northwest of the Project Site. The LADOT Commuter Express 437 Bus Line at the Washington Blvd and Robertson Boulevard bust stop is approximately 350 feet southeast of the Project Site.

The trip reductions associated with the Project's location near transit is reflected in the Project's TIA, as the estimated trip rates for the Project accounted for trip rate reductions including reductions due to pass-by trips, internal trips and proximity to public transit/walk-in trips.[139]

In addition, the Project would be consistent with the 2016 RTP/SCS strategies to promote active transportation and supports improvements in local bike networks as the Project promotes the use of bicycles as it is located close to many Culver City bike paths. SCAG's 2016 RTP/SCS states that 38 percent of all trips in the region are less than 3 miles.[140] The RTP/SCS intends to decrease these trips by extending local bikeway networks. The Project would be consistent with this RTP/SCS goal by installing the City and CALGreen Code required number of bicycle parking spots. Therefore, the Project would be consistent with the SCAG 2016 RTP/SCS regional and local trip and VMT reduction goals.

Project Consistency with City Goals and Actions

The significance of the Project's GHG emissions is also evaluated based on whether they would be generated in connection with a design that is consistent with relevant City of Culver City goals and actions designed to encourage development that results in the efficient use of public and

139 Crain and Associates, Robertson (3727) Mixed-Use Project Traffic Impact Analysis (TIA), July 2019.
140 The 2016-2040 Regional Transportation Plan/ Sustainable Communities Strategy, April 2016. http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf. Accessed September 2019.

private resources. **Table 7**, *Project Consistency with Applicable Culver City Green Building Program Requirements* contains mandatory items the Project would implement that would increase energy efficiency and reduce energy consumption, thus reducing Project GHG emissions. As discussed in **Table 7**, the Project is consistent with the applicable requirements. Therefore, as the Project's GHG emissions would be generated in connection with a development located and designed to be consistent with the applicable City goals and actions for GHG emission reductions, and the impact would result in less than significant impacts.

TABLE 7
PROJECT CONSISTENCY WITH APPLICABLE CULVER CITY GREEN BUILDING PROGRAM REQUIREMENTS

Source	Category / Description	Consistency Analysis
Culver City Green Building Program	Requires all new buildings of 10,000 or more of gross floor area to install 1kW of solar photovoltaic systems per 10,000 square feet of gross floor area	**Consistent:** The Project would consist of approximately 22,262 sf of new development and would install a solar photovoltaic system that meets City requirements.
	Requires new construction totaling up to 49,999 square feet must comply with 80% of the applicable Green Building Program Category 1 Project checklist items.	**Consistent:** The Project applicant is required to submit a filled checklist with the construction permit application drawings and all items checked must be indicated in the construction permit application drawings

SOURCE: ESA, 2019. This table lists applicable City of Culver City requirements for Category 1 projects; Culver City Building Safety Division Mandatory Green Building Program, Category 1 Qualifying Projects, https://www.culvercity.org/Home/ShowDocument?id=902. Accessed September 2019.

Consistency with Plans, Policies, Regulations, or Recommendations to Reduce GHG Emissions

The Project would be consistent with statewide, regional and local plan, policies, regulations, and recommendations to reduce GHG emissions from development. The primary focus of many of the statewide and regional mandates, plans, policies and regulations is to address worldwide climate change. According to CAPCOA, "GHG impacts are exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective."[141] Due to the complex physical, chemical and atmospheric mechanisms involved in global climate change,

[141] California Air Pollution Control Officers Association, CEQA & Climate change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, (2008).

there is no basis for concluding that the Project's annual GHG emissions would cause a measurable change in global GHG emissions sufficient to create a significant Project level impact on global climate change. Newer construction materials and practices, energy efficiency requirements, and newer appliances tend to emit lower levels of air pollutant emissions, including GHGs, as compared to those built years ago; however, the net effect is difficult to quantify. The GHG emissions of the Project alone is not expected to cause a direct physical change in the environment. It is global GHG emissions in their aggregate that contribute to climate change, not any single source of GHG emissions alone. Because of the lack of evidence indicating that the Project's GHG emissions would cause a measurable change in global GHG emissions sufficient to create a significant project-level impact on global climate change, and the fact that the Project incorporates physical and operational Project characteristics that would ensure its consistency with City goals and actions, Project emissions are not anticipated to contribute considerably to global climate change. The Project is also considered to be consistent with the GHG reduction goals of HSC Division 25.5 and associated GHG reduction plans such as SCAG's 2016 RTP/SCS, and it is not expected that Project development would impede their goals. In fact, as discussed above, the Project's location and development comply with the recommendations in these documents and would meet their goals.

As discussed above, the Project would result in a mixed-use, infill development that would co-locate complementary residential, office, retail/restaurant land uses, which would be in close to proximity to existing off-site commercial uses and Downtown Culver City. In addition, the Project is located in close proximity to existing public transit stops, which would result in reduced VMT, as well as being within a reasonable walking distance from Downtown Culver City. The Project would create a pedestrian-friendly environment with direct access to Downtown Culver City and clear linkages to regional and local transportation systems. The Project would promote alternate modes of transit as it is served by the Metro Expo Line Culver City Station located approximately 550 feet northeast of the Project, as well as various bus routes operated by Metro, LADOT, City of Santa Monica's Big Blue Bus and Culver City. The Project would not conflict with the 2016 RTP/SCS strategies to promote active transportation and supports improvements in local bike networks as the Project promotes the use of bicycles as it is located close to many Culver City bike paths. This would support regional plans to reduce transportation-related GHG emissions as part of the overall statewide strategy under AB 32. The Project would be consistent with and support the goals of the 2016 RTP/SCS, which seeks improved access and mobility by placing "destinations closer together, thereby decreasing the time and cost of traveling between them."[142] According to SCAG, giving people more transportation choices and providing greater opportunities for biking and walking reduces the number of people who drive alone and encourages people to use alternative modes of travel.[143]

Table 8, Project *Consistency with Applicable Greenhouse Gas Reduction Strategies*, contains a list of statewide GHG emission reduction strategies and describes the Project's consistency.

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[142] Southern California Association of Governments, 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy, (2016) p16, http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf. Accessed February 2018

[143] Southern California Association of Governments, 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy, (2016) p14, http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf. Accessed February 2018

Furthermore, not only is the Project consistent with currently applicable GHG emission reduction strategies, but the Project also would not conflict with or impede the future statewide GHG emission reductions goals. CARB has outlined a number of potential strategies for achieving the 2030 reduction target of 40 percent below 1990 levels. These potential strategies include renewable resources for 60 percent of the State's electricity by 2030, increasing the fuel economy of vehicles and the number of zero-emission or hybrid vehicles, reducing the rate of growth in VMT, supporting and other alternative transportation options, and use of high efficiency appliances, water heaters, and HVAC systems.[144] The Project would benefit from statewide and utility-provider efforts toward increasing the portion of electricity provided from renewable resources. The Project would also benefit from statewide efforts toward increasing the fuel economy standards of vehicles. The Project would be consistent with reducing the rate of growth in VMT by providing onsite bicycle parking facilities, being located in close proximity to public transit, and being located in an area with other commercial, retail, and residential land uses within walking distance. The Project would utilize energy-efficient lighting and equipment and would reduce its building energy consumption via compliance with City Green Building Program and the CALGreen Code.

TABLE 8
PROJECT CONSISTENCY WITH APPLICABLE GREENHOUSE GAS REDUCTION STRATEGIES

Source	Category / Description	Consistency Analysis
AB 1493 (Pavley Regulations)	Reduces greenhouse gas emissions in new passenger vehicles from model year 2012 through 2016 (Phase I) and model year 2017-2025 (Phase II). Also reduces gasoline consumption to a rate of 31 percent of 1990 gasoline consumption (and associated GHG emissions) by 2020.	**Consistent.** The Project would be consistent with this regulation and would not conflict with implementation of the vehicle emissions standards.
SB 1368	Establishes an emissions performance standard for power plants within the State of California.	**Consistent.** The Project would be consistent with this regulation and would not conflict with implementation of the emissions standards for power plants.
Low Carbon Fuel Standard	Establishes protocols for measuring life-cycle carbon intensity of transportation fuels and helps to establish use of alternative fuels.	**Consistent.** The Project would be consistent with this regulation and would not conflict with implementation of the transportation fuel standards.
California Green Building Standards Code Requirements	All bathroom exhaust fans shall be ENERGY STAR compliant.	**Consistent.** The Project would meet or exceed the energy standards in the Title 24 Building Energy Efficiency Standards.
	HVAC Systems will be designed to meet ASHRAE standards.	**Consistent.** The Project would utilize energy efficient equipment and would meet or exceed the energy standards in ASHRAE 90.1-2013, Appendix G and the Title 24 Building Energy Efficiency Standards.
	Energy commissioning shall be performed for buildings larger than 10,000 square feet.	**Consistent.** The Project would meet this requirement as part of its compliance with the CALGreen Code.
	Refrigerants used in newly installed HVAC systems shall not contain any CFCs.	**Consistent.** The Project would meet this requirement as part of its compliance with the CALGreen Code.
	Parking spaces shall be designed for carpool or alternative fueled vehicles. For 10 to 25 total provided parking spots, one parking space will be designed for such vehicles.	**Consistent.** The Project would meet this requirement as part of its compliance with the CALGreen Code.

144 Energy + Environmental Economics, Summary of the California State Agencies' PATHWAYS Project: Long-term Greenhouse Gas Reduction Scenarios, April 6, 2015. Accessed September 2019.

Source	Category / Description	Consistency Analysis
	Long-term and short-term bike parking shall be provided for up to five percent of vehicle spaces.	**Consistent.** The Project would meet this requirement as part of its compliance with the CALGreen Code.
	Indoor water usage must be reduced by 20% compared to current California Building Code Standards for maximum flow.	**Consistent.** The Project would meet this requirement as part of its compliance with the CALGreen Code by using low-flow water fixtures.
	All irrigation controllers must be installed with weather sensing or soil moisture sensors.	**Consistent.** The Project would meet this requirement as part of its compliance with the CALGreen Code and would use water efficient techniques, such as drip irrigation.
	Wastewater usage shall be reduced by 20 percent compared to current California Building Standards.	**Consistent.** The Project would meet or exceed this requirement as part of its compliance with the CALGreen Code by installing infrastructure for future grey water uses.
	Requires a minimum of 65 percent recycle or reuse of nonhazardous construction and demolition debris.	**Consistent.** The Project would meet or exceed this requirement as part of its compliance with the CALGreen Code.
	Requires documentation of types of waste recycled, diverted or reused.	**Consistent.** The Project would meet this requirement as part of its compliance with the CALGreen Code.
	Requires use of low VOC coatings consistent with AQMD Rule 1168.	**Consistent.** The Project would be consistent with this regulation and would meet or exceed the low VOC coating requirements.
	100 percent of vegetation, rocks, soils from land clearing shall be reused or recycled.	**Consistent.** The Project would meet this requirement as part of its compliance with the CALGreen Code.
	Requires installation of electrical conduit for future uses of electric vehicle charging parking spaces. Parking spaces shall be designed for carpool or alternative fueled vehicles. For 10 to 25 total provided parking spots, one parking space will be designed for such vehicles.	**Consistent.** The Project would meet this requirement as part of its compliance with the CALGreen Code.
Climate Action Team	Achieve California's 50 percent waste diversion mandate (Integrated Waste Management Act of 1989) to reduce GHG emissions associated with virgin material extraction	**Consistent.** CALGreen Code implements this goal, and the Project would be consistent with the requirements.
	Implement efficient water management practices and incentives, as saving water saves energy and GHG emissions.	**Consistent.** CALGreen Code implements this goal, and the Project would be consistent with the requirements.
	The California Energy Commission updates building energy efficiency standards that apply to newly constructed buildings and additions to and alterations to existing buildings. Both the Energy Action Plan and the Integrated Energy Policy Report call for ongoing updating of the standards.	**Consistent.** CALGreen Code implements this goal, and the Project would be consistent with the requirements.
	Reduce GHG emissions from electricity by reducing energy demand. The California Energy Commission updates appliance energy efficiency standards that apply to electrical devices or equipment sold in California. Recent policies have established specific goals for updating the standards; new standards are currently in development	**Consistent.** CALGreen Code implements this goal, and the Project would be consistent with the requirements.
	Apply strategies that integrate transportation and land-use decisions, including but not limited to promoting jobs/housing proximity, high-density residential/commercial development along transit corridors, and implementing intelligent transportation systems.	**Consistent.** The Project would be located in an infill location and co-locate residential, office, retail/restaurant uses in proximity to existing residential and commercial businesses, which would minimize trip lengths and associated emissions.

SOURCE: ESA, 2019.

Because the Project's location, land use characteristics, and design render it consistent with statewide and regional climate change mandates, plans, policies, and recommendations, and with the City's Green Building Program and CAL Green Code, the Project would be consistent with and would not conflict with any applicable plan, policy, regulation or recommendation to reduce GHG emissions. Therefore, impacts would be less than significant.

Consistency with Executive Orders S-3-05 and B-30-15

At the state level, Executive Orders S-3-05 and B-30-15 establish goals for reducing GHG emissions. Executive Order S-3-05's goal to reduce GHG emissions to 1990 levels by 2020 was codified by the Legislature as AB 32. As analyzed above, the Project would be consistent with AB 32. Therefore, the Project does not conflict with the 2020 component of Executive Orders S-3-05 and B-30-15.

The Executive Orders S-3-05 and B-30-15 also establish goals to reduce GHG emissions to 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by 2050. These goals have not yet been codified by the Legislature. However, studies have shown that, to meet the 2030 and 2050 targets, aggressive technologies in the transportation and energy sectors, including electrification and the decarbonization of fuel, will be required. In its Climate Change Scoping Plan, CARB acknowledged that the "measures needed to meet the 2050 goal are too far in the future to define in detail."[145] In the First Update, however, CARB generally described the type of activities required to achieve the 2050 target: "energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings, and industrial machinery; decarbonizing electricity and fuel supplies; and rapid market penetration of efficiency and clean energy technologies that requires significant efforts to deploy and scale markets for the cleanest technologies immediately."[146] Due to the technological shifts required and the unknown parameters of the regulatory framework and market conditions in 2030 and 2050, as well as uncertainties regarding the exact regulations that CARB will ultimately adopt for achieving the 2030 and 2050 reduction goal, quantitatively analyzing the Project's impacts further relative to the 2030 and especially the 2050 goals currently is speculative for purposes of CEQA.

Despite thorough investigation, due to the uncertainties regarding specific state and local actions and regulations that will be adopted to achieve the 2030 and 2050 GHG emission reduction targets, such as future Title 24 building energy standards and future vehicle emission standards beyond vehicle model year 2025, calculating Project emissions levels for 2030 and 2050 would be highly speculative. Nonetheless, statewide efforts are underway to facilitate the State's achievement of those goals and it is reasonable to expect the Project's emissions level to decline as the regulatory initiatives identified by CARB in the First Update and strategies in the 2017 Scoping Plan are refined and implemented, and other technological innovations occur. Stated differently, the Project's emissions total at buildout represents the maximum emissions inventory for the Project as California's emissions sources are being regulated (and foreseeably expected to continue to be regulated in the future) in furtherance of the State's environmental policy

[145] CARB, Climate Change Scoping Plan, p. 117, December 2008
[146] CARB, First Update, p. 32, May 2014

objectives. As such, given the reasonably anticipated decline in Project emissions once fully constructed and operational, the Project would be consistent with the Executive Orders' goals.

The Climate Change Scoping Plan recognizes that HSC Division 25.5 establishes an emissions reduction trajectory that will allow California to achieve the more stringent 2050 target: "These [greenhouse gas emission reduction] measures also put the state on a path to meet the long-term 2050 goal of reducing California's greenhouse gas emissions to 80 percent below 1990 levels. This trajectory is consistent with the reductions that are needed globally to stabilize the climate."[147] Also, CARB's First Update provides that it "lays the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050," and many of the emission reduction strategies recommended by CARB would serve to reduce the Project's emissions level to the extent applicable by law: [148, 149]

- **Energy Sector:** Continued improvements in California's appliance and building energy efficiency programs and initiatives, such as the State's zero net energy building goals, would serve to reduce the Project's emissions level.[150] Additionally, further additions to California's renewable resource portfolio would favorably influence the Project's emissions level.[151]
- **Transportation Sector:** Anticipated deployment of improved vehicle efficiency, zero emission technologies, lower carbon fuels, and improvement of existing transportation systems all will serve to reduce the Project's emissions level.[152]
- **Water Sector:** The Project's emissions level will be reduced as a result of further enhancements to water conservation technologies.[153]
- **Waste Management Sector:** Plans to further improve recycling, reuse, and reduction of solid waste will beneficially reduce the Project's emissions level.[154]

Under AB 398, the Cap-and-Trade Program has been extended to 2030. The Cap-and-Trade Program extension is built on the "recommended action" in the First Update to the Climate Change Scoping Plan for the Cap-and-Trade Program, which was to: "Develop a plan for a post-2020 Cap-and-Trade Program, including cost containment, to provide market certainty and address a mid-term emissions target."[155]

In addition to CARB's First Update, in January 2015 during his inaugural address, Governor Jerry Brown expressed a commitment to achieve "3 ambitious goals" that he would like to see

147 CARB, Climate Change Proposed Scoping Plan, p. 15, October 2008

148 CARB, First Update, p. 4, May 2014. See also id. at pp. 32–33 [recent studies show that achieving the 2050 goal will require that the "electricity sector will have to be essentially zero carbon; and that electricity or hydrogen will have to power much of the transportation sector, including almost all passenger vehicles."]

149 Ibid., at Table 6: Summary of Recommended Actions by Sector, pp. 94-99, May 2014.

150 Ibid., at pp. 37-39, 85, May 2014.

151 Ibid., at pp. 40-41, May 2014.

152 Ibid., at pp. 55-56, May 2014.

153 CARB, First Update, p. 65, May 2014.

154 Ibid., at p. 69, May 2014.

155 California Air Resources Board, First Update to the Climate Change Scoping Plan: Building on the Framework, May 2014, page 98.

accomplished by 2030 to reduce the State's GHG emissions: (1) increasing the State's Renewables Portfolio Standard from 33 percent in 2020 to 50 percent in 2030; (2) cutting the petroleum use in cars and trucks in half; and (3) doubling the efficiency of existing buildings and making heating fuels cleaner.[156] These expressions of Executive Branch policy may be manifested in adopted legislative or regulatory action through the state agencies and departments responsible for achieving the State's environmental policy objectives, particularly those relating to global climate change. As discussed previously, the Governor signed into law SB 350 (Chapter 547, Statues of 2015), which increased the Renewables Portfolio Standard to 50 percent by 2030 and included interim targets of 40 percent by 2024 and 45 percent by 2027. The utility provider for the Project Site, SCE, has committed providing an increasing percentage of electricity from renewable sources in compliance with the Renewables Portfolio Standard with 41.4 percent by 2020. The Project would also include the installation of on-site solar photovoltaic systems consistent with City requirements to increase energy efficiency and reduce GHG emissions.

Further, the State's existing and proposed regulatory framework can allow the State to reduce its GHG emissions level to 40 percent below 1990 levels by 2030, and to 80 percent below 1990 levels by 2050. According to the 2017 Scoping Plan (adopted in December 2017), reductions needed to achieve the 2030 target are expected to be achieved by targeting specific emission sectors, including those sectors that are not directly controlled or influenced by the Project, but nonetheless contribute to Project-related GHG emissions. For instance, the Project itself is not subject to the Cap-and-Trade regulation; however, Project-related emissions would decline pursuant to the regulation as utility providers and transportation fuel producers are subject to renewable energy standards, Cap-and-Trade, and the LCFS. The 2017 Scoping Plan also calls for the doubling of the energy efficiency savings, including demand-response flexibility for 10 percent of residential and commercial electric space heating, water heating, air conditioning and refrigeration. The strategy is in the process of being designed specifically to accommodate existing residential and commercial uses under the CEC's Existing Building Energy Efficiency Action Plan.[157] This strategy requires the CEC in collaboration with the CPUC to establish the framework for the energy savings target setting outlines the necessary actions that will need to occur in future years, including workforce education and training institutions engaging with the building industry, mapping industry priorities for efficiency to major occupations that will provide services, identifying workforce competency gaps, and quantifying the work needed to build a workforce to implement high-quality efficiency projects at scale.[158] Even though these studies did not provide an exact regulatory and technological roadmap to achieve the 2030 and 2050 goals, they demonstrated that various combinations of policies could allow the statewide emissions level to remain very low through 2050, suggesting that the combination of new

[156] Los Angeles Times, Transcript: Governor Jerry Brown's January 5, 2015, Inaugural Address, http://www.latimes.com/local/political/la-me-pc-brown-speech-text-20150105-story.html. Accessed February 2018.

[157] California Energy Commission, 2016 Existing Buildings Energy Efficiency Plan Update, December 2016, https://ww2.energy.ca.gov/efficiency/existing_buildings/16-EBP-01/. Accessed September 2019.

[158] California Energy Commission, 2016 Existing Buildings Energy Efficiency Plan Update, December 2016, https://ww2.energy.ca.gov/efficiency/existing_buildings/16-EBP-01/. Accessed September 2019.

technologies and other regulations not analyzed in the study could allow the State to meet the 2030 and 2050 targets.[159]

For the reasons described above, the Project's emissions trajectory is expected to follow a declining trend, consistent with the establishment of the 2030 and 2050 targets. Therefore, given the Project's GHG emissions efficiency and the Project's consistency with applicable GHG plans, policies and regulations adopted for the purpose of reducing GHG emissions, impacts regarding GHG emissions and reduction plans would be less than significant.

5.4 Cumulative Impacts

Worldwide man-made emissions of GHGs were approximately 49,000 $MMTCO_2e$ in 2010 including ongoing emissions from industrial and agricultural sources and emissions from land use changes (e.g., deforestation).[160] Emissions of CO_2 from fossil fuel use and industrial processes account for 65 percent of the total while CO_2 emissions from all sources accounts for 76 percent of the total GHG emissions. Methane emissions account for 16 percent and N_2O emissions for 6.2 percent. In 2013, the United States was the world's second largest emitter of carbon dioxide at 5,300 MMT (China was the largest emitter of carbon dioxide at 10,300 MMT).[161]

CARB compiles GHG inventories for the State of California. As previously stated, based on the 2017 GHG inventory data California has met the Statewide GHG target of 1990 level emissions prior to the 2020 deadline. Between 1990 and 2017, the population and economic activities of California have increased substantially between 1990 and 2017. Despite the population and economic growth, California's net GHG emissions are below 1990 levels. According to CARB, the declining trend coupled with the state's GHG reduction programs (such as the Renewables Portfolio Standard, LCFS, vehicle efficiency standards, and declining caps under the Cap and Trade Program) demonstrate that California is on track to meet the 2020 GHG reduction target in California HSC, Division 25.5, also known as The Global Warming Solutions Act of 2006 (AB 32),[162] is making positive steps towards meeting the 2030 GHG reduction target of 40 percent below 1990 level emissions.

[159] Energy + Environmental Economics (E3), Summary of the California State Agencies' PATHWAYS Project: Long-Term Greenhouse Gas Reduction Scenarios, April 2015; Greenblatt, Jeffrey, "Modeling California Impacts on Greenhouse Gas Emissions," Energy Policy, Vol. 78, pages 158-172. The California Air Resources Board, California Energy Commission, California Public Utilities Commission, and the California Independent System Operator engaged E3 to evaluate the feasibility and cost of a range of potential 2030 targets along the way to the state's goal of reducing GHG emissions to 80% below 1990 levels by 2050. With input from the agencies, E3 developed scenarios that explore the potential pace at which emission reductions can be achieved as well as the mix of technologies and practices deployed. E3 conducted the analysis using its California PATHWAYS model. Enhanced specifically for this study, the model encompasses the entire California economy with detailed representations of the buildings, industry, transportation, and electricity sectors.

[160] Intergovernmental Panel on Climate Change, Fifth Assessment Report Synthesis Report, 2014.

[161] PBL Netherlands Environmental Assessment Agency and the European Commission Joint Research Center, Trends in Global CO_2 Emissions 2014 Report, 2014.

[162] California Air Resources Board, Frequently Asked Questions for the 2016 Edition California Greenhouse Gas Emission Inventory, (2016). Available:

CEQA requires that lead agencies consider the cumulative impacts of GHG emissions from even relatively small (on a global basis) increases in GHG emissions. Small contributions to this cumulative impact (from which significant effects are occurring and are expected to worsen over time) may be potentially considerable and therefore significant. In the case of global climate change, the proximity of the Project to other GHG emissions generating activities is not directly relevant to the determination of a cumulative impact because climate change is a global condition. As stated above, GHG emission impacts are, by their very nature cumulative, as both the California Natural Resources Agency and CAPCOA have recognized.[163] Therefore, an analysis of a project's GHG emission impacts also serves as a cumulative impact assessment.

Although HSC Division 25.5 sets a statewide target for statewide 2020 and 2030 GHG emission levels, its implementing tools (e.g., CARB's *Climate Change Scoping Plan*) make clear that the reductions are not expected to occur uniformly from all sources or sectors. CARB has set targets specific to the transportation sector (land use-related transportation emissions), for example, and under SB 375, SCAG must incorporate these GHG-reduction goals into its Regional Transportation Plan and demonstrate that its Sustainable Communities Strategy is consistent with the Regional Housing Needs Assessment. One of the goals of this process is to ensure that the efforts of State, regional and local planning agencies accommodate the contemporaneous increase in population and employment with a decrease in overall GHG emissions. For example, adopting zoning designations that reduce density in areas which are expected to experience growth in population and housing needs, is seen as inconsistent with anti-sprawl goals of sustainable planning. Although development under a reduced density scenario would result in lower GHG emissions from the use of that individual parcel of land compared to what is currently or hypothetically allowed (by creating fewer units and fewer attributable vehicle trips), total regional GHG emissions would likely fail to decrease at the desired rate or, worse, would increase if regional housing and employment needs of an area were then met with a larger number of less-intensive development projects. Therefore, it is not simply a cumulative increase in regional development or the resultant GHG emissions that potentially threatens GHG reduction goals, but the configuration and design of that development.

With implementation of good planning policies, the land use sector can accommodate growth and still be consistent with statewide plans to reduce GHG emissions. To that end, various agencies are required to develop programs to guide future building and transportation development toward minimizing resource consumption and reducing resultant pollution. As discussed above, the City has adopted a Green Building Code that includes mandatory measures to minimize and reduce GHG emissions from energy consumption.

As discussed in the tables above, the Project's design and location would be consistent with applicable GHG reduction strategies recommended by the State, region, and City. In addition, the Project would support and be consistent with relevant and applicable GHG emission reduction strategies in SCAG's 2016 RTP/SCS. The Project is mixed-use, in an urban infill location and

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https://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2014/ghg_inventory_faq_20160617.pdf. Accessed September 2019.

[163] California Air Pollution Control Officers Association, CEQA & Climate change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, (2008).

within a relatively short distance of existing transit stops; providing residential, office, retail/restaurant uses and employment near current transit stops and neighborhood commercial centers. As a result, the Project would be consistent with SCAG's 2016 RTP/SCS policies for the concentration of growth in proximity to transit.

Furthermore, the overwhelming majority of the Project-related GHG emissions are from two highly regulated source sectors, including electricity generation and transportation fuels. These sectors are already covered entities under the Renewables Portfolio Standard and the Cap-and-Trade Program and as such would be reduced sector-wide in accordance with the GHG reduction targets of HSC Division 25.5, in addition to the previously discussed GHG emissions reductions from the Project-specific energy efficiency design features, and substantial VMT-reducing land use characteristics of the Project. As indicated above, the CEQA Guidelines were amended in response to SB 97. In particular, the CEQA Guidelines were amended to specify that compliance with a GHG emissions reduction program renders a cumulative impact insignificant. Per CEQA Guidelines Section 15064(h)(3), a project's incremental contribution to a cumulative impact can be found not cumulatively considerable if the project would comply with an approved plan or mitigation program that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area of the project.[164] To qualify, such a plan or program must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency.[165] Examples of such programs include a "water quality control plan, air quality attainment or maintenance plan, integrated waste management plan, habitat conservation plan, natural community conservation plan, [and] **plans or regulations for the reduction of greenhouse gas emissions**" (emphasis added).[166] Put another way, CEQA Guidelines Section 15064(h)(3) allows a lead agency to make a finding of non-significance for GHG emissions if a project complies with the California Cap-and-Trade Program or other regulatory schemes to reduce GHG emissions.

Given that the Project would generate GHG emissions consistent with applicable reduction plans and policies, and given that GHG emission impacts are cumulative in nature, the Project's incremental contribution to cumulatively significant GHG emissions would be less than cumulatively considerable, and impacts would be less than significant.

164 14 CCR § 15064(h)(3).
165 14 CCR § 15064(h)(3).
166 14 CCR § 15064(h)(3).

SECTION 6
Summary of Results

GHG emissions associated with the Project have been evaluated to determine the level of impact from construction activities and future operations of the Project. The Project would be consistent with the requirements of the City's Green Building Program which would increase building energy efficiency and reduce energy consumption, leading to reductions in GHG emissions. This would be consistent with applicable SCAG RTP/SCS policies intended to meet the region's GHG reduction targets as assigned by CARB. Thus the Project's GHG emissions are consistent with regulatory schemes intended to reduce GHG emissions.

Construction of the Project would result in temporary and incremental increases to GHG emissions through the use of heavy-duty construction equipment and through vehicle trips generated from construction workers traveling to and from the Project Site. GHG emissions associated with Project operations would be generated by the consumption of electricity, natural gas, and water, vehicle trips to and from the site, waste production, and landscaping.

The Project would be consistent with applicable GHG reduction strategies recommended by the State. In addition, the Project would support and be consistent with relevant and applicable GHG emission reduction strategies in SCAG's Sustainable Communities Strategy, as the Project would result in a mixed-use, infill development that would co-locate complementary residential, office, retail/restaurant land uses, which would be in close to proximity to existing off-site commercial uses and Downtown Culver City. In addition, the Project is located in close proximity to existing public transit stops including local and regional bus lines as well as the Metro Expo light rail and would provide commuters the CALGreen Code required number of bicycle parking spaces, to encourage alternative modes of transportation and reducing single occupancy vehicle transit, thus reducing VMT and GHG emissions.

In summary, construction and operation of the proposed Project would result in GHG emissions that would not result in a significant impact on the environment. The Project would be consistent with local, regional, and State's plans and programs adopted for the purpose of reducing the emissions of GHGs. Accordingly, the Project would not result in a cumulatively considerable impact to global climate change.

Exhibit A

Project Construction Emissions

3727 Robertson Blvd. Mixed-Use Project

Existing Land Uses[1]

Land Use Type	CalEEMod LandUse Type	CalEEMod LandUse Subtype	Amount	Unit	Building SF
Sound Studio	Commercial	General Office Building	2.85	1000sqft	2,850

Environmental Site Assessment/info from client
2,850

Project Land Uses[1,2]

Land Use Type	CalEEMod LandUse Type	CalEEMod LandUse Subtype	Amount	Unit	Building SF	Acres	Population[6]
Apartment	Residential	Apartments Mid Rise	12	DU	12,921	0.03	28
Office	Commercial	General Office Building	5.455	1000sqft	5,455	0.02	
Restaurant/retail	Recreational	High turnover restaurant	3.886	1000sqft	3,886	0.02	
Parking Lot	Parking	Parking Lot	6.00	Spaces	2,400	0.02	
Subeterranean Parking	Parking	Enclosed Parking Structure with	19.00	Spaces	7,600	0.03	
				Total	**22,262**	0.12	5,100

sqft

Construction Data[2]

Start	End	Total Duration
1/1/2020	5/31/2021	17 months
Total Construction Site Area (acres)	0.78	

Construction Phase	CalEEMod Phase Type	Start Date	End Date	Total Calendar Days	Workdays (6 days/week)	Worker Trips/Day (In/Out)	Vendor Trips/Day (In/Out)	Total Haul (or Concrete) Trips (In/Out)	Total Haul (or Concrete) Trucks/Day	Haul (or Concrete) Trips/Day (In/Out)
Demolition	Demolition	1/1/2020	1/15/2020	14	13	10	0	92	4	8
Grading/Excavation	Grading	1/16/2020	2/15/2020	30	27	14	0	480	9	18
Building Construction	Building Construction	2/16/2020	5/31/2021	470	403	12	4	0	0	0
Building Construction - 2020		2/16/2020	12/31/2020	319	274					
Building Construction - 2021		1/1/2021	5/31/2021	150	129					
Paving	Paving	5/1/2021	5/15/2021	14	13	18	0	0	0	0
Architectural Coating	Architectural Coating	5/1/2021	5/31/2021	30	26	2	0	0	0	0

Demolition Quantities

Buildings	Amount	
Building Area (ft^2)[2]	2,850	
Building Height (ft)[4]	15	
Building Volume (ft^3)	42,750	
Building Waste Volume (CY)[3]	396	
Building Waste weight (tons)[3]	198	
Hardscape		
Hardscape Area (ft^2)[4]	3,130	
Thickness (ft)	0.50	
Hardscape Debris Volume (CY)	58	
Debris weight (lb):Volume (CY)[5]	2,400	
Hardscape Debris Weight (tons)	70	
Total Debris Weight (tons)	267	<--Enter in CalEEMod
Total Demolition Debris (CY)	**454**	<--Enter in CalEEMod
Haul Truck Capacity (CY)	10	
Total Haul Trucks Required	45	
Total Haul Truck Trips (In/Out)	**92**	<--Enter in CalEEMod
Total Haul Truck Trips (In/Out) per day	8	

Excavation Quantities

Parameters	Amount	
Excavation Volume (Export) (CY)	**2,400**	**<--Enter in CalEEMod**
Haul Truck Capacity (CY)	10	
Total Haul Trucks Required	240	
Total Haul Truck Trips (In/Out)	**480**	**<--Enter in CalEEMod**
Total Haul Truck Trips (In/Out) per day	18	

Notes:

1 Crain and Associates Traffic Impact Analysis. Matches trip assumptions of restaurant
2 Information received from client and Architectural Plan by Architecture West Inc.
3 CalEEMod User's Guide, Appendix A
4 Measured approximate height and lot size using Google Earth
5 CalRecycle Weights and Volumes
6 United States Census Bureau, Culver City Quick Facts.

Phase[4]	CalEEMod Phase Type	Equipment Type[4]	# of Equipment	Hours/day	HP	Load Factor	Notes
Demolition	Demolition	Dumper/Tenders	1	8	16	0.38	
Demolition	Demolition	Rubber Tired Dozers	2	8	247	0.4	
Demolition	Demolition	Generator Sets	1	8	84	0.74	Accounts for Jackhammer Use
Grading/Excavation	Grading	Tractors/Loaders/Backhoes	2	8	97	0.37	
Grading/Excavation	Grading	Excavators	2	8	158	0.38	
Grading/Excavation	Grading	Bore/Drill Rig	1	8	221	0.5	
Building Construction	Building Construction	Cranes	1	4	231	0.29	
Building Construction	Building Construction	Forklifts	2	6	89	0.2	
Building Construction	Building Construction	Tractors/Loaders/Backhoes	2	8	97	0.37	
Building Construction	Building Construction	Pump	1	8	84	0.74	For Cement Trucks
Paving	Paving	Pavers	1	7	130	0.42	
Paving	Paving	Cement and Mortar Mixers	4	6	9	0.56	
Paving	Paving	Rollers	1	7	80	0.38	
Paving	Paving	Tractors/Loaders/Backhoes	1	7	97	0.37	
Architectural Coating	Architectural Coating	Air Compressors	1	6	78	0.48	

Worker/Vendors Amounts

Phase	# of workers[1]	# of worker trips/day (In/Out)[2,3]	Vendor Trips/day (In/Out)[2]
Demolition	5	10	0
Grading/Excavation	6.25	14	0
Building Construction		12	4
Paving	9	18	0
Architectural Coating		2	0

Notes:

1 Worker trips for all construction phases except building construction and architectural coating is based on 1.25 workers per equipment in that phase resulting in one roundtrip per worker.

2 For building construction workers, the trip number is estimated using the trip generation rate from a survey conducted by SMAQMD.
Office/Inudstrial rates used for Project construction

3 Architectural coating worker trips are 20% of building construction phase trips. Vendor trips are only associated with building construction and is based on the land uses and trip rate indicated in the table above.

4 Information received from client and CalEEMod defaults

Building Construction Worker and Vendor Trip Rates

Land Use SubType	Rate Metric	Worker Trip Rate	Vendor Trip Rate
Single Family	Daily Trips per DU*	0.36	0.1069
Multi-Family	Daily Trips per DU*	0.72	0.1069
Commercial/Retail	Daily Trips per 1000 sq. ft.	0.32	0.1639
Office/Industrial	Daily Trips per 1000 sq. ft.	0.42	0.1639
Source: SCAQMD's analysis of SMAQMD Building Construction Worker and Vendor trip rates found in Appendix E.			

*DU = dwelling unit

3727 Robertson-Construction
South Coast AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	12.00	Dwelling Unit	0.03	12,921.00	34
General Office Building	5.46	1000sqft	0.02	5,455.00	0
High Turnover (Sit Down Restaurant)	3.89	1000sqft	0.02	3,886.00	0
Parking Lot	6.00	Space	0.02	2,400.00	0
Enclosed Parking with Elevator	19.00	Space	0.03	7,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	11			**Operational Year**	2021
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 - see construction assumptions

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment -

Off-road Equipment -

Grading -

Demolition -

Trips and VMT - construction mobile emissions calculations calculated outside of CalEEMod

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	5.00	26.00
tblConstructionPhase	NumDays	100.00	403.00
tblConstructionPhase	NumDays	10.00	13.00
tblConstructionPhase	NumDays	2.00	27.00
tblConstructionPhase	NumDays	5.00	13.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	PhaseEndDate	6/19/2020	5/31/2021
tblConstructionPhase	PhaseEndDate	6/5/2020	5/31/2021
tblConstructionPhase	PhaseEndDate	1/14/2020	1/15/2020
tblConstructionPhase	PhaseEndDate	1/17/2020	2/15/2020
tblConstructionPhase	PhaseEndDate	6/12/2020	5/15/2021
tblConstructionPhase	PhaseStartDate	6/13/2020	5/1/2021
tblConstructionPhase	PhaseStartDate	1/18/2020	2/16/2020
tblConstructionPhase	PhaseStartDate	6/6/2020	5/1/2021
tblGrading	MaterialExported	0.00	2,400.00
tblLandUse	LandUseSquareFeet	12,000.00	12,921.00
tblLandUse	LotAcreage	0.32	0.03

tblLandUse	LotAcreage	0.13	0.02
tblLandUse	LotAcreage	0.09	0.02
tblLandUse	LotAcreage	0.05	0.02
tblLandUse	LotAcreage	0.17	0.03
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	UsageHours	1.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripNumber	26.00	0.00
tblTripsAndVMT	HaulingTripNumber	300.00	0.00
tblTripsAndVMT	VendorTripNumber	4.00	0.00
tblTripsAndVMT	WorkerTripNumber	10.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblTripsAndVMT	WorkerTripNumber	16.00	0.00
tblTripsAndVMT	WorkerTripNumber	18.00	0.00
tblTripsAndVMT	WorkerTripNumber	3.00	0.00

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					
2020	0.2092	2.0393	1.7854	2.9700e-003	2.9900e-003	0.1167	0.1197	4.5000e-004	0.1098	0.1102	0.0000	259.1829	259.1829	0.0624	0.0000	260.7418
2021	0.1672	0.7856	0.7795	1.2700e-003	0.0000	0.0438	0.0438	0.0000	0.0414	0.0414	0.0000	110.4332	110.4332	0.0249	0.0000	111.0550
Maximum	**0.2092**	**2.0393**	**1.7854**	**2.9700e-003**	**2.9900e-003**	**0.1167**	**0.1197**	**4.5000e-004**	**0.1098**	**0.1102**	**0.0000**	**259.1829**	**259.1829**	**0.0624**	**0.0000**	**260.7418**

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					
2020	0.2092	2.0393	1.7854	2.9700e-003	1.1700e-003	0.1167	0.1179	1.8000e-004	0.1098	0.1099	0.0000	259.1826	259.1826	0.0624	0.0000	260.7415
2021	0.1672	0.7856	0.7795	1.2700e-003	0.0000	0.0438	0.0438	0.0000	0.0414	0.0414	0.0000	110.4331	110.4331	0.0249	0.0000	111.0549
Maximum	**0.2092**	**2.0393**	**1.7854**	**2.9700e-003**	**1.1700e-003**	**0.1167**	**0.1179**	**1.8000e-004**	**0.1098**	**0.1099**	**0.0000**	**259.1826**	**259.1826**	**0.0624**	**0.0000**	**260.7415**

	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**	**60.87**	**0.00**	**1.11**	**60.00**	**0.00**	**0.18**	**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	1-1-2020	3-31-2020	0.6347	0.6347
2	4-1-2020	6-30-2020	0.5330	0.5330
3	7-1-2020	9-30-2020	0.5388	0.5388
4	10-1-2020	12-31-2020	0.5388	0.5388
5	1-1-2021	3-31-2021	0.4764	0.4764
6	4-1-2021	6-30-2021	0.4809	0.4809
		Highest	0.6347	0.6347

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	1/1/2020	1/15/2020	6	13	
2	Grading	Grading	1/16/2020	2/15/2020	6	27	
3	Building Construction	Building Construction	2/16/2020	5/31/2021	6	403	
4	Paving	Paving	5/1/2021	5/15/2021	6	13	
5	Architectural Coating	Architectural Coating	5/1/2021	5/31/2021	6	26	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.05

Residential Indoor: 26,165; Residential Outdoor: 8,722; Non-Residential Indoor: 14,012; Non-Residential Outdoor: 4,671; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Grading	Concrete/Industrial Saws	0	8.00	81	0.73

Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Demolition	Dumpers/Tenders	1	8.00	16	0.38
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	0	1.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Demolition	Generator Sets	1	8.00	84	0.74
Grading	Excavators	2	8.00	158	0.38
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Building Construction	Pumps	1	8.00	84	0.74

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	4	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	5	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	6	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 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					
Fugitive Dust					2.8600e-003	0.0000	2.8600e-003	4.3000e-004	0.0000	4.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0171	0.1730	0.0794	1.6000e-004		8.6100e-003	8.6100e-003		8.0300e-003	8.0300e-003	0.0000	13.7904	13.7904	3.4000e-003	0.0000	13.8754
Total	**0.0171**	**0.1730**	**0.0794**	**1.6000e-004**	**2.8600e-003**	**8.6100e-003**	**0.0115**	**4.3000e-004**	**8.0300e-003**	**8.4600e-003**	**0.0000**	**13.7904**	**13.7904**	**3.4000e-003**	**0.0000**	**13.8754**

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	0.0000	0.0000	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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					1.1100e-003	0.0000	1.1100e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0171	0.1730	0.0794	1.6000e-004		8.6100e-003	8.6100e-003		8.0300e-003	8.0300e-003	0.0000	13.7904	13.7904	3.4000e-003	0.0000	13.8754
Total	**0.0171**	**0.1730**	**0.0794**	**1.6000e-004**	**1.1100e-003**	**8.6100e-003**	**9.7200e-003**	**1.7000e-004**	**8.0300e-003**	**8.2000e-003**	**0.0000**	**13.7904**	**13.7904**	**3.4000e-003**	**0.0000**	**13.8754**

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	0.0000	0.0000	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.3 Grading - 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					
Fugitive Dust					1.4000e-004	0.0000	1.4000e-004	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0161	0.1701	0.1785	3.5000e-004		8.1400e-003	8.1400e-003		7.4900e-003	7.4900e-003	0.0000	30.8763	30.8763	9.9900e-003	0.0000	31.1259
Total	**0.0161**	**0.1701**	**0.1785**	**3.5000e-004**	**1.4000e-004**	**8.1400e-003**	**8.2800e-003**	**2.0000e-005**	**7.4900e-003**	**7.5100e-003**	**0.0000**	**30.8763**	**30.8763**	**9.9900e-003**	**0.0000**	**31.1259**

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	0.0000	0.0000	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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					5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0161	0.1701	0.1785	3.5000e-004		8.1400e-003	8.1400e-003		7.4900e-003	7.4900e-003	0.0000	30.8762	30.8762	9.9900e-003	0.0000	31.1259
Total	**0.0161**	**0.1701**	**0.1785**	**3.5000e-004**	**5.0000e-005**	**8.1400e-003**	**8.1900e-003**	**1.0000e-005**	**7.4900e-003**	**7.5000e-003**	**0.0000**	**30.8762**	**30.8762**	**9.9900e-003**	**0.0000**	**31.1259**

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	0.0000	0.0000	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Building Construction - 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	0.1760	1.6962	1.5276	2.4600e-003		0.1000	0.1000		0.0942	0.0942	0.0000	214.5163	214.5163	0.0490	0.0000	215.7405
Total	**0.1760**	**1.6962**	**1.5276**	**2.4600e-003**		**0.1000**	**0.1000**		**0.0942**	**0.0942**	**0.0000**	**214.5163**	**214.5163**	**0.0490**	**0.0000**	**215.7405**

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	0.0000	0.0000	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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					
Off-Road	0.1760	1.6962	1.5276	2.4600e-003		0.1000	0.1000		0.0942	0.0942	0.0000	214.5160	214.5160	0.0490	0.0000	215.7402
Total	**0.1760**	**1.6962**	**1.5276**	**2.4600e-003**		**0.1000**	**0.1000**		**0.0942**	**0.0942**	**0.0000**	**214.5160**	**214.5160**	**0.0490**	**0.0000**	**215.7402**

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	0.0000	0.0000	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Building Construction - 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	0.0745	0.7221	0.7098	1.1600e-003		0.0403	0.0403		0.0380	0.0380	0.0000	101.0089	101.0089	0.0229	0.0000	101.5805
Total	**0.0745**	**0.7221**	**0.7098**	**1.1600e-003**		**0.0403**	**0.0403**		**0.0380**	**0.0380**	**0.0000**	**101.0089**	**101.0089**	**0.0229**	**0.0000**	**101.5805**

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	0.0000	0.0000	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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	0.0745	0.7221	0.7098	1.1600e-003		0.0403	0.0403		0.0380	0.0380	0.0000	101.0088	101.0088	0.0229	0.0000	101.5804
Total	**0.0745**	**0.7221**	**0.7098**	**1.1600e-003**		**0.0403**	**0.0403**		**0.0380**	**0.0380**	**0.0000**	**101.0088**	**101.0088**	**0.0229**	**0.0000**	**101.5804**

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	0.0000	0.0000	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.5 Paving - 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	4.6900e-003	0.0437	0.0461	7.0000e-005		2.3000e-003	2.3000e-003		2.1400e-003	2.1400e-003	0.0000	6.1051	6.1051	1.7800e-003	0.0000	6.1496
Paving	3.0000e-005					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**4.7200e-003**	**0.0437**	**0.0461**	**7.0000e-005**		**2.3000e-003**	**2.3000e-003**		**2.1400e-003**	**2.1400e-003**	**0.0000**	**6.1051**	**6.1051**	**1.7800e-003**	**0.0000**	**6.1496**

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	0.0000	0.0000	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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	4.6900e-003	0.0437	0.0461	7.0000e-005		2.3000e-003	2.3000e-003		2.1400e-003	2.1400e-003	0.0000	6.1051	6.1051	1.7800e-003	0.0000	6.1496
Paving	3.0000e-005					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**4.7200e-003**	**0.0437**	**0.0461**	**7.0000e-005**		**2.3000e-003**	**2.3000e-003**		**2.1400e-003**	**2.1400e-003**	**0.0000**	**6.1051**	**6.1051**	**1.7800e-003**	**0.0000**	**6.1496**

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	0.0000	0.0000	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.6 Architectural Coating - 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	0.0851					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.8500e-003	0.0199	0.0236	4.0000e-005		1.2200e-003	1.2200e-003		1.2200e-003	1.2200e-003	0.0000	3.3192	3.3192	2.3000e-004	0.0000	3.3249
Total	**0.0880**	**0.0199**	**0.0236**	**4.0000e-005**		**1.2200e-003**	**1.2200e-003**		**1.2200e-003**	**1.2200e-003**	**0.0000**	**3.3192**	**3.3192**	**2.3000e-004**	**0.0000**	**3.3249**

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	0.0000	0.0000	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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	0.0851					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.8500e-003	0.0199	0.0236	4.0000e-005		1.2200e-003	1.2200e-003		1.2200e-003	1.2200e-003	0.0000	3.3192	3.3192	2.3000e-004	0.0000	3.3249
Total	**0.0880**	**0.0199**	**0.0236**	**4.0000e-005**		**1.2200e-003**	**1.2200e-003**		**1.2200e-003**	**1.2200e-003**	**0.0000**	**3.3192**	**3.3192**	**2.3000e-004**	**0.0000**	**3.3249**

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	0.0000	0.0000	0.0000	0.0000	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	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Exhibit B

Existing Site Operational Emissions

3727 Robertson-Existing

South Coast AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	2.85	1000sqft	0.12	2,850.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	11			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	506.46	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - SCE CO2e intensity factor was linearly projected for year 2019 anticipated RPS based on SB 100 target of 44% RPS by 2024. See existing assumptions for more details

Land Use - see existing assumptions for more details.

Construction Phase - existing operational run only

Vehicle Trips - existing trip rate from project traffic impact analysis.

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Energy Use - Historical energy used since existing uses were built before 2005.

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	2.00
tblFleetMix	HHD	0.03	0.03
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD2	5.8700e-003	5.7655e-003
tblFleetMix	MCY	4.7240e-003	4.2102e-003
tblFleetMix	MDV	0.12	0.13
tblFleetMix	MH	9.9100e-004	9.9959e-004
tblFleetMix	MHD	0.02	0.02
tblFleetMix	OBUS	1.9990e-003	1.2392e-003
tblFleetMix	SBUS	7.0400e-004	6.4756e-004
tblFleetMix	UBUS	2.0270e-003	1.4619e-003
tblLandUse	LotAcreage	0.07	0.12
tblProjectCharacteristics	CH4IntensityFactor	0.029	0
tblProjectCharacteristics	CO2IntensityFactor	702.44	506.46
tblProjectCharacteristics	N2OIntensityFactor	0.006	0
tblVehicleEF	HHD	0.85	0.03
tblVehicleEF	HHD	0.08	0.08
tblVehicleEF	HHD	0.12	4.2653e-007
tblVehicleEF	HHD	3.14	5.53
tblVehicleEF	HHD	0.99	0.82
tblVehicleEF	HHD	3.18	9.5370e-003
tblVehicleEF	HHD	4,992.93	1,154.64
tblVehicleEF	HHD	1,647.55	1,537.04
tblVehicleEF	HHD	9.63	0.11
tblVehicleEF	HHD	25.01	6.67
tblVehicleEF	HHD	4.55	4.81

tblVehicleEF	HHD	19.77	1.52
tblVehicleEF	HHD	0.03	0.02
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.08
tblVehicleEF	HHD	1.1800e-004	4.2255e-006
tblVehicleEF	HHD	0.03	0.02
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8190e-003	8.8734e-003
tblVehicleEF	HHD	0.02	0.07
tblVehicleEF	HHD	1.1000e-004	3.9615e-006
tblVehicleEF	HHD	1.3200e-004	1.2385e-005
tblVehicleEF	HHD	5.9330e-003	5.8881e-004
tblVehicleEF	HHD	0.79	0.49
tblVehicleEF	HHD	9.1000e-005	8.1541e-006
tblVehicleEF	HHD	0.14	0.17
tblVehicleEF	HHD	4.8800e-004	2.6148e-003
tblVehicleEF	HHD	0.10	2.2417e-006
tblVehicleEF	HHD	0.05	0.01
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	1.4900e-004	1.1157e-006
tblVehicleEF	HHD	1.3200e-004	1.2385e-005
tblVehicleEF	HHD	5.9330e-003	5.8881e-004
tblVehicleEF	HHD	0.92	0.56
tblVehicleEF	HHD	9.1000e-005	8.1541e-006
tblVehicleEF	HHD	0.24	0.27
tblVehicleEF	HHD	4.8800e-004	2.6148e-003
tblVehicleEF	HHD	0.11	2.4543e-006
tblVehicleEF	HHD	0.80	0.03
tblVehicleEF	HHD	0.08	0.08

tblVehicleEF	HHD	0.11	4.0875e-007
tblVehicleEF	HHD	2.29	5.35
tblVehicleEF	HHD	0.99	0.82
tblVehicleEF	HHD	3.02	9.0529e-003
tblVehicleEF	HHD	5,285.68	1,158.03
tblVehicleEF	HHD	1,647.55	1,537.04
tblVehicleEF	HHD	9.63	0.11
tblVehicleEF	HHD	25.81	6.56
tblVehicleEF	HHD	4.30	4.55
tblVehicleEF	HHD	19.76	1.52
tblVehicleEF	HHD	0.03	0.02
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.08
tblVehicleEF	HHD	1.1800e-004	4.2255e-006
tblVehicleEF	HHD	0.02	0.02
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8190e-003	8.8734e-003
tblVehicleEF	HHD	0.02	0.07
tblVehicleEF	HHD	1.1000e-004	3.9615e-006
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tblVehicleEF	HHD	6.1900e-003	6.0457e-004
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tblVehicleEF	HHD	1.4700e-004	1.3636e-005
tblVehicleEF	HHD	0.14	0.17
tblVehicleEF	HHD	4.8400e-004	2.6080e-003
tblVehicleEF	HHD	0.10	2.1542e-006
tblVehicleEF	HHD	0.05	0.01
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	1.4700e-004	1.1081e-006

tblVehicleEF	HHD	2.1500e-004	2.0386e-005
tblVehicleEF	HHD	6.1900e-003	6.0457e-004
tblVehicleEF	HHD	0.87	0.58
tblVehicleEF	HHD	1.4700e-004	1.3636e-005
tblVehicleEF	HHD	0.24	0.27
tblVehicleEF	HHD	4.8400e-004	2.6080e-003
tblVehicleEF	HHD	0.11	2.3586e-006
tblVehicleEF	HHD	0.91	0.03
tblVehicleEF	HHD	0.08	0.08
tblVehicleEF	HHD	0.12	4.3011e-007
tblVehicleEF	HHD	4.32	5.79
tblVehicleEF	HHD	0.99	0.82
tblVehicleEF	HHD	3.20	9.5974e-003
tblVehicleEF	HHD	4,588.64	1,149.97
tblVehicleEF	HHD	1,647.55	1,537.04
tblVehicleEF	HHD	9.63	0.11
tblVehicleEF	HHD	23.92	6.82
tblVehicleEF	HHD	4.48	4.74
tblVehicleEF	HHD	19.77	1.52
tblVehicleEF	HHD	0.04	0.02
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.08
tblVehicleEF	HHD	1.1800e-004	4.2255e-006
tblVehicleEF	HHD	0.03	0.02
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8190e-003	8.8734e-003
tblVehicleEF	HHD	0.02	0.07
tblVehicleEF	HHD	1.1000e-004	3.9615e-006
tblVehicleEF	HHD	1.2900e-004	1.3087e-005

tblVehicleEF	HHD	6.7430e-003	7.2786e-004
tblVehicleEF	HHD	0.86	0.47
tblVehicleEF	HHD	8.9000e-005	8.3235e-006
tblVehicleEF	HHD	0.14	0.17
tblVehicleEF	HHD	5.2300e-004	2.7607e-003
tblVehicleEF	HHD	0.10	2.2588e-006
tblVehicleEF	HHD	0.04	0.01
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	1.5000e-004	1.1167e-006
tblVehicleEF	HHD	1.2900e-004	1.3087e-005
tblVehicleEF	HHD	6.7430e-003	7.2786e-004
tblVehicleEF	HHD	0.99	0.54
tblVehicleEF	HHD	8.9000e-005	8.3235e-006
tblVehicleEF	HHD	0.24	0.27
tblVehicleEF	HHD	5.2300e-004	2.7607e-003
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tblVehicleEF	LDA	296.90	289.60
tblVehicleEF	LDA	63.02	57.92
tblVehicleEF	LDA	0.07	0.06
tblVehicleEF	LDA	0.10	0.22
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	8.0000e-003	8.0000e-003
tblVehicleEF	LDA	2.1320e-003	1.9540e-003
tblVehicleEF	LDA	2.3470e-003	2.1114e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	2.0000e-003	2.0000e-003

tblVehicleEF	LDA	1.9670e-003	1.8006e-003
tblVehicleEF	LDA	2.1590e-003	1.9415e-003
tblVehicleEF	LDA	0.05	0.07
tblVehicleEF	LDA	0.12	0.12
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	0.24
tblVehicleEF	LDA	0.11	0.29
tblVehicleEF	LDA	2.9750e-003	2.8651e-003
tblVehicleEF	LDA	6.5600e-004	5.7318e-004
tblVehicleEF	LDA	0.05	0.07
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tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.04	0.24
tblVehicleEF	LDA	0.12	0.32
tblVehicleEF	LDA	6.9190e-003	4.5647e-003
tblVehicleEF	LDA	6.9240e-003	0.06
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tblVehicleEF	LDA	0.09	0.21
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	8.0000e-003	8.0000e-003
tblVehicleEF	LDA	2.1320e-003	1.9540e-003
tblVehicleEF	LDA	2.3470e-003	2.1114e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	2.0000e-003	2.0000e-003

tblVehicleEF	LDA	1.9670e-003	1.8006e-003
tblVehicleEF	LDA	2.1590e-003	1.9415e-003
tblVehicleEF	LDA	0.08	0.11
tblVehicleEF	LDA	0.13	0.13
tblVehicleEF	LDA	0.07	0.09
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	0.23
tblVehicleEF	LDA	0.09	0.26
tblVehicleEF	LDA	3.1350e-003	3.0128e-003
tblVehicleEF	LDA	6.5300e-004	5.6692e-004
tblVehicleEF	LDA	0.08	0.11
tblVehicleEF	LDA	0.13	0.13
tblVehicleEF	LDA	0.07	0.09
tblVehicleEF	LDA	0.03	0.03
tblVehicleEF	LDA	0.04	0.23
tblVehicleEF	LDA	0.10	0.29
tblVehicleEF	LDA	6.3270e-003	4.1507e-003
tblVehicleEF	LDA	8.0020e-003	0.06
tblVehicleEF	LDA	0.74	0.87
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tblVehicleEF	LDA	291.73	284.71
tblVehicleEF	LDA	63.02	58.05
tblVehicleEF	LDA	0.06	0.06
tblVehicleEF	LDA	0.10	0.23
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	8.0000e-003	8.0000e-003
tblVehicleEF	LDA	2.1320e-003	1.9540e-003
tblVehicleEF	LDA	2.3470e-003	2.1114e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	2.0000e-003	2.0000e-003

tblVehicleEF	LDA	1.9670e-003	1.8006e-003
tblVehicleEF	LDA	2.1590e-003	1.9415e-003
tblVehicleEF	LDA	0.05	0.07
tblVehicleEF	LDA	0.14	0.13
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.05	0.27
tblVehicleEF	LDA	0.11	0.30
tblVehicleEF	LDA	2.9230e-003	2.8167e-003
tblVehicleEF	LDA	6.5700e-004	5.7447e-004
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tblVehicleEF	LDA	0.12	0.33
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tblVehicleEF	LDT1	3.80	2.55
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tblVehicleEF	LDT1	3.9250e-003	3.2584e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003

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tblVehicleEF	LDT1	0.13	0.14
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tblVehicleEF	LDT1	0.13	0.14
tblVehicleEF	LDT1	0.07	0.07
tblVehicleEF	LDT1	0.20	0.91
tblVehicleEF	LDT1	0.30	0.55
tblVehicleEF	LDT1	0.02	0.01
tblVehicleEF	LDT1	0.02	0.08
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tblVehicleEF	LDT1	0.21	0.31
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tblVehicleEF	LDT1	3.9250e-003	3.2584e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003

tblVehicleEF	LDT1	3.3780e-003	2.9639e-003
tblVehicleEF	LDT1	3.6110e-003	2.9966e-003
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tblVehicleEF	LDT1	0.20	0.21
tblVehicleEF	LDT1	0.05	0.05
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tblVehicleEF	LDT1	0.24	0.44
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tblVehicleEF	LDT1	0.36	0.29
tblVehicleEF	LDT1	0.20	0.21
tblVehicleEF	LDT1	0.07	0.08
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tblVehicleEF	LDT1	0.02	0.01
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tblVehicleEF	LDT1	0.23	0.34
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	3.6680e-003	3.2197e-003
tblVehicleEF	LDT1	3.9250e-003	3.2584e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003

tblVehicleEF	LDT1	3.3780e-003	2.9639e-003
tblVehicleEF	LDT1	3.6110e-003	2.9966e-003
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tblVehicleEF	LDT1	0.38	0.30
tblVehicleEF	LDT1	0.12	0.13
tblVehicleEF	LDT1	0.05	0.05
tblVehicleEF	LDT1	0.24	1.07
tblVehicleEF	LDT1	0.28	0.51
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tblVehicleEF	LDT1	8.1800e-004	6.8617e-004
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tblVehicleEF	LDT1	0.38	0.30
tblVehicleEF	LDT1	0.12	0.13
tblVehicleEF	LDT1	0.07	0.07
tblVehicleEF	LDT1	0.24	1.07
tblVehicleEF	LDT1	0.31	0.56
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tblVehicleEF	LDT2	0.17	0.38
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9950e-003	2.0175e-003
tblVehicleEF	LDT2	2.3030e-003	2.1081e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003

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tblVehicleEF	LDT2	2.1180e-003	1.9387e-003
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tblVehicleEF	LDT2	0.13	0.15
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.07	0.46
tblVehicleEF	LDT2	0.13	0.41
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tblVehicleEF	LDT2	8.9100e-004	7.5703e-004
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tblVehicleEF	LDT2	0.13	0.15
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.07	0.46
tblVehicleEF	LDT2	0.14	0.45
tblVehicleEF	LDT2	9.1950e-003	7.0670e-003
tblVehicleEF	LDT2	8.4280e-003	0.08
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tblVehicleEF	LDT2	0.16	0.35
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9950e-003	2.0175e-003
tblVehicleEF	LDT2	2.3030e-003	2.1081e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003

tblVehicleEF	LDT2	1.8350e-003	1.8570e-003
tblVehicleEF	LDT2	2.1180e-003	1.9387e-003
tblVehicleEF	LDT2	0.09	0.14
tblVehicleEF	LDT2	0.14	0.16
tblVehicleEF	LDT2	0.08	0.13
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.07	0.43
tblVehicleEF	LDT2	0.11	0.36
tblVehicleEF	LDT2	4.2860e-003	3.8606e-003
tblVehicleEF	LDT2	8.8600e-004	7.4880e-004
tblVehicleEF	LDT2	0.09	0.14
tblVehicleEF	LDT2	0.14	0.16
tblVehicleEF	LDT2	0.08	0.13
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.07	0.43
tblVehicleEF	LDT2	0.12	0.40
tblVehicleEF	LDT2	8.4340e-003	6.4559e-003
tblVehicleEF	LDT2	9.7300e-003	0.09
tblVehicleEF	LDT2	0.96	1.25
tblVehicleEF	LDT2	1.94	3.06
tblVehicleEF	LDT2	399.66	369.64
tblVehicleEF	LDT2	85.85	76.68
tblVehicleEF	LDT2	0.10	0.12
tblVehicleEF	LDT2	0.17	0.38
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9950e-003	2.0175e-003
tblVehicleEF	LDT2	2.3030e-003	2.1081e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003

tblVehicleEF	LDT2	1.8350e-003	1.8570e-003
tblVehicleEF	LDT2	2.1180e-003	1.9387e-003
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.14	0.16
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.08	0.54
tblVehicleEF	LDT2	0.13	0.42
tblVehicleEF	LDT2	4.0050e-003	3.6571e-003
tblVehicleEF	LDT2	8.9200e-004	7.5878e-004
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.14	0.16
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.08	0.54
tblVehicleEF	LDT2	0.14	0.46
tblVehicleEF	LHD1	6.4120e-003	6.0565e-003
tblVehicleEF	LHD1	0.02	7.6280e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.16	0.19
tblVehicleEF	LHD1	1.13	0.93
tblVehicleEF	LHD1	3.23	1.26
tblVehicleEF	LHD1	8.98	9.12
tblVehicleEF	LHD1	628.01	695.72
tblVehicleEF	LHD1	35.68	13.22
tblVehicleEF	LHD1	0.07	0.06
tblVehicleEF	LHD1	1.53	1.13
tblVehicleEF	LHD1	1.14	0.38
tblVehicleEF	LHD1	8.1700e-004	7.0981e-004
tblVehicleEF	LHD1	0.08	0.08

tblVehicleEF	LHD1	9.8590e-003	9.5450e-003
tblVehicleEF	LHD1	0.01	8.3538e-003
tblVehicleEF	LHD1	1.1990e-003	3.3991e-004
tblVehicleEF	LHD1	7.8200e-004	6.7910e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.4650e-003	2.3863e-003
tblVehicleEF	LHD1	0.01	7.9614e-003
tblVehicleEF	LHD1	1.1050e-003	3.1349e-004
tblVehicleEF	LHD1	3.5670e-003	3.1349e-003
tblVehicleEF	LHD1	0.11	0.10
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	2.0130e-003	1.7695e-003
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	0.32	0.63
tblVehicleEF	LHD1	0.33	0.10
tblVehicleEF	LHD1	9.1000e-005	8.8742e-005
tblVehicleEF	LHD1	6.1830e-003	6.8013e-003
tblVehicleEF	LHD1	4.1800e-004	1.3086e-004
tblVehicleEF	LHD1	3.5670e-003	3.1349e-003
tblVehicleEF	LHD1	0.11	0.10
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.0130e-003	1.7695e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.32	0.63
tblVehicleEF	LHD1	0.36	0.11
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tblVehicleEF	LHD1	0.02	7.7595e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.16	0.19
tblVehicleEF	LHD1	1.14	0.94

tblVehicleEF	LHD1	3.08	1.20
tblVehicleEF	LHD1	8.98	9.12
tblVehicleEF	LHD1	628.01	695.75
tblVehicleEF	LHD1	35.68	13.12
tblVehicleEF	LHD1	0.07	0.06
tblVehicleEF	LHD1	1.43	1.06
tblVehicleEF	LHD1	1.10	0.37
tblVehicleEF	LHD1	8.1700e-004	7.0981e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	9.8590e-003	9.5450e-003
tblVehicleEF	LHD1	0.01	8.3538e-003
tblVehicleEF	LHD1	1.1990e-003	3.3991e-004
tblVehicleEF	LHD1	7.8200e-004	6.7910e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.4650e-003	2.3863e-003
tblVehicleEF	LHD1	0.01	7.9614e-003
tblVehicleEF	LHD1	1.1050e-003	3.1349e-004
tblVehicleEF	LHD1	5.5850e-003	4.8835e-003
tblVehicleEF	LHD1	0.12	0.10
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	3.0770e-003	2.6924e-003
tblVehicleEF	LHD1	0.08	0.07
tblVehicleEF	LHD1	0.31	0.62
tblVehicleEF	LHD1	0.32	0.10
tblVehicleEF	LHD1	9.1000e-005	8.8742e-005
tblVehicleEF	LHD1	6.1830e-003	6.8015e-003
tblVehicleEF	LHD1	4.1500e-004	1.2984e-004
tblVehicleEF	LHD1	5.5850e-003	4.8835e-003
tblVehicleEF	LHD1	0.12	0.10
tblVehicleEF	LHD1	0.03	0.03

tblVehicleEF	LHD1	3.0770e-003	2.6924e-003
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tblVehicleEF	LHD1	0.31	0.62
tblVehicleEF	LHD1	0.35	0.11
tblVehicleEF	LHD1	6.4120e-003	6.0545e-003
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tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.16	0.19
tblVehicleEF	LHD1	1.12	0.93
tblVehicleEF	LHD1	3.25	1.27
tblVehicleEF	LHD1	8.98	9.12
tblVehicleEF	LHD1	628.01	695.72
tblVehicleEF	LHD1	35.68	13.24
tblVehicleEF	LHD1	0.07	0.06
tblVehicleEF	LHD1	1.50	1.11
tblVehicleEF	LHD1	1.15	0.38
tblVehicleEF	LHD1	8.1700e-004	7.0981e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	9.8590e-003	9.5450e-003
tblVehicleEF	LHD1	0.01	8.3538e-003
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tblVehicleEF	LHD1	7.8200e-004	6.7910e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.4650e-003	2.3863e-003
tblVehicleEF	LHD1	0.01	7.9614e-003
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tblVehicleEF	LHD1	3.6920e-003	3.2651e-003
tblVehicleEF	LHD1	0.13	0.11
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.9880e-003	1.7521e-003

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tblVehicleEF	LHD1	0.35	0.68
tblVehicleEF	LHD1	0.33	0.10
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tblVehicleEF	LHD1	6.1830e-003	6.8012e-003
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tblVehicleEF	LHD1	3.6920e-003	3.2651e-003
tblVehicleEF	LHD1	0.13	0.11
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	1.9880e-003	1.7521e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.35	0.68
tblVehicleEF	LHD1	0.36	0.11
tblVehicleEF	LHD2	4.7550e-003	4.3651e-003
tblVehicleEF	LHD2	6.4800e-003	5.2907e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.14	0.16
tblVehicleEF	LHD2	0.53	0.63
tblVehicleEF	LHD2	1.73	0.87
tblVehicleEF	LHD2	13.70	13.75
tblVehicleEF	LHD2	639.58	701.59
tblVehicleEF	LHD2	30.04	10.39
tblVehicleEF	LHD2	0.11	0.10
tblVehicleEF	LHD2	1.25	1.41
tblVehicleEF	LHD2	0.70	0.27
tblVehicleEF	LHD2	1.2000e-003	1.1885e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	5.7800e-004	1.8429e-004

tblVehicleEF	LHD2	1.1490e-003	1.1371e-003
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tblVehicleEF	LHD2	2.6260e-003	2.6020e-003
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tblVehicleEF	LHD2	0.02	0.02
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tblVehicleEF	LHD2	0.12	0.42
tblVehicleEF	LHD2	0.17	0.07
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tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	9.3200e-004	1.1036e-003
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tblVehicleEF	LHD2	6.5770e-003	5.3568e-003
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tblVehicleEF	LHD2	639.58	701.60

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tblVehicleEF	LHD2	1.2000e-003	1.1885e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
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tblVehicleEF	LHD2	5.7800e-004	1.8429e-004
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tblVehicleEF	LHD2	2.6260e-003	2.6020e-003
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tblVehicleEF	LHD2	5.3200e-004	1.6946e-004
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tblVehicleEF	LHD2	0.05	0.07
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tblVehicleEF	LHD2	1.4090e-003	1.6678e-003
tblVehicleEF	LHD2	0.07	0.08
tblVehicleEF	LHD2	0.12	0.40

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tblVehicleEF	LHD2	0.14	0.16
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tblVehicleEF	LHD2	30.04	10.40
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tblVehicleEF	LHD2	2.6260e-003	2.6020e-003
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tblVehicleEF	LHD2	5.3200e-004	1.6946e-004
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tblVehicleEF	LHD2	0.13	0.45
tblVehicleEF	LHD2	0.17	0.07

tblVehicleEF	LHD2	1.3400e-004	1.3203e-004
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tblVehicleEF	LHD2	1.6010e-003	1.9864e-003
tblVehicleEF	LHD2	0.06	0.07
tblVehicleEF	LHD2	0.02	0.03
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tblVehicleEF	LHD2	0.18	0.08
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tblVehicleEF	MCY	19.79	20.12
tblVehicleEF	MCY	9.59	8.45
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tblVehicleEF	MCY	1.13	1.13
tblVehicleEF	MCY	0.31	0.26
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.0830e-003	2.0705e-003
tblVehicleEF	MCY	4.0650e-003	3.4362e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	1.9510e-003	1.9400e-003
tblVehicleEF	MCY	3.8420e-003	3.2466e-003
tblVehicleEF	MCY	1.19	1.21
tblVehicleEF	MCY	0.72	0.75
tblVehicleEF	MCY	0.72	0.73
tblVehicleEF	MCY	2.52	2.54

tblVehicleEF	MCY	0.66	2.23
tblVehicleEF	MCY	2.09	1.85
tblVehicleEF	MCY	2.2050e-003	2.1630e-003
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tblVehicleEF	MCY	0.72	0.75
tblVehicleEF	MCY	0.72	0.73
tblVehicleEF	MCY	3.11	3.12
tblVehicleEF	MCY	0.66	2.23
tblVehicleEF	MCY	2.28	2.01
tblVehicleEF	MCY	0.48	0.36
tblVehicleEF	MCY	0.14	0.21
tblVehicleEF	MCY	19.25	19.55
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tblVehicleEF	MCY	46.13	59.16
tblVehicleEF	MCY	0.99	0.99
tblVehicleEF	MCY	0.29	0.25
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.0830e-003	2.0705e-003
tblVehicleEF	MCY	4.0650e-003	3.4362e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	1.9510e-003	1.9400e-003
tblVehicleEF	MCY	3.8420e-003	3.2466e-003
tblVehicleEF	MCY	2.00	2.03
tblVehicleEF	MCY	0.83	0.86
tblVehicleEF	MCY	1.28	1.29
tblVehicleEF	MCY	2.46	2.48

tblVehicleEF	MCY	0.63	2.12
tblVehicleEF	MCY	1.86	1.64
tblVehicleEF	MCY	2.1950e-003	2.1518e-003
tblVehicleEF	MCY	6.6100e-004	5.8548e-004
tblVehicleEF	MCY	2.00	2.03
tblVehicleEF	MCY	0.83	0.86
tblVehicleEF	MCY	1.28	1.29
tblVehicleEF	MCY	3.03	3.04
tblVehicleEF	MCY	0.63	2.12
tblVehicleEF	MCY	2.03	1.78
tblVehicleEF	MCY	0.49	0.37
tblVehicleEF	MCY	0.16	0.24
tblVehicleEF	MCY	19.80	20.14
tblVehicleEF	MCY	9.68	8.53
tblVehicleEF	MCY	180.67	218.64
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tblVehicleEF	MCY	1.11	1.11
tblVehicleEF	MCY	0.31	0.26
tblVehicleEF	MCY	0.01	0.01
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tblVehicleEF	MCY	2.0830e-003	2.0705e-003
tblVehicleEF	MCY	4.0650e-003	3.4362e-003
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tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	1.9510e-003	1.9400e-003
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tblVehicleEF	MCY	0.93	0.96
tblVehicleEF	MCY	0.68	0.70
tblVehicleEF	MCY	2.53	2.55

tblVehicleEF	MCY	0.76	2.54
tblVehicleEF	MCY	2.13	1.88
tblVehicleEF	MCY	2.2060e-003	2.1636e-003
tblVehicleEF	MCY	6.8200e-004	6.0553e-004
tblVehicleEF	MCY	1.28	1.30
tblVehicleEF	MCY	0.93	0.96
tblVehicleEF	MCY	0.68	0.70
tblVehicleEF	MCY	3.12	3.13
tblVehicleEF	MCY	0.76	2.54
tblVehicleEF	MCY	2.31	2.05
tblVehicleEF	MDV	0.02	9.2638e-003
tblVehicleEF	MDV	0.02	0.10
tblVehicleEF	MDV	1.80	1.64
tblVehicleEF	MDV	3.45	3.61
tblVehicleEF	MDV	542.45	456.57
tblVehicleEF	MDV	112.95	93.04
tblVehicleEF	MDV	0.21	0.17
tblVehicleEF	MDV	0.33	0.46
tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.2450e-003	2.1942e-003
tblVehicleEF	MDV	2.6000e-003	2.3357e-003
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0720e-003	2.0250e-003
tblVehicleEF	MDV	2.3950e-003	2.1507e-003
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.18	0.17
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.05	0.04

tblVehicleEF	MDV	0.10	0.49
tblVehicleEF	MDV	0.28	0.53
tblVehicleEF	MDV	5.4410e-003	4.5149e-003
tblVehicleEF	MDV	1.1910e-003	9.2067e-004
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.18	0.17
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.07	0.06
tblVehicleEF	MDV	0.10	0.49
tblVehicleEF	MDV	0.30	0.58
tblVehicleEF	MDV	0.02	9.8235e-003
tblVehicleEF	MDV	0.02	0.09
tblVehicleEF	MDV	1.97	1.80
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tblVehicleEF	MDV	570.27	473.39
tblVehicleEF	MDV	112.95	92.01
tblVehicleEF	MDV	0.18	0.15
tblVehicleEF	MDV	0.31	0.43
tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.2450e-003	2.1942e-003
tblVehicleEF	MDV	2.6000e-003	2.3357e-003
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0720e-003	2.0250e-003
tblVehicleEF	MDV	2.3950e-003	2.1507e-003
tblVehicleEF	MDV	0.13	0.17
tblVehicleEF	MDV	0.19	0.18
tblVehicleEF	MDV	0.12	0.15
tblVehicleEF	MDV	0.05	0.05

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tblVehicleEF	MDV	0.24	0.47
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tblVehicleEF	MDV	1.1820e-003	9.1054e-004
tblVehicleEF	MDV	0.13	0.17
tblVehicleEF	MDV	0.19	0.18
tblVehicleEF	MDV	0.12	0.15
tblVehicleEF	MDV	0.07	0.06
tblVehicleEF	MDV	0.09	0.46
tblVehicleEF	MDV	0.27	0.52
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tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.2450e-003	2.1942e-003
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tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0720e-003	2.0250e-003
tblVehicleEF	MDV	2.3950e-003	2.1507e-003
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tblVehicleEF	MDV	0.20	0.18
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.05	0.04

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tblVehicleEF	MDV	0.07	0.06
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tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
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tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	3.2130e-003	3.2517e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.6140e-003	3.3066e-004
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tblVehicleEF	MH	0.53	0.46
tblVehicleEF	MH	0.14	0.09

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tblVehicleEF	MH	0.09	0.08
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tblVehicleEF	MH	1.7360e-003	3.5794e-004
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tblVehicleEF	MH	1.6140e-003	3.3066e-004
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tblVehicleEF	MH	0.02	1.78
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tblVehicleEF	MH	1.7360e-003	3.5794e-004
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tblVehicleEF	MH	3.2130e-003	3.2517e-003
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tblVehicleEF	MH	0.11	0.09
tblVehicleEF	MH	0.55	0.47
tblVehicleEF	MH	0.14	0.09

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tblVehicleEF	MHD	3.0000e-003	3.0000e-003
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tblVehicleEF	SBUS	7.58	2.56
tblVehicleEF	SBUS	0.94	0.87
tblVehicleEF	SBUS	7.88	0.88
tblVehicleEF	SBUS	1,175.17	354.94
tblVehicleEF	SBUS	1,116.42	1,146.90
tblVehicleEF	SBUS	49.91	5.17
tblVehicleEF	SBUS	11.44	3.64
tblVehicleEF	SBUS	5.41	5.86
tblVehicleEF	SBUS	13.16	0.65
tblVehicleEF	SBUS	0.01	5.8373e-003
tblVehicleEF	SBUS	0.74	0.74
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.8700e-004	4.5738e-005
tblVehicleEF	SBUS	0.01	5.5848e-003
tblVehicleEF	SBUS	0.32	0.32
tblVehicleEF	SBUS	2.7100e-003	2.6888e-003
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.3100e-004	4.2055e-005
tblVehicleEF	SBUS	3.8950e-003	1.1088e-003
tblVehicleEF	SBUS	0.03	8.9260e-003
tblVehicleEF	SBUS	0.92	0.30
tblVehicleEF	SBUS	1.7890e-003	5.1837e-004

tblVehicleEF	SBUS	0.13	0.12
tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.42	0.04
tblVehicleEF	SBUS	0.01	3.3844e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.3600e-004	5.1112e-005
tblVehicleEF	SBUS	3.8950e-003	1.1088e-003
tblVehicleEF	SBUS	0.03	8.9260e-003
tblVehicleEF	SBUS	1.32	0.43
tblVehicleEF	SBUS	1.7890e-003	5.1837e-004
tblVehicleEF	SBUS	0.15	0.15
tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.46	0.04
tblVehicleEF	SBUS	0.88	0.06
tblVehicleEF	SBUS	0.02	9.9062e-003
tblVehicleEF	SBUS	0.07	5.4353e-003
tblVehicleEF	SBUS	7.44	2.52
tblVehicleEF	SBUS	0.95	0.89
tblVehicleEF	SBUS	6.27	0.69
tblVehicleEF	SBUS	1,230.37	365.42
tblVehicleEF	SBUS	1,116.42	1,146.93
tblVehicleEF	SBUS	49.91	4.86
tblVehicleEF	SBUS	11.80	3.74
tblVehicleEF	SBUS	5.10	5.53
tblVehicleEF	SBUS	13.13	0.64
tblVehicleEF	SBUS	0.01	4.9270e-003
tblVehicleEF	SBUS	0.74	0.74
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.8700e-004	4.5738e-005

tblVehicleEF	SBUS	0.01	4.7139e-003
tblVehicleEF	SBUS	0.32	0.32
tblVehicleEF	SBUS	2.7100e-003	2.6888e-003
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.3100e-004	4.2055e-005
tblVehicleEF	SBUS	5.9980e-003	1.6969e-003
tblVehicleEF	SBUS	0.03	9.1386e-003
tblVehicleEF	SBUS	0.91	0.30
tblVehicleEF	SBUS	2.7960e-003	7.9994e-004
tblVehicleEF	SBUS	0.13	0.12
tblVehicleEF	SBUS	0.02	0.06
tblVehicleEF	SBUS	0.37	0.03
tblVehicleEF	SBUS	0.01	3.4835e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.0900e-004	4.8095e-005
tblVehicleEF	SBUS	5.9980e-003	1.6969e-003
tblVehicleEF	SBUS	0.03	9.1386e-003
tblVehicleEF	SBUS	1.32	0.43
tblVehicleEF	SBUS	2.7960e-003	7.9994e-004
tblVehicleEF	SBUS	0.15	0.15
tblVehicleEF	SBUS	0.02	0.06
tblVehicleEF	SBUS	0.40	0.03
tblVehicleEF	SBUS	0.88	0.06
tblVehicleEF	SBUS	0.02	9.7588e-003
tblVehicleEF	SBUS	0.08	6.3489e-003
tblVehicleEF	SBUS	7.78	2.63
tblVehicleEF	SBUS	0.93	0.87
tblVehicleEF	SBUS	8.15	0.91
tblVehicleEF	SBUS	1,098.95	340.46
tblVehicleEF	SBUS	1,116.42	1,146.90

tblVehicleEF	SBUS	49.91	5.22
tblVehicleEF	SBUS	10.93	3.51
tblVehicleEF	SBUS	5.33	5.77
tblVehicleEF	SBUS	13.17	0.65
tblVehicleEF	SBUS	0.02	7.0944e-003
tblVehicleEF	SBUS	0.74	0.74
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.8700e-004	4.5738e-005
tblVehicleEF	SBUS	0.02	6.7875e-003
tblVehicleEF	SBUS	0.32	0.32
tblVehicleEF	SBUS	2.7100e-003	2.6888e-003
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.3100e-004	4.2055e-005
tblVehicleEF	SBUS	4.0560e-003	1.1541e-003
tblVehicleEF	SBUS	0.03	9.9783e-003
tblVehicleEF	SBUS	0.92	0.30
tblVehicleEF	SBUS	1.7640e-003	5.1819e-004
tblVehicleEF	SBUS	0.13	0.12
tblVehicleEF	SBUS	0.02	0.09
tblVehicleEF	SBUS	0.43	0.04
tblVehicleEF	SBUS	0.01	3.2476e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.4000e-004	5.1608e-005
tblVehicleEF	SBUS	4.0560e-003	1.1541e-003
tblVehicleEF	SBUS	0.03	9.9783e-003
tblVehicleEF	SBUS	1.32	0.43
tblVehicleEF	SBUS	1.7640e-003	5.1819e-004
tblVehicleEF	SBUS	0.15	0.15
tblVehicleEF	SBUS	0.02	0.09

tblVehicleEF	SBUS	0.47	0.04
tblVehicleEF	UBUS	2.82	6.37
tblVehicleEF	UBUS	0.06	0.02
tblVehicleEF	UBUS	12.54	35.61
tblVehicleEF	UBUS	10.71	0.94
tblVehicleEF	UBUS	1,986.82	1,937.47
tblVehicleEF	UBUS	99.14	11.89
tblVehicleEF	UBUS	10.84	2.26
tblVehicleEF	UBUS	15.55	0.12
tblVehicleEF	UBUS	0.61	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.14	4.2635e-003
tblVehicleEF	UBUS	1.1020e-003	2.8939e-005
tblVehicleEF	UBUS	0.26	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.13	4.0767e-003
tblVehicleEF	UBUS	1.0160e-003	2.6609e-005
tblVehicleEF	UBUS	5.5290e-003	9.5825e-004
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	2.9760e-003	7.4208e-004
tblVehicleEF	UBUS	0.94	0.25
tblVehicleEF	UBUS	0.02	0.08
tblVehicleEF	UBUS	0.81	0.07
tblVehicleEF	UBUS	0.01	2.3921e-003
tblVehicleEF	UBUS	1.1840e-003	1.1771e-004
tblVehicleEF	UBUS	5.5290e-003	9.5825e-004
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	2.9760e-003	7.4208e-004
tblVehicleEF	UBUS	3.87	6.68
tblVehicleEF	UBUS	0.02	0.08

tblVehicleEF	UBUS	0.88	0.07
tblVehicleEF	UBUS	2.82	6.37
tblVehicleEF	UBUS	0.05	0.01
tblVehicleEF	UBUS	12.61	35.61
tblVehicleEF	UBUS	9.31	0.83
tblVehicleEF	UBUS	1,986.82	1,937.47
tblVehicleEF	UBUS	99.14	11.69
tblVehicleEF	UBUS	10.21	2.25
tblVehicleEF	UBUS	15.49	0.12
tblVehicleEF	UBUS	0.61	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.14	4.2635e-003
tblVehicleEF	UBUS	1.1020e-003	2.8939e-005
tblVehicleEF	UBUS	0.26	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.13	4.0767e-003
tblVehicleEF	UBUS	1.0160e-003	2.6609e-005
tblVehicleEF	UBUS	8.3230e-003	1.4315e-003
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	4.5310e-003	1.0810e-003
tblVehicleEF	UBUS	0.95	0.25
tblVehicleEF	UBUS	0.02	0.07
tblVehicleEF	UBUS	0.74	0.06
tblVehicleEF	UBUS	0.01	2.3921e-003
tblVehicleEF	UBUS	1.1600e-003	1.1572e-004
tblVehicleEF	UBUS	8.3230e-003	1.4315e-003
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	4.5310e-003	1.0810e-003
tblVehicleEF	UBUS	3.88	6.68
tblVehicleEF	UBUS	0.02	0.07

tblVehicleEF	UBUS	0.81	0.07
tblVehicleEF	UBUS	2.82	6.37
tblVehicleEF	UBUS	0.06	0.02
tblVehicleEF	UBUS	12.53	35.61
tblVehicleEF	UBUS	10.92	0.96
tblVehicleEF	UBUS	1,986.82	1,937.47
tblVehicleEF	UBUS	99.14	11.93
tblVehicleEF	UBUS	10.64	2.25
tblVehicleEF	UBUS	15.56	0.12
tblVehicleEF	UBUS	0.61	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.14	4.2635e-003
tblVehicleEF	UBUS	1.1020e-003	2.8939e-005
tblVehicleEF	UBUS	0.26	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.13	4.0767e-003
tblVehicleEF	UBUS	1.0160e-003	2.6609e-005
tblVehicleEF	UBUS	6.0970e-003	9.3075e-004
tblVehicleEF	UBUS	0.11	0.01
tblVehicleEF	UBUS	3.0990e-003	7.1395e-004
tblVehicleEF	UBUS	0.94	0.25
tblVehicleEF	UBUS	0.03	0.09
tblVehicleEF	UBUS	0.82	0.07
tblVehicleEF	UBUS	0.01	2.3921e-003
tblVehicleEF	UBUS	1.1880e-003	1.1801e-004
tblVehicleEF	UBUS	6.0970e-003	9.3075e-004
tblVehicleEF	UBUS	0.11	0.01
tblVehicleEF	UBUS	3.0990e-003	7.1395e-004
tblVehicleEF	UBUS	3.87	6.68
tblVehicleEF	UBUS	0.03	0.09

tblVehicleEF	UBUS	0.90	0.07
tblVehicleTrips	ST_TR	2.46	4.62
tblVehicleTrips	SU_TR	1.05	4.62
tblVehicleTrips	WD_TR	11.03	4.62

2.0 Emissions Summary

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	0.0116	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Energy	1.9000e-004	1.7400e-003	1.4600e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	11.8699	11.8699	4.0000e-005	3.0000e-005	11.8811
Mobile	7.4200e-003	0.0182	0.0730	1.8000e-004	0.0161	3.0000e-004	0.0164	4.2900e-003	2.9000e-004	4.5800e-003	0.0000	17.2463	17.2463	1.1400e-003	0.0000	17.2748
Waste						0.0000	0.0000		0.0000	0.0000	0.5379	0.0000	0.5379	0.0318	0.0000	1.3327
Water						0.0000	0.0000		0.0000	0.0000	0.1607	2.3076	2.4683	0.0165	3.9000e-004	2.9971
Total	**0.0192**	**0.0199**	**0.0745**	**1.9000e-004**	**0.0161**	**4.3000e-004**	**0.0165**	**4.2900e-003**	**4.2000e-004**	**4.7100e-003**	**0.6986**	**31.4238**	**32.1225**	**0.0495**	**4.2000e-004**	**33.4858**

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	0.0116	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Energy	1.9000e-004	1.7400e-003	1.4600e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	11.8699	11.8699	4.0000e-005	3.0000e-005	11.8811
Mobile	7.4200e-003	0.0182	0.0730	1.8000e-004	0.0161	3.0000e-004	0.0164	4.2900e-003	2.9000e-004	4.5800e-003	0.0000	17.2463	17.2463	1.1400e-003	0.0000	17.2748
Waste						0.0000	0.0000		0.0000	0.0000	0.2690	0.0000	0.2690	0.0159	0.0000	0.6663
Water						0.0000	0.0000		0.0000	0.0000	0.1607	2.3076	2.4683	0.0165	3.9000e-004	2.9971
Total	**0.0192**	**0.0199**	**0.0745**	**1.9000e-004**	**0.0161**	**4.3000e-004**	**0.0165**	**4.2900e-003**	**4.2000e-004**	**4.7100e-003**	**0.4297**	**31.4238**	**31.8535**	**0.0336**	**4.2000e-004**	**32.8194**

	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**	**38.50**	**0.00**	**0.84**	**32.11**	**0.00**	**1.99**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	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	7.4200e-003	0.0182	0.0730	1.8000e-004	0.0161	3.0000e-004	0.0164	4.2900e-003	2.9000e-004	4.5800e-003	0.0000	17.2463	17.2463	1.1400e-003	0.0000	17.2748
Unmitigated	7.4200e-003	0.0182	0.0730	1.8000e-004	0.0161	3.0000e-004	0.0164	4.2900e-003	2.9000e-004	4.5800e-003	0.0000	17.2463	17.2463	1.1400e-003	0.0000	17.2748

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	13.17	13.17	13.17	42,417	42,417
Total	13.17	13.17	13.17	42,417	42,417

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
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Office Building	0.553045	0.055446	0.182004	0.125273	0.023413	0.005765	0.018938	0.027556	0.001239	0.001462	0.004210	0.000648	0.001000

5.0 Energy Detail

Historical Energy Use: Y

5.1 Mitigation Measures Energy

	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	9.9779	9.9779	0.0000	0.0000	9.9779
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	9.9779	9.9779	0.0000	0.0000	9.9779
NaturalGas Mitigated	1.9000e-004	1.7400e-003	1.4600e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	1.8920	1.8920	4.0000e-005	3.0000e-005	1.9032
NaturalGas Unmitigated	1.9000e-004	1.7400e-003	1.4600e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	1.8920	1.8920	4.0000e-005	3.0000e-005	1.9032

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					
General Office Building	35454	1.9000e-004	1.7400e-003	1.4600e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	1.8920	1.8920	4.0000e-005	3.0000e-005	1.9032
Total		**1.9000e-004**	**1.7400e-003**	**1.4600e-003**	**1.0000e-005**		**1.3000e-004**	**1.3000e-004**		**1.3000e-004**	**1.3000e-004**	**0.0000**	**1.8920**	**1.8920**	**4.0000e-005**	**3.0000e-005**	**1.9032**

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					
General Office Building	35454	1.9000e-004	1.7400e-003	1.4600e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	1.8920	1.8920	4.0000e-005	3.0000e-005	1.9032
Total		**1.9000e-004**	**1.7400e-003**	**1.4600e-003**	**1.0000e-005**		**1.3000e-004**	**1.3000e-004**		**1.3000e-004**	**1.3000e-004**	**0.0000**	**1.8920**	**1.8920**	**4.0000e-005**	**3.0000e-005**	**1.9032**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	43434	9.9779	0.0000	0.0000	9.9779
Total		**9.9779**	**0.0000**	**0.0000**	**9.9779**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	43434	9.9779	0.0000	0.0000	9.9779
Total		**9.9779**	**0.0000**	**0.0000**	**9.9779**

6.0 Area Detail

6.1 Mitigation Measures Area

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	0.0116	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Unmitigated	0.0116	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005

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
	tons/yr										MT/yr					
Architectural Coating	1.3200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0103					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Total	**0.0116**	**0.0000**	**4.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**0.0000**	**8.0000e-005**

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	1.3200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0103					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Total	**0.0116**	**0.0000**	**4.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**0.0000**	**8.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	2.4683	0.0165	3.9000e-004	2.9971
Unmitigated	2.4683	0.0165	3.9000e-004	2.9971

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	0.506541 / 0.310461	2.4683	0.0165	3.9000e-004	2.9971
Total		**2.4683**	**0.0165**	**3.9000e-004**	**2.9971**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	0.506541 / 0.310461	2.4683	0.0165	3.9000e-004	2.9971
Total		**2.4683**	**0.0165**	**3.9000e-004**	**2.9971**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.2690	0.0159	0.0000	0.6663
Unmitigated	0.5379	0.0318	0.0000	1.3327

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	2.65	0.5379	0.0318	0.0000	1.3327
Total		**0.5379**	**0.0318**	**0.0000**	**1.3327**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	1.325	0.2690	0.0159	0.0000	0.6663
Total		**0.2690**	**0.0159**	**0.0000**	**0.6663**

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

Exhibit C
Project Operational Emissions

3727 Robertson Blvd. Mixed-Use Project

Project Land Uses

Land Use Type	CalEEMod LandUse Type	CalEEMod LandUse Subtype	Amount	Unit	Building SF	Acres	Raw Trip Rate	Trip Rate Reduction (Internal Trips)	Trip Rate Reduction (Transit/walk in trips)	Trip Rate Reduction (Pass-by trips)	Adjusted Trip Rates
Apartment	Residential	Apartments Mid Rise	12	DU		0.03	5.44	10%	15%	0%	4.16
Office	Commercial	General Office Building	5.45	1000sqft	5,450	0.02	9.74	10%	15%	0%	7.45
Restaurant/retail[1]	Recreational	High turnover restaurant	3.89	1000sqft	3,886	0.02	112.18	0%	15%	20%	76.28
Parking Lot	Parking	Parking Lot	6.00	Spaces	2,400	0.02					
Subterranean Parking	Parking	Enclosed Parking Structure with Elevator	19.00	Spaces	7,600	0.03					

Existing Land Uses

Land Use Type	CalEEMod LandUse Type	CalEEMod LandUse Subtype	Amount	Unit	Building SF	Acres	Raw Trip Rate	Trip Rate Reduction (Internal Trips)	Trip Rate Reduction (Transit/walk in trips)	Trip Rate Reduction (Pass-by trips)	Adjusted Trip Rates
Sound Studio	Commercial	General Office Building	2.85	1000sqft	2,850	0.06	5.44	0%	15%	0%	4.62

1 Crain and Associates Traffic Impact Analysis. Matches trip assumptions of restaurant

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Caution: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at https://sam.nrel.gov) that allow for more precise and complex modeling of PV systems.

The expected range is based on 30 years of actual weather data at the given location and is intended to provide an indication of the variation you might see. For more information, please refer to this NREL report: The Error Report.

The energy output range is based on analysis of 30 years of historical weather data for nearby , and is intended to provide an indication of the possible interannual variability in generation for a Fixed (open rack) PV system at this location.

RESULTS

3,350 kWh/Year*

System output may range from 3,192 to 3,420 kWh per year near this location.

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)	Value ($)
January	4.49	214	28
February	5.05	217	28
March	6.25	291	38
April	6.96	320	42
May	7.16	330	43
June	7.24	325	42
July	7.43	330	43
August	7.49	332	43
September	6.75	293	38
October	5.72	263	34
November	5.06	228	30
December	4.37	208	27
Annual	**6.16**	**3,351**	**$ 436**

Location and Station Identification

Requested Location	90232, USA
Weather Data Source	Lat, Lon: 34.01, -118.38 0.9 mi
Latitude	34.01° N
Longitude	118.38° W

PV System Specifications *(Residential)*

DC System Size	2 kW
Module Type	Standard
Array Type	Fixed (open rack)
Array Tilt	20°
Array Azimuth	180°
System Losses	14.08%
Inverter Efficiency	96%
DC to AC Size Ratio	1.2

Economics

Average Retail Electricity Rate	0.130 $/kWh

Performance Metrics

Capacity Factor	19.1%

3727 Robertson-Operations

South Coast AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	5.46	1000sqft	0.02	5,455.00	0
Enclosed Parking with Elevator	19.00	Space	0.03	7,600.00	0
Parking Lot	6.00	Space	0.02	2,400.00	0
High Turnover (Sit Down Restaurant)	3.89	1000sqft	0.02	3,886.00	0
Apartments Mid Rise	12.00	Dwelling Unit	0.03	12,921.00	28

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	11			**Operational Year**	2021
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	483.27	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2e intensity factor was linearly projected for year 2021 anticipated RPS based on SB 100 target of 44% RPS by 2024. See operational assumptions for more details.

Land Use - see operational assumptions

Construction Phase - operational run only

Vehicle Trips - trip rates from project traffic impact analysis.

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Woodstoves - see operational assumptions

Energy Use -

Energy Mitigation - see operational assumptions for solar pv system assumptions.

Waste Mitigation - in compliance with 75% waste diversion by state by 2020.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	2.00
tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	10.20	0.00
tblFireplaces	NumberNoFireplace	1.20	0.00
tblFireplaces	NumberWood	0.60	0.00
tblFleetMix	HHD	0.03	0.03
tblFleetMix	HHD	0.03	0.03
tblFleetMix	HHD	0.03	0.03
tblFleetMix	HHD	0.03	0.03
tblFleetMix	HHD	0.03	0.03
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDA	0.55	0.55
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tblFleetMix	LDT1	0.04	0.06
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tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT2	0.20	0.18

tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LDT2	0.20	0.18
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tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
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tblFleetMix	MCY	4.8170e-003	4.3394e-003
tblFleetMix	MCY	4.8170e-003	4.3394e-003
tblFleetMix	MCY	4.8170e-003	4.3394e-003
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tblFleetMix	MHD	0.02	0.02
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tblFleetMix	UBUS	1.8770e-003	1.4541e-003
tblFleetMix	UBUS	1.8770e-003	1.4541e-003
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tblLandUse	LandUseSquareFeet	3,890.00	3,886.00
tblLandUse	LandUseSquareFeet	12,000.00	12,921.00
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tblLandUse	LotAcreage	0.09	0.02
tblLandUse	LotAcreage	0.32	0.03
tblLandUse	Population	34.00	28.00
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tblProjectCharacteristics	CO2IntensityFactor	702.44	483.27

tblProjectCharacteristics	N2OIntensityFactor	0.006	0
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tblVehicleEF	LDA	2.2900e-003	1.9372e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	2.0000e-003	2.0000e-003
tblVehicleEF	LDA	1.8840e-003	1.6434e-003
tblVehicleEF	LDA	2.1060e-003	1.7813e-003
tblVehicleEF	LDA	0.07	0.09
tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.06	0.08
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.04	0.21
tblVehicleEF	LDA	0.07	0.21
tblVehicleEF	LDA	2.9060e-003	2.8517e-003
tblVehicleEF	LDA	6.0700e-004	5.3628e-004
tblVehicleEF	LDA	0.07	0.09
tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.06	0.08
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	0.21
tblVehicleEF	LDA	0.08	0.23
tblVehicleEF	LDA	5.0990e-003	3.0732e-003
tblVehicleEF	LDA	5.9770e-003	0.05

tblVehicleEF	LDA	0.63	0.71
tblVehicleEF	LDA	1.25	2.21
tblVehicleEF	LDA	270.53	269.50
tblVehicleEF	LDA	58.96	54.89
tblVehicleEF	LDA	0.05	0.04
tblVehicleEF	LDA	0.08	0.20
tblVehicleEF	LDA	0.04	0.04
tblVehicleEF	LDA	8.0000e-003	8.0000e-003
tblVehicleEF	LDA	2.0440e-003	1.7838e-003
tblVehicleEF	LDA	2.2900e-003	1.9372e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	2.0000e-003	2.0000e-003
tblVehicleEF	LDA	1.8840e-003	1.6434e-003
tblVehicleEF	LDA	2.1060e-003	1.7813e-003
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.05	0.25
tblVehicleEF	LDA	0.08	0.25
tblVehicleEF	LDA	2.7100e-003	2.6661e-003
tblVehicleEF	LDA	6.1100e-004	5.4318e-004
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.05	0.25
tblVehicleEF	LDA	0.09	0.27
tblVehicleEF	LDT1	0.01	8.2654e-003
tblVehicleEF	LDT1	0.02	0.08

tblVehicleEF	LDT1	1.65	1.56
tblVehicleEF	LDT1	3.08	2.36
tblVehicleEF	LDT1	339.89	323.15
tblVehicleEF	LDT1	71.61	65.44
tblVehicleEF	LDT1	0.16	0.13
tblVehicleEF	LDT1	0.18	0.28
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	3.3000e-003	2.7341e-003
tblVehicleEF	LDT1	3.5610e-003	2.8287e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003
tblVehicleEF	LDT1	3.0390e-003	2.5162e-003
tblVehicleEF	LDT1	3.2750e-003	2.6011e-003
tblVehicleEF	LDT1	0.14	0.15
tblVehicleEF	LDT1	0.29	0.22
tblVehicleEF	LDT1	0.11	0.12
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	0.18	0.76
tblVehicleEF	LDT1	0.21	0.40
tblVehicleEF	LDT1	3.4200e-003	3.1978e-003
tblVehicleEF	LDT1	7.7000e-004	6.4755e-004
tblVehicleEF	LDT1	0.14	0.15
tblVehicleEF	LDT1	0.29	0.22
tblVehicleEF	LDT1	0.11	0.12
tblVehicleEF	LDT1	0.05	0.05
tblVehicleEF	LDT1	0.18	0.76
tblVehicleEF	LDT1	0.24	0.44
tblVehicleEF	LDT1	0.02	8.8396e-003
tblVehicleEF	LDT1	0.01	0.07

tblVehicleEF	LDT1	1.81	1.73
tblVehicleEF	LDT1	2.63	2.02
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tblVehicleEF	LDT1	71.61	64.74
tblVehicleEF	LDT1	0.14	0.12
tblVehicleEF	LDT1	0.17	0.26
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	3.3000e-003	2.7341e-003
tblVehicleEF	LDT1	3.5610e-003	2.8287e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003
tblVehicleEF	LDT1	3.0390e-003	2.5162e-003
tblVehicleEF	LDT1	3.2750e-003	2.6011e-003
tblVehicleEF	LDT1	0.24	0.24
tblVehicleEF	LDT1	0.31	0.24
tblVehicleEF	LDT1	0.17	0.18
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	0.17	0.71
tblVehicleEF	LDT1	0.19	0.35
tblVehicleEF	LDT1	3.5920e-003	3.3399e-003
tblVehicleEF	LDT1	7.6200e-004	6.4062e-004
tblVehicleEF	LDT1	0.24	0.24
tblVehicleEF	LDT1	0.31	0.24
tblVehicleEF	LDT1	0.17	0.18
tblVehicleEF	LDT1	0.06	0.06
tblVehicleEF	LDT1	0.17	0.71
tblVehicleEF	LDT1	0.21	0.39
tblVehicleEF	LDT1	0.01	8.0953e-003
tblVehicleEF	LDT1	0.02	0.08

tblVehicleEF	LDT1	1.59	1.51
tblVehicleEF	LDT1	3.17	2.44
tblVehicleEF	LDT1	334.24	318.34
tblVehicleEF	LDT1	71.61	65.58
tblVehicleEF	LDT1	0.15	0.13
tblVehicleEF	LDT1	0.18	0.29
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	8.0000e-003	8.0000e-003
tblVehicleEF	LDT1	3.3000e-003	2.7341e-003
tblVehicleEF	LDT1	3.5610e-003	2.8287e-003
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	2.0000e-003	2.0000e-003
tblVehicleEF	LDT1	3.0390e-003	2.5162e-003
tblVehicleEF	LDT1	3.2750e-003	2.6011e-003
tblVehicleEF	LDT1	0.14	0.15
tblVehicleEF	LDT1	0.33	0.25
tblVehicleEF	LDT1	0.11	0.11
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	0.21	0.90
tblVehicleEF	LDT1	0.22	0.41
tblVehicleEF	LDT1	3.3630e-003	3.1501e-003
tblVehicleEF	LDT1	7.7200e-004	6.4900e-004
tblVehicleEF	LDT1	0.14	0.15
tblVehicleEF	LDT1	0.33	0.25
tblVehicleEF	LDT1	0.11	0.11
tblVehicleEF	LDT1	0.05	0.05
tblVehicleEF	LDT1	0.21	0.90
tblVehicleEF	LDT1	0.24	0.45
tblVehicleEF	LDT2	7.0440e-003	5.0887e-003
tblVehicleEF	LDT2	7.1880e-003	0.07

tblVehicleEF	LDT2	0.84	1.06
tblVehicleEF	LDT2	1.49	2.74
tblVehicleEF	LDT2	382.63	349.24
tblVehicleEF	LDT2	81.02	71.19
tblVehicleEF	LDT2	0.08	0.09
tblVehicleEF	LDT2	0.12	0.31
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9920e-003	1.8561e-003
tblVehicleEF	LDT2	2.3200e-003	1.9489e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003
tblVehicleEF	LDT2	1.8320e-003	1.7082e-003
tblVehicleEF	LDT2	2.1330e-003	1.7921e-003
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.11	0.13
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.06	0.42
tblVehicleEF	LDT2	0.10	0.34
tblVehicleEF	LDT2	3.8330e-003	3.4552e-003
tblVehicleEF	LDT2	8.3500e-004	7.0452e-004
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.11	0.13
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.03	0.03
tblVehicleEF	LDT2	0.06	0.42
tblVehicleEF	LDT2	0.11	0.37
tblVehicleEF	LDT2	7.5350e-003	5.4660e-003
tblVehicleEF	LDT2	6.3730e-003	0.06

tblVehicleEF	LDT2	0.94	1.18
tblVehicleEF	LDT2	1.28	2.34
tblVehicleEF	LDT2	402.38	363.41
tblVehicleEF	LDT2	81.02	70.44
tblVehicleEF	LDT2	0.07	0.08
tblVehicleEF	LDT2	0.11	0.29
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9920e-003	1.8561e-003
tblVehicleEF	LDT2	2.3200e-003	1.9489e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003
tblVehicleEF	LDT2	1.8320e-003	1.7082e-003
tblVehicleEF	LDT2	2.1330e-003	1.7921e-003
tblVehicleEF	LDT2	0.08	0.13
tblVehicleEF	LDT2	0.12	0.14
tblVehicleEF	LDT2	0.07	0.12
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.06	0.40
tblVehicleEF	LDT2	0.09	0.30
tblVehicleEF	LDT2	4.0320e-003	3.5954e-003
tblVehicleEF	LDT2	8.3200e-004	6.9709e-004
tblVehicleEF	LDT2	0.08	0.13
tblVehicleEF	LDT2	0.12	0.14
tblVehicleEF	LDT2	0.07	0.12
tblVehicleEF	LDT2	0.03	0.03
tblVehicleEF	LDT2	0.06	0.40
tblVehicleEF	LDT2	0.09	0.33
tblVehicleEF	LDT2	6.8940e-003	4.9777e-003
tblVehicleEF	LDT2	7.3550e-003	0.07

tblVehicleEF	LDT2	0.81	1.02
tblVehicleEF	LDT2	1.53	2.82
tblVehicleEF	LDT2	376.06	344.49
tblVehicleEF	LDT2	81.02	71.35
tblVehicleEF	LDT2	0.08	0.09
tblVehicleEF	LDT2	0.12	0.31
tblVehicleEF	LDT2	0.04	0.04
tblVehicleEF	LDT2	8.0000e-003	8.0000e-003
tblVehicleEF	LDT2	1.9920e-003	1.8561e-003
tblVehicleEF	LDT2	2.3200e-003	1.9489e-003
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	2.0000e-003	2.0000e-003
tblVehicleEF	LDT2	1.8320e-003	1.7082e-003
tblVehicleEF	LDT2	2.1330e-003	1.7921e-003
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.12	0.14
tblVehicleEF	LDT2	0.05	0.07
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.07	0.49
tblVehicleEF	LDT2	0.10	0.35
tblVehicleEF	LDT2	3.7670e-003	3.4081e-003
tblVehicleEF	LDT2	8.3600e-004	7.0609e-004
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.12	0.14
tblVehicleEF	LDT2	0.05	0.07
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.07	0.49
tblVehicleEF	LDT2	0.11	0.38
tblVehicleEF	LHD1	5.8640e-003	5.6691e-003
tblVehicleEF	LHD1	0.01	6.0175e-003

tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.15	0.19
tblVehicleEF	LHD1	0.91	0.71
tblVehicleEF	LHD1	2.81	1.13
tblVehicleEF	LHD1	9.00	9.05
tblVehicleEF	LHD1	610.88	671.68
tblVehicleEF	LHD1	33.50	12.37
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	1.31	0.90
tblVehicleEF	LHD1	1.05	0.35
tblVehicleEF	LHD1	8.5300e-004	7.7068e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.6787e-003
tblVehicleEF	LHD1	0.01	7.5768e-003
tblVehicleEF	LHD1	1.0090e-003	2.8117e-004
tblVehicleEF	LHD1	8.1600e-004	7.3734e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5040e-003	2.4197e-003
tblVehicleEF	LHD1	0.01	7.2207e-003
tblVehicleEF	LHD1	9.2800e-004	2.5852e-004
tblVehicleEF	LHD1	3.3200e-003	2.7392e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.9270e-003	1.5952e-003
tblVehicleEF	LHD1	0.07	0.05
tblVehicleEF	LHD1	0.31	0.55
tblVehicleEF	LHD1	0.28	0.08
tblVehicleEF	LHD1	9.0000e-005	8.7938e-005
tblVehicleEF	LHD1	6.0020e-003	6.5586e-003
tblVehicleEF	LHD1	3.8800e-004	1.2242e-004

tblVehicleEF	LHD1	3.3200e-003	2.7392e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	1.9270e-003	1.5952e-003
tblVehicleEF	LHD1	0.09	0.07
tblVehicleEF	LHD1	0.31	0.55
tblVehicleEF	LHD1	0.31	0.09
tblVehicleEF	LHD1	5.8640e-003	5.6816e-003
tblVehicleEF	LHD1	0.01	6.1375e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.15	0.19
tblVehicleEF	LHD1	0.92	0.72
tblVehicleEF	LHD1	2.68	1.08
tblVehicleEF	LHD1	9.00	9.05
tblVehicleEF	LHD1	610.88	671.71
tblVehicleEF	LHD1	33.50	12.28
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	1.23	0.84
tblVehicleEF	LHD1	1.01	0.33
tblVehicleEF	LHD1	8.5300e-004	7.7068e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.6787e-003
tblVehicleEF	LHD1	0.01	7.5768e-003
tblVehicleEF	LHD1	1.0090e-003	2.8117e-004
tblVehicleEF	LHD1	8.1600e-004	7.3734e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5040e-003	2.4197e-003
tblVehicleEF	LHD1	0.01	7.2207e-003
tblVehicleEF	LHD1	9.2800e-004	2.5852e-004
tblVehicleEF	LHD1	5.1880e-003	4.2555e-003

tblVehicleEF	LHD1	0.11	0.09
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	2.9140e-003	2.4001e-003
tblVehicleEF	LHD1	0.07	0.05
tblVehicleEF	LHD1	0.30	0.54
tblVehicleEF	LHD1	0.27	0.08
tblVehicleEF	LHD1	9.0000e-005	8.7938e-005
tblVehicleEF	LHD1	6.0030e-003	6.5588e-003
tblVehicleEF	LHD1	3.8500e-004	1.2152e-004
tblVehicleEF	LHD1	5.1880e-003	4.2555e-003
tblVehicleEF	LHD1	0.11	0.09
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	2.9140e-003	2.4001e-003
tblVehicleEF	LHD1	0.09	0.07
tblVehicleEF	LHD1	0.30	0.54
tblVehicleEF	LHD1	0.30	0.09
tblVehicleEF	LHD1	5.8640e-003	5.6673e-003
tblVehicleEF	LHD1	0.01	5.9900e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.15	0.19
tblVehicleEF	LHD1	0.91	0.70
tblVehicleEF	LHD1	2.82	1.14
tblVehicleEF	LHD1	9.00	9.05
tblVehicleEF	LHD1	610.88	671.68
tblVehicleEF	LHD1	33.50	12.38
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	1.28	0.88
tblVehicleEF	LHD1	1.06	0.35
tblVehicleEF	LHD1	8.5300e-004	7.7068e-004
tblVehicleEF	LHD1	0.08	0.08

tblVehicleEF	LHD1	0.01	9.6787e-003
tblVehicleEF	LHD1	0.01	7.5768e-003
tblVehicleEF	LHD1	1.0090e-003	2.8117e-004
tblVehicleEF	LHD1	8.1600e-004	7.3734e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5040e-003	2.4197e-003
tblVehicleEF	LHD1	0.01	7.2207e-003
tblVehicleEF	LHD1	9.2800e-004	2.5852e-004
tblVehicleEF	LHD1	3.3910e-003	2.8163e-003
tblVehicleEF	LHD1	0.12	0.09
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.8940e-003	1.5726e-003
tblVehicleEF	LHD1	0.07	0.05
tblVehicleEF	LHD1	0.33	0.60
tblVehicleEF	LHD1	0.28	0.08
tblVehicleEF	LHD1	9.0000e-005	8.7938e-005
tblVehicleEF	LHD1	6.0020e-003	6.5585e-003
tblVehicleEF	LHD1	3.8800e-004	1.2254e-004
tblVehicleEF	LHD1	3.3910e-003	2.8163e-003
tblVehicleEF	LHD1	0.12	0.09
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	1.8940e-003	1.5726e-003
tblVehicleEF	LHD1	0.09	0.07
tblVehicleEF	LHD1	0.33	0.60
tblVehicleEF	LHD1	0.31	0.09
tblVehicleEF	LHD2	4.2390e-003	4.0130e-003
tblVehicleEF	LHD2	4.8300e-003	4.2072e-003
tblVehicleEF	LHD2	9.6290e-003	0.01
tblVehicleEF	LHD2	0.13	0.15
tblVehicleEF	LHD2	0.41	0.49

tblVehicleEF	LHD2	1.43	0.76
tblVehicleEF	LHD2	13.72	13.73
tblVehicleEF	LHD2	622.17	675.94
tblVehicleEF	LHD2	28.08	9.60
tblVehicleEF	LHD2	0.10	0.10
tblVehicleEF	LHD2	0.93	1.09
tblVehicleEF	LHD2	0.60	0.24
tblVehicleEF	LHD2	1.2010e-003	1.2468e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	4.7800e-004	1.5922e-004
tblVehicleEF	LHD2	1.1490e-003	1.1928e-003
tblVehicleEF	LHD2	0.04	0.04
tblVehicleEF	LHD2	2.6500e-003	2.6300e-003
tblVehicleEF	LHD2	9.6020e-003	0.01
tblVehicleEF	LHD2	4.3900e-004	1.4640e-004
tblVehicleEF	LHD2	1.3010e-003	1.6722e-003
tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	8.0500e-004	9.8876e-004
tblVehicleEF	LHD2	0.05	0.05
tblVehicleEF	LHD2	0.09	0.35
tblVehicleEF	LHD2	0.13	0.06
tblVehicleEF	LHD2	1.3400e-004	1.3167e-004
tblVehicleEF	LHD2	6.0640e-003	6.5428e-003
tblVehicleEF	LHD2	3.0700e-004	9.4991e-005
tblVehicleEF	LHD2	1.3010e-003	1.6722e-003
tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	0.02	0.03

tblVehicleEF	LHD2	8.0500e-004	9.8876e-004
tblVehicleEF	LHD2	0.06	0.06
tblVehicleEF	LHD2	0.09	0.35
tblVehicleEF	LHD2	0.14	0.06
tblVehicleEF	LHD2	4.2390e-003	4.0218e-003
tblVehicleEF	LHD2	4.8960e-003	4.2547e-003
tblVehicleEF	LHD2	9.2930e-003	0.01
tblVehicleEF	LHD2	0.13	0.15
tblVehicleEF	LHD2	0.41	0.49
tblVehicleEF	LHD2	1.37	0.73
tblVehicleEF	LHD2	13.72	13.73
tblVehicleEF	LHD2	622.17	675.95
tblVehicleEF	LHD2	28.08	9.54
tblVehicleEF	LHD2	0.10	0.10
tblVehicleEF	LHD2	0.88	1.03
tblVehicleEF	LHD2	0.58	0.23
tblVehicleEF	LHD2	1.2010e-003	1.2468e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	4.7800e-004	1.5922e-004
tblVehicleEF	LHD2	1.1490e-003	1.1928e-003
tblVehicleEF	LHD2	0.04	0.04
tblVehicleEF	LHD2	2.6500e-003	2.6300e-003
tblVehicleEF	LHD2	9.6020e-003	0.01
tblVehicleEF	LHD2	4.3900e-004	1.4640e-004
tblVehicleEF	LHD2	2.0260e-003	2.5915e-003
tblVehicleEF	LHD2	0.04	0.06
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	1.2020e-003	1.4788e-003

tblVehicleEF	LHD2	0.05	0.05
tblVehicleEF	LHD2	0.09	0.34
tblVehicleEF	LHD2	0.13	0.06
tblVehicleEF	LHD2	1.3400e-004	1.3167e-004
tblVehicleEF	LHD2	6.0640e-003	6.5429e-003
tblVehicleEF	LHD2	3.0600e-004	9.4391e-005
tblVehicleEF	LHD2	2.0260e-003	2.5915e-003
tblVehicleEF	LHD2	0.04	0.06
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	1.2020e-003	1.4788e-003
tblVehicleEF	LHD2	0.06	0.07
tblVehicleEF	LHD2	0.09	0.34
tblVehicleEF	LHD2	0.14	0.06
tblVehicleEF	LHD2	4.2390e-003	4.0115e-003
tblVehicleEF	LHD2	4.8130e-003	4.1958e-003
tblVehicleEF	LHD2	9.6860e-003	0.01
tblVehicleEF	LHD2	0.13	0.15
tblVehicleEF	LHD2	0.40	0.48
tblVehicleEF	LHD2	1.44	0.77
tblVehicleEF	LHD2	13.72	13.73
tblVehicleEF	LHD2	622.17	675.94
tblVehicleEF	LHD2	28.08	9.61
tblVehicleEF	LHD2	0.10	0.10
tblVehicleEF	LHD2	0.92	1.07
tblVehicleEF	LHD2	0.60	0.24
tblVehicleEF	LHD2	1.2010e-003	1.2468e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	4.7800e-004	1.5922e-004

tblVehicleEF	LHD2	1.1490e-003	1.1928e-003
tblVehicleEF	LHD2	0.04	0.04
tblVehicleEF	LHD2	2.6500e-003	2.6300e-003
tblVehicleEF	LHD2	9.6020e-003	0.01
tblVehicleEF	LHD2	4.3900e-004	1.4640e-004
tblVehicleEF	LHD2	1.2850e-003	1.6760e-003
tblVehicleEF	LHD2	0.05	0.06
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	7.7600e-004	9.5349e-004
tblVehicleEF	LHD2	0.05	0.05
tblVehicleEF	LHD2	0.10	0.38
tblVehicleEF	LHD2	0.13	0.06
tblVehicleEF	LHD2	1.3400e-004	1.3167e-004
tblVehicleEF	LHD2	6.0640e-003	6.5428e-003
tblVehicleEF	LHD2	3.0700e-004	9.5083e-005
tblVehicleEF	LHD2	1.2850e-003	1.6760e-003
tblVehicleEF	LHD2	0.05	0.06
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	7.7600e-004	9.5349e-004
tblVehicleEF	LHD2	0.06	0.06
tblVehicleEF	LHD2	0.10	0.38
tblVehicleEF	LHD2	0.14	0.06
tblVehicleEF	MCY	0.50	0.37
tblVehicleEF	MCY	0.15	0.24
tblVehicleEF	MCY	19.08	19.33
tblVehicleEF	MCY	9.63	8.50
tblVehicleEF	MCY	182.36	218.96
tblVehicleEF	MCY	45.23	60.14
tblVehicleEF	MCY	1.13	1.13
tblVehicleEF	MCY	0.31	0.26

tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.2250e-003	2.2167e-003
tblVehicleEF	MCY	3.8410e-003	3.2543e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	2.0810e-003	2.0731e-003
tblVehicleEF	MCY	3.6200e-003	3.0666e-003
tblVehicleEF	MCY	1.18	1.20
tblVehicleEF	MCY	0.69	0.71
tblVehicleEF	MCY	0.70	0.72
tblVehicleEF	MCY	2.49	2.50
tblVehicleEF	MCY	0.63	2.04
tblVehicleEF	MCY	2.06	1.83
tblVehicleEF	MCY	2.2100e-003	2.1668e-003
tblVehicleEF	MCY	6.7000e-004	5.9514e-004
tblVehicleEF	MCY	1.18	1.20
tblVehicleEF	MCY	0.69	0.71
tblVehicleEF	MCY	0.70	0.72
tblVehicleEF	MCY	3.08	3.10
tblVehicleEF	MCY	0.63	2.04
tblVehicleEF	MCY	2.24	1.99
tblVehicleEF	MCY	0.49	0.36
tblVehicleEF	MCY	0.14	0.21
tblVehicleEF	MCY	18.59	18.81
tblVehicleEF	MCY	8.86	7.79
tblVehicleEF	MCY	182.36	217.93
tblVehicleEF	MCY	45.23	58.33
tblVehicleEF	MCY	0.99	0.99
tblVehicleEF	MCY	0.29	0.25

tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.2250e-003	2.2167e-003
tblVehicleEF	MCY	3.8410e-003	3.2543e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	2.0810e-003	2.0731e-003
tblVehicleEF	MCY	3.6200e-003	3.0666e-003
tblVehicleEF	MCY	1.98	2.00
tblVehicleEF	MCY	0.80	0.83
tblVehicleEF	MCY	1.25	1.26
tblVehicleEF	MCY	2.43	2.44
tblVehicleEF	MCY	0.59	1.93
tblVehicleEF	MCY	1.84	1.62
tblVehicleEF	MCY	2.2010e-003	2.1566e-003
tblVehicleEF	MCY	6.5100e-004	5.7722e-004
tblVehicleEF	MCY	1.98	2.00
tblVehicleEF	MCY	0.80	0.83
tblVehicleEF	MCY	1.25	1.26
tblVehicleEF	MCY	3.02	3.03
tblVehicleEF	MCY	0.59	1.93
tblVehicleEF	MCY	2.00	1.76
tblVehicleEF	MCY	0.51	0.37
tblVehicleEF	MCY	0.15	0.24
tblVehicleEF	MCY	19.10	19.35
tblVehicleEF	MCY	9.72	8.59
tblVehicleEF	MCY	182.36	219.02
tblVehicleEF	MCY	45.23	60.39
tblVehicleEF	MCY	1.10	1.10
tblVehicleEF	MCY	0.31	0.27

tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	4.0000e-003	4.0000e-003
tblVehicleEF	MCY	2.2250e-003	2.2167e-003
tblVehicleEF	MCY	3.8410e-003	3.2543e-003
tblVehicleEF	MCY	5.0400e-003	5.0400e-003
tblVehicleEF	MCY	1.0000e-003	1.0000e-003
tblVehicleEF	MCY	2.0810e-003	2.0731e-003
tblVehicleEF	MCY	3.6200e-003	3.0666e-003
tblVehicleEF	MCY	1.26	1.28
tblVehicleEF	MCY	0.89	0.91
tblVehicleEF	MCY	0.67	0.69
tblVehicleEF	MCY	2.49	2.51
tblVehicleEF	MCY	0.72	2.33
tblVehicleEF	MCY	2.10	1.86
tblVehicleEF	MCY	2.2110e-003	2.1674e-003
tblVehicleEF	MCY	6.7300e-004	5.9762e-004
tblVehicleEF	MCY	1.26	1.28
tblVehicleEF	MCY	0.89	0.91
tblVehicleEF	MCY	0.67	0.69
tblVehicleEF	MCY	3.09	3.11
tblVehicleEF	MCY	0.72	2.33
tblVehicleEF	MCY	2.28	2.02
tblVehicleEF	MDV	0.01	7.0561e-003
tblVehicleEF	MDV	0.02	0.09
tblVehicleEF	MDV	1.48	1.33
tblVehicleEF	MDV	2.84	3.27
tblVehicleEF	MDV	515.44	429.05
tblVehicleEF	MDV	107.59	87.05
tblVehicleEF	MDV	0.16	0.13
tblVehicleEF	MDV	0.26	0.38

tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.1880e-003	2.0176e-003
tblVehicleEF	MDV	2.5060e-003	2.1338e-003
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0180e-003	1.8612e-003
tblVehicleEF	MDV	2.3060e-003	1.9635e-003
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.17	0.15
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.04	0.03
tblVehicleEF	MDV	0.10	0.45
tblVehicleEF	MDV	0.22	0.44
tblVehicleEF	MDV	5.1660e-003	4.2422e-003
tblVehicleEF	MDV	1.1260e-003	8.6147e-004
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.17	0.15
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.05	0.05
tblVehicleEF	MDV	0.10	0.45
tblVehicleEF	MDV	0.24	0.48
tblVehicleEF	MDV	0.01	7.5222e-003
tblVehicleEF	MDV	0.01	0.08
tblVehicleEF	MDV	1.63	1.46
tblVehicleEF	MDV	2.45	2.79
tblVehicleEF	MDV	541.84	444.43
tblVehicleEF	MDV	107.59	86.14
tblVehicleEF	MDV	0.14	0.11
tblVehicleEF	MDV	0.24	0.36

tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.1880e-003	2.0176e-003
tblVehicleEF	MDV	2.5060e-003	2.1338e-003
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0180e-003	1.8612e-003
tblVehicleEF	MDV	2.3060e-003	1.9635e-003
tblVehicleEF	MDV	0.13	0.16
tblVehicleEF	MDV	0.18	0.16
tblVehicleEF	MDV	0.11	0.14
tblVehicleEF	MDV	0.04	0.03
tblVehicleEF	MDV	0.09	0.43
tblVehicleEF	MDV	0.19	0.39
tblVehicleEF	MDV	5.4320e-003	4.3943e-003
tblVehicleEF	MDV	1.1190e-003	8.5241e-004
tblVehicleEF	MDV	0.13	0.16
tblVehicleEF	MDV	0.18	0.16
tblVehicleEF	MDV	0.11	0.14
tblVehicleEF	MDV	0.06	0.05
tblVehicleEF	MDV	0.09	0.43
tblVehicleEF	MDV	0.21	0.43
tblVehicleEF	MDV	0.01	6.9155e-003
tblVehicleEF	MDV	0.02	0.09
tblVehicleEF	MDV	1.43	1.28
tblVehicleEF	MDV	2.92	3.36
tblVehicleEF	MDV	506.79	424.01
tblVehicleEF	MDV	107.59	87.24
tblVehicleEF	MDV	0.16	0.12
tblVehicleEF	MDV	0.26	0.39

tblVehicleEF	MDV	0.04	0.04
tblVehicleEF	MDV	8.0000e-003	8.0000e-003
tblVehicleEF	MDV	2.1880e-003	2.0176e-003
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tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	2.0000e-003	2.0000e-003
tblVehicleEF	MDV	2.0180e-003	1.8612e-003
tblVehicleEF	MDV	2.3060e-003	1.9635e-003
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tblVehicleEF	MDV	0.18	0.16
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.04	0.03
tblVehicleEF	MDV	0.11	0.53
tblVehicleEF	MDV	0.23	0.45
tblVehicleEF	MDV	5.0790e-003	4.1922e-003
tblVehicleEF	MDV	1.1270e-003	8.6332e-004
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.18	0.16
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.05	0.04
tblVehicleEF	MDV	0.11	0.53
tblVehicleEF	MDV	0.25	0.49
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tblVehicleEF	MH	0.03	0.02
tblVehicleEF	MH	2.61	1.40
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tblVehicleEF	MH	1.32	1.32
tblVehicleEF	MH	0.84	0.24

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tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.1510e-003	2.7879e-004
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	3.2170e-003	3.2632e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.0590e-003	2.5634e-004
tblVehicleEF	MH	1.15	0.99
tblVehicleEF	MH	0.08	0.06
tblVehicleEF	MH	0.46	0.39
tblVehicleEF	MH	0.10	0.06
tblVehicleEF	MH	0.02	1.51
tblVehicleEF	MH	0.35	0.10
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	7.0200e-004	1.9081e-004
tblVehicleEF	MH	1.15	0.99
tblVehicleEF	MH	0.08	0.06
tblVehicleEF	MH	0.46	0.39
tblVehicleEF	MH	0.14	0.09
tblVehicleEF	MH	0.02	1.51
tblVehicleEF	MH	0.38	0.11
tblVehicleEF	MH	0.03	0.01
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	2.69	1.44
tblVehicleEF	MH	5.74	2.05
tblVehicleEF	MH	1,106.44	1,502.46
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tblVehicleEF	MH	1.22	1.23
tblVehicleEF	MH	0.80	0.23

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tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.1510e-003	2.7879e-004
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	3.2170e-003	3.2632e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.0590e-003	2.5634e-004
tblVehicleEF	MH	1.78	1.52
tblVehicleEF	MH	0.08	0.07
tblVehicleEF	MH	0.72	0.61
tblVehicleEF	MH	0.10	0.07
tblVehicleEF	MH	0.02	1.49
tblVehicleEF	MH	0.34	0.09
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	6.9500e-004	1.8871e-004
tblVehicleEF	MH	1.78	1.52
tblVehicleEF	MH	0.08	0.07
tblVehicleEF	MH	0.72	0.61
tblVehicleEF	MH	0.14	0.09
tblVehicleEF	MH	0.02	1.49
tblVehicleEF	MH	0.37	0.10
tblVehicleEF	MH	0.03	0.01
tblVehicleEF	MH	0.03	0.02
tblVehicleEF	MH	2.59	1.39
tblVehicleEF	MH	6.16	2.19
tblVehicleEF	MH	1,106.44	1,502.38
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tblVehicleEF	MH	1.30	1.30
tblVehicleEF	MH	0.84	0.24

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tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.1510e-003	2.7879e-004
tblVehicleEF	MH	0.06	0.06
tblVehicleEF	MH	3.2170e-003	3.2632e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.0590e-003	2.5634e-004
tblVehicleEF	MH	1.27	1.08
tblVehicleEF	MH	0.09	0.08
tblVehicleEF	MH	0.47	0.40
tblVehicleEF	MH	0.10	0.06
tblVehicleEF	MH	0.02	1.59
tblVehicleEF	MH	0.35	0.10
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	7.0300e-004	1.9114e-004
tblVehicleEF	MH	1.27	1.08
tblVehicleEF	MH	0.09	0.08
tblVehicleEF	MH	0.47	0.40
tblVehicleEF	MH	0.14	0.09
tblVehicleEF	MH	0.02	1.59
tblVehicleEF	MH	0.39	0.11
tblVehicleEF	MHD	0.02	4.2432e-003
tblVehicleEF	MHD	4.8740e-003	6.7473e-003
tblVehicleEF	MHD	0.05	0.01
tblVehicleEF	MHD	0.37	0.38
tblVehicleEF	MHD	0.37	0.62
tblVehicleEF	MHD	6.44	1.34
tblVehicleEF	MHD	139.10	66.57
tblVehicleEF	MHD	1,139.95	1,077.13

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tblVehicleEF	MHD	0.55	0.55
tblVehicleEF	MHD	1.18	2.23
tblVehicleEF	MHD	10.45	1.13
tblVehicleEF	MHD	3.6300e-004	1.8182e-003
tblVehicleEF	MHD	0.13	0.13
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	5.7190e-003	0.06
tblVehicleEF	MHD	8.4000e-004	1.2621e-004
tblVehicleEF	MHD	3.4700e-004	1.7396e-003
tblVehicleEF	MHD	0.06	0.06
tblVehicleEF	MHD	3.0000e-003	3.0000e-003
tblVehicleEF	MHD	5.4680e-003	0.06
tblVehicleEF	MHD	7.7200e-004	1.1604e-004
tblVehicleEF	MHD	1.2630e-003	6.3990e-004
tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	0.03	0.02
tblVehicleEF	MHD	7.7200e-004	3.9325e-004
tblVehicleEF	MHD	0.04	0.11
tblVehicleEF	MHD	0.02	0.13
tblVehicleEF	MHD	0.40	0.06
tblVehicleEF	MHD	1.3390e-003	6.3252e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.2800e-004	1.1367e-004
tblVehicleEF	MHD	1.2630e-003	6.3990e-004
tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	7.7200e-004	3.9325e-004
tblVehicleEF	MHD	0.05	0.13
tblVehicleEF	MHD	0.02	0.13

tblVehicleEF	MHD	0.43	0.07
tblVehicleEF	MHD	0.02	4.0192e-003
tblVehicleEF	MHD	4.9460e-003	6.7968e-003
tblVehicleEF	MHD	0.05	0.01
tblVehicleEF	MHD	0.27	0.31
tblVehicleEF	MHD	0.37	0.63
tblVehicleEF	MHD	6.12	1.27
tblVehicleEF	MHD	147.32	67.79
tblVehicleEF	MHD	1,139.95	1,077.14
tblVehicleEF	MHD	61.46	11.37
tblVehicleEF	MHD	0.57	0.55
tblVehicleEF	MHD	1.11	2.10
tblVehicleEF	MHD	10.41	1.12
tblVehicleEF	MHD	3.0600e-004	1.5351e-003
tblVehicleEF	MHD	0.13	0.13
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	5.7190e-003	0.06
tblVehicleEF	MHD	8.4000e-004	1.2621e-004
tblVehicleEF	MHD	2.9300e-004	1.4687e-003
tblVehicleEF	MHD	0.06	0.06
tblVehicleEF	MHD	3.0000e-003	3.0000e-003
tblVehicleEF	MHD	5.4680e-003	0.06
tblVehicleEF	MHD	7.7200e-004	1.1604e-004
tblVehicleEF	MHD	1.9740e-003	9.9194e-004
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	1.1660e-003	5.9016e-004
tblVehicleEF	MHD	0.04	0.11
tblVehicleEF	MHD	0.02	0.12
tblVehicleEF	MHD	0.38	0.06

tblVehicleEF	MHD	1.4170e-003	6.4425e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.2200e-004	1.1256e-004
tblVehicleEF	MHD	1.9740e-003	9.9194e-004
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.03	0.03
tblVehicleEF	MHD	1.1660e-003	5.9016e-004
tblVehicleEF	MHD	0.05	0.13
tblVehicleEF	MHD	0.02	0.12
tblVehicleEF	MHD	0.42	0.06
tblVehicleEF	MHD	0.02	4.5651e-003
tblVehicleEF	MHD	4.8520e-003	6.7314e-003
tblVehicleEF	MHD	0.05	0.01
tblVehicleEF	MHD	0.51	0.48
tblVehicleEF	MHD	0.37	0.62
tblVehicleEF	MHD	6.50	1.35
tblVehicleEF	MHD	127.72	64.87
tblVehicleEF	MHD	1,139.95	1,077.13
tblVehicleEF	MHD	61.46	11.51
tblVehicleEF	MHD	0.53	0.54
tblVehicleEF	MHD	1.16	2.19
tblVehicleEF	MHD	10.46	1.13
tblVehicleEF	MHD	4.4200e-004	2.2092e-003
tblVehicleEF	MHD	0.13	0.13
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	5.7190e-003	0.06
tblVehicleEF	MHD	8.4000e-004	1.2621e-004
tblVehicleEF	MHD	4.2300e-004	2.1137e-003
tblVehicleEF	MHD	0.06	0.06
tblVehicleEF	MHD	3.0000e-003	3.0000e-003

tblVehicleEF	MHD	5.4680e-003	0.06
tblVehicleEF	MHD	7.7200e-004	1.1604e-004
tblVehicleEF	MHD	1.2610e-003	6.4610e-004
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.03	0.02
tblVehicleEF	MHD	7.4700e-004	3.8266e-004
tblVehicleEF	MHD	0.04	0.11
tblVehicleEF	MHD	0.02	0.14
tblVehicleEF	MHD	0.40	0.06
tblVehicleEF	MHD	1.2320e-003	6.1624e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.2900e-004	1.1388e-004
tblVehicleEF	MHD	1.2610e-003	6.4610e-004
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	7.4700e-004	3.8266e-004
tblVehicleEF	MHD	0.05	0.13
tblVehicleEF	MHD	0.02	0.14
tblVehicleEF	MHD	0.44	0.07
tblVehicleEF	OBUS	0.01	8.8894e-003
tblVehicleEF	OBUS	8.7600e-003	9.7062e-003
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.28	0.58
tblVehicleEF	OBUS	0.59	1.02
tblVehicleEF	OBUS	5.80	2.47
tblVehicleEF	OBUS	101.23	91.74
tblVehicleEF	OBUS	1,241.90	1,424.87
tblVehicleEF	OBUS	68.87	19.84
tblVehicleEF	OBUS	0.52	0.58
tblVehicleEF	OBUS	1.61	2.00

tblVehicleEF	OBUS	2.46	0.65
tblVehicleEF	OBUS	1.8000e-004	2.2610e-003
tblVehicleEF	OBUS	0.13	0.13
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.1890e-003	0.04
tblVehicleEF	OBUS	8.1000e-004	1.9695e-004
tblVehicleEF	OBUS	1.7300e-004	2.1631e-003
tblVehicleEF	OBUS	0.06	0.06
tblVehicleEF	OBUS	3.0000e-003	3.0000e-003
tblVehicleEF	OBUS	7.8190e-003	0.04
tblVehicleEF	OBUS	7.4400e-004	1.8109e-004
tblVehicleEF	OBUS	1.5730e-003	1.9706e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.04	0.06
tblVehicleEF	OBUS	8.0200e-004	9.7278e-004
tblVehicleEF	OBUS	0.06	0.11
tblVehicleEF	OBUS	0.04	0.26
tblVehicleEF	OBUS	0.36	0.12
tblVehicleEF	OBUS	9.7800e-004	8.7302e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	7.9100e-004	1.9634e-004
tblVehicleEF	OBUS	1.5730e-003	1.9706e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.05	0.08
tblVehicleEF	OBUS	8.0200e-004	9.7278e-004
tblVehicleEF	OBUS	0.08	0.13
tblVehicleEF	OBUS	0.04	0.26
tblVehicleEF	OBUS	0.40	0.13
tblVehicleEF	OBUS	0.01	8.9089e-003
tblVehicleEF	OBUS	8.9130e-003	9.8457e-003

tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.27	0.55
tblVehicleEF	OBUS	0.60	1.04
tblVehicleEF	OBUS	5.48	2.33
tblVehicleEF	OBUS	106.24	92.40
tblVehicleEF	OBUS	1,241.90	1,424.90
tblVehicleEF	OBUS	68.87	19.61
tblVehicleEF	OBUS	0.53	0.58
tblVehicleEF	OBUS	1.52	1.88
tblVehicleEF	OBUS	2.42	0.64
tblVehicleEF	OBUS	1.5200e-004	1.9106e-003
tblVehicleEF	OBUS	0.13	0.13
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.1890e-003	0.04
tblVehicleEF	OBUS	8.1000e-004	1.9695e-004
tblVehicleEF	OBUS	1.4600e-004	1.8280e-003
tblVehicleEF	OBUS	0.06	0.06
tblVehicleEF	OBUS	3.0000e-003	3.0000e-003
tblVehicleEF	OBUS	7.8190e-003	0.04
tblVehicleEF	OBUS	7.4400e-004	1.8109e-004
tblVehicleEF	OBUS	2.3950e-003	2.9676e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.04	0.06
tblVehicleEF	OBUS	1.2060e-003	1.4483e-003
tblVehicleEF	OBUS	0.06	0.11
tblVehicleEF	OBUS	0.04	0.25
tblVehicleEF	OBUS	0.35	0.11
tblVehicleEF	OBUS	1.0260e-003	8.7927e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	7.8500e-004	1.9401e-004

tblVehicleEF	OBUS	2.3950e-003	2.9676e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.05	0.08
tblVehicleEF	OBUS	1.2060e-003	1.4483e-003
tblVehicleEF	OBUS	0.08	0.13
tblVehicleEF	OBUS	0.04	0.25
tblVehicleEF	OBUS	0.38	0.12
tblVehicleEF	OBUS	0.01	8.8830e-003
tblVehicleEF	OBUS	8.7200e-003	9.6690e-003
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.30	0.62
tblVehicleEF	OBUS	0.59	1.02
tblVehicleEF	OBUS	5.86	2.50
tblVehicleEF	OBUS	94.31	90.82
tblVehicleEF	OBUS	1,241.90	1,424.86
tblVehicleEF	OBUS	68.87	19.88
tblVehicleEF	OBUS	0.49	0.58
tblVehicleEF	OBUS	1.59	1.97
tblVehicleEF	OBUS	2.47	0.65
tblVehicleEF	OBUS	2.2000e-004	2.7447e-003
tblVehicleEF	OBUS	0.13	0.13
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	8.1890e-003	0.04
tblVehicleEF	OBUS	8.1000e-004	1.9695e-004
tblVehicleEF	OBUS	2.1000e-004	2.6260e-003
tblVehicleEF	OBUS	0.06	0.06
tblVehicleEF	OBUS	3.0000e-003	3.0000e-003
tblVehicleEF	OBUS	7.8190e-003	0.04
tblVehicleEF	OBUS	7.4400e-004	1.8109e-004
tblVehicleEF	OBUS	1.5900e-003	2.0387e-003

tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.04	0.06
tblVehicleEF	OBUS	7.8500e-004	9.6217e-004
tblVehicleEF	OBUS	0.06	0.11
tblVehicleEF	OBUS	0.04	0.28
tblVehicleEF	OBUS	0.37	0.12
tblVehicleEF	OBUS	9.1200e-004	8.6440e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	7.9200e-004	1.9677e-004
tblVehicleEF	OBUS	1.5900e-003	2.0387e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.06	0.08
tblVehicleEF	OBUS	7.8500e-004	9.6217e-004
tblVehicleEF	OBUS	0.08	0.13
tblVehicleEF	OBUS	0.04	0.28
tblVehicleEF	OBUS	0.40	0.13
tblVehicleEF	SBUS	0.86	0.07
tblVehicleEF	SBUS	0.01	8.3268e-003
tblVehicleEF	SBUS	0.07	6.6492e-003
tblVehicleEF	SBUS	7.86	2.82
tblVehicleEF	SBUS	0.81	0.72
tblVehicleEF	SBUS	7.55	0.92
tblVehicleEF	SBUS	1,146.60	356.21
tblVehicleEF	SBUS	1,098.65	1,119.95
tblVehicleEF	SBUS	52.57	5.57
tblVehicleEF	SBUS	10.06	3.44
tblVehicleEF	SBUS	4.64	5.26
tblVehicleEF	SBUS	12.63	0.76
tblVehicleEF	SBUS	0.01	4.7705e-003
tblVehicleEF	SBUS	0.74	0.74

tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.03
tblVehicleEF	SBUS	7.2300e-004	5.0385e-005
tblVehicleEF	SBUS	0.01	4.5641e-003
tblVehicleEF	SBUS	0.32	0.32
tblVehicleEF	SBUS	2.6920e-003	2.6700e-003
tblVehicleEF	SBUS	0.02	0.03
tblVehicleEF	SBUS	6.6400e-004	4.6327e-005
tblVehicleEF	SBUS	3.6480e-003	1.0930e-003
tblVehicleEF	SBUS	0.03	8.9369e-003
tblVehicleEF	SBUS	0.94	0.33
tblVehicleEF	SBUS	1.8170e-003	5.4744e-004
tblVehicleEF	SBUS	0.11	0.11
tblVehicleEF	SBUS	0.01	0.06
tblVehicleEF	SBUS	0.40	0.04
tblVehicleEF	SBUS	0.01	3.3993e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.5600e-004	5.5117e-005
tblVehicleEF	SBUS	3.6480e-003	1.0930e-003
tblVehicleEF	SBUS	0.03	8.9369e-003
tblVehicleEF	SBUS	1.36	0.47
tblVehicleEF	SBUS	1.8170e-003	5.4744e-004
tblVehicleEF	SBUS	0.14	0.13
tblVehicleEF	SBUS	0.01	0.06
tblVehicleEF	SBUS	0.44	0.04
tblVehicleEF	SBUS	0.86	0.07
tblVehicleEF	SBUS	0.01	8.4259e-003
tblVehicleEF	SBUS	0.06	5.8398e-003
tblVehicleEF	SBUS	7.73	2.78
tblVehicleEF	SBUS	0.82	0.73

tblVehicleEF	SBUS	6.01	0.73
tblVehicleEF	SBUS	1,199.32	365.47
tblVehicleEF	SBUS	1,098.65	1,119.97
tblVehicleEF	SBUS	52.57	5.25
tblVehicleEF	SBUS	10.38	3.52
tblVehicleEF	SBUS	4.37	4.95
tblVehicleEF	SBUS	12.59	0.76
tblVehicleEF	SBUS	9.1580e-003	4.0282e-003
tblVehicleEF	SBUS	0.74	0.74
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.03
tblVehicleEF	SBUS	7.2300e-004	5.0385e-005
tblVehicleEF	SBUS	8.7620e-003	3.8540e-003
tblVehicleEF	SBUS	0.32	0.32
tblVehicleEF	SBUS	2.6920e-003	2.6700e-003
tblVehicleEF	SBUS	0.02	0.03
tblVehicleEF	SBUS	6.6400e-004	4.6327e-005
tblVehicleEF	SBUS	5.6470e-003	1.6880e-003
tblVehicleEF	SBUS	0.03	9.1687e-003
tblVehicleEF	SBUS	0.94	0.33
tblVehicleEF	SBUS	2.8110e-003	8.4298e-004
tblVehicleEF	SBUS	0.11	0.11
tblVehicleEF	SBUS	0.01	0.05
tblVehicleEF	SBUS	0.35	0.03
tblVehicleEF	SBUS	0.01	3.4868e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.3100e-004	5.1967e-005
tblVehicleEF	SBUS	5.6470e-003	1.6880e-003
tblVehicleEF	SBUS	0.03	9.1687e-003
tblVehicleEF	SBUS	1.36	0.47

tblVehicleEF	SBUS	2.8110e-003	8.4298e-004
tblVehicleEF	SBUS	0.14	0.13
tblVehicleEF	SBUS	0.01	0.05
tblVehicleEF	SBUS	0.39	0.04
tblVehicleEF	SBUS	0.86	0.07
tblVehicleEF	SBUS	0.01	8.3036e-003
tblVehicleEF	SBUS	0.07	6.8163e-003
tblVehicleEF	SBUS	8.03	2.88
tblVehicleEF	SBUS	0.81	0.72
tblVehicleEF	SBUS	7.81	0.95
tblVehicleEF	SBUS	1,073.80	343.43
tblVehicleEF	SBUS	1,098.65	1,119.94
tblVehicleEF	SBUS	52.57	5.62
tblVehicleEF	SBUS	9.61	3.32
tblVehicleEF	SBUS	4.57	5.17
tblVehicleEF	SBUS	12.63	0.76
tblVehicleEF	SBUS	0.01	5.7955e-003
tblVehicleEF	SBUS	0.74	0.74
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.03
tblVehicleEF	SBUS	7.2300e-004	5.0385e-005
tblVehicleEF	SBUS	0.01	5.5448e-003
tblVehicleEF	SBUS	0.32	0.32
tblVehicleEF	SBUS	2.6920e-003	2.6700e-003
tblVehicleEF	SBUS	0.02	0.03
tblVehicleEF	SBUS	6.6400e-004	4.6327e-005
tblVehicleEF	SBUS	3.6250e-003	1.0870e-003
tblVehicleEF	SBUS	0.03	9.5228e-003
tblVehicleEF	SBUS	0.95	0.33
tblVehicleEF	SBUS	1.7640e-003	5.3514e-004

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tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.41	0.04
tblVehicleEF	SBUS	0.01	3.2785e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.6100e-004	5.5645e-005
tblVehicleEF	SBUS	3.6250e-003	1.0870e-003
tblVehicleEF	SBUS	0.03	9.5228e-003
tblVehicleEF	SBUS	1.37	0.47
tblVehicleEF	SBUS	1.7640e-003	5.3514e-004
tblVehicleEF	SBUS	0.14	0.13
tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.45	0.04
tblVehicleEF	UBUS	2.51	5.87
tblVehicleEF	UBUS	0.06	0.02
tblVehicleEF	UBUS	11.01	39.42
tblVehicleEF	UBUS	10.46	0.95
tblVehicleEF	UBUS	1,940.83	1,945.19
tblVehicleEF	UBUS	106.77	11.70
tblVehicleEF	UBUS	9.09	1.22
tblVehicleEF	UBUS	14.93	0.12
tblVehicleEF	UBUS	0.59	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.11	3.6015e-003
tblVehicleEF	UBUS	1.1160e-003	5.2582e-005
tblVehicleEF	UBUS	0.25	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.11	3.4412e-003
tblVehicleEF	UBUS	1.0260e-003	4.8347e-005
tblVehicleEF	UBUS	5.1810e-003	9.4034e-004

tblVehicleEF	UBUS	0.08	0.01
tblVehicleEF	UBUS	2.8830e-003	7.3606e-004
tblVehicleEF	UBUS	0.80	0.09
tblVehicleEF	UBUS	0.02	0.08
tblVehicleEF	UBUS	0.79	0.06
tblVehicleEF	UBUS	9.6900e-003	2.3326e-003
tblVehicleEF	UBUS	1.2560e-003	1.1578e-004
tblVehicleEF	UBUS	5.1810e-003	9.4034e-004
tblVehicleEF	UBUS	0.08	0.01
tblVehicleEF	UBUS	2.8830e-003	7.3606e-004
tblVehicleEF	UBUS	3.40	5.99
tblVehicleEF	UBUS	0.02	0.08
tblVehicleEF	UBUS	0.87	0.07
tblVehicleEF	UBUS	2.52	5.87
tblVehicleEF	UBUS	0.05	0.01
tblVehicleEF	UBUS	11.06	39.42
tblVehicleEF	UBUS	9.07	0.83
tblVehicleEF	UBUS	1,940.83	1,945.19
tblVehicleEF	UBUS	106.77	11.50
tblVehicleEF	UBUS	8.56	1.21
tblVehicleEF	UBUS	14.87	0.11
tblVehicleEF	UBUS	0.59	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.11	3.6015e-003
tblVehicleEF	UBUS	1.1160e-003	5.2582e-005
tblVehicleEF	UBUS	0.25	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.11	3.4412e-003
tblVehicleEF	UBUS	1.0260e-003	4.8347e-005
tblVehicleEF	UBUS	7.7250e-003	1.3858e-003

tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	4.3230e-003	1.0574e-003
tblVehicleEF	UBUS	0.81	0.09
tblVehicleEF	UBUS	0.02	0.07
tblVehicleEF	UBUS	0.73	0.06
tblVehicleEF	UBUS	9.6910e-003	2.3326e-003
tblVehicleEF	UBUS	1.2320e-003	1.1379e-004
tblVehicleEF	UBUS	7.7250e-003	1.3858e-003
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	4.3230e-003	1.0574e-003
tblVehicleEF	UBUS	3.42	5.99
tblVehicleEF	UBUS	0.02	0.07
tblVehicleEF	UBUS	0.80	0.07
tblVehicleEF	UBUS	2.51	5.87
tblVehicleEF	UBUS	0.06	0.02
tblVehicleEF	UBUS	11.00	39.42
tblVehicleEF	UBUS	10.67	0.97
tblVehicleEF	UBUS	1,940.83	1,945.19
tblVehicleEF	UBUS	106.77	11.73
tblVehicleEF	UBUS	8.92	1.22
tblVehicleEF	UBUS	14.95	0.12
tblVehicleEF	UBUS	0.59	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.11	3.6015e-003
tblVehicleEF	UBUS	1.1160e-003	5.2582e-005
tblVehicleEF	UBUS	0.25	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5896e-003
tblVehicleEF	UBUS	0.11	3.4412e-003
tblVehicleEF	UBUS	1.0260e-003	4.8347e-005
tblVehicleEF	UBUS	5.7050e-003	9.1790e-004

tblVehicleEF	UBUS	0.10	0.01
tblVehicleEF	UBUS	2.9930e-003	7.0556e-004
tblVehicleEF	UBUS	0.80	0.09
tblVehicleEF	UBUS	0.03	0.09
tblVehicleEF	UBUS	0.80	0.07
tblVehicleEF	UBUS	9.6890e-003	2.3326e-003
tblVehicleEF	UBUS	1.2600e-003	1.1608e-004
tblVehicleEF	UBUS	5.7050e-003	9.1790e-004
tblVehicleEF	UBUS	0.10	0.01
tblVehicleEF	UBUS	2.9930e-003	7.0556e-004
tblVehicleEF	UBUS	3.40	5.99
tblVehicleEF	UBUS	0.03	0.09
tblVehicleEF	UBUS	0.88	0.07
tblVehicleTrips	ST_TR	6.39	4.16
tblVehicleTrips	ST_TR	2.46	7.45
tblVehicleTrips	ST_TR	158.37	76.28
tblVehicleTrips	SU_TR	5.86	4.16
tblVehicleTrips	SU_TR	1.05	7.45
tblVehicleTrips	SU_TR	131.84	76.28
tblVehicleTrips	WD_TR	6.65	4.16
tblVehicleTrips	WD_TR	11.03	7.45
tblVehicleTrips	WD_TR	127.15	76.28
tblWoodstoves	NumberCatalytic	0.60	0.00
tblWoodstoves	NumberNoncatalytic	0.60	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

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					
Area	0.0934	1.4400e-003	0.1245	1.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	0.2030	0.2030	2.0000e-004	0.0000	0.2080
Energy	5.7400e-003	0.0518	0.0414	3.1000e-004		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	130.2828	130.2828	1.0900e-003	1.0400e-003	130.6202
Mobile	0.1640	0.2803	1.2065	2.9900e-003	0.2674	4.0400e-003	0.2714	0.0715	3.8000e-003	0.0753	0.0000	278.8828	278.8828	0.0203	0.0000	279.3913
Waste						0.0000	0.0000		0.0000	0.0000	11.5482	0.0000	11.5482	0.6825	0.0000	28.6101
Water						0.0000	0.0000		0.0000	0.0000	0.9305	11.2042	12.1347	0.0956	2.2600e-003	15.1965
Total	**0.2631**	**0.3336**	**1.3724**	**3.3100e-003**	**0.2674**	**8.6900e-003**	**0.2761**	**0.0715**	**8.4500e-003**	**0.0800**	**12.4787**	**420.5728**	**433.0515**	**0.7997**	**3.3000e-003**	**454.0260**

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	0.0934	1.4400e-003	0.1245	1.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	0.2030	0.2030	2.0000e-004	0.0000	0.2080
Energy	5.7400e-003	0.0518	0.0414	3.1000e-004		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	129.5484	129.5484	1.0900e-003	1.0400e-003	129.8859
Mobile	0.1640	0.2803	1.2065	2.9900e-003	0.2674	4.0400e-003	0.2714	0.0715	3.8000e-003	0.0753	0.0000	278.8828	278.8828	0.0203	0.0000	279.3913
Waste						0.0000	0.0000		0.0000	0.0000	2.8870	0.0000	2.8870	0.1706	0.0000	7.1525
Water						0.0000	0.0000		0.0000	0.0000	0.9305	11.2042	12.1347	0.0956	2.2600e-003	15.1965
Total	**0.2631**	**0.3336**	**1.3724**	**3.3100e-003**	**0.2674**	**8.6900e-003**	**0.2761**	**0.0715**	**8.4500e-003**	**0.0800**	**3.8176**	**419.8384**	**423.6560**	**0.2878**	**3.3000e-003**	**431.8341**

	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**	**69.41**	**0.17**	**2.17**	**64.01**	**0.00**	**4.89**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	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	0.1640	0.2803	1.2065	2.9900e-003	0.2674	4.0400e-003	0.2714	0.0715	3.8000e-003	0.0753	0.0000	278.8828	278.8828	0.0203	0.0000	279.3913
Unmitigated	0.1640	0.2803	1.2065	2.9900e-003	0.2674	4.0400e-003	0.2714	0.0715	3.8000e-003	0.0753	0.0000	278.8828	278.8828	0.0203	0.0000	279.3913

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	49.92	49.92	49.92	170,584	170,584
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	40.68	40.68	40.68	131,039	131,039
High Turnover (Sit Down Restaurant)	296.73	296.73	296.73	404,392	404,392
Parking Lot	0.00	0.00	0.00		
Total	387.33	387.33	387.33	706,015	706,015

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 Mid Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
High Turnover (Sit Down Restaurant)	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
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 Mid Rise	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975
Enclosed Parking with Elevator	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975
General Office Building	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975
High Turnover (Sit Down Restaurant)	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975
Parking Lot	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Kilowatt Hours of Renewable Electricity Generated

	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	72.7628	72.7628	0.0000	0.0000	72.7628
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	73.4971	73.4971	0.0000	0.0000	73.4971
NaturalGas Mitigated	5.7400e-003	0.0518	0.0414	3.1000e-004		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	56.7857	56.7857	1.0900e-003	1.0400e-003	57.1231
NaturalGas Unmitigated	5.7400e-003	0.0518	0.0414	3.1000e-004		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	56.7857	56.7857	1.0900e-003	1.0400e-003	57.1231

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 Mid Rise	110603	6.0000e-004	5.1000e-003	2.1700e-003	3.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	5.9022	5.9022	1.1000e-004	1.1000e-004	5.9373
Enclosed Parking with Elevator	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
General Office Building	56786.6	3.1000e-004	2.7800e-003	2.3400e-003	2.0000e-005		2.1000e-004	2.1000e-004		2.1000e-004	2.1000e-004	0.0000	3.0304	3.0304	6.0000e-005	6.0000e-005	3.0484
High Turnover (Sit Down Restaurant)	896733	4.8400e-003	0.0440	0.0369	2.6000e-004		3.3400e-003	3.3400e-003		3.3400e-003	3.3400e-003	0.0000	47.8531	47.8531	9.2000e-004	8.8000e-004	48.1375
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		**5.7500e-003**	**0.0518**	**0.0414**	**3.1000e-004**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**56.7857**	**56.7857**	**1.0900e-003**	**1.0500e-003**	**57.1231**

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 Mid Rise	110603	6.0000e-004	5.1000e-003	2.1700e-003	3.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	5.9022	5.9022	1.1000e-004	1.1000e-004	5.9373
Enclosed Parking with Elevator	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
General Office Building	56786.6	3.1000e-004	2.7800e-003	2.3400e-003	2.0000e-005		2.1000e-004	2.1000e-004		2.1000e-004	2.1000e-004	0.0000	3.0304	3.0304	6.0000e-005	6.0000e-005	3.0484
High Turnover (Sit Down Restaurant)	896733	4.8400e-003	0.0440	0.0369	2.6000e-004		3.3400e-003	3.3400e-003		3.3400e-003	3.3400e-003	0.0000	47.8531	47.8531	9.2000e-004	8.8000e-004	48.1375
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		**5.7500e-003**	**0.0518**	**0.0414**	**3.1000e-004**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**56.7857**	**56.7857**	**1.0900e-003**	**1.0500e-003**	**57.1231**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	47521	10.4170	0.0000	0.0000	10.4170
Enclosed Parking with Elevator	44536	9.7626	0.0000	0.0000	9.7626
General Office Building	70860.4	15.5332	0.0000	0.0000	15.5332
High Turnover (Sit Down Restaurant)	171528	37.6003	0.0000	0.0000	37.6003
Parking Lot	840	0.1841	0.0000	0.0000	0.1841
Total		**73.4971**	**0.0000**	**0.0000**	**73.4971**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	46851	10.2701	0.0000	0.0000	10.2701
Enclosed Parking with Elevator	43866	9.6158	0.0000	0.0000	9.6158
General Office Building	70190.4	15.3863	0.0000	0.0000	15.3863
High Turnover (Sit Down Restaurant)	170858	37.4534	0.0000	0.0000	37.4534
Parking Lot	170	0.0373	0.0000	0.0000	0.0373
Total		**72.7628**	**0.0000**	**0.0000**	**72.7628**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	0.0934	1.4400e-003	0.1245	1.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	0.2030	0.2030	2.0000e-004	0.0000	0.2080
Unmitigated	0.0934	1.4400e-003	0.1245	1.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	0.2030	0.2030	2.0000e-004	0.0000	0.2080

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	8.5100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0811					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	3.8000e-003	1.4400e-003	0.1245	1.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	0.2030	0.2030	2.0000e-004	0.0000	0.2080
Total	**0.0934**	**1.4400e-003**	**0.1245**	**1.0000e-005**		**6.9000e-004**	**6.9000e-004**		**6.9000e-004**	**6.9000e-004**	**0.0000**	**0.2030**	**0.2030**	**2.0000e-004**	**0.0000**	**0.2080**

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	8.5100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0811					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	3.8000e-003	1.4400e-003	0.1245	1.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	0.2030	0.2030	2.0000e-004	0.0000	0.2080
Total	**0.0934**	**1.4400e-003**	**0.1245**	**1.0000e-005**		**6.9000e-004**	**6.9000e-004**		**6.9000e-004**	**6.9000e-004**	**0.0000**	**0.2030**	**0.2030**	**2.0000e-004**	**0.0000**	**0.2080**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	12.1347	0.0956	2.2600e-003	15.1965
Unmitigated	12.1347	0.0956	2.2600e-003	15.1965

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	0.781848 / 0.492904	3.6801	0.0255	6.0000e-004	4.4963
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	0.970426 / 0.594777	4.5263	0.0316	7.5000e-004	5.5393
High Turnover (Sit Down Restaurant)	1.18075 / 0.0753668	3.9284	0.0385	9.1000e-004	5.1609
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**12.1347**	**0.0956**	**2.2600e-003**	**15.1965**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	0.781848 / 0.492904	3.6801	0.0255	6.0000e-004	4.4963
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	0.970426 / 0.594777	4.5263	0.0316	7.5000e-004	5.5393
High Turnover (Sit Down Restaurant)	1.18075 / 0.0753668	3.9284	0.0385	9.1000e-004	5.1609
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**12.1347**	**0.0956**	**2.2600e-003**	**15.1965**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	2.8870	0.1706	0.0000	7.1525
Unmitigated	11.5482	0.6825	0.0000	28.6101

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	5.52	1.1205	0.0662	0.0000	2.7760
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	5.08	1.0312	0.0609	0.0000	2.5547
High Turnover (Sit Down Restaurant)	46.29	9.3965	0.5553	0.0000	23.2793
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**11.5482**	**0.6825**	**0.0000**	**28.6101**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	1.38	0.2801	0.0166	0.0000	0.6940
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	1.27	0.2578	0.0152	0.0000	0.6387
High Turnover (Sit Down Restaurant)	11.5725	2.3491	0.1388	0.0000	5.8198
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**2.8870**	**0.1706**	**0.0000**	**7.1525**

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

3727 Robertson-BAU Operations

South Coast AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	5.46	1000sqft	0.02	5,455.00	0
Enclosed Parking with Elevator	19.00	Space	0.03	7,600.00	0
Parking Lot	6.00	Space	0.02	2,400.00	0
High Turnover (Sit Down Restaurant)	3.89	1000sqft	0.02	3,886.00	0
Apartments Mid Rise	12.00	Dwelling Unit	0.03	12,921.00	28

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	11			**Operational Year**	2021
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 - BAU Scenario - CO2, CH4 and N2O intensity factors left at default.

Land Use - see operational assumptions

Construction Phase - operational run only

Vehicle Trips - trip rates from project traffic impact analysis without reductions.

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Vehicle Emission Factors - Updated to EMFAC2017 EFs

Woodstoves - see operational assumptions

Energy Use -

Energy Mitigation -

Waste Mitigation - in compliance with 75% waste diversion by state by 2020.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	2.00
tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	10.20	0.00
tblFireplaces	NumberNoFireplace	1.20	0.00
tblFireplaces	NumberWood	0.60	0.00
tblFleetMix	HHD	0.03	0.03
tblFleetMix	HHD	0.03	0.03
tblFleetMix	HHD	0.03	0.03
tblFleetMix	HHD	0.03	0.03
tblFleetMix	HHD	0.03	0.03
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDA	0.55	0.55
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT2	0.20	0.18

tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LDT2	0.20	0.18
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD2	5.8510e-003	6.0310e-003
tblFleetMix	LHD2	5.8510e-003	6.0310e-003
tblFleetMix	LHD2	5.8510e-003	6.0310e-003
tblFleetMix	LHD2	5.8510e-003	6.0310e-003
tblFleetMix	LHD2	5.8510e-003	6.0310e-003
tblFleetMix	MCY	4.8170e-003	4.3390e-003
tblFleetMix	MCY	4.8170e-003	4.3390e-003
tblFleetMix	MCY	4.8170e-003	4.3390e-003
tblFleetMix	MCY	4.8170e-003	4.3390e-003
tblFleetMix	MCY	4.8170e-003	4.3390e-003
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MDV	0.12	0.12
tblFleetMix	MH	9.2500e-004	9.7500e-004
tblFleetMix	MH	9.2500e-004	9.7500e-004
tblFleetMix	MH	9.2500e-004	9.7500e-004
tblFleetMix	MH	9.2500e-004	9.7500e-004
tblFleetMix	MH	9.2500e-004	9.7500e-004
tblFleetMix	MHD	0.02	0.02

tblFleetMix	MHD	0.02	0.02
tblFleetMix	MHD	0.02	0.02
tblFleetMix	MHD	0.02	0.02
tblFleetMix	MHD	0.02	0.02
tblFleetMix	OBUS	2.0700e-003	1.2250e-003
tblFleetMix	OBUS	2.0700e-003	1.2250e-003
tblFleetMix	OBUS	2.0700e-003	1.2250e-003
tblFleetMix	OBUS	2.0700e-003	1.2250e-003
tblFleetMix	OBUS	2.0700e-003	1.2250e-003
tblFleetMix	SBUS	7.0700e-004	6.6300e-004
tblFleetMix	SBUS	7.0700e-004	6.6300e-004
tblFleetMix	SBUS	7.0700e-004	6.6300e-004
tblFleetMix	SBUS	7.0700e-004	6.6300e-004
tblFleetMix	SBUS	7.0700e-004	6.6300e-004
tblFleetMix	UBUS	1.8770e-003	1.4540e-003
tblFleetMix	UBUS	1.8770e-003	1.4540e-003
tblFleetMix	UBUS	1.8770e-003	1.4540e-003
tblFleetMix	UBUS	1.8770e-003	1.4540e-003
tblFleetMix	UBUS	1.8770e-003	1.4540e-003
tblLandUse	LandUseSquareFeet	5,460.00	5,455.00
tblLandUse	LandUseSquareFeet	3,890.00	3,886.00
tblLandUse	LandUseSquareFeet	12,000.00	12,921.00
tblLandUse	LotAcreage	0.13	0.02
tblLandUse	LotAcreage	0.17	0.03
tblLandUse	LotAcreage	0.05	0.02
tblLandUse	LotAcreage	0.09	0.02
tblLandUse	LotAcreage	0.32	0.03
tblLandUse	Population	34.00	28.00
tblVehicleEF	HHD	0.75	0.03
tblVehicleEF	HHD	0.09	0.08

tblVehicleEF	HHD	0.09	0.00
tblVehicleEF	HHD	2.69	6.18
tblVehicleEF	HHD	0.97	0.65
tblVehicleEF	HHD	2.90	7.9880e-003
tblVehicleEF	HHD	4,950.31	1,194.39
tblVehicleEF	HHD	1,610.72	1,479.86
tblVehicleEF	HHD	9.10	0.07
tblVehicleEF	HHD	22.19	6.50
tblVehicleEF	HHD	3.79	3.84
tblVehicleEF	HHD	19.75	1.92
tblVehicleEF	HHD	0.02	9.3830e-003
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.05
tblVehicleEF	HHD	7.7000e-005	1.0000e-006
tblVehicleEF	HHD	0.02	8.9770e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8180e-003	8.8730e-003
tblVehicleEF	HHD	0.02	0.05
tblVehicleEF	HHD	7.1000e-005	1.0000e-006
tblVehicleEF	HHD	1.0500e-004	6.0000e-006
tblVehicleEF	HHD	4.2950e-003	2.3900e-004
tblVehicleEF	HHD	0.67	0.48
tblVehicleEF	HHD	7.5000e-005	4.0000e-006
tblVehicleEF	HHD	0.13	0.11
tblVehicleEF	HHD	3.6200e-004	1.2690e-003
tblVehicleEF	HHD	0.08	2.0000e-006
tblVehicleEF	HHD	0.05	0.01
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	1.3900e-004	1.0000e-006

tblVehicleEF	HHD	1.0500e-004	6.0000e-006
tblVehicleEF	HHD	4.2950e-003	2.3900e-004
tblVehicleEF	HHD	0.79	0.55
tblVehicleEF	HHD	7.5000e-005	4.0000e-006
tblVehicleEF	HHD	0.23	0.20
tblVehicleEF	HHD	3.6200e-004	1.2690e-003
tblVehicleEF	HHD	0.09	2.0000e-006
tblVehicleEF	HHD	0.71	0.03
tblVehicleEF	HHD	0.09	0.08
tblVehicleEF	HHD	0.08	0.00
tblVehicleEF	HHD	1.96	6.03
tblVehicleEF	HHD	0.97	0.65
tblVehicleEF	HHD	2.75	7.5840e-003
tblVehicleEF	HHD	5,242.63	1,192.05
tblVehicleEF	HHD	1,610.72	1,479.86
tblVehicleEF	HHD	9.10	0.07
tblVehicleEF	HHD	22.90	6.33
tblVehicleEF	HHD	3.59	3.63
tblVehicleEF	HHD	19.74	1.92
tblVehicleEF	HHD	0.01	8.7460e-003
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.05
tblVehicleEF	HHD	7.7000e-005	1.0000e-006
tblVehicleEF	HHD	0.01	8.3670e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8180e-003	8.8730e-003
tblVehicleEF	HHD	0.02	0.05
tblVehicleEF	HHD	7.1000e-005	1.0000e-006
tblVehicleEF	HHD	1.7000e-004	1.1000e-005

tblVehicleEF	HHD	4.5010e-003	2.4900e-004
tblVehicleEF	HHD	0.64	0.50
tblVehicleEF	HHD	1.1700e-004	7.0000e-006
tblVehicleEF	HHD	0.13	0.11
tblVehicleEF	HHD	3.5600e-004	1.2610e-003
tblVehicleEF	HHD	0.07	2.0000e-006
tblVehicleEF	HHD	0.05	0.01
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	1.3600e-004	1.0000e-006
tblVehicleEF	HHD	1.7000e-004	1.1000e-005
tblVehicleEF	HHD	4.5010e-003	2.4900e-004
tblVehicleEF	HHD	0.74	0.57
tblVehicleEF	HHD	1.1700e-004	7.0000e-006
tblVehicleEF	HHD	0.23	0.20
tblVehicleEF	HHD	3.5600e-004	1.2610e-003
tblVehicleEF	HHD	0.08	2.0000e-006
tblVehicleEF	HHD	0.81	0.03
tblVehicleEF	HHD	0.09	0.08
tblVehicleEF	HHD	0.09	0.00
tblVehicleEF	HHD	3.70	6.39
tblVehicleEF	HHD	0.97	0.65
tblVehicleEF	HHD	2.92	8.0430e-003
tblVehicleEF	HHD	4,546.63	1,197.61
tblVehicleEF	HHD	1,610.72	1,479.86
tblVehicleEF	HHD	9.10	0.07
tblVehicleEF	HHD	21.21	6.74
tblVehicleEF	HHD	3.74	3.79
tblVehicleEF	HHD	19.75	1.92
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	0.06	0.06

tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.02	0.05
tblVehicleEF	HHD	7.7000e-005	1.0000e-006
tblVehicleEF	HHD	0.02	9.8200e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8180e-003	8.8730e-003
tblVehicleEF	HHD	0.02	0.05
tblVehicleEF	HHD	7.1000e-005	1.0000e-006
tblVehicleEF	HHD	1.0000e-004	7.0000e-006
tblVehicleEF	HHD	4.6100e-003	2.7300e-004
tblVehicleEF	HHD	0.73	0.45
tblVehicleEF	HHD	7.2000e-005	4.0000e-006
tblVehicleEF	HHD	0.13	0.11
tblVehicleEF	HHD	3.9100e-004	1.3430e-003
tblVehicleEF	HHD	0.08	2.0000e-006
tblVehicleEF	HHD	0.04	0.01
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	1.3900e-004	1.0000e-006
tblVehicleEF	HHD	1.0000e-004	7.0000e-006
tblVehicleEF	HHD	4.6100e-003	2.7300e-004
tblVehicleEF	HHD	0.85	0.52
tblVehicleEF	HHD	7.2000e-005	4.0000e-006
tblVehicleEF	HHD	0.23	0.20
tblVehicleEF	HHD	3.9100e-004	1.3430e-003
tblVehicleEF	HHD	0.09	2.0000e-006
tblVehicleEF	LDA	5.2110e-003	3.1430e-003
tblVehicleEF	LDA	5.8420e-003	0.05
tblVehicleEF	LDA	0.65	0.74
tblVehicleEF	LDA	1.21	2.15
tblVehicleEF	LDA	275.32	274.11

tblVehicleEF	LDA	58.96	54.77
tblVehicleEF	LDA	0.05	0.04
tblVehicleEF	LDA	0.08	0.19
tblVehicleEF	LDA	2.0440e-003	1.7840e-003
tblVehicleEF	LDA	2.2900e-003	1.9370e-003
tblVehicleEF	LDA	1.8840e-003	1.6430e-003
tblVehicleEF	LDA	2.1060e-003	1.7810e-003
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.11	0.10
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.04	0.22
tblVehicleEF	LDA	0.08	0.24
tblVehicleEF	LDA	2.7580e-003	2.7120e-003
tblVehicleEF	LDA	6.1000e-004	5.4200e-004
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.11	0.10
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	0.22
tblVehicleEF	LDA	0.09	0.26
tblVehicleEF	LDA	5.5820e-003	3.3870e-003
tblVehicleEF	LDA	5.1760e-003	0.05
tblVehicleEF	LDA	0.73	0.83
tblVehicleEF	LDA	1.04	1.84
tblVehicleEF	LDA	290.06	288.26
tblVehicleEF	LDA	58.96	54.19
tblVehicleEF	LDA	0.05	0.04
tblVehicleEF	LDA	0.07	0.18
tblVehicleEF	LDA	2.0440e-003	1.7840e-003

tblVehicleEF	LDA	2.2900e-003	1.9370e-003
tblVehicleEF	LDA	1.8840e-003	1.6430e-003
tblVehicleEF	LDA	2.1060e-003	1.7810e-003
tblVehicleEF	LDA	0.07	0.09
tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.06	0.08
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.04	0.21
tblVehicleEF	LDA	0.07	0.21
tblVehicleEF	LDA	2.9060e-003	2.8520e-003
tblVehicleEF	LDA	6.0700e-004	5.3600e-004
tblVehicleEF	LDA	0.07	0.09
tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.06	0.08
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.04	0.21
tblVehicleEF	LDA	0.08	0.23
tblVehicleEF	LDA	5.0990e-003	3.0730e-003
tblVehicleEF	LDA	5.9770e-003	0.05
tblVehicleEF	LDA	0.63	0.71
tblVehicleEF	LDA	1.25	2.21
tblVehicleEF	LDA	270.53	269.50
tblVehicleEF	LDA	58.96	54.89
tblVehicleEF	LDA	0.05	0.04
tblVehicleEF	LDA	0.08	0.20
tblVehicleEF	LDA	2.0440e-003	1.7840e-003
tblVehicleEF	LDA	2.2900e-003	1.9370e-003
tblVehicleEF	LDA	1.8840e-003	1.6430e-003
tblVehicleEF	LDA	2.1060e-003	1.7810e-003
tblVehicleEF	LDA	0.04	0.06

tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.05	0.25
tblVehicleEF	LDA	0.08	0.25
tblVehicleEF	LDA	2.7100e-003	2.6660e-003
tblVehicleEF	LDA	6.1100e-004	5.4300e-004
tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.04	0.05
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.05	0.25
tblVehicleEF	LDA	0.09	0.27
tblVehicleEF	LDT1	0.01	8.2650e-003
tblVehicleEF	LDT1	0.02	0.08
tblVehicleEF	LDT1	1.65	1.56
tblVehicleEF	LDT1	3.08	2.36
tblVehicleEF	LDT1	339.89	323.15
tblVehicleEF	LDT1	71.61	65.44
tblVehicleEF	LDT1	0.16	0.13
tblVehicleEF	LDT1	0.18	0.28
tblVehicleEF	LDT1	3.3000e-003	2.7340e-003
tblVehicleEF	LDT1	3.5610e-003	2.8290e-003
tblVehicleEF	LDT1	3.0390e-003	2.5160e-003
tblVehicleEF	LDT1	3.2750e-003	2.6010e-003
tblVehicleEF	LDT1	0.14	0.15
tblVehicleEF	LDT1	0.29	0.22
tblVehicleEF	LDT1	0.11	0.12
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	0.18	0.76

tblVehicleEF	LDT1	0.21	0.40
tblVehicleEF	LDT1	3.4200e-003	3.1980e-003
tblVehicleEF	LDT1	7.7000e-004	6.4800e-004
tblVehicleEF	LDT1	0.14	0.15
tblVehicleEF	LDT1	0.29	0.22
tblVehicleEF	LDT1	0.11	0.12
tblVehicleEF	LDT1	0.05	0.05
tblVehicleEF	LDT1	0.18	0.76
tblVehicleEF	LDT1	0.24	0.44
tblVehicleEF	LDT1	0.02	8.8400e-003
tblVehicleEF	LDT1	0.01	0.07
tblVehicleEF	LDT1	1.81	1.73
tblVehicleEF	LDT1	2.63	2.02
tblVehicleEF	LDT1	356.82	337.51
tblVehicleEF	LDT1	71.61	64.74
tblVehicleEF	LDT1	0.14	0.12
tblVehicleEF	LDT1	0.17	0.26
tblVehicleEF	LDT1	3.3000e-003	2.7340e-003
tblVehicleEF	LDT1	3.5610e-003	2.8290e-003
tblVehicleEF	LDT1	3.0390e-003	2.5160e-003
tblVehicleEF	LDT1	3.2750e-003	2.6010e-003
tblVehicleEF	LDT1	0.24	0.24
tblVehicleEF	LDT1	0.31	0.24
tblVehicleEF	LDT1	0.17	0.18
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	0.17	0.71
tblVehicleEF	LDT1	0.19	0.35
tblVehicleEF	LDT1	3.5920e-003	3.3400e-003
tblVehicleEF	LDT1	7.6200e-004	6.4100e-004
tblVehicleEF	LDT1	0.24	0.24

tblVehicleEF	LDT1	0.31	0.24
tblVehicleEF	LDT1	0.17	0.18
tblVehicleEF	LDT1	0.06	0.06
tblVehicleEF	LDT1	0.17	0.71
tblVehicleEF	LDT1	0.21	0.39
tblVehicleEF	LDT1	0.01	8.0950e-003
tblVehicleEF	LDT1	0.02	0.08
tblVehicleEF	LDT1	1.59	1.51
tblVehicleEF	LDT1	3.17	2.44
tblVehicleEF	LDT1	334.24	318.34
tblVehicleEF	LDT1	71.61	65.58
tblVehicleEF	LDT1	0.15	0.13
tblVehicleEF	LDT1	0.18	0.29
tblVehicleEF	LDT1	3.3000e-003	2.7340e-003
tblVehicleEF	LDT1	3.5610e-003	2.8290e-003
tblVehicleEF	LDT1	3.0390e-003	2.5160e-003
tblVehicleEF	LDT1	3.2750e-003	2.6010e-003
tblVehicleEF	LDT1	0.14	0.15
tblVehicleEF	LDT1	0.33	0.25
tblVehicleEF	LDT1	0.11	0.11
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	0.21	0.90
tblVehicleEF	LDT1	0.22	0.41
tblVehicleEF	LDT1	3.3630e-003	3.1500e-003
tblVehicleEF	LDT1	7.7200e-004	6.4900e-004
tblVehicleEF	LDT1	0.14	0.15
tblVehicleEF	LDT1	0.33	0.25
tblVehicleEF	LDT1	0.11	0.11
tblVehicleEF	LDT1	0.05	0.05
tblVehicleEF	LDT1	0.21	0.90

tblVehicleEF	LDT1	0.24	0.45
tblVehicleEF	LDT2	7.0440e-003	5.0890e-003
tblVehicleEF	LDT2	7.1880e-003	0.07
tblVehicleEF	LDT2	0.84	1.06
tblVehicleEF	LDT2	1.49	2.74
tblVehicleEF	LDT2	382.63	349.24
tblVehicleEF	LDT2	81.02	71.19
tblVehicleEF	LDT2	0.08	0.09
tblVehicleEF	LDT2	0.12	0.31
tblVehicleEF	LDT2	1.9920e-003	1.8560e-003
tblVehicleEF	LDT2	2.3200e-003	1.9490e-003
tblVehicleEF	LDT2	1.8320e-003	1.7080e-003
tblVehicleEF	LDT2	2.1330e-003	1.7920e-003
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.11	0.13
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.06	0.42
tblVehicleEF	LDT2	0.10	0.34
tblVehicleEF	LDT2	3.8330e-003	3.4550e-003
tblVehicleEF	LDT2	8.3500e-004	7.0500e-004
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.11	0.13
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.03	0.03
tblVehicleEF	LDT2	0.06	0.42
tblVehicleEF	LDT2	0.11	0.37
tblVehicleEF	LDT2	7.5350e-003	5.4660e-003
tblVehicleEF	LDT2	6.3730e-003	0.06
tblVehicleEF	LDT2	0.94	1.18

tblVehicleEF	LDT2	1.28	2.34
tblVehicleEF	LDT2	402.38	363.41
tblVehicleEF	LDT2	81.02	70.44
tblVehicleEF	LDT2	0.07	0.08
tblVehicleEF	LDT2	0.11	0.29
tblVehicleEF	LDT2	1.9920e-003	1.8560e-003
tblVehicleEF	LDT2	2.3200e-003	1.9490e-003
tblVehicleEF	LDT2	1.8320e-003	1.7080e-003
tblVehicleEF	LDT2	2.1330e-003	1.7920e-003
tblVehicleEF	LDT2	0.08	0.13
tblVehicleEF	LDT2	0.12	0.14
tblVehicleEF	LDT2	0.07	0.12
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.06	0.40
tblVehicleEF	LDT2	0.09	0.30
tblVehicleEF	LDT2	4.0320e-003	3.5950e-003
tblVehicleEF	LDT2	8.3200e-004	6.9700e-004
tblVehicleEF	LDT2	0.08	0.13
tblVehicleEF	LDT2	0.12	0.14
tblVehicleEF	LDT2	0.07	0.12
tblVehicleEF	LDT2	0.03	0.03
tblVehicleEF	LDT2	0.06	0.40
tblVehicleEF	LDT2	0.09	0.33
tblVehicleEF	LDT2	6.8940e-003	4.9780e-003
tblVehicleEF	LDT2	7.3550e-003	0.07
tblVehicleEF	LDT2	0.81	1.02
tblVehicleEF	LDT2	1.53	2.82
tblVehicleEF	LDT2	376.06	344.49
tblVehicleEF	LDT2	81.02	71.35
tblVehicleEF	LDT2	0.08	0.09

tblVehicleEF	LDT2	0.12	0.31
tblVehicleEF	LDT2	1.9920e-003	1.8560e-003
tblVehicleEF	LDT2	2.3200e-003	1.9490e-003
tblVehicleEF	LDT2	1.8320e-003	1.7080e-003
tblVehicleEF	LDT2	2.1330e-003	1.7920e-003
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.12	0.14
tblVehicleEF	LDT2	0.05	0.07
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.07	0.49
tblVehicleEF	LDT2	0.10	0.35
tblVehicleEF	LDT2	3.7670e-003	3.4080e-003
tblVehicleEF	LDT2	8.3600e-004	7.0600e-004
tblVehicleEF	LDT2	0.05	0.08
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tblVehicleEF	LDT2	0.07	0.49
tblVehicleEF	LDT2	0.11	0.38
tblVehicleEF	LHD1	5.8640e-003	5.6690e-003
tblVehicleEF	LHD1	0.01	6.0180e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.15	0.19
tblVehicleEF	LHD1	0.91	0.71
tblVehicleEF	LHD1	2.81	1.13
tblVehicleEF	LHD1	9.00	9.05
tblVehicleEF	LHD1	610.88	671.68
tblVehicleEF	LHD1	33.50	12.37
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	1.31	0.90

tblVehicleEF	LHD1	1.05	0.35
tblVehicleEF	LHD1	8.5300e-004	7.7100e-004
tblVehicleEF	LHD1	0.01	9.6790e-003
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tblVehicleEF	LHD1	1.0090e-003	2.8100e-004
tblVehicleEF	LHD1	8.1600e-004	7.3700e-004
tblVehicleEF	LHD1	2.5040e-003	2.4200e-003
tblVehicleEF	LHD1	0.01	7.2210e-003
tblVehicleEF	LHD1	9.2800e-004	2.5900e-004
tblVehicleEF	LHD1	3.3200e-003	2.7390e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.9270e-003	1.5950e-003
tblVehicleEF	LHD1	0.07	0.05
tblVehicleEF	LHD1	0.31	0.55
tblVehicleEF	LHD1	0.28	0.08
tblVehicleEF	LHD1	9.0000e-005	8.8000e-005
tblVehicleEF	LHD1	6.0020e-003	6.5590e-003
tblVehicleEF	LHD1	3.8800e-004	1.2200e-004
tblVehicleEF	LHD1	3.3200e-003	2.7390e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	1.9270e-003	1.5950e-003
tblVehicleEF	LHD1	0.09	0.07
tblVehicleEF	LHD1	0.31	0.55
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tblVehicleEF	LHD1	0.01	6.1380e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.15	0.19

tblVehicleEF	LHD1	0.92	0.72
tblVehicleEF	LHD1	2.68	1.08
tblVehicleEF	LHD1	9.00	9.05
tblVehicleEF	LHD1	610.88	671.71
tblVehicleEF	LHD1	33.50	12.28
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	1.23	0.84
tblVehicleEF	LHD1	1.01	0.33
tblVehicleEF	LHD1	8.5300e-004	7.7100e-004
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tblVehicleEF	LHD1	5.1880e-003	4.2550e-003
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tblVehicleEF	LHD1	5.1880e-003	4.2550e-003
tblVehicleEF	LHD1	0.11	0.09
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	2.9140e-003	2.4000e-003

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tblVehicleEF	LHD1	0.30	0.09
tblVehicleEF	LHD1	5.8640e-003	5.6670e-003
tblVehicleEF	LHD1	0.01	5.9900e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.15	0.19
tblVehicleEF	LHD1	0.91	0.70
tblVehicleEF	LHD1	2.82	1.14
tblVehicleEF	LHD1	9.00	9.05
tblVehicleEF	LHD1	610.88	671.68
tblVehicleEF	LHD1	33.50	12.38
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	1.28	0.88
tblVehicleEF	LHD1	1.06	0.35
tblVehicleEF	LHD1	8.5300e-004	7.7100e-004
tblVehicleEF	LHD1	0.01	9.6790e-003
tblVehicleEF	LHD1	0.01	7.5770e-003
tblVehicleEF	LHD1	1.0090e-003	2.8100e-004
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tblVehicleEF	LHD1	2.5040e-003	2.4200e-003
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tblVehicleEF	LHD1	3.3910e-003	2.8160e-003
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tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.8940e-003	1.5730e-003
tblVehicleEF	LHD1	0.07	0.05
tblVehicleEF	LHD1	0.33	0.60
tblVehicleEF	LHD1	0.28	0.08

tblVehicleEF	LHD1	9.0000e-005	8.8000e-005
tblVehicleEF	LHD1	6.0020e-003	6.5590e-003
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tblVehicleEF	LHD1	3.3910e-003	2.8160e-003
tblVehicleEF	LHD1	0.12	0.09
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	1.8940e-003	1.5730e-003
tblVehicleEF	LHD1	0.09	0.07
tblVehicleEF	LHD1	0.33	0.60
tblVehicleEF	LHD1	0.31	0.09
tblVehicleEF	LHD2	4.2390e-003	4.0130e-003
tblVehicleEF	LHD2	4.8300e-003	4.2070e-003
tblVehicleEF	LHD2	9.6290e-003	0.01
tblVehicleEF	LHD2	0.13	0.15
tblVehicleEF	LHD2	0.41	0.49
tblVehicleEF	LHD2	1.43	0.76
tblVehicleEF	LHD2	13.72	13.73
tblVehicleEF	LHD2	622.17	675.94
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tblVehicleEF	LHD2	0.93	1.09
tblVehicleEF	LHD2	0.60	0.24
tblVehicleEF	LHD2	1.2010e-003	1.2470e-003
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tblVehicleEF	LHD2	4.7800e-004	1.5900e-004
tblVehicleEF	LHD2	1.1490e-003	1.1930e-003
tblVehicleEF	LHD2	2.6500e-003	2.6300e-003
tblVehicleEF	LHD2	9.6020e-003	0.01
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tblVehicleEF	LHD2	8.0500e-004	9.8900e-004
tblVehicleEF	LHD2	0.05	0.05
tblVehicleEF	LHD2	0.09	0.35
tblVehicleEF	LHD2	0.13	0.06
tblVehicleEF	LHD2	1.3400e-004	1.3200e-004
tblVehicleEF	LHD2	6.0640e-003	6.5430e-003
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tblVehicleEF	LHD2	1.3010e-003	1.6720e-003
tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	8.0500e-004	9.8900e-004
tblVehicleEF	LHD2	0.06	0.06
tblVehicleEF	LHD2	0.09	0.35
tblVehicleEF	LHD2	0.14	0.06
tblVehicleEF	LHD2	4.2390e-003	4.0220e-003
tblVehicleEF	LHD2	4.8960e-003	4.2550e-003
tblVehicleEF	LHD2	9.2930e-003	0.01
tblVehicleEF	LHD2	0.13	0.15
tblVehicleEF	LHD2	0.41	0.49
tblVehicleEF	LHD2	1.37	0.73
tblVehicleEF	LHD2	13.72	13.73
tblVehicleEF	LHD2	622.17	675.95
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tblVehicleEF	LHD2	0.10	0.10
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tblVehicleEF	LHD2	1.2010e-003	1.2470e-003

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tblVehicleEF	LHD2	1.1490e-003	1.1930e-003
tblVehicleEF	LHD2	2.6500e-003	2.6300e-003
tblVehicleEF	LHD2	9.6020e-003	0.01
tblVehicleEF	LHD2	4.3900e-004	1.4600e-004
tblVehicleEF	LHD2	2.0260e-003	2.5920e-003
tblVehicleEF	LHD2	0.04	0.06
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tblVehicleEF	LHD2	6.0640e-003	6.5430e-003
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tblVehicleEF	LHD2	0.04	0.06
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	1.2020e-003	1.4790e-003
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tblVehicleEF	LHD2	0.09	0.34
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tblVehicleEF	LHD2	4.2390e-003	4.0110e-003
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tblVehicleEF	LHD2	0.60	0.24
tblVehicleEF	LHD2	1.2010e-003	1.2470e-003
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tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	4.7800e-004	1.5900e-004
tblVehicleEF	LHD2	1.1490e-003	1.1930e-003
tblVehicleEF	LHD2	2.6500e-003	2.6300e-003
tblVehicleEF	LHD2	9.6020e-003	0.01
tblVehicleEF	LHD2	4.3900e-004	1.4600e-004
tblVehicleEF	LHD2	1.2850e-003	1.6760e-003
tblVehicleEF	LHD2	0.05	0.06
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	7.7600e-004	9.5300e-004
tblVehicleEF	LHD2	0.05	0.05
tblVehicleEF	LHD2	0.10	0.38
tblVehicleEF	LHD2	0.13	0.06
tblVehicleEF	LHD2	1.3400e-004	1.3200e-004
tblVehicleEF	LHD2	6.0640e-003	6.5430e-003
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tblVehicleEF	LHD2	1.2850e-003	1.6760e-003
tblVehicleEF	LHD2	0.05	0.06
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	7.7600e-004	9.5300e-004
tblVehicleEF	LHD2	0.06	0.06
tblVehicleEF	LHD2	0.10	0.38

tblVehicleEF	LHD2	0.14	0.06
tblVehicleEF	MCY	0.50	0.37
tblVehicleEF	MCY	0.15	0.24
tblVehicleEF	MCY	19.08	19.33
tblVehicleEF	MCY	9.63	8.50
tblVehicleEF	MCY	182.36	218.96
tblVehicleEF	MCY	45.23	60.14
tblVehicleEF	MCY	1.13	1.13
tblVehicleEF	MCY	0.31	0.26
tblVehicleEF	MCY	2.2250e-003	2.2170e-003
tblVehicleEF	MCY	3.8410e-003	3.2540e-003
tblVehicleEF	MCY	2.0810e-003	2.0730e-003
tblVehicleEF	MCY	3.6200e-003	3.0670e-003
tblVehicleEF	MCY	1.18	1.20
tblVehicleEF	MCY	0.69	0.71
tblVehicleEF	MCY	0.70	0.72
tblVehicleEF	MCY	2.49	2.50
tblVehicleEF	MCY	0.63	2.04
tblVehicleEF	MCY	2.06	1.83
tblVehicleEF	MCY	2.2100e-003	2.1670e-003
tblVehicleEF	MCY	6.7000e-004	5.9500e-004
tblVehicleEF	MCY	1.18	1.20
tblVehicleEF	MCY	0.69	0.71
tblVehicleEF	MCY	0.70	0.72
tblVehicleEF	MCY	3.08	3.10
tblVehicleEF	MCY	0.63	2.04
tblVehicleEF	MCY	2.24	1.99
tblVehicleEF	MCY	0.49	0.36
tblVehicleEF	MCY	0.14	0.21
tblVehicleEF	MCY	18.59	18.81

tblVehicleEF	MCY	8.86	7.79
tblVehicleEF	MCY	182.36	217.93
tblVehicleEF	MCY	45.23	58.33
tblVehicleEF	MCY	0.99	0.99
tblVehicleEF	MCY	0.29	0.25
tblVehicleEF	MCY	2.2250e-003	2.2170e-003
tblVehicleEF	MCY	3.8410e-003	3.2540e-003
tblVehicleEF	MCY	2.0810e-003	2.0730e-003
tblVehicleEF	MCY	3.6200e-003	3.0670e-003
tblVehicleEF	MCY	1.98	2.00
tblVehicleEF	MCY	0.80	0.83
tblVehicleEF	MCY	1.25	1.26
tblVehicleEF	MCY	2.43	2.44
tblVehicleEF	MCY	0.59	1.93
tblVehicleEF	MCY	1.84	1.62
tblVehicleEF	MCY	2.2010e-003	2.1570e-003
tblVehicleEF	MCY	6.5100e-004	5.7700e-004
tblVehicleEF	MCY	1.98	2.00
tblVehicleEF	MCY	0.80	0.83
tblVehicleEF	MCY	1.25	1.26
tblVehicleEF	MCY	3.02	3.03
tblVehicleEF	MCY	0.59	1.93
tblVehicleEF	MCY	2.00	1.76
tblVehicleEF	MCY	0.51	0.37
tblVehicleEF	MCY	0.15	0.24
tblVehicleEF	MCY	19.10	19.35
tblVehicleEF	MCY	9.72	8.59
tblVehicleEF	MCY	182.36	219.02
tblVehicleEF	MCY	45.23	60.39
tblVehicleEF	MCY	1.10	1.10

tblVehicleEF	MCY	0.31	0.27
tblVehicleEF	MCY	2.2250e-003	2.2170e-003
tblVehicleEF	MCY	3.8410e-003	3.2540e-003
tblVehicleEF	MCY	2.0810e-003	2.0730e-003
tblVehicleEF	MCY	3.6200e-003	3.0670e-003
tblVehicleEF	MCY	1.26	1.28
tblVehicleEF	MCY	0.89	0.91
tblVehicleEF	MCY	0.67	0.69
tblVehicleEF	MCY	2.49	2.51
tblVehicleEF	MCY	0.72	2.33
tblVehicleEF	MCY	2.10	1.86
tblVehicleEF	MCY	2.2110e-003	2.1670e-003
tblVehicleEF	MCY	6.7300e-004	5.9800e-004
tblVehicleEF	MCY	1.26	1.28
tblVehicleEF	MCY	0.89	0.91
tblVehicleEF	MCY	0.67	0.69
tblVehicleEF	MCY	3.09	3.11
tblVehicleEF	MCY	0.72	2.33
tblVehicleEF	MCY	2.28	2.02
tblVehicleEF	MDV	0.01	7.0560e-003
tblVehicleEF	MDV	0.02	0.09
tblVehicleEF	MDV	1.48	1.33
tblVehicleEF	MDV	2.84	3.27
tblVehicleEF	MDV	515.44	429.05
tblVehicleEF	MDV	107.59	87.05
tblVehicleEF	MDV	0.16	0.13
tblVehicleEF	MDV	0.26	0.38
tblVehicleEF	MDV	2.1880e-003	2.0180e-003
tblVehicleEF	MDV	2.5060e-003	2.1340e-003
tblVehicleEF	MDV	2.0180e-003	1.8610e-003

tblVehicleEF	MDV	2.3060e-003	1.9640e-003
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.17	0.15
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.04	0.03
tblVehicleEF	MDV	0.10	0.45
tblVehicleEF	MDV	0.22	0.44
tblVehicleEF	MDV	5.1660e-003	4.2420e-003
tblVehicleEF	MDV	1.1260e-003	8.6100e-004
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.17	0.15
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.05	0.05
tblVehicleEF	MDV	0.10	0.45
tblVehicleEF	MDV	0.24	0.48
tblVehicleEF	MDV	0.01	7.5220e-003
tblVehicleEF	MDV	0.01	0.08
tblVehicleEF	MDV	1.63	1.46
tblVehicleEF	MDV	2.45	2.79
tblVehicleEF	MDV	541.84	444.43
tblVehicleEF	MDV	107.59	86.14
tblVehicleEF	MDV	0.14	0.11
tblVehicleEF	MDV	0.24	0.36
tblVehicleEF	MDV	2.1880e-003	2.0180e-003
tblVehicleEF	MDV	2.5060e-003	2.1340e-003
tblVehicleEF	MDV	2.0180e-003	1.8610e-003
tblVehicleEF	MDV	2.3060e-003	1.9640e-003
tblVehicleEF	MDV	0.13	0.16
tblVehicleEF	MDV	0.18	0.16
tblVehicleEF	MDV	0.11	0.14

tblVehicleEF	MDV	0.04	0.03
tblVehicleEF	MDV	0.09	0.43
tblVehicleEF	MDV	0.19	0.39
tblVehicleEF	MDV	5.4320e-003	4.3940e-003
tblVehicleEF	MDV	1.1190e-003	8.5200e-004
tblVehicleEF	MDV	0.13	0.16
tblVehicleEF	MDV	0.18	0.16
tblVehicleEF	MDV	0.11	0.14
tblVehicleEF	MDV	0.06	0.05
tblVehicleEF	MDV	0.09	0.43
tblVehicleEF	MDV	0.21	0.43
tblVehicleEF	MDV	0.01	6.9160e-003
tblVehicleEF	MDV	0.02	0.09
tblVehicleEF	MDV	1.43	1.28
tblVehicleEF	MDV	2.92	3.36
tblVehicleEF	MDV	506.79	424.01
tblVehicleEF	MDV	107.59	87.24
tblVehicleEF	MDV	0.16	0.12
tblVehicleEF	MDV	0.26	0.39
tblVehicleEF	MDV	2.1880e-003	2.0180e-003
tblVehicleEF	MDV	2.5060e-003	2.1340e-003
tblVehicleEF	MDV	2.0180e-003	1.8610e-003
tblVehicleEF	MDV	2.3060e-003	1.9640e-003
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.18	0.16
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.04	0.03
tblVehicleEF	MDV	0.11	0.53
tblVehicleEF	MDV	0.23	0.45
tblVehicleEF	MDV	5.0790e-003	4.1920e-003

tblVehicleEF	MDV	1.1270e-003	8.6300e-004
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.18	0.16
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.05	0.04
tblVehicleEF	MDV	0.11	0.53
tblVehicleEF	MDV	0.25	0.49
tblVehicleEF	MH	0.03	0.01
tblVehicleEF	MH	0.03	0.02
tblVehicleEF	MH	2.61	1.40
tblVehicleEF	MH	6.11	2.17
tblVehicleEF	MH	1,106.44	1,502.39
tblVehicleEF	MH	59.52	19.28
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tblVehicleEF	MH	0.84	0.24
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.1510e-003	2.7900e-004
tblVehicleEF	MH	3.2170e-003	3.2630e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.0590e-003	2.5600e-004
tblVehicleEF	MH	1.15	0.99
tblVehicleEF	MH	0.08	0.06
tblVehicleEF	MH	0.46	0.39
tblVehicleEF	MH	0.10	0.06
tblVehicleEF	MH	0.02	1.51
tblVehicleEF	MH	0.35	0.10
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	7.0200e-004	1.9100e-004
tblVehicleEF	MH	1.15	0.99

tblVehicleEF	MH	0.08	0.06
tblVehicleEF	MH	0.46	0.39
tblVehicleEF	MH	0.14	0.09
tblVehicleEF	MH	0.02	1.51
tblVehicleEF	MH	0.38	0.11
tblVehicleEF	MH	0.03	0.01
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	2.69	1.44
tblVehicleEF	MH	5.74	2.05
tblVehicleEF	MH	1,106.44	1,502.46
tblVehicleEF	MH	59.52	19.07
tblVehicleEF	MH	1.22	1.23
tblVehicleEF	MH	0.80	0.23
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.1510e-003	2.7900e-004
tblVehicleEF	MH	3.2170e-003	3.2630e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.0590e-003	2.5600e-004
tblVehicleEF	MH	1.78	1.52
tblVehicleEF	MH	0.08	0.07
tblVehicleEF	MH	0.72	0.61
tblVehicleEF	MH	0.10	0.07
tblVehicleEF	MH	0.02	1.49
tblVehicleEF	MH	0.34	0.09
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	6.9500e-004	1.8900e-004
tblVehicleEF	MH	1.78	1.52
tblVehicleEF	MH	0.08	0.07
tblVehicleEF	MH	0.72	0.61

tblVehicleEF	MH	0.14	0.09
tblVehicleEF	MH	0.02	1.49
tblVehicleEF	MH	0.37	0.10
tblVehicleEF	MH	0.03	0.01
tblVehicleEF	MH	0.03	0.02
tblVehicleEF	MH	2.59	1.39
tblVehicleEF	MH	6.16	2.19
tblVehicleEF	MH	1,106.44	1,502.38
tblVehicleEF	MH	59.52	19.32
tblVehicleEF	MH	1.30	1.30
tblVehicleEF	MH	0.84	0.24
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.1510e-003	2.7900e-004
tblVehicleEF	MH	3.2170e-003	3.2630e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.0590e-003	2.5600e-004
tblVehicleEF	MH	1.27	1.08
tblVehicleEF	MH	0.09	0.08
tblVehicleEF	MH	0.47	0.40
tblVehicleEF	MH	0.10	0.06
tblVehicleEF	MH	0.02	1.59
tblVehicleEF	MH	0.35	0.10
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	7.0300e-004	1.9100e-004
tblVehicleEF	MH	1.27	1.08
tblVehicleEF	MH	0.09	0.08
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tblVehicleEF	MH	0.14	0.09
tblVehicleEF	MH	0.02	1.59

tblVehicleEF	MH	0.39	0.11
tblVehicleEF	MHD	0.02	4.2430e-003
tblVehicleEF	MHD	4.8740e-003	6.7470e-003
tblVehicleEF	MHD	0.05	0.01
tblVehicleEF	MHD	0.37	0.38
tblVehicleEF	MHD	0.37	0.62
tblVehicleEF	MHD	6.44	1.34
tblVehicleEF	MHD	139.10	66.57
tblVehicleEF	MHD	1,139.95	1,077.13
tblVehicleEF	MHD	61.46	11.49
tblVehicleEF	MHD	0.55	0.55
tblVehicleEF	MHD	1.18	2.23
tblVehicleEF	MHD	10.45	1.13
tblVehicleEF	MHD	3.6300e-004	1.8180e-003
tblVehicleEF	MHD	5.7190e-003	0.06
tblVehicleEF	MHD	8.4000e-004	1.2600e-004
tblVehicleEF	MHD	3.4700e-004	1.7400e-003
tblVehicleEF	MHD	5.4680e-003	0.06
tblVehicleEF	MHD	7.7200e-004	1.1600e-004
tblVehicleEF	MHD	1.2630e-003	6.4000e-004
tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	0.03	0.02
tblVehicleEF	MHD	7.7200e-004	3.9300e-004
tblVehicleEF	MHD	0.04	0.11
tblVehicleEF	MHD	0.02	0.13
tblVehicleEF	MHD	0.40	0.06
tblVehicleEF	MHD	1.3390e-003	6.3300e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.2800e-004	1.1400e-004
tblVehicleEF	MHD	1.2630e-003	6.4000e-004

tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	7.7200e-004	3.9300e-004
tblVehicleEF	MHD	0.05	0.13
tblVehicleEF	MHD	0.02	0.13
tblVehicleEF	MHD	0.43	0.07
tblVehicleEF	MHD	0.02	4.0190e-003
tblVehicleEF	MHD	4.9460e-003	6.7970e-003
tblVehicleEF	MHD	0.05	0.01
tblVehicleEF	MHD	0.27	0.31
tblVehicleEF	MHD	0.37	0.63
tblVehicleEF	MHD	6.12	1.27
tblVehicleEF	MHD	147.32	67.79
tblVehicleEF	MHD	1,139.95	1,077.14
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tblVehicleEF	MHD	1.11	2.10
tblVehicleEF	MHD	10.41	1.12
tblVehicleEF	MHD	3.0600e-004	1.5350e-003
tblVehicleEF	MHD	5.7190e-003	0.06
tblVehicleEF	MHD	8.4000e-004	1.2600e-004
tblVehicleEF	MHD	2.9300e-004	1.4690e-003
tblVehicleEF	MHD	5.4680e-003	0.06
tblVehicleEF	MHD	7.7200e-004	1.1600e-004
tblVehicleEF	MHD	1.9740e-003	9.9200e-004
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	1.1660e-003	5.9000e-004
tblVehicleEF	MHD	0.04	0.11
tblVehicleEF	MHD	0.02	0.12

tblVehicleEF	MHD	0.38	0.06
tblVehicleEF	MHD	1.4170e-003	6.4400e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.2200e-004	1.1300e-004
tblVehicleEF	MHD	1.9740e-003	9.9200e-004
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.03	0.03
tblVehicleEF	MHD	1.1660e-003	5.9000e-004
tblVehicleEF	MHD	0.05	0.13
tblVehicleEF	MHD	0.02	0.12
tblVehicleEF	MHD	0.42	0.06
tblVehicleEF	MHD	0.02	4.5650e-003
tblVehicleEF	MHD	4.8520e-003	6.7310e-003
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tblVehicleEF	MHD	1.16	2.19
tblVehicleEF	MHD	10.46	1.13
tblVehicleEF	MHD	4.4200e-004	2.2090e-003
tblVehicleEF	MHD	5.7190e-003	0.06
tblVehicleEF	MHD	8.4000e-004	1.2600e-004
tblVehicleEF	MHD	4.2300e-004	2.1140e-003
tblVehicleEF	MHD	5.4680e-003	0.06
tblVehicleEF	MHD	7.7200e-004	1.1600e-004
tblVehicleEF	MHD	1.2610e-003	6.4600e-004

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tblVehicleEF	MHD	0.03	0.02
tblVehicleEF	MHD	7.4700e-004	3.8300e-004
tblVehicleEF	MHD	0.04	0.11
tblVehicleEF	MHD	0.02	0.14
tblVehicleEF	MHD	0.40	0.06
tblVehicleEF	MHD	1.2320e-003	6.1600e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.2900e-004	1.1400e-004
tblVehicleEF	MHD	1.2610e-003	6.4600e-004
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	0.04	0.03
tblVehicleEF	MHD	7.4700e-004	3.8300e-004
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tblVehicleEF	OBUS	8.7600e-003	9.7060e-003
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tblVehicleEF	OBUS	0.28	0.58
tblVehicleEF	OBUS	0.59	1.02
tblVehicleEF	OBUS	5.80	2.47
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tblVehicleEF	OBUS	1,241.90	1,424.87
tblVehicleEF	OBUS	68.87	19.84
tblVehicleEF	OBUS	0.52	0.58
tblVehicleEF	OBUS	1.61	2.00
tblVehicleEF	OBUS	2.46	0.65
tblVehicleEF	OBUS	1.8000e-004	2.2610e-003
tblVehicleEF	OBUS	8.1890e-003	0.04

tblVehicleEF	OBUS	8.1000e-004	1.9700e-004
tblVehicleEF	OBUS	1.7300e-004	2.1630e-003
tblVehicleEF	OBUS	7.8190e-003	0.04
tblVehicleEF	OBUS	7.4400e-004	1.8100e-004
tblVehicleEF	OBUS	1.5730e-003	1.9710e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.04	0.06
tblVehicleEF	OBUS	8.0200e-004	9.7300e-004
tblVehicleEF	OBUS	0.06	0.11
tblVehicleEF	OBUS	0.04	0.26
tblVehicleEF	OBUS	0.36	0.12
tblVehicleEF	OBUS	9.7800e-004	8.7300e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	7.9100e-004	1.9600e-004
tblVehicleEF	OBUS	1.5730e-003	1.9710e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.05	0.08
tblVehicleEF	OBUS	8.0200e-004	9.7300e-004
tblVehicleEF	OBUS	0.08	0.13
tblVehicleEF	OBUS	0.04	0.26
tblVehicleEF	OBUS	0.40	0.13
tblVehicleEF	OBUS	0.01	8.9090e-003
tblVehicleEF	OBUS	8.9130e-003	9.8460e-003
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tblVehicleEF	OBUS	106.24	92.40
tblVehicleEF	OBUS	1,241.90	1,424.90
tblVehicleEF	OBUS	68.87	19.61

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tblVehicleEF	OBUS	8.1890e-003	0.04
tblVehicleEF	OBUS	8.1000e-004	1.9700e-004
tblVehicleEF	OBUS	1.4600e-004	1.8280e-003
tblVehicleEF	OBUS	7.8190e-003	0.04
tblVehicleEF	OBUS	7.4400e-004	1.8100e-004
tblVehicleEF	OBUS	2.3950e-003	2.9680e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.04	0.06
tblVehicleEF	OBUS	1.2060e-003	1.4480e-003
tblVehicleEF	OBUS	0.06	0.11
tblVehicleEF	OBUS	0.04	0.25
tblVehicleEF	OBUS	0.35	0.11
tblVehicleEF	OBUS	1.0260e-003	8.7900e-004
tblVehicleEF	OBUS	0.01	0.01
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tblVehicleEF	OBUS	0.05	0.08
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tblVehicleEF	OBUS	0.30	0.62

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tblVehicleEF	OBUS	2.2000e-004	2.7450e-003
tblVehicleEF	OBUS	8.1890e-003	0.04
tblVehicleEF	OBUS	8.1000e-004	1.9700e-004
tblVehicleEF	OBUS	2.1000e-004	2.6260e-003
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tblVehicleEF	SBUS	3.6480e-003	1.0930e-003
tblVehicleEF	SBUS	0.03	8.9370e-003
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tblVehicleEF	SBUS	6.3100e-004	5.2000e-005
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tblVehicleEF	SBUS	8.03	2.88
tblVehicleEF	SBUS	0.81	0.72
tblVehicleEF	SBUS	7.81	0.95
tblVehicleEF	SBUS	1,073.80	343.43
tblVehicleEF	SBUS	1,098.65	1,119.94
tblVehicleEF	SBUS	52.57	5.62
tblVehicleEF	SBUS	9.61	3.32
tblVehicleEF	SBUS	4.57	5.17
tblVehicleEF	SBUS	12.63	0.76
tblVehicleEF	SBUS	0.01	5.7950e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.03

tblVehicleEF	SBUS	7.2300e-004	5.0000e-005
tblVehicleEF	SBUS	0.01	5.5450e-003
tblVehicleEF	SBUS	2.6920e-003	2.6700e-003
tblVehicleEF	SBUS	0.02	0.03
tblVehicleEF	SBUS	6.6400e-004	4.6000e-005
tblVehicleEF	SBUS	3.6250e-003	1.0870e-003
tblVehicleEF	SBUS	0.03	9.5230e-003
tblVehicleEF	SBUS	0.95	0.33
tblVehicleEF	SBUS	1.7640e-003	5.3500e-004
tblVehicleEF	SBUS	0.11	0.11
tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.41	0.04
tblVehicleEF	SBUS	0.01	3.2780e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.6100e-004	5.6000e-005
tblVehicleEF	SBUS	3.6250e-003	1.0870e-003
tblVehicleEF	SBUS	0.03	9.5230e-003
tblVehicleEF	SBUS	1.37	0.47
tblVehicleEF	SBUS	1.7640e-003	5.3500e-004
tblVehicleEF	SBUS	0.14	0.13
tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.45	0.04
tblVehicleEF	UBUS	2.51	5.87
tblVehicleEF	UBUS	0.06	0.02
tblVehicleEF	UBUS	11.01	39.42
tblVehicleEF	UBUS	10.46	0.95
tblVehicleEF	UBUS	1,940.83	1,945.19
tblVehicleEF	UBUS	106.77	11.70
tblVehicleEF	UBUS	9.09	1.22
tblVehicleEF	UBUS	14.93	0.12

tblVehicleEF	UBUS	0.59	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.11	3.6010e-003
tblVehicleEF	UBUS	1.1160e-003	5.3000e-005
tblVehicleEF	UBUS	0.25	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5900e-003
tblVehicleEF	UBUS	0.11	3.4410e-003
tblVehicleEF	UBUS	1.0260e-003	4.8000e-005
tblVehicleEF	UBUS	5.1810e-003	9.4000e-004
tblVehicleEF	UBUS	0.08	0.01
tblVehicleEF	UBUS	2.8830e-003	7.3600e-004
tblVehicleEF	UBUS	0.80	0.09
tblVehicleEF	UBUS	0.02	0.08
tblVehicleEF	UBUS	0.79	0.06
tblVehicleEF	UBUS	9.6900e-003	2.3330e-003
tblVehicleEF	UBUS	1.2560e-003	1.1600e-004
tblVehicleEF	UBUS	5.1810e-003	9.4000e-004
tblVehicleEF	UBUS	0.08	0.01
tblVehicleEF	UBUS	2.8830e-003	7.3600e-004
tblVehicleEF	UBUS	3.40	5.99
tblVehicleEF	UBUS	0.02	0.08
tblVehicleEF	UBUS	0.87	0.07
tblVehicleEF	UBUS	2.52	5.87
tblVehicleEF	UBUS	0.05	0.01
tblVehicleEF	UBUS	11.06	39.42
tblVehicleEF	UBUS	9.07	0.83
tblVehicleEF	UBUS	1,940.83	1,945.19
tblVehicleEF	UBUS	106.77	11.50
tblVehicleEF	UBUS	8.56	1.21
tblVehicleEF	UBUS	14.87	0.11

tblVehicleEF	UBUS	0.59	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.11	3.6010e-003
tblVehicleEF	UBUS	1.1160e-003	5.3000e-005
tblVehicleEF	UBUS	0.25	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5900e-003
tblVehicleEF	UBUS	0.11	3.4410e-003
tblVehicleEF	UBUS	1.0260e-003	4.8000e-005
tblVehicleEF	UBUS	7.7250e-003	1.3860e-003
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	4.3230e-003	1.0570e-003
tblVehicleEF	UBUS	0.81	0.09
tblVehicleEF	UBUS	0.02	0.07
tblVehicleEF	UBUS	0.73	0.06
tblVehicleEF	UBUS	9.6910e-003	2.3330e-003
tblVehicleEF	UBUS	1.2320e-003	1.1400e-004
tblVehicleEF	UBUS	7.7250e-003	1.3860e-003
tblVehicleEF	UBUS	0.09	0.01
tblVehicleEF	UBUS	4.3230e-003	1.0570e-003
tblVehicleEF	UBUS	3.42	5.99
tblVehicleEF	UBUS	0.02	0.07
tblVehicleEF	UBUS	0.80	0.07
tblVehicleEF	UBUS	2.51	5.87
tblVehicleEF	UBUS	0.06	0.02
tblVehicleEF	UBUS	11.00	39.42
tblVehicleEF	UBUS	10.67	0.97
tblVehicleEF	UBUS	1,940.83	1,945.19
tblVehicleEF	UBUS	106.77	11.73
tblVehicleEF	UBUS	8.92	1.22
tblVehicleEF	UBUS	14.95	0.12

tblVehicleEF	UBUS	0.59	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.11	3.6010e-003
tblVehicleEF	UBUS	1.1160e-003	5.3000e-005
tblVehicleEF	UBUS	0.25	0.03
tblVehicleEF	UBUS	3.0000e-003	7.5900e-003
tblVehicleEF	UBUS	0.11	3.4410e-003
tblVehicleEF	UBUS	1.0260e-003	4.8000e-005
tblVehicleEF	UBUS	5.7050e-003	9.1800e-004
tblVehicleEF	UBUS	0.10	0.01
tblVehicleEF	UBUS	2.9930e-003	7.0600e-004
tblVehicleEF	UBUS	0.80	0.09
tblVehicleEF	UBUS	0.03	0.09
tblVehicleEF	UBUS	0.80	0.07
tblVehicleEF	UBUS	9.6890e-003	2.3330e-003
tblVehicleEF	UBUS	1.2600e-003	1.1600e-004
tblVehicleEF	UBUS	5.7050e-003	9.1800e-004
tblVehicleEF	UBUS	0.10	0.01
tblVehicleEF	UBUS	2.9930e-003	7.0600e-004
tblVehicleEF	UBUS	3.40	5.99
tblVehicleEF	UBUS	0.03	0.09
tblVehicleEF	UBUS	0.88	0.07
tblVehicleTrips	ST_TR	6.39	5.44
tblVehicleTrips	ST_TR	2.46	9.74
tblVehicleTrips	ST_TR	158.37	112.18
tblVehicleTrips	SU_TR	5.86	5.44
tblVehicleTrips	SU_TR	1.05	9.74
tblVehicleTrips	SU_TR	131.84	112.18
tblVehicleTrips	WD_TR	6.65	5.44
tblVehicleTrips	WD_TR	11.03	9.74

tblVehicleTrips	WD_TR	127.15	112.18
tblWoodstoves	NumberCatalytic	0.60	0.00
tblWoodstoves	NumberNoncatalytic	0.60	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

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	0.0934	1.4400e-003	0.1245	1.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	0.2030	0.2030	2.0000e-004	0.0000	0.2080
Energy	5.7400e-003	0.0518	0.0414	3.1000e-004		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	163.6148	163.6148	5.5000e-003	1.9500e-003	164.3344
Mobile	0.2340	0.3952	1.7026	4.1900e-003	0.3746	5.6600e-003	0.3802	0.1002	5.3400e-003	0.1055	0.0000	391.1232	391.1232	0.0288	0.0000	391.8423
Waste						0.0000	0.0000		0.0000	0.0000	11.5482	0.0000	11.5482	0.6825	0.0000	28.6101
Water						0.0000	0.0000		0.0000	0.0000	0.9305	16.2855	17.2160	0.0962	2.4000e-003	20.3361
Total	**0.3332**	**0.4485**	**1.8685**	**4.5100e-003**	**0.3746**	**0.0103**	**0.3849**	**0.1002**	**9.9900e-003**	**0.1102**	**12.4787**	**571.2265**	**583.7052**	**0.8132**	**4.3500e-003**	**605.3308**

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	0.0934	1.4400e-003	0.1245	1.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	0.2030	0.2030	2.0000e-004	0.0000	0.2080
Energy	5.7400e-003	0.0518	0.0414	3.1000e-004		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	163.6148	163.6148	5.5000e-003	1.9500e-003	164.3344
Mobile	0.2340	0.3952	1.7026	4.1900e-003	0.3746	5.6600e-003	0.3802	0.1002	5.3400e-003	0.1055	0.0000	391.1232	391.1232	0.0288	0.0000	391.8423
Waste						0.0000	0.0000		0.0000	0.0000	2.8870	0.0000	2.8870	0.1706	0.0000	7.1525
Water						0.0000	0.0000		0.0000	0.0000	0.9305	16.2855	17.2160	0.0962	2.4000e-003	20.3361
Total	**0.3332**	**0.4485**	**1.8685**	**4.5100e-003**	**0.3746**	**0.0103**	**0.3849**	**0.1002**	**9.9900e-003**	**0.1102**	**3.8176**	**571.2265**	**575.0441**	**0.3013**	**4.3500e-003**	**583.8733**

	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**	**69.41**	**0.00**	**1.48**	**62.95**	**0.00**	**3.54**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	0.2340	0.3952	1.7026	4.1900e-003	0.3746	5.6600e-003	0.3802	0.1002	5.3400e-003	0.1055	0.0000	391.1232	391.1232	0.0288	0.0000	391.8423
Unmitigated	0.2340	0.3952	1.7026	4.1900e-003	0.3746	5.6600e-003	0.3802	0.1002	5.3400e-003	0.1055	0.0000	391.1232	391.1232	0.0288	0.0000	391.8423

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	65.28	65.28	65.28	223,072	223,072
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	53.18	53.18	53.18	171,319	171,319
High Turnover (Sit Down Restaurant)	436.38	436.38	436.38	594,712	594,712
Parking Lot	0.00	0.00	0.00		
Total	554.84	554.84	554.84	989,103	989,103

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 Mid Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
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 Mid Rise	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975
Enclosed Parking with Elevator	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975
General Office Building	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975
High Turnover (Sit Down Restaurant)	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975
Parking Lot	0.551227	0.057467	0.182210	0.123097	0.023484	0.006031	0.019468	0.028359	0.001225	0.001454	0.004339	0.000663	0.000975

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	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	106.8291	106.8291	4.4100e-003	9.1000e-004	107.2113
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	106.8291	106.8291	4.4100e-003	9.1000e-004	107.2113
NaturalGas Mitigated	5.7400e-003	0.0518	0.0414	3.1000e-004		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	56.7857	56.7857	1.0900e-003	1.0400e-003	57.1231
NaturalGas Unmitigated	5.7400e-003	0.0518	0.0414	3.1000e-004		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	56.7857	56.7857	1.0900e-003	1.0400e-003	57.1231

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 Mid Rise	110603	6.0000e-004	5.1000e-003	2.1700e-003	3.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	5.9022	5.9022	1.1000e-004	1.1000e-004	5.9373
Enclosed Parking with Elevator	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
General Office Building	56786.6	3.1000e-004	2.7800e-003	2.3400e-003	2.0000e-005		2.1000e-004	2.1000e-004		2.1000e-004	2.1000e-004	0.0000	3.0304	3.0304	6.0000e-005	6.0000e-005	3.0484
High Turnover (Sit Down Restaurant)	896733	4.8400e-003	0.0440	0.0369	2.6000e-004		3.3400e-003	3.3400e-003		3.3400e-003	3.3400e-003	0.0000	47.8531	47.8531	9.2000e-004	8.8000e-004	48.1375
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		**5.7500e-003**	**0.0518**	**0.0414**	**3.1000e-004**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**56.7857**	**56.7857**	**1.0900e-003**	**1.0500e-003**	**57.1231**

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 Mid Rise	110603	6.0000e-004	5.1000e-003	2.1700e-003	3.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	5.9022	5.9022	1.1000e-004	1.1000e-004	5.9373
Enclosed Parking with Elevator	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
General Office Building	56786.6	3.1000e-004	2.7800e-003	2.3400e-003	2.0000e-005		2.1000e-004	2.1000e-004		2.1000e-004	2.1000e-004	0.0000	3.0304	3.0304	6.0000e-005	6.0000e-005	3.0484
High Turnover (Sit Down Restaurant)	896733	4.8400e-003	0.0440	0.0369	2.6000e-004		3.3400e-003	3.3400e-003		3.3400e-003	3.3400e-003	0.0000	47.8531	47.8531	9.2000e-004	8.8000e-004	48.1375
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		**5.7500e-003**	**0.0518**	**0.0414**	**3.1000e-004**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**56.7857**	**56.7857**	**1.0900e-003**	**1.0500e-003**	**57.1231**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	47521	15.1412	6.3000e-004	1.3000e-004	15.1954
Enclosed Parking with Elevator	44536	14.1901	5.9000e-004	1.2000e-004	14.2409
General Office Building	70860.4	22.5777	9.3000e-004	1.9000e-004	22.6584
High Turnover (Sit Down Restaurant)	171528	54.6525	2.2600e-003	4.7000e-004	54.8480
Parking Lot	840	0.2676	1.0000e-005	0.0000	0.2686
Total		**106.8291**	**4.4200e-003**	**9.1000e-004**	**107.2113**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	47521	15.1412	6.3000e-004	1.3000e-004	15.1954
Enclosed Parking with Elevator	44536	14.1901	5.9000e-004	1.2000e-004	14.2409
General Office Building	70860.4	22.5777	9.3000e-004	1.9000e-004	22.6584
High Turnover (Sit Down Restaurant)	171528	54.6525	2.2600e-003	4.7000e-004	54.8480
Parking Lot	840	0.2676	1.0000e-005	0.0000	0.2686
Total		**106.8291**	**4.4200e-003**	**9.1000e-004**	**107.2113**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	0.0934	1.4400e-003	0.1245	1.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	0.2030	0.2030	2.0000e-004	0.0000	0.2080
Unmitigated	0.0934	1.4400e-003	0.1245	1.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	0.2030	0.2030	2.0000e-004	0.0000	0.2080

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	8.5100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0811					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	3.8000e-003	1.4400e-003	0.1245	1.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	0.2030	0.2030	2.0000e-004	0.0000	0.2080
Total	**0.0934**	**1.4400e-003**	**0.1245**	**1.0000e-005**		**6.9000e-004**	**6.9000e-004**		**6.9000e-004**	**6.9000e-004**	**0.0000**	**0.2030**	**0.2030**	**2.0000e-004**	**0.0000**	**0.2080**

<u>**Mitigated**</u>

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
	tons/yr										MT/yr					
Architectural Coating	8.5100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0811					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	3.8000e-003	1.4400e-003	0.1245	1.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	0.2030	0.2030	2.0000e-004	0.0000	0.2080
Total	**0.0934**	**1.4400e-003**	**0.1245**	**1.0000e-005**		**6.9000e-004**	**6.9000e-004**		**6.9000e-004**	**6.9000e-004**	**0.0000**	**0.2030**	**0.2030**	**2.0000e-004**	**0.0000**	**0.2080**

7.0 Water Detail

7.1 Mitigation Measures Water

Category	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	17.2160	0.0962	2.4000e-003	20.3361
Unmitigated	17.2160	0.0962	2.4000e-003	20.3361

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	0.781848 / 0.492904	5.2366	0.0257	6.4000e-004	6.0706
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	0.970426 / 0.594777	6.4394	0.0319	8.0000e-004	7.4744
High Turnover (Sit Down Restaurant)	1.18075 / 0.0753668	5.5400	0.0387	9.5000e-004	6.7911
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**17.2160**	**0.0962**	**2.3900e-003**	**20.3361**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	0.781848 / 0.492904	5.2366	0.0257	6.4000e-004	6.0706
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	0.970426 / 0.594777	6.4394	0.0319	8.0000e-004	7.4744
High Turnover (Sit Down Restaurant)	1.18075 / 0.0753668	5.5400	0.0387	9.5000e-004	6.7911
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**17.2160**	**0.0962**	**2.3900e-003**	**20.3361**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	2.8870	0.1706	0.0000	7.1525
Unmitigated	11.5482	0.6825	0.0000	28.6101

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	5.52	1.1205	0.0662	0.0000	2.7760
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	5.08	1.0312	0.0609	0.0000	2.5547
High Turnover (Sit Down Restaurant)	46.29	9.3965	0.5553	0.0000	23.2793
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**11.5482**	**0.6825**	**0.0000**	**28.6101**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	1.38	0.2801	0.0166	0.0000	0.6940
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	1.27	0.2578	0.0152	0.0000	0.6387
High Turnover (Sit Down Restaurant)	11.5725	2.3491	0.1388	0.0000	5.8198
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**2.8870**	**0.1706**	**0.0000**	**7.1525**

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

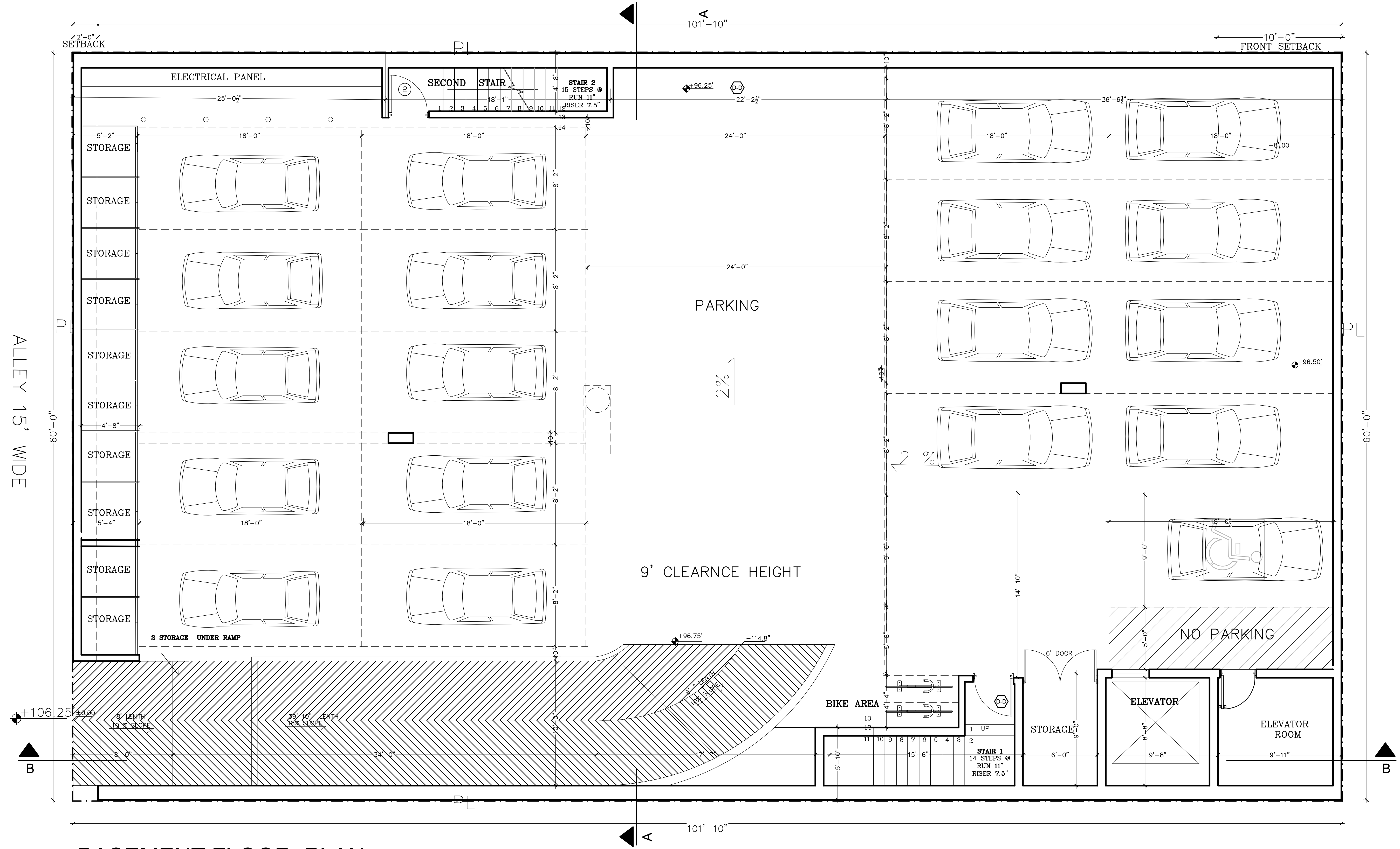
User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Exhibit D
Project Architectural Plans

ESA

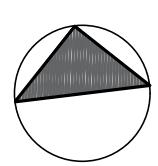


BASEMENT FLOOR PLAN

SCALE BAR1/8 FT

SCALE: 1/8"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232



ALT 2
20% RAMP SLOPE

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

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PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

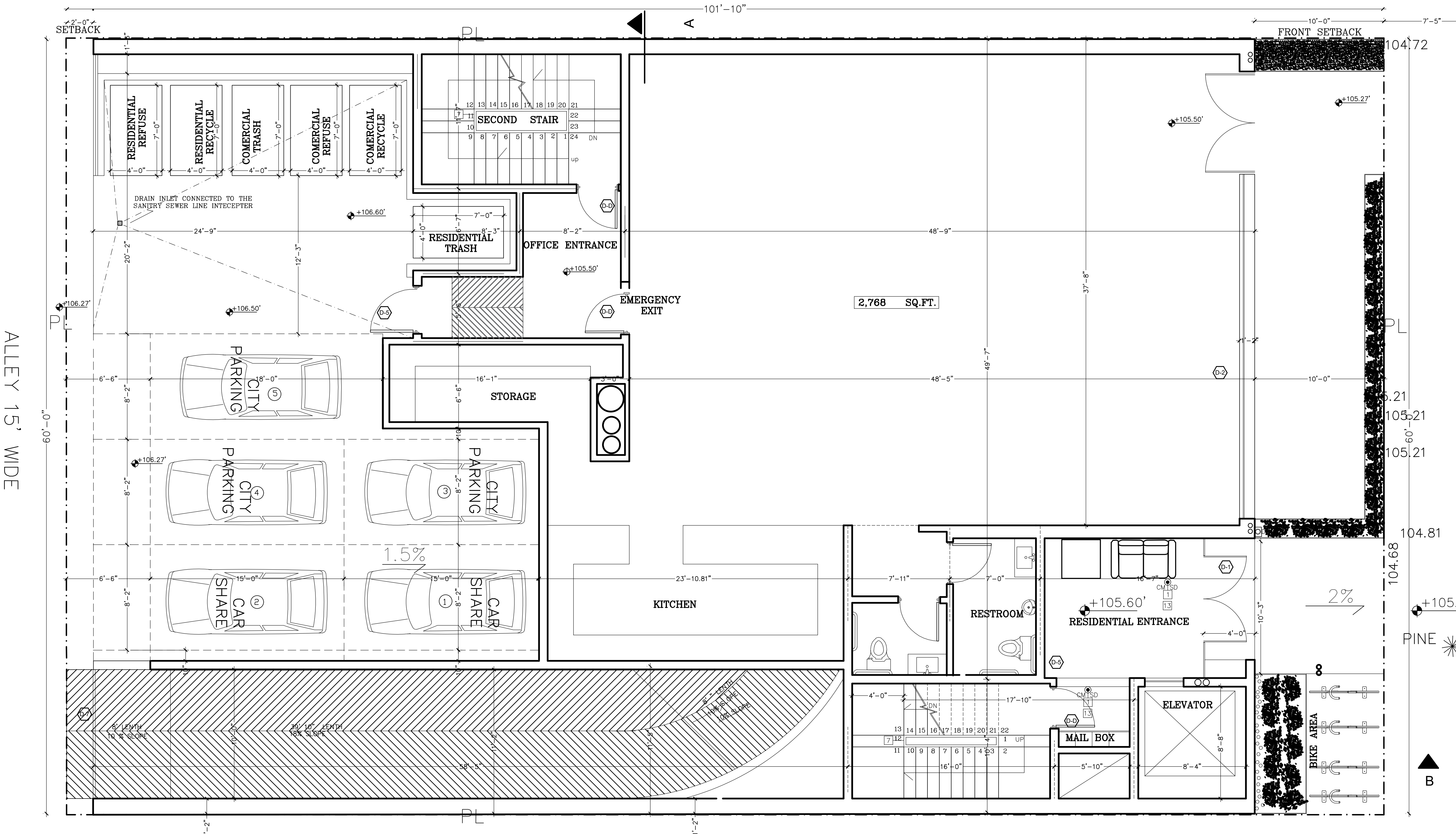
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: BASEMENT FLOOR

SHEET NUMBER: A 2

08/08/2019



FIRST FLOOR PLAN

SCALE: 1/8"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232

NORTH

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

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CLIENT:

DATE: 04/27/2016

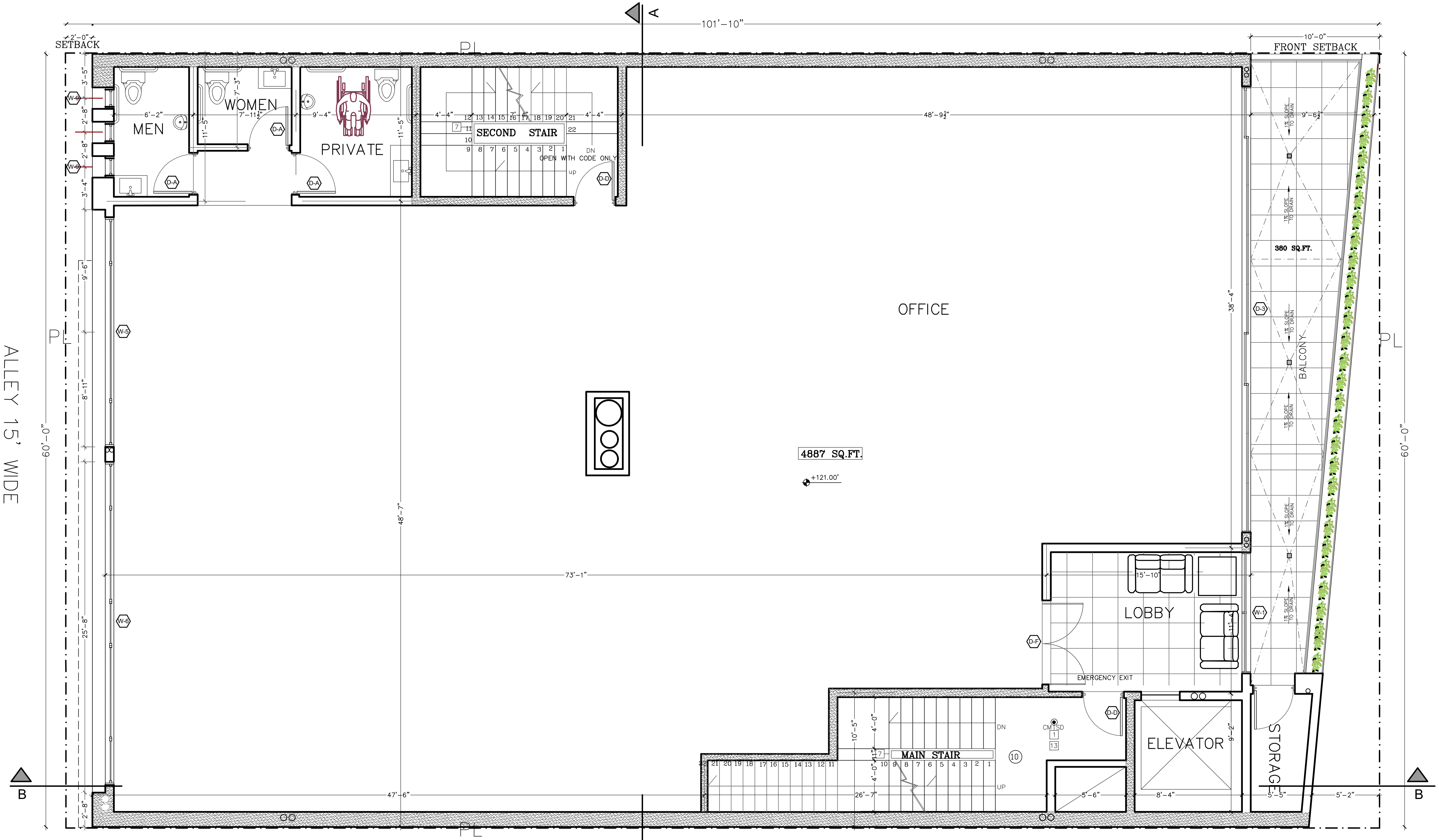
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: FIRST FLOOR

SHEET NUMBER: A3

~~08/13/2019~~

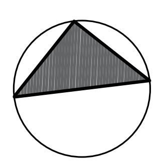


SECOND FLOOR PLAN

SCALE BAR1/8 FT

SCALE: 1/8"=1'-0"

4887 SQ.FT.



NORTH

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

PLAN KEY NOTES:

DENOTES ONE-HR FIRE PROTECTION WALL AND CEILLING (5/8" TYPE "X" GYP. BOARD ON THE SIDE OF GARAGE OR UNDER THE STAIR)

RECESSED HALOGEN DOWNLIGHT

DOOR MUST OPEN OVER A LANDING NOT MORE THAN 1.5" BELOW THE THRESHOLD. EXCEPTION : THE DOOR DOES NOT SWING OVER THE LANDING SHALL BE NOT THAN MORE 7.75" BELOW THE THRESHOLD.

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CLIENT:

DATE: 04/27/2016

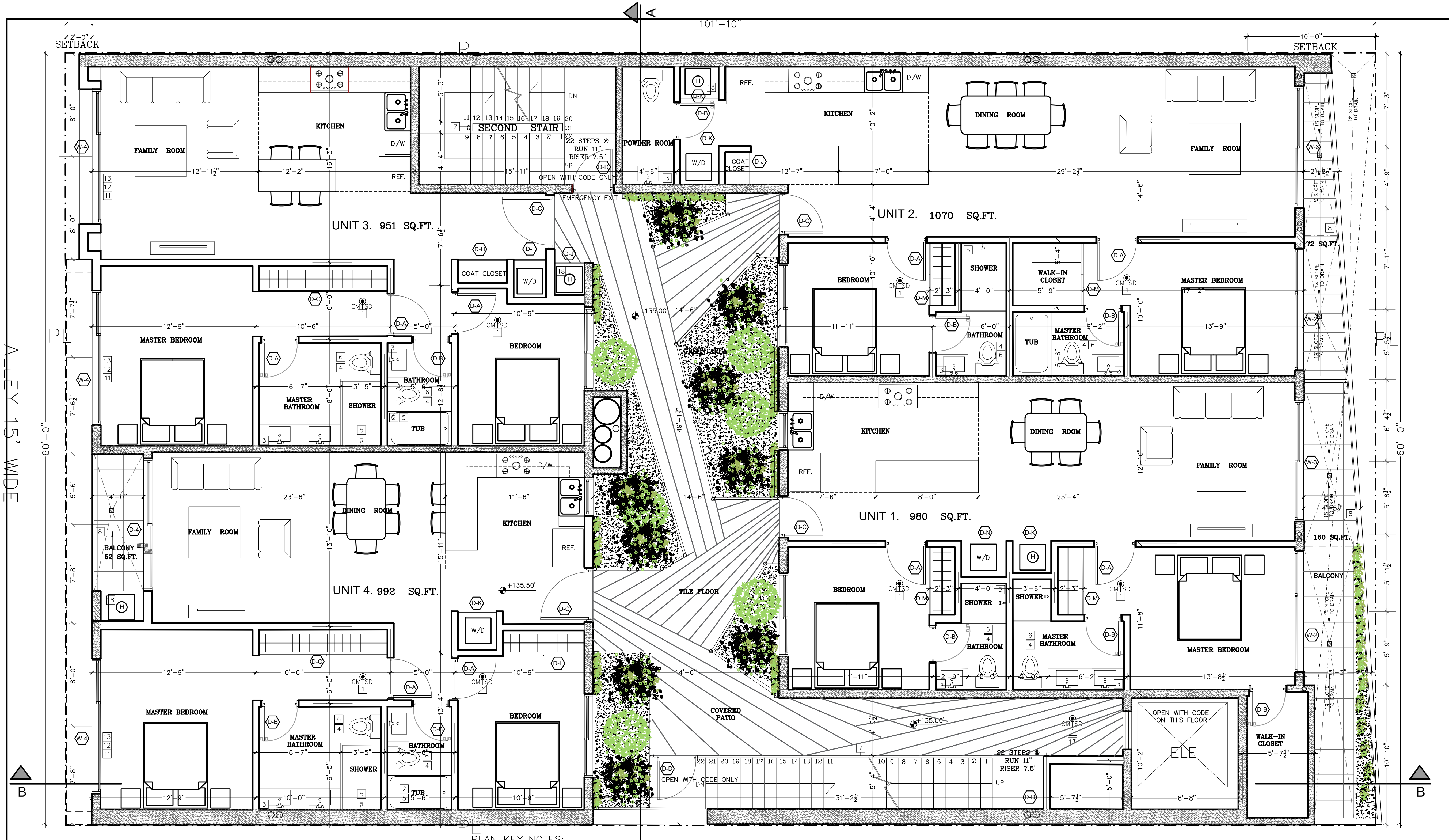
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: SECOND FLOOR

SHEET NUMBER: A 4

~~08/13/2019~~



PLAN KEY NOTES:

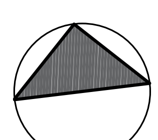
THIRD FLOOR PLAN

SCALE: 1/8"=1'-0"

SCALE BAR1/8

4307 SQ.FT.

3727 ROBERTSON
CULVER CITY CA 90232



NORTH

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

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WALL OUTLET W/SENSOR

1. HARDWIRED SMOKE DETECTORS WITH BATTERY BACKUP
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3. MEDICINE CABINET
4. PROVIDE EXHAUST FAN WITH MINIMUM 5 AIR EXCHANGES PER HOUR AND AS PER GREEN BUILDING REQUIREMENT REFER TO NOTE #25/H&I DWG. G-B FOR BATHROOMS CONTAINING BATHTUBS,SHOWER ,OR TUB/SHOWER COMBINATIONS . IT SHALL BE ENERGY STAR
5. PROVIDE 70 INCH HIGH NON-ABSORBENT WALL ADJACENT TO SHOWER AND APPROVED-RESISTANT MATERIALS FOR SHOWER ENCLOSURE. 91.807.1.3, 91.2406.4(5), 91.1115B.9.6,7,8
6. PROVIDE ULTRA FLUSH WATER CLOSETS FOR ALL NEW CONSTRUCTION. EXISTING SHOWER HEADS AND TOILETS MUST BE ADAPTED FOR LOW WATER CONSUMPTION.
8. HANDRAIL @ 36" ABOVE TREAD NOSING WITH LESS THAN 4" CLEAR SPACING BETWEEN INTERMEDIATE RAILS GUARDRAIL @ 42" HIGH ABOVE THE ADJACENT FINISH FLOOR WITH LESS THAN 4" CLEAR SPACING BETWEEN INTERMEDIATE RAILS
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14. CARBON MONOXIDE DETECTORS
15. GAS FIREPLACE - HEAT & GLO, SL-550TR-IPI-E, DIRECT VENT W/SEAL COMBUSTION GAS FIREPLACE REFER TO SPEC #5 DWG A-10b "WOOD BURNING FIREPLACES ARE PROHIBITED PER AQMD RULE 445 (4.503.1, AQMD RULE 445) FOR MORE DETAIL CHECK A-13

FOR FUTURE INSTALLATION OF ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) IN ONE AND TWO FAMILY DWELLINGS AND TOWNHOUSES:

a. MIN. 1" (INSIDE DIAMETER) LISTED RACEWAY IS INSTALLED TO ACCOMMODATE A DEDICATED 208/240 VOLT BRANCH CIRCUIT. THE RACEWAY SHALL ORIGINATE AT THE MAIN SERVICE OR A SUBPANEL AND TERMINATE IN CLOSE PROXIMITY TO THE PROPOSED LOCATION OF THE CHARGING SYSTEM INTO A LISTED CABINET, BOX OR ENCLOSURE.
b. SUFFICIENT CONDUCTOR SIZING AND SERVICE CAPACITY TO INSTALL LEVEL 2 EVSE SHALL BE PROVIDED.
c. A LABEL STATING 'EV CAPABLE' SHALL BE POSTED IN A CONSPICUOUS PLACE AT THE SERVICE PANEL OR SUBPANEL AND NEXT TO THE RACEWAY TERMINATION POINT.

17. AUTOMATIC IRRIGATION SYSTEM CONTROLLER . MANUFACTURER'S SPECIFICATIONS. (RD-900-EXT- RAIN DIAL SERVICES 9 STATIONS CONTROLLER).
18. WATER HEATER MUST BE STRAPPED TO THE WALL
19. DOORS BETWEEN GARAGE AND THE DWELLING UNIT SHALL BE SELF-CLOSING AND SELF-LATCHING, SOLID WOOD OR SOLID OR HONEYCOMB CORE STEEL NOT LESS THAN 1⅜ INCHES THICK, OR HAVE A MINIMUM FIRE PROTECTION RATING OF 20 MINUTES (406.1.4)
20. TYPE OF CONSTRUCTIONS 1-B
21. ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH TAPE,PLASTIC,OR SHEET METAL UNTIL THE FINAL STARTUP OF THE HEATING,COOLING AND VENTILATING EQUIPMENT.

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

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CLIENT:

DATE: 04/27/2016

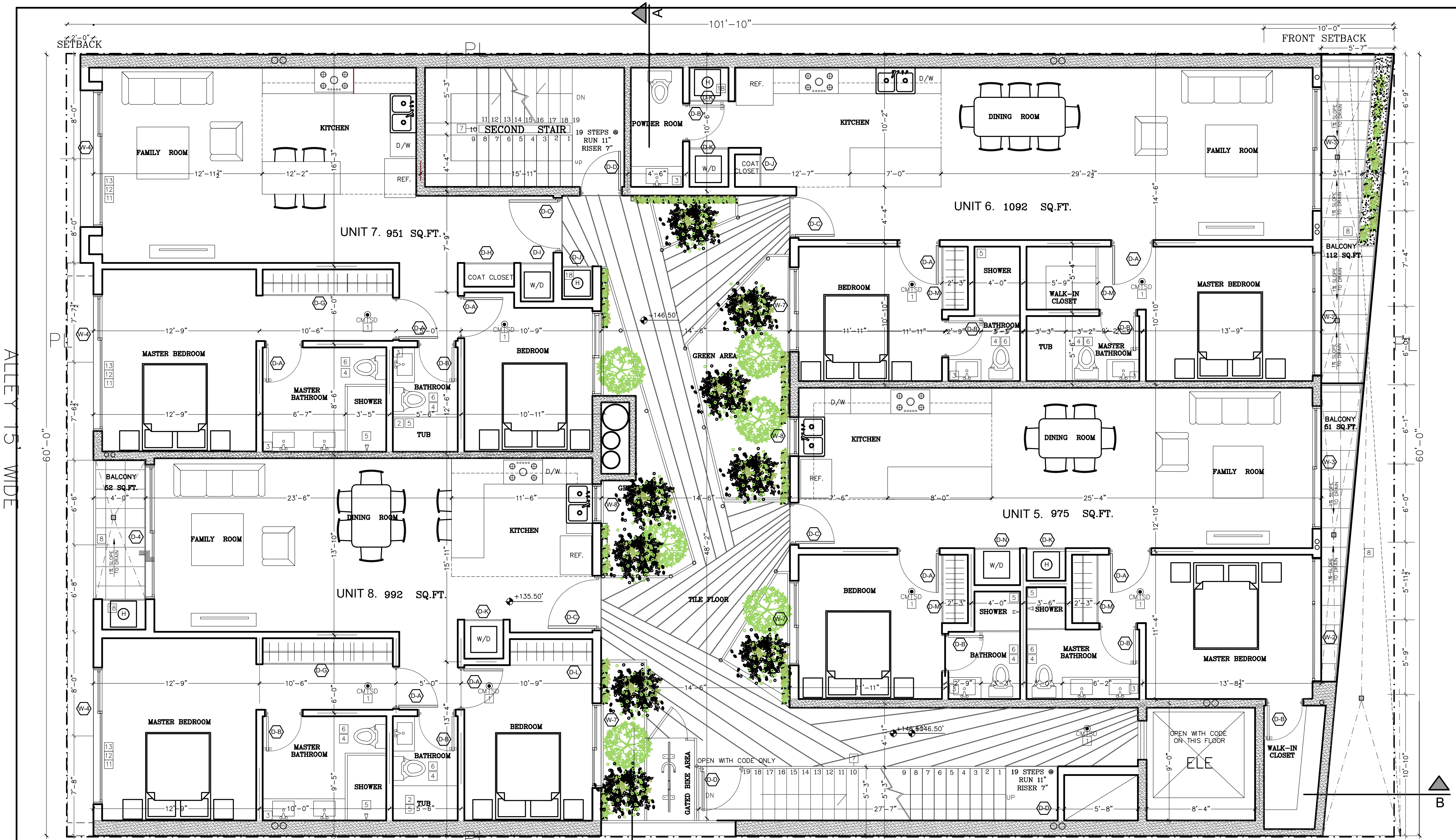
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: THIRD FLOOR

SHEET NUMBER: A 5

08/13/2019



FORTH FLOOR PLAN

SCALE: 1/4"=1'-0"

SCALE BAR1/8 FT

4307 SQ.FT.

3727 ROBERTSON
CULVER CITY CA 90232

NORTH

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

PLAN KEY NOTES:

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PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

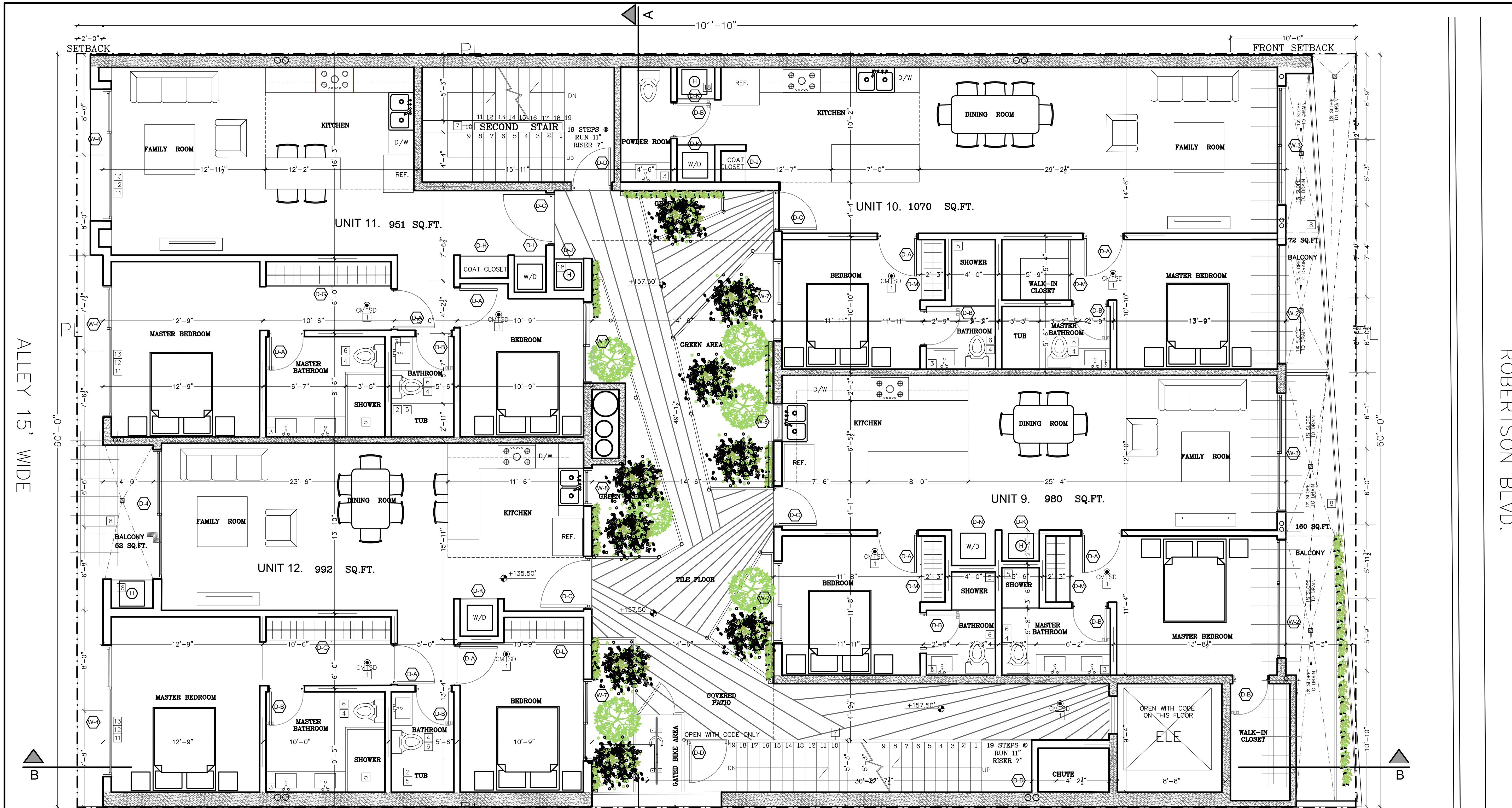
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: FORTH FLOOR

SHEET NUMBER: A 6

08/13/2019



PLAN KEY NOTES:

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b. SUFFICIENT CONDUCTOR SIZING AND SERVICE CAPACITY TO INSTALL LEVEL 2 EVSE SHALL BE PROVIDED.
c. A LABEL STATING 'EV CAPABLE' SHALL BE POSTED IN A CONSPICUOUS PLACE AT THE SERVICE PANEL OR SUBPANEL AND NEXT TO THE RACEWAY TERMINATION POINT.

17 — AUTOMATIC IRRIGATION SYSTEM CONTROLLER . MANUFACTURER'S SPECIFICATIONS. (RD-900-EXT- RAIN DIAL SERVICES 9 STATIONS CONTROLLER).

18 — WATER HEATER MUST BE STRAPPED TO THE WALL

19 — DOORS BETWEEN GARAGE AND THE DWELLING UNIT SHALL BE SELF-CLOSING AND SELF-LATCHING, SOLID WOOD OR SOLID OR HONEYCOMB CORE STEEL NOT LESS THAN 1⅜ INCHES THICK, OR HAVE A MINIMUM FIRE PROTECTION RATING OF 20 MINUTES (406.1.4)

20 — TYPE OF CONSTRUCTIONS 1-B

21 — ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH TAPE,PLASTIC,OR SHEET METAL UNTIL THE FINAL STARTUP OF THE HEATING,COOLING AND VENTILATING EQUIPMENT.

FIFTH FLOOR PLAN

SCALE: 1/4"=1'-0"

SCALE BAR1/8

4307 SQ.FT.

3727 ROBERTSON
CULVER CITY CA 90232

NORTH

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

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1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

7

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

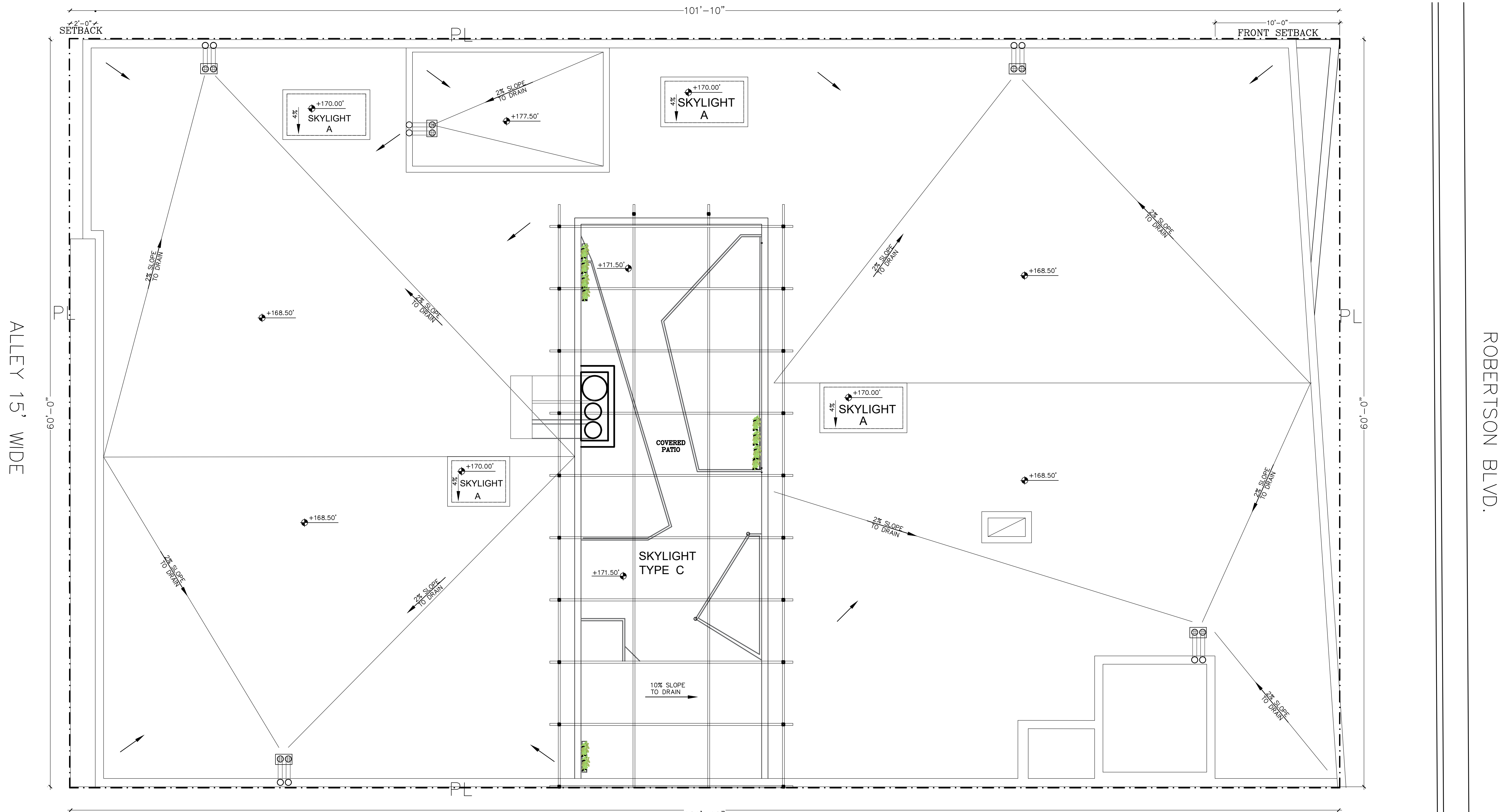
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: FIFTH FLOOR

SHEET NUMBER: A 7

08/13/2019



ROOF FLOOR PLAN

SCALE: 1/4"=1'-0"

SCALE BAR1/8

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

GENERAL NOTES:

A. THE CONSTRUCTION SHALL NOT RESTRICT A FIVE-FOOT CLEAR AND UNOBSTRUCTED ACCESS TO ANY WATER OR POWER DISTRIBUTION FACILITIES (POWER POLES, PULL-BOXES, TRANSFORMERS, VAULTS, PUMPS, VALVES, METERS, APPURTENANCES, ETC.) OR TO THE LOCATION OF THE HOOK-UP. THE CONSTRUCTION SHALL NOT BE WITHIN TEN FEET OF ANY POWER LINES-WHETHER OR NOT THE LINES ARE LOCATED ON THE PROPERTY. FAILURE TO COMPLY MAY CAUSE CONSTRUCTION DELAYS AND/OR ADDITIONAL EXPENSES.

B. AN APPROVED SEISMIC GAS SHUTOFF VALVE WILL BE INSTALLED ON THE FUEL GAS LINE ON THE DOWN STREAM SIDE OF THE UTILITY METER AND BE RIGIDLY CONNECTED TO THE EXTERIOR OF THE BUILDING OR STRUCTURE CONTAINING THE FUEL GAS PIPING."(PER ORDINANCE 170,158) (INCLUDES COMMERCIAL ADDITIONS AND TI WORK OVER $10,000.) SEPARATE PLUMBING PERMIT IS REQUIRED.

C. PLUMBING FIXTURES ARE REQUIRED TO BE CONNECTED TO A SANITARY SEWER OR TO AN APPROVED SEWAGE DISPOSAL SYSTEM (R306.3).

D. PROVIDE 70 INCH HIGH NON-ABSORBENT WALL ADJACENT TO SHOWER AND APPROVED SHATTER-RESISTANT MATERIALS FOR SHOWER ENCLOSURE."(1115B.2 AND 2406.3(5)

E. KITCHEN SINKS, LAVATORIES, BATHTUBS, SHOWERS,BIDETS, LANDRY TUBS AND WASHING MACHINE OUT LETS SHALL BE PROVIED WITH HOT AND COLD WATER AND CONNECTED TO AN APPROVED WATER SUPPLY (R306.4) .

F. WATER HEATER MUST BE STRAPPED TO WALL (SEC. 507.3, UPC)

G. BATHTUB AND SHOWER FLOOR, WALL ABOVE BATHTUBS WITH A SHOWERHEAD, AND SHOWER COMPARTMENT SHALL BE FINISHED WITH A NONABSORBENT SURFACE . SUCH WALL SURFACES SHALL EXTEND TO A HEIGHT OF NOT LESS THAN 6 FEET ABOVE THE FLOOR (R307.2)

H. DUCTS PENETRATING THE WALL OR CEILINGS SEPARATING THE DWELLING FROM THE GARAGE SHALL BE CONSTRUCTED OF A MINIMUM NO. 26 GAGE SHEET STEEL OR OTHER APPROVED MATERIAL AND THERE SHALL BE NO OPENINGS FROM THE DUCTS INTO THE GARAGE (R302.5.2).

I . OTHER PENETRATIONS OF GARAGE/DWELLING AND WALLS ARE TO BE PROTECTED AS REQUIRED BY SECTION R302.11,ITEM 4 9r309.1).

J. GARAGE FLOOR SURFACES SHALL BE OF AN APPROVED NONCOMBUSTIBLE MATERIAL, AND THE AREA USED TO PARK VEHICLES SHALL BE SLOPED TO A DRAIN OR TOWARD THE MAIN VEHICLE ENTRY (R309.1) .

K. AUTOMATIC GARAGE DOOR OPENERS, IF PROVIDED, SHALL BE LISTED IN ACCORDANCE WITH UL 325 .

L. VEHICULAR ACCESS DOORS SHALL COMPLY WITH SECTION R612.7 .

M. BUILDINGS SHALL HAVE APPROVED ADDRESS NUMBERS, BUILDING NUMBERS OR APPROVED BUILDING IDENTIFICATION PLACED IN APOSITION THAT IS PLAINLY LEGIBLE AND VISIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY . (R319) .

N. PROTECTION OF WOOD AND WOOD BASED PRODUCTS FROM DECAY SHALL BE PROVIDED IN THE LOCATIONS SPECIFIED PER SECTION R317 BY THE USE OF NATURALLY DURABLE WOOD OR WOOD THAT IS PRESERVATIVE-TREATED IN ACCORDANCE WITH AWPA UI FOR THE SPECIES, PRODUCT, PRESERVATIVE AND END USE . PRESERVATIVES SHALL BE LISTED IN SECTION 4 OF AWPA U1 .

O. I. A COPY OF THE EVALUATION REPORT AND/OR CONDITIONS OF LISTING SHALL BE MADE AVAILABLE AT THE JOB SITE

P. ANTI GRAFFITI FINISH MAINTENANCE OF BUILDING AFFIDAVIT IS RECORDED BY THE OWNER TO COVENANT AND AGREE W/THE CITY OF L.A. TO REMOVE ANY GRAFFITI W/IN 7-DAYS OF GRAFFITI BEING APPLIED (SEE SHEET A8-b) .

r. ALL WINDOWS TO BE TEMPERED GLAZING WHEN LOCATED IN VHFHSZ.

s. PROVIDE ULTRA-LOW FLUSH WATER CLOSETS FOR ALL NEW CONSTRUCTION, EXISTING SHOWER HEADS AND TOILETS MUST BE ADAPTED FOR LOW WATER CONSUMPTION .

t. A COPY OF THE EVALUTION REPORT AND/OR CONDITION OF LISITING SHALL BE MADE AVAILABLE AT THE JOB SITE .

SKYLIGHT
TYPE A

SKYLIGHT
TYPE B

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REVISIONS

PROJECT ADDRESS :
3727 ROBERTSON ST.
CULVER CITY
CA 90232

PROJECT TITLE:
3727 ROBERTSON

DATE:
04/27/2016

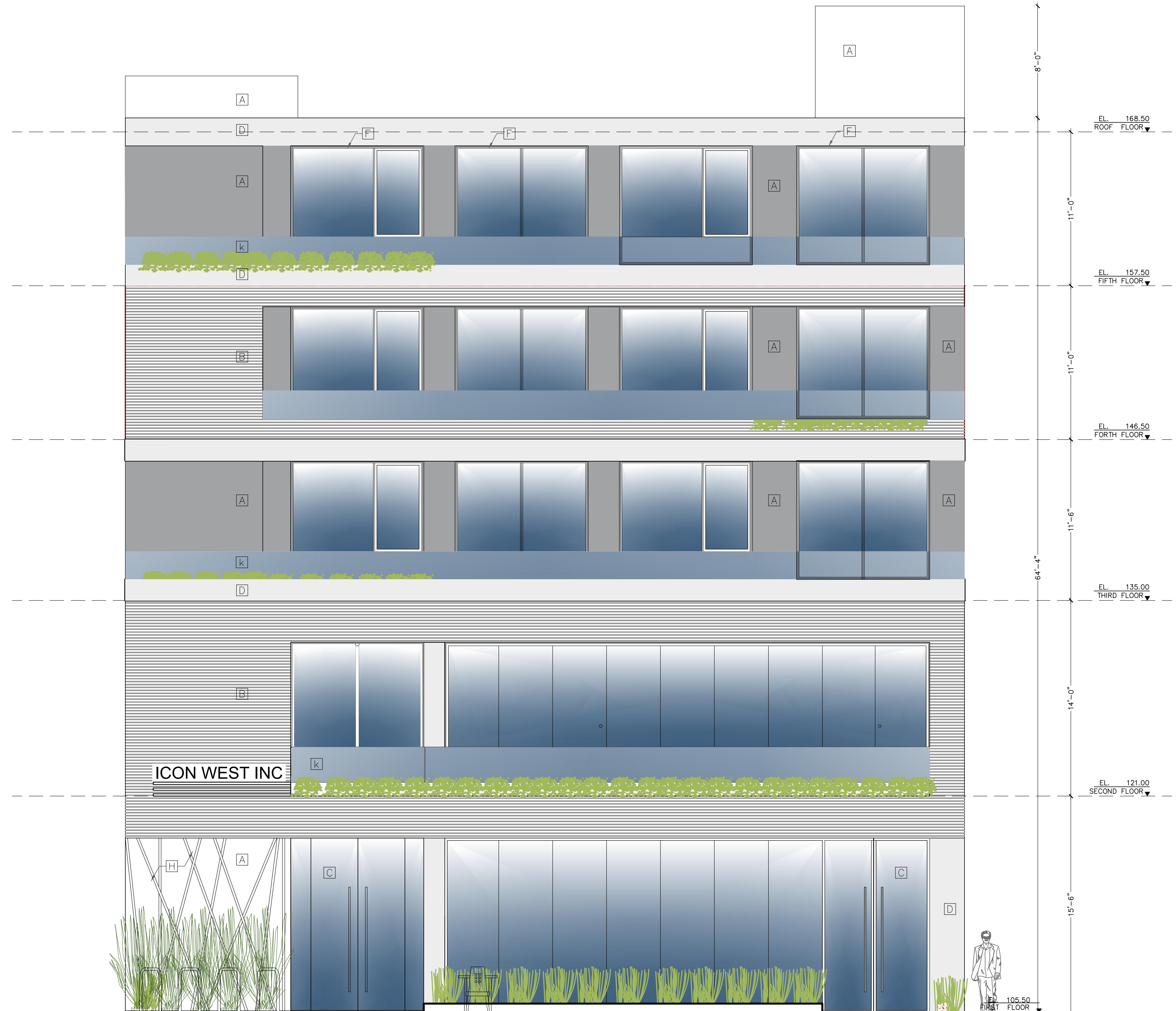
JOB NUMBER:

DRAWING PHASE:
P/CSUBMITTAL

SHEET TITLE:
ROOF FLOOR

SHEET NUMBER:
A
8

08/13/2019



WEST ELEVATION

SCALE: 1/4"=1'-0"

SCALE BAR1/8 FT

**3727 ROBERTSON
CULVER CITY CA 90232**

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

ELEVATION KEY NOTES:

- A — STUCCO FINISH FIREPLACE
- B — CORRUGATED METAL
- C — GLASS DOOR
- D — ALUMINUM COMPOSITE TILE
- F — ANODIZED ALUMINUM WINDOW
- G — PLEXIGLASS ROOF PANELS
- H — STAINLESS STEEL PIPE
- L — EMERGENCY EGRESS TYPICAL TO ALL SLEEPING ROOMS MIN.24" CLEAR HT, 20" CLEAR WIDTH , 5.7 SQ.FT. MIN AREA (5.0 SQ. FT. AT GRADE) &42"MIN. -44" MAX. TO SILL
- I — METAL RAILING
- K — GLASS GUARDRAIL

PROVIDE ANTI-GRAFFITI FINISH within THE FIRST 9', MEASURED FROM GRADE, AT EXTERIOR WALLS and DOORS PER SECTION 6306

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REVISIONS

PROJECT ADDRESS : 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

DATE: 04/27/2016

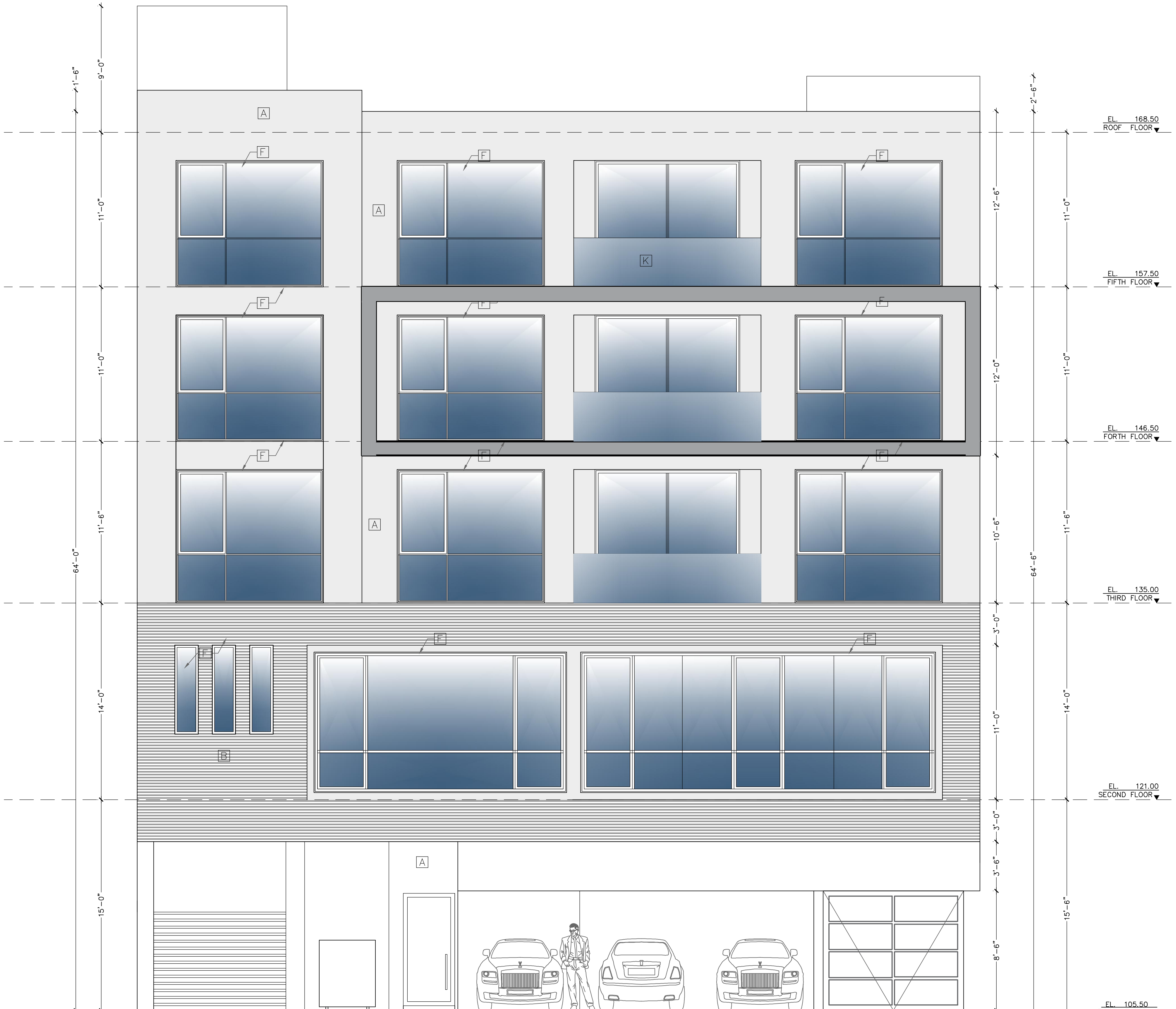
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: EAST ELEVATION

SHEET NUMBER: A 9

08/13/2019



WEST ELEVATION

SCALE BAR1/8 FT

SCALE: 1/4"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
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DATE: 04/27/2016

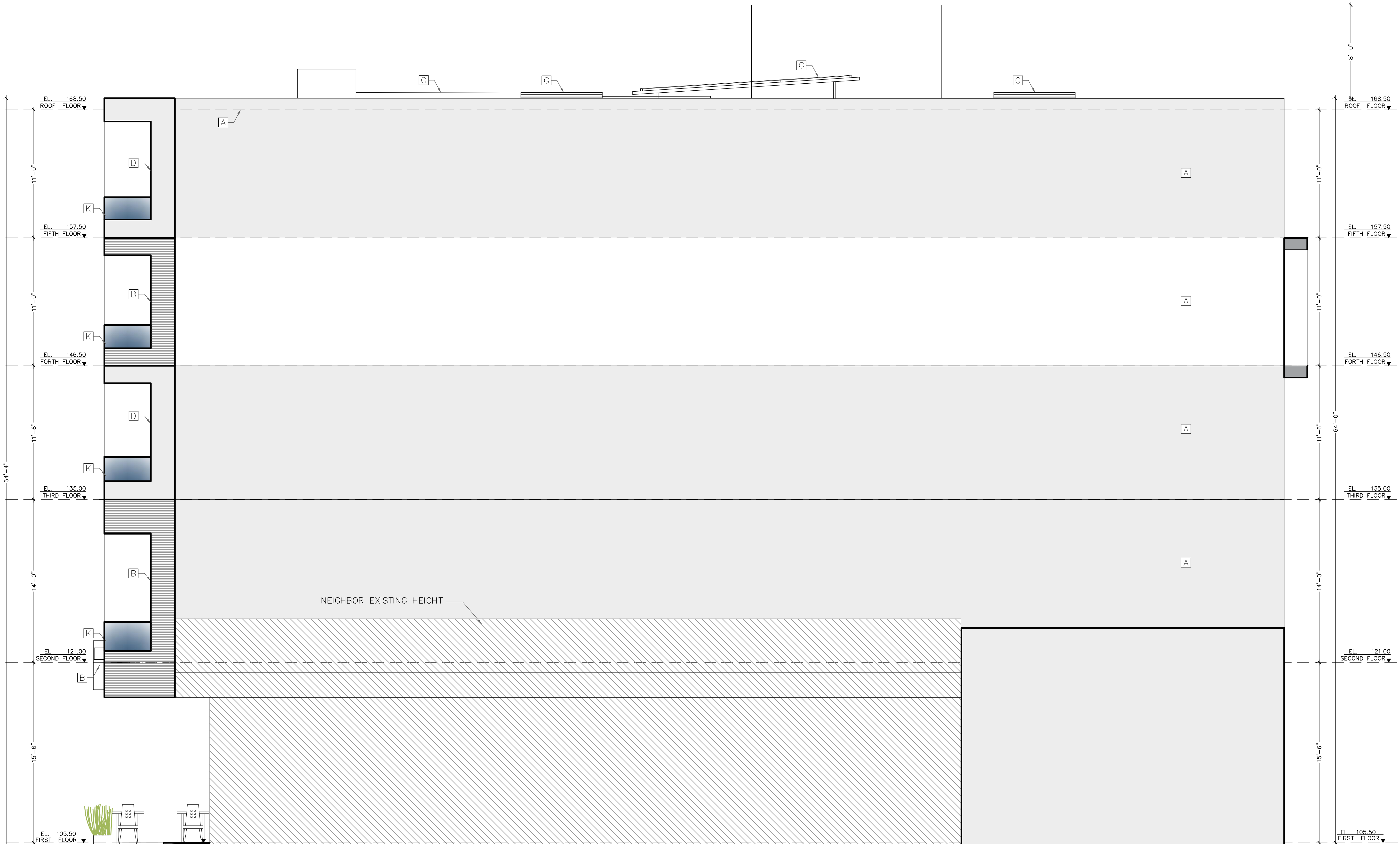
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: EAST ELEVATION

SHEET NUMBER: A 10

08/13/2019



NORTH ELEVATION

SCALE: 1/4"=1'-0"

SCALE BAR1/8 FT

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
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BLOCK:	NONE
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- I — METAL RAILING
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PROVIDE ANTI-GRAFFITI FINISH within THE FIRST 9', MEASURED FROM GRADE, AT EXTERIOR WALLS and DOORS PER SECTION 6306

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PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

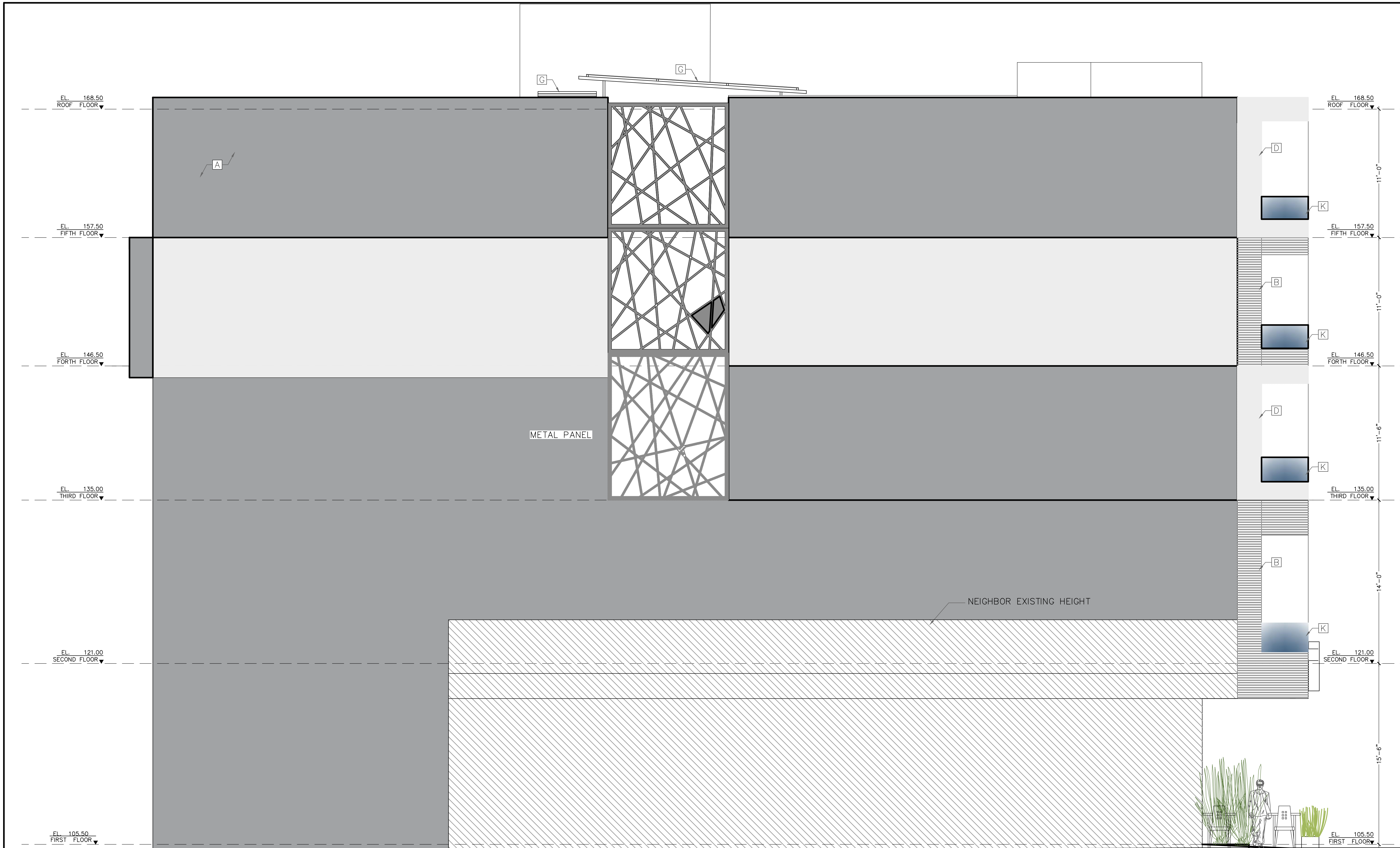
JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: WEST ELEVATION

SHEET NUMBER: A 11

08/13/2019



SOUTH ELEVATION

SCALE BAR1/8 FT

SCALE: 1/4"=1'-0"

3727 ROBERTSON
CULVER CITY CA 90232

LEGAL DESCRIPTION:

ASSESSOR PARCEL NUMBER:	4206033057
TRACT:	3872
BLOCK:	NONE
LOT:	42 & 43
ZONING:	IG

ELEVATION KEY NOTES:

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- H — STAINLESS STEEL PIPE
- L — EMERGENCY EGRESS TYPICAL TO ALL SLEEPING ROOMS MIN.24" CLEAR HT, 20" CLEAR WIDTH , 5.7 SQ.FT. MIN AREA (5.0 SQ. FT. AT GRADE) &42"MIN. -44" MAX. TO SILL
- I — METAL RAILING
- K — GLASS GUARDRAIL

PROVIDE ANTI-GRAFFITI FINISH within THE FIRST 9', MEASURED FROM GRADE, AT EXTERIOR WALLS and DOORS PER SECTION 6306

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DATE:
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JOB NUMBER:

DRAWING PHASE:
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SHEET TITLE:
WEST ELEVATION

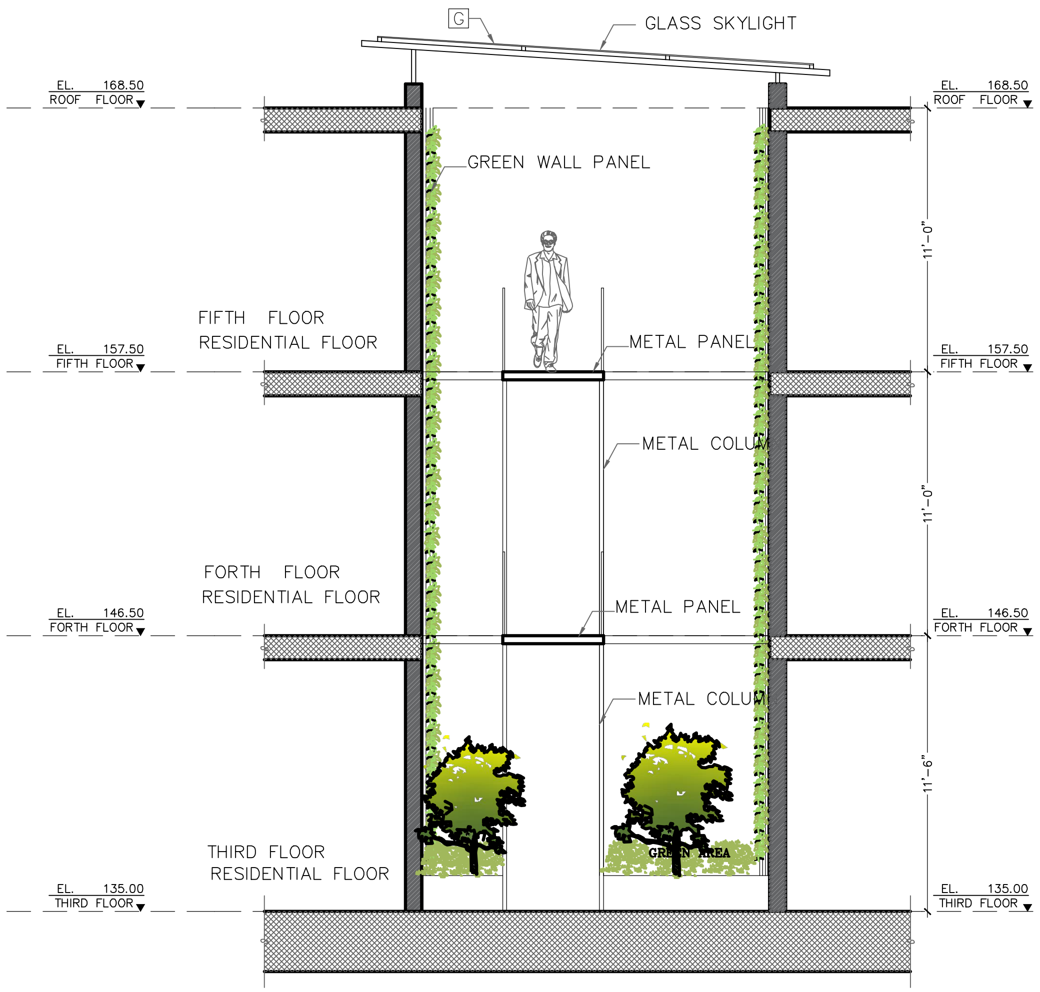
SHEET NUMBER:
A
12

08/13/2019

SECTION A - A

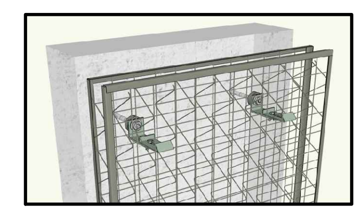
SCALE: 1/4"=1'-0"

SCALE BAR1/8



COURT YARD SECTION

SCALE: 1/4"=1'-0"



GREEN WALL PANEL

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CA 90232

PROJECT TITLE:
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DATE:
04/27/2016

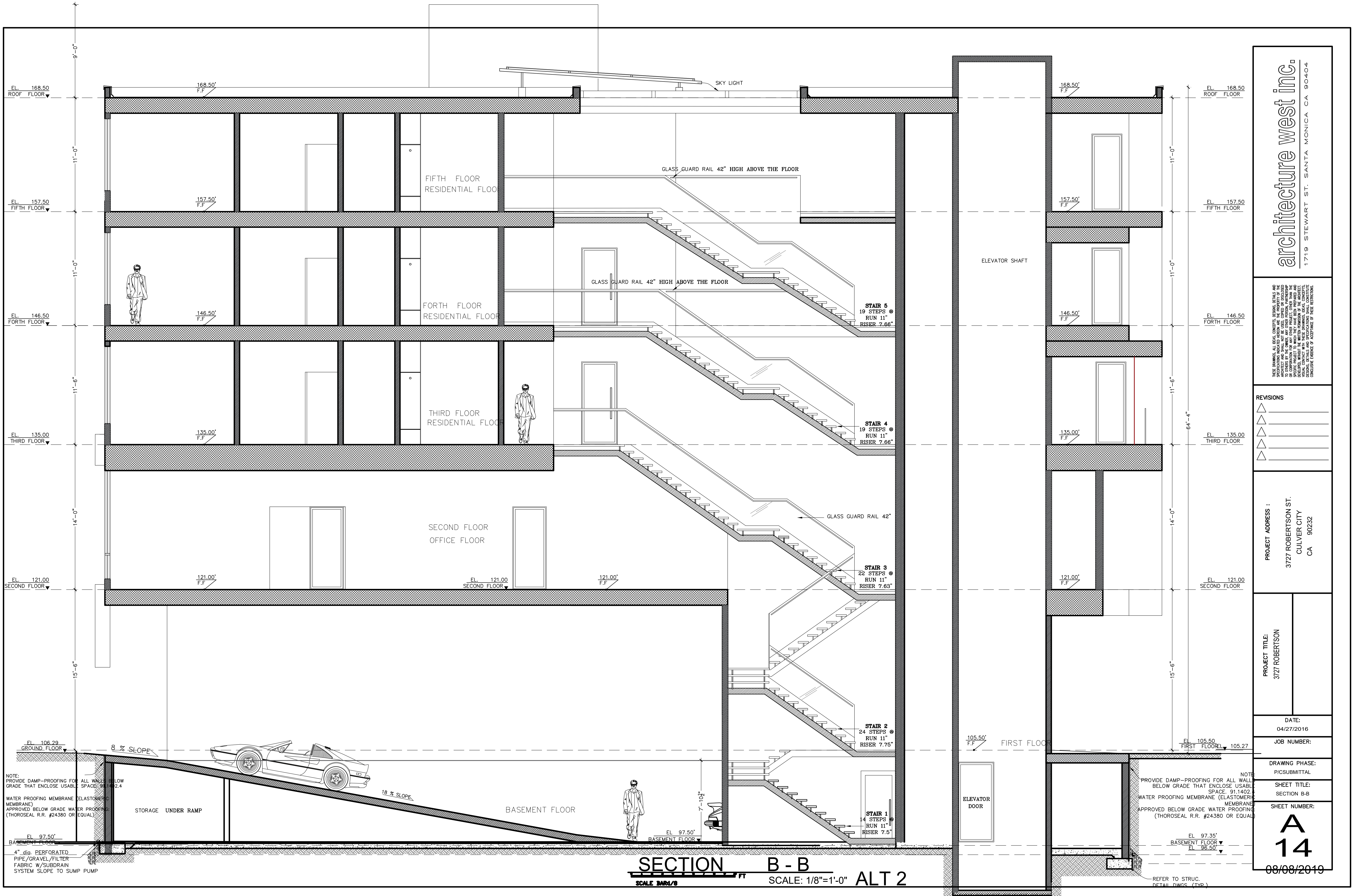
JOB NUMBER:

DRAWING PHASE:
P/CSUBMITTAL

SHEET TITLE:
SECTION A-A

SHEET NUMBER:
A
13

08/13/2019



EL. 168.50 ROOF FLOOR
SKY LIGHT
168.50' F.F
GLASS GUARD RAIL 42" HIGH ABOVE THE FLOOR
FIFTH FLOOR RESIDENTIAL FLOOR
EL. 157.50 FIFTH FLOOR
157.50' F.F
ELEVATOR SHAFT
FORTH FLOOR RESIDENTIAL FLOOR
EL. 146.50 FORTH FLOOR
146.50' F.F
STAIR 5 19 STEPS @ RUN 11" RISER 7.66"
THIRD FLOOR RESIDENTIAL FLOOR
STAIR 4 19 STEPS @ RUN 11" RISER 7.66"
EL. 135.00 THIRD FLOOR
135.00' F.F
GLASS GUARD RAIL 42"
SECOND FLOOR OFFICE FLOOR
STAIR 3 22 STEPS @ RUN 11" RISER 7.63"
EL. 121.00 SECOND FLOOR
121.00' F.F
STAIR 2 24 STEPS @ RUN 11" RISER 7.75"
EL. 106.29 GROUND FLOOR
8 % SLOPE
105.50' F.F
FIRST FLOOR
EL. 105.50 FIRST FLOOR
EL. 105.27
18 % SLOPE
STORAGE UNDER RAMP
BASEMENT FLOOR
7'-10½"
STAIR 1 14 STEPS @ RUN 11" RISER 7.5"
ELEVATOR DOOR
EL. 97.50' BASEMENT FLOOR
EL. 97.50 BASEMENT FLOOR
EL. 97.35' BASEMENT FLOOR
EL. 96.50'
NOTE: PROVIDE DAMP-PROOFING FOR ALL WALLS BELOW GRADE THAT ENCLOSE USABLE SPACE. 91.1402.4
WATER PROOFING MEMBRANE (ELASTOMERIC MEMBRANE) APPROVED BELOW GRADE WATER PROOFING (THOROSEAL R.R. #24380 OR EQUAL)
4" dia. PERFORATED PIPE/GRAVEL/FILTER FABRIC W/SUBDRAIN SYSTEM SLOPE TO SUMP PUMP
REFER TO STRUC. DETAIL DWGS. (TYP.)
9'-0"
11'-0"
11'-0"
11'-6"
14'-0"
15'-6"
64'-4"
SECTION B - B
SCALE: 1/8"=1'-0"
ALT 2
SCALE BAR1/8
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REVISIONS
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SHEET TITLE: SECTION B-B
SHEET NUMBER:
A 14
08/08/2019

EXTERIOR DOOR & WINDOW OPENING SCHEDULE & TYPES

MEASUREMENTS OF DOORS / WINDOWS ARE CLEAR LEAF SIZE

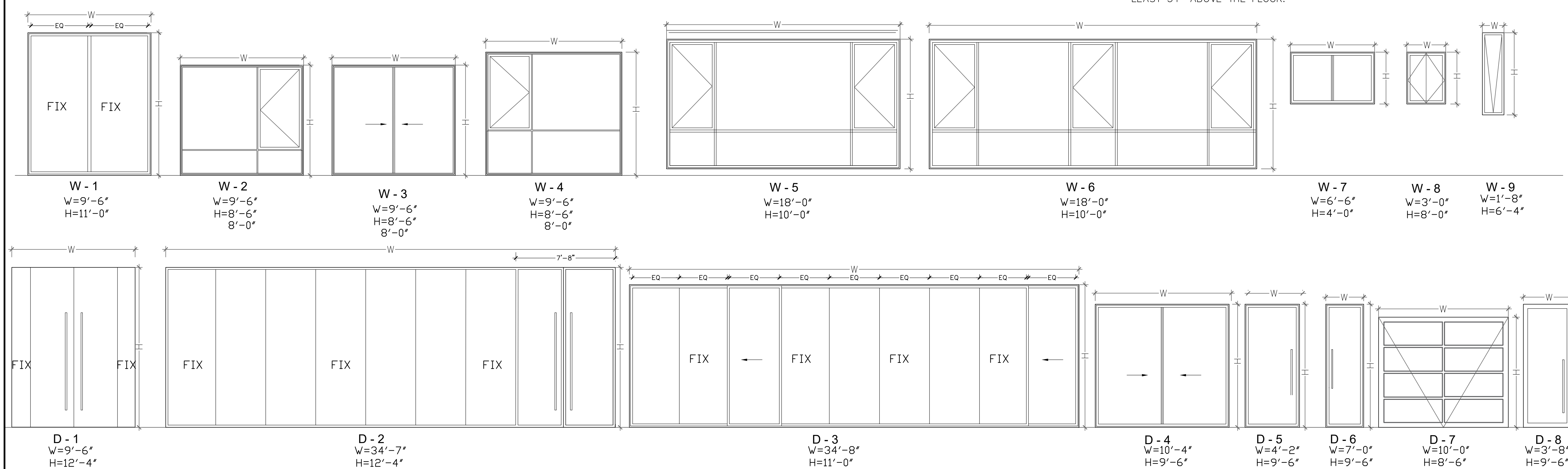
TYPE	FINISH DOOR LEAF SIZE W	FINISH DOOR LEAF SIZE H	SILL H	NUMBER	DOOR& WINDOW MATERIAL	COLOR	FRAME	COLOR	FINISH	MANUFACTURE	REMARKS	GLASSES
W - 1	8'-0"	8'-0"	1'-6"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 2	36'-5"	11'-6"	1'-0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 3	18'-0"	10'-6"	1'-0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 4	25'-3"	10'-6"	2'-0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 5	6'-6"	4'-0"	6'-0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
W - 6	3'-0"	4'-0"	6'-0"		ALUMINIUM ANODIZED	DARK GRAY					AWINING	FROSTED
D - 1	7'-0"	12'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY						
D - 2	36'-5"	11'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY						
D - 3	7'-0"	11'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
D - 4	10'-0"	11'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY					SLIDING	CLEAR
D - 5	7'-0"	11'-6"	0"		ALUMINIUM ANODIZED	DARK GRAY					AWINING	FROSTED
D - 6	10'-0"	8'-6"	0"		METAL	DARK GRAY						FROSTED

GENERAL NOTES: GLAZING IN THE FOLLOWING LOCATIONS SHALL BE SAFETY GLAZING CONFORMING TO THE HUMAN IMPACT LOADS OF SECTION R308.3. (SEE DWG A-9-b FOR ADDITIONAL NOTES)

1. FIXED AND OPERABLE PANELS OF SWINGING, SLIDING AND BIFOLD DOOR ASSEMBLIES.
2. INDIVIDUAL FIXED OR OPERABLE PANEL ADJACENT TO A DOOR WHERE THE NEAREST VERTICAL EDGE IS WITHIN A 24-INCH ARC OF THE DOOR IN A CLOSED POSITION AND WHOSE BOTTOM EDGE IS LESS THAN 60 INCHES ABOVE THE FLOOR OR WALKING SURFACE
3. EXPOSED AREA OF AN INDIVIDUAL PANE GREATER THAN 9 SQ.FT.
4. BOTTOM EDGE HAS LESS THAN 18 IN. ABOVE THE FLOOR
5. TOP EDGE GREATER THAN 36 IN.ABOVE THE FLOOR
6. ONE OF MORE WALKING SURFACES WITHIN 36 IN. HORIZONTALLY OF THE GLAZING
7. GLAZING IN RAILINGS
8. ENCLOSURES FOR OR WALLS FACING HOT TUBS, WHIRLPOOLS, SAUNAS, STEAM ROOMS, BATHTUBS, AND SHOWERS WHERE THE BOTTOM EDGE OF THE GLAZING IS LESS THAN 60 IN. MEASURED VERTICALLY ABOVE ANY STANDING OR WALKING SURFACE.
9. WALLS AND FENCES ADJACENT TO INDOOR AND OUTDOOR SWIMMING POOLS, HOT TUBS AND SPAS WHERE THE BOTTOM EDGE OF THE GLAZING IS LESS THAN 60 IN. ABOVE A WALKING SURFACE AND WITHIN 60 IN., MEASURED HORIZONTALLY AND IN A STRAIGHT LINE, OF THE WATER'S EDGE.
10. GLAZING ADJACENT TO STAIRWAYS, LANDINGS AND RAMPS WITHIN 36 IN. HORIZONTALLY OF A WALKING SURFACE WHEN THE SURFACE OF THE GLAZING IS LESS THAN 60 IN. ABOVE THE PLANE OF THE ADJACENT WALKING SURFACE.
11. GLAZING ADJACENT TO STAIRWAYS WITHIN 60 IN. HORIZONTALLY OF THE BOTTOM TREAD OF A STAIRWAY IN ANY DIRECTION WHEN THE EXPOSED SURFACE OF THE GLAZING IS LESS THAN 60 IN. ABOVE THE NOSE OF THE TREAD.

PROVIDE AN ALARM FOR DOORS TO THE DWELLING THAT FORM A PART OF THE POOL ENCLOSURE.
THE ALARM SHALL SOUND CONTINUOUSLY FOR A MIN. OF 30 SECONDS IMMEDIATELY AFTER THE DOOR IS OPENED AND BE CAPABLE OF BEING HEARD THROUGHOUT THE HOUSE DURING NORMAL HOUSEHOLD ACTIVITIES. IT SHALL AUTOMATICALLY RESET AND SHALL BE EQ. WITH A MANUAL MEANS TO TEMP. DESACTIVIATE (FOR 15 SECS.MAX.) FOR SINGLE OPENING. THE DESACTIVATION SWITCH SHALL BE AT LEAST 54" ABOVE THE FLOOR.

EXTERIOR DOOR & WINDOW OPENING SCHEDULE & TYPES



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REVISIONS

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PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: EXTERIOR DOOR

SHEET NUMBER: A 15

08/13/2019

FINISH SCHEDULE

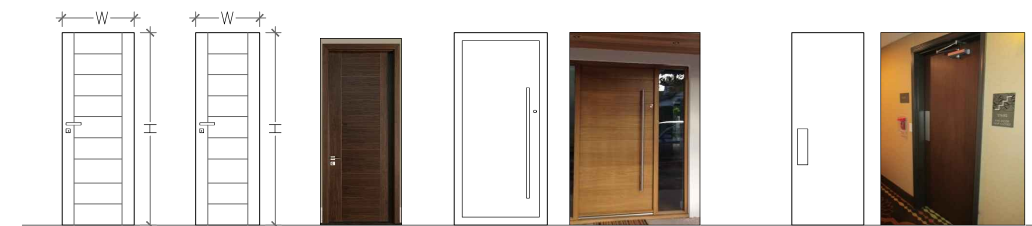
FLOOR	ROOM	FLOOR – MATERIAL	FLOOR – FINISH	BASE – MATERIAL	BASE – FINISH	WALLS – MATERIAL	WALLS – FINISH	CEILING – MATERIAL	CEILING – FINISH	REMARKS
BASEMENT	1 PARKING	CONCRETE	NOT APPLICABLE	NOTHING		STONE/BRICK/CONCRETE				
BASEMENT	2 STAIR	CONCRETE		METAL		STUCCO	ACRYLIC FLAT FINISH		ACRYLIC FLAT FINISH	
BASEMENT	3 TRASH AREA	CONCRETE		NOTHING		STONE/BRICK/CONCRETE			ACRYLIC FLAT FINISH	
BASEMENT	4 STORE	CONCRETE		NOTHING		STUCCO	ACRYLIC FLAT FINISH			
BASEMENT	5 MECHANICAL ROOM	CONCRETE	NOT APPLICABLE	NOTHING		STUCCO	ACRYLIC FLAT FINISH			
FIRST	6 ENTRANCE	STONE		STONE		5/8" TYPE X DRYWALL	ACRYLIC FLAT FINISH		ACRYLIC FLAT FINISH	
FIRST	7 EMERGENCY EXIT	STONE		STONE		5/8" TYPE X DRYWALL	ACRYLIC FLAT FINISH		ACRYLIC FLAT FINISH	
FIRST	8 OFFICE	HARDWOOD		HARDWOOD		5/8" TYPE X DRYWALL	ACRYLIC FLAT FINISH		ACRYLIC FLAT FINISH	
FIRST	9 REST ROOM	PORCELAIN TILE FLOOR		TILE		TILE /GREEN BOARD	ACRYLIC LOW SHEEN		ACRYLIC LOW SHEEN	
FIRST	10 PARKING	CONCRETE	NOT APPLICABLE	NOTHING		STONE/BRICK/CONCRETE				
SECOND	11 ENTRANCE	HARDWOOD		HARDWOOD		5/8" TYPE X DRYWALL	ACRYLIC FLAT FINISH		ACRYLIC FLAT FINISH	
SECOND	12 OFFICE	HARDWOOD		HARDWOOD		5/8" TYPE X DRYWALL	ACRYLIC FLAT FINISH		ACRYLIC FLAT FINISH	
SECOND	13 STORE	PORCELAIN TILE FLOOR		TILE		5/8" TYPE X DRYWALL	ACRYLIC FLAT FINISH		ACRYLIC FLAT FINISH	
SECOND	14 REST ROOM	PORCELAIN TILE FLOOR		TILE		TILE /GREEN BOARD	ACRYLIC LOW SHEEN		ACRYLIC LOW SHEEN	
THIRD,FORTH,FIFTH FLOOR	MASTER BEDROOM	CARPET	EPOXY PAINT	NOTHING		GREEN BOARD	ACRYLIC LOW SHEEN	GREEN BOARD	ACRYLIC LOW SHEEN	
THIRD,FORTH,FIFTH FLOOR	MASTER BATHROOM	STONE	EPOXY PAINT	NOTHING		STUCCO	ACRYLIC GLOSS FINISH	STUCCO	ACRYLIC GLOSS FINISH	
THIRD,FORTH,FIFTH FLOOR	MASTER BATH TUB	STONE	EPOXY PAINT							
THIRD,FORTH,FIFTH FLOOR	MASTER SHOWER	STONE	EPOXY PAINT	NOTHING		STUCCO	ACRYLIC GLOSS FINISH	STUCCO	ACRYLIC GLOSS FINISH	
THIRD,FORTH,FIFTH FLOOR	MASTER TOILET	STONE	EPOXY PAINT	NOTHING		STUCCO	ACRYLIC GLOSS FINISH	STUCCO	ACRYLIC GLOSS FINISH	
THIRD,FORTH,FIFTH FLOOR	MSTR WALK-IN CLOSET	PORCELAIN TILE FLOOR	EPOXY PAINT	NOTHING		GREEN BOARD	ACRYLIC LOW SHEEN	GREEN BOARD	ACRYLIC LOW SHEEN	
THIRD,FORTH,FIFTH FLOOR	BEDROOM	PORCELAIN TILE FLOOR	EPOXY PAINT	NOTHING		GREEN BOARD	ACRYLIC LOW SHEEN	GREEN BOARD	ACRYLIC LOW SHEEN	
THIRD,FORTH,FIFTH FLOOR	BATHROOM	STONE	EPOXY PAINT	NOTHING		STUCCO	ACRYLIC GLOSS FINISH	STUCCO	ACRYLIC GLOSS FINISH	
THIRD,FORTH,FIFTH FLOOR	SHOWER	STONE	EPOXY PAINT	NOTHING		STUCCO	ACRYLIC GLOSS FINISH	STUCCO	ACRYLIC GLOSS FINISH	
THIRD,FORTH,FIFTH FLOOR	KITCHEN	CARPET	NOT APPLICABLE	HARDWOOD		STONE/BRICK/CONCRETE	STAIN ENAMEL	STONE	STAIN ENAMEL	
THIRD,FORTH,FIFTH FLOOR	LIVING ROOM	CARPET	NOT APPLICABLE	HARDWOOD		STUCCO	ACRYLIC GLOSS FINISH	STUCCO	ACRYLIC GLOSS FINISH	
THIRD,FORTH,FIFTH FLOOR	FAMILY ROOM	CARPET	NOT APPLICABLE	HARDWOOD		STUCCO	ACRYLIC GLOSS FINISH	STUCCO	ACRYLIC GLOSS FINISH	
THIRD,FORTH,FIFTH FLOOR	LAUNDRY	CONCRETE	NOT APPLICABLE		GLOSS ENAMEL PAINT	TILE /GREEN BOARD	ACRYLIC GLOSS FINISH	CERAMIC TILE	ACRYLIC GLOSS FINISH	
THIRD,FORTH,FIFTH FLOOR	BALCONY	PORCELAIN TILE FLOOR	NOT APPLICABLE	TILE				STUCCO	ACRYLIC FLAT FINISH	
THIRD,FORTH,FIFTH FLOOR	INTERIOR YARD	CONCRETE			ACRYLIC FLAT FINISH	STUCCO	ACRYLIC FLAT FINISH		ACRYLIC FLAT FINISH	
THIRD,FORTH,FIFTH FLOOR	STAIR	CONCRETE		METAL		STUCCO	ACRYLIC FLAT FINISH			

INTERIOR DOOR OPENING SCHEDULE & TYPES

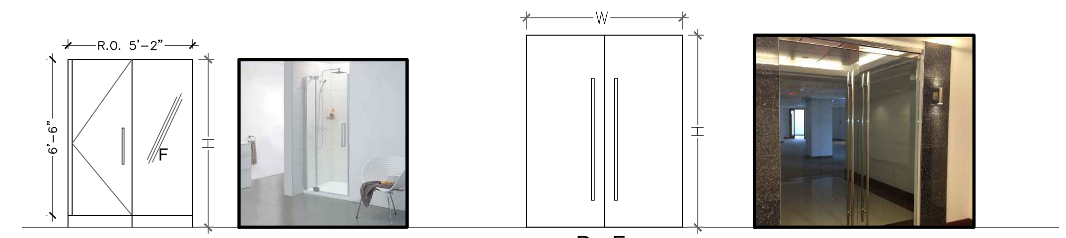
MEASUREMENTS OF DOORS / WINDOWS ARE CLEAR LEAF SIZE

TYPE	FINISH DOOR LEAF SIZE W	FINISH DOOR LEAF SIZE H	SILL H	NUMBER	DOOR& WINDOW MATERIAL	COLOR	FRAME	COLOR	FINISH	MANUFACTURE	REMARKS	GLASSES
D - A	3′-0″	8′-0″	0		WOOD		WOOD				BED ROOM- LANDRY	
D - B	2′-8″	8′-0″	0		WOOD		WOOD				BED ROOM- BATH ROOM	
D - C	3′-10″	8′-0″	0		WOOD		WOOD					
D - D	3′-0″	8′-0″	0		WOOD		WOOD				FIRE-RESISTANT DOOR	
D - E	5′-2″	6′-6″	0′-6″		GLASS		METAL				TEMPERED SHOWER GLASS PANELS	CLEAR
D - F	6′-6″	8′-0″	0		GLASS		METAL				GLASS DOORS	CLEAR
D - G	10′-0″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - H	3′-10″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - I	2′-6″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - J	2′-4″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - K	3′-0″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - L	6′-4″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - M	4′-10″	8′-0″	0		GLASS		METAL				GLASS DOORS	
D - N	3′-6″	8′-0″	0		GLASS		METAL					

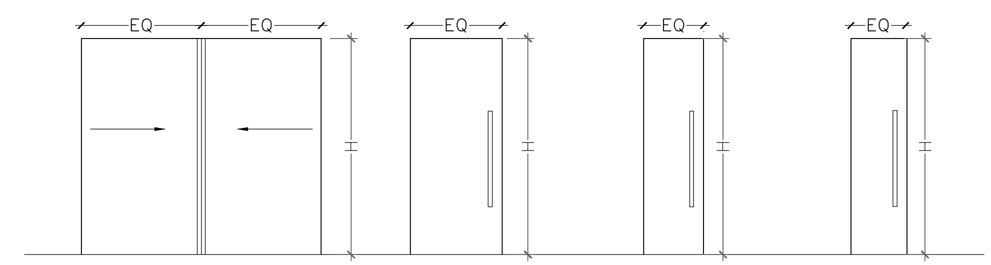
INTERIOR DOOR OPENING SCHEDULE & TYPES



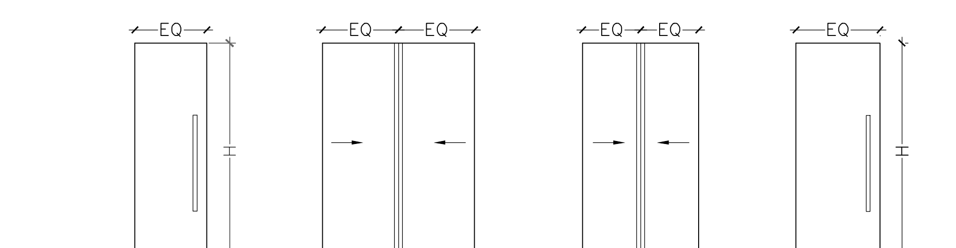
D - A W=3′-0″ H=8′-0″
D - B W=2′-8″ H=8′-0″
D - C W=3′-10″ H=7′-0″
D - D W=3′-0″ H=8′-0″ FIRE-RESISTANT DOOR



D - E TEMPERED SHOWER GLASS PANELS
D - F W=6′-6″ H=8′-0″
GLASS DOOR



D - G CLOSET
D - H CLOSET
D - I CLOSET
D - J CLOSET



D - K CLOSET
D - L CLOSET
D - M CLOSET
D - N CLOSET

architecture west inc.
1719 STEWART ST. SANTA MONICA CA 90404

REVISIONS

PROJECT ADDRESS: 3727 ROBERTSON ST. CULVER CITY CA 90232

PROJECT TITLE: 3727 ROBERTSON

CLIENT:

DATE: 04/27/2016

JOB NUMBER:

DRAWING PHASE: P/CSUBMITTAL

SHEET TITLE: INTERIOR DOOR & SCHEDULE

SHEET NUMBER: A 16

08/13/2019

Attachment E

ESA, Cultural Resources Assessment Report

3727 ROBERTSON BOULEVARD, CULVER CITY, CALIFORNIA

Cultural Resources Assessment Report

Prepared for
Icon West, Inc
520 S. La Fayette Park Place
Suite 503
Los Angeles, CA 90057

December 2020

ESA

3727 ROBERTSON BOULEVARD, CULVER CITY, CALIFORNIA

Cultural Resources Assessment Report

Prepared for:
Icon West, Inc
520 S. La Fayette Park Place
Suite 503
Los Angeles, CA 90057

December 2020

Prepared by:
ESA
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Sara Dietler, B.A.

Report Author:
Sara Dietler, B.A.
Amber Madrid, B.A.
Hanna Winzenried, M.Sc

Project Location:
Beverly Hills (CA) USGS 7.5-minute Topographic Quad
Township 2 South, Range 14 West, Unsectioned

Assessor Parcel Numbers: 4206-033-057

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3727 ROBERTSON BOULEVARD PROJECT

Cultural Resources Assessment Report

Introduction

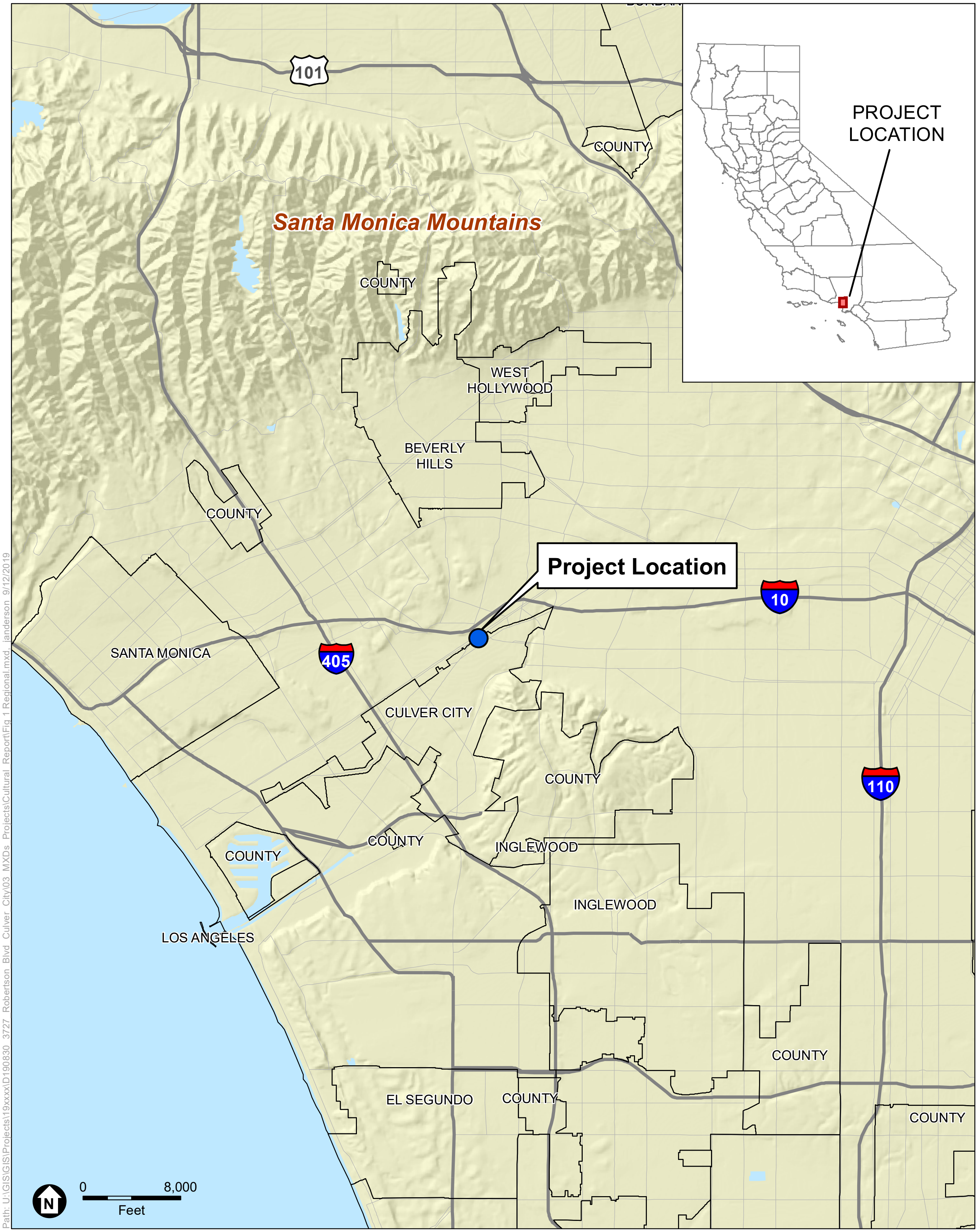
Environmental Science Associates (ESA) has been retained by the Icon West Inc. (applicant) to conduct a cultural resources assessment for the 3727 Robertson Boulevard Project (Project) in support of a Class 32 Infill Exemption for the Project. The Project proposes to develop a five-story mixed-use building in Culver City, California. Culver City (City) is the lead agency for the Project pursuant to the California Environmental Quality Act (CEQA).

The scope of work for this assessment included a cultural resources records search through the California Historical Resources Information System-South Central Coastal Information Center (CHRIS-SCCIC), a Sacred Lands File (SLF) search through the Native American Heritage Commission, a pedestrian survey of the project site, land use history research, and other archival research.

ESA personnel involved in the preparation of this report are as follows: Monica Strauss, M.A., RPA, and Margarita Jerabek, Ph.D., project directors; Sara Dietler, B.A., Senior Cultural Resources Specialist, project manager and report author; Amber Madrid, B.A., archaeologist, report author and surveyor; Hanna Winzenried, M.Sc., architectural historian, report author and surveyor; and Jason Nielson, GIS specialist. Resumes of key personnel are included in **Appendix A**.

Project Location

The Project Site is approximately 0.14 acres and is located on Robertson Boulevard, between Venice Boulevard and Washington Boulevard, in Culver City (**Figure 1**). A single-lane service alley runs along the western side of the Project Site and the service alley serves as the western boundary of the Project Site. Specifically, the Project Site is located in an unsectioned portion of Township 2 South, Range 14 West on the Beverly Hills USGS 7.5-minute topographic quadrangle (**Figure 2**). The Project Site is 6,110 square feet in size and is currently developed with a sound studio totaling 2,850 square feet, which would be demolished and removed to support development of the Project (**Figure 3**).

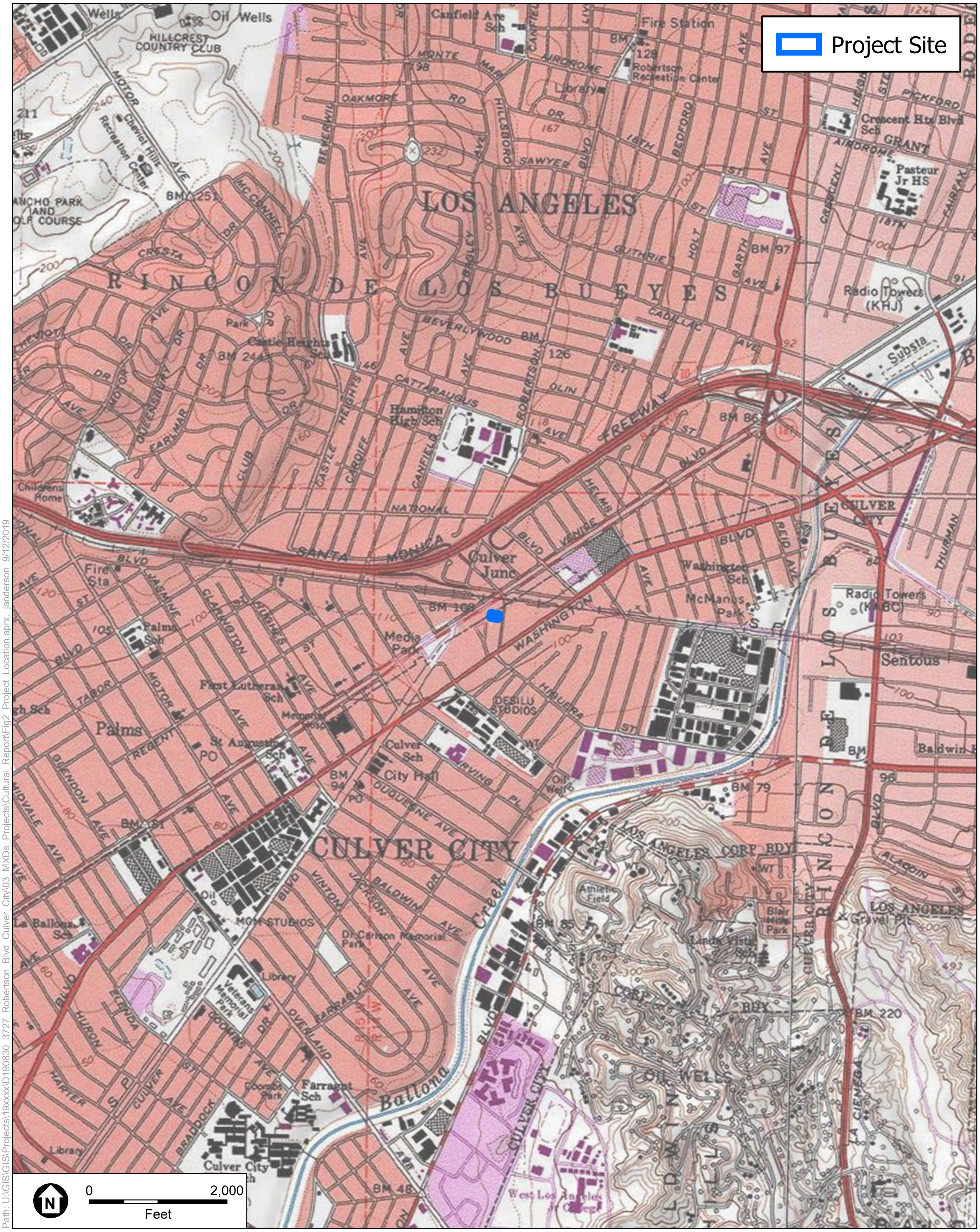


SOURCE: ESRI

3727 S. Robertson Blvd, Culver City

Figure 1
Regional Location

ESA



SOURCE: USGS Topographic Series (Beverly Hills, Hollywood, CA).

3727 S. Robertson Blvd, Culver City

ESA

Figure 2
Project Location

SOURCE: Mapbox, 2018.

3727 S. Robertson Blvd, Culver City

ESA

Figure 3
Aerial Photograph of Project Site and Vicinity

Project Description

The applicant proposes to develop a five-story, mixed-use building located at 3727 Robertson Boulevard in Culver City, California. The Project would be located on a 0.14 acre (6,110 square feet) parcel. Development of the Project would require the demolition of the existing sound studio totaling 2,850 square feet.

The Project would be designed to accommodate approximately 3,886 square feet of ground-floor retail/restaurant space, 5,455 square feet of commercial office space on the second floor, and 12 two-bedroom apartment units on floors 3 through 5. Parking would be provided in a one-floor, subterranean parking garage with a capacity of 25 vehicles. Excavations of up to 10 feet maximum height are anticipated to construct the subterranean garage.

Setting

Geologic Setting

The Project Site is located in the Los Angeles Basin, a structural depression approximately 50 miles long and 20 miles wide in the northernmost Peninsular Ranges Geomorphic Province (Ingersoll and Rumelhart, 1999). The Los Angeles basin developed as a result of tectonic forces and the San Andreas fault zone, with subsidence occurring 18 to 3 million years ago (Mya) (Critelli et al., 1995). While sediments dating back to the Cretaceous (66 million years ago) are preserved in the basin, continuous sedimentation began in the middle Miocene (around 13 million years ago) (Yerkes et al., 1965). Since that time, sediments have been eroded into the basin from the surrounding highlands, resulting in thousands of feet of accumulation (Yerkes et al., 1965). Most of these sediments are marine, until sea level dropped in the Pleistocene and deposition of the alluvial sediments that compose the uppermost units in the Los Angeles Basin began.

The Los Angeles Basin is subdivided into four structural blocks, with the Project Site occurring in the Central Block, where sediments range from 32,000 to 35,000 feet thick (Yerkes et al., 1965). The Central Block is wedge-shaped, extending from the Santa Monica Mountains in the northwest, where it is about 10 miles wide, to the San Joaquin Hills to the southeast, where it widens to around 20 miles across (Yerkes et al., 1965).

Geologic mapping by Dibblee and Ehrenspeck (1991) indicates that the surface of the Project Site is covered with Holocene-aged younger Quaternary alluvium. The alluvial sediments were deposited on the ancient floodplain of the Los Angeles River and consist of well-sorted silts and sands, interbedded with stream channel deposits of sands and gravels (Dibblee and Ehrenspeck, 1991).

Prehistoric Setting

Based on recent research in the region (Homburg et al., 2014), the following prehistoric chronology has been divided into four general time periods: the Paleocoastal Period (12,000 to 8,000 Before Present [B.P.]), the Millingstone Period (8,000 to 3,000 B.P.), the Intermediate Period (3,000 to 1,000 B.P.), and the Late Period (1,000 B.P. to A.D. 1542). This chronology is manifested in the archaeological record by particular artifacts and burial practices that indicate specific technologies, economic systems, trade networks, and other aspects of culture.

Paleocoastal Period (12,000–8,000 B.P.)

While it is not certain when humans first came to California, their presence in Southern California by about 11,000 B.P. has been well documented. At Daisy Cave, on San Miguel Island, cultural remains have been radiocarbon dated to between 11,100 and 10,950 B.P. (Byrd and Raab, 2007). During this time period, the climate of Southern California became warmer and more arid and the human population, residing mainly in coastal or inland desert areas, began exploiting a wider range of plant and animal resources (Byrd and Raab, 2007).

Millingstone Period (8,000–3,000 B.P.)

During this time period, there is evidence for the processing of acorns for food and a shift toward a more generalized economy. The first evidence of human occupation in the Los Angeles area dates to at least 9,000 years B.P. and is associated with the Millingstone cultures (Wallace, 1955; Warren, 1968). Millingstone cultures were characterized by the collection and processing of plant foods, particularly acorns, and the hunting of a wider variety of game animals (Byrd and Raab, 2007; Wallace, 1955). Millingstone cultures also established more permanent settlements that were located primarily on the coast and in the vicinity of estuaries, lagoons, lakes, streams, and marshes where a variety of resources, including seeds, fish, shellfish, small mammals, and birds, were exploited. Early Millingstone occupations are typically identified by the presence of handstones (manos) and millingstones (metates), while those Millingstone occupations dating later than 5,000 B.P. contain a mortar and pestle complex as well, signifying the exploitation of acorns in the region.

Intermediate Period (3,000–1,000 B.P.)

During this time period, many aspects of Millingstone culture persisted, but a number of socioeconomic changes occurred (Erlandson, 1994; Wallace, 1955; Warren, 1968). The native populations of Southern California were becoming less mobile and populations began to gather in small sedentary villages with satellite resource-gathering camps. Increasing population size necessitated the intensified use of existing terrestrial and marine resources (Erlandson, 1994). Evidence indicates that the overexploitation of larger, high-ranked food resources may have led to a shift in subsistence, towards a focus on acquiring greater amounts of smaller resources, such as shellfish and small-seeded plants (Byrd and Raab, 2007). This period is characterized by increased labor specialization, expanded trading networks for both utilitarian and non-utilitarian materials, and extensive travel routes. Although the intensity of trade had already been increasing, it now reached its zenith, with asphaltum (tar), seashells, and steatite being traded from Southern California to the Great Basin. Use of the bow and arrow spread to the coast around 1,500 B.P, largely replacing the dart and atlatl (Homburg et al., 2014). Increasing population densities, with ensuing territoriality and resource intensification, may have given rise to increased disease and violence between 3,300 and 1,650 B.P. (Raab et al. 1995).

Late Period (1,000 B.P.–A.D. 1542)

The Late Period is associated with the florescence of the Gabrielino, who are estimated to have had a population numbering around 5,000 in the pre-contact period. The Gabrielino occupied what is presently Los Angeles County and northern Orange County, along with the southern Channel Islands, including Santa Catalina, San Nicholas, and San Clemente (Kroeber, 1925). This period saw the development of elaborate trade networks and use of shell-bead currency. Fishing became an increasingly significant part of subsistence strategies at this time, and investment in fishing technologies, including the plank canoe, are reflected in the archaeological record (Erlandson, 1994; Raab et al., 1995). Settlement at this time is believed to have consisted of dispersed family groups that revolved around a relatively limited number of permanent village settlements that were located centrally with respect to a variety of resources (Koerper et al., 2002).

Ethnographic Setting

The Project Site is located in a region traditionally occupied by the Gabrielino Indians. The term "Gabrielino" is a general term that refers to those Native Americans who were administered by the Spanish at the Mission San Gabriel Arcángel. Their neighbors included the Chumash and Tataviam to the north, the Juañeno to the south, and the Serrano and Cahuilla to the east. The Gabrielino are reported to have been second only to the Chumash in terms of population size and regional influence (Bean and Smith, 1978). The Gabrielino language is part of the Takic branch of the Uto-Aztecan language family.

At the time of Spanish contact, many Gabrielino practiced a religion that was centered around the mythological figure Chinigchinich (Bean and Smith, 1978). This religion may have been relatively new when the Spanish arrived, and was spreading at that time to other neighboring Takic groups. The Gabrielino practiced both cremation and inhumation of their dead. A wide variety of grave offerings, such as stone tools, baskets, shell beads, projectile points, bone and shell ornaments, and otter skins, were interred with the deceased.

Coming ashore on Santa Catalina Island in October of 1542, Juan Rodriguez Cabrillo was the first European to make contact with the Gabrielino; the 1769 expedition of Portolá also passed through Gabrielino territory (Bean and Smith, 1978). Native Americans suffered severe depopulation and their traditional culture was radically altered after Spanish contact. Nonetheless, Gabrielino descendants still reside in the greater Los Angeles and Orange County areas and maintain an active interest in their heritage.

The nearest Gabrielino village, to the Project Site was located in what is now Playa Vista and was known by the early Gabrielino placename of "Waachnga" (Hackel, et. al., 2019), and was located approximately 4 miles to the southwest of the Project site. This location was also the site of extensive archaeological investigations in the early 21st century and includes a very large complex of many village sites representing an occupation of more than 8,000 years up into the Mission Period (Douglass et. al., 2016). Mission baptism records show baptisms from Waachnga from about 1798 to 1811 (Hackel, et. al., 2019). Approximately 1 mile to the east of the Project Site is the location where "Los Angeles Man" was found deeply buried near the creek channel at Higuera Street (Kielbasa, 1997: 111)

Historic Setting

Spanish Period (A.D. 1542–1821)

Although Spanish explorers made brief visits the region in 1542 and 1602, sustained contact with Europeans did not commence until the onset of the Spanish Period. In 1769 Gaspar de Portolá led an expedition from San Diego, passing through the Los Angeles Basin and the San Fernando Valley, on its way to the San Francisco Bay (McCawley, 1996). Father Juan Crespi, who accompanied the 1769 expedition, noted the suitability of the Los Angeles area for supporting a large settlement. This was followed in 1776 by the expedition of Father Francisco Garcés (Johnson and Earle, 1990).

In the late 18th century, the Spanish began establishing missions in California and forcibly relocating and converting native peoples. Mission San Gabriel Arcángel was founded on September 8, 1771 and Mission San Fernando Rey de España on September 8, 1797. By the early 1800s, the majority of the surviving Gabrielino population had entered the mission system, either at San Gabriel or San Fernando. Mission life offered some degree of security in a time when traditional trade and political alliances were failing and epidemics and subsistence instabilities were increasing (Jackson, 1999). This lifestyle change also brought with it significant negative consequences for Gabrielino health and cultural integrity.

On September 4, 1781, El Pueblo de la Reina de los Angeles was established not far from the site where Portolá and his men camped during their 1769 excursion, with a land grant of 28 acres issued to California Governor Felipe de Neve in 1781 (Gumprecht, 2001). The pueblo was first established in response to the increasing agricultural needs of Spanish missions and presidios in Alta California. The original pueblo consisted of a central square surrounded by 12 houses and a series of agricultural fields. Thirty-six fields occupied 250 acres between the town and the river to the east (Gumprecht, 2001).

By 1786, the flourishing pueblo attained self-sufficiency and funding by the Spanish government ceased. Fed by a steady supply of water and an expanding irrigation system, agriculture and ranching grew, and by the early 1800s the pueblo produced surplus wheat, corn, barley, and beans for export. A large number of livestock, including cattle and sheep, grazed in the surrounding lands (Gumprecht, 2001).

Mexican Period (A.D. 1821–1848)

Mexico gained its independence from Spain in 1821 (Gumprecht, 2001). Mexico promoted the settlement of California with the issuance of land grants. In 1833, Mexico began the process of secularizing the missions, reclaiming the majority of mission lands and redistributing them as land grants. According to the terms of the Secularization Law of 1833 and Regulations of 1834, at least a portion of the lands would be returned to the Native populations, but this did not always occur (Milliken et al., 2009).

Many ranchos continued to be used for cattle grazing by settlers during the Mexican Period. Hides and tallow from cattle became a major export for Californios[1], many of whom became wealthy and prominent members of society. The Californios led generally easy lives, leaving the hard work to vaqueros[2] and Indian laborers (Pitt, 1994; Starr, 2007).

American Period (A.D. 1848–present)

Mexico ceded California to the United States as part of the Treaty of Guadalupe Hildalgo in 1848. California officially became one of the United States in 1850. While the treaty recognized right of Mexican citizens to retain ownership of land granted to them by Spanish or Mexican authorities, the claimant was required to prove their right to the land before a patent was given. The process was lengthy and generally resulted in the claimant losing at least a portion of their land to attorney's fees and other costs associated with proving ownership (Starr, 2007).

When the discovery of gold in northern California was announced in 1848, a huge influx of people from other parts of North America flooded into California and the population of Los Angeles tripled between 1850 and 1860. The increased population provided an additional outlet for the Californios' cattle. As demand increased, the price of beef skyrocketed and Californios reaped the benefits. However, a devastating flood in 1861, followed by droughts in 1862 and 1864, led to a rapid decline of the cattle industry; over 70 percent of cattle perished during these droughts (McWilliams, 1946; Dinkelspiel, 2008). These natural disasters, coupled with the burden of proving ownership, caused many Californios to lose their lands during this period. Former ranchos were subsequently subdivided and sold for agriculture and residential settlement (Gumprecht, 2001; McWilliams, 1946).

Los Angeles was connected to the transcontinental railroad via San Francisco on September 5, 1876 and the population again exploded. The city would experience its greatest growth in the 1880s when two more direct rail connections to the East Coast were constructed. The Southern Pacific completed its second transcontinental railway, the Sunset Route from Los Angeles to New Orleans, in 1883 (Orsi, 2005). In 1885, the Santa Fe Railroad completed a competing transcontinental railway to San Diego, with connecting service to Los Angeles (Mullaly and Petty, 2002). The resulting fare wars led to an unprecedented real estate boom. Despite a subsequent collapse of the real estate market, the population of Los Angeles increased 350 percent from 1880 to 1890 (Dinkelspiel, 2008). Los Angeles continued on its upward trajectory in the first few decades of the 20th century with the rise of tourism, automobile travel, and the movie industry (McWilliams, 1946).

Development and Incorporation of Culver City

Harry H. Culver (1880 -1946), the founder of Culver City, was born in Milford, Nebraska on January 22, 1880 (**Figure 4**) (Cerra, 2013). The middle child of five, Culver was raised on a farm along with three brothers and a sister. His father, Jacob Hazel Culver, was a brigadier general in the National Guard and a strict disciplinarian. Culver followed in his father's footsteps, enlisting in the military during the Spanish-American War. He studied at Doane College before spending

[1] Spanish speaking, Catholic persons of Latin American descent born in Alta California between 1769 and 1848
[2] Horsemen and cattle herders of Spanish Mexico and Alta California

three years at the University of Nebraska. In 1901, Culver traveled to the Philippines where he began working in the mercantile business, worked as a reporter for the *Manila Times*, and served as a special agent for the customs department. After more than three years in the Philippines, Culver returned to the United States, performing his customs duties in Detroit and Saint Louis. He resigned from the customs department in 1910 when he moved to California and began working for real estate giant I.N. Van Nuys. “As the story goes, after Van Nuys offered to make him a manager because of his exemplary work, Culver decided to venture out on his own. After intense study, Harry Culver pinpointed the area between Los Angeles and Abbot Kinney’s resort of Venice for his city” (Cerra, 2013).

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SOURCE: Davis-Monthan Aviation Field Register

Figure 4
Harry Culver, date unknown

At the California Club in 1913, Harry Culver announced his plans to develop a city west of downtown Los Angeles. Culver saw an opportunity to capitalize on the excitement generated by Abbot Kinney’s Venice of America development along the California coast south of Santa Monica. Between Venice and Los Angeles sat open land, originally part of Rancho La Ballona and Rancho Rincón de los Bueyes, and as the relationship between Los Angeles and Venice took shape, Culver saw a spot in between that was ideal for a new town site. “If you draw a line from the Story Building to the Ocean Front at Venice, at the halfway mark you will find three intersection electric lines—the logical center for what we propose to develop a townsite” (Cerra, 2013). Soon after Culver’s speech, the city of Culver City was established. Culver promoted his new community by holding special events like “prettiest baby contests” and an annual marathon race. Newspaper advertisements exclaimed “All Roads Lead to Culver City!” Culver City continued to grow and finally incorporated in 1917 (Cerra, 2013). The City grew outward from the downtown commercial area and adjacent film studios. This area saw commercial development along Culver Boulevard in the 1920s and 1930s, and spread to Washington Boulevard in the 1940s and 1950s, and was surrounded by residential neighborhoods (**Figure 4** and **5**).

At the heart of Screenland, the economic health of Culver City has always been strongly tied to the movie industry. Following the closure of MGM Studios, the City was looking for ways to spur economic development. To spur development and create a new flow of money, the City created the Redevelopment Agency (CCRA) (Sony Pictures 2017). One of the first projects undertaken by the newly formed agency was the Fox Hills redevelopment. This development would open up more than 300 acres of land just southwest of the City to residential, commercial, and industrial growth.

D190830.00

SOURCE: *Sony Pictures Museum*

Figure 4
The triangular intersection at Washington and Culver Boulevards, c. 1930s

D190830.00

SOURCE: *Sony Pictures Museum*

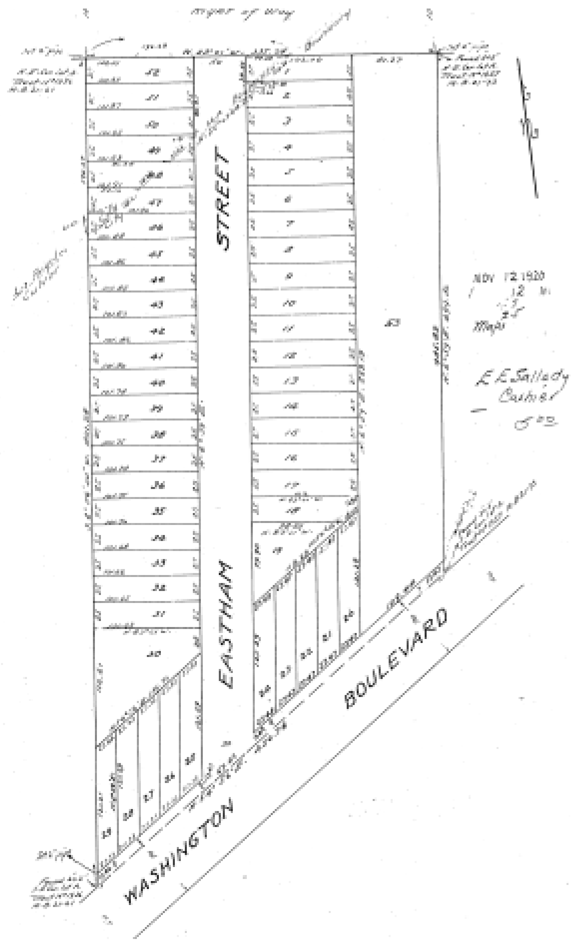
Figure 5
The triangular intersection at Washington and Culver Boulevards, c. 1930-40s

History of Project Site

The Project Site was originally part of the Rincon De Los Bueyes land grant which means "Corner of the Oxen", it was known as this due to a large ravine at the southeast corner of the grant which served as a natural corral. La Cienega Boulevard, in the present day, follows the former route of this ravine. (Kielbasa 1997:111). Lying immediately south of Ranch Rodeo de las Aguas, Rincon De Los Bueyes was originally public land where citizens from the pueblo could graze their cattle. In 1823, the rancho was granted to Bernardo Hiǵuera and Cornelio Lopez. Hiǵuera later bequeathed his ownership in the rancho to his two sons Francisco and Secundino. Franciso then conveyed 100 acres of the rancho to Jose Antonio Rocha II in 1872 who later built the Rocha Adobe which still stands today on Shenandoah Street which continued to be farmland until much of the area and the larger Rancho was repeatedly subdivided, and then later annexed to the City of Los Angeles in 1915as part of the Palms District (Kielbasa 1997:111-114).

Tract No. 3872

The project site was originally located within Tract No. 1957, a subdivision of Rancho Rincon de los Bueyes and deeded from William T. Hoke to Vienta B. de Ivarrondo in 1912. Tract No. 3872 was a subdivision of Tract No. 1957 done in 1920 **(Figure 6)**. By 1929, A few single-family dwellings were constructed along Eastham (Now Robertson Boulevard) **(Figure 7)**. By 1950, Willat Avenue was developed with commercial buildings such as a woodworking and printing store, plumbing, factories, upholstery, food products, etcetera. Robertson Boulevard was still developed with single-family dwellings **(Figure 8)**. However, by 1957, the properties along the west side of Robertson Boulevard was developed with commercial/industrial buildings **(Figure 9**. In 1971, the buildings along the west side of Robertson Avenue were also developed with commercial/industrial buildings which were then replaced with a large commercial building in 1985 **(Figure 10)**. Figure 11 depicts the current configuration of the Project Site and vicinity.



D1190830.00

SOURCE: *Los Angeles County Public Works*

Figure 6
Tract No. 3872 in 1920

D190830.00

SOURCE: *Los Angeles Public Library*

Figure 7
Sanborn map, 1929

D190830.00

SOURCE: *Los Angeles Public Library*

Figure 8
Sanborn map, 1950

D190830.00

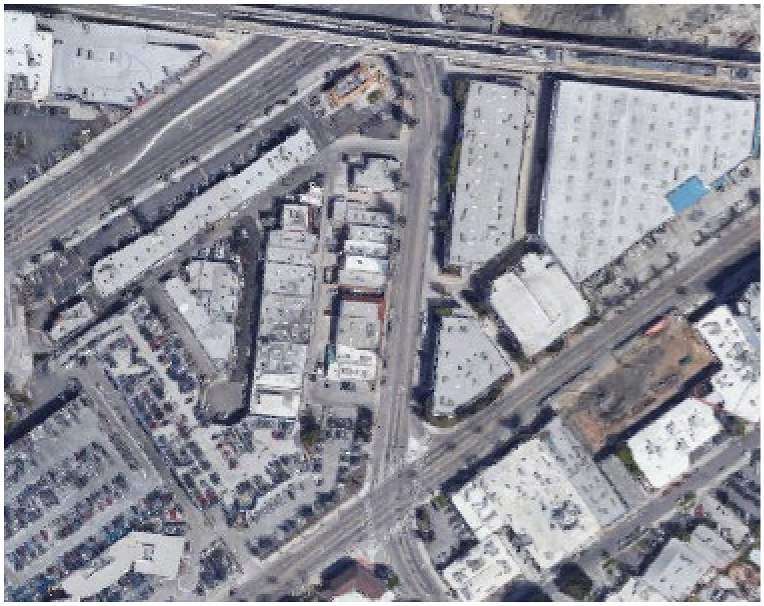
SOURCE: *University of California, Santa Barbara*

Figure 9
Aerial of the Tract in 1956

D190830.00

SOURCE: *University of California, Santa Barbara*

Figure 10
Aerial of the Tract in 1971



D190830.00

SOURCE: *Google Maps*

Figure 11
Aerial of the Tract in 2019

Ivy Park Substation

Ivy Park Substation is on the National Register of Historic Places located at 9015 Venice Boulevard. The building was constructed in 1907 as a power substation which housed equipment to convert electricity for the electric railway cars and locomotives. It was built in the Mission Revival Style (**Figure 12**). The building is believed to be the only remaining major structure built by the Los Angeles Pacific Electric Company. Further, it is one of the most intact electric railway substation buildings in Southern California and it is believed to be one of the most in-tact Mission Revival Style industrial buildings in Los Angeles County (Electric Railway Historical Association of Southern California, 1981). The Substation does not have a view of the subject property as the Expo Metro line overpass blocks the view down Venice Boulevard from the Substation. Furthermore, the substation's original setting has already been drastically altered since its construction in 1907.

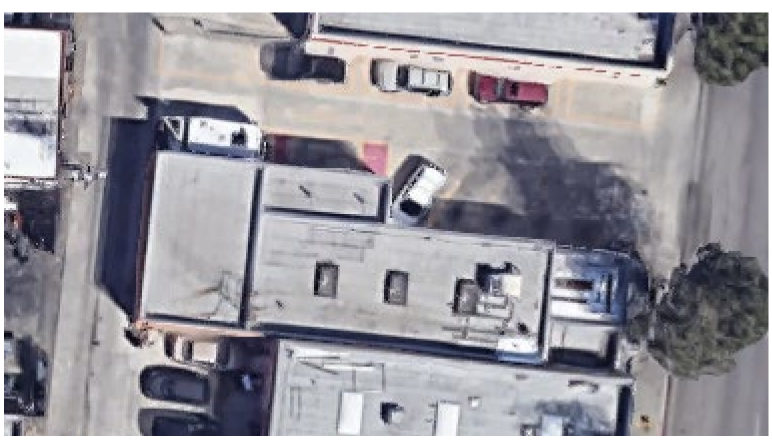
D190830.00

SOURCE: *Electric Railway Historical Association of Southern California*

Figure 12
Historical Photograph of the Ivy Park Substation

Architectural Description

The subject property is located on a rectangular lot and the improvement on the lot is a commercial/industrial building built in 1949/1954 and is oriented east towards Robertson Boulevard. The subject building is made up of a main rectangular mass with an addition to the west (rear) façade, north (side) façade, and front (east) façade. The building has a flat roof and stucco siding (**Figure 13**). It is built in a vernacular commercial style.



D190830.00

SOURCE: *Google Maps*

Figure 13
Aerial of the subject property, 2019

The front (east) façade has a front door with a ramp leading to it on the south. To the north there is a bay with two fixed windows and a door with a flat overhanging roof **(Figure 14)**.

D190830.00

SOURCE: *ESA, 2019*

Figure 14
Front (east) façade of the subject property, view facing southwest

The north (side) elevation is articulated. The front (east) volume is slightly shorter with stucco siding. The middle volume has painted brick siding and is taller. The west volume steps out a few feet from the rest of the façade and has brick siding. There is a man door and a large loading door **(Figure 15)**.

D190830.00

SOURCE: *ESA, 2019*

Figure 15
North (side) elevation, view facing southeast

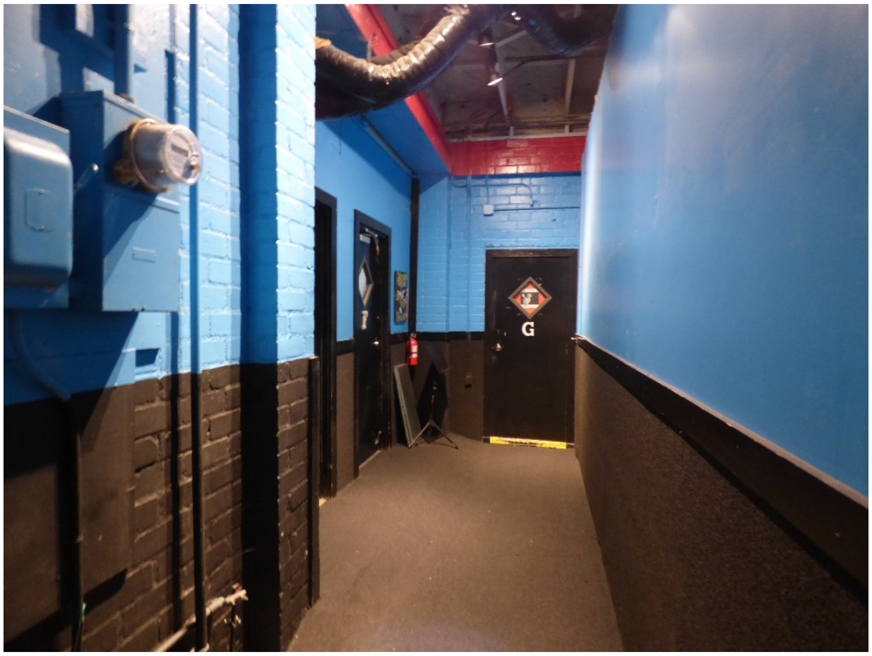
The west (rear) elevation and south (side) elevation are plain masonry walls with no openings **(Figure 16)**.

D19083000

SOURCE: *ESA, 2019*

Figure 16
West (rear) and south (side) elevations, view facing northeast

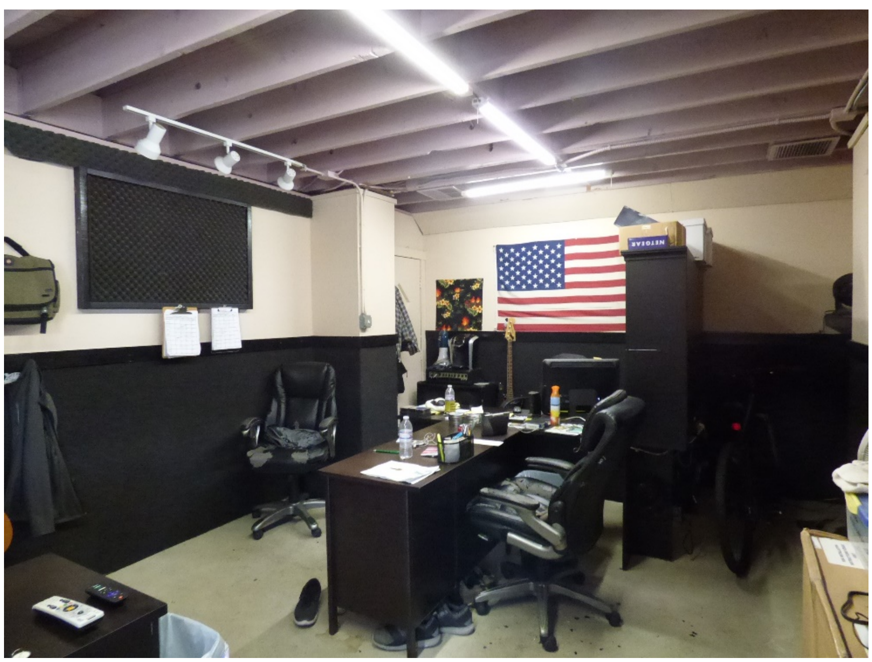
The interior of the building has been completely reconfigured to make sound studios. The only original features are the exterior masonry walls and the original ceiling **(Figure 17)**. There is also an office with the original ceiling but new partitions **(Figure 18)**.



D190830.00

SOURCE: *ESA, 2019*

Figure 17
Interior of sound studio portion



D190830.00

SOURCE: *ESA, 2019*

Figure 18
Interior of the office

Regulatory Framework

Numerous laws and regulations require federal, state, and local agencies to consider the effects a project may have on cultural resources. These laws and regulations stipulate a process for compliance, define the responsibilities of the various agencies proposing the action, and prescribe the relationship among other involved agencies.

State

The State implements the NHPA through its statewide comprehensive cultural resources surveys and preservation programs. The California Office of Historic Preservation (OHP), as an office of the California Department of Parks and Recreation, implements the policies of the NHPA on a statewide level. The OHP also maintains the California Historic Resources Inventory. The SHPO is an appointed official who implements historic preservation programs within the State's jurisdictions.

California Environmental Quality Act

CEQA is the principal statute governing environmental review of projects occurring in the state and is codified at *Public Resources Code (PRC) Section 21000 et seq.* CEQA requires lead agencies to determine if a proposed project would have a significant effect on the environment, including significant effects on historical or unique archaeological resources. Under CEQA (Section 21084.1), a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.

The *CEQA Guidelines* (Title 14 California Code of Regulations [CCR] Section 15064.5) recognize that historical resources include: (1) a resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (California Register or CR); (2) a resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); and (3) any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California by the lead agency, provided the lead agency's determination is supported by substantial evidence in light of the whole record. The fact that a resource does not meet the three criteria outlined above does not preclude the lead agency from determining that the resource may be an historical resource as defined in PRC Sections 5020.1(j) or 5024.1.

If a lead agency determines that an archaeological site is a historical resource, the provisions of Section 21084.1 of CEQA and Section 15064.5 of the *CEQA Guidelines* apply. If an archaeological site does not meet the criteria for a historical resource contained in the *CEQA Guidelines*, then the site may be treated in accordance with the provisions of Section 21083, which is as a unique archaeological resource. As defined in Section 21083.2 of CEQA a "unique" archaeological resource is an archaeological artifact, object, or site, about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information;
- Has a special and particular quality such as being the oldest of its type or the best available example of its type; or,
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

If an archaeological site meets the criteria for a unique archaeological resource as defined in Section 21083.2, then the site is to be treated in accordance with the provisions of Section 21083.2, which state that if the lead agency determines that a project would have a significant effect on unique archaeological resources, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place (Section 21083.1(a)). If preservation in place is not feasible, mitigation measures shall be required. The *CEQA Guidelines* note that if an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment (*CEQA Guidelines* Section 15064.5(c)(4)).

A significant effect under CEQA would occur if a project results in a substantial adverse change in the significance of a historical resource as defined in *CEQA Guidelines* Section 15064.5(a). Substantial adverse change is defined as “physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired” (*CEQA Guidelines* Section 15064.5(b)(1)). According to *CEQA Guidelines* Section 15064.5(b)(2), the significance of a historical resource is materially impaired when a project demolishes or materially alters in an adverse manner those physical characteristics that:

A. Convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register; or
B. Account for its inclusion in a local register of historical resources pursuant to section 5020.1(k) of the Public Resources Code or its identification in a historical resources survey meeting the requirements of section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
C. Convey its historical significance and that justify its eligibility for inclusion in the California Register as determined by a Lead Agency for purposes of CEQA.

In general, a project that complies with the *Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* (Standards) (Weeks and Grimer, 1995) is considered to have mitigated its impacts to historical resources to a less-than-significant level (*CEQA Guidelines* Section 15064.5(b)(3)).

California Register of Historical Resources

The California Register is "an authoritative listing and guide to be used by State and local agencies, private groups, and citizens in identifying the existing historical resources of the State and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1[a]). The criteria for eligibility for the California Register are based upon National Register criteria (PRC Section 5024.1[b]). Certain resources are determined by the statute to be automatically included in the California Register, including California properties formally determined eligible for, or listed in, the National Register.

To be eligible for the California Register, a prehistoric or historical-period property must be significant at the local, State, and/or federal level under one or more of the following four criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. Is associated with the lives of persons important in our past;
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4. Has yielded, or may be likely to yield, information important in prehistory or history.

A resource eligible for the California Register must meet one of the criteria of significance described above, and retain enough of its historic character or appearance (integrity) to be recognizable as a historical resource and to convey the reason for its significance. It is possible that a historic resource may not retain sufficient integrity to meet the criteria for listing in the National Register, but it may still be eligible for listing in the California Register.

Additionally, the California Register consists of resources that are listed automatically and those that must be nominated through an application and public hearing process. The California Register automatically includes the following:

- California properties listed on the National Register and those formally determined eligible for the National Register;
- California Registered Historical Landmarks from No. 770 onward; and
- Those California Points of Historical Interest that have been evaluated by the OHP and have been recommended to the State Historical Commission for inclusion on the California Register.

Other resources that may be nominated to the California Register include:

- Historical resources with a significance rating of Category 3 through 5 (those properties identified as eligible for listing in the National Register, the California Register, and/or a local jurisdiction register);
- Individual historical resources;
- Historical resources contributing to historic districts; and,

- Historical resources designated or listed as local landmarks, or designated under any local ordinance, such as an historic preservation overlay zone.

California Health and Safety Code Section 7050.5

California Health and Safety Code Section 7050.5 requires that in the event human remains are discovered, the County Coroner be contacted to determine the nature of the remains. In the event the remains are determined to be Native American in origin, the Coroner is required to contact the Native American Heritage Commission (NAHC) within 24 hours to relinquish jurisdiction.

California Public Resources Code Section 5097.98

California PRC Section 5097.98, as amended by Assembly Bill 2641, provides procedures in the event human remains of Native American origin are discovered during project implementation. PRC Section 5097.98 requires that no further disturbances occur in the immediate vicinity of the discovery, that the discovery is adequately protected according to generally accepted cultural and archaeological standards, and that further activities take into account the possibility of multiple burials. PRC Section 5097.98 further requires the NAHC, upon notification by a County Coroner, designate and notify a Most Likely Descendant (MLD) regarding the discovery of Native American human remains. Once the MLD has been granted access to the site by the landowner and inspected the discovery, the MLD then has 48 hours to provide recommendations to the landowner for the treatment of the human remains and any associated grave goods.

In the event that no descendant is identified, or the descendant fails to make a recommendation for disposition, or if the land owner rejects the recommendation of the descendant, the landowner may, with appropriate dignity, reinter the remains and burial items on the property in a location that will not be subject to further disturbance.

Local

City of Culver City

Municipal Code

The City enacted a Historic Preservation Ordinance in 1991 which defines Cultural Resources. The Historic Preservation Ordinance (Chapter 15.05 of the City's Municipal Code)[3] is administered through the City's Community Development Department by Cultural Affairs. The Ordinance outlines a designation process, criteria, and procedures for altering or modifying designated Cultural Resources. Pursuant to the City's Ordinance, a Cultural Resource is a property that has aesthetic, cultural, architectural or historical significance to the city, state, or nation, and may have been designated as a Landmark Structure, Significant Structure, or Recognized Structure. After satisfying at least one of the threshold criteria, classification is based on a ranking system, currently outlined in Resolution No. 91-R015.

[3] Culver City Historic Preservation Ordinance, www.culvercity.org/~/media/Files/Culture/Ordinance2004%20004%20pdf.ashx, accessed February 12, 2015.

A **Landmark Structure** is defined as a structure designated as an exceptional example of the highest architectural, historical, or cultural significance to the community. A Landmark structure or district may be designated without owner consent.

A **Significant Structure** is defined as a structure designated as being of substantial architectural, historical, or cultural significance to the community. If residential, a "Significant" structure or district shall be designated with written consent of the owner, provided that the consent of only a majority of the owners shall be required for a "Significant District" designation. Once the designation has been made and the designation document has been filed for recondition, owner consent is irrevocable. If the owner consent is not obtained, a residential structure or district may be designated "Recognized." If nonresidential, a structure may be designated without owner consent.

All structures with "Landmark" or "Significant" designations are required to display a plaque identifying that building or district as either "Landmark" or "Significant."

A **Recognized Structure** is defined as a structure designated as being of architectural, historical, or cultural interest. A structure or district may be designated as "Recognized" without the consent of the owner. No other requirements apply to Recognized structures.

The Ordinance also identifies historic districts as a "Landmark District," a "Significant District," or a "Recognized District" with similar criteria for designation. A historic district is described as a designated area consisting of one (1) or more contiguous parcels improved with structures at which events occurred that made a significant contribution to the city, state, or national history or culture, or an area that contains structures that are collectively significant examples of period, style, or method of construction that provide distinguishing characteristics of the architectural type or period represented.

The Culver City Historic Preservation Ordinance (Section 15.05.020) establishes criteria for designating local historical resources and districts as Cultural Resources. To be considered for designation, a structure must be at least fifty (50) years old and the exterior of the structure is accessible or visible to the public, or the structure or district has special importance to the City.

After satisfying the threshold criteria, a structure or district must meet at least one of the following criteria:

1. Is the structure(s) of architectural significance"?
2. Is the structure(s) of "historical or cultural significance"?
3. Do the structures in the district collectively meet 1 or 2 above?

Integrity

The City Historic Preservation Ordinance does not include integrity requirements and the City has no integrity guidelines. A historical resource eligible for City designation must meet the threshold criteria and at least one or both of the criteria of significance above and retain enough of its historic character or appearance to be recognizable and to convey the reasons for its significance. In the absence of City integrity requirements, integrity assessments at the local level are conducted utilizing best practices. Integrity at the local level is evaluated in consideration of the area of significance, either architectural or historical/cultural, and with regard to retention of seven aspects of integrity similar to the National Register (location, design, setting, materials, workmanship, feeling, and association). It is possible that a historical resource may not retain sufficient integrity to meet the criteria for listing in the National Register or California Register, but may still be eligible for local listing if it has enough integrity to convey its local significance.

General Plan

The City's General Plan does not include policies, goals, and objectives for cultural resources.

Archival Research

SCCIC Records Search

ESA conducted a cultural resources records search on August 20, 2019 at the CHRIS-SCCIC housed at California State University, Fullerton. The record search included a review of all previously recorded archaeological resources and previous studies within the Project Site and a 0.5-mile radius of the Project Site, and historic architectural resources within or adjacent to the Project Site. The records search also included a review of listings for the National Register, California Register, California Points of Historical Interest, California Historical Landmarks, California State Historic Resources Inventory (HRI), and Los Angeles Historical Cultural Monuments (LAHCM).

Previous Cultural Resources Investigations

The records search results indicate that 10 cultural resources studies have been conducted within a 0.5-mile radius of the Project Site. Approximately 20 percent of the 0.5-mile records search radius has been included in previous cultural resources studies. Of the 10 previous studies, four have previously included the Project Site. These studies include two archaeological surveys, one combined historic resources evaluation and archaeological survey, and one historic resources evaluation. The studies are discussed in detail below the table.

Previously Recorded Cultural Resources

The records search revealed that a total of four cultural resources have been previously recorded within the 0.5-mile radius of the Project Site. These include two archaeological resources, one historic architectural resource, and one LAHCM listing (**Table 2**). All four of the are historic-period sites and structures. None of these resources have been recorded within the Project Site; however, two are located near the Project Site.

Sacred Lands File Search

The NAHC maintains a confidential SLF which contains sites of traditional, cultural, or religious value to the Native American community. The NAHC was contacted by ESA on September 3, 2019 to request a search of the SLF. The NAHC responded to the request in a letter dated

September 20, 2019. The results of the SLF search conducted by the NAHC indicate that Native American cultural resources are not known to be located within the Project Site (**Appendix B**).

Additional Research

Historic Maps and Aerial Photographs

Historic maps and aerial photographs were examined to understand the development of the Project Site and vicinity and to contribute to an assessment of the Project Site's potential to retain buried archaeological resources. Available topographic maps include the 1894 and 1900 Los Angeles 15-minute topographic quadrangle, the 1921 Santa Monica 15-minute topographic quadrangles, the 1924 Hollywood 7.5-minute topographic quadrangle, and the 1950, 1966, and 1995 Beverly Hills 7.5-minute topographic quadrangles (USGS, 2018). Historic aerial photographs were available for the years 1928, 1937, and 1956 (UCSB). Sanborn maps were available for the years 1924, 1929, 1949, 1950, and 1970.

The available historic maps and aerial photographs indicate that the Project vicinity was largely rural until the 1920s. In 1894, the Southern Pacific Railroad (Santa Monica Branch Line) and a few structures in the surrounding area are developed. Nearby water resources include the Ballona Creek located 0.56-miles southeast of the Project Site and swamp/marsh located approximately one-mile east of the Project Site. By 1921 further development to the east and west of the Project Site dramatically increase with commercial and residential uses. In addition, the Pacific Electric Railway is depicted north of the Project Site and utilizing the Southern Pacific Railroad Line. The 1924 Sanborn Map indicates that by this time, the block in which the Project is located was averagely developed, although the surrounding areas were still vastly undeveloped. The Project area occupies two adjacent lots, and by this time, there was a residential improvement on the northern lot, while the southern one remained vacant. By the 1929 Sanborn, not much changed in terms of development in the area, except for a few more improvements that appeared in the surrounding blocks. In the Project area, a smaller rear improvement, used as a garage, existed to the back of the structure on the northern lot. The area surrounding the Project Site did not change much through 1937, however, by the 1949 Sanborn map, it's clear that substantial development, both residential and commercial/industrial, had occurred both in the Project's block, and in the areas surrounding it. By the following year, the southern lot of the Project Site had been developed with a factory building. This 1950 Sanborn also shows how existing structures in this area were pretty evenly divided into residential buildings and commercial/industrial buildings. A historic aerial from 1956 confirms this development of the area, and demonstrates how much expansion has occurred in the vicinity since the 1928 and 1937 aerial. The next available Sanborn map is from 1970, and by this time, the residential improvement on the northern lot of the Project Site has been demolished, and the subject property identified as "machine shop" with the northern portion vacant or parking. Several other of the residential dwellings that surrounded the Project Site have additionally been replaced by commercial and/or industrial structures, specially most of the buildings on the lots directly north, east, and some of the lots south, of the Project Site.

Building Permits

The original building permits for the construction of the subject property located at 3727 Robertson Blvd. were issued to R.W. Parizek on September 28, 1949. No contractor was listed on the permit, but it called for the construction of a 1,650 square foot, two story industrial structure, valued at $7,430. The building would be used as a sash and doors manufacturing building, and had a cement foundation and brick exterior walls. **Table 3** includes the building permits for the subject property. A detailed construction history is included below the table. Copies of the building permits are provided in **Appendix D** of this report.

TABLE 3
3727 ROBERTSON BLVD
CULVER CITY BUILDING SAFETY DIVISION PERMITS[4]

Address	Issued	Permit	Owner	Contractor/ Engineer	Valuation ($)	Description
3727	9/28/49	Permit #9195	R.W. Parizek	--	$7,430	Permit to Build: build an industrial building, used to manufacture sashes and doors, 25x60 first floor, 10x15 second floor.
3727	2/7/50	Illegible	Parizek	C.C. Carney	$2.50	Electrical Permit
3727	5/5/52	Permit #F2730	Frank Dietrich	Mar Vista Electric	$12	Electrical Permit
3727	11/10/59	Permit #B445	Cal Det & F. Dietrich	Mar Vista Electric	$9	Electrical Permit
3727	2/23/60	Permit #B7531	Frank Dietrich	Arco Electric Co	$4.50	Electrical Permit
3727	1/22/62	Permit #A11296	Frank Dietrich	Dennis & Flatch	$26	Permit to Build: total floor area 984 sq ft., cement foundation, plaster walls
3727	2/21/62	Permit #B2064	Frank Dietrich	Arco Electric Co	$10.50	Electrical Permit
3727	3/11/83	Permit #00854	Robert & Shirley Kreiman	Owner	$4000	This addition is required to comply with urban development district requirements.
3727	4/4/83	Permit #00978	Robert & Shirley Kreiman	Owner	$18	Electrical permit: 0 to 120 Branch Circuits
3727	4/4/83	Permit #00977	Robert Kreiman	Owner	$29	Electrical permit: 1 to 10 heads
3727	4/4/83	Permit #00976	Robert & Shirley Kreiman	Owner	$16	Plumbing permit: Water service or dist. systems, and alter drain
3727	4/7/83	Permit #01002	Robert Kreiman	Owner	$14	Plumbing permit: Sump: Interceptor
3727	4/20/83	Permit #01090	Robert Kreiman	Owner	$12	Plumbing permit: Water service or dist. systems
3727	5/5/83	Permit #01170	Robert Kreiman	Hull Bros. Roofing Co.	$4,000	All roofing to be removed down to bare wood. Apply two layers of 15# felt mopped with hot asphalt and 1-72# Class A.

[4] Documentation exists for all permits and certificates of occupancy listed in this table.

Address	Issued	Permit	Owner	Contractor/ Engineer	Valuation ($)	Description
3727	3/10/95	Permit #37000	Bob Kreiman	Hull Bros. Roofing Co.	$4,000	Remove existing roofs & dispose of. Apply 28-11-72# embed in hot. 7 Sq. class "A" roof

Construction History

The original building permits for the construction of the subject property were issued on September 28, 1949 to R. W. Parizek for the construction of a two-story industrial building used to manufacture sashes and doors valued at $7,430. Electrical permits for the subject building were issued in 1950, 1952, and 1959. According to the Los Angeles County Office of the Assessor, the property was improved in 1949, 1952, and 1954, although there does not appear to be any building records for the improvements done in 1952 and 1954. A permit to build an addition of 984 square feet was issued on January 22, 1962 (alteration). Another electrical permit was issued in 1962. Another permit was issued on March 11, 1983 for an addition (alteration). Further electrical permits and plumbing permits were issued in 1983. The building was reroofed in 1983. In 1995, another permit was issued to reroof.

Occupancy and Ownership History

City directories and building permits on file with the City's Building Division, as well as Assessor, U. S. Census, and other records, were reviewed to determine if the subject properties have any significant associations with the productive lives of historic personages. **Table 4** below summarizes the occupancy and ownership history of 3727 Robertson Boulevard.

TABLE 4
3727 ROBERTSON BLVD
OCCUPANCY AND OWNERSHIP

Date	Address	Occupant/owner	Source	Notes
1949-1950	3727	R.W. Parizek	Building Permits	Salesman
1952-1962	3727	Frank Dietrich	Building Permits	-
1983-1995	3727	Robert & Shirley Kreiman	Building Permits	-
2000	3727	C Tech 310 B 3 M S Shirley Kreiman	Hanes & Company	-
2006-2013	3727	Musicians Choice	Haines Co, Inc. Cole Information Services	-

Archival research indicates that Rudy W. Parizek was born to Czechoslovakian parents in about 1909 and worked as a salesman (United States Federal Census, 1940). Archival research did not reveal significant information for any of the other early owners or occupants of the property.

Review of Geotechnical Report

ESA reviewed the preliminary geotechnical report (Icon West, Inc., 2016) prepared for the project. The report indicated that a total of two borings were drilled down to depths of 41 feet below the existing grade and one exploratory bore was done for infiltration testing per LADPW GS200.1. Historic fill sediments were found during the borings up to an approximate depth of 7 feet below ground surface. These sediments are likely related to historic disturbance of the site during the construction and use of the earlier residences, the demolition of those residences and the construction of the current development as opposed to imported fill. Natural alluvium soils were also found directly beneath the historic fill soils that terminated at approximately 17 feet below the ground surface. The upper 3 feet of this Quaternary Alluvium lens consists of clayey find sand that can be conducive to preserved fossiliferous deposits. Directly below the Quaternary Alluvium horizon, starting at an approximate depth of 18 feet below ground surface and continuing to depth, are Quaternary Old Marine Sediments that have produced marine fossils at several surrounding project sites within the immediate surrounding area of the Project area.

Cultural Resources Survey

Methods

A cultural resources survey of the Project area was conducted on September 20th, 2019 by ESA staff Amber Madrid, B.A., and Hanna Winzenried, M.Sc. The survey aimed at identifying historic architectural resources and archaeological resources within or immediately adjacent to the Project. Given 100 percent of the Project area was paved, survey coverage was subject to all visible ground surfaces and building utility lines using opportunistic pedestrian survey transects no greater than 5 meter (approximately 16ft) apart. Additionally, an intensive-level historic architectural survey was conducted to identify and record potential historical architectural resources within the Project Site and in the immediate vicinity. Existing on-site buildings and structures, as well as the immediate surroundings, were photographed.

Results

The Project Site and its surroundings have been completely developed and improved with a small one-story building constructed in 1949 with no basement level. An evaluation of this building is provided in the following section. ESA identified one additional off-site potential historic architectural resources that meet the 45-year age threshold to be considered a historical resource to the east and south of the subject property, a potential historic district of a grouping of 1940s and 1950s commercial/industrial vernacular buildings along South Robertson Boulevard and Hoke Avenue (Los Angeles County Office of the Assessor). The potential district includes 3731, 3737, 3739, 3743, and 3749 South Robertson Boulevard and 3814, 3816, 3818, 3820, 3824, 3825, 3830, and 3836 Willcat Avenue as shown on **Figures 19 and 20**. Nearly all of the buildings in the historic grouping would have a direct or indirect view of the subject property, which would be developed with a five story mixed-use building. However, the subject property itself does not retain the integrity to be a contributor to the district and its demolition would not cause a significant and unavoidable impact. Furthermore, it is located at the northeast corner of the potential district. Therefore, if a five-story development were to happen there, the overall setting of the potential district would not be adversely impacted. Because the Project would not affect these buildings or their immediate surrounding setting that contributes to their potential eligibility, they will not be directly or indirectly impacted by the Project and were therefore not evaluated for significance by ESA. Until they are formally evaluated, they should be considered as potentially eligible for listing in the National and California Registers. No additional historical architectural resources were identified that would have indirect or direct views of the Project Site. In addition, no archaeological resources were identified as a result of the survey.

D190830.00

SOURCE: *ESA, 2019*

Figure 19
Commercial/industrial buildings on the west side of South Robertson Boulevard south of the subject property

D190830.00

SOURCE: *ESA, 2019*

Figure 20
Commercial/industrial buildings on the east side of Hoke Avenue southwest of the subject property

Evaluation of Resources

As discussed above, the properties at 3731, 3737, 3739, 3743, and 3749 South Robertson Boulevard and 3814, 3816, 3818, 3820, 3824, 3825, 3830, and 3836 Willcat Avenue are off-site unevaluated resources over 45 years in age. Until they are formally evaluated, they should be considered as potentially eligible for listing in the National, California, and local Registers. However, as discussed above, they are not on the Project Site and they would not be directly impacted by the Project. These properties have direct and indirect views of the Project Site due to their low profile. However, the subject property is located at the very northeast corner of the potential district and therefore the settings of the district would not be significantly or irreversibly impacted. Since they will not be directly or indirectly impacted by the Project, they were not evaluated for significance by ESA. Furthermore, Ivy Park Substation, a building on the National Register of Historic Places, is within 0.25 miles of the subject property. However, the Substation does not have a view of the subject property as the Expo Metro line overpass blocks the view down Venice Boulevard from the Substation. Furthermore, the substation's original setting has already been drastically altered since its construction in 1907.

3727 S. Robertson Boulevard

Broad Patterns of History

With regard to broad patterns of history, the following are the relevant criteria:

- **National Register Criterion A:** Is associated with events that have made a significant contribution to the broad patterns of our history.
- **California Register Criterion 1:** Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

The subject property is located in Tract No. 3872, a small subdivision of established in 1920. The significant development in the neighborhood primarily consists of commercial/industrial buildings constructed in the 1940s and 1950s. This tract is one of many similar commercial/industrial developments in Culver City during the early-to-mid-20th century. Therefore, 3727 Robertson Boulevard does not appear to individually have made a significant contribution to the settlement patterns of Culver City. Additional research on 3727 Robertson Boulevard did not reveal any significant events associated with the buildings. The commercial buildings on the tract could be considered a commercial/industrial local historic district, but a district in the area has not yet been identified. Furthermore, due to substantial alterations, the subject building would be considered a non-contributor. **As a result, 3727 Robertson Boulevard does not appear to meet the significance requirements as individual resources under National Register Criterion A, or California Register Criterion.**

Significant Persons

With regard to associations with important persons, the following are the relevant criteria:

- **National Register Criterion B:** Is associated with the lives of persons significant in our past.
- **California Register Criterion 2:** Is associated with the lives of persons important in our past.

The occupancy and ownership history for the subject property was researched by reviewing City directories, building permits, Los Angeles County Assessor records, and the U. S. Census. Archival research did not reveal any significant persons associated with the property. **Therefore, 3727 Robertson Boulevard does not appear to be associated with significant personages or events as is required under National Register Criterion B or California Register Criterion 2.**

Architecture

With regard to architecture, design, or construction, the following are the relevant criteria:

- **National Register Criterion C:** Embodies the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.
- **California Register Criterion 3:** Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

3727 Robertson Boulevard is a modest example of the commercial vernacular style. It has been extremely altered as there are numerous additions. Further, windows and doors have been changed. The interior configuration has been completely altered. **Therefore, 3727 Robertson Boulevard, does not meet the significance requirements under National Register Criterion C, California Register Criterion 3, or the LAHCM Criterion.**

Data

- **National Register Criterion D:** It yields, or may be likely to yield, information important in prehistory or history.
- **California Register Criterion 4:** Has yielded, or may be likely to yield, information important in prehistory or history.

While most often applied to archaeological districts and sites, Criterion D/4 can also apply to buildings, structures, and objects that contain important information. In order for these types of properties to be eligible under Criterion D/4, they themselves must be, or must have been, the principal source of the important information. None of the buildings on the subject property appear to yield significant information that would expand our current knowledge or theories of design, methods of construction, operation, or other information that is not already known about the period in which they were constructed, their method of construction, or their design. The buildings reflect common building practices and materials of the early twentieth century, which have already been well documented. **Therefore, 3727 Robertson Boulevard does not meet the significance requirements under National Register Criterion D and California Register Criterion 4.**

Conclusion

3727 Robertson Boulevard is not a historically significant building. It is not an example of historic patterns of history in Culver City. Further, no significant persons are associated with the building. Finally, the architecture is modest and the building retains little integrity. Therefore 3727 S. Robertson Boulevard is not a historically significant Building. However, it could conservatively be considered a non-contributor to a locally significant commercial/industrial district. As a non-contributor, its demolition would not significantly impact the potential district. The redevelopment would be substantially taller than the rest of the district. However, it is at the northeast corner of the district and therefore the overall setting of the district would not be a substantial and unavoidable impact. Such a district has not yet been identified, however.

Impacts Analysis

Direct Impacts

No historic-age architectural resources were identified within the Project Site; therefore, the Project will have no direct impact on known historical or archaeological resources.

Indirect Impacts

Indirect impacts were analyzed to determine if the Project would result in a substantial material change to the integrity of adjacent historical resources pursuant to CEQA. (i.e. buildings identified as potentially eligible in a survey, determined eligible, or designated). The indirect impacts study area was defined as properties with direct or indirect views of the Project Site in the immediate Project vicinity (i.e. adjacent parcels or parcels directly across the street facing the Project Site). The record search results did not indicate that any recorded historical resources were located in the immediate Project vicinity, however a potential historic district was identified during the site survey. While the redevelopment would be substantially taller than the rest of the district it will be located at the northeast corner, or edge of the district. The current building is not a contributor to the district, and the new development will not substantially change the overall setting of the district making it ineligible for state or local listing. Ivy Park Substation was further found to not have a view of the subject property and the substation's original setting has already been drastically altered since its construction in 1907. As such, the Project would not have indirect impacts to any known historical resources.

Archaeological Analysis of Potential Impacts

The project site lies under the current 1949 building and pavement. Research has revealed high archaeological sensitivity of the project site due to the current and former development of the site there is potential for encountering foundations and associated remains of the single-family residences demolished from the Project Site prior to the addition of the current improvement. In addition to potentially uncovering historic period archaeological resources, unearthing buried sites related to prehistoric activities in the project are also possible, as the site has a high sensitivity for prehistoric resources due to the proximity to resources important to prehistoric peoples as well as known, deeply buried sites nearby.

Recommendations

No known archaeological resources were identified within or immediately adjacent to the Project Site, although the majority of the Project Site is developed which may have obstructed the identification of surface resources. In addition, this does not preclude the possibility that subsurface archaeological deposits underlie the Project Site. The current improvement on the Project Site does not include a basement level and like most historic development in the late 1940's did involve heavy excavation during construction. Based on the results of the archival research, it is possible that prehistoric and historic archaeological resources may be present within the project site. Prehistoric (or Native American) archaeological resources are the material remains the results from human activities that predate written records and can include village sites, temporary camps, lithic (stone tool) scatters, rock art, roasting pits/hearths, milling features, rock features, and human remains. Historic archaeological resources can include refuse heaps, bottle dumps, ceramic scatters, privies, foundations, and human remains and are generally associated in California with the Spanish Mission Period to the mid-20th century of the American Period. Such resources may lie beneath the surface obscured by development and pavement. Such resources could qualify as **historical resources** under CEQA, and impacts to any such resources would constitute a significant impact on the environment.

Because of the potential to encounter archaeological resources exists for the proposed project, the following recommended standard City conditions below, ensure that potential impacts to buried archaeological resources and human remains would be less than significant.

- Prior to issuance of demolition permit, the Applicant shall retain a qualified Archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards (Qualified Archaeologist) to oversee an archaeological monitor who shall be present during construction excavations such as demolition, clearing/grubbing, grading, trenching, or any other construction excavation activity associated with the project. The frequency of monitoring shall be based on the rate of excavation and grading activities, proximity to known archaeological resources, the materials being excavated (younger alluvium vs. older alluvium), and the depth of excavation, and if found, the abundance and type of archaeological resources encountered, as determined by the Qualified Archaeologist). Full-time field observation can be reduced to part-time inspections or ceased entirely if determined appropriate by the Qualified Archaeologist. Prior to commencement of excavation activities, an Archaeological and Cultural Resources Sensitivity Training shall be given for construction personnel. The training session, shall be carried out by the Qualified Archaeologist and shall focus on how to identify archaeological and cultural resources that may be encountered during earthmoving activities and the procedures to be followed in such an event.

- In the event that historic or prehistoric archaeological resources (e.g., bottles, foundations, refuse dumps, Native American artifacts or features, etc.) are unearthed, ground-disturbing activities shall be halted or diverted away from the vicinity of the find so that the find can be evaluated. An appropriate buffer area shall be established by the Qualified Archaeologist around the find where construction activities shall not be allowed to continue. Work shall be allowed to continue outside of the buffer area. All archaeological resources unearthed by project construction activities shall be evaluated by the Qualified Archaeologist and a Gabrielino Tribe. If the resources are Native American in origin, the Gabrieleno Tribe shall consult with the City and Qualified Archaeologist regarding the treatment and curation of any prehistoric archaeological resources. If a resource is determined by the Qualified Archaeologist to constitute a "historical resource" pursuant to CEQA Guidelines Section 15064.5(a) or a "unique archaeological resource" pursuant to Public Resources Code Section 21083.2(g), the Qualified Archaeologist shall coordinate with the Applicant and the City to develop a formal treatment plan that would serve to reduce impacts to the resources. The treatment plan established for the resources shall be in accordance with CEQA Guidelines Section 15064.5(f) for historical resources and Public Resources Code Sections 21083.2(b) for unique archaeological resources. The treatment plan shall incorporate the Gabrielino Tribe's treatment and curation recommendations. Preservation in place (i.e., avoidance) is the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. The treatment plan shall include measures regarding the curation of the recovered resources that may include curation at a public, non-profit institution with a research interest in the materials, such as the Natural History Museum of Los Angeles County or the Fowler Museum, if such an institution agrees to accept the material and/or the Gabrielino Tribe. If no institution or the Gabrielino Tribe accept the resources, they may be donated to a local school or historical society in the area (such as the Culver City Historical Society) for educational purposes.

- Prior to the release of the grading bond, the Qualified Archaeologist shall prepare a final report and appropriate California Department of Parks and Recreation Site Forms at the conclusion of archaeological monitoring. The report shall include a description of resources unearthed, if any, treatment of the resources, results of the artifact processing, analysis, and research, and evaluation of the resources with respect to the California Register of Historical Resources and CEQA. The report and the Site Forms shall be submitted by the applicant to the City, the South Central Coastal Information Center, and representatives of other appropriate or concerned agencies to signify the satisfactory completion of the project and required mitigation measures.

- If human remains are encountered unexpectedly during implementation of the project, State Health and Safety Code Section 7050.5 requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the Native American Heritage Commission (NAHC). The NAHC shall then identify the person(s) thought to be the Most Likely Descendent (MLD). The MLD may, with the permission of the land owner, or his or her authorized representative, inspect the site of the discovery of the Native American remains and may recommend to the owner or the person responsible for the excavation work means for treating or disposing, with appropriate dignity, the human remains and any associated grave goods. The MLD shall complete their inspection and make their recommendation within 48 hours of being granted access by the land owner to inspect the discovery. The recommendation may include the scientific removal and nondestructive analysis of human remains and items associated with Native American burials. Upon the discovery of the Native American remains, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred, as prescribed in this mitigation measure, with the MLD regarding their recommendations, if applicable, taking into account the possibility of multiple human remains. The landowner shall discuss and confer with the descendants all reasonable options regarding the descendants' preferences for treatment.

- If the NAHC is unable to identify a MLD, or the MLD identified fails to make a recommendation, or the landowner rejects the recommendation of the MLD and the mediation provided for in Subdivision (k) of Section 5097.94, if invoked, fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall inter the human remains and items associated with Native American human remains with appropriate dignity on the facility property in a location not subject to further and future subsurface disturbance.

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Appendix A
Personnel Qualifications

Sara Dietler

Senior Archaeologist

EDUCATION

BA. Anthropology, San Diego State University

20 YEARS OF EXPERIENCE

CERTIFICATIONS/ REGISTRATION

California BLM Permit, Principal Investigator, Statewide

Nevada BLM Permit, Paleontology, Field Agent, Statewide

PROFESSIONAL AFFILIATIONS

Society for American Archaeology (SAA)

Society for California Archaeology (SCA)

Sara is a senior archaeology and paleontology lead with 20 years of experience in cultural resources management in Southern California. As a senior project manager, she manages technical studies including archaeological and paleontological assessments and surveys, as well as monitoring and fossil salvage for many clients, including public agencies and private developers. She is a cross-trained paleontological monitor and supervisor, familiar with regulations and guidelines implementing the National Historic Preservation Act (NHPA), National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), and the Society of Vertebrate Paleontology guidelines. She has extensive experience providing oversight for long-term monitoring projects throughout the Los Angeles Basin for archaeological, Native American, and paleontological monitoring compliance projects and provides streamlined management for these disciplines.

Relevant Experience

San Pedro Plaza Park, San Pedro, Los Angeles, CA. *Senior Cultural Resources Project Manager.* Provided archaeological and paleontological monitoring support for the San Pedro Plaza Park Project. The project area is located in the City of Los Angeles port district of San Pedro, approximately 26 miles south of downtown Los Angeles for the City of Los Angeles, Bureau of Engineering, Environmental Management Group, Sara provided quality control oversight for the archaeological and paleontological mitigation. During monitoring on the project, archaeological materials were recovered include refuse associated with park use since it opened in 1889, and historic building debris likely associated with the Carnegie Library which formerly stood on site. Provided recommendations for commemoration and protection of the find.

City of Los Angeles Department of Public Works BOE, Gaffey Street Pool Construction Monitoring, San Pedro, Los Angeles, CA. *Project Manager.* Sara oversaw the data recovery of a World War I slit trench discovered during project excavation for an ADA compliant sidewalk. Provided mitigation recommendations and immediate response to the find. Served as project manager and senior archaeologist on the project.

Warner Grand Theatre, Historic Resources Technical Report and Conditions Assessment, San Pedro, Los Angeles, CA. *Project Manager, Report Co-Author*. The City of Los Angeles Bureau of Engineering, Environmental Management Group requested a Cultural Resources Surveys to inform and guide future rehabilitation or redevelopment efforts of the Warner Grand Theatre. The Warner Grand Theatre designed in the Art Deco-Modern style by master architect B. Marcus Priteca in 1931, and is listed on the National Register of Historic Places, and is designated a Los Angeles Historic-Cultural Monument. ESA prepared a historical resources technical report and conditions assessment report, which provided a comprehensive table of character-defining features along with a conditions assessment of each feature located within the interior and exterior of the Warner Grand Theatre.

City of Los Angeles Department of Public Works BOE, Alameda Street Widening Between Harry Bridges Boulevard and Anaheim Street Project, Los Angeles, CA. *Project Manager.* The project included upgrades to Alameda Street and adjoining streets with improved infrastructure to accept increased traffic from existing and proposed projects located primarily within the Port of Los Angeles and the Wilmington Industrial Park and to adequately deal with storm flows. Conducted a CHRIS record search of the project area for archaeological and paleontological resources and produced technical documents regarding the findings and recommendations for construction activities during the proposed project. In addition, provided archaeological/paleontological monitoring for geotechnical testing and further recommendations based on the results of the testing. Sara provided senior oversight of the reporting and survey and served as project manager.

670 Mesquit Street and Seventh Street Bridge Evaluation, Los Angeles, CA. *Project Manager and Report Co-author*. ESA prepared an EIR for the 670 Mesquit Street project in Los Angeles. As part of the EIR, a Cultural Resources Technical Report was prepared to determine if the project site was eligible for listing as a historical resource. The project site, originally occupied by the Los Angeles Ice and Cold Storage Company, was determined to lack integrity and therefore, ineligible for listing. Although the core of the building on the project site retained elements of the historic cold storage building, the facility was seismically upgraded resulting in significant alterations to its exterior. In its current condition, the facility does not convey its historical associations. The project was also evaluated to determine if it would result in any potential impacts to nearby historic resources, including the Seventh Street Bridge and adjacent railroad tracts. Located south of the project site is the Seventh Street Bridge, which is listed on the California Register of Historical Resources, and eligible for the National Register of Historic Places. Sara provided oversight and analysis for the preparation of Cultural Resources Technical Report.

Long Beach Courthouse Project; Long Beach, CA. *Senior Project Archaeologist and Project Manager.* Under contract to Clark Construction Sara directed the paleontological and archaeological monitoring for the construction of the New Long Beach Courthouse. She supervised monitors inspecting excavations up to 25 feet in depth. Nine archaeological features were recovered. Sara completed an assessment of the artifacts and fossil localities in a technical report at the completion of the project.

Venice Dual Force Main Project, Venice, CA. *Cultural Resources Lead.* The Venice Dual Force Main Project is an $88 million sewer force main construction project spanning 2 miles within Venice, Marina del Rey, and Playa del Rey. Contracted to Vadnais Trenchless Services and reporting to the City of Los Angeles, Bureau of Engineering, Environmental Management Group, ESA is serving as the project's environmental resource manager. Sara provides quality control oversight for the archaeological and paleontological mitigation.

Advanced Water Treatment Facility Project Groundwater Reliability Improvement Project, Pico Rivera, CA. *Project Manager.* ESA is providing environmental compliance monitoring for the Water Replenishment District to ensure compliance with the conditions contained in the Mitigation and Monitoring Reporting Programs associated with three environmental documents, including the Final EIR, a Mitigated Negative Declaration, and a Supplemental EIR, pertaining to three infrastructure components associated with the project. ESA provides general compliance monitoring at varying rates of frequency depending on the nature of the activities and is sometimes on-site for 4-hour spot checks and other times for full 24-hour rotations. The project is located near a residential neighborhood and adjacent the San Gabriel River. Issues of concern include noise, vibration, night lighting, biological resources, cultural resources, and air quality. Sara provides quality assurance and oversight of the field monitoring, and day-to-day response to issues. She oversees archaeological and Native American monitoring for ground disturbance and coordinates all sub-consultants for the project. She provides daily, weekly, and quarterly reporting on project compliance to support permitting and agency oversight.

Southern California Edison On-Call Master Services Agreement for Natural and Cultural Resources Services; *Cultural Resources Task Manager*. Sara provides project management and senior archaeological support for an on-call Master Services Agreement with Southern California Edison for cultural and natural resources consulting services. This contract has included numerous surveys and monitoring projects for pole replacements and small- to mid-size reconductoring projects, substation maintenance, and construction projects. Sara has served as project manager for more than 25 projects under this contract. She is the go-to person for all water, gas, and power projects occurring in the city of Avalon on Santa Catalina Island. Sara is responsible for oversight of archaeological and paleontological monitors, serving as report author and report manager.

Los Angeles Unified School District (LAUSD) Central Los Angeles High School #9; Los Angeles, CA. *Senior Project Archaeologist & Project Manager*. Sara conducted on-site monitoring and investigation of archaeological sites exposed as a result of construction activities. During the data recovery phase in connection with a 19th century cemetery located on-site, she participated in locating of features, feature excavation, mapping, and client coordination. She organized background research on the cemetery, including genealogical, local libraries, city and county archives, other local cemetery records, internet, and local fraternal organizations. Sara advised on the lab methodology and setup and served as project manager. Sara was a contributing author and editor for the published monograph, which was published as part of a technical series, "Not Dead but Gone Before: The Archaeology of Los Angeles City Cemetery."

Scattergood Olympic Transmission Line, Los Angeles, CA. *Report Author*. The Los Angeles Department of Water and Power is proposing to construct and operate approximately 11.4 miles of new 230 kilovolt (kv) underground transmission line that would connect the Scattergood Generation Station and Olympic Receiving Station. The project includes monitoring of construction activities occurring in street rights-of-way. Sara is providing final reporting for the long-term monitoring and QA/QC of the field data.

Veterans Administration Long Beach, Long Beach, CA. *Senior Project Manager.* Sara managed a long term monitoring project which also includes implementation of a Memorandum of Agreement, a Plan of Action, and Historic Properties Treatment plan for the mitigation of disturbance to a prehistoric site on the campus.

Downtown Cesar Chavez Median Project, City of Los Angeles, CA. *Project Manager*. Sara assisted the City of Los Angeles Department of Public Works Bureau of Engineering with a Local Assistance Project requiring consultations with Caltrans cultural resources. Sara was responsible for Caltrans coordination, serving as contributing author and report manager for the required Archaeological Survey Report, Historic Properties Survey Report, and Historical Resources Evaluation Report prepared for the project.

Hellman Ranch Project, Orange County, CA. *Lab Director.* Sara served as the lab director for the final monitoring phase of the John Laing Homes development project, cataloging and analyzing artifacts recovered from salvage monitoring and test units placed in relation to recovered intact burials. She conducted microscopic analysis of small items such as bone tools and shell and stone beads, directed lab assistants, and oversaw special studies, including the photo-documentation of the entire collection. Sara completed a section reporting on the results of the bead and ornament analysis in the final report, which was published as part of a technical series.

Hansen Dam Golf Course Water Recycling Project, Los Angeles, CA. *Senior Archaeologist* and *Project Manager.* Sara directed a phase I historical assessment for the Hansen Dam Golf Course Water Recycling Project located in the San Fernando Valley, City of Los Angeles, California. The project included the construction of an outdoor pumping station adjacent to the existing Hansen Tank located at the Los Angeles Department of Water and Power's (LADWP's) Valley Generating Station. In addition, a pipeline or distribution line was planned to be installed from the pumping station to the Hansen Dam Golf Course along the Tujunga Wash. The phase I study of this project included mitigation for the effects of the project on the portion of the golf course falling within the area of potential effects, which was potentially sensitive for buried cultural resources as the result of a complex of World War II housing units placed on the site between the 1940s and the 1960s. Sara conducted consultation with the USACE regarding the project.

EDUCATION

MSc Historic Conservation, Oxford Brookes University

BA, European Studies, Brigham Young University

3 YEARS OF EXPERIENCE

PROFESSIONAL AFFILIATIONS

The Society for the Protection of Ancient Buildings

Historic England

National Trust for Places of Historic Interest or Natural Beauty

Hanna Winzenried

Architectural Historian

Hanna is an architectural historian with 3 years of academic and professional experience performing building conservation, historic research, and field surveys and conducting plan reviews for conformance with local regulations and ordinances. Prior to joining ESA, she has 1.5 years of experience with the City of Los Angeles, Department of Planning, in the Office of Historic Resources Historic Preservation Overlay Zones (HPOZ) Unit. Her experience and education both in California and abroad have given her a wide set of interdisciplinary skills, including strong technical and research skills.

Relevant Experience

9120 W. Olympic Boulevard Preliminary Assessment and Character Defining Features Analysis for the Harkham Hillel Hebrew Academy, Beverly Hills, CA. *Contributor.* ESA prepared a Phase I Historic Resources Assessment for the modernist educational building at 9120 W. Olympic Boulevard. The purpose of the report is to identify and evaluate potential historic resources. The subject property was built in 1963 as the largest Jewish day school. It was built in the Modernist architectural style by the renowned architect Sydney Eisenshtate. The Academy enrollment has outgrown the existing space, and the school is looking for a way to expand its square footage. Hanna performed research and prepared of the reports.

Universal Hilton Environmental Impacts Report and Historic Resources Technical Report for 555 W Universal Terrace Parkway, Los Angeles, CA. *Contributor.* ESA prepared an Environmental Impacts Report including a Historic Resources Technical Report. The Universal Hilton Hotel was designed by master architect, William L. Pereira in 1983 in the postmodern style. The hotel was designed to accommodate visitors to the Universal Theme Parks. The hotel management wants to expand the number of rooms by building a large addition. Hanna performed research and assisted in the preparation of the report.

361 Myrtle Street Peer Review Letter for the residence at 361 Myrtle Street, Glendale, CA. *Contributor.* ESA prepared a peer review letter to conduct a peer review of previous historic resource evaluations and analyze potential cumulative impacts of the demolition for the property at 361 Myrtle Street. Previous evaluations and the impact of demolishing the residence were reviewed and analyzed. Hanna performed research and assisted with the preparation of the report.

Nestor Way Affordable Housing Project Historical Resources Technical Report, San Diego, CA. *Contributor.* ESA prepared a Historical Resources Technical Report for 1120 and 1130 Nestor Way on behalf of the Federal Housing Administration. The site is improved with a Methodist church built in 1896 in the Gothic Revival architectural style and multiple ancillary buildings. The City of San

Diego is planning on constructing permanent supportive housing containing 100 units, consisting of multi-family affordable housing for formerly homeless seniors 55 years of age and older. Hanna performed research and assisted with the preparation of the reports.

Nelles School Site Redevelopment, Whittier, CA. *Contributor.* ESA oversaw the documentation and architectural salvage of the Fred C. Nelles School. Brookfield Residential plans on redeveloping the whole site into a residential neighborhood while maintaining four historically significant structures. Hanna helped draft a documentation and architectural features salvage plan according to the character defining features list and oversaw the deconstruction of the other school buildings to ensure the architectural features were salvaged correctly.

Riverside Cement Company, Crestmore Plant HAER, Jurupa Valley, CA. *Contributor.* ESA prepared two Historic American Engineering Records for the Crestmore Plant for the White Cement Mill and for the Stock House. The Riverside Cement Company, Crestmore Plant was a former cement plant that was initially constructed in 1909, although went through multiple periods of alteration. Developers proposed an industrial and open space development at the facility. Hanna helped drafts HAERs which had to be made as a mitigating measure for deconstruction of the historically eligible buildings, the White Cement Mill and the Stock House.

Previous Work Experience

Department of City Planning, City of Los Angeles. *Student, Professional Worker.* Hanna assisted HPOZ staff with client walk-ins, which included conducting design review, drafting casework letters/certificates, and performing public outreach/presentations regarding adoption of HPOZs. She conducted field surveys of several HPOZs, using photography and making note of historical elements. She corrected technical elements on databases of HPOZ properties and research historical patterns of neighborhood growth. Hanna also communicated with project applicants to improve their projects' conformance with preservation guidelines.

Museum of Peoples and Cultures, Brigham Young University. *Collections Manager.* Hanna made an itinerary of the entire Brigham Young University (BYU) ethnographic collection. Hanna designed and implemented a social media marketing campaign. She took pictures of 400 objects for the digital collection. She helped develop a new way to house kachina dolls and Polynesian necklaces. She cataloged 25 objects in a collection and housed them for storage.

History Department, Brigham Young University. *Intern.* As part of her duties as an intern, Hanna cataloged and transcribed historic letters to and from Senator Bancroft found in the BYU digital collections. Hanna also created a marketing plan to raise campus awareness for "Europe in a Nutshell" and helped to inaugurate the international event with prominent world leaders.

Publications and Presentations

"Knobs and Knockers: The Conservation of Arts and Crafts Metal Fixtures and Fittings," Oxford Brookes University (2015).

Appendix B
Sacred Lands File Search

NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone: (916) 373-3710
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov
Twitter: @CA_NAHC

September 20, 2019

Vanessa Ortiz
ESA

VIA Email to: vortiz@esassoc.com

RE: 3727 Robertson Boulevard Project, Los Angeles County

Dear Ms. Ortiz:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify the NAHC. With your assistance, we can assure that our lists contain current information. If you have any questions or need additional information, please contact me at my email address: steven.quinn@nahc.ca.gov.

Sincerely,

Steven Quinn

Steven Quinn
Associate Governmental Program Analyst

Attachment

Native American Heritage Commission
Native American Contact List
Los Angeles County
9/20/2019

Gabrieleno Band of Mission Indians - Kizh Nation
Andrew Salas, Chairperson
P.O. Box 393 — Gabrieleno
Covina, CA, 91723
Phone: (626) 926 - 4131
admin@gabrielenoindians.org

Gabrieleno/Tongva San Gabriel Band of Mission Indians
Anthony Morales, Chairperson
P.O. Box 693 — Gabrieleno
San Gabriel, CA, 91778
Phone: (626) 483 - 3564
Fax: (626) 286-1262
GTTribalcouncil@aol.com

Gabrielino /Tongva Nation
Sandonne Goad, Chairperson
106 1/2 Judge John Aiso St., #231 — Gabrielino
Los Angeles, CA, 90012
Phone: (951) 807 - 0479
sgoad@gabrielino-tongva.com

Gabrielino Tongva Indians of California Tribal Council
Robert Dorame, Chairperson
P.O. Box 490 — Gabrielino
Bellflower, CA, 90707
Phone: (562) 761 - 6417
Fax: (562) 761-6417
gtongva@gmail.com

Gabrielino-Tongva Tribe
Charles Alvarez,
23454 Vanowen Street — Gabrielino
West Hills, CA, 91307
Phone: (310) 403 - 6048
roadkingcharles@aol.com

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed 3727 Robertson Boulevard Project, Los Angeles County.