APPENDIX A
Shade/Shadow Study
Shade | Shadow Study
Arroyo Village Residential Condominium Project

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EXECUTIVE SUMMARY

The purpose of this Shade/Shadow Study (Study) is to describe the existing sunlight exposure and shade/shadow conditions at the proposed Arroyo Village Residential Condominium Project ("project") site and in the immediate vicinity, as well as analyzing the introduction of new sources of shade/shadow associated with the proposed project. The proposed project is located at 235 South Arroyo Drive in the City of San Gabriel (Assessor’s Parcel Numbers [APNs] 5346-011-001, -011-004, and -011-006). A limited portion of the project site is located in the City of Alhambra at APNs 5346-008-031, -009-008, and -009-010. The project site is situated within the City of San Gabriel’s Mission District Specific Plan.

The project site encompasses approximately 1.16 acres (50,343 square feet) and has an irregular shape. The northern portion of the project site is currently developed with an existing two-story single-family residential building totaling approximately 2,895 square feet. The Los Angeles County Flood Control District-owned Alhambra Wash traverses the project site in a northeast to southeast direction. The remainder of the project site is vacant land. On-site topography varies and slopes to the southeast and southwest toward the wash.

Overall, the project proposes to demolish the existing on-site single-family residential building in order to construct a new four-story residential building (up to 48 feet in height from top of plate). The building would have 41 condominium units totaling approximately 55,000 square feet with a 36,000 square foot underground parking garage. Each condominium unit would range between two to four bedrooms and would range in size between 1,230 to 2,489 square feet. The project would incorporate approximately 30,654 square feet of private and common residential open space, including covered and uncovered courtyards, balconies, terraces, and decks. A vehicular bridge with a pedestrian walkway would be installed at the southern portion of the project site to provide project access at South Arroyo Drive. The access bridge over the wash would include two lanes for vehicular ingress and egress directly to the parking garage. The project would require a total of 97 parking spaces, including 83 residential parking spaces and 14 guest parking spaces. In addition, the project would provide four surface-level parking spaces.

The proposed project would result in new shadows cast onto surrounding residential uses and roads, as well as the Alhambra Wash. As discussed in Section 4.1, Thresholds of Significance, a significant impact would result if shadow-sensitive use areas (where sunlight is important to its function, such as outdoor backyard spaces for residences) would be shaded by project-related structures for more than three hours between 9:00 a.m. and 3:00 p.m. Pacific Standard Time (between late October and early April), or for more than four hours between 9:00 a.m. and 5:00 p.m. Pacific Daylight Time (between early April and late October), compared to existing conditions.

Early April to Late October

Summer Months. The proposed project would cast minimal shadows onto single-family residential uses to the north during the morning (9:00 a.m.) hour. During the mid-day (12:00 p.m.) hour, shadows cast by the proposed project would primarily be contained within the
project’s boundary, except for a small portion of the Alhambra Wash to the east. During the afternoon (3:00 p.m.) hour, shadows cast by the proposed project would nominally be cast onto the Alhambra Wash to the east. Shadows cast during the evening (6:00 p.m.) hour would spill onto the Alhambra Wash, South Arroyo Drive, and a small portion of a residential front yard area to the east. The project would not result in the shading of any shadow-sensitive uses for more than four hours between 9:00 a.m. and 5:00 p.m. Thus, during the summer months, surrounding uses would not experience significant shadow impacts as a result of the proposed project.

**Fall Months.** The proposed project would cast shade to off-site uses for greater than four hours between the hours of 9:00 a.m. and 6:00 p.m. during the fall months. The narrow and limited side/back yard area associated with the residential use to the north would be shaded for more than four hours between 9:00 a.m. and 6:00 p.m. However, this area is not considered a shadow-sensitive use (as sunlight is not important to its function). This shaded area is utilized for side yard, driveway, and garage uses and therefore is not considered a routinely usable outdoor space, where sunlight is important to its function. Further, this area already experiences shading under existing conditions. Thus, during the fall months, surrounding uses would not experience significant shadow impacts as a result of the proposed project.

**Late October to Early April**

**Winter Months.** The proposed project would cast shade for greater than three hours between 9:00 a.m. and 3:00 p.m. at off-site areas in the winter months. These areas shaded for more than three hours include the side/back yard area, paved driveway, detached garage, and residential structure associated with the single-family residential use to the north, as well as a small portion of the Alhambra Wash to the east. These areas are not considered shadow-sensitive (as sunlight is not important to their function) and/or routinely usable outdoor spaces. In addition, the areas associated with the single-family residential use to the north experience shading under existing conditions as a result of the residential and ancillary structures at the residential use to the north. Therefore, the project would not result in significant shade/shadow impacts during the winter months.

**Spring Months.** The proposed project would cast shadows onto the front and side/back yard area associated with the residence to north of the project site for greater than three hours between 9:00 a.m. and 3:00 p.m. during the spring months. These narrow and limited areas are not considered shadow-sensitive (as sunlight is not important to their function). This shaded area is utilized for side yard, driveway, and garage uses, and therefore is not considered routinely useable outdoor space where sunlight is important to its function. Further, this area already experiences shading under existing conditions as a result of the residential and ancillary structures at the residential use to the north. Therefore, the project would not result in significant shade/shadow impacts during the spring months.

As discussed above, the proposed project would not result in significant shading of the any shadow-sensitive uses for more than three hours between 9:00 a.m. and 3:00 p.m. Pacific Standard Time (between late October and early April), or for more than four hours between 9:00 a.m. and 5:00 p.m. Pacific Daylight Time (between early April and late October). Although the side/back
yard area, paved driveway, and residential structure to the north and a small portion of the Alhambra Wash would experience significant shading as a result of the project, these uses are not considered shadow-sensitive (as these areas are not dependent on sunlight for its function, and these areas are not routinely usable outdoor spaces). As discussed, the majority of the areas associated with the residence to the north are utilized for side yard, driveway, and garage uses and therefore are not considered routinely usable outdoor space where sunlight is important to its function. Further, this area already experiences shading under existing conditions. As such, a less than significant shade/shadow impact would occur with implementation of the proposed project.

Shading of On-Site Courtyard

The proposed project includes a central courtyard to be used by on-site residents. During the summer months, the on-site courtyard area would experience some shading during the morning, afternoon, and evening hours, but would receive sunlight in the majority of the courtyard for most of the day. During the fall months, the on-site courtyard area would be completely shaded during the morning and evening hours and would be partially shaded during the mid-day and afternoon hours. This area would be shaded at all hours during the winter months. During the spring months, this area would be fully shaded during the morning hours and would be partially shaded during the mid-day and afternoon hours.

1.0 PURPOSE OF THE STUDY

The purpose of this Shade/Shadow Study (Study) is to describe the existing sunlight exposure and shade/shadow conditions at the proposed Arroyo Village Residential Condominium Project (project) site and in the immediate vicinity, as well as analyzing the introduction of new sources of shade/shadow associated with the proposed project. The information upon which this Study is based was compiled from site photographs, Google Earth 2018 satellite imagery, and shade/shadow diagrams prepared by Digital Preview in May 2019 for both the existing and proposed conditions.

1.1 PROJECT LOCATION/SETTING

The City of San Gabriel (City) is located in the San Gabriel Valley of Los Angeles County, approximately 11 miles east of the Los Angeles Civic Center; refer to Exhibit 1, Regional Vicinity. The City consists of 4.09 square miles. Surrounding jurisdictions include the cities of San Marino and Temple City to the north, Temple City, unincorporated County of Los Angeles, and Rosemead to the east, Rosemead to the south, and Alhambra to the west.

The proposed project site is approximately 1.16 acres and is located at 235 South Arroyo Drive in the City of San Gabriel (APNs 5346-011-001, -011-004, and -011-006); refer to Exhibit 2, Site Vicinity. A limited portion of the project site is located in the City of Alhambra at APNs 5346-008-031, -009-008, and -009-010. Regional access to the project site is provided via the San Bernardino Freeway (Interstate 10) or the Foothill Freeway (Interstate 210). Local access to the project site is provided by Arroyo Drive.
SHADE / SHADOW STUDY
ARROYO VILLAGE RESIDENTIAL CONDOMINIUM PROJECT
Regional Vicinity
Exhibit 1
Source: Google Earth, April 2019.
The northern portion of the project site is currently developed with an existing two-story single-family residential building totaling approximately 2,895 square feet. The Los Angeles County Flood Control District-owned Alhambra Wash traverses the project site in a northeast to southeast direction. The remainder of the project site is vacant land. The project site topography varies and slopes to the southeast and southwest toward the wash.

1.2 PROJECT DESCRIPTION

Overall, the project proposes to demolish the existing on-site single-family residential building in order to construct a new four-story residential building (up to 48 feet in height from top of plate). The building would have 41 condominium units totaling approximately 55,000 square feet with a 36,000-square foot underground parking garage; refer to Exhibit 3, Conceptual Site Plan. Each condominium unit would range between two to four bedrooms and would range in size between 1,230 to 2,489 square feet. The project would incorporate approximately 30,654 square feet of private and common residential open space, including covered and uncovered courtyards, balconies, terraces, and decks. A vehicular bridge with a pedestrian walkway would be installed at the southern portion of the project site to provide project access at South Arroyo Drive. The access bridge over the wash would include two lanes for vehicular ingress and egress directly to the parking garage. The project would require a total of 97 parking spaces, including 83 residential parking spaces and 14 guest parking spaces. In addition, the project would provide four surface-level parking spaces.

2.0 METHODOLOGY

Shading refers to the effect of shadows cast upon adjacent areas by proposed structures. Consequences of shadows upon land uses may be positive, including cooling effects during warm weather, or negative, such as the loss of natural light necessary for solar energy purposes or the loss of warming influences during cool weather. Shadow effects are dependent upon several factors, including the local topography, the height and bulk of the project’s structural elements, sensitivity of adjacent land uses, season, and duration of shadow projection. Facilities and operations sensitive to the effects of shading include: routinely usable outdoor spaces associated with residential, recreational, or institutional (e.g., schools, convalescent homes) land uses; commercial uses such as pedestrian-oriented outdoor spaces or restaurants with outdoor eating areas; nurseries; and existing solar collectors. These uses are considered sensitive because sunlight is important to function, physical comfort, or commerce.

To identify the proposed project’s potential shadow-related impacts, existing and project-generated morning, mid-day, afternoon, and evening shade patterns were compared for each of the four seasons. Specifically, four dates were used for analysis purposes:

- Winter and summer solstices (December 21 and June 21), when the sun is at its lowest and highest point, respectively, and
- Spring and fall equinoxes (March 21 and September 21), when day and night are of approximately equal length.
The longest shadows are cast during the winter months and the shortest shadows are cast during the summer months. The following discussion describes the summer/winter solstice and vernal/autumnal equinox phenomenon, local topography, and some general assumptions that affect shadow patterns in the project vicinity. Note that the analysis considers shadow effects associated with proposed building massing only and the shadow patterns associated with proposed landscaping are not addressed.

**SUMMER AND WINTER SOLSTICE**

“Solstice” is defined as either of the two points on the ecliptic that lie midway between the equinoxes (separated from them by an angular distance of 90°). At the solstices, the sun’s apparent position on the celestial sphere reaches its greatest distance above or below the celestial equator, about 23.5° of the arc. At the time of summer solstice, approximately June 21, the sun is directly overhead at noon at the Tropic of Cancer. In the Northern Hemisphere, the longest day and shortest night of the year occur on this date, marking the beginning of summer. At winter solstice, approximately December 21, the sun is overhead at noon at the Tropic of Capricorn; this marks the beginning of winter in the Northern Hemisphere. Measuring shadow lengths for the winter and summer solstices represents the extreme shadow patterns that occur throughout the year. Shadows cast on the summer solstice are the shortest shadows during the year, becoming progressively longer until winter solstice when the shadows are the longest they are all year.

**VERNAL AND AUTUMNAL EQUINOX**

An equinox is the moment when the sun passes over the equator. The event occurs twice a year, approximately March 21 and September 21. The equinoxes are the two days each year when the middle of the sun is an equal amount of time above and below the horizon for every location on Earth. In the Northern Hemisphere, the March equinox is known as the vernal equinox and the September equinox is the autumnal equinox. In the Southern Hemisphere, the names are reversed. In practice, at the equinox, the day is longer than the night.

The equinoxes can be interpreted as virtual points in the sky. As Earth moves around the sun, the apparent position of the sun relative to the other stars moves in a full circle over the period of a year. This circle is called the ecliptic, and is also the plane of Earth’s orbit projected against the whole sky. Other bright planets like Venus, Mars, and Saturn also appear to move along the ecliptic, because their orbits are in a similar plane to Earth’s. Another virtual circle in the sky is the celestial equator, or the projection of the plane of Earth’s equator against the whole sky. Because Earth’s axis of rotation is tilted relative to the plane of Earth’s orbit around the sun, the celestial equator is inclined to the ecliptic by about 23.5°.

**SHADE/SHADOW DIAGRAMS**

The shade/shadow diagrams are composed of a series of three-dimensional rendered site plans. The site plans consist of the project massing models, as well as the surrounding context and geography. Upon receiving the electronic site plan files (AutoCAD) and project description, a 3D model is created to the correct heights. The 3D model is then merged with an ortho-rectified aerial photograph into AutoCAD at the correct coordinates, creating a base for the model. The
existing surrounding buildings are modeled to height and included with the project model. The model is then set to include the model location, times, and dates, and then the shadow conditions are rendered. The model illustrates the shadow effects of existing building and new buildings proposed as part of the project application. The orientation of the model was set to represent the orientation of the project site. Dates selected for each season were: summer/winter solstices and the vernal/autumnal equinoxes. For each of those days selected, the time periods were 9:00 a.m., 12:00 p.m., and 3:00 p.m., as well as 6:00 p.m. (for summer solstice and autumnal equinox only).

3.0 EXISTING CONDITIONS

The northern portion of the project site is currently developed with an existing two-story single-family residential building totaling approximately 2,895 square feet. The Los Angeles County Flood Control District-owned Alhambra Wash traverses the project site in a northeast to southeast direction. The remainder of the project site is vacant land.

The project site is generally located within a developed area of the City, surrounded by the following land uses:

- **North**: High density single- and multi-family residential (up to two stories in height) and commercial/office uses are located to the north of the project site;
- **East**: The Alhambra Wash bounds the project site to the east with multi-family residential uses located east of the Alhambra Wash;
- **South**: Areas to the south of the project site include vacant land associated with the Alhambra Wash; and
- **West**: Areas to the west of the project site are located within the City of Alhambra’s jurisdiction and include single-family residential uses.

3.1 CLIMATE

The general region lies in the semipermanent high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. The climate consists of a semiarid environment with mild winters, warm summers, moderate temperatures, and comfortable humidity. Precipitation is limited to a few winter storms. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds.

The average annual temperature varies little throughout the area (which encompasses the project site), averaging 75 degrees Fahrenheit (°F). However, with a less-pronounced oceanic influence, the eastern inland portions of the project’s geographical area show greater variability in annual minimum and maximum temperatures. All portions of the area have had recorded temperatures over 100°F in recent years.
Although the project’s geographical area has a semi-arid climate, the air near the surface is moist because of the presence of a shallow marine layer. Except for infrequent periods when dry, continental air is brought into the area by offshore winds, the ocean effect is dominant. Periods with heavy fog are frequent, and low stratus clouds, occasionally referred to as “high fog,” are a characteristic climate feature. The local climate is typically warm during summer when temperatures tend to be in the 80s and cool during winter when temperatures tend to be in the 60s. The warmest month of the year is August with an average maximum temperature of 87 degrees Fahrenheit, while the coldest month of the year is December with an average minimum temperature of 44 degrees Fahrenheit. The annual average precipitation in San Gabriel is 18.06 inches. Rainfall occurs most frequently in February, with an average rainfall of 4.66 inches.  

3.2 EXISTING SHADOW-SENSITIVE USES

As noted above, facilities and operations sensitive to the effects of shading include: routinely usable outdoor spaces associated with residential, recreational, or institutional (e.g., schools, convalescent homes) land uses; commercial uses such as pedestrian-oriented outdoor spaces or restaurants with outdoor eating areas; nurseries; and existing solar collectors. Shadow-sensitive uses in the vicinity of the project site include single-family residential yard areas surrounding the project site. These areas are dependent on sunlight for the physical comfort of this use (outdoor space for residence).

3.3 EXISTING SHADE/SHADOW CONDITIONS

A two-story residential building, vacant land, and areas with mature vegetation currently present within the boundaries of the project site. The Alhambra Wash traverses the project site in a northeast-southwest direction. Existing shade/shadow diagrams were created for the existing two-story residential structure within the project site. The following describes the existing shadow conditions of the project site during the summer/winter solstices and the vernal/autumnal equinoxes.

Winter Solstice. During the winter solstice, shadows cast by the on-site residential building from 9:00 a.m. to 3:00 p.m. are confined to the boundaries of the project site, although a small portion of the Alhambra Wash to the northeast/east is shaded during the afternoon hour (3:00 p.m.); refer to Exhibit 4, Existing Shade/Shadow Patterns. This shaded area at the Alhambra Wash to the east/northeast is not considered shadow-sensitive. The existing on-site residential structure does not currently shade any sensitive uses during the winter solstice; refer to Exhibit 4.

Vernal Equinox. Shadows cast by the existing on-site residential structure during the vernal equinox are similar to the shadows cast during the winter solstice, although to a lesser extent. Shadows cast between 9:00 a.m. and 3:00 p.m. during the vernal equinox are predominantly confined to the boundaries of the project site. However, a small portion of the Alhambra Wash

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1 The Weather Channel, San Gabriel, CA Monthly Weather, https://weather.com/weather/monthly/l/72c00ef93e5739c7c8de446fb391b845057190926d9522da9ba4aa6ad a34493a, accessed May 6, 2019.
LEGEND

- 9 a.m. Shadow Pattern
- 12 p.m. Shadow Pattern
- 3 p.m. Shadow Pattern
- 6 p.m. Shadow Pattern

Note: Based on the daytime lighting conditions throughout the year, the Summer Solstice and Autumnal Equinox shadow patterns are represented from 9:00 a.m. to 6:00 p.m. and the Winter Solstice and Vernal Equinox shadow patterns are represented from 9:00 a.m. to 3:00 p.m.
to the east is shaded during the afternoon (3:00 p.m.) hour. No shadows-sensitive uses are currently shaded by the on-site residential structure during the vernal equinox; refer to Exhibit 4.

**Summer Solstice.** During the summer solstice, shadows cast between the morning (9:00 a.m.) and afternoon (3:00 p.m.) hours from the on-site single-family residential building would be predominantly contained within the boundaries of the project site, although a small portion of the Alhambra Wash to the east would be shaded during the afternoon (3:00 p.m.) hour; refer to Exhibit 4. During the evening (6:00 p.m.) hour, more extensive shadows are cast onto the Alhambra Wash to the east. However, the Alhambra Wash is not considered a shadow-sensitive use. The existing on-site residential structure does not currently shade any sensitive uses during the summer solstice.

**Autumnal Equinox.** Shadows cast from the on-site single-family residential building are fully contained within the project site between the morning (9:00 a.m.) and mid-day (12:00 p.m.) hours. Shadows are nominally cast onto the Alhambra Wash to the east during the afternoon (3:00 p.m.) hour; refer to Exhibit 4. Shadows from the on-site single-family residential building are further cast onto the Alhambra Wash and South Arroyo Drive to the east during the evening (6:00 p.m.) hour. The Alhambra Wash and South Arroyo Drive are not considered shadow-sensitive uses. Combined shadows from the on-site residential structure and off-site residential structures to the northwest cast shadows onto the Alhambra Wash, South Arroyo Drive, and residential uses to the east during the evening hour. However, the Alhambra Wash and South Arroyo Drive are not considered shadow-sensitive uses and the residential uses to the east are not shaded for more than four hours. Shadow patterns cast by the existing on-site residential building do not shade any off-site shadow-sensitive uses for more than four hours during the autumnal equinox.

### 4.0 SHADE/SHADOW ANALYSIS

#### 4.1 THRESHOLDS OF SIGNIFICANCE

A project would have a significant impact pertaining to the degradation of character/quality if it would substantially block surrounding shadow-sensitive areas. Since the City of San Gabriel does not have a specific adopted threshold to determine whether or not increased shade/shadow patterns are considered significant, Michael Baker International has utilized the City of Los Angeles’ adopted threshold. Further, the urbanized character of the City is similar to that of Los Angeles (pertaining to potential shade/shadow concerns) and Los Angeles is one of the few cities in southern California with an adopted threshold of significance for shade/shadow impacts. Thus, for the purposes of this analysis, a project would have a significant impact if:

- Shadow-sensitive use areas (where sunlight is important to its function) would be shaded by project-related structures for more than three hours between the hours of 9:00 a.m. and 3:00 p.m. Pacific Standard Time (between late October and early April), or for more than four hours between the hours of 9:00 a.m. and 5:00 p.m. Pacific Daylight Time (between early April and late October), compared to existing conditions.²

For the purposes of this analysis, facilities and operations sensitive to the effects of shading include: routinely useable outdoor spaces associated with residential, recreational, or institutional (e.g., schools, convalescent homes) land uses; commercial uses such as pedestrian-oriented outdoor spaces or restaurants with outdoor eating areas; nurseries; and existing solar collectors. These uses are considered sensitive because sunlight is important to function, physical comfort, or commerce.

4.2 IMPACTS AND MITIGATION MEASURES

**SS-1**  
Result in shading of shadow-sensitive use areas (where sunlight is important to its function) by project-related structures for more than three hours between the hours of 9:00 a.m. and 3:00 p.m. Pacific Standard Time (between late October and early April), or for more than four hours between the hours of 9:00 a.m. and 5:00 p.m. Pacific Daylight Time (between early April and late October), compared to existing conditions?

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

The proposed project would demolish the existing on-site single-family residential building and construct a new 55,000 square-foot, four-story residential building encompassing 41 condominium units. Construction of the new four-story building would cast shadows on nearby residential uses. The following analysis describes the shadow conditions from the proposed project onto surrounding uses during the summer/winter solstices and the vernal/autumnal equinoxes.

**Winter Solstice.** On December 21, shadows are widespread within and around the project site from the morning (9:00 a.m.) to the afternoon (3:00 p.m.) hours; refer to Exhibit 5, Proposed Shade/Shadow Patterns. Morning shadows (9:00 a.m.) would spill onto the residential front and side yard areas, paved driveway/parking areas, and residential structures to the north, as well as a small portion of the Alhambra Wash to the east.

At mid-day (12:00 p.m.), shadows cast from the project site would be similar to those cast during the morning hour. Shadows cast during the afternoon (3:00 p.m.) would also cast onto the front and narrow and limited side/back yard areas, and the paved driveway at residential uses to the north; refer to Exhibit 5. Shadows would also be cast onto Hampton Court to the north, and the Alhambra Wash and South Arroyo Drive to the northeast/east during the afternoon (3:00 p.m.) hour. Hampton Court, the Alhambra Wash, and South Arroyo Drive are not considered shadow-sensitive uses. As noted above, the front and side/back yard areas associated with the residences to the north of the project site would be shaded for more than three hours between the morning (9:00 a.m.) and afternoon (3:00 p.m.). These areas are not considered shadow-sensitive, as sunlight is not important to its function, and these areas are not considered routinely outdoor usable spaces. The majority of these areas are utilized for driveway and garage uses. In addition, a portion of front and side/back yards currently experience shading as a result of the existing
Exhibit 5

**Proposed Shade/Shadow Patterns**

**LEGEND**
- 9 a.m. Shadow Pattern
- 12 p.m. Shadow Pattern
- 3 p.m. Shadow Pattern
- 6 p.m. Shadow Pattern

**Late October to Early April**

- **Winter Solstice**
- **Vernal Equinox**

**Early April to Late October**

- **Summer Solstice**
- **Autumnal Equinox**

Note: Based on the daytime lighting conditions throughout the year, the Summer Solstice and Autumnal Equinox shadow patterns are represented from 9:00 a.m. and 6:00 p.m. and the Winter Solstice and Vernal Equinox shadow patterns are represented from 9:00 a.m. to 3:00 p.m.
residential structure and existing ancillary structure at the residential use to the north; refer to Exhibit 4. A less than significant impact would occur in this regard.

**Vernal Equinox.** Shadows generated by the proposed project on March 21, when the sun shines at a moderate angle at noon, would cast shadows to the north, northeast, east, west, and northwest between the hours of 9:00 a.m. and 3:00 p.m.; refer to Exhibit 5. The proposed project would cast shadows onto the front and side/back yard area associated with the single-family residential use to the north of the project site during the morning (9:00 a.m.) and mid-day (12:00 p.m.) hours. During the afternoon (3:00 p.m.) hour, shadows cast by the proposed project would primarily be contained within the project’s boundary, except for a small portion of the Alhambra Wash to the east.

As seen on Exhibit 5, the project would cast shadows onto the front and narrow and limited side/back yard area of the single-family residential use to the north for greater than three hours between 9:00 a.m. and 3:00 p.m. during the spring months. The areas shaded for more than three hours include the front and side/back yard area associated with the residence to north of the project site. However, this area is not considered shadow-sensitive (as sunlight is not important to their function). This shaded area is utilized for side yard, driveway, and garage uses and therefore is not considered a routinely usable outdoor space where sunlight is important to its function. Further, the areas associated with the single-family residential use to the north experience shading under existing conditions as a result of the residential and ancillary structures at the residential use to the north. A less than significant impact would occur in this regard.

**Summer Solstice.** During the summer solstice, shadows would be cast onto the single-family residential use to the north during the morning hour (9:00 a.m.). During the mid-day hour (12:00 p.m.), shadows cast by the proposed project would be completely confined within the boundaries of the project site, except for a small portion of the Alhambra Wash to the east. Shadows cast during the afternoon (3:00 p.m.) would be similar to the mid-day (12:00 p.m. hour), with limited spillover onto the Alhambra Wash to the east. Shadows cast during the evening (6:00 p.m.) hour would spill onto the Alhambra Wash, South Arroyo Drive, and a small portion of a residential front yard area to the east. As shown in Exhibit 5, shadows cast by the project during summer solstice would not shade any off-site shadow-sensitive uses for more than four hours. A less than significant impact would occur in this regard.

**Autumnal Equinox.** Shadows generated by the proposed project on September 21 would occur when the sun shines at a moderate angle at noon and would cast shadows to the north, east, and southeast between the hours of 9:00 a.m. and 6:00 p.m.; refer to Exhibit 5. Morning shadows (9:00 a.m.) would spill onto the front and side/back yard areas, paved driveway, detached garage, and residential structure associated with the single-family residential use to the north. At mid-day (12:00 p.m.), shadows cast by the project would be similar to those cast in the morning hour, although to a lesser extent.

During the afternoon hour (3:00 p.m.), shadows cast by the proposed project would primarily be contained within the project’s boundary, except for a small portion of the Alhambra Wash to the east. During the evening (6:00 p.m.) hour, shadows would be cast onto Alhambra Wash, South
Arroyo Drive and a small portion of residential uses to the east. As seen in Exhibit 5, the project would cast shade to off-site uses for greater than four hours between the hours of 9:00 a.m. and 6:00 p.m. during the fall months. Specifically, the narrow and limited side/back yard area associated with the residential use to the north would be shaded for more than four hours between 9:00 a.m. and 6:00 p.m. However, this area is not considered a shadow-sensitive use (as sunlight is not important to its function). This shaded area is utilized for side yard, driveway, and garage uses and therefore is not considered a routinely useable outdoor space where sunlight is important to its function. Further, this area already experiences shading under existing conditions. Thus, during the fall months, surrounding uses would not experience significant shadow impacts as a result of the proposed project.

**Impact Conclusion**

The proposed project would result in new shadows cast onto surrounding residential uses, as well as onto the Alhambra Wash, adjacent roadways, and sidewalks. As discussed in Section 4.1, *Thresholds of Significance*, a significant impact would result if shadow-sensitive use areas (where sunlight is important to its function) would be shaded by project-related structures for more than three hours between 9:00 a.m. and 3:00 p.m. Pacific Standard Time (between late October and early April), or for more than four hours between 9:00 a.m. and 5:00 p.m. Pacific Daylight Time (between early April and late October), compared to existing conditions.

**Early April to Late October**

*Summer Months.* As illustrated on Exhibit 5, the proposed project would cast minimal shadows onto single-family residential uses to the north during the morning (9:00 a.m.) hour. During the mid-day (12:00 p.m.) hour, shadows cast by the proposed project would primarily be contained within the project’s boundary, except for a small portion of the Alhambra Wash to the east. During the afternoon (3:00 p.m.) hour, shadows cast by the proposed project would nominally be cast onto the Alhambra Wash to the east. Shadows cast during the evening (6:00 p.m.) hour would spill onto the Alhambra Wash, South Arroyo Drive, and a small portion of a residential front yard area to the east. As shown in Exhibit 5, the project would not result in the shading of any shadow-sensitive uses for more than four hours between 9:00 a.m. and 5:00 p.m. Thus, during the summer months, surrounding uses would not experience significant shadow impacts as a result of the proposed project.

*Fall Months.* As illustrated on Exhibit 5, the proposed project would cast shade to off-site uses for greater than four hours between the hours of 9:00 a.m. and 6:00 p.m. during the fall months. The narrow and limited side/back yard area associated with the residential use to the north would be shaded for more than four hours between 9:00 a.m. and 6:00 p.m. However, this area is not considered a shadow-sensitive use (as sunlight is not important to its function). This shaded area is utilized for side yard, driveway, and garage uses and therefore is not considered a routinely useable outdoor space where sunlight is important to its function. Further, this area already experiences shading under existing conditions. Thus, during the fall months, surrounding uses would not experience significant shadow impacts as a result of the proposed project.
Late October to Early April

**Winter Months.** As illustrated on Exhibit 5, the proposed project would cast shadows for greater than three hours between 9:00 a.m. and 3:00 p.m. at off-site areas in the winter months. These areas shaded for more than three hours include the side/back yard area, paved driveway, and detached garage, and residential structure associated with the single-family residential use to the north, as well as a small portion of the Alhambra Wash to the east. These areas are not considered shadow-sensitive (as sunlight is not important to their function) and/or routinely usable outdoor spaces. In addition, the areas associated with the residential use to the north experience shading under existing conditions as a result of the residential and ancillary structures at the single-family residential use to the north. Therefore, the project would not result in significant shade/shadow impacts during the winter months.

**Spring Months.** As illustrated on Exhibit 5, the proposed project would cast shadows onto the front and side/back yard area associated with the residence to north of the project site for greater than three hours between 9:00 a.m. and 3:00 p.m. during the spring months. These narrow and limited areas are not considered shadow-sensitive (as sunlight is not important to their function). This shaded area is utilized for side yard, driveway, and garage uses and therefore is not considered routinely usable outdoor space where sunlight is important to its function. In addition, the areas associated with the single-family residential use to the north experience shading under existing conditions as a result of the residential and ancillary structures at the residential use to the north. Therefore, the project would not result in significant shade/shadow impacts during the spring months.

As discussed above, the proposed project would not result in significant shading of the any shadow-sensitive uses for more than three hours during the winter and spring months, and for more than four hours during the fall and summer months. Although the side/back yard area, paved driveway, and residential structure to the north as well as a small portion of the Alhambra Wash to the east would experience significant shading as a result of the project during the winter months, these uses are not considered shadow-sensitive (as these areas are not dependent on sunlight for its function, and these areas are not routinely usable outdoor spaces). As discussed, the majority of the areas associated with the residence to the north are utilized for side yard, driveway, and garage uses and therefore are not considered routinely useable outdoor space where sunlight is important to its function. Further, this area already experiences shading under existing conditions. As such, a less than significant shade/shadow impact would occur with implementation of the proposed project.

**Shading of On-Site Courtyard**

The proposed project includes a central courtyard to be used by on-site residents. As shown on Exhibit 5, the on-site courtyard area would experience some shading during the morning, afternoon, and evening hours, but would receive sunlight in the majority of the courtyard for most of the day during the summer months. During the fall months, the on-site courtyard area would be completely shaded during the morning and evening hours and would be partially shaded during the mid-day and afternoon hours. This area would be shaded at all hours during
the winter months. During the spring months, this area would be fully shaded during the morning hours and would be partially shaded during the mid-day and afternoon hours.

**Mitigation Measures:** No mitigation measures are required.

### 5.0 REFERENCES

### 5.1 PREPARERS

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### 5.2 DOCUMENTS


### 5.3 WEBSITES
