City of Sonoma

Proposed Mitigated Negative Declaration

Circulation Date: September 20, 2017

Project Title: Oliva Apartments

Project Location: 655 West Spain Street (Parcel 1 of Parcel Map No. A-445)

Applicant: DeNova Homes, Inc.
1500 Willow Pass Court
Concord, CA 94520

Project Description: The project involves developing the ±1.5-acre site with a 30-unit apartment community. The apartments would be contained in four buildings (all two-stories in height), including two 5-unit buildings toward West Spain Street (Buildings 1 and 2), one 10-unit building in the middle of the site (Building 3), and one 10-unit building at the rear of the site (Building 4). A common outdoor area is provided in the intervening space between Buildings 1 and 3. The apartments consist of six 1 bedroom/1 bath units (704-712 sq. ft.), sixteen 2 bedroom/2 bath units (956-1,153 sq. ft.), and eight 2 bedroom/2.5 bath units (1,349-1,477 sq. ft.) with an average unit size of 1,057 square feet. Buildings 1 and 2 would have a maximum height of 29 feet measured to the highest roof peak, while Buildings 3 and 4 would have a maximum height of 29.5 feet. The buildings have a Spanish architectural style with stucco finish and tile roofing. Access to the development would be provided by a 30-foot wide driveway entry off West Spain Street centered on the project frontage. Proposed interior circulation includes a T intersection that would also serve as the required fire truck turn around A total of 56 parking spaces are provided for the project, consisting of 8 garage spaces, 37 covered carport spaces and 11 uncovered spaces along the driveway, project perimeter, and between Buildings 3 and 4. The carport structures would be setback two to three feet from the side property line. Two alternative site plan have been put forward (Alternate A and Alternate B), which are same plan simply reversed on the site. Construction activities associated with the project would include tree removal (roughly five trees), grading, excavation and trenching for installation of required improvements (e.g., utilities, drainage features, driveways/parking, etc.), preparation of building pads, and construction of the residential buildings.

Pursuant to the State of California Public Resources Code and the *Guidelines for Implementation of the California Environmental Quality Act of 1970* (hereinafter referred to as CEQA), as amended to date, this is to advise you that the City of Sonoma has prepared an Environmental Initial Study Checklist on the Oliva Apartments project (see attached). Potential significant impacts were identified relating to air quality, biological resources, cultural resources, noise, and traffic. Mitigation measures which would reduce the potential impacts to a less-than-significant level have been identified as follows:

Mitigation Measure 3.c: To limit the project's construction-related dust and criteria pollutant emissions, the following Bay Area Air Quality Management District (BAAQMD)-recommended Mitigation Measures shall be included in the project's grading plan, building plans, and contract specifications:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes. Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer‘s specifications. All equipment shall be checked by a certified visible emissions evaluator.
8. Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District‘s phone number shall also be visible to ensure compliance with applicable regulations.

Mitigation Measure 4.a: If grading or removal of nesting trees and habitat is proposed to occur within the nesting season (between February 1 and August 31), a pre-construction nesting bird survey of grasslands, shrubs and trees on the project site shall be performed by a qualified biologist within 7 days of proposed ground breaking. If no nesting birds are observed no further action is required and vegetation removal and/or grading shall commence within one week of the survey to prevent “take” of individual birds that could begin nesting after the survey. If active bird nests are observed during the pre-construction survey, a disturbance-free buffer zone shall be established around the nest tree(s) until the young have fledged, as determined by a qualified biologist in consultation with CDFG.

Mitigation Measure 5.b: Construction personnel involved with earthmoving shall be alerted to the potential for the discovery of prehistoric or historic-period archaeological/tribal cultural resources. Tribal cultural resources and prehistoric archaeological site indicators may include: obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil (“midden”) containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse.

If prehistoric or historic-period archaeological/tribal cultural resources are encountered, all construction activities within 50 feet shall halt and the Planning Director shall be notified. A Secretary of the Interior-qualified archaeologist shall inspect the findings within 24 hours of discovery. If it is determined that the project could damage a historical resource or a unique archaeological resource (as defined pursuant to the CEQA Guidelines), mitigation shall be implemented in accordance with Public Resources Code (PRC) Section 21083.2 and Section 15126.4 of the CEQA Guidelines, with a preference for preservation in place. Consistent with Section 15126.4(b)(3), this may be accomplished through planning and construction to avoid the resource; incorporating the resource within open space; capping and covering the resource; or deeding the site into a permanent conservation easement. If avoidance is not feasible, a qualified archaeologist shall prepare and implement a detailed treatment plan in consultation with the Planning Department. Treatment of unique archaeological resources shall follow the applicable requirements of PRC Section 21083.2.

Mitigation Measure 5.c: If paleontological resources are identified during construction activities, all work in the immediate area will cease until a qualified paleontologist has evaluated the finds in accordance with the standard guidelines established by the Society of Vertebrate Paleontology. If the paleontological resources are considered to be significant, a data recovery program will be implemented in accordance with the guidelines established by the Society of Vertebrate Paleontology.

***Mitigation Measure 5.d*:** If human remains are encountered, excavation or disturbance of the location must be halted in the vicinity of the find, and the County Coroner contacted. If the coroner determined the remains are Native American, the coroner will contact the Native American Heritage Commission. The Native American Heritage Commission will identify the person or persons believed to be most likely descended from the deceased Native American. The most likely descendent makes recommendations regarding the treatment of the remains with appropriate dignity.

***Mitigation Measure 12.d*:** Prior to issuance of grading permits, the project applicant shall ensure that the following practices are incorporated into the construction specification documents to be implemented by the project contractor:

1. Provide enclosures and mufflers for stationary equipment, shrouding or shielding for impact tools, and barriers around particularly noisy operations, such as grading or use of concrete saws within 50 feet of an occupied sensitive land use.
2. Use construction equipment with lower (less than 70 dB) noise emission ratings whenever possible, particularly air compressors and generators.
3. Do not use equipment on which sound-control devices provided by the manufacturer have been altered to reduce noise control.
4. Locate stationary equipment, material stockpiles, and vehicle staging areas as far as practicable from sensitive receptors.
5. Prohibit unnecessary idling of internal combustion engines and comply with Municipal Code limitations on vehicle idling.
6. Implement noise attenuation measures to the extent feasible (i.e., such that they do not impede efficient operation of equipment or dramatically slow production rates), which may include, but are not limited to, noise barriers or noise blankets. The placement of such attenuation measures shall be reviewed and approved by the Building Department prior to issuance of grading and building permits for construction activities.
7. Designate a construction liaison that would be responsible for responding to any local complaints about construction noise. The liaison would determine the cause of the noise complaints (e.g., starting too early, bad muffler, etc.) and institute reasonable measures to correct the problem. Conspicuously post a telephone number for the liaison at the construction site.
8. Hold a pre-construction meeting with the job inspectors and the general contractor/onsite project manager to confirm that noise mitigation and practices (including construction hours, construction schedule, and noise coordinator) are completed.

Mitigation Measure 16.b: As determined by the City Engineer, the project applicant/developer shall pay a proportional share of the cost to either install a signal or roundabout at the West Spain Street/Fifth Street West intersection and shall pay a proportional share of the cost of improving the West Napa Street/Fifth Street West intersection by widening the southbound approach to include a right-turn lane and adding a westbound right-turn overlap phase at the signal.

A copy of the Environmental Initial Study Checklist is attached to this proposed Mitigated Negative Declaration. All project file documents referenced in the Environmental Initial Study Checklist may be reviewed in the offices of the Planning Division at City Hall, No. 1 The Plaza, Sonoma, California 95476 during normal business hours.

Finding: On the basis of the Environmental Initial Study Checklist, the City of Sonoma Planning and Community Services Administrator hereby finds that the proposed project could have a significant effect on the environment, however, there would not be a significant effect in this case because mitigation measures summarized above and described in the attached Initial Study have been added to the project.

Public Comment Period: Comments on the adequacy of the environmental document are due by October 11, 2017. Any comments should be in writing and submitted to the following address:

City of Sonoma
Planning Department
No. 1 The Plaza
Sonoma CA, 95476

The Proposed Mitigated Negative Declaration will be considered at a meeting of the Sonoma Planning Commission on October 12, 2017. The hearing will begin at 6:30 PM and will be held in the Community Meeting Room at 177 First Street West, Sonoma, California.

California Environmental Quality Act

Initial Study

(As required by Sec. 15063 of the Public Resources Code)
Prepared: September 2017

1. **Project Title:** Oliva Apartments

2. **Lead Agency Name and Address:** City of Sonoma Planning Department

3. **Contact Person and Phone Number:** Rob Gjestland, Senior Planner
(707) 938-3681

4. **Project Location:** 655 West Spain Street (Parcel 1 of Parcel Map No. A-445)

5. **Project Sponsor's Name and Address:** DeNova Homes, Inc.
1500 Willow Pass Court
Concord, CA 94520

6. **General Plan Designation:** Mixed Use

7. **Zoning:** Mixed Use (MX)

8. **Description of Project:**

The project involves developing the ±1.5-acre site with a 30-unit apartment community. The apartments would be contained in four buildings (all two-stories in height), including two 5-unit buildings toward West Spain Street (Buildings 1 and 2) setback a minimum of 21 feet from the front property line, one 10-unit building in the middle of the site (Building 3), and one 10-unit building at the rear of the site (Building 4) setback a minimum of 12 feet from the south property line. A common outdoor area is provided in the intervening space between Buildings 1 and 3. The apartments consist of six 1 bedroom/1 bath units (704-712 sq. ft.), sixteen 2 bedroom/2 bath units (956-1,153 sq. ft.), and eight 2 bedroom/2.5 bath units (1,349-1,477 sq. ft.) with an average unit size of 1,057 square feet. Buildings 1 and 2 would have a maximum height of 29 feet measured to the highest roof peak, while Buildings 3 and 4 would have a maximum height of 29.5 feet. The buildings have a Spanish architectural style with stucco finish and tile roofing. Access to the development would be provided by a 30-foot wide driveway entry off West Spain Street centered on the project frontage. Proposed interior circulation includes a T intersection that would also serve as the required fire truck turn around (a trash/recycling enclosure is located opposite the firetruck turnaround to provide easy access for garbage collection). A total of 56 parking spaces are provided for the project, consisting of 8 garage spaces, 37 covered carport spaces and 11 uncovered spaces along the driveway, project perimeter, and between Buildings 3 and 4. The carport structures would be setback two to three feet from the side property line. Two alternative site plan have been put forward (Alternate A and Alternate B), which are same plan simply reversed on the site. Construction activities associated with the project would include tree removal (roughly five trees), grading, excavation and trenching for installation of required improvements (e.g., utilities, drainage features, driveways/parking, etc.), preparation of building pads, and construction of the residential buildings. Additional details are provided in the attached project submittal (Attachment 1).

9. Setting and Context:

The project site is a vacant 1.52-acre parcel fronting West Spain Street that was created through a two-lot subdivision recorded in July 2017 (Parcel Map No. A-445). The site is flat, undeveloped, and dominated by grasses with several trees (a modern shed and roof remains were recently removed from the project site). The property frontage on West Spain Street is improved with curb, gutter, sidewalk and a residential driveway. Surrounding land uses include single-family homes to the north (across West Spain Street), condominium complexes to the west, and an office building, parking areas and the rear of a shopping center to the east. The property has a General Plan land use designation and zoning of "Mixed Use."

10. Other public agencies whose approval is required (e.g. permits, financing approval, or participation agreement).

Sonoma County Water Agency/Sonoma County PRMD, Engineering Division (sanitary sewer connection).

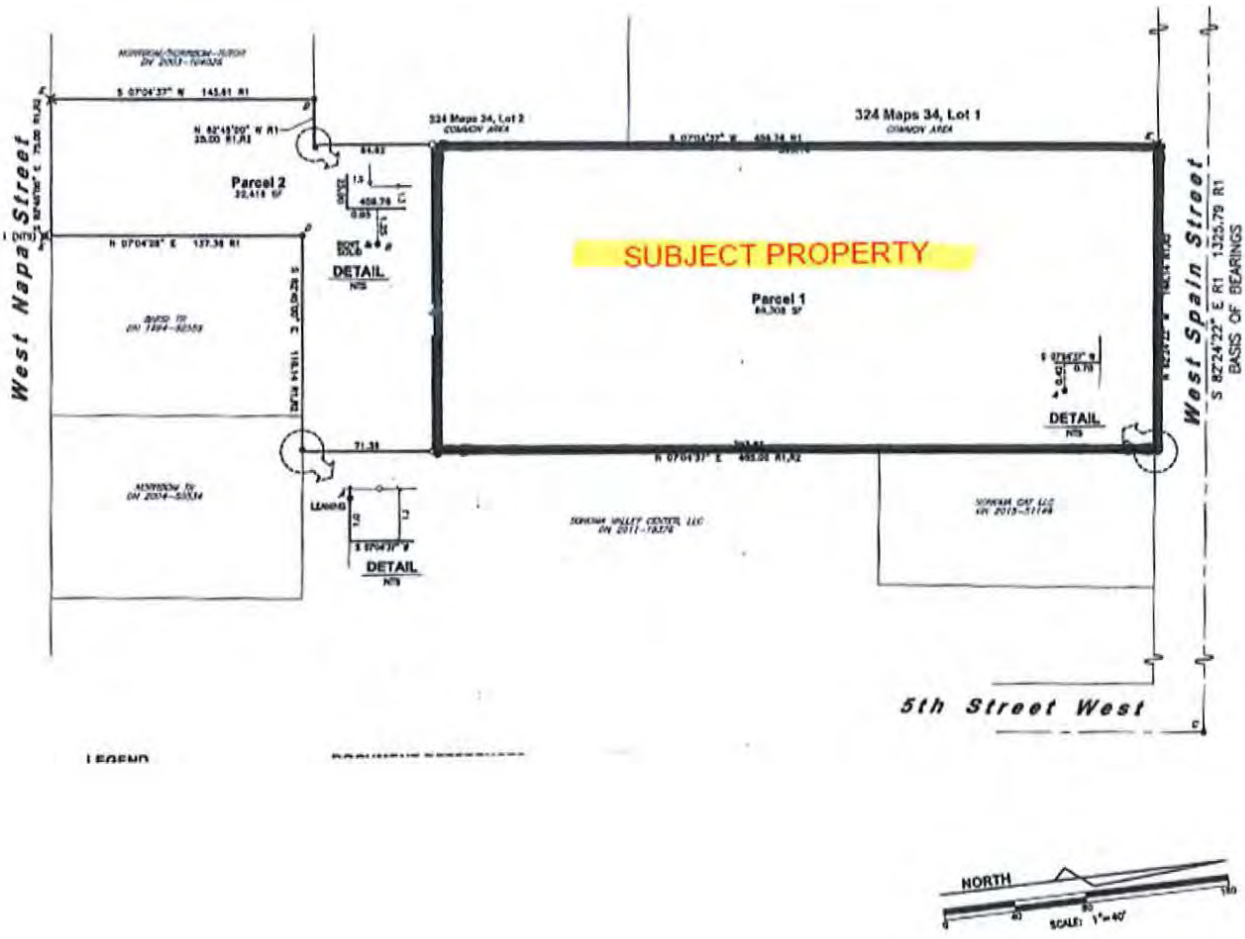
11. Application of CEQA requirements.

This Project is subject to the requirements of the California Environmental Quality Act (CEQA). The City of Sonoma is the CEQA lead agency. Prior to making a decision to approve the Project, the City must identify and document the potential significant environmental effects of the Project in accordance with CEQA. This Initial Study has been prepared under the direction of the City to fulfill the CEQA requirements.

David Goodison, Planning Director

#1 The Plaza
Sonoma, CA 95476
Email: dgoodison@sonomacity.org

Figure 1 – Location Map



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

☐ Aesthetics	☐ Hazards & Hazardous Materials	☐ Public Services
☐ Agriculture Resources	☐ Hydrology / Water Quality	☐ Recreation
☐ Air Quality	☐ Land Use / Planning	☐ Storm Water
☐ Biological Resources	☐ Mineral Resources	☐ Transportation / Traffic
☐ Cultural Resources	☐ Noise	☐ Utilities / Service Systems
☐ Geology / Soils	☐ Population / Housing	☐ Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

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

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

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

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

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

9-26-17

Signature Date

David Goodison, Planning Director City of Sonoma, Planning Department

Printed name For *(Lead Agency)*

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

   a. Earlier Analysis Used. Identify and state where they are available for review.

   b. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   c. Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:

   a. The significance criteria or threshold, if any, used to evaluate each question; and

   b. The mitigation measure identified, if any, to reduce the impact to less than significance.

1. AESTHETICS: Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☑	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☑
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☑	☐
d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	☐	☐	☑	☐

Discussion:

a) Have a substantial adverse effect on a scenic vista?

Section 19.40.130 of the Sonoma Municipal Code (SMC) defines "scenic vistas" as a public view, benefiting the community at large, of significant features, including hillside terrain, ridgelines, canyons, geologic features, and community amenities (e.g., parks, landmarks, permanent open space). This definition is intended to include public views from road corridors of the hillsides located north, east, and west of the City. The view element potentially affected by the project would be the hillsides located east and west of the City as viewed from the West Spain Street corridor.

Public views of hillside terrain located east and west of Sonoma are currently available from the West Spain Street corridor, although these public views are filtered or partially obscured at some vantage points by trees located along both sides of the street. With the existing street trees, the proposed front yard setbacks of ≥21 feet for Buildings 1 and 2, and two-story height limit, the project would have a minimal effect, if any, on public views of the hills from the West Spain Street corridor. Accordingly, the project would have a ***less-than-significant*** impact on scenic vistas.

b) Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

The project is not located along a Scenic Highway; therefore, the project would have ***no impact*** on scenic resources associated with a Scenic Highway.

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

The project site is a vacant parcel supporting grassland with a several trees. The project involves developing the site with a 30-unit apartment community, including four buildings and associated parking areas, which would alter the existing visual character of the site. However, the project site is located in an urban setting with commercial and residential uses/development on all sides, including single-family homes to the north (across West Spain Street), condominium complexes to the west, gas station and residence to the south, and an office building, parking areas and shopping center to the east. The adjoining condominiums to the west, as well as other multi-family development

along the West Spain Street corridor, have a similar density to the project and also include two-story buildings. The project site itself is identified as a Housing Opportunity Site by the Housing Element of the General Plan with an allowable density of up to 20 units per acre. While five trees would be removed from the site, replacement trees would be required by the City's Tree Ordinance. For these reasons, the project would not substantially degrade the existing visual character or quality of the site and its surroundings. This would be considered a ***less-than-significant*** impact

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Exterior lighting would be necessary for the development, such as exterior building lighting and parking lot lighting for safety and security. However, this lighting would be typical of residential development throughout the City. In addition, all proposed exterior lighting would require review and approval by the City's Design Review and Historic Preservation Commission (DRHPC) and would be subject to the exterior lighting standards of the City's Development Code[1], which specify that exterior light fixtures must be shielded to reduce or eliminate light spillage off-site. For this reason, the project will not create a new source of substantial light or glare that would adversely affect views in the area. This would be a ***less-than-significant*** impact.

2. AGRICULTURAL RESOURCES: **In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland.** **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☑
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☑
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), or timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☑
d) Result in the loss of forest land, conversion of forest land to non-forest use, or involve other changes in the existing environment, which, due to their location or nature, could result in conversion of forest land to non-forest use?	☐	☐	☐	☑

[1] City of Sonoma Development Code § 19.40.030

e) Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Important Farmland or other agricultural resources, to non-agricultural use?	☐	☐	☐	☑

Discussion:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

The project site is not designated Prime Farmland, Unique Farmland, or Farmland of Statewide Importance on maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Department of Conservation. The project site is identified as "Urban and Built-up Lands" on the most recent Important Farmland Map maintained by the Department of Conservation[2]. ***No impact*** would occur.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

The subject property is not zoned for agricultural use and is not under a Williamson Act contract. Therefore, ***no impact*** would occur.

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), or timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

The project site does not contain any forest lands as defined in Public Resources Code section 12220(g) and is not zoned for forest uses. In addition, the project is not located in the vicinity of off-site forest resources. For these reasons, there would be ***no impact***.

d) Result in the loss of forest land, conversion of forest land to non-forest use, or involve other changes in the existing environment, which, due to their location or nature, could result in conversion of forest land to non-forest use?

See response 2.c above. There would be ***no impact***.

e) Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Important Farmland or other agricultural resources, to non- agricultural use.?

The site is not used for agricultural purposes and is located within the City of Sonoma adjoining commercial and residential development on all sides. Accordingly, the project would have ***no impact*** with regard to the conversion of farmland or other agricultural resources to non-agricultural use.

[2] http://maps.conservation.ca.gov/ciff/ciff.html

3. AIR QUALITY: Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☑	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☑	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	☐	☑	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☑	☐
e) Create objectionable odors or airborne dust affecting a substantial number of people?	☐	☑	☐	☐

Discussion:

a) Conflict with or obstruct implementation of the applicable air quality plan?

The San Francisco Bay Area Air Basin (SFBAAB) is classified by the Bay Area Air Quality Management District (BAAQMD) as non-attainment for ozone and inhalable particulates (PM10). To address these exceedances, BAAQMD, in cooperation with the Metropolitan Transportation Commission and the Association of Bay Area Governments, prepared the Bay Area 2005 Ozone Strategy (BAOS) in September 2005 and Particulate Matter Implementation Schedule (PMIS) in November 2005. The PMIS discusses how BAAQMD implements the California Air Resources Board's 103 particulate matter control measures. Later, BAAQMD adopted the 2010 Bay Area Clean Air Plan (Plan), which updates the BAOS. BAAQMD guidance states that *"if approval of a project would not result in significant and unavoidable air quality impacts, after the application of all feasible mitigation, the project would be considered consistent with the 2010 [Plan]"* (BAAQMD, 2010a). As indicated under Sections 3.b through 3.e, below, the project would not result in significant and unavoidable air quality impacts. Therefore, the Project would be consistent with the Plan, and the impact would be ***less-than-significant***.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

See discussion under Section 3.c below.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

Operational Emissions

As indicated under Section 3.a, above, the SFBAAB is classified by BAAQMD as non-attainment for ozone and inhalable particulates (PM10). BAAQMD sets forth screening criteria in the 2017 BAAQMD CEQA Guidelines to indicate the minimum development size (by land use category) at which air pollutant emissions could exceed significance thresholds and result in potentially significant impacts related to violation of air quality standards or cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment. The Guidelines set forth the following screening criteria for low-rise apartment development based on the above thresholds: 451 apartment units for operational emissions and 240 units for construction emissions. The Guidelines also specify that the project must also meet two other criteria: (1) the BAAQMD's Basic Construction Mitigation Measures must be implemented during construction; and (2) the project does not include demolition, simultaneous occurrence of more than two construction phases, simultaneous construction of more than one land use type; extensive site preparation; or extensive material transport (more than 10,000 cubic yards of soil). As further explained below, the project would meet these criteria, and therefore the impact would be ***less-than-significant with mitigation***.

Construction-Related Emissions

Project-related excavation, grading, and other construction activities at the project site may cause wind-blown dust that could generate particulate matter into the atmosphere. Fugitive dust includes not only PM10 and PM2.5 that could contribute to violation of air quality standards, but also larger particles that can represent a nuisance impact. Dust can be an irritant, causing watering eyes or irritation to the lungs, nose, and throat. To assess whether a proposed project would result in the generation of construction-related criteria air pollutants and/or precursors that exceed BAAQMD thresholds of significance, the BAAQMD guidelines set forth screening criteria as set forth below.

1. *The project is below the applicable screening level size, (identified as 240 units for low-rise apartment development).*

   The project features 30 units, a number well below the screening threshold.

2. *All BAAQMD Basic Construction Mitigation Measures would be included in the project design and implemented during construction.*

   All basic construction mitigation measures would be required through Mitigation Measure 3.c.

3. *Construction-related activities would not include any of the following:*

   - *Demolition activities inconsistent with District Regulation 11, Rule 2: Asbestos Demolition, Renovation and Manufacturing.*
   - *Simultaneous occurrence of more than two construction phases (e.g., paving and building construction would occur simultaneously).*
   - *Simultaneous construction of more than one land use type (e.g., project would develop residential and commercial uses on the same site) (not applicable to high density infill development).*

- *Extensive site preparation (i.e., greater than default assumptions used by the Urban Land Use Emissions Model [URBEMIS] for grading, cut/fill, or earth movement); or*

- *Extensive material transport (e.g., greater than 10,000 cubic yards of soil import/export) requiring a considerable amount of haul truck activity.*

The project would not result include any of the activities identified above. There are no buildings on the site, so no demolition would occur. The project would be developed in a single construction phase. The project consists of a single land use type. Project construction would not entail extensive site preparation or materials transport.

As shown above, the project complies with BAAQMD screening criteria.

Depending on exposure, adverse health effects can also occur due to specific contaminants, such as lead or asbestos from existing buildings, or contaminated soils from excavation, that may be constituents of dust. As discussed in Section 8, Hazards and Hazardous Materials, the project site is not identified on the Hazardous Waste and Substances Site List (Cortese List) for Sonoma County. In addition, the project site has been reviewed for possible contamination with hazardous materials through a Phase 1 Environmental Site Assessment, prepared in 2016, which revealed no evidence of contaminants, hazardous substances, or petroleum products in connection with the project site.

In addition, as discussed above BAAQMD recommends using specific best management practices, which have proved a practical and effective approach to control fugitive dust emissions. The guidelines note that individual measures have been shown to reduce fugitive dust by anywhere from 30 percent to more than 90 percent. Absent the implementation of these measure, the project could have a significant impact with respect to construction dust emissions. To address this issue, the following mitigation measure is required:

Mitigation Measure 3.c: To limit the project's construction-related dust and criteria pollutant emissions, the following Bay Area Air Quality Management District (BAAQMD)-recommended Mitigation Measures shall be included in the project's grading plan, building plans, and contract specifications:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes. Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.
8. Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

With implementation of Mitigation 3.c, potential impacts in this area would be reduced to a ***less-than-significant*** level.

d) Expose sensitive receptors to substantial pollutant concentrations?

BAAQMD specifically defines sensitive receptors as facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples include schools, hospitals and residential areas. The nearest sensitive receptor is the condominium development immediately to the west, though additional sensitive receptors are also located in the vicinity.

Construction of the project would result in short-term diesel exhaust particulate matter (DPM), which is defined as a toxic air contaminants (TAC), from onsite heavy-duty equipment, as well as from soils-hauling activities. Exposure of sensitive receptors is the primary factor used to determine health risk. Exposure is a function of the concentration of a substance or substances in the environment and the extent of exposure that person has with the substance.

According to the Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to toxic emissions, should be based on a 70-year exposure period. As explained in the BAAQMD Guidelines, *"current models and methodologies for conducting health risk assessments are associated with longer-term exposure periods of 9, 40, and 70 years, which do not correlate well with the temporary and highly variable nature of construction activities."* The State Office of Environmental Health Hazard Assessment (OEHHA) recommends that districts assume a minimum of two years of exposure for health risk analysis. Based on the estimated construction duration of approximately 10 months, construction activities would fall below the minimum two-year exposure criteria for preparation of a Health Risk Assessment. Further, although on-road heavy-duty diesel vehicles and off-road equipment would be used during construction, emissions would be temporary and variable in nature and would not be expected to expose sensitive receptors to substantial air pollutants. In addition, the proposed project would be subject to City regulations limiting idling to no more than five minutes, which would further reduce nearby sensitive receptor exposure to temporary and variable DPM emissions. Finally, based on the BAAQMD Guidelines for conducting health risk assessments, the project's construction period would not trigger longer-term exposure periods of 9, 40 and 70 years that are typical of health risk assessment. As such, the limited construction duration of the project would be sufficient to avoid TAC health impacts to nearby sensitive receptors and the project impact in this area would be ***less-than-significant***.

e) Create objectionable odors and/or airborne dust affecting a substantial number of people?

Land uses associated with odor complaints typically include wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, refineries, and chemical plants. In contrast, the proposed project is a residential land uses that would not be expected to result in substantial new odors affecting a substantial number of people.

During the construction phase, operation of diesel equipment on-site, as well as from architectural coatings and asphalt off-gassing, could generate construction-related odors. These odors would be short-term in nature and would cease soon after project completion. Impacts to adjacent land uses would be ***less-than-significant***.

As discussed in Section 3.b-c, above, dust generated by construction activities associated with the Project could result in a significant impact. However, the implementation of Mitigation 3.c., as set forth above, would reduce the impact in this area to a ***less-than-significant*** level.

4. BIOLOGICAL RESOURCES – Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☑	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☑
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☑
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☑
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☑
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☑

Discussion:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

A biological assessment of the project site was prepared by Moore Biological Consultants, dated September 22, 2016 (Attachment 2). Due to a lack of suitable habitat and the site's location within an urban setting, the biological assessment concludes it is unlikely that special-status plants occur on the site, and that no special-status wildlife species are expected to occur on or near the site on more than occasional basis. That said, the assessment concludes that on-site trees, shrubs and grassland may be used by nesting birds protected by the Migratory Bird Treaty Act of 1918 and Fish and Game Code of California. Therefore if vegetation removal and/or project construction occurs between February 1 and August 31, the biological assessment recommends conducting a pre-construction nesting

bird survey. This recommendation has been incorporated into Mitigation Measure 4.a below, which would reduce potential impacts to nesting birds and special status bird species to a ***less-than-significant*** level.

Mitigation Measure 4.a: If grading or removal of nesting trees and habitat is proposed to occur within the nesting season (between February 1 and August 31), a pre-construction nesting bird survey of grasslands, shrubs and trees on the project site shall be performed by a qualified biologist within 7 days of proposed ground breaking. If no nesting birds are observed no further action is required and vegetation removal and/or grading shall commence within one week of the survey to prevent "take" of individual birds that could begin nesting after the survey. If active bird nests are observed during the pre-construction survey, a disturbance-free buffer zone shall be established around the nest tree(s) until the young have fledged, as determined by a qualified biologist in consultation with CDFG.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

The site supports disturbed upland grassland with several trees. The biological assessment prepared by Moore Biological Consultants (Attachment 2) concludes there are no sensitive habitats on the site and that the site is biologically unremarkable**.** Accordingly, the project would have ***no impact*** on any riparian habitat or other sensitive natural community.

c) Have a substantial adverse effect on federally-protected wetlands?

The biological assessment prepared by Moore Biological Consultants (Attachment 2) concludes there are no potentially jurisdictional Waters of the U.S or wetlands on the site**.** Accordingly, ***no impact*** would occur.

d) Interfere substantially with the movement of any fish or wildlife species or on any wildlife corridor, or impede the use of native wildlife nursery sites?

The project site is bordered by urban development on all sides, with no connectivity to undeveloped natural habitat areas. In addition, the project site does not adjoin/encompass a stream or other waterway and the property is not used as a native wildlife nursery site. As a result, the project would not interfere with the movement of any fish or wildlife species or any wildlife corridor or nursery site. ***No impact*** would occur.

e) Conflict with any local policies or ordinances protecting biological resources such as a tree preservation policy or ordinance?

The proposed residential development would not conflict with any local policies or ordinances protecting biological resources, including the City's Tree Ordinance (Chapter 12.08 of the Sonoma Municipal Code). As required by Section 12.08.035 of the Tree Ordinance, an arborist report was prepared for the project which was reviewed by the City's Tree Committee on March 16, 2017. The recommendations of the Tree Committee with respect to tree removal, tree relocation, tree preservation, and tree replacement will be considered by the Planning Commission as part of their review of the proposed development as normally required. Accordingly, there would be ***no impact*** in terms of conflicting with the City's Tree Ordinance or other policies protecting biological resources.

f) Conflict with the provisions of any adopted or approved local, regional, or state habitat conservation plan?

No habitat conservation plans have been prepared addressing the project site. As a result, the project would not conflict with any adopted or approved habitat conservation plans. ***No impact*** would occur.

5. CULTURAL RESOURCES: Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☑
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☑	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☑	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☑	☐	☐
e) Cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code 21074?	☐	☑	☐	☐

Discussion:

a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

The City of Sonoma commissioned Tom Origer & Associates to conduct an historical resources study of the site. The project site is undeveloped (a modern shed and roof remains were removed from the project site after the study). The Historical Resources Study for the Oliva Apartments Project prepared by Tom Origer & Associates, dated April 17, 2017 (Attachment 3) found no historical resources on the project site or within the study area. Accordingly, the project would have ***no impact*** on historical resources.

b) Cause a substantial adverse change in the significance of an archaeological resource?

The City of Sonoma commissioned Tom Origer & Associates to conduct an historical resources survey of the site (Attachment 3). No archaeological remains were observed during the course of the survey; therefore no resource-specific recommendations were warranted. However, there is a very low probability that buried archaeological deposits could be present at the site that could be identified during earth-moving activities. Accordingly, consistent with the historic resource survey, the following mitigation measure has been included to address the potential for accidental discovery. Implementation of this mitigation measure would ensure that potentially significant impacts to archeological resources are reduced to a ***less-than-significant*** level.

Mitigation Measure 5.b: Construction personnel involved with earthmoving shall be alerted to the potential for the discovery of prehistoric or historic-period archaeological/tribal cultural resources. Tribal cultural resources and prehistoric archaeological site indicators may include: obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse.

If prehistoric or historic-period archaeological/tribal cultural resources are encountered, all construction activities within 50 feet shall halt and the Planning Director shall be notified. A Secretary of the Interior-qualified archaeologist shall inspect the findings within 24 hours of discovery. If it is determined that the project could damage a historical resource or a unique archaeological resource (as defined pursuant to the CEQA Guidelines), mitigation shall be implemented in accordance with Public Resources Code (PRC) Section 21083.2 and Section 15126.4 of the CEQA Guidelines, with a preference for preservation in place. Consistent with Section 15126.4(b)(3), this may be accomplished through planning and construction to avoid the resource; incorporating the resource within open space; capping and covering the resource; or deeding the site into a permanent conservation easement. If avoidance is not feasible, a qualified archaeologist shall prepare and implement a detailed treatment plan in consultation with the Planning Department. Treatment of unique archaeological resources shall follow the applicable requirements of PRC Section 21083.2.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Paleontological resources (fossils) are the remains or traces of prehistoric animals and plants. The National Resources Conservation Service has classified site soils as belonging to the Tuscan cobbly clay loam series[3], which is a Holocene aged soil (10,000 to Present) that generally extends to a depth of 5 feet. Significant fossils are not typically found in Holocene-aged soils. The Tuscan cobbly clay loam is underlain by Pleistocene (10,000 to 1.5 million years old) Older Alluvium (Qa) which can contain fossils. Rancholabrean fossils, typically found in Pleistocene alluvium, may include mammoths, horses, mastodons, camels, ground sloths, and pronghorns. Sonoma Volcanics underlie the Older Alluvium at an unknown depth. Sonoma Volcanics do not usually contain fossils.

Since most of the construction activities will be within the Holocene-aged Tuscan cobbly clay loam, it is unlikely fossils will be encountered during construction activities. However, potential impacts to paleontological resources may occur during project ground-disturbing activities where such activities as grading or trenching would occur below the project area's soil layers (approximately 5 feet). Should a paleontological resource be encountered, the following mitigation measure would reduce impacts to a ***less-than-significant*** level.

Mitigation Measure 5.c: If paleontological resources are identified during construction activities, all work in the immediate area will cease until a qualified paleontologist has evaluated the finds in accordance with the standard guidelines established by the Society of Vertebrate Paleontology. If the paleontological resources are considered to be significant, a data recovery program will be implemented in accordance with the guidelines established by the Society of Vertebrate Paleontology.

d) Disturb any human remains, including those interred outside of formal cemeteries?

Although impacts to human remains are not anticipated, there is always the remote possibility that human remains are present below the ground surface and could be unearthed during ground disturbing activities. Consistent with the historic resource survey and CEQA Guidelines Section 15064.5(d), implantation of Mitigation Measure 5.d below would reduce this impact to a ***less-than-significant*** level.

Mitigation Measure 5.d: If human remains are encountered, excavation or disturbance of the location must be halted in the vicinity of the find, and the County Coroner contacted. If the coroner determined the remains are Native American, the coroner will contact the Native American Heritage Commission. The Native American Heritage Commission will identify the person or persons believed to be most likely descended from the deceased

3 *Soil Survey of Sonoma County, California,* National Resources Conservation Service, 1972.

Native American. The most likely descendent makes recommendations regarding the treatment of the remains with appropriate dignity.

e) Cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code 21074?

The historical resources study (Attachment 3) did not identify any such resources on the site. However, the potential exists for the accidental discovery of tribal resources during project construction, a possibility which represents a potentially significant impact. To address this contingency, the study recommends that procedures be in place to address the potential for the accidental discovery. This recommendation would be implemented through Mitigation Measure 5.b, as set forth above. With implementation of this mitigation measure, potential impacts to tribal cultural resources would be reduced to a ***less-than-significant*** level.

6. GEOLOGY AND SOILS: **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)	☐	☐	☐	☑
ii. Strong seismic ground shaking?	☐	☐	☑	☐
iii. Seismic-related ground failure, including liquefaction?	☐	☐	☑	☐
iv. Landslides?	☐	☐	☐	☑
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☑	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☑	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☑	☐

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☑

Discussion:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?

The project site would not be subject to surface fault rupture. In general, surface fault rupture occurs along active faults. While the project site is located in a seismically active region, the City of Sonoma, including the project site, is not affected by an Alquist-Priolo Earthquake Fault Zone pursuant to Division of Mines and Geology Special Publication 42[4]. Therefore, ***no impact*** would occur.

ii) Strong seismic ground shaking?

The City of Sonoma is located in the seismically active San Francisco Bay Area, in proximity to several mapped active or potentially active regional faults. The Rodgers Creek fault is nearest to the project site, located approximately five miles to the southwest on the western side of the Sonoma Mountains. As a result, the project could result in the exposure of people, structures, and/or property to seismic ground shaking. While hazards associated with potential ground shaking cannot be eliminated, potential impacts resulting from seismic ground shaking would be reduced to the greatest extent feasible through compliance with the City of Sonoma's building code requirements, which requires that new structures be designed and constructed in a manner to maximize seismic safety, in conformance with the 2016 California Building Code. This would be considered a ***less-than-significant*** impact.

iii) Seismic-related ground failure, including liquefaction?

Refer to Section 6.a.ii and 6.c. Potential impacts associated with seismic-related ground failure would be ***less-than-significant***

iv) Landslides?

There is no potential for the project site to be affected by a landslide as the site is relatively flat and not located in proximity to any hillside area. Therefore, ***no impact*** would occur.

b) Result in substantial soil erosion or the loss of topsoil?

The project site is almost flat, ranging between 90 to 96 feet above mean sea level. The National Resources Conservation Service has classified site soils are as belonging to the Tuscan cobbly clay loam (TuC) series, which have slow to medium runoff and a slight to moderate hazard of erosion. Despite the relatively flat topography and site soils, grading and/or earthmoving activity associated with construction of the project could result in a temporary increase in erosion. However, erosion control measures to be implemented during construction would be included in the project Storm Water Pollution Prevention Plan (SWPPP) required for construction and identified in the erosion

[4] *Fault-Rupture Hazard Zones in California,* Earl W. Hart and William A. Bryant, California Geological Survey, Special Publication 42, supplements 1 and 2 1999.

and sediment control plan (ECP) required by the City's grading ordinance (Chapter 14.20 of the Sonoma Municipal Code). See also the responses to Section 9.a and 9.c regarding construction-related erosion. With the implementation of these normal requirements, the project would not result in substantial soil erosion and would have a ***less-than-significant*** impact in this regard.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Existing development on and around the project site, constructed on similar soils and bedrock geology has not experienced landslides, lateral spreading, subsidence, liquefaction, or collapse. Based on this past experience, it is not anticipated that unstable geologic units or soil would affect the project. In addition, pursuant to Chapter 4 of the California Residential Code (CRC) and Chapter 18 of the California Building Code (CBC), a soils and geotechnical investigation (prepared by a licensed geotechnical engineer) is required for multi-family development. As normally required, the recommendations identified in the soils and geotechnical investigation, such as appropriate foundation systems, soil stability measures, on-site soil preparation and compaction levels, must be incorporated into the permits and construction plans for the project (i.e., improvement plans, grading permit, and building permits), which are subject to review and approval by the City Engineer and Plans Examiner prior to the issuance of any building permits for grading or building construction. Incorporation of the recommendations into the plans and permits for the project would ensure that potential impacts relating to unstable geologic units or soils would be ***less-than-significant***.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Refer to Section 6.c. Impacts in this area would be ***less-than-significant***.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

The proposed development would be connected to the local sewer system managed by the Sonoma Valley County Sanitation District. Use of septic tanks or alternative wastewater disposal systems is not proposed as part of the project. ***No impact*** would occur.

7. GREENHOUSE GAS EMISSIONS: **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☑	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☑

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

On June 2, 2010 the Bay Area Air Quality Management District (BAAQMD) adopted guidelines for analyzing air quality impacts under CEQA, including suggested thresholds of significance and associated screening criteria for the

analysis of greenhouse gas (GHG) impacts from development projects. Under the most recent BAAQMD guidelines, which were updated in May 2017, land use development projects that generate GHG emissions below 1,100 metric tons of carbon dioxide equivalent (MTC2e) per year are considered to have a less than significant impact. The BAAQMD screening criteria indicate that low rise apartment projects of less than 78 dwelling units would not exceed the GHG operational threshold of 1,100 MTC_2e per year. The proposed apartment development would result in 39 residential units on the site, well below the BAAQMD threshold. Accordingly, the project would be considered to have a ***less than significant impact*** with respect to GHG emissions.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

The proposed residential development would be consistent with the following State and local plans, policies, and requirements addressing GHG reduction:

State Regulations Addressing GHG Reduction:

California Building Code – Building and Energy Efficiency Standards: Energy conservation standards for new residential and non-residential buildings were adopted by the California Energy Resources Conservation and Development Commission (now the CEC) in June 1977 and most recently revised in 2008 (Title 24, Part 6, of the California Code of Regulations [CCR]). Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. On May 31, 2012, the CEC adopted the 2013 Building and Energy Efficiency Standards, which went into effect on July 1, 2014. Buildings that are constructed in accordance with the 2013 Building and Energy Efficiency Standards are 25 percent (residential) to 30 percent (non-residential) more energy efficient than the 2008 standards as a result of better windows, insulation, lighting, ventilation systems, and other features that reduce energy consumption in homes and businesses. Most recently, the CEC adopted the 2016 Building and Energy Efficiency Standards. The 2016 Standards improved upon the 2013 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings. These standards went into effect on January 1, 2017. Under the 2016 Standards, residential buildings are required to be 28 percent more energy efficient than the 2013 Standards while non-residential buildings are required to be 5 percent more energy efficient than the 2013 Standards.

California Building Code – CALGreen: The California Green Building Standards Code (Part 11, Title 24, known as "CALGreen") establishes planning and design standards for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants. The mandatory provisions of the California Green Building Code Standards became effective January 1, 2011, were updated in 2013, and became effective January 1, 2014.

2006 Appliance Efficiency Regulations: The 2006 Appliance Efficiency Regulations (Title 20, CCR Sections 1601 through 1608) were adopted by the CEC on October 11, 2006, and approved by the California Office of Administrative Law on December 14, 2006. The regulations include standards for both federally regulated appliances and non-federally regulated appliances. Though these regulations are often viewed as "business as usual," they exceed the standards imposed by all other states, and they reduce GHG emissions by reducing energy demand.

The project would be developed in compliance with these requirements, as enforced through the normal application of the Building Permit plan check process.

Local Plans, Policies, and Regulations addressing GHG Reduction:

City of Sonoma General Plan/Green Building Code: The City of Sonoma *2020 General Plan* sets forth policies promoting sustainable practices such as not using renewable resources faster than they can regenerate, not consuming non-renewable resources faster than renewable alternatives can be substituted for them, and ensuring that pollution and

waste are not emitted faster or in greater volumes than natural systems can absorb, recycle, or render them harmless. As part of the implementation of these policies, the City adopted the State of California Green Building Code which raised the level of construction standards in the City to encourage water and resource conservation, reduce water use generated by construction projects, increase energy efficiency, provide durable buildings that are efficient and economical to own and operate, and promote the health and productivity of residents, workers, and visitors to the City. Beginning January 1, 2014, the 2013 California Green Building Standards Code (CALGreen) became effective for new buildings and certain addition or alteration projects throughout California. The City of Sonoma has adopted and amended CALGreen as part of the City's Municipal Code to require CALGreen+Tier 1 level of compliance for all new buildings (except the Tier 1 Energy Efficiency measures). The City of Sonoma requires that project applicants hire a third-party green building special inspector to verify compliance with CALGreen requirements as amended by the City of Sonoma. Revisions to CALGreen became effective on July 1, 2015. The Project will be developed in compliance with CalGreen requirements, as enforced through the normal application of the Building Permit plan check process.

2016 Climate Action Plan Measures: Beginning in May of 2013, the City began participating in the development of a County-wide Greenhouse Gas Reduction Implementation Program, subsequently renamed Climate Action 2020. Climate Action 2020 is a collaborative effort among all nine cities and the County of Sonoma to take coordinated action in reducing GHG emissions on a county-wide basis. Through the implementation of this program, participating jurisdictions would achieve compliance with Bay Area Air Quality Management District (BAAQMD) guidelines and other related policies that establish reduction targets for GHG emissions, including AB 32, CEQA, and local GHG reduction goals. The development of the draft Plan was led by the Regional Climate Protection Authority (RCPA), with the assistance of a Working Group comprised of planning staff from each of the 10 jurisdictions of Sonoma County, including the City of Sonoma.

On August 15, 2016, the City Council began its review of the draft Climate Action 2020 Plan (CAP). For Sonoma, a total of 22 Climate Action Measures were recommended for Council consideration. Although the County-wide adoption of Climate Action 2020 Plan was subsequently postponed as a result of litigation brought against the RCPA, the City Council decided to take separate action to begin implementation of the measures identified in the CAP planning process. On November 21, 2016, the City Council adopted Resolution 40-2016, adopting the local measures identified for Sonoma through the CAP planning process. The proposed project is consistent with and would help implement measures 1-L3 (shade tree planting), measure 4-L3 (supporting land use measures), 7-L1 (electric vehicle charging stations) and measure 11-L2 (water conservation for new construction).

Because the proposed development would not conflict with State and local plans, policies, and requirements addressing GHG reduction, it would have ***no impact*** in this area.

8. HAZARDS AND HAZARDOUS MATERIALS: **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☑

b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☑
c)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☑
d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☑
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☑
f)	For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☑
g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☑
h)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☑

Discussion:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

The proposed residential development would not involve the routine transport, use, handling, emission, or disposal of hazardous materials. Therefore, ***no impact*** would occur.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials (including, but not limited to, oil, pesticides, chemicals, or radiation) into the environment?

A Phase 1 Environmental Site Assessment[5] was performed, which revealed no evidence of contaminants, hazardous substances, or petroleum products in connection with the project site. Accordingly, development of the proposed

[5] Phase I Environmental Site Assessment of Norrbom Property 590 West Napa Street, Sonoma, CA 95476, Advanced GeoEnvironmental, June 2016.

apartment community would have ***no impact*** in terms of creating a hazard from the release of hazardous materials into the environment.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Refer to Section 8.a. and 8.b. above. ***No impact*** would occur.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

The project site is not identified on the Hazardous Waste and Substances Site List (Cortese List) for Sonoma County. Therefore, the proposed development would not create a significant hazard to the public or environment in this regard, and ***no impact*** would occur.

e) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

The project site does not lie within an Airport Clear Zone or Accident Potential Zone. The nearest private airport, Sonoma Skypark, is over two miles away. Therefore, the project would not reasonably be expected to result in a safety hazard, and thus ***no impact*** would occur.

f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

The development and operation of the project would not interfere with any adopted emergency response or evacuation plan. Therefore, ***no impact*** would occur.

g) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

The project site is located in an urban environment, and is not adjacent to wildlands Therefore, ***no impact*** would occur.

9. HYDROLOGY AND WATER QUALITY: **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☐	☑
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☑	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☑	☐

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☑	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☑	☐
f) Otherwise substantially degrade water quality?	☐	☐	☑	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☑
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☑
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☑
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☑

Discussion:

a) Violate any water quality standards or waste discharge requirements?

Construction Requirements: The Clean Water Act (CWA) prohibits the discharge of pollutants from point sources to Waters of the U.S. except where those discharges are authorized by a National Pollutant Discharge Elimination System (NPDES) permit. The project applicant would be required to comply with all construction requirements in NPDES Permits CAS000004 (permitting stormwater discharges from the City of Sonoma Municipal Separate Storm Sewer System) and CAS000002 (permitting stormwater discharges from construction sites disturbing more than 1 acre of land) for the construction period.

Under the NPDES program, the applicant would be required to submit a Notice of Intent (NOI) with the State Water Resource Control Board's (SWRCB) Division of Water Quality. The NOI would include general information on the types of construction activities that would occur on the site. The applicant would also be required to submit a site-specific plan called the Storm Water Pollution Prevention Plan (SWPPP). The SWPPP would include a description of appropriate erosion control and water quality Best Management Practices (BMPs) to minimize the discharge of pollutants from the site during the construction period. Similarly, under the City's Grading Ordinance (SMC 14.20) an Erosion and Sediment Control Plan (ECP) would also be required for the project, likewise identifying measures that would be implemented during construction to appropriately and effectively minimize soil erosion and sedimentation.

Construction-related erosion control and water quality BMPs identified in the SWPPP generally include soil stabilization techniques such as: hydroseeding and short-term biodegradable erosion control blankets; silt fences or

some kind of inlet protection at downstream storm drain inlets; post-construction inspection of all drainage facilities for accumulated sediment; and post-construction clearing of all drainage facilities of debris and sediment. Finally, the project applicant would be required to submit a Notice of Termination (NOT) once construction is complete and final stabilization of the site has been achieved.

Post-Construction Requirements: Since the proposed development would create more than 5,000 square feet of new impervious surface, a Storm Water Control Plan (SCP) would be required, subject to review and approval by the City Engineer and Stormwater Compliance Specialist, identifying stormwater BMPs that, when implemented, reduce the quantity of pollutants in stormwater runoff discharging from a project site to the maximum extent practicable. The SCP also outlines BMPs that, when implemented, reduce the total volume of stormwater runoff from the project site (retention) and attenuate peak flows (detention). The applicant has provided a preliminary Grading and Drainage Plan and preliminary BASMAA LID Plan (i.e., Storm Water Control Plan) dated March 15, 2017, prepared by Stephen J. Lafranchi & Associates, Inc. (Attachment 4), to demonstrate how stormwater runoff from the site would be addressed. As identified on these plans, stormwater runoff from building rooftops and walkways and landscape areas adjacent to buildings would be directed to numerous bioretention facilities appropriately sized to address runoff from their respective drainage maintenance area. Similarly, stormwater runoff from vehicle parking and drive aisles would be directed via curb inlets and undersidewalk drains to bioretention facilities appropriately sized to address runoff from their respective drainage maintenance area. (A bioretention area is a depression that detains and treats stormwater runoff through filtration with plant media and infiltration of a gravel bed.) Any overflow from the biodetention facilities would be directed to an underground storm drain network proposed on-site that would ultimately connect to an existing 18-inch diameter City storm drain located under West Spain Street.

With the implementation of the normal construction and post-construction requirements noted above, the project would not violate any water quality standards or waste discharge requirements and ***no impact*** would occur.

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

The Department of Water Resources (DWR) defines groundwater basins based on geologic and hydrogeologic conditions. According to the DWR, the project site is located within the Sonoma Valley groundwater sub-basin. Natural recharge in the sub-basin predominantly occurs where stream channels cut into the alluvial fan deposits. Areas of low relief and sufficiently permeable soil also allow for some slow infiltration from precipitation. The project would increase the amount of impervious surface on the site. However, the site does not include a stream channel or areas of low relief and site soils (Tuscan cobbly clay loam) are characterized as belonging to Hydrologic Soil Group D, meaning they have low infiltration rates and thus would not allow for a significant amount of infiltration of runoff into the underlying groundwater basin. Regardless, as discussed under Section 9.a above, the preliminary Stormwater Control Plan for the project includes a number of bioretention areas where stormwater runoff from the development would be directed to allow for treatment and infiltration to some degree.

Lastly, the project would not involve the construction of new groundwater wells for project water supplies. Water for the proposed project would be supplied by the City of Sonoma. The City of Sonoma obtains its water from the Sonoma County Water Agency (SCWA) and City wells. On an annual basis, approximately 90% of water used in the City is supplied by SCWA and is derived from surface water. City wells are considered a secondary water source used only to supplement deliveries from SCWA during peak demands. As a result, the proposed project would not result in the substantial depletion of groundwater supplies. Project impacts on groundwater resources are considered ***less-than-significant***.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

The project site is almost flat, ranging between 90 to 96 feet above mean sea level. The National Resources Conservation Service has classified site soils are as belonging to the Tuscan cobbly clay loam (TuC) series, which have slow to medium runoff and a slight to moderate hazard of erosion. The existing drainage pattern consists of sheet flow on the surface of the property in a northerly or north-westerly direction toward West Spain Street. There are no rivers, streams, creeks, or any significant concentrations of runoff on the project site. With implementation of the proposed drainage improvements identified in the preliminary Grading and Drainage Plan and preliminary BASMAA LID Plan/Storm Water Control Plan (Attachment 4), the project would not substantially alter the existing drainage pattern of the site or area. In addition, with implementation of the normally required construction and post-construction erosion control and stormwater control measures/BMPs discussed under Subsections 9.a and 6.b (including the project Storm Water Pollution Prevention Plan, Erosion Control Plan, and Storm Water Control Plan), the project would not result in substantial erosion or siltation on- or off-site and have a ***less-than-significant*** impact in this regard

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

The project site is almost flat, ranging between 90 to 96 feet above mean sea level. The National Resources Conservation Service has classified site soils are as belonging to the Tuscan cobbly clay loam (TuC) series, which have a slow permeability and slow to medium runoff. The existing drainage pattern consists of sheet flow on the surface of the property in a northerly or north-westerly direction toward West Spain Street. There are no rivers, streams, creeks, or any significant concentrations of runoff on the project site. With implementation of the proposed drainage improvements identified in the preliminary Grading and Drainage Plan and preliminary BASMAA LID Plan/Storm Water Control Plan (Attachment 4), the project would not substantially alter the existing drainage pattern of the site or area. In addition, with implementation of the normally required construction and post-construction erosion control and stormwater control measures/BMPs discussed under Subsections 9.a and 6.b (including the project Storm Water Pollution Prevention Plan, Erosion Control Plan, and Storm Water Control Plan), the project would not substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. In particular, implementation of BMPs required as part of the Storm Water Control Plan, such as the bio-retention facilities, would retain runoff and allow it to infiltrate with any overflow directed to the City's storm drain system. Accordingly, the project would have a ***less-than-significant*** impact with regard to increased surface runoff and potential flooding

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

As discussed under 9.d, the project would not substantially alter the existing drainage pattern of the site/area or substantially increase the rate or amount of surface runoff in a manner that would exceed the capacity of existing or planned stormwater drainage systems.

In addition, with implementation of the normally required construction and post-construction erosion control and stormwater control measures/BMPs discussed under Subsections 9.a and 6.b (including the project Storm Water Pollution Prevention Plan, Erosion Control Plan, and Storm Water Control Plan), the project would not provide substantial additional sources of polluted runoff. In particular, implementation of BMPs required as part of the Storm Water Control Plan, such as the bioretention facilities, would retain and treat runoff through filtration with plant

media and infiltration of a gravel bed. Accordingly, the project would have a ***less-than-significant*** impact with regard to increased polluted runoff.

f) Otherwise substantially degrade water quality?

The proposed apartment development would not otherwise substantially degrade water quality. See responses to Items 9.a, 9.c, and 9.e. Impacts would be ***less-than-significant***.

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

According to the applicable Flood Insurance Rate Maps (Map Number 06097C0936E/Panel 936 of 1150 and Map Number 06097C0937E/Panel 937 of 1150) the project site is not located within a 100-year flood hazard area. The property is located within an area designated as "Other Areas, Zone X," which are areas determined to be outside of the 0.2% annual chance floodplain. Accordingly, housing would not be placed within a 100-year flood hazard area and ***no impact*** would occur.

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

The project would not place structures within a 100-year flood hazard area (refer to Section 9.g above). ***No impact*** would occur.

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

The project would not place people or structures within a 100-year flood hazard zone (refer to Section 9.g above). The project site is not located below a levee or dam. As a result, the project would not expose people or structures to a significant risk of loss, injury, or death involving flood hazards. ***No impact*** would occur.

j) Expose people or structures to inundation by seiche, tsunami, or mudflow?

The project site is not located in the vicinity of a large inland water body, along coastal waters, or in the path of a potential mudflow. ***No impact*** would occur.

10. LAND USE AND PLANNING: **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Physically divide an established community?	☐	☐	☐	☑
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☑
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☑

Discussion:

a) Physically divide an established community?

The project site is located in an urban setting surrounded by various residential and commercial land uses, including similar multi-family housing directly to the west. As a result, the proposed residential development would not physically divide the community. ***No impact*** would occur.

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

As discussed in the other sections of the Initial Study, the project would not conflict with any land use plan, policy or regulation adopted to avoid or mitigate environmental effects. ***No impact*** would occur.

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?

No habitat conservation plans or natural community conservation plans have been prepared addressing the site and adjoining lands. Therefore, ***no impact*** would occur.

11. MINERAL RESOURCES: Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☑
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☑

Discussion:

a) Result in the loss of availability of a known mineral resource that would be of future value to the region and the residents of the state?

The project site is not identified as containing any valuable mineral resources. Bedrock geology in the vicinity of the project site is dominated by tuff and andesitic to basaltic lava flows of the Sonoma Volcanics. In the Sonoma Valley and at the project site, the Sonoma Volcanics are overlain by moderately to highly dissected alluvial fan deposits consisting of coarse to very coarse weathered gravels. The National Resources Conservation Service has classified site soils as belonging to the Tuscan cobbly clay loam (TuC) series (0 to 9 percent slopes).[6] As a result, the project would have ***no impact*** on mineral resources.

6 *Soil Survey of Sonoma County, California*, U.S.D.A. Soil Conservation Service, 1972.

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

Refer to Section 11.a. ***No impact*** would occur.

12. NOISE: Would the project result in:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exposure of persons to, or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☑
b) Exposure of persons to, or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☑
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☑	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity due to construction activities above levels existing without the project?	☐	☑	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑

Discussion:

a) Exposure of persons to, or generation of noise levels in excess of, standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

According to the Noise Element of the City of Sonoma 2020 General Plan, the primary source of noise locally is traffic on major streets, especially arterial and collector streets such as Highway 12 (i.e., Broadway, West Napa Street, and Sonoma Highway), Leveroni Road, Napa Road, Fifth Street West, East Napa Street, West Spain Street, Verano Avenue, East MacArthur Street, and West MacArthur Street. Under the City's Noise Element, an outdoor noise level of 60 DBA or less is considered normally acceptable for residential land uses, including apartments. Pursuant to Figures NE-1 and NE-2, the southern project boundary is well outside the 60 DBA Ldn contour line for traffic noise generated on West Napa Street, and Buildings 1 and 2 (proposed toward the north side of the site) would be setback at least 21 feet from the front property line, behind the 60 DBA Ldn contour line for traffic noise generated on West Spain Street. Accordingly, indoor and outdoor noise levels within the apartment community

would meet applicable standards and road noise would not significantly affect residents of the proposed project. In addition, as a residential land use the project would not be expected to generate or expose other residents/workers in vicinity of the site to noise levels in excess of standards established by the Noise Element of the General Plan or the City's Noise Ordinance (Chapter 9.56 of the Sonoma Municipal Code). Thus, ***no impact*** would occur. Refer to Section 12.d below for a discussion of construction noise impacts

b) Exposure of persons to, or generation of excessive groundborne vibration or groundborne noise levels?

The proposed residential development does not include features or activities that would expose persons to or generate excessive groundborne vibration or groundborne noise levels. In addition, due to its low-rise, residential building type, construction of the project would not involve the use of vibratory rollers or other forms of equipment that would result in excessive vibration levels. There would be ***no impact.***

c) A substantial permanent increase in ambient noise levels in the project vicinity?

The project site is located between West Spain Street and West Napa Street (State Highway 12) in an area that supports a variety of residential and commercial uses, including single-family homes, multi-family housing (i.e., condominium complexes), a shopping center, office building, gas station, fast food restaurant, and associated parking areas. Given the surrounding context and the residential nature of the proposed development, any permanent increase in ambient noise levels resulting from the project would be ***less-than-significant*** with respect to existing ambient noise levels in the area.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity due to construction activities above levels existing without the project?

Construction activities typically associated with new development, including grading, excavation, paving, material deliveries, and building construction, would result in a substantial temporary increase in ambient noise levels in the project vicinity. Although this impact is temporary in nature, increased noise levels throughout the construction period may adversely affect residents in the area. Project construction is anticipated to last approximately ten months. The grading/excavation phase of project construction tends to be the shortest in duration, but creates the highest construction noise levels because of the operation of heavy equipment. Pursuant to the City's Noise Ordinance (Chapter 9.56 of the Sonoma Municipal Code), construction activities and material deliveries are restricted to the hours between 8 a.m. and 6 p.m. Monday through Friday, between 9 a.m. and 6 p.m. on Saturday, and between 10 a.m. and 6 p.m. on Sundays and holidays; however, the noise level at any point outside of the property plane of the Project shall not exceed (90) dBA. In addition, the City's Noise Ordinance requires sign postings at all site entrances upon commencement of construction to inform contractors and subcontractors, their employees, agents, and materialmen of the allowable construction hours.

Despite its temporary nature, construction noise has the potential to result in a significant impact on neighboring residents. Therefore, in addition to compliance with the City's Noise Ordinance as normally required, the following mitigation measure shall be required:

Mitigation Measure 12.d: Prior to issuance of grading permits, the project applicant shall ensure that the following practices are incorporated into the construction specification documents to be implemented by the project contractor:

1. Provide enclosures and mufflers for stationary equipment, shrouding or shielding for impact tools, and barriers around particularly noisy operations, such as grading or use of concrete saws within 50 feet of an occupied sensitive land use.

2. Use construction equipment with lower (less than 70 dB) noise emission ratings whenever possible, particularly air compressors and generators.
3. Do not use equipment on which sound-control devices provided by the manufacturer have been altered to reduce noise control.
4. Locate stationary equipment, material stockpiles, and vehicle staging areas as far as practicable from sensitive receptors.
5. Prohibit unnecessary idling of internal combustion engines and comply with Municipal Code limitations on vehicle idling.
6. Implement noise attenuation measures to the extent feasible (i.e., such that they do not impede efficient operation of equipment or dramatically slow production rates), which may include, but are not limited to, noise barriers or noise blankets. The placement of such attenuation measures shall be reviewed and approved by the Building Department prior to issuance of grading and building permits for construction activities.
7. Designate a construction liaison that would be responsible for responding to any local complaints about construction noise. The liaison would determine the cause of the noise complaints (e.g., starting too early, bad muffler, etc.) and institute reasonable measures to correct the problem. Conspicuously post a telephone number for the liaison at the construction site.
8. Hold a pre-construction meeting with the job inspectors and the general contractor/onsite project manager to confirm that noise mitigation and practices (including construction hours, construction schedule, and noise coordinator) are completed.

The implementation of this mitigation measure would ensure that potential impacts from temporary construction noise are reduced to a ***less-than-significant*** level.

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

Because the project is not located within an airport land use plan or within two miles of a public airport or public use airport, ***no impact*** would occur.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

Because the project is not in the vicinity of a private airstrip, ***no impact*** would occur.

13. POPULATION AND HOUSING: **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☑	☐

b) Displace substantial numbers of existing housing units, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑

Discussion:

a) Induce substantial population growth in an area, either directly or indirectly?

The proposed infill development would result in 30 residential apartment units on the project site. The project site has a zoning designation of Mixed Use, which provides for a maximum base density of 20 units per acre. The number of units proposed is consistent with the zoning and density allowance. In addition, the site has been identified as a Housing Opportunity site in the Housing Element of the General Plan, meaning that it is considered generally suitable for development with higher density, residential development. Lastly, units proposed by the project have been accounted for in the City's residential housing allocation process (i.e., Growth Management Ordinance), which limits residential growth within the city to an average of 65 units per year. Based on these factors, the project would constitute a ***less-than-significant*** impact in terms of inducing substantial population growth in the area.

b) Displace substantial numbers of existing housing units?

The project site is vacant. Accordingly, no housing would be displaced by the project. ***No impact*** would occur

c) Displace substantial numbers of people?

See response 13.b, above. ***No impact*** would occur.

14. PUBLIC SERVICES: **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
i. Fire protection?	☐	☐	☐	☑
ii. Police protection?	☐	☐	☐	☑
iii. Schools?	☐	☐	☑	☐
iv. Parks?	☐	☐	☑	☐

v. Other public facilities?	☐	☐	☐	☑

Discussion:

a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

i. *Fire protection?*

Fire protection services are provided by Sonoma Valley Fire & Rescue Authority (SVFRA). According to the Fire Marshall, the project would not require new or physically altered fire department facilities, nor will it induce growth and demand for services in excess of what is allowed through the Growth Management Ordinance or anticipated in the General Plan as a whole. ***No impact*** would occur.

ii. *Police protection?*

The Sonoma County Sheriff's Department currently provides police services for the City. According to Police Department staff, the project would not require new or physically altered fire department facilities, nor will it induce growth and demand for services in excess of what is allowed through the Growth Management Ordinance or anticipated in the General Plan as a whole. ***No impact*** would occur.

iii. *Schools?*

The project site is located within the Sonoma Valley Unified School District (SVUSD), which operates five elementary schools, two middle schools, and one comprehensive high school. As normally required, the applicant/developer would have to pay school impact fees to offset potential impacts to the SVUSD. As set forth in California Government Code Section 65995, the payment of development fees mitigates any impact to school districts, and no additional mitigation beyond the payment of these fees is permitted. This would be a ***less-than-significant*** impact.

iv. *Parks?*

Policy 4.2 of the Environmental Resources Element of the General Plan established a minimum parkland ration of 5 acres per 1,000 residents. The current population of the City is 10,989 and the amount of City parkland and open space (excluding State parkland and the Maxwell Farms County Regional park) is 157 acres, resulting in a parkland to population ratio of 14.27 acres per 1,000 residents. Because the minimum parkland/population ratio called for in the General Plan has been greatly exceeded, the incremental increase in usage of City and County park facilities is considered to be a ***less-than-significant*** impact.

v. *Other Public Facilities?*

The proposed project would not require the provision or construction of other public facilities. ***No impact*** would occur.

15. RECREATION	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☑	☐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☑	☐

Discussion:

a) Would the project increase the use of existing neighborhood or regional parks, or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

In combination with State and County parks that are maintained within and adjacent to the city limits, the City of Sonoma has roughly 250 acres of parkland and other recreational facilities. With the acquisition of the Montini Preserve, an additional 95 acres of open space developed with hiking trail systems has become available to the public. As discussed above in Section 14.a.iv, City-owned parkland and open space totals 157 acres, resulting in a parkland to population ratio of 14.27 acres per 1,000 residents, which greatly exceeds the minimum ratio established in the City's General Plan of 5 acres of parkland and open space per 1,000 residents. The project site is in proximity to several of these facilities, including Vallejo Home State Park, Olsen Park, the Montini Open Space Preserve, Maxwell Farms Regional Park, and the Sonoma City Trail Class 1 bicycle/pedestrian path. The project would also include a common outdoor area to provide for the recreational needs of residents. The project would not create a significant demand for recreational facilities and there are currently a sufficient number of parks and recreational facilities within the city and region to serve residents of the proposed development. Based on these considerations, the project would not result in a substantial deterioration of local/regional recreational facilities and its impact in this regard would be ***less-than-significant***.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

The apartment community would include a common outdoor area between Buildings 1 and 3. This small ancillary feature does not raise the prospect of creating an adverse physical impact on the environment. A ***less-than-significant impact*** would occur.

16. TRANSPORTATION/TRAFFIC: Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☑	☐	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways?	☐	☑	☐	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☑
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☑
e) Result in inadequate emergency access?	☐	☐	☐	☑
f) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	☑

Discussion:

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

The site is located on the south side of West Spain Street, midway between Fifth Street West and Seventh Street West. On July 26, 2017, W-Trans completed a Traffic Impact Study for the Oliva-W. Spain Apartments (Attachment 5) to analyze the potential traffic impacts that would be associated with the proposed 30-unit apartment project. The study area consists of the section of West Spain Street fronting the project site and the project access point as well as the following three intersections: West Spain Street/Fifth Street West, West Spain Street/Sonoma Highway, and West Napa Street/Fifth Street West. According to the Traffic Impact Study (TIS), the proposed project is expected to generate an average of 200 vehicle trips on a daily basis, including 15 trips during the a.m. peak hour and 19 trips during the p.m. peak hour. The results of the analysis, including potential impacts and recommendations, are discussed in greater detail under sections 16.b, 16.c, 16.d, and 16.e below. As noted under

section 16.b, mitigation would be required to achieve acceptable intersection operation and reduce the project's impacts in this regard to a ***less-than-significant*** level.

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

The City of Sonoma considers Level of Service (LOS) D to be the poorest acceptable level of service operation at both signalized and unsignalized intersections. The Traffic Impact Study (Attachment 5) finds that, under existing traffic volumes, the study intersections of West Spain Street/Sonoma Highway and West Napa Street/Fifth Street West are operating acceptably, but the study intersection of West Spain Street/Fifth Street West is operating at an unacceptable LOS E during the evening (p.m.) peak hour under the existing stop controls. However, there are plans to signalize or install a roundabout at the intersection of West Spain Street/Fifth Street West in the future, and with either the planned signal or roundabout, the intersection is expected to operate acceptably.

Under anticipated future traffic volumes (2040), only the West Spain Street/Sonoma Highway intersection is expected to operate acceptably. The other two study intersections (West Napa Street/Fifth Street West and West Spain Street/Fifth Street West) are expected to operate at LOS E or F during the evening peak hour under anticipated future volumes. However, a previously noted, with either the signal or roundabout planned for West Spain Street/Fifth Street West intersection operation would be expected to improve to LOS C during the evening peak hour. The intersection of West Napa Street/Fifth Street West is expected operate at LOS E during the evening peak hour under anticipated future volumes. To address this deficiency, it is recommended in the Circulation Element of the City's General Plan that the southbound approach be widened to include a right-turn lane and add a westbound right-turn overlap phase at the signal. With this improvement LOS D operation could be achieved at the intersection of West Napa Street/Fifth Street West under future volumes.

Upon the addition of project trips to the existing and future scenarios, with and without the planned intersection improvement project at West Spain Street/Fifth Street West, and the recommended improvements at the intersection of the West Napa Street/Fifth Street West, the two intersections would continue to operate at the same levels of service. In order to mitigate the project's impacts at the two intersections, the Traffic Impact Study recommends that the project pay a proportional share of the costs of improving those intersections. This recommendation has been included as Mitigation Measure 16.b below:

Mitigation Measure 16.b: As determined by the City Engineer, the project applicant/developer shall pay a proportional share of the cost to either install a signal or roundabout at the West Spain Street/Fifth Street West intersection and shall pay a proportional share of the cost of improving the West Napa Street/Fifth Street West intersection by widening the southbound approach to include a right-turn lane and adding a westbound right-turn overlap phase at the signal.

With implementation of the mitigation measure set forth above, the project would have a ***less-than-significant*** impact with respect to level of service standards.

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

The proposed apartment development would have no effect on air traffic patterns. ***No impact*** would occur.

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

The proposed apartment community would be accessed by a new, 30-foot wide driveway approach centrally located on the site's West Spain Street frontage, consistent with City Standard Plan 111 (Residential Driveway Approach). In addition, adjoining commercial and residential land uses would not present traffic hazards due to incompatibility. The project would not substantially increase hazards due to a design feature or incompatible uses. ***No impact*** would occur**.**

e) Result in inadequate emergency access?

The apartment community would be accessed by a driveway off West Spain Street that provides access to the interior of the site. Proposed interior circulation consists of drive aisles with a width of 25 feet and includes a T intersection that would also serve as the required fire truck turn around. The Fire Marshall has reviewed the proposed development plans and confirmed that they comply with Sonoma Valley Fire & Rescue Authority (SVFRA) emergency access requirements. Emergency vehicle access was also evaluated in the Traffic Impact Study (Attachment 5), which similarly determined that emergency vehicles would be able to navigate the site entrance and firetruck turnaround. Accordingly, adequate emergency access would be provided and ***no impact*** would occur.

f) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g. bus turnouts, bicycle racks)?

Alternative modes of transportation are evaluated in the Traffic Impact Study (Attachment 5), which finds that pedestrian, bicycle, and transit facilities serving the project site are adequate. Sidewalks exist along the project frontage and a network of sidewalks is proposed within the project site. Covered bicycle parking is proposed in the common outdoor area consistent with the City's Development Code, which requires new multi-family development to provide bicycle parking (as a discretionary project, the location, amount, and design of bicycle parking would be subject to review by the Design Review and Historic Preservation Commission). Lastly, existing public transit routes are adequate with bus stops within acceptable walking distance of the site at the West Napa Street intersections with either Seventh Street West or Fifth Street West. Accordingly, the project would not conflict with policies, plans and programs supporting alternative transportation. ***No impact*** would occur.

17. UTILITIES AND SERVICE SYSTEMS: **Would the project:**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☑
b) Require or result in the construction of new wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☑
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☑	☐

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☑	☐
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☑	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☑
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☑

Discussion:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

The proposed project is within the Sonoma Valley County Sanitation District (SVCSD). The SVCSD's service area extends from the unincorporated community of Glen Ellen in the north to Schellville in the south. The wastewater collection system consists of approximately 188 miles of pipeline and two lift stations. The collection system conveys wastewater to the District's treatment facility located in the southern portion of the Sonoma Valley. The treatment facility currently provides tertiary level treatment of wastewater. The SVCSD treatment plant operates under a National Pollutant Discharge Elimination System (NPDES) permit which was granted by the San Francisco Regional Water Quality Control Board. While the estimated maximum capacity of the treatment plant is 20 MGD, the NPDES permit limits the permitted average dry weather flow (ADWF) of the treatment plant to 3.0 million gallons per day (MGD). According to the most recent inspection report prepared by the RWQCB, the average dry weather flow through the facility in 2016 amounted to 1.78 MGD[7].

Each ESD in the existing service area is assigned a sewer flow of 200 gallons per day to calculate the average dry weather flow. The project involves development of 30 apartment units which would generate 24 ESDs, or 4,800 gallons per day. Because this level of increased treatment would not exceed the permitted treatment capacity of the plant, ***no impact*** would occur.

b) Require or result in the construction of new or expanded wastewater treatment facilities?

See response to 17.a. The project would not require or result in the construction of new or expanded wastewater treatment facilities. ***No impact*** would occur.

c) Require or result in the construction of new or expanded storm water drainage facilities, the construction of which could cause significant environmental effects?

As identified on the preliminary Grading and Drainage Plan and preliminary BASMAA LID Plan (i.e., Storm Water Control Plan) dated March 15, 2017, prepared by Stephen J. Lafranchi & Associates, Inc. (Attachment 4),

[7] Sonoma Valley County Sanitation District Wastewater Treatment Plant (NPDES No. CA0037800) Compliance Evaluation Inspection Report, December 2, 2016.

stormwater runoff from building rooftops and walkways and landscape areas adjacent to buildings would be directed to numerous bioretention facilities appropriately sized to address runoff from their respective drainage maintenance area. Similarly, stormwater runoff from vehicle parking and drive aisles would be directed via curb inlets and undersidewalk drains to bioretention facilities appropriately sized to address runoff from their respective drainage maintenance area. (A bioretention area is a depression that detains and treats stormwater runoff through filtration with plant media and infiltration of a gravel bed.) Any overflow from the biodetention facilities would be directed to an underground storm drain network proposed on-site that ultimately would connect to an existing 18-inch diameter City storm drain located under West Spain Street, where runoff from the site currently goes.

The proposed on-site drainage improvements noted above would not cause significant environmental affects in that they are intended to maintain the existing drainage condition to the maximum extent possible and include stormwater BMPs designed to reduce the total volume of stormwater runoff from the project site (retention), attenuate peak flows (detention), and reduce the quantity of pollutants in stormwater runoff discharging from the project site (see Sections 9.a, 9.c, 9.d, and 9.e). With respect to potential impacts associated with the actual construction of the proposed drainage improvements, such as erosion during grading and/or earthmoving activities, these would be reduced to a ***less-than-significant*** level through implementation of the erosion control measures required during construction by the City's Grading Ordinance and included the Storm Water Pollution Prevention Plan (SWPPP) for the project (see Sections 9.a, 9.c, 9.e, and 6.b).

d) Have sufficient water supplies available to serve the project from existing entitlements and resources?

The City of Sonoma supplies potable water to a population of approximately 10,800 people and approximately 300 businesses. The City's potable water supply is primarily water purchased from the Sonoma County Water Agency (SCWA) and water pumped from six groundwater wells owned and operated by the City. The SCWA water supply is delivered to the City through the SCWA aqueduct system and is supplied with water from the natural flow of the Russian River. The City is one of eight water contractors under contract with the SCWA, known as the Restructured Agreement for Water Supply. Under the Restructured Agreement, the SCWA is obligated to deliver up to 6.3 million gallons of water per day (mgd) during any month and 3,000 acre-feet of water during a fiscal year. The term of the agreement is through 2037 and can be extended by amendment.

The City's water service area encompasses the city limits, as well as portions of Sonoma County to the east of the city limits, as well as pocket areas that have outside service area agreements with the City along Thornsberry Road, Lovall Valley Road, East Napa Road, East MacArthur Street, and Denmark Street. The City's service area is approximately 2.5 square miles. The City's water distribution system contains three pressure zones that are each served by one or more storage tanks. The principal water mains in the distribution system range in size from 6 to 16 inches. Most of the distribution grid piping in the older sections of the City range in size from 1½ to 4 inches, while the newer areas are served by pipes 6 to 8 inches in diameter.

In compliance with the SB X7-7 and the Urban Water Management Planning Act, the City of Sonoma has a water management plan that evaluates water demands over a 25-year planning horizon. This analysis addresses a variety of scenarios, including years with normal water conditions, single-dry years, and multiple dry year conditions. Additionally, the UWMP attempts to accomplish the following:

- Identify measures to be implemented or projects to be undertaken to reduce water demands and address water supply shortfalls;
- Identify stages of action to address up to 50 percent reduction in water supplies during dry water years;
- Identify actions to be implemented in the event of a catastrophic interruption in water supplies;

- Assess the reliability of the sources during normal, single-dry, and multiple-dry water years; and
- Identify when, how, and what measures the City could undertake in order to meet the State Legislature's call for a 20 percent per capita reduction in urban water use statewide by 2020.

Overall, the City's UWMP, which was updated in 2015[8], determined that the City's combined projected water supplies are sufficient to meet projected demands during normal and multiple-year dry year conditions. During a severe drought condition, under the single-dry year condition, the City would not have adequate supplies and would need to impose mandatory water conservation. However, the City's water customers have been successful in reducing its water demands during water shortages, such as what occurred in 2009 when the City's water deliveries were reduced by 18 percent of normal. Moreover, in compliance with State mandates to reduce water usage, the city of Sonoma has reduced its water use by 29 percent from July 2015 through November 2015, when compared to the same period in 2013. In addition, the City can produce more groundwater on a short-term basis during peak summer months to supplement the SCWA supply.

Given the factors noted above and because development of the project site with 30 dwelling units is anticipated in the water demand projections of the City's UWMP, the project would have a ***less-than-significant*** impact with respect to water supply.

e) Result in a determination by the wastewater treatment provider that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

The project site is located within the Sonoma Valley County Sanitation District (SVCSD), which is managed by the Sonoma County Water Agency (SCWA). As noted under Section 17.a above, the project involves development of 30 apartment units that would generate 24 ESDs, or 4,800 gallons of sewer flow per day, which would be well within the permitted capacity of the SVCSD's treatment facility. As a result, the project would not be expected to result in a determination by SVCSD/SCWA that there is inadequate capacity to serve the project's wastewater treatment demand in addition to existing commitments. In addition, PRMD/SCWA staff has indicated that the local sanitary sewer collection system in proximity to the site, including the existing 8-inch diameter sewer line in West Spain Street that the project would connect to, has adequate capacity to accommodate increased flows resulting from the project. Accordingly, the project would be considered to have a ***less-than-significant*** impact with respect to sewer capacity.

f) Be served by a landfill with sufficient permitted capacity to accommodate the project?

The County of Sonoma owns the Central Disposal Site and four other transfer stations located throughout Sonoma County. The Central Disposal Site landfill, located at 500 Mecham Road in Petaluma, California, accommodates solid waste from the City of Sonoma. The Central Disposal Site has a permitted capacity of 19.59 million tons (32.65 million cubic yards). This site includes two landfills, including Landfill 1, which has a permitted capacity of 18.27 million tons (25.65 million cubic yards), and Landfill 2, which has a permitted capacity of 4.98 million tons (7.0 million cubic yards). Landfill 1 currently contains approximately 12.83 million tons (21.38 million cubic yards) of solid waste, and Landfill 2 currently has 1.12 million tons (1.87 million cubic yards) of solid waste. Therefore, remaining capacity at Landfill 1 is 5.44 million tons (4.27 million cubic yards), and remaining capacity at Landfill 2 is 3.86 million tons (5.13 million cubic yards. Further, permitted daily tonnage at the Central Disposal Site is 2,500 tons; however, average daily tonnage is 1,250 tons. Therefore, the landfill is currently receiving less than its

[8] 2015 Urban Water Management Plan Water Demand Analysis and Water Conservation Measures Update, City of Sonoma, July 1, 2015.

permitted daily tonnage of solid waste. According to the Sonoma County Waste Management Agency, there is sufficient capacity at these facilities to accommodate the project's solid waste disposal needs and thus ***no impact*** would occur.

g) Comply with federal, state, and local statutes and regulations related to solid waste?

In order for Sonoma County to help meet the diversion requirements of the California Integrated Waste Management Act of 1989 (AB939), Chapter 22 of the Sonoma County Code (Section 2207A) explicitly bans the disposal at County disposal sites of yard debris, recyclable wood waste, scrap metal and corrugated cardboard. The project would be subject to these limitations. All applicable federal, state, and local regulations related to solid waste would be complied with as part of the project. As a result, ***no impact*** would occur.

17. MANDATORY FINDINGS OF SIGNIFICANCE	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☑	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☑	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☑	☐	☐

Discussion:

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

The implementation of measures identified in this Initial Study Environmental Checklist would reduce the severity of potential impacts on biological and cultural resources to ***less-than-significant*** levels. No further mitigation beyond Mitigation Measures 4.a, 5.b, 5.c, and 5.d would be required.

b) Does the project have impacts that are individually limited, but cumulatively considerable ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

The proposed project would not result in cumulative impacts deemed considerable. Impacts on air quality, biological resources, cultural resources, noise, and traffic could contribute incrementally, but the combined effect would not be significant. As described in this Initial Study, implementation of Mitigation Measures 3.c, 4.a, 5.b, 5.c, 5.d, 12.d, and 16.b would reduce the magnitude of these cumulative impacts to a ***less-than-significant*** level.

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

The project could have temporary noise and short-term air quality effects on people in vicinity of the site during construction which, with implementation of Mitigation Measures 3.c and 12.d would be reduced to ***less-than-significant*** levels. With implementation of standard practices required of all projects approved in the City (compliance with the California Building Code, etc.), the project would not pose a hazard to future residents through exposure to geologic hazards.

Attachments:

1. Project Submittal
2. Biological Assessment prepared by Moore Biological Consultants, dated September 22, 2016
3. Historical Resources Study for the Oliva Apartments Project prepared by Tom Origer & Associates, dated April 17, 2017
4. Preliminary Grading and Drainage Plan and BASMAA LID Plan (i.e., Storm Water Control Plan) dated March 15, 2017, prepared by Stephen J. Lafranchi & Associates, Inc.
5. Traffic Impact Study for the Oliva-W. Spain Apartments dated July 26, 2017, prepared by W-Trans

ATTACHMENT 1

PROJECT SUBMITTAL

OLIVA APARTMENT COMMUNITY – 655 W SPAIN ST

655 W Spain St – APN 127-221-005

Conditional Use Permit

Currently owned by the Norrbom family, the mostly vacant land between W Napa St and W Spain St contains 2.04 acres with a home on the W Napa side of the property. Towards the middle of the property there are two barn structures, and the rest of the land remains vacant heading north towards the W Spain side of the property. Currently the land is designated as Mixed Use under the General Plan and contains Mixed Use zoning under, which allows for higher density residential uses on the property.

The Norrbom family desires to retain the portion of their land on the W Napa side of the property that contains the existing home and the larger barn. This leaves 1.52 acres to be used for the proposed apartment community to be accessed from W Spain Street (*shown on Alternative Site Plans A & B in the Submittal Package*). To which a Tentative Map was approved by the Planning Commission on October 18, 2016 to begin creating the new parcel boundaries.

With an allowed density of 20 du/ac the community can comfortably provide 30 apartment units spread throughout four separate two story structures; containing a mix of one and two bedroom units to service various household sizes with "townhome" and "flat" style units (*illustrated within the Submittal Package)*

Summary of community details can be found in the attached exhibit containing the "Project Summary"; where information on the specific units, setbacks, parking, open space, etc. can be found.

Massing of the buildings is proposed in two alternative manners: 1) on the west side of the parcel to shield existing residents at the neighboring condominiums from seeing too much parking with units on W Spain to shield the view of parking from the streetscape down W Spain, or 2) on the east side of the parcel to give buffer to condos with shielding still on W Spain at the entry. The plotting of the buildings along W Spain has been oriented to face the street to better engage the landscaping and streetscape.

Within the community there will be some garages for select units, carports to serve the residents, in addition to guest parking spread throughout (including electric vehicle charging stations). Outdoor space will be provided through patios or balconies for each apartment unit, in addition to the outdoor common area interlinked by an internal pedestrian path.

The outdoor common area, to be refined through future landscape designs, is intended to inspire a sense of community amongst the residents through providing the following: covered outdoor seating and bike parking area, adjacent to outdoor space intended to provide area to barbeque and enjoy other outdoor activities. With the close proximity to the dining and shopping options the bike corral is intended to allow residents to gather for trips to Sonoma Market or the downtown square to get supplies for an outdoor lunch or barbeque. Then ride back to the community's common area to have room to prepare and enjoy a meal while enjoying the place they call home.

Exception

Per the October 13, 2016 Study Session with the Planning Commission, the Applicant was requested to come up with more creative ways to shield parking from the view of W Spain Street, and create a streetscape that better enhances W Spain Street; with this feedback members of the Planning Commission voiced they would be supportive of granting exceptions to parking standards for the Applicant to better design/plan the site.

A summary of the community details regarding the proposed exceptions can be found in the attached "Project Summary" exhibit; comparisons between city standards and what is being proposed are provided.

SHEET INDEX

Oliva

655 West Spain

Sonoma, California

DeNova Homes

WILLIAM HEZMALHALCH
ARCHITECTS INC.

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April 18, 2017

CS

2016204

2016204 - Oliva, 655 West Spain - Sonoma, CA

Project Summary

Zoning: Northwest Planning Area I (MX) Mixed Use Zoning District

Total Site Area: ± 1.52 ac

Total Units: 30 du

Plan Type	Gross SF	Bdrm/Ba	# Units	%
PLAN 1	±712 sf	1 bdrm/1 ba	4 du	13%
PLAN 1X	±704 sf	1 bdrm/1 ba	2 du	7%
PLAN 1Y	±981 sf	2 bdrm/2 ba	2 du	7%
PLAN 2	±978 sf	2 bdrm/2 ba	4 du	13%
PLAN 2X	±956 sf	2 bdrm/2 ba	2 du	7%
PLAN 2Y	±994 sf	2 bdrm/2 ba	2 du	7%
PLAN 3	±1,153 sf	2 bdrm/2 ba	2 du	7%
PLAN 4	±1,020 sf	2 bdrm/2 ba	4 du	13%
PLAN 5	±1,349 sf	2 bdrm/2.5 ba	2 du	7%
PLAN 5X	±1,377 sf	2 bdrm/2.5 ba	2 du	7%
PLAN 6	±1,449 sf	2 bdrm/2.5 ba	2 du	7%
PLAN 6X	±1,477 sf	2 bdrm/2.5 ba	2 du	7%
Subtotal			30 du	

	Sonoma City Standards	Proposed
SETBACKS MX ZONE:		
Front/Street-Side	15 ft	21 ft
West Side (Two-Story)	9 ft	10 ft
East Side (Two-Story)	None	10 ft

REQUIRED: 2 ft for every 5 ft (or fraction thereof) of height above 20 ft, in addition to the normal requirement of one-story structures (5 ft minimum, 15 ft combined). Proposed building height is 30 ft.

Rear (Two-Story)	None	12 ft
Fire Turn Radii	28 ft	20 ft
Fire Drive Aisle	20 ft	25 ft

	Sonoma City Standards		Proposed	
PARKING STANDARDS:	Standard	Compact	Standard	Compact
90° Perpendicular Parking				
Minimum Backing Space	27 ft	25 ft	25ft	25 ft
Minimum Parking Width	10 ft	9.5 ft	9.5 ft	8.5 ft
Minimum Parking Length	20 ft	18 ft	19 ft	18 ft

Density: 19.7 du/ac

Parking:

Required: 56 spaces

- 1.5 spaces / unit = 45 spaces
- Guest: 25% of total required spaces = 11 spaces

Provided: 56 spaces

- Garage (11' x 20') 8 spaces
- Carport (9.5' x 18'): 26 spaces
- Compact Carport (8.5' x 18') 11 spaces

(Compact Stalls = 29% I 30% Max Allowed)

- Uncovered Guest (9.5' x 18'): 11 spaces

Open Space:

Required: 300 sf/unit

Total: 9,000 sf

(Combination of common and private open space per Northwest Planning Area MX Open Space Requirements. Private Open Space shall have min. dimension of 7ft and accommodate a rectangle of at least 100 SF. Common Open Space shall have a min. dimension of 15ft.)

Provided: ± 432 sf / unit average

- Common: 7,173 sf
- Private: 5,869 sf
- Total: 12,982 sf

Maximum Site Coverage & Floor Area Ratio (FAR):

	MX
FAR	0.7
Coverage	60%

Proposed:

FAR: 0.48

Maximum building as a ratio of site area, excluding porches and detached garages.

Site Coverage: 31%

Maximum site coverage as percentage of site area, excluding porches and detached garages.

NOTES:

1. Every unit will have a minimum of 70 sf of private open space. The ground floor units in the buildings along West Spain Street will have private yard space.
2. AC units directly adjacent to walkways will be screened

Project Summary

Oliva

655 West Spain

Sonoma, California

DeNova Homes

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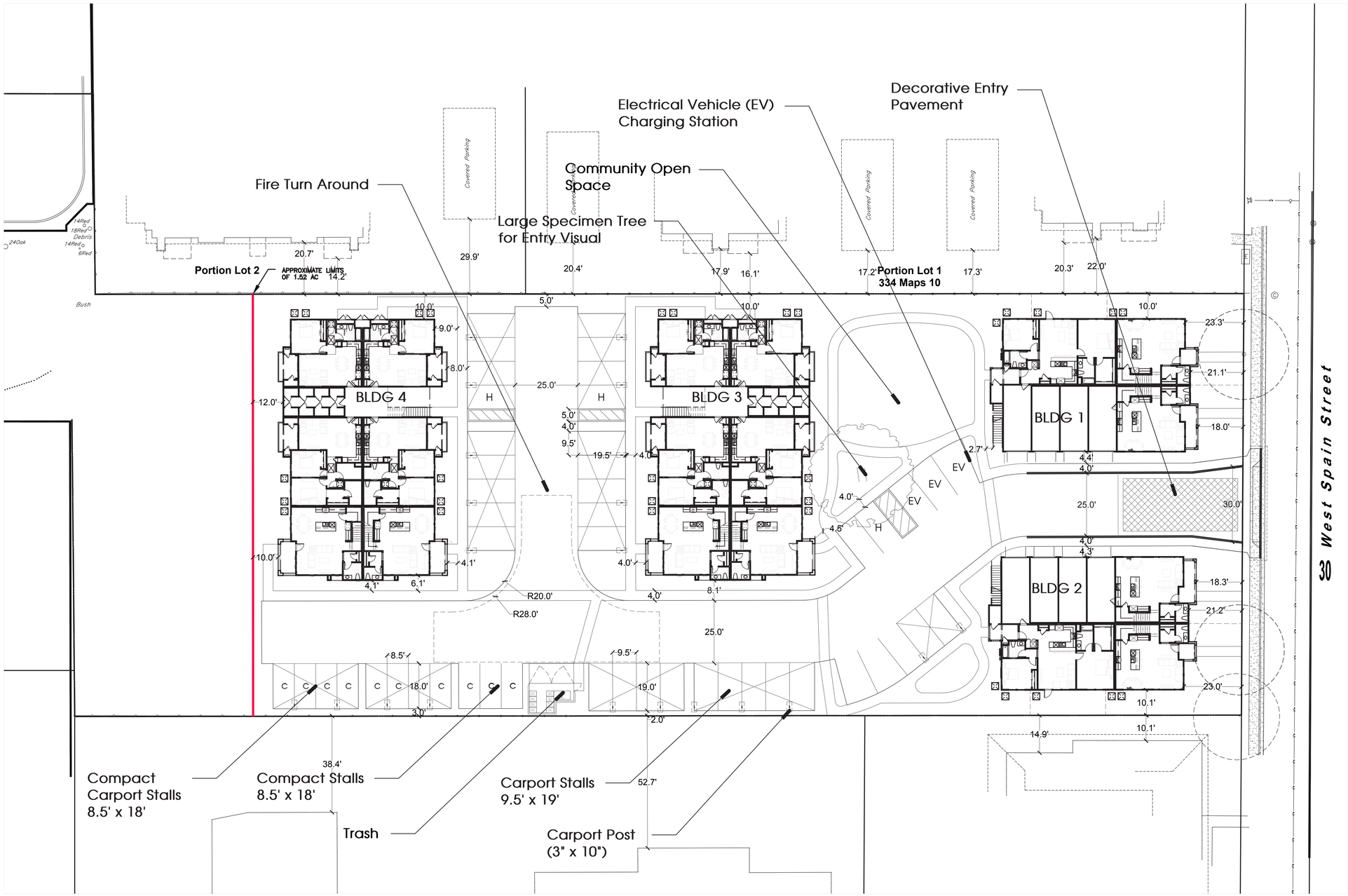
April 18, 2017

SP1

2016204



Conceptual Site Plan

Alternate A

Oliva

655 West Spain

Sonoma, California

DeNova Homes

0 10 20 40

Notes:

1. Site plan is for conceptual purposes only.
2. Site plan must be reviewed by planning, building, and fire departments for code compliance.
3. Base information per civil engineer.
4. Civil engineer to verify all setbacks and grading information
5. Building Footprints might change due to the final design elevation style.
6. Open space area is subject to change due to the balcony design of the elevation.
7. Building setbacks are measured from property lines to building foundation lines.

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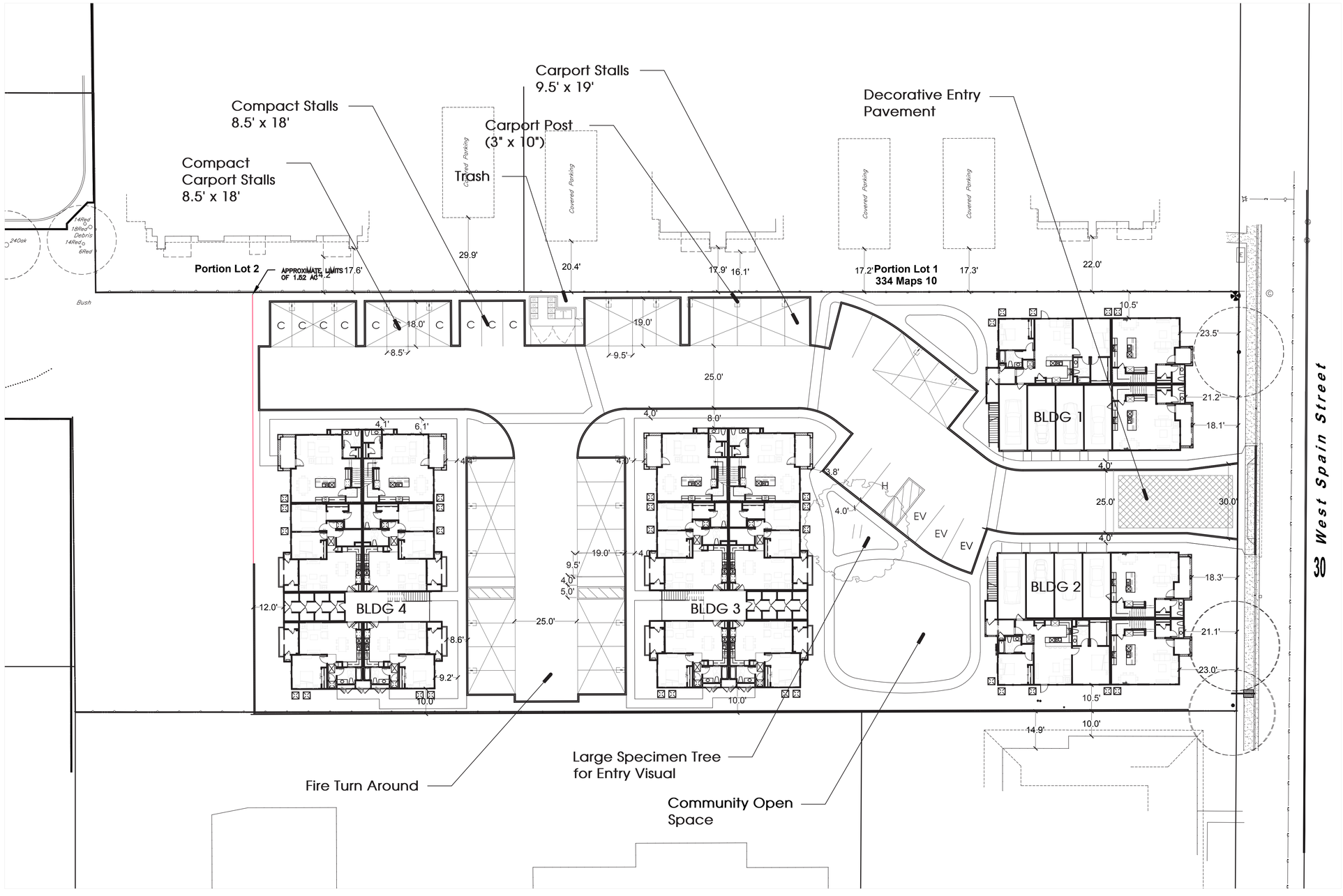
April 18, 2017

SP2

2016204

2016204 - Oliva, 655 West Spain - Sonoma, CA



Conceptual Site Plan

Alternate B

Oliva

655 West Spain

Sonoma, California

DeNova Homes

0 10 20 40

Notes:

1. Site plan is for conceptual purposes only.
2. Site plan must be reviewed by planning, building, and fire departments for code compliance.
3. Base information per civil engineer.
4. Civil engineer to verify all setbacks and grading information
5. Building Footprints might change due to the final design elevation style.
6. Open space area is subject to change due to the balcony design of the elevation.
7. Building setbacks are measured from property lines to building foundation lines.

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925 463 1700 fax 949 250 1529
2850 REDHILL AVENUE SUITE 200 SANTA ANA CA 92705-5543
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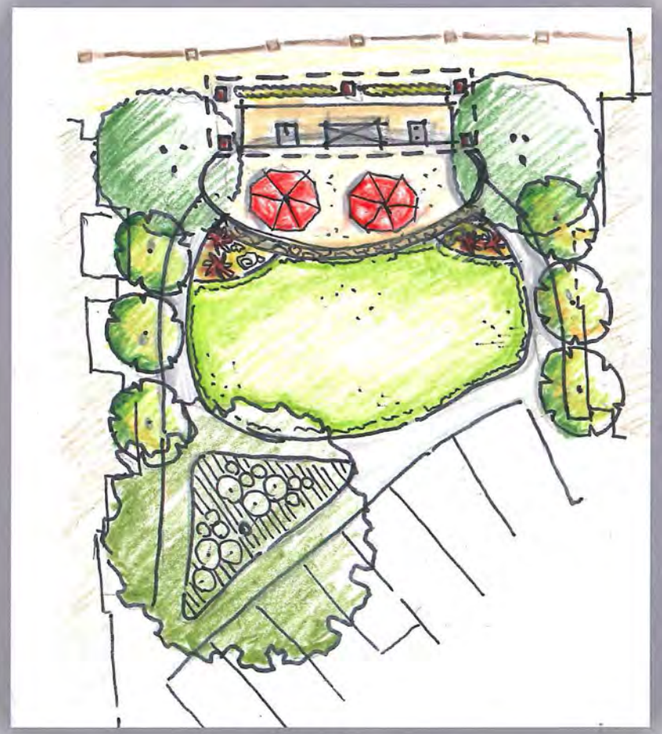
April 18, 2017

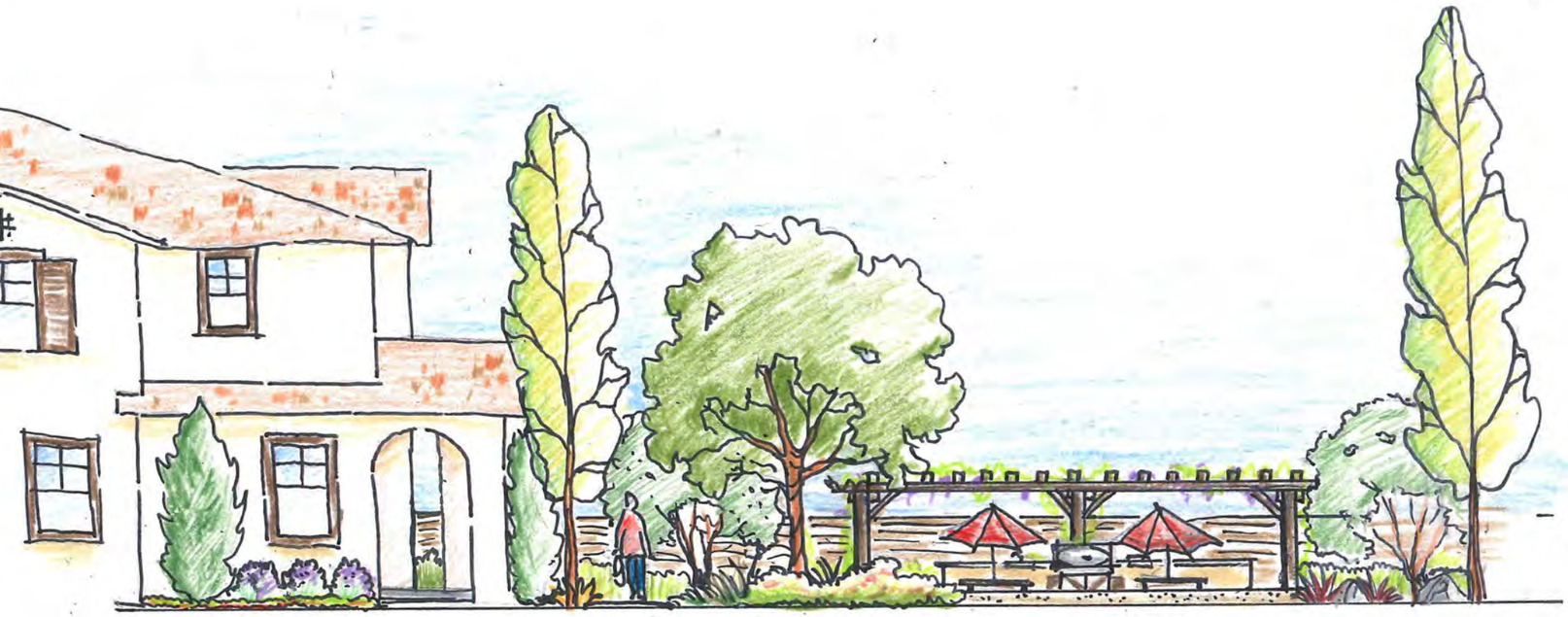
SP3

2016204

2016204 - Oliva, 655 West Spain - Sonoma, CA



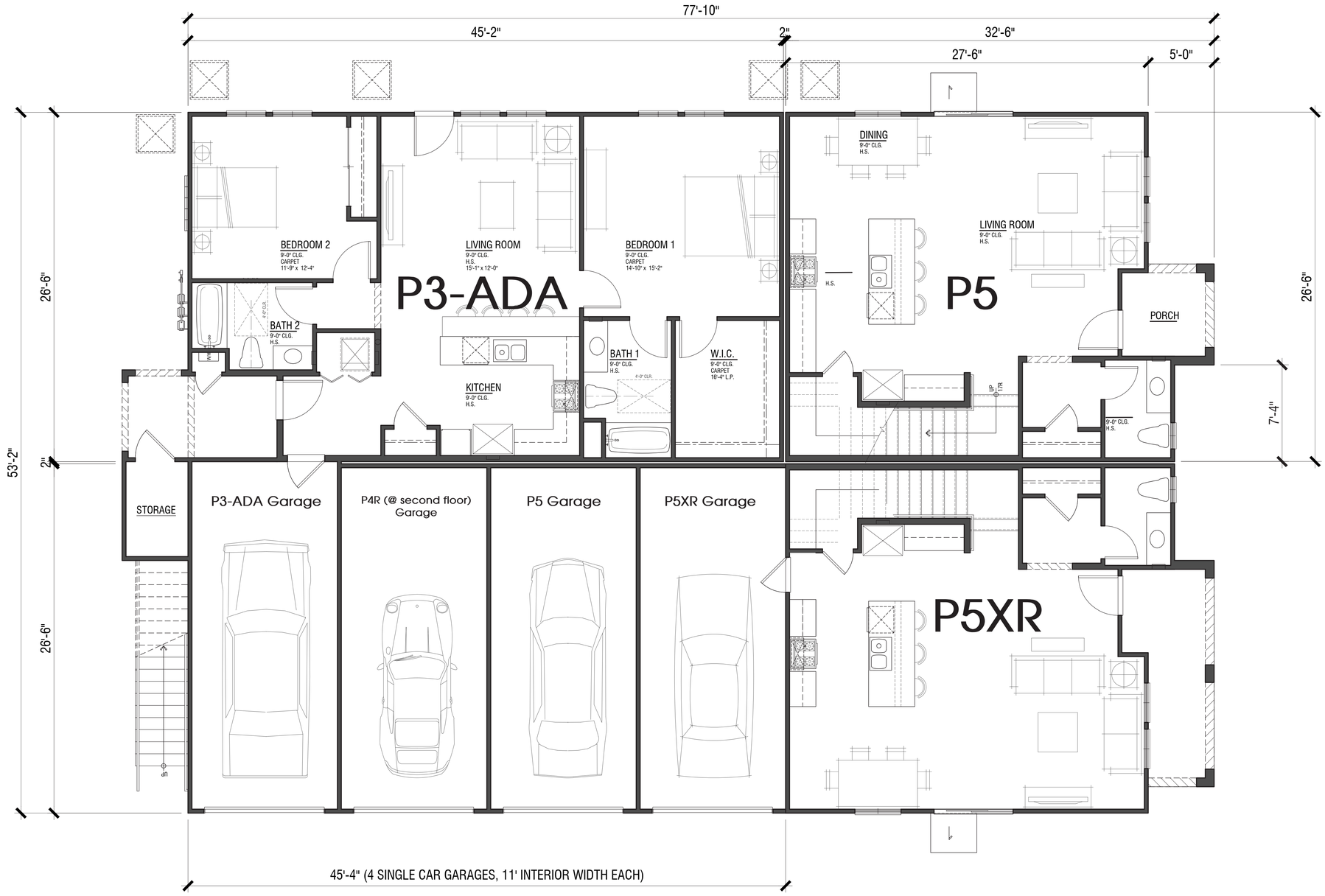
PLAN



ELEVATION

Concept 1 -

Open green space: Likely not turf, but a tough perennial ornamental grass
BBQ Island
Decomposed granite dining patio
Overhead Trellis over BBQ
Large Tree Specimen (could easily incorporate the circular bench)
Landscape pockets with boulders and mediterranean plantings
Allee of columnar trees along both sides
Seat wall along bottom portion of the patio. Thought was to have added seating to patio and seating for those using the open space.



Summary

Plan	Gross SF	Bdrm/Ba
P3	1,153 SF	2 Bdrm/2 Ba
P5	1st Flr - 732 SF 2nd Flr - 617 SF Total - 1,349 SF	2 Bdrm/2.5 Ba
P5X	1st Flr - 732 SF 2nd Flr - 645 SF Total - 1,377 SF	2 Bdrm/2.5 Ba

Notes:
- "R" = Reversed
- Refer to page SP1 for more unit information

Building 1 & 2 (Reversed)

First Floor

Oliva

655 West Spain
Sonoma, California
DeNova Homes

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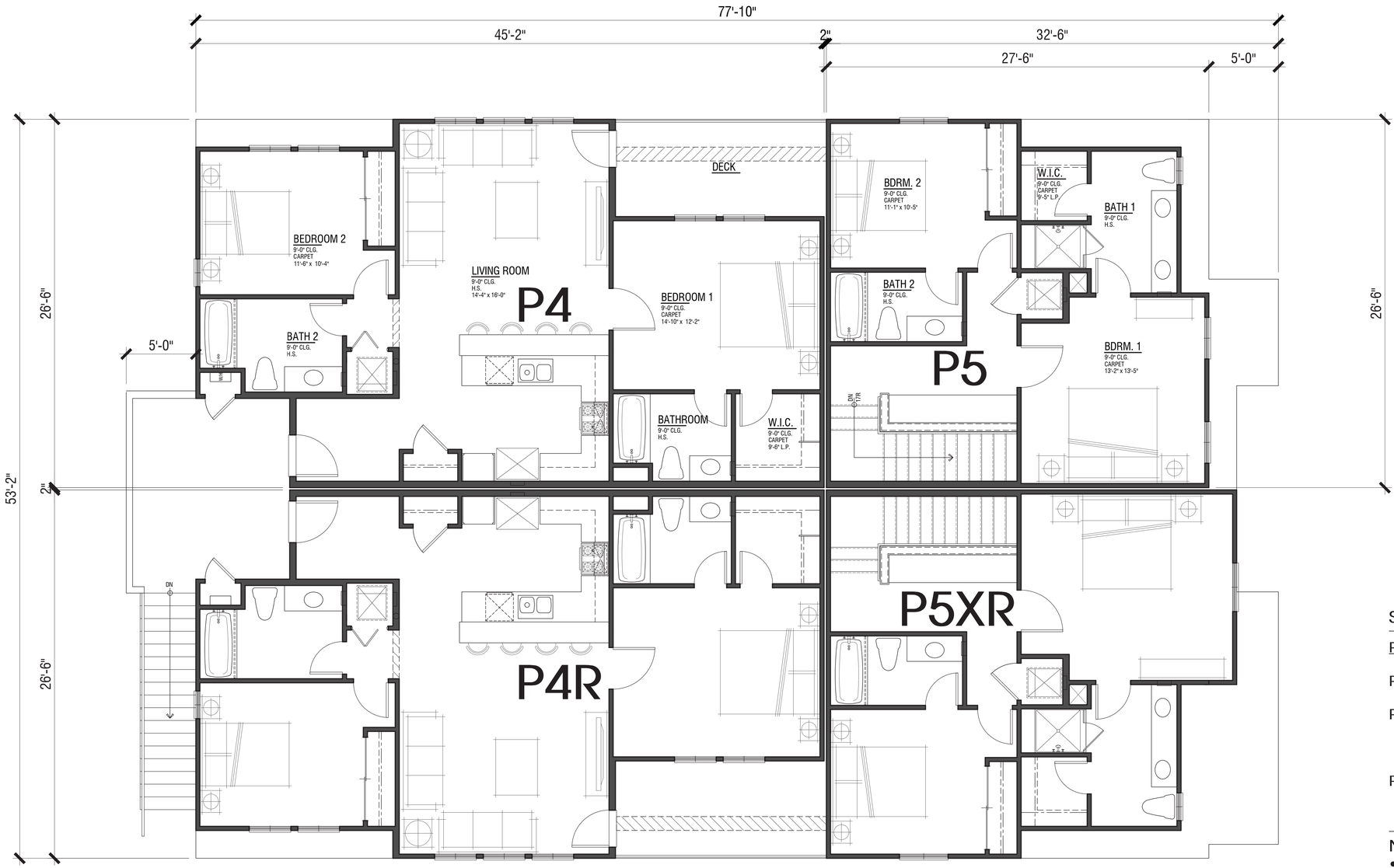
April 18, 2017

A1.1

2016204



Summary

Plan	Gross SF	Bdrm/Ba
P4	1,020 SF	2 Bdrm/2 Ba
P5	1st Flr - 732 SF 2nd Flr - 617 SF Total - 1,349 SF	2 Bdrm/2.5 Ba
P5X	1st Flr - 732 SF 2nd Flr - 645 SF Total - 1,377 SF	2 Bdrm/2.5 Ba

Notes:
- "R" = Reversed
- Refer to page SP1 for more unit information

Building 1 & 2 (Reversed)

Second Floor

Oliva

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0 4 8 12

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A1.2

2016204

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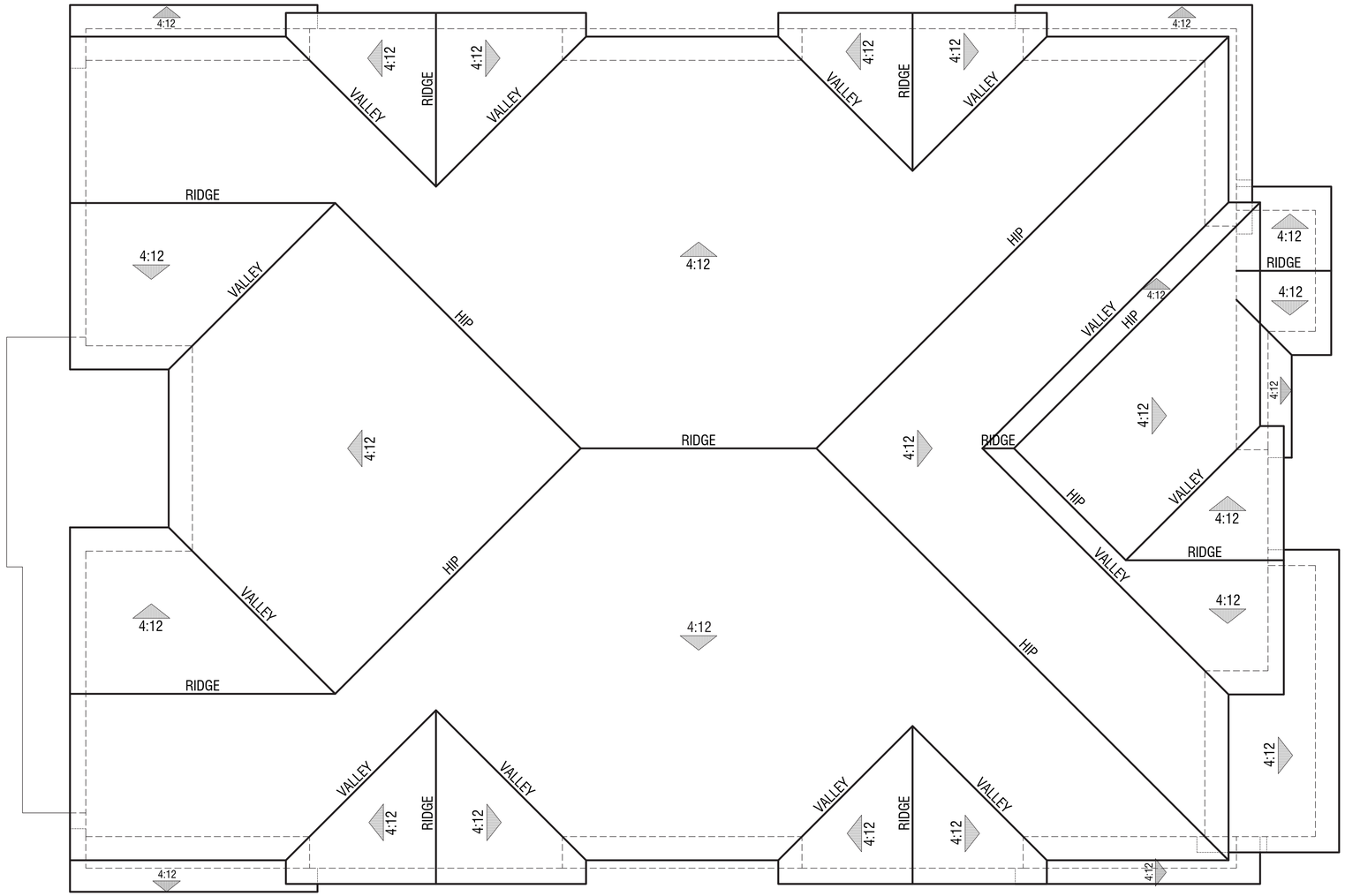

Building 1 & 2 (Reversed)

Roof Plan

Oliva

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Sonoma, California

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0 4 8 12

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April 18, 2017

A1.3

2016204

2016204 - Oliva, 655 West Spain - Sonoma, CA

Right

Rear

Left

Front

Materials List
- S-tile roofing
- Stucco
- Insulated vinyl windows
- High density foam trim
- Metal railing
- Overhead garage door

Exterior Elevations

Building 1
(Bldg. 2 reversed)

Oliva

655 West Spain
Sonoma, California

DeNova Homes

0 8 16 24

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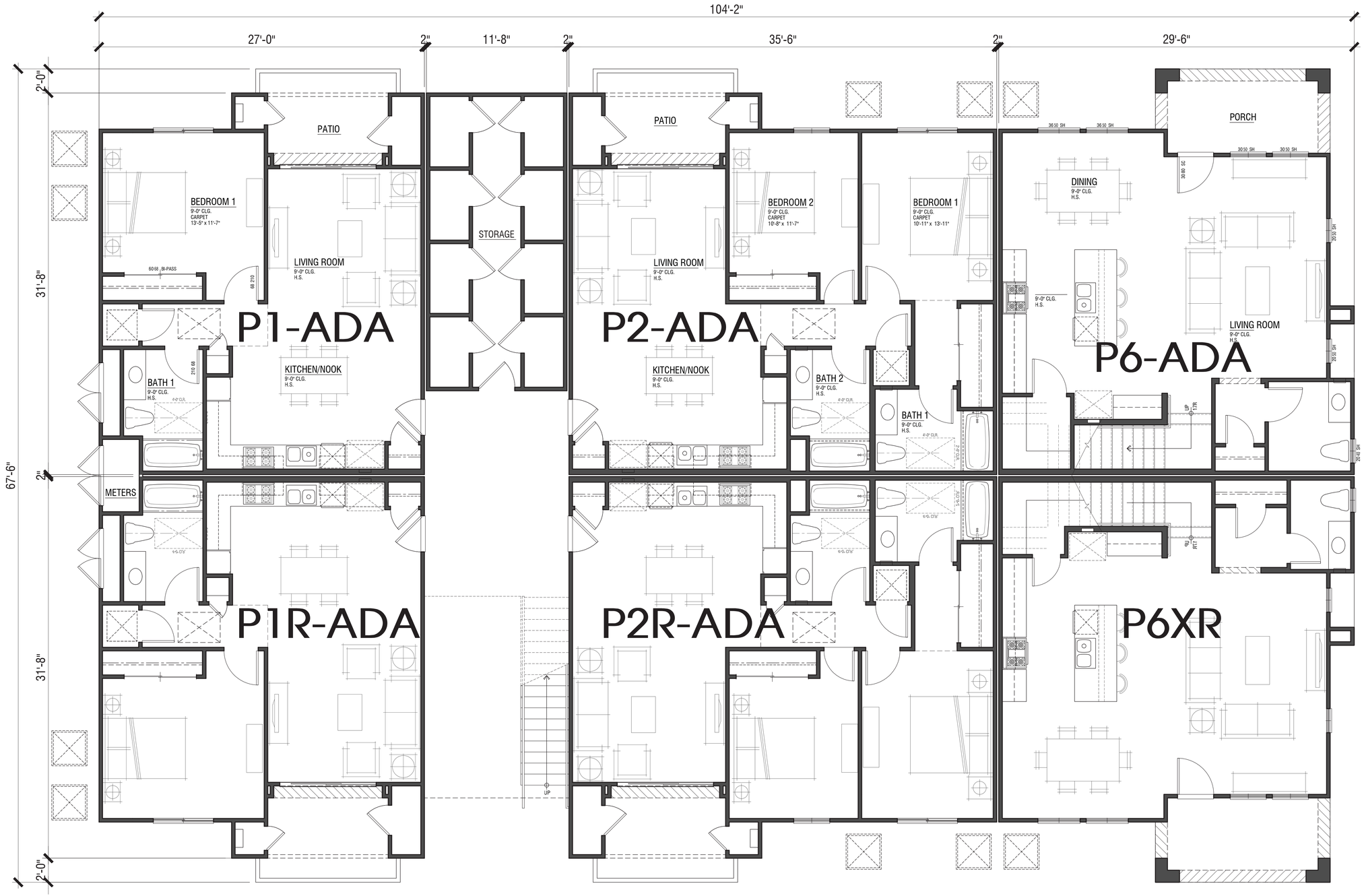
April 18, 2017

A1.4

2016204

2016204 - Oliva, 655 West Spain - Sonoma, CA



Summary

Plan	Gross SF	Bdrm/Ba
P1	712 SF	1 Bdrm/1 Ba
P2	978 SF	2 Bdrm/2 Ba
P6	1st Flr - 777 SF 2nd Flr - 672 SF Total - 1,449 SF	2 Bdrm/2.5 Ba
P6X	1st Flr - 777 SF 2nd Flr - 700 SF Total - 1,477 SF	2 Bdrm/2.5 Ba

Notes:
- "R" = Reversed
- Refer to page SP1 for more unit information

Building 3 & 4 (Reversed)

First Floor

0 4 8 12

Oliva

655 West Spain
Sonoma, California
DeNova Homes

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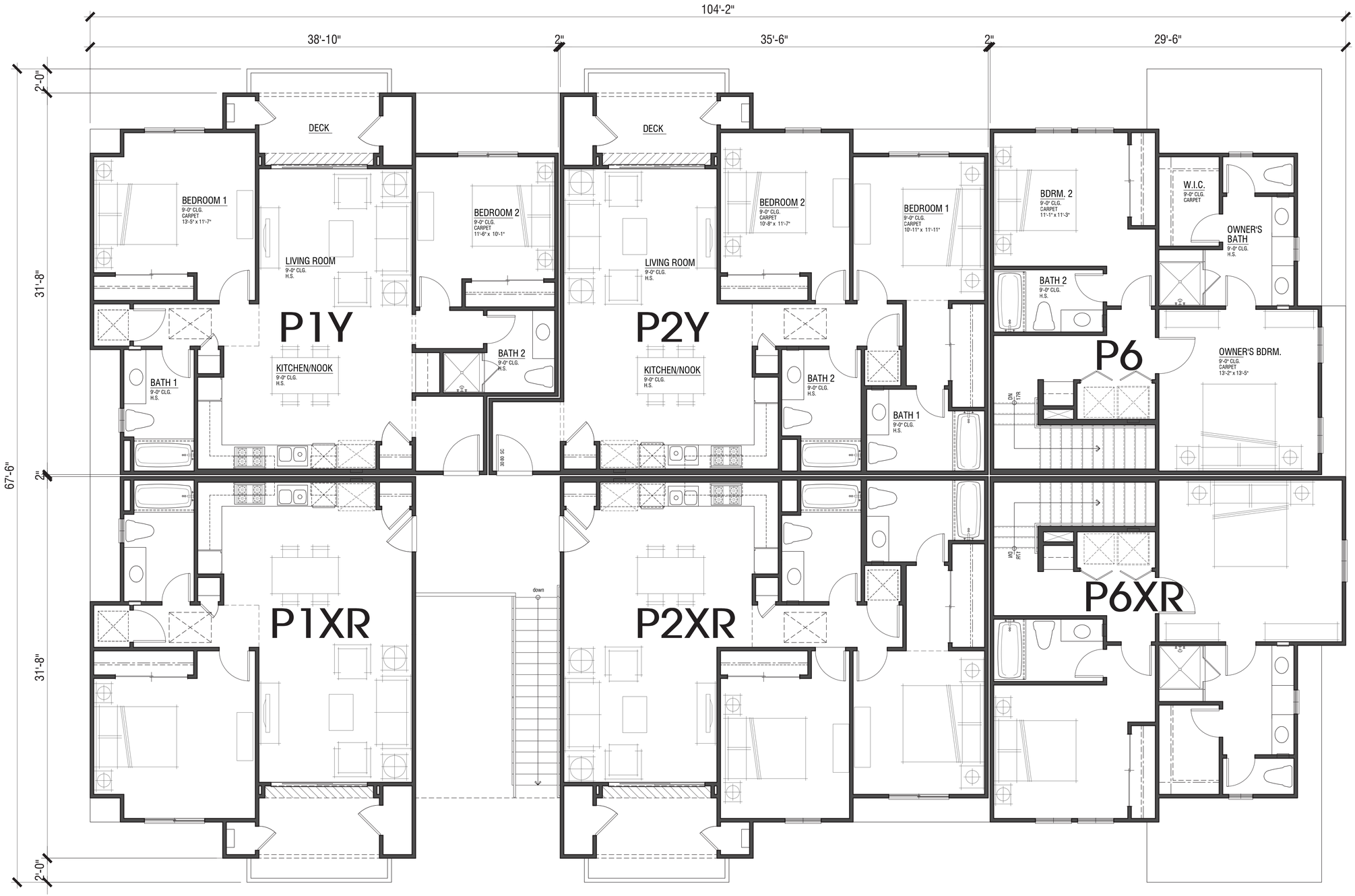
April 18, 2017

A2.1

2016204

2016204 - Oliva, 655 West Spain - Sonoma, CA



Summary

Plan	Gross SF	Bdrm/Ba
P1X	704 SF	1 Bdrm/1 Ba
P1Y	981 SF	2 Bdrm/2 Ba
P2X	956 SF	2 Bdrm/2 Ba
P2Y	994 SF	2 Bdrm/2 Ba
P6	1st Flr - 777 SF 2nd Flr - 672 SF Total - 1,449 SF	2 Bdrm/2.5 Ba
P6X	1st Flr - 777 SF 2nd Flr - 700 SF Total - 1,477 SF	2 Bdrm/2.5 Ba

Notes:
- "R" = Reversed
- Refer to page SP1 for more unit information

Building 3 & 4 (Reversed)

Second Floor

0 4 8 12

Oliva

655 West Spain
Sonoma, California
DeNova Homes

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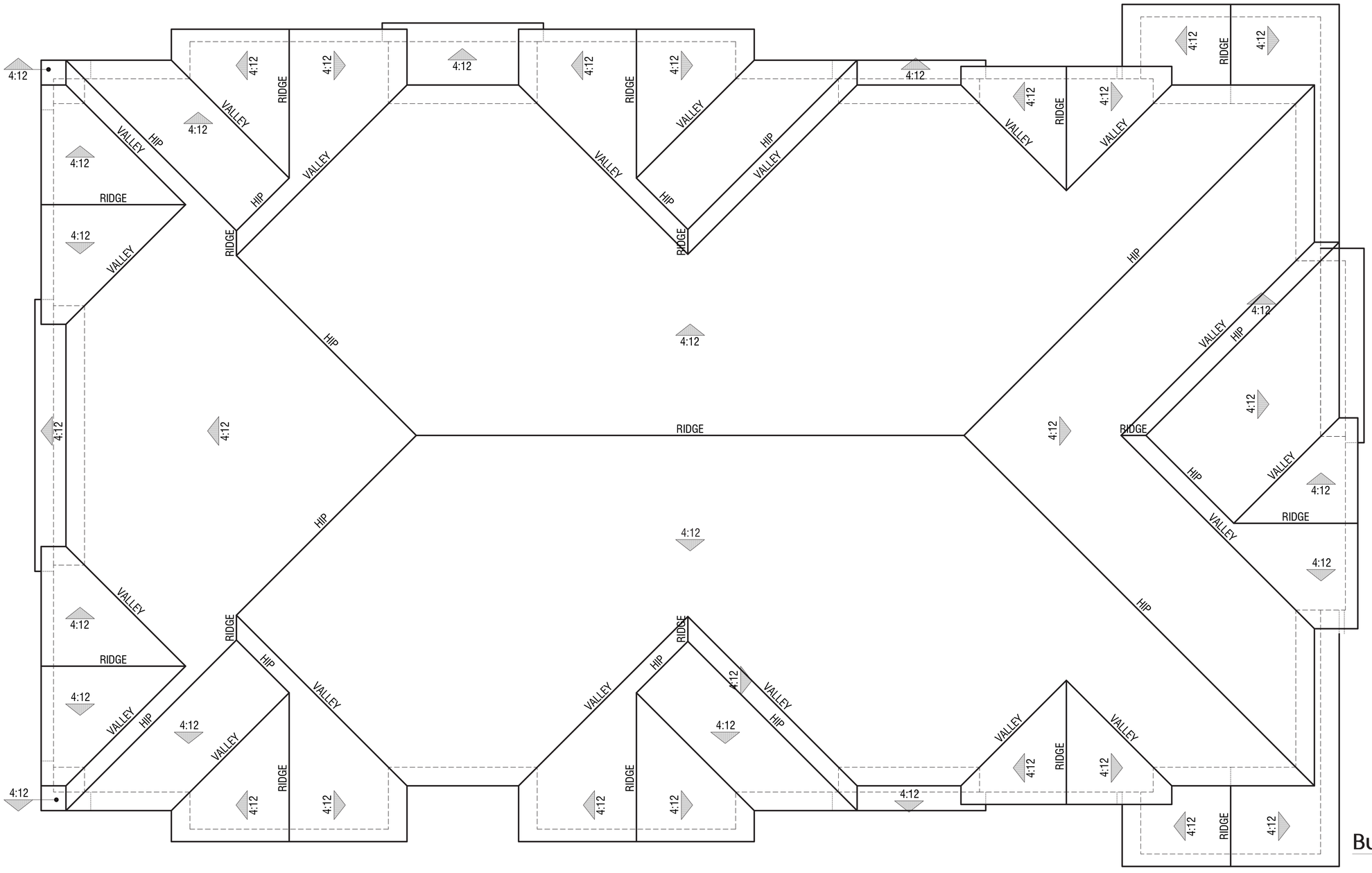
April 18, 2017

A2.2

2016204

2016204 - Oliva, 655 West Spain - Sonoma, CA



Building 3 & 4 (Reversed)

Roof Plan

Oliva

655 West Spain
Sonoma, California

DeNova Homes

0 4 8 12

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April 18, 2017

A2.3

2016204

2016204 - Oliva, 655 West Spain - Sonoma, CA

Right

Rear

Left

Front

Materials List
- S-tile roofing
- Stucco
- Insulated vinyl windows
- High density foam trim
- Metal railing
- Overhead garage door

Exterior Elevations

Building 3
(Bldg. 4 reversed)

Oliva

655 West Spain
Sonoma, California

DeNova Homes

0 8 16 24

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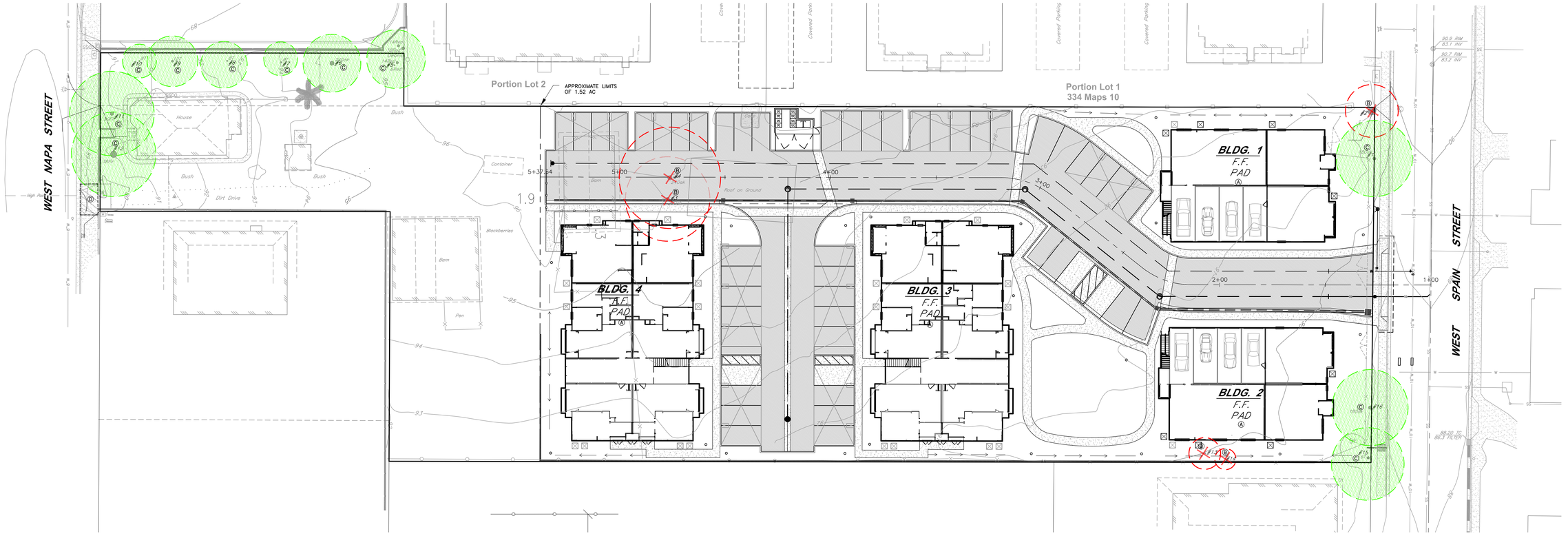
April 18, 2017

A2.4

2016204

2016204 - Oliva, 655 West Spain - Sonoma, CA



PLAN
SCALE: 1"=20'

KEYNOTES

Ⓐ SEE ARCHITECTURAL PLANS PREPARED BY WHA (WILLIAM HEZMALHALCH ARCHITECTS INC.) FOR ALL UNIT INFORMATION.

Ⓑ TREE TO BE REMOVED, ARBORIST TO VERIFY PROTECTED TREES AND MITIGATION REQUIREMENTS.

Ⓒ TREE TO BE PRESERVED, MAY OR MAY NOT BE CONSIDERED PROTECTED, ARBORIST TO VERIFY PROTECTED TREES AND ANY PROTECTIVE MEASURES TO BE ADMINISTERED.

Ⓓ PROPOSED ADA ACCESSIBLE DRIVEWAY APPROACH, THIS PORTION OF WORK IS UNDER A SEPARATE CAL TRANS PERMIT.

NOTES

SEE CITY OF SONOMA 2020 GENERAL PLAN FOR LIMITS OF WEST NAPA STREET/ SONOMA CORRIDOR AND NORTHWEST PLANNING AREAS.

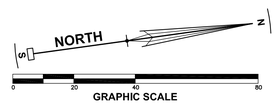
LEGEND

EXISTING	PROPOSED	
		BOUNDARY LINE
		LOT LINE
		CONCRETE
		CURB & GUTTER
		ASPHALT CONCRETE
		EXISTING TREE CANOPY AND TREE ID NUMBER
		EXISTING TREE PROPOSED TO BE REMOVED, CANOPY AND TREE ID NUMBER

	TREE #	SPECIES	TRUNK DIAMETER (in. @ 4'-6" above grade)	GENERAL HEALTH/CONDITION	STRUCTURAL INTEGRITY	COMMENTS
Ⓒ	1	Valley Oak/*Quercus lobata*	19"	Excellent	Excellent	On W Spain street frontage; to be preserved. Entry walk will be relocated and designed to avoid roots
Ⓑ	2	Black Locust/*Robinia pseudoacacia*	48"	Fair	Fair	Multi-trunk from 5' above grade (topped years ago), extensive branch dieback; to be removed
ⒸⒷ	3	Valley Oak/*Quercus lobata*	17"	Excellent	Excellent	Lo-branched 30-40' diameter; to be removed for driveway
ⒸⒷ	4	Valley Oak/*Quercus lobata*	18	Fair/Good	Fair/Good	High-branched; slightly sparse foliage, small branch dieback; to be removed for driveway
Ⓒ	5	Coast Redwood/*Sequoia sempervirens*	11,12,13,15"	Poor	Fair	Very drought stressed, much dead foliage and branches; outside zone of construction impact; to be preserved
Ⓒ	6	Monterey Pine/*Pinus radiata*	20"	Good	Good	To be preserved; outside zone of construction impact
Ⓒ	7	Coast Live Oak/*Quercus agrifolia*	7"	Good	Good	To be preserved; vertical scar on lower trunk, probably sumburn; outside zone of construction impact
Ⓒ	8	Ash/*Fraxinus* sp.	11"	Good	Fair	To be preserved; leans at 45° angle toward house, but stable; outside zone of construction impact
Ⓒ	9	Ash/*Fraxinus* sp.	11"	Good/Excellent	Good/Excellent	To be preserved; outside zone of construction impact
Ⓒ	10	Ash/*Fraxinus* sp.	10"	Good/Excellent	Good/Excellent	To be preserved; outside zone of construction impact
Ⓒ	11	Deodar Cedar/*Cedrus deodara*	24"	Excellent	Excellent	To be preserved; outside zone of construction impact
Ⓒ	12	Deodar Cedar/*Cedrus deodara*	29"	Excellent	Excellent	To be preserved; new driveway will be designed to avoid/protect roots
Ⓑ	13	Eucalyptus/*Eucalyptus* sp.	10,11"	Fair/Good	Fair/Good	Insect infested (lerp psyllid); co-dominant leaders wih included bark. To be removed
Ⓑ	14	Eucalyptus/*Eucalyptus* sp.	8"	Good	Fair/Good	Co-dominant leaders with included bark. To be removed
Ⓒ	15	Valley Oak/*Quercus lobata*	11,12"	Fair/Good	Fair/Good	To be preserved. Slightly stressed w/epicormic growth. Storm drain and DI will be relocated to avoid impacting roots
Ⓒ	16	Valley Oak/*Quercus lobata*	12,17"	Good	Good	To be preserved; lo-branched on south side, 18' radius. Entry walk will be relocated and designed to avoid roots

MITIGATION NOTE

ARBORIST WILL DETERMINE IF ANY MITIGATION IS REQUIRED FOR TREES TO BE REMOVED. ARBORIST SHALL FOLLOW THE SONOMA MUNICIPAL CODE CHAPTER 12.08 TREE ORDINANCE REQUIREMENTS.



GRAPHIC SCALE

REGISTERED PROFESSIONAL ENGINEER
STEVEN J. LAFRANCHI
No. 49302
CIVIL
STATE OF CALIFORNIA

REVISIONS	BY

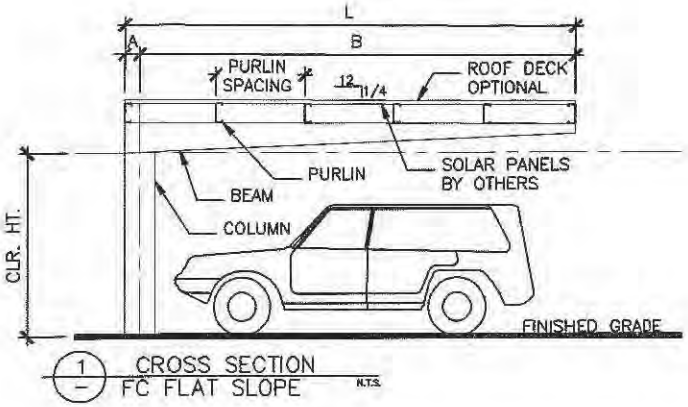
TREE LOCATION PLAN

LANDS OF NORRBOM
590 WEST NAPA STREET
SONOMA CALIFORNIA

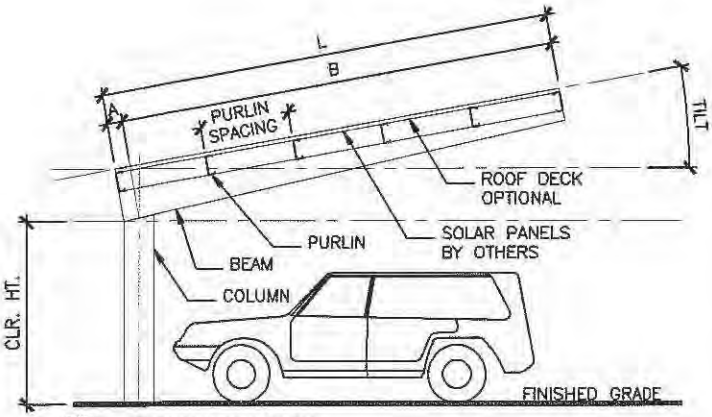
STEVEN J. LAFRANCHI & ASSOCIATES, INC.
CIVIL ENGINEERS – LAND SURVEYORS – LAND PLANNERS
PETALUMA THEATRE SQUARE
140 KENTUCKY STREET, SUITE 312
PETALUMA, CALIFORNIA 94952
(707) 762-3122 FAX (707) 762-3239

DATE:	2017.04.19
SCALE:	1"=20'
DESIGN:	
DRAWN:	
CHECK:	AJC
JOB:	DENOVA OLIVA
JOB No:	161870
SHEET	EX-A
OF	1 SHEETS

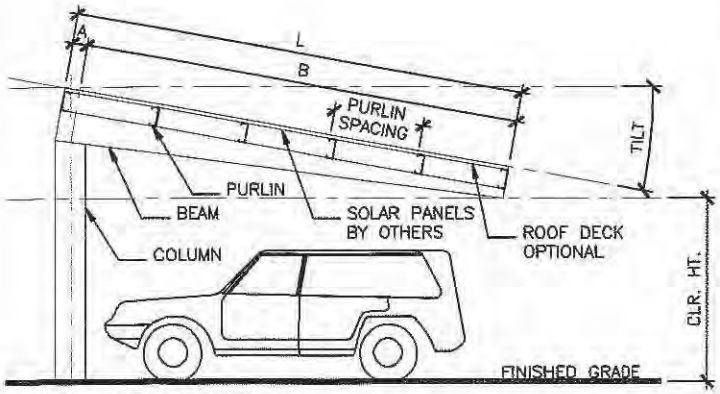
*The proposed full cantilever carport, made of non-combustible materials, is based off of thid SPEC , however the solar panels are to be determined once we go through our Title 24 energy calculations per the new energy code. The attached image is of an as-built carport based off of this SPEC.



1 CROSS SECTION
FC FLAT SLOPE N.T.S.



2 CROSS SECTION
FC UP SLOPE N.T.S.

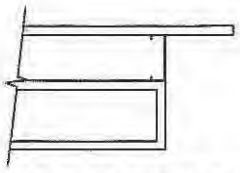


3 CROSS SECTION
FC DOWN SLOPE N.T.S.

SPECIFICATIONS

L = (MAX. 20')
B = (2/3L MAX.)
A = (L–B)
PURLIN SPACING =
TILT = (IN DEGREES)
MIN. CLEAR HIGH =
HIGH EAVE = HIGH EAVE = CLR HT + 18" + LSW (TILT)
PANEL GAP (IF ANY) =
PORTRAIT: OR, LANDSCAPE: SOLAR PANEL
ROOF DECK (OPTIONAL) =
CANTILEVER (OPTIONAL) =
HANDICAP SPACE (OPTIONAL) =

NOTES



OPTIONAL SOLAR PANEL CANTILEVER N.T.S.

BAJA CONSTRUCTION CO., INC. 223 FOSTER ST., MARTINEZ CA 94553 1-800-366-9600 FAX: (925) 229-0161	SOLAR SUPPORT SYSTEM FULL CANTILEVER		PROJ. NO.: SHEET: 3 OF 4

SITE PLAN A

04/06/16

2016204

Oliva - W. Spain Apartments

Sonoma, CA

DeNova Homes

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Scene 1

04/06/16

2016204

Oliva - W. Spain Apartments

Sonoma, CA

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Scene 2

04/06/16

2016204

Oliva - W. Spain Apartments

Sonoma, CA

DeNova Homes

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Scene 3

04/06/16

2016204

Oliva - W. Spain Apartments

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Scene 4

04/06/16

2016204

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Sonoma, CA

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Scene 5

04/06/16

2016204

Oliva - W. Spain Apartments

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Scene 6

04/06/16

2016204

Oliva - W. Spain Apartments

Sonoma, CA

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Scene 7

04/06/16

2016204

Oliva - W. Spain Apartments

Sonoma, CA

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SITE PLAN B

04/06/16

2016204

Oliva - W. Spain Apartments

Sonoma, CA

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Scene 1

04/06/16

2016204

Oliva - W. Spain Apartments

Sonoma, CA

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Scene 2

04/06/16

2016204

Oliva - W. Spain Apartments

Sonoma, CA

DeNova Homes

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Scene 3

04/06/16

2016204

Oliva - W. Spain Apartments

Sonoma, CA

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Scene 4

04/06/16

2016204

Oliva - W. Spain Apartments

Sonoma, CA

DeNova Homes

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Scene 5

04/06/16

2016204

Oliva - W. Spain Apartments

Sonoma, CA

DeNova Homes

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Scene 6

04/06/16

2016204

Oliva - W. Spain Apartments

Sonoma, CA

DeNova Homes

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ARCHITECTS INC.
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ATTACHMENT 2

BIOLOGICAL ASSESSMENT

MOORE BIOLOGICAL CONSULTANTS

September 22, 2016

Mr. Trent Sanson
DeNova Homes
1500 Willow Pass Court
Concord, CA 94520

Subject: "590 WEST NAPA STREET", SONOMA, CALIFORNIA:
BIOLOGICAL ASSESSMENT

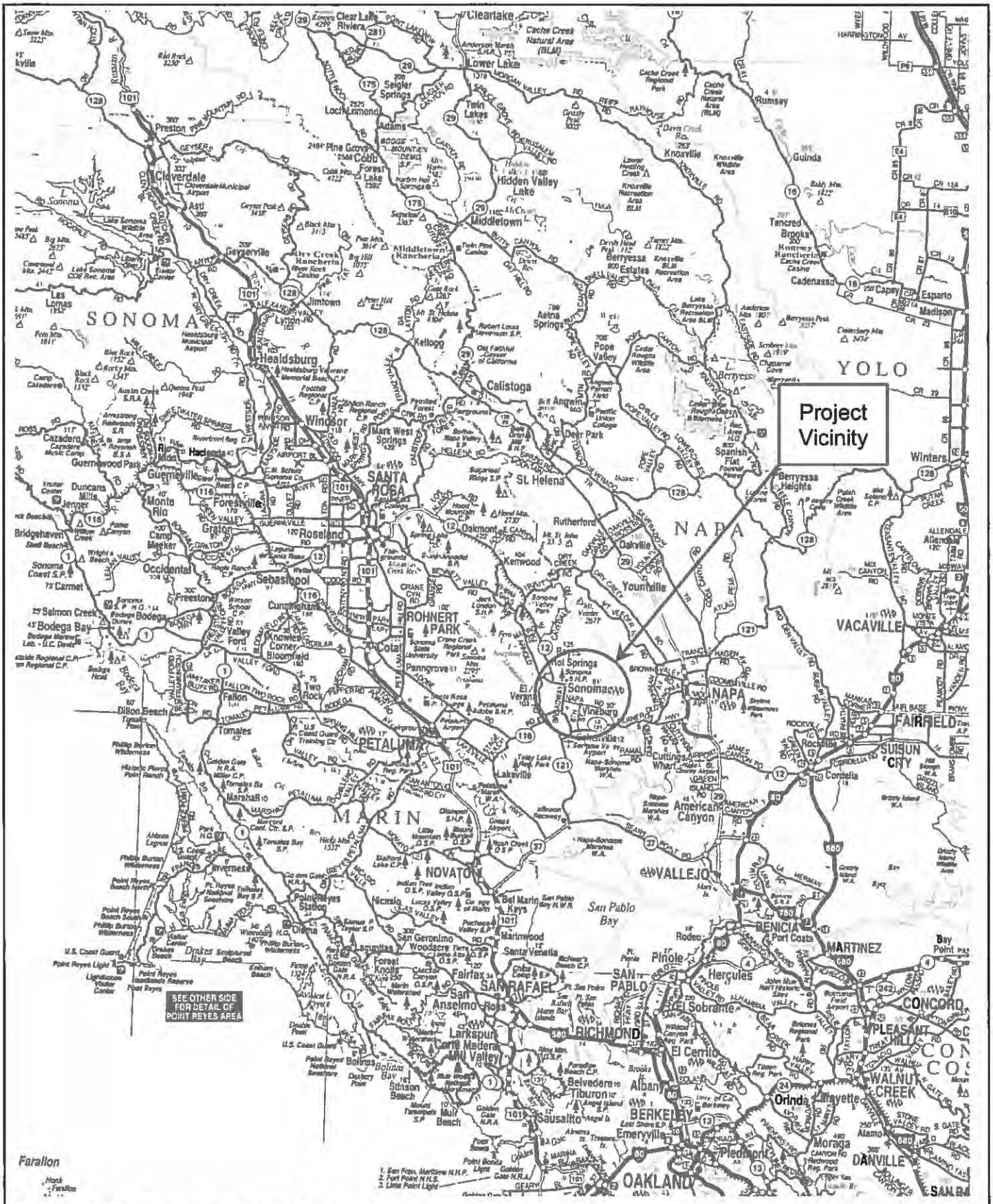
Dear Trent:

Thank you for asking Moore Biological Consultants to assist with this project in Sonoma, California (Figure 1). The site is an infill project on the north side of Napa Street in a mixed commercial and residential neighborhood (Figure 2). The purpose of our work was to document current habitat conditions, identify potential waters of the U.S. and wetlands, search for suitable habitat for or presence of special-status species in the site, and identify any potential biological constraints to residential development of the site. The work involved reviewing databases and available documents, conducting a survey to document habitats present in the site, and searching the site for potentially jurisdictional Waters of the U.S. or wetlands and suitable habitat for or presence of special-status species. This report details the methodology and results of our investigation.

Project Overview

The 1.5+/- acre project site is the north part of a larger parcel that has an existing home fronting on West Napa Street. The project is a 30-unit apartment complex with access from West Spain Street (see Site Plan in Attachment A). The apartments will be constructed in the west part of the site and parking will be located along the east side of the site.

10330 Twin Cities Rd., Ste. 30 • Galt, CA 95632
(209) 745-1159 • Fax (209) 745-7513
e-mail: mooreblo@softcom.net



Source: Calif. State Automobile Association

Moore Biological Consultants

FIGURE 1
PROJECT VICINITY

Source: USGS 7.5' Quadrangles; SONOMA, CA

Figure 2

Moore Biological Consultants

0 500 1,000

1 inch = 1,000 feet

N
W E
S

USGS

590 West Napa Street

Sonoma, CA

Map Date: 07/14/2016

C:\Users\owner\Documents\Fremont Environmental Consulting\Projects\Moore Biological\590 West Napa Street\MXD\590 west napa street_figure 2.mxd

Methods

Prior to the field survey, we conducted a search of California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB, 2016). The CNDDB search included the USGS 7.5-minute Sonoma and Glen Ellen topographic quadrangles, which encompass approximately 120 square miles surrounding the project site. The United States Fish and Wildlife Service (USFWS) IPac Trust Report of Federally Threatened and Endangered species that may occur in or be affected by projects in the project vicinity was also reviewed (Attachment B). This information was used to identify wildlife and plant species that have been previously documented in the project vicinity or have the potential to occur based on suitable habitat and geographical distribution. The USFWS on-line maps of designated critical habitat were also downloaded.

A field survey was conducted on July 15, 2016. The survey consisted of walking throughout the site making observations of habitat conditions and noting surrounding land uses, general habitat types, and plant and wildlife species. The survey included an assessment of the site for presence or absence of potentially jurisdictional Waters of the U.S. (a term that includes wetlands) as defined by the ACOE (1987; 2008), special-status species, and suitable habitat for special-status species (e.g., salt marshes, vernal pools). Additionally, trees in and near the site were assessed for the potential use by nesting raptors and the site was also searched for burrowing owls (*Athene cunicularia*) or ground squirrel burrows that could be utilized by burrowing owls.

Results

GENERAL SETTING: The site is located in Sonoma, in Sonoma County, California (Figure 1). The site is in an unnumbered Section, in Township 5 North, Range 6 West of the USGS 7.5-minute Sonoma topographic quadrangle (Figure 2). The site is essentially level and is at an elevation of approximately 85 feet above

mean sea level. The site is an open field with a few trees (Figure 3 and photographs in Attachment C).

The north edge of the site is bounded by West Spain Street and there are single-family homes to the north of the site, across West Spain Street. The remainder of the larger parcel, which contains a home, barn, and some outbuildings, bounds the site to the south. There are relatively new apartments to the west of the site and commercial development to the east of the site.

VEGETATION: Natural habitats surrounding the project site have been entirely replaced by streets, homes, and generally highly landscaped areas. The body of the site is a periodically disked and/or mowed field vegetated in ruderal grass and weed species. California annual grassland best describes the disturbed upland grassland vegetation in the site. Oats (*Avena* sp.), foxtail barley (*Hordeum murinum*), soft chess (*Bromus hordeaceus*), and perennial ryegrass (*Lolium perenne*) are dominant grass species on-site. Other grassland species such as rancher's fireweed (*Amsinckia menziesii*), mustard (*Brassica* sp.), mallow (*Malva neglecta*), morning glory (*Convolvulus arvensis*), chickory (*Cichorium intybus*), and prickly lettuce (*Lactuca serriola*) are intermixed with the grasses.

There are only a few trees in the site. The most notable trees are a pair of valley oaks (*Quercus lobata*) in the southwest corner of the site and a couple of oaks along West Spain Street (Figure 3 and photographs in Attachment C). There are also a few trees along the edges of the site, primarily eucalyptus saplings and some ornamentals.

WILDLIFE: Only a few bird species were observed in the site during the July survey. These include turkey vulture (*Cathartes aura*), American crow (*Corvus brachyrhynchos*), northern mockingbird (*Mimus polyglottos*), and mourning dove (*Zenaida macroura*). There are a few potential nest trees in and near the site that are suitable for nesting raptors and other protected migratory birds. A few

C:\Users\owner\Documents\Fremont Environmental Consulting\Projects\Moore Biological\590 West Napa Street\MXD\590 west napa street_figure 3.mxd

Figure 3

Moore Biological Consultants

0 50 100

1 inch = 100 feet

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AERIAL

590 West Napa Street

Sonoma, CA

Map Date: 07/14/2016

stick nests were observed within some of the trees within and near the site. Given the presence of some relatively large trees and raptor foraging habitat (i.e., open fields) in and near the site, it is possible one or more pairs of raptors, plus a variety of songbirds, nest in trees in the site each year. Further, it is considered likely that several songbirds nest within trees, shrubs, and grassland habitats in and adjacent to the site each year.

Only a few mammals common to urban areas have potential to occur in the site and no mammals were observed during the field survey. Striped skunk (*Mephitis mephitis*), black-tailed hare (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), Virginia opossum (*Didelphis virginiana*), and California ground squirrels (*Spermophilus beecheyi*) are expected to occur in the project site on occasion. No ground squirrel burrows were observed in the site.

Due to lack of suitable habitat and the location of the site in town, few amphibians and reptiles are expected to use habitats in the site. No reptiles or amphibians were observed during the recent survey. Common species such as western fence lizard (*Sceloporus occidentalis*) and Pacific chorus frog (*Pseudacris regilla*) may occur in the site.

WATERS OF THE U.S. AND WETLANDS: Waters of the U.S., including wetlands, are broadly defined under 33 Code of Federal Regulations (CFR) 328 to include navigable waterways, their tributaries, and adjacent wetlands. State and federal agencies regulate these habitats and Section 404 of the Clean Water Act requires that a permit be secured prior to the discharge of dredged or fill materials into any waters of the U.S., including wetlands. Both CDFW and ACOE have jurisdiction over modifications to riverbanks, lakes, stream channels and other wetland features.

“Waters of the U.S.”, as defined in 33 CFR 328.4, encompasses Territorial Seas, Tidal Waters, and Non-Tidal Waters; Non-Tidal Waters includes interstate and intrastate rivers and streams, as well as their tributaries. The limit of federal

jurisdiction of Non-Tidal Waters of the U.S. extends to the “ordinary high water mark”. The ordinary high water mark is established by physical characteristics such as a natural water line impressed on the bank, presence of shelves, destruction of terrestrial vegetation, or the presence of litter and debris.

Jurisdictional wetlands and Waters of the U.S. include, but are not limited to, perennial and intermittent creeks and drainages, lakes, seeps, and springs; emergent marshes; riparian wetlands; and seasonal wetlands. Wetlands and Waters of the U.S. provide critical habitat components, such as nest sites and a reliable source of water, for a wide variety of wildlife species.

No potentially jurisdictional wetlands or Waters of the U.S. were observed in the site. The site consists of upland grassland habitats that are highly disturbed.

SPECIAL-STATUS SPECIES: Special-status species are plants and animals that are legally protected under the state and/or federal Endangered Species Act or other regulations. The Federal Endangered Species Act (FESA) of 1973 declares that all federal departments and agencies shall utilize their authority to conserve endangered and threatened plant and animal species. The California Endangered Species Act (CESA) of 1984 parallels the policies of FESA and pertains to native California species.

Special-status species also include other species that are considered rare enough by the scientific community and trustee agencies to warrant special consideration, particularly with regard to protection of isolated populations, nesting or denning locations, communal roosts, and other essential habitat. The presence of species with legal protection under the Endangered Species Act often represents a major constraint to development, particularly when the species are wide-ranging or highly sensitive to habitat disturbance and where proposed development would result in a take of these species.

Special-status plants are those which are designated rare, threatened, or endangered and candidate species for listing by the USFWS. Special-status plants also include species considered rare or endangered under the conditions of Section 15380 of the California Environmental Quality Act Guidelines, such as those plant species identified on Lists 1A, 1B and 2 in the Inventory of Rare and Endangered Vascular Plants of California (CNPS, 2016). Finally, special-status plants may include other species that are considered sensitive or of special concern due to limited distribution or lack of adequate information to permit listing or rejection for state or federal status, such as those included on CNPS List 3.

The likelihood of occurrence of listed, candidate, and other special-status species in the site is generally low. Table 1 provides a summary of the listing status and habitat requirements of special-status species that have been documented in the greater project vicinity or for which there is potentially suitable habitat in the greater project vicinity. This table also includes an assessment of the likelihood of occurrence of each of these species in the site. The evaluation of the potential for occurrence of each species is based on the distribution of regional occurrences (if any), habitat suitability, and field observations.

SPECIAL-STATUS PLANTS: Fifteen (15) species of special-status plants were identified in the CNDDB (2016) search: Franciscan onion (*Allium peninsulare var. franciscanum*), Napa false indigo (*Amorpha californica var. napensis*), big-scale balsamroot (*Balsamorhiza macrolepis var. macrolepis*), Sonoma sunshine (*Blennosperma bakeri*), narrow-anthered California brodiaea (*Brodiaea californica var, leptandra*), Rincon Ridge ceanothus (*Ceanothus confusus*), Sonoma ceanothus (*Ceanothus sonomensis*), dwarf downingia (*Downingia pusilla*), fragrant frittilary (*Fritillaria liliacea*), congested-headed hayfield tarplant (*Hemizonia congesta ssp. congesta*), thin-lobed horkelia (*Horkelia tenuiloba)*, legenere (*Legenere limosa*), Jepson's leptosiphon (*Leptosiphon jepsonii*), Cobb Mountain lupine (*Lupinus sericatus*), and oval-leaved viburnum (*Viburnum ellipticum*). (Table 1 and Attachment A). Sonoma sunshine is the only special-status plant in the USFWS IPac Trust Report.

No special-status plants or suitable habitat for special-status plants were observed in the site. Special-status plants generally occur in relatively undisturbed areas in vegetation communities such as chaparral, vernal pools, marshes and swamps, seasonal wetlands, woodlands, and areas with unusual soils. Most of the species in Table 1 occur in one of these unique habitat types that are not present on-site. In contrast, the site is disturbed upland grassland that is not suitable for any special-status plant species. Due to lack of suitable habitat, it is unlikely that special-status plants occur in the site.

SPECIAL-STATUS WILDLIFE: The potential for intensive use of the site by special-status wildlife species is low. Special-status wildlife species recorded in project area in the CNDDB (2016) query include northern spotted owl (*Strix occidentalis caurina*) western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), white-tailed kite (*Elanus leucurus*), bank swallow (*Riparia riparia*), burrowing owl (*Athene cunicularia*), San Pablo song sparrow (*Melospiza melodia samuelis*), golden eagle (*Aquila chrysaetos*), black swift (*Cypseloides niger*), grasshopper sparrow (*Ammodramus savannarum*), American badger (*Taxidea taxus*), pallid bat (*Antrozous pallidus*)Salt-marsh harvest mouse (*Reithrodontomys raviventris*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana auroura draytonii*), foothill yellow-legged frog (*Rana boylii*), western pond turtle (*Emys marmorata*), California giant salamander (*Dicamptodon ensatus*), and Central Coast steelhead (*Oncorhynchus mykiss*). San Bruno elfin butterfly (*Callophrys mossii bayensis*) and delta smelt (*Hypomesus transpacificus*) are not recorded in the CNDDB (2015) within the search area, but are on the USFWS IPaC Trust Report (Attachment B).

While the project site may have provided habitat for special-status wildlife species at some time in the past, development has substantially modified natural habitats in the greater project vicinity, including those within the site. None of the wildlife species identified in the CNDDB have the potential to occur in the site on more than a transitory or very occasional basis. Special-status birds may fly over the area on occasion, but would not be expected to nest in the project site.

TABLE 1

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED OR POTENTIALLY-OCCURRING IN THE PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence in the Project Site
PLANTS						
Franciscan onion	*Allium peninsulare var. franciscanum*	None	None	1B	Valley and foothill grassland, cismontane woodland.	Unlikely: the site is highly disturbed and does not provide suitable habitat for Franciscan onion. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 1 mile northeast of the site.
Napa false indigo	*Amorpha californica var. napensis*	None	None	1B	Broadleafed upland forest, chaparral, cismontane woodland.	Unlikely: the site does not provide suitable habitat for this species. The nearest occurrence of Napa false indigo in the CNDDB (2016) search area is approximately 2 miles northeast of the site.
Big-scale balsamroot	*Balsamorhiza macrolepis var. macrolepis*	None	None	1B	Chaparral, valley and foothill grassland, cismontane woodland.	Unlikely: the site does not provide suitable habitat for big-scale balsamroot; the site is also below the elevation range of this species (CNPS, 2016). The nearest occurrence of this species in the CNDDB (2016) search area is approximately 0.5 miles southeast of the site.
Sonoma sunshine	*Blennosperma bakeri*	E	E	1B	Vernal pools, valley and foothill grassland.	Unlikely: the upland grassland in the site do not provide suitable habitat for Sonoma sunshine. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 0.5 miles south of the site.
Narrow-anthered California brodiaea	*Brodiaea californica var. leptandra*	None	None	1B	Broadleafed upland forest, chaparral, lower montane coniferous forest.	Unlikely: the site does not provide suitable habitat for narrow-anthered California brodiaea; the site is also below the elevation range of this species (CNPS, 2016). The nearest occurrence of narrow-anthered California brodiaea in the CNDDB (2016) search area is approximately 1 mile northeast of the site.
Rincon Ridge ceanothus	*Ceanothus confusus*	None	None	1B	Closed-cone coniferous forest, chaparral, cismontane woodland.	Unlikely: the site does not provide suitable habitat for Rincon Ridge ceanothus. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 4 miles southeast of the site.

TABLE 1

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED OR POTENTIALLY-OCCURRING IN THE PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence in the Project Site
Sonoma ceanothus	*Ceanothus sonomensis*	None	None	1B	Chaparral on sandy serpentine or volcanic soils.	Unlikely: the site does not provide suitable habitat for Sonoma ceanothus. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 4 miles northeast of the site.
Dwarf downingia	*Downingia pusilla*	None	None	2	Vernal pools.	Unlikely: there are no vernal pools or seasonal wetlands in the site. The nearest occurrence of dwarf downingia in the CNDDB (2016) search area is approximately 2.5 miles west of the site.
Fragrant fritillary	*Fritillaria liliacea*	None	None	1B	Coastal scrub, valley and foothill grassland and coastal prairie; often serpentine soils.	Unlikely: the site does not provide suitable habitat for fragrant fritillary. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 2.5 miles southwest of the site.
Congested-headed hayfield tarplant	*Hemizonia congesta ssp. congesta*	None	None	1B	Valley and foothill grassland.	Unlikely: the site does not provide suitable habitat for congested-headed hayfield tarplant. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 1.5 miles southeast of the site.
Thin-lobed horkelia	*Horkelia tenuiloba*	None	None	1B	Broadleafed upland forest, chaparral, valley and foothill grassland.	Unlikely: the site does not provide suitable habitat for thin-lobed horkelia. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 4 miles northeast of the site.
Legenere	*Legenere limosa*	None	None	1B	Vernal pools.	Unlikely: there are no vernal pools or seasonal wetlands in the project site. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 8 miles northwest of the project site.
Jepson's leptosiphon	*Leptosiphon jepsonii*	None	None	1B	Chaparral, cismontane woodlanf.	Unlikely: the site does not provide suitable habitat for Jepson's leptosiphon. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 7 miles northwest of the site.

TABLE 1

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED OR POTENTIALLY-OCCURRING IN THE PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence in the Project Site
Cobb Mountain lupine	*Lupinus sericatus*	None	None	1B	Chaparral, cismontane woodland, lower montane coniferous forest.	Unlikely: the site does not provide suitable habitat for Cobb Mountain lupine; the site is also below the elevation range of this species (CNPS, 2016). The nearest occurrence of Cobb Mountain lupine in the CNDDB (2016) search area is approximately 4.5 miles northeast of the site.
Oval-leaved viburnum	*Viburnum ellipticum*	None	None	2	Chaparral, cismontane woodland, and lower montane coniferous forest.	Unlikely: the site does not contain suitable habitat for this species. The site is also well below the known elevation range of oval-leaved viburnum (CNPS, 2016). The nearest occurrence of this species in the CNDDB (2016) search area is approximately 1.5 miles east of the site.
WILDLIFE						
Birds						
Northern spotted owl	*Strix occidentalis caurina*	T	T	N/A	Mixed aged stands of old growth and mature trees; usually damp, dense, shaded forests. Occasionally found in younger forests.	Unlikely: the site does not provide suitable habitat for this species. There are no occurrences of northern spotted owl in the CNDDB (2016) search area.
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	T	E	N/A	Nests in riparian forests, along the broad, lower flood-bottoms of larger river systems.	Unlikely: the site does not provide suitable habitat for this species. The nearest occurrence of western yellow-billed cuckoo in the CNDDB (2016) search area is approximately 9 miles northwest of the site.
White-tailed kite	*Elanus leucurus*	None	FP	N/A	Herbaceous lowlands with variable tree growth and dense population of voles.	Unlikely: white-tailed kite is unlikely to occur in such an urban setting. The nearest occurrence of white-tailed kite in the CNDDB (2016) search area is approximately 6.5 miles northwest of the site.
Bank swallow	*Riparia riparia*	None	T	N/A	Nests colonially in riparian habitats; requires vertical banks and cliffs with fine-textured soils.	Unlikely: there is no suitable nesting habitat for bank swallows in the project site. The only occurrence of this species in the CNDDB (2016) search area is approximately 1.5 miles south of the project site.

TABLE 1

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED OR POTENTIALLY-OCCURRING IN THE PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence in the Project Site
Burrowing owl	*Athene cunicularia*	None	SC	N/A	Grasslands, deserts and scrubland; subterranean nester, dependent upon burrowing mammals.	Unlikely: no burrowing owls, evidence of past occupancy by owls, ground squirrels, or ground squirrel burrows were observed in the site during the recent field survey. The nearest occurrence of burrowing owls in the CNDDB (2016) search area is approximately 7 miles northwest of the site.
San Pablo song sparrow	*Melospiza melodia samuelis*	None	SC	N/A	Salt marshes bordering the north side of San Francisco Bay and San Pablo Bay.	Unlikely: the project site does not contain suitable marsh habitat for this species. This species may fly over the site on occasion. The closest occurrence of San Pablo song sparrow in the CNDDB (2016) search area is approximately 4 miles southeast of the site.
Golden eagle	*Aquila chrysaetos*	None	SC	N/A	Nesting areas are associated with cliff-walled canyons and large trees. Forages in rolling hills and mountain areas.	Unlikely: the trees within the site provide poor quality nesting habitat for golden eagles, as they prefer ledges on cliff walls or very large trees and isolated from any type of disturbance. The nearest occurrence of golden eagle in the CNDDB (2016) search area is approximately 6.5 miles northwest of the site.
Black swift	*Cypseloides niger*	None	SC	N/A	Breeds in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and sea bluffs above the surf; forages widely.	Unlikely: the project site does not contain suitable marsh habitat for this species. This species may fly over the site on occasion. The closest occurrence of black swift in the CNDDB (2016) search area is approximately 5.5 miles north of the site.
Grasshopper sparrow	*Ammodramus savannarum*	SC	None	N/A	Occurs primarily in dry densely vegetated grasslands in the eastern San Joaquin Valley and coastal foothills.	Unlikely: the project site does not contain suitable habitat for grasshopper sparrow. This species may fly over the site on occasion. The closest occurrence of grasshopper sparrow in the CNDDB (2016) search area is approximately 6.5 miles northwest of the site.
Mammals						
American badger	*Taxidea taxus*	None	SC	N/A	A variety of habitat types with friable soils for digging.	Unlikely: the site does not contain burrow habitat for this species; no evidence of American badger was observed in the site. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 6 miles northwest of the site.

TABLE 1

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED OR POTENTIALLY-OCCURRING IN THE PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence in the Project Site
Pallid bat	*Antrozous pallidus*	None	SC	N/A	Open and dry habitats with rocky areas for roosting.	Unlikely: pallid bat may fly over, forage, or roost in the site on occasion. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 0.5 miles west of the site.
Salt-marsh harvest mouse	*Reithrodontomys raviventris*	E	E	N/A	Saline emergent wetlands dominated by pickleweed.	Unlikely: the project site does not contain suitable emergent wetland habitat for this species. There are no occurrences of the Salt-marsh harvest mouse recorded in the CNDDB (2016) in the search area.
Reptiles & Amphibians						
California tiger salamander	*Ambystoma californiense*	E	T	N/A	Seasonal water bodies without fish (i.e., vernal pools and stock ponds) and grassland/ woodland habitats with summer refugia (i.e., burrows).	Unlikely: there is no suitable breeding habitat within or near the site for California tiger salamander. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 10 miles southwest of the site. The site is not within designated critical habitat for California tiger salamander (USFWS, 2011**).**
California red-legged frog	*Rana aurora draytonii*	T	SC	N/A	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation.	Unlikely: there is no suitable aquatic habitat for California red-legged frog in the project site. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 6.5 miles northwest of the site. The site is not within designated critical habitat for California red-legged frog (USFWS, 2006).
Foothill yellow-legged frog	*Rana boylii*	None	SC	N/A	Rocky perennial streams in the Sierra and coastal foothills.	Unlikely: the site does not provide suitable habitat for foothill yellow-legged frog. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 3 miles west of the site.
Western pond turtle	*Emys marmorata*	None	SC	N/A	Ponds, marshes, streams, and ditches with emergent aquatic vegetation and basking areas.	Unlikely: the site does not provide suitable habitat for western pond turtle. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 2.5 miles southeast of the site.

TABLE 1

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED OR POTENTIALLY-OCCURRING IN THE PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence in the Project Site
California giant salamander	*Dicamptodon ensatus*	None	SC	N/A	Coastal forests; breeds in streams.	Unlikely: there is no suitable breeding habitat within or near the site for pacific giant salamander. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 2 miles northwest of the site.
Fish						
Central California coast steelhead	*Oncorhynchus mykiss*	T	None	N/A	Riffle and pool complexes with adequate spawning substrates within Central Valley drainages.	Unlikely: there is no aquatic habitat in the site. The nearest occurrence of Central Valley steelhead in the CNDDB (2016) search area is approximately 3 miles west of the site. The site is not within designated critical habitat for Central California coast steelhead (NOAA, 2005).
Delta smelt	*Hypomesus transpacificus*	T	T	N/A	Shallow lower delta waterways with submersed aquatic plants and other suitable refugia.	Unlikely: there is no suitable aquatic habitat in the site. There are no occurrences of this species in the CNDDB (2016) search area. The site is not within designated critical habitat for delta smelt (USFWS, 1994).
Invertebrates						
San Bruno elfin butterfly	*Incisalia mossii bayensis*	E	None	N/A	Rocky outcrops and cliffs in coastal scrub habitats.	Unlikely: the site does not provide suitable habitat for this species. There are no occurrences of San Bruno elfin butterfly recorded in the CNDDB (2016) in the search area.
California freshwater shrimp	*Syncaris pacifica*	E	None	N/A	Low-elevation perennial streams in the northern Bay Area.	Unlikely: there is no aquatic habitat in the site. The nearest occurrence of California freshwater shrimp in the CNDDB (2016) search area is approximately 1 mile northwest of the site.

[1] T= Threatened; E = Endangered.

[2] T = Threatened; E = Endangered; FP = State of California Fully Protected Species; SC = State of California Species of Special Concern.

[3] CNPS List 1B includes species that are rare, threatened, or endangered in California and elsewhere; List 2 includes plants that are rare, threatened or endangered in California but are more common elsewhere.

Special-status bats may also fly over the area on occasion, but would not be expected to roost in the site. The site does not provide aquatic habitat for any species of special-status fish, or suitable aquatic habitat for California red-legged frog, foothill yellow-legged frog, California tiger salamander, California giant salamander, or western pond turtle. The site does not provide suitable denning habitat for American badger and there is no coastal scrub habitat in the site for San Bruno elfin butterfly.

CRITICAL HABITAT: The site is not in designated critical habitat of any federally listed species (Attachment D). There is a polygon of designated critical habitat for California red-legged frog (USFWS, 2006) several miles west of the site a polygon of designated critical habitat for Northern spotted owl (USFWS, 2012) a few miles northeast of the site (Attachment D). Several rivers and creeks in the area are designated critical habitat for Central Coast steelhead (NOAA, 2005).

Conclusions and Recommendations

- The site is disturbed upland grassland and a few trees. There are no sensitive habitats in the site; the site is biologically unremarkable.

- There are no potentially jurisdictional Waters of the U.S. or wetlands in the site.

- Due to a lack of suitable habitat, it is unlikely that special-status plants occur in the site.

- Due to a lack of suitable habitat and location in an urban setting, no special-status wildlife species are expected to occur in or near the site on more than an occasional basis.

- The site is not within designated critical habitat for any federally listed species.

- On-site trees, shrubs, and grasslands may be used by nesting birds protected by the Migratory Bird Treaty Act of 1918 and Fish and Game Code of California. If vegetation removal and/or project construction occurs between February 1 and August 31, a pre-construction nesting bird survey is recommended. If active nests are found within the survey area, vegetation removal and/or project construction should be delayed until a qualified biologist determines nesting is complete.

We hope this information is useful. Please call me at (209) 745-1159 with any questions.

Sincerely,

Diane S. Moore, M.S.
Principal Biologist

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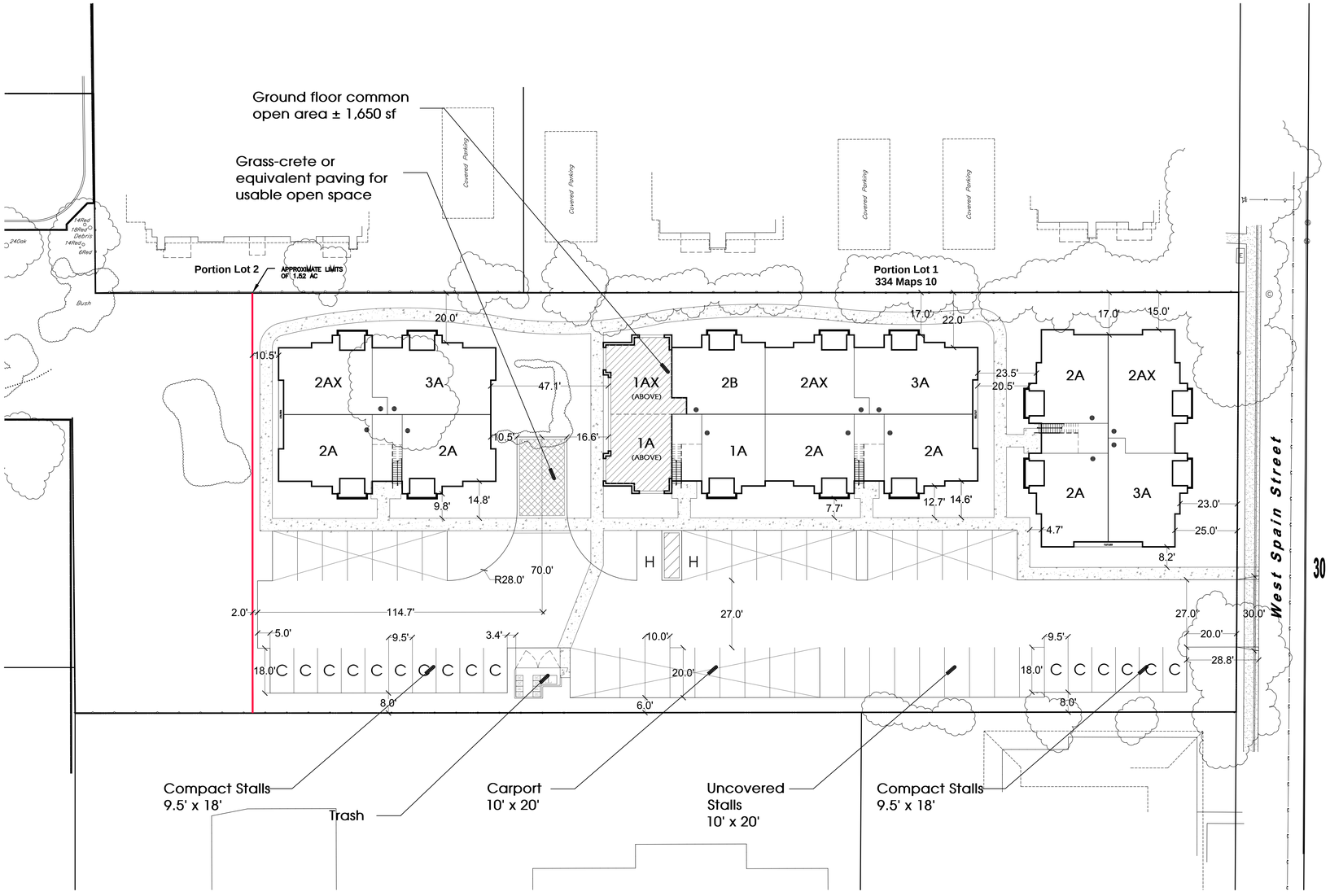
USFWS. 2011. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Sonoma County Distinct Population Segment of California Tiger Salamander; Final Rule. Federal Register Vol. 76, No. 1692, August 31, 2011, pp. 54346 – 54372.

USFWS. 2012. Part II, Department of the Interior, Fish and Wildlife Service. 50 CFR Part 17: Endangered and Threatened Wildlife and Plants;
Designation of Revised Critical Habitat for the Northern Spotted Owl; Final Rule. Federal Register Vol. 77, No. 233, December 4. pp. 71876 – 72068.

Attachment A

Site Plan



Project Summary

Total Site Area: ± 1.52 ac
Total Units: 30 du

Plan Type	*Gross SF*	*Bdrm/Ba*	*# Units*	*%*
Plan 1A	*716 sf*	*1 bdrm/1 ba*	*3 du*	*10%*
Plan 1AX	*753 sf*	*1 bdrm/1 ba*	*1 du*	*3%*
Plan 1 Subtotal			*4 du*	*13%*
Plan 2A	*982 sf*	*2 bdrm/2 ba*	*12 du*	*40%*
Plan 2AX	*1,020 sf*	*2 bdrm/2 ba*	*6 du*	*20%*
Plan 2B	*993 sf*	*2 bdrm/2 ba*	*2 du*	*7%*
Plan 2 Subtotal			*20 du*	*67%*
Plan 3A	*1,260 sf*	*3 bdrm/2 ba*	*6 du*	*20%*

Density: 19.7 du/ac
Parking:
Required: 56 spaces
- *1.5 spaces / unit = 45 spaces*
- *Guest: 25% of total spaces = 11 spaces*

Provided: 56 spaces
- *Carport (10' x 20'): 30 spaces*
- *Uncovered (10' x 20'): 10 spaces*
- *Compact Uncovered (9.5' x 18') 16 spaces*
  (Compact Stalls = 29% I 30% Max Allowed)

Open Space:
Required: 300 sf/unit
(Combination of common and private open space per Northwest Planning Area MX Open Space Requirements)
Provided: 608 sf/unit
- Common: 15,880 sf
- Private: 2,370 sf
- Total: 18,250 sf

Site Coverage: 17,788 sf (27% of site)
Maximum site coverage as percentage of site area, excluding porches and detached garages.
Paved Area: 22,809 sf (34% of site)
Open Space: 25,614 sf (39% of site)
Total Site Area: 66,211 sf

Floor Area Ratio (FAR): 0.48
Floor Area Ratio: Maximum building area as a ratio of site area, excluding porches, cellars, attics, detached garages, and underground parking.

Notes:
1. Site plan is for conceptual purposes only.
2. Site plan must be reviewed by planning, building, and fire departments for code compliance.
3. Base information per civil engineer.
4. Civil engineer to verify all setbacks and grading information
5. Building Footprints might change due to the final design elevation style.
6. Open space area is subject to change due to the balcony design of the elevation.
7. Building setbacks are measured from property lines to building foundation lines.

Conceptual Site Plan

08/08/16
2016204
0 10 20 40

Oliva - W. Spain Apartments

Sonoma, CA

DeNova Homes

WILLIAM HEZMALHALCH ARCHITECTS INC.
2850 REDHILL AVENUE SUITE 200 SANTA ANA CA 92705-5543
949 250 0607 www.wharchitects.com fax 949 250 1529

SP

Attachment B

CNDDB Summary Report and Exhibits

& USFWS IPaC Trust Resource Report

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

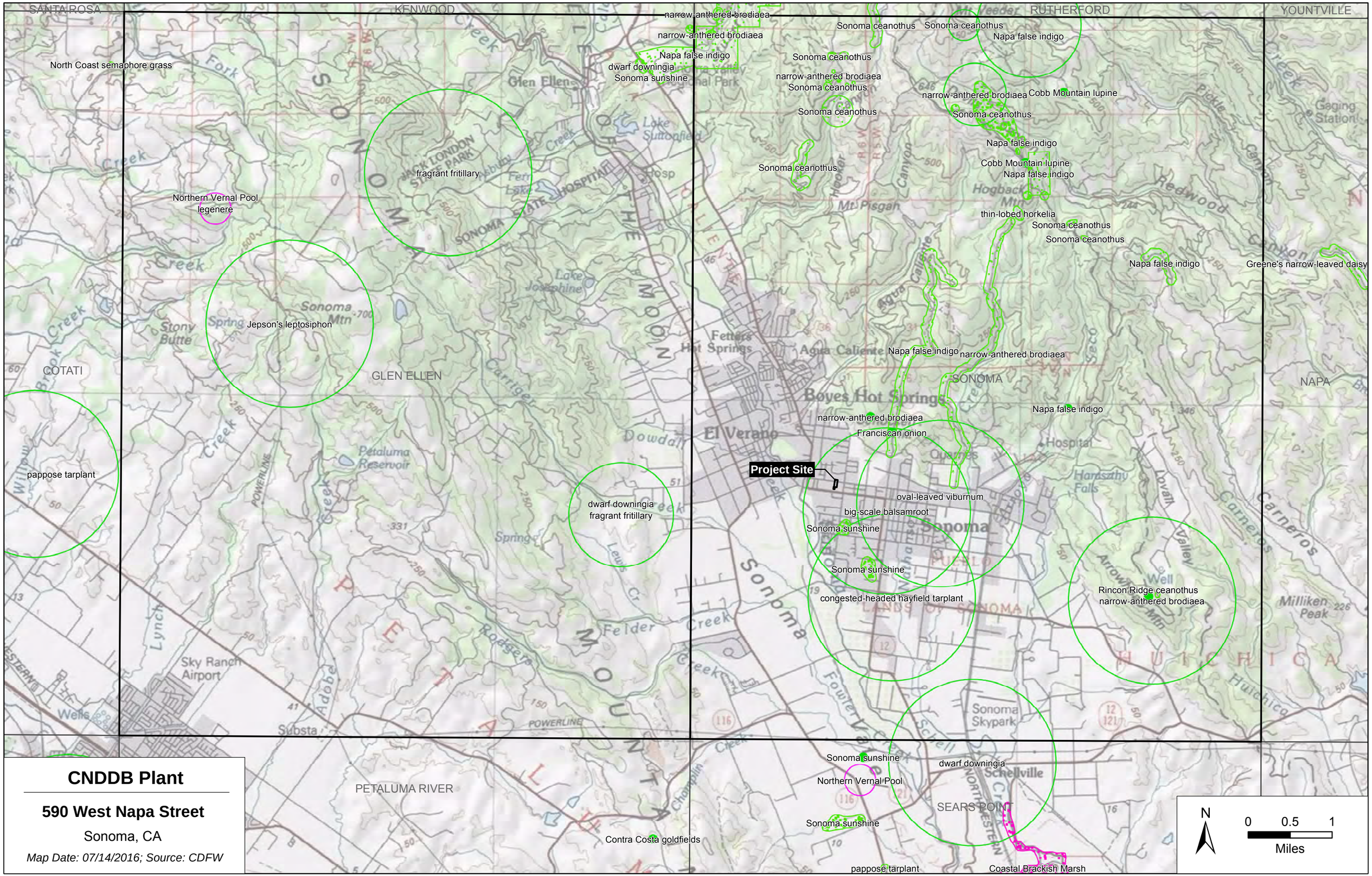
Query Criteria: Quad IS (Glen Ellen (3812235) OR Sonoma (3812234))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Allium peninsulare var. franciscanum Franciscan onion	PMLIL021R1	None	None	G5T1	S1	1B.2
Ambystoma californiense California tiger salamander	AAAAA01180	Threatened	Threatened	G2G3	S2S3	WL
Ammodramus savannarum grasshopper sparrow	ABPBXA0020	None	None	G5	S3	SSC
Amorpha californica var. napensis Napa false indigo	PDFAB08012	None	None	G4T2	S2	1B.2
Antrozous pallidus pallid bat	AMACC10010	None	None	G5	S3	SSC
Aquila chrysaetos golden eagle	ABNKC22010	None	None	G5	S3	FP
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC
Balsamorhiza macrolepis big-scale balsamroot	PDAST11061	None	None	G2	S2	1B.2
Blennosperma bakeri Sonoma sunshine	PDAST1A010	Endangered	Endangered	G1	S1	1B.1
Bombus caliginosus obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
Bombus crotchii Crotch bumble bee	IIHYM24480	None	None	G3G4	S1S2	
Bombus occidentalis western bumble bee	IIHYM24250	None	None	G2G3	S1	
Brodiaea leptandra narrow-anthered brodiaea	PMLIL0C022	None	None	G3?	S3?	1B.2
Buteo regalis ferruginous hawk	ABNKC19120	None	None	G4	S3S4	WL
Caecidotea tomalensis Tomales isopod	ICMAL01220	None	None	G2	S2S3	
Ceanothus confusus Rincon Ridge ceanothus	PDRHA04220	None	None	G1	S1	1B.1
Ceanothus sonomensis Sonoma ceanothus	PDRHA04420	None	None	G2	S2	1B.2
Coccyzus americanus occidentalis western yellow-billed cuckoo	ABNRB02022	Threatened	Endangered	G5T2T3	S1	
Cypseloides niger black swift	ABNUA01010	None	None	G4	S2	SSC
Dicamptodon ensatus California giant salamander	AAAAH01020	None	None	G3	S2S3	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Downingia pusilla dwarf downingia	PDCAM060C0	None	None	GU	S2	2B.2
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Eremophila alpestris actia California horned lark	ABPAT02011	None	None	G5T3Q	S3	WL
Fritillaria liliacea fragrant fritillary	PMLIL0V0C0	None	None	G2	S2	1B.2
Hemizonia congesta ssp. congesta congested-headed hayfield tarplant	PDAST4R065	None	None	G5T1T2	S1S2	1B.2
Horkelia tenuiloba thin-lobed horkelia	PDROS0W0E0	None	None	G2	S2	1B.2
Hydrochara rickseckeri Ricksecker's water scavenger beetle	IICOL5V010	None	None	G2?	S2?	
Legenere limosa legenere	PDCAM0C010	None	None	G2	S2	1B.1
Leptosiphon jepsonii Jepson's leptosiphon	PDPLM09140	None	None	G3	S3	1B.2
Lupinus sericatus Cobb Mountain lupine	PDFAB2B3J0	None	None	G2	S2	1B.2
Melospiza melodia samuelis San Pablo song sparrow	ABPBXA301W	None	None	G5T2?	S2?	SSC
Myotis thysanodes fringed myotis	AMACC01090	None	None	G4	S3	
Myotis volans long-legged myotis	AMACC01110	None	None	G5	S3	
Myotis yumanensis Yuma myotis	AMACC01020	None	None	G5	S4	
Northern Vernal Pool Northern Vernal Pool	CTT44100CA	None	None	G2	S2.1	
Oncorhynchus mykiss irideus steelhead - central California coast DPS	AFCHA0209G	Threatened	None	G5T2T3Q	S2S3	
Rana boylii foothill yellow-legged frog	AAABH01050	None	None	G3	S3	SSC
Rana draytonii California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
Riparia riparia bank swallow	ABPAU08010	None	Threatened	G5	S2	
Syncaris pacifica California freshwater shrimp	ICMAL27010	Endangered	Endangered	G1	S1	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Taxidea taxus American badger	AMAJF04010	None	None	G5	S3	SSC
Viburnum ellipticum oval-leaved viburnum	PDCPR07080	None	None	G4G5	S3?	2B.3

Record Count: 43



CNDDB Plant

590 West Napa Street

Sonoma, CA

Map Date: 07/14/2016; Source: CDFW

SANTA ROSA
KENWOOD
RUTHERFORD
YOUNTVILLE
COTATI
GLEN ELLEN
SONOMA
NAPA

California red-legged frog
California freshwater shrimp
California giant salamander
foothill yellow-legged frog
steelhead - central California coast DPS
black swift
obscure bumble bee
pallid bat
Yuma myotis
Ricksecker's water scavenger beetle
Tomales isopod
burrowing owl
western yellow-billed cuckoo
Crotch bumble bee
western bumble bee
ferruginous hawk
western pond turtle
golden eagle
white-tailed kite
California tiger salamander
bank swallow
San Pablo song sparrow
Sonoma zerene fritillary
Blennosperma vernal pool andrenid bee

Project Site

CNDDB Wildlife

590 West Napa Street

Sonoma, CA

Map Date: 07/14/2016; Source: CDFW

N

0 0.5 1

Miles

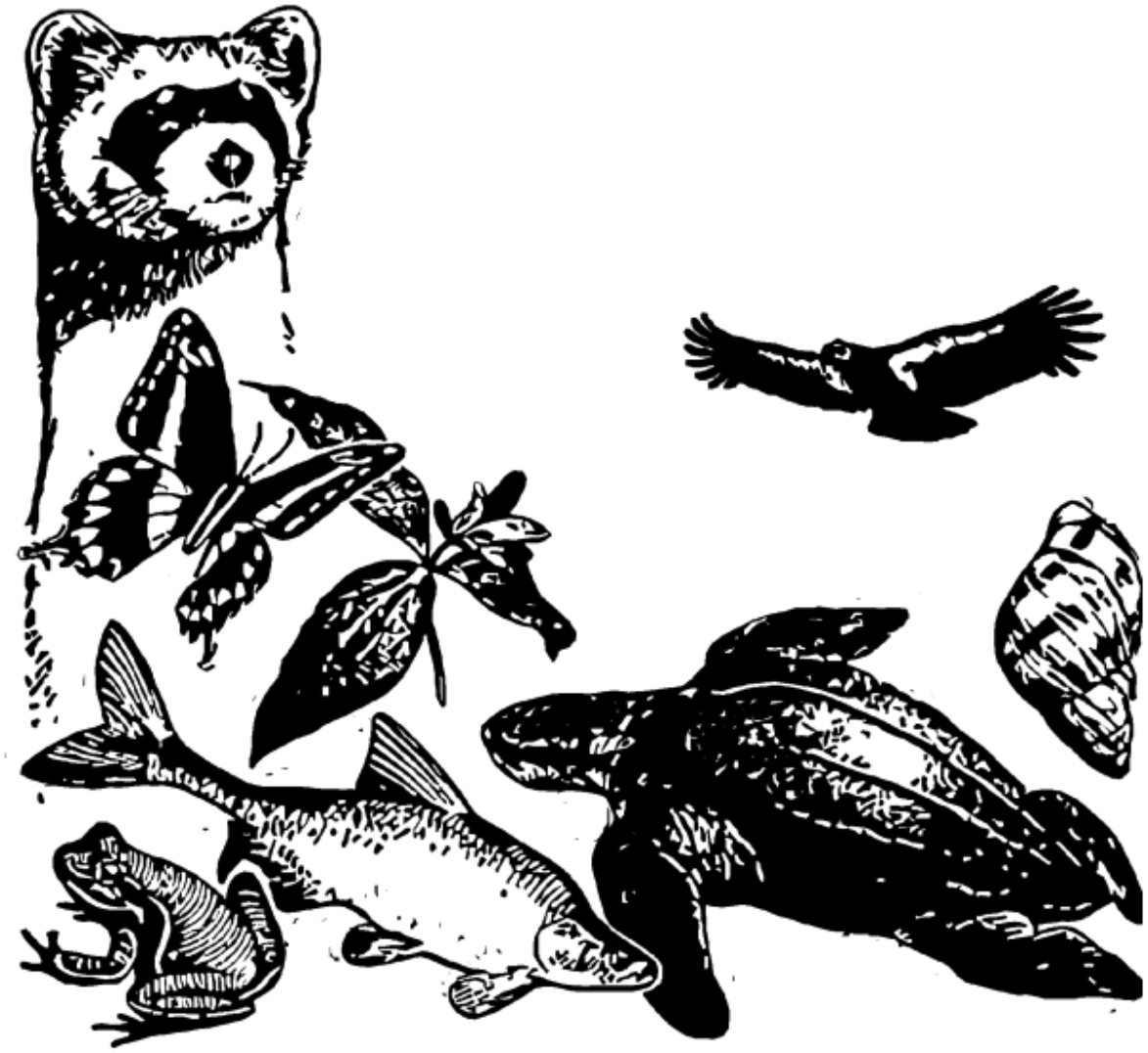
U.S. Fish & Wildlife Service

590 West Napa Street

IPaC Trust Resources Report

Generated September 18, 2016 06:12 PM MDT, IPaC v3.0.9

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

Table of Contents

U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

590 West Napa Street

LOCATION

Sonoma County, California

DESCRIPTION

Residential Infill Project

IPAC LINK

https://ecos.fws.gov/ipac/project/QKY3X-VE2MV-FFBJ3-J4WRS-HOXQQQ

U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Amphibians

California Red-legged Frog Rana draytonii — Threatened

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=D02D

Birds

Northern Spotted Owl Strix occidentalis caurina — Threatened

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B08B

Crustaceans

California Freshwater Shrimp Syncaris pacifica — Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=K01W

Fishes

Delta Smelt Hypomesus transpacificus — Threatened

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E070

Steelhead Oncorhynchus (=Salmo) mykiss — Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E08D

Flowering Plants

Sonoma Sunshine Blennosperma bakeri — Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q1TO

Insects

San Bruno Elfin Butterfly Callophrys mossii bayensis — Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=I00Q

Mammals

Salt Marsh Harvest Mouse Reithrodontomys raviventris — Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A03Y

Critical Habitats

There are no critical habitats in this location

Attachment C

Photographs

Ruderal grassland in the southeast part of the site, looking north; 07/15/16.

Ruderal grassland in the north part of the site, looking southwest; 07/15/16.

Relatively large valley oaks in the southwest part of the project site, looking southwest; 07/15/16.

North edge of the site along West Spain Avenue looking east; 07/15/16. The valley oaks in the foreground and in the distance at the end of the fence are in the northern corners of the site.

Barn and outbuildings in the south part of the parcel, looking southwest; 07/15/16. This part of the parcel will be retained by the seller and is not a part of the project.

Home in the southwest part of the parcel, looking south; 07/15/16. This part of the parcel will be retained by the seller and is not a part of the project.

Relatively large valley oaks in the southwest part of the project site, looking southwest; 07/15/16.

North edge of the site along West Spain Avenue looking east; 07/15/16. The valley oaks in the foreground and in the distance at the end of the fence are in the northern corners of the site.

Attachment D

Designated Critical Habitat

Legend

- California red-legged frog
- California tiger Salamander
- Northern spotted owl
- Steelhead

CNDDB Critical Habitat

590 West Napa Street

Sonoma, CA

Map Date: 07/14/2016; Source: USFWS

Project Site

N

0 0.5 1

Miles

ATTACHMENT 3

HISTORICAL RESOURCES STUDY

Historical Resources Study for the Oliva Apartments Project Sonoma, Sonoma County, California

Taylor Alshuth, B.A.
and
Thomas M. Origer, M.A., RPA

April 17, 2017

Historical Resources Study for the Oliva Apartments Project Sonoma, Sonoma County, California

Prepared by:

_____

Taylor Alshuth, B.A.
and
Thomas M. Origer, M.A., RPA

Tom Origer & Associates
Post Office Box 1531
Rohnert Park, California 94927
(707) 584-8200

Prepared for:

Rob Gjestland
City of Sonoma
1 The Plaza
Sonoma, California 95476

April 17, 2017

ABSTRACT

Tom Origer & Associates conducted an historical resources survey of the property at 655 West Spain Street, Sonoma, Sonoma County, California. The study was requested and authorized by Rob Gjestland of the City of Sonoma. This study was conducted to meet the requirements of the City of Sonoma and those of the California Environmental Quality Act. The purpose of this report is to identify historical resources only (see definition of historical resources in the Regulatory Context section). This report will not address Tribal Cultural Resources as defined in Public Resources Code [PRC] 21074 (a)(1)(A)-(B).

The proposed project includes development of a 30-unit apartment community at 655 West Spain Street (the northerly 1.5 acre portion of APN 127-221-005).

This study included archival research at the Northwest Information Center, Sonoma State University (NWIC File No. 16-1496), examination of the library and files of Tom Origer & Associates, Native American contact, and field inspection of the study area. No historical resources were found within the study area. Documentation pertaining to this study is on file at the offices of Tom Origer & Associates (File No. 2017-037S).

This report contains information about the locations of archaeological sites. For the protection of these resources, this report, and such location information, should not be publicly circulated.

Synopsis

Project:	Oliva Apartments
Location:	655 West Spain Street, Sonoma, Sonoma County
APN:	127-221-005
Quadrangles:	Sonoma 7.5' series
Study Type:	Intensive
Scope:	1.5 acres
Finds:	None

Key Project Personnel

Tom Origer provided project oversight for this study. Mr. Origer obtained a Master of Arts in Anthropology from San Francisco State University in 1983, after obtaining a Bachelor of Arts degree in Anthropology at Sonoma State University in 1974. He has over forty years of experience in cultural resources management throughout Northern California. His experience includes work that has been completed in compliance with local ordinances, CEQA, NEPA, and Section 106 (NHPA) requirements. Mr. Origer taught archaeological analysis and field archaeology classes at Santa Rosa Junior College from 1979 - 2009. He has been affiliated with the Society for California Archaeology (Presidential duties from April 1998 to April 2001), the International Association for Obsidian Studies (charter member and President from 1990-1992), the Archaeological Institute of America (President of the North Coast Society from 1985 to 1987), the Society for American Archaeology, the Society for Historical Archaeology, and the Register of Professional Archaeologists.

Taylor Alshuth prepared the report and participated in the field phase of this study. Mr. Alshuth obtained a Bachelor of Arts degree in Anthropology from Humboldt State University in 2014, after obtaining a Associate of Arts degree in Anthropology at Santa Rosa Junior College in 2012. He has been affiliated with the Society for California Archaeology, the Archaeological Institute of America, and the Archaeological Conservancy. Mr. Alshuth has been a part of northern California archaeology since 2014.

CONTENTS

TABLES

FIGURES

INTRODUCTION

Tom Origer & Associates conducted an historical resources survey of the property at 655 West Spain Street, Sonoma, Sonoma County, California. The study was requested and authorized by Rob Gjestland of the City of Sonoma. This study was conducted to meet the requirements of the City of Sonoma and those of the California Environmental Quality Act. The proposed project includes development of a 30-unit apartment community at 655 West Spain Street (the northerly 1.5 acre portion of APN 127-221-005). Documentation pertaining to this study is on file at Tom Origer & Associates (File No. 2017-037S).

REGULATORY CONTEXT

The California Environmental Quality Act (CEQA) requires that historical resources be considered during the environmental review process. This is accomplished by an inventory of resources within a study area and by assessing the potential that historical resources could be affected by development. The term "Historical Resources' encompasses prehistoric and historical archaeological sites and built environment resources (e.g., buildings, bridges, canals). An additional category of resources is defined in CEQA under the term "Tribal Cultural Resources" (Public Resources Code Section 21074). They are not addressed in this report. Tribal cultural resources are resources that are of specific concern to California Native American tribes, and knowledge of such resources is limited to tribal people. Pursuant to revisions to CEQA enacted in July of 2015, such resources are to be identified by tribal people in direct, confidential consultation with the lead agency (PRC §21080.3.1).

This historical resources survey was designed to satisfy environmental issues specified in the CEQA and its guidelines (Title 14 CCR §15064.5) by: (1) identifying all historical resources within the project area; (2) offering a preliminary significance evaluation of the identified cultural resources; (3)

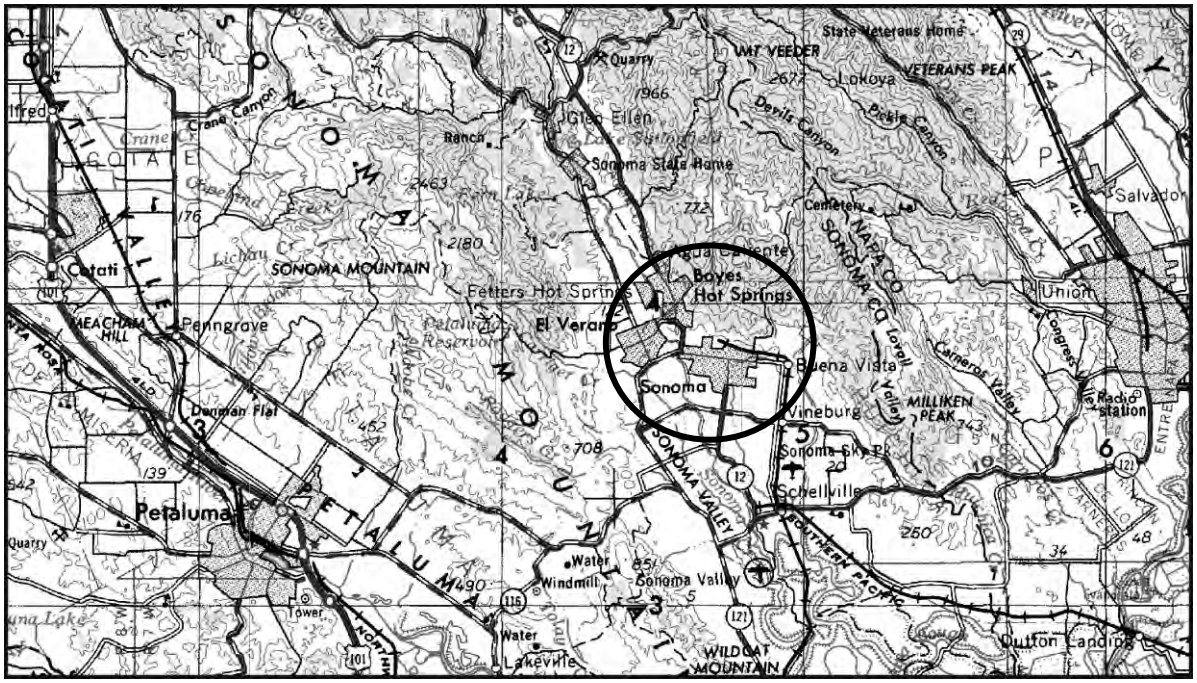


Figure 1. Project vicinity (adapted from the 1980 Santa Rosa 1:250,000-scale USGS map).

assessing resource vulnerability to effects that could arise from project activities; and (4) offering suggestions designed to protect resource integrity, as warranted.

Resource Definitions

Historical resources are classified by the State Office of Historic Preservation (OHP) as sites, buildings, structures, objects and districts, and each is described by OHP (1995) as follows.

> **Site.** A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archaeological value regardless of the value of any existing structure.
>
> **Building.** A building, such as a house, barn, church, hotel, or similar construction, is created principally to shelter any form of human activity. "Building" may also be used to refer to a historically and functionally related unit, such as a courthouse and jail, or a house and barn.
>
> **Structure.** The term "structure" is used to distinguish from buildings those functional constructions made usually for purposes other than creating human shelter.
>
> **Object.** The term "object" is used to distinguish from buildings and structures those constructions that are primarily artistic in nature or are relatively small in scale and simply constructed. Although it may be, by nature or design, movable, an object is associated with a specific setting or environment.
>
> **District.** A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

Significance Criteria

When a project might affect an historical resource, the project proponent is required to conduct an assessment to determine whether the effect may be one that is significant. Consequently, it is necessary to determine the importance of resources that could be affected. The importance of a resource is measured in terms of criteria for inclusion on the California Register of Historical Resources (Title 14 CCR, §4852(a)) as listed below. A resource may be important if it meets any one of the criteria below, or if it is already listed on the California Register of Historical Resources or a local register of historical resources.

An important historical resource is one which:

1. Is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.

2. Is associated with the lives of persons important to local, California, or national history.

3. Embodies the distinctive characteristics of a type, period, region or method of construction, or represents the work of a master or possesses high artistic values.

4. Has yielded, or may be likely to yield, information important to the pre-history or history of the local area, California, or the nation.

In addition to meeting one or more of the above criteria, eligibility for the California Register requires that a resource retains sufficient integrity to convey a sense of its significance or importance. Seven elements are considered key in considering a property's integrity: location, design, setting, materials, workmanship, feeling, and association.

The OHP advocates that all historical resources over 45 years old be recorded for inclusion in the OHP filing system (OHP 1995:2), although the use of professional judgment is urged in determining whether a resource warrants documentation.

PROJECT SETTING

Study Area Location and Description

The study area is located at 655 West Spain Street, Sonoma, Sonoma County, as shown on the Sonoma 7.5' USGS topographic map (Figure 2). It consists of 1.5 acres situated on generally level land. Vegetation within the study area consisted of grasses, forbs, and a few scattered oak trees.

The geology of the study area consists of alluvial deposits that date to the early to late Pleistocene (2.5 million years ago to11,700 years ago [Wagner *et al.* 2004]).

Soils within the study area belong to the Tuscan series (Miller 1972:Sheet 108). Tuscan soils are moderately well-draining, cobbly clay loams. In a natural state these soils support the growth of annual grasses, forbs, and low growing shrubs, but there are a few places of scattered small brush and shrub oak trees. Historically, parcels containing Tuscan soils were used mainly for pasture for sheep and cattle. Some areas were used for homesites (Miller 1972:85-86).

The closest water source is Sonoma Creek, which is located approximately 0.40 miles to the west of the study area.

Cultural Setting

Archaeological evidence indicates that human occupation of California began at least 11,000 years ago (Erlandson *et al.* 2007). Early occupants appear to have had an economy based largely on hunting, with limited exchange, and social structures based on the extended family unit. Later, milling technology and an inferred acorn economy were introduced. This diversification of economy appears to be coeval with the development of sedentism and population growth and expansion.

Sociopolitical complexity and status distinctions based on wealth are also observable in the archaeological record, as evidenced by an increased range and distribution of trade goods (e.g., shell beads, obsidian tool stone), which are possible indicators of both status and increasingly complex exchange systems.

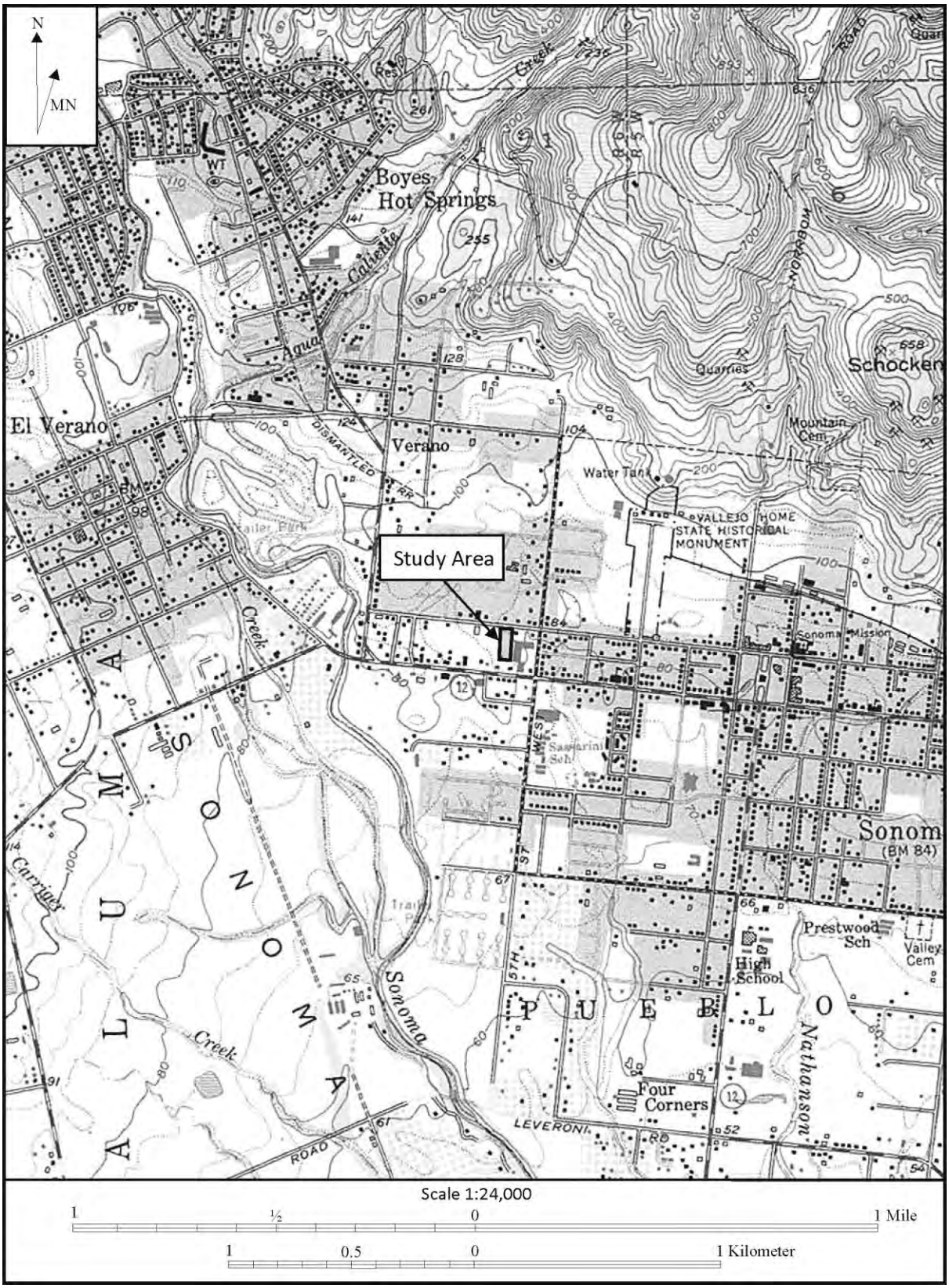


Figure 2. Study area location (adapted from the 1980 Sonoma 7.5' USGS topographic map).

At the time of European settlement, the study area was within territory controlled by the Coast Miwok (Barrett 1908). This group lived in rich environments that allowed for dense populations with complex social structures. They settled in large, permanent villages about which were distributed seasonal camps and task-specific sites. Primary village sites were occupied throughout the year and other sites were visited in order to procure particular resources that were especially abundant or available only during certain seasons. Sites often were situated near sources of fresh water and in ecotones where plant life and animal life were diverse and abundant. The Coast Miwok economy focused on marsh resources, and was supplemented by hunting and gathering in the North Coast Ranges (Kelly 1978). For more information about the Coast Miwok see Kelly (1978).

Historically, the study area is within the Mexican pueblo lands of Sonoma (GLO 1876). The Mexican pueblo of Sonoma grew and prospered between 1835 and 1846, in part due to a steady influx of Americans. Many of the American men married into prominent Mexican families. Through these unions, American men became landowners, and they brought with them many American attitudes regarding land use and business dealings. This phenomenon occurred throughout California and served to weaken the Mexican government's grasp on the region. During the mid-1840s, the United States government actively pursued nonviolent acquisition of California as a U.S. territory but progress toward that end was too slow for some. In early 1846, disgruntled Americans in the Sacramento Valley rallied around U.S. explorer John C. Fremont and in June of that year, a group of men seized Mariano Vallejo and imprisoned him in Sacramento. A crude flag with the image of a bear was raised in the Sonoma plaza, giving rise to the name Bear Flag Revolt. The year 1846 marked the end of Mexican domain and in September 1850, Sonoma officially became a United States town as California was admitted to the union.

STUDY PROCEDURES

Native American Contact

A request was sent to the State of California's Native American Heritage Commission seeking information from the sacred lands files and the names of Native American individuals and groups that would be appropriate to contact regarding this project. Letters were also sent to the following groups:

Federated Indians of Graton Rancheria
Kashia Band of Pomo Indians of the Stewarts Point
Lytton Rancheria of California
Mishewal-Wappo Tribe of Alexander Valley

This contact represents notification that TOA is conducting this study and it does not constitute consultation with tribes.

Archival Study Procedures

Archival research included examination of the library and project files at Tom Origer & Associates. A review (NWIC File No. 16-1496) was completed of the archaeological site base maps and records, survey reports, and other materials on file at the Northwest Information Center (NWIC), Sonoma State University, Rohnert Park. Sources of information included but were not limited to the current listings of properties on the National Register of Historic Places, California Historical Landmarks, California Register of Historical Resources, and California Points of Historical Interest as listed in the Office of Historic Preservation's *Historic Property Directory* (OHP 2012).

The Office of Historic Preservation has determined that structures in excess of 45 years of age should be considered potentially important historical resources, and former building and structure locations could be potentially important historic archaeological sites. Archival research included an examination of historical maps to gain insight into the nature and extent of historical development in the general vicinity, and especially within the study area. Maps ranged from hand-drawn maps of the 1800s (e.g., GLO) to topographic maps issued by the United States Geological Survey (USGS) and the United States Army Corps of Engineers (USACE).

In addition, ethnographic literature that describes appropriate Native American groups, county histories, and other primary and secondary sources were reviewed. Sources reviewed are listed in the "Materials Consulted" section of this report.

Based on the results of the prefield research, it was anticipated that prehistoric and historic-period resources could be found within the study area. Prehistoric archaeological site indicators expected to be found in the region include but are not limited to: obsidian and chert flakes and chipped stone tools; grinding and mashing implements such as slabs and hand-stones, and mortars and pestles; and locally darkened midden soils containing some of the previously listed items plus fragments of bone, shellfish, and fire affected stones. Historic period site indicators generally include: fragments of glass, ceramic, and metal objects; milled and split lumber; and structure and feature remains such as building foundations and discrete trash deposits (e.g., wells, privy pits, dumps).

Field Survey Procedures

An intensive field survey was completed by Taylor Alshuth on April 3, 2017. The study area was surveyed in transects spaced 10-15 meters apart. Ground visibility ranged from good to poor, with vegetation, such as grasses and forbs, imported gravel, wood chips, and buildings being the primary hindrances. A hoe was used, as needed, to clear patches so that the ground surface could be inspected.

STUDY FINDINGS

Native American Contact Results

A letter was received from Buffy McQuillen, Tribal Heritage Preservation Officer for the Federated Indians of Graton Rancheria, on April 10, 2017. They indicated that they would be reviewing the project within ten business days. A response was received from the Native American Heritage Commission via email on April 11, 2017 stating that a search of the Sacred Lands File resulted in a negative findings. A list of additional contacts was provided.

No other comments have been received as of the date of this report. A log of contact efforts is appended to this report, along with copies of correspondence (see Appendix A).

Archival Study Findings

Archival research found that the study area had not been previously subject to a pedestrian survey. Fourteen studies have been conducted within a quarter mile of the study area. See Table 1 for a complete list of studies conducted within one quarter mile of the study area.

Table 1 Studies that have been conducted within one quarter-mile of the study area

S#	Report Title	Author	Date
2390	An Archaeological Survey of a Proposed Underground Storm Drain in Sonoma, Sonoma County, California	Cole and Fredrickson	1980
2672	An Archaeological Survey of the proposed Village Green, Phase II, Sonoma, California	Stillinger and Fredrickson	1981
4987	An Archaeological Study for the Verano Avenue and Fifth Street West Reconstruction Project (56017), Sonoma County, California.	Gerike and Fredrickson	1982
8761	An Archaeological Investigation of the Senior Housing Project (Lot 2-City of Sonoma) at the Intersection of Seventh Street West and Oregon Street, Sonoma, California.	Wilbur and Fredrickson	1986
9089	Cultural Resources Evaluation for the Infiltration and Inflow Relief Sewer Project for the Riverside Drive Area, Sonoma Valley County Sanitation District, Sonoma, California	Chavez	1987
13231	A Cultural Resources Study for the Sonoma Affordable Housing Site at 820 West Spain Street, City of Sonoma, Sonoma County, California.	Origer	1991
15359	An Archaeological Study of 400 West Spain Street, Sonoma, Sonoma County, California.	Whatford and Fredrickson	1993
30487	A Cultural Resources Survey for the Willow's Wild Planned Development, 310 Fifth Street West, Sonoma, Sonoma County, California.	Beard	2005
37414	A Cultural Resources Evaluation of the Proposed Valley Oaks Homes Project Area on Sonoma Highway, Sonoma, Sonoma County, California (APNs 127-202-034 & 127-202-034)	Chattan	2009
38811	Letter report regarding the Subsurface Cultural resources Survey report for the Valley Oaks Homes Project.	Konzak	2011
42707	A Cultural Resources Evaluation of 821-845 W. Spain Street, City of Sonoma, Sonoma County, California. (APNS 127-211-021 and 127-211-022).	Evans	2012
44559	Sonoma Commons Project: Historical Architectural Evaluation of The Hansen Hatchery 796 and 800 West Spain Street, Sonoma, California	Corbett and Dobkin	2013
44607	Letter report on the Survey and Evaluation for 840 West Napa Street (APN 127-211-009-000)	Dawson	2013
46942	Sonoma League for Historic Preservation Survey Update Sonoma Valley Survey Update) Sonoma County, California	Painter	2015

The ethnographic site know as *Hútci* (Huchi) is described as "...near the plaza in the town of Sonoma" (Barrett 1908:312).

A review of 19th and 20th century maps shows a building within the study area in 1942 (USACE 1942). ParcelQuest indicates that this building was constructed sometime between 1909 and 1944 (ParcelQuest 2017). However, the building is not located on the 1.5 acres of the parcel that was subject to study (Bell and Heymans 1888; Bowers 1867; GLO 1876; McIntire and Lewis 1908; Peugh 1934; Reynolds and Proctor 1898; Thompson 1877; USACE 1942; USGS 1951a, 1951b, 1968, 1980).

Field Survey Findings

Archaeology

No archaeological remains were observed during the course of our survey.

Built Environment

A residence, barn, the remains of a roof, and a shed are located on the parcel. However; only the remains of the roof and the shed are located on the 1.5 acres of the parcel where the future development is proposed.

Roof

The remains of a roof are located within the study area. It is a tile roof that measures 40 feet long by 25 feet wide. No evidence of the corresponding structure was observed.

Shed

There is a shed located in the study area. It has a side-gabled corrugated metal roof, vertical plywood siding, and rests on a concrete foundation. This building appears to be made from repurposed wood to give it an aged appearance.

RECOMMENDATIONS

Known Resources

Archaeology

No archaeological remains were observed during the course of our survey; therefore, no resource-specific recommendations are warranted.

Built Environment

Roof

No evidence of the corresponding structure was found during the course of the survey; therefore, no recommendations are warranted.

Shed

The shed appears to have been built relatively recently, using reclaimed wood to give it an aged appearance to better match the other buildings located on the parcel. By itself, the shed would not be eligible for inclusion on the California Register of Historic Resources because it is not architecturally distinct.

No historical resources were observed; therefore no resource specific recommendations are required.

At present, project plan do not include development on the remaining 0.5 acre portion of the parcel. If any future plans call for the development or alteration of the buildings located on that portion of the parcel, they will need to be evaluated.

Accidental Discovery

Determining the potential for buried deposits factors includes landform age, distance to water, slope of the study area, and archaeological data (Meyer *et al.* 2016). The study area was essentially level and is very close to water. The geology of the study area is made up of late Pleistocene alluvial deposits. These geologic deposits date from about 2.5 million years ago to 11,700 years ago. Buried prehistoric archaeological sites are found in or beneath Holocene-age depositional landforms (Meyer and Rosenthal 2007). Based on the study area's geologic age, our analysis of the environmental setting, and incorporating King's (2004) analysis of soil sensitivity for buried sites, the probability of identifying a buried site is very low.

In keeping with the CEQA guidelines, if archaeological remains are uncovered, work at the place of discovery should be halted immediately until a qualified archaeologist can evaluate the finds (§15064.5 [f]). Prehistoric archaeological site indicators include: obsidian and chert flakes and chipped stone tools; grinding and mashing implements (e.g., slabs and handstones, and mortars and pestles); bedrock outcrops and boulders with mortar cups; and locally darkened midden soils. Midden soils may contain a combination of any of the previously listed items with the possible addition of bone and shell remains, and fire-affected stones. Historic period site indicators generally include: fragments of glass, ceramic, and metal objects; milled and split lumber; and structure and feature remains such as building foundations and discrete trash deposits (e.g., wells, privy pits, dumps).

The following actions are promulgated in the CEQA Guidelines Section 15064.5(d) and pertain to the discovery of human remains. If human remains are encountered, excavation or disturbance of the location must be halted in the vicinity of the find, and the county coroner contacted. If the coroner determines the remains are Native American, the coroner will contact the Native American Heritage Commission. The Native American Heritage Commission will identify the person or persons believed to be most likely descended from the deceased Native American. The most likely descendent makes recommendations regarding the treatment of the remains with appropriate dignity.

SUMMARY

Tom Origer & Associates conducted an historical resources survey of the property at 655 West Spain Street, Sonoma, Sonoma County, California. The study was requested and authorized by Rob Gjestland of the City of Sonoma. This study was conducted to meet the requirements of the City of Sonoma and those of the California Environmental Quality Act. The proposed project includes development of a 30-unit apartment community at 655 West Spain Street (the northerly 1.5 acre portion of APN 127-221-005). No historical resources were found within the study area and no resource-specific recommendations are warranted. Documentation pertaining to this study is on file at the offices of Tom Origer & Associates (File No. 2017-037S).

MATERIALS CONSULTED

Barrett, S.
1908 *The Ethno-Geography of the Pomo and Neighboring Indians*. University of California Publications in American Archaeology and Ethnology Vol. 6, No. 1:1-322. University of California Press, Berkeley.

Beard, V.
2005 *A Cultural Resources Survey for the Willow's Wild Planned Development, 310 Fifth Street West, Sonoma, Sonoma County, California.* Document S-30487 on file at the Northwest Information Center, Sonoma State University, Rohnert Park.

Bell and Heymans
1888 *Map of Sonoma County, California. Bell* and Heymans, San Francisco.

Bowers, A.
1867 *Map of Sonoma County, California.* 2nd ed. A. Bowers.

Byrd, B., A. Whitaker, and P. Mikkelsen
2016 *Caltrans District 4 Research Design and Treatment Plan for Native American Archaeological Resources in the San Francisco Bay-Delta Region.* On file at the Caltrans District 04 Office of Cultural Resource Studies, Oakland, California.

Chattan, C.
2009 *A Cultural Resources Evaluation of the Proposed Valley Oaks Homes Project Area on Sonoma Highway, Sonoma, Sonoma County, California (APNs 127-202-034 & 127-202-034).* Document S-37424 on file at the Northwest Information Center, Sonoma State University, Rohnert Park.

Chavez, D.
1987 *Cultural Resources Evaluation for the Infiltration and Inflow Relief Sewer Project for the Riverside Drive Area, Sonoma Valley Sewer County Sanitation District, Sonoma County.* Document S-9089 on file at the Northwest Information Center, Sonoma State University, Rohnert Park.

Cole, W. and D. Fredrickson
1980 *An Archaeological Survey of a Proposed Underground Storm Drain in Sonoma, Sonoma County, California.* Document S-2390 on file at the Northwest Information Center, Sonoma State University, Rohnert Park.

Corbett, M. and M. Dobkin
1993 *Sonoma Commons Project: Historical Architectural Evaluation of The Hansen Hatchery, 796 and 800 West Spain Street, Sonoma, California.* Document S-44559 on file at the Northwest Information Center, Sonoma State University, Rohnert Park.

Dawson, A.
2013 *Letter report on the Survey and Evaluation for 840 West Napa Street 9APN 127-211-009-000).* Document S-44607 on file at the Northwest Information Center, Sonoma State University, Rohnert Park.

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1976 *California Inventory of Historical Resources*. State of California, Sacramento.

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Evans, S.
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1876 *Plat of the Pueblo lands of Sonoma Grant.* Department of the Interior, Washington, D.C.

Gerike, C. and D. Fredrickson
1982 *An Archaeological Study for the Verano Avenue and Fifth Street West Reconstruction Project (56017), Sonoma County, California (Job #3142).* Document S-4987 on file at the Northwest Information Center, Sonoma State University, Rohnert Park.

Hoover, M., H. Rensch, E. Rensch, and W. Abeloe
1966 *Historic Spots in California.* 3rd edition. Stanford University Press, Stanford.

Hoover, M., H. Rensch, E. Rensch, W. Abeloe, and D. Kyle
1990 *Historic Spots in California.* 4th edition. Stanford University Press, Stanford.

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Kelly, I.
1978 Coast Miwok. In *California*, edited by R. Heizer, pp. 414-425. Handbook of North American Indians, Vol. 8, W. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

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1939 *Pomo Geography.* University of California Publications in American Archaeology and Ethnology, Vol. 36. Berkeley.

Konzak, M.
2011 *Letter report regarding the Subsurface Cultural Resources Survey report for the Valley Oaks Homes Project.* Document S-38811 on file at the Northwest Information Center, Sonoma State University, Rohnert Park.

Kroeber, A.
1925 *Handbook of the Indians of California.* Bureau of American Ethnology, Bulletin 78, Smithsonian Institution, Washington, D.C.

McIntire and Lewis
1908 *Official Map of the County of Sonoma, California.* County of Sonoma, Santa Rosa.

Meyer, J., P. Kaijankoski, and J. Rosenthal
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Meyer, J. and J. Rosenthal
2007 *Geoarchaeological Overview of the Nine Bay Area Counties in Caltrans District 4.* Document S-33600 on file at the Northwest Information Center, Sonoma State University, Rohnert Park.

Miller, V.
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1984 *California Archaeology.* Academic Press, San Francisco.

Office of Historic Preservation
1995 *Instructions for Recording Historical Resources.* California Office of Historic Preservation, Sacramento.

2012 *Historic Property Directory*. Office of Historic Preservation, Sacramento.

Origer, T.
1991 *A Cultural Resources Study for the Sonoma Affordable Housing Site at 820 West Spain Street, City of Sonoma, Sonoma County.* Document S-13231 on file at the Northwest Information Center, Sonoma State University, Rohnert Park.

Painter, D.
2015 *Sonoma League for Historic Preservation Survey Update (Sonoma Valley Survey Update), Sonoma County, California.* Document S-46942 on file at the Northwest Information Center, Sonoma State University, Rohnert Park.

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2017 Property Information for APN 127-221-005. http://www.parcelquest.com/ Date Accessed 3/29/17

Peugh, E.A.
1934 *Map of Sonoma County, California.* E.A. Peugh, Santa Rosa.

Reynolds, W. and T. Proctor
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Stillinger, R. and D. Fredrickson
1981 *An Archaeological Survey of the proposed Village Green, Phase II, Sonoma, California.* Document S-2672 on file at the Northwest information Center, Sonoma State University, Rohnert Park.

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Whatford, C. and D. Fredrickson
1993 *An Archaeological Study of 400 West Spain Street, Sonoma, Sonoma County, California.* Document S-15359 on file at the Northwest Information Center, Sonoma State University, Rohnert Park.

Wilbur, R. and D. Fredrickson
1986 *An Archaeological Investigation of the Senior Housing Project (Lot 2-City of Sonoma) at the intersection of Seventh Street West and Oregon Street, Sonoma, California.* Document S-8761 on file at the Northwest Information Center, Sonoma State University, Rohnert Park.

Appendix A

Native American Contact

Copies of Correspondence

Native American Contact Efforts
655 West Spain Street, Sonoma, Sonoma County

Organization	Contact	Action	Results
Native American Heritage Commission		Email 3/30/17	A response was received via email on 4/11/17 stating that a search of the Sacred Lands File resulted in a negative findings. A list of additional contacts was provided.
Federated Indians of Graton Rancheria	Gene Buvelot Buffy McQuillen Peter Nelson Greg Sarris	Letter 3/31/17	Buffy McQuillen, the THPO representing the Federated Indians of Graton Rancheria, responded on 4/10/17 via email. In her email, she stated that the tribe would be reviewing the project and would respond within 10 business days.
Kashia Band of Pomo Indians of the Stewarts Point	Reno Franklin	Letter 4/17/17	No response received as of the date of this report
Lytton Band of Pomo Indians	Marjorie Mejia	Letter 4/17/17	No response received as of the date of this report.
Mishewal-Wappo Tribe of Alexander Valley	Scott Gabaldon	Letter 3/31/17	No response received as of the date of this report.

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710
(916) 373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: 655 West Spain St.
County: Sonoma

USGS Quadrangles
Name: Sonoma
Township T5N Range R6W Section(s) N/A MDBM (within the Pueblo Lands of Sonoma)

Date: March 30, 2017
Company/Firm/Agency: Tom Origer & Associates
Contact Person: Julia Franco

Address: P.O. Box 1531
City: Rohnert Park Zip: 94927
Phone: (707) 584-8200 Fax: (707) 584-8300
Email: julia@origer.com

Project Description: We are conducting a cultural resources study of approximately 1.5-acres of land in Sonoma.

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710
Fax (916) 373-5471

April 11, 2017

Julia Franco
Tom Origer & Associates

Sent by Email: Julia@origer.com
Number of Pages: 2

RE: 655 West Spain Street, Sonoma, Sonoma County

Dear Ms. Franco:

A record search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed for the area of potential project effect (APE) referenced above with negative results. **Please note that the absence of specific site information in the *Sacred Lands File* does not indicate the absence of Native American cultural resources in any APE.**

I suggest you contact all of those listed, if they cannot supply information, they might recommend others with specific knowledge. The list should provide a starting place to locate areas of potential adverse impact within the APE. **By contacting all those on the list, your organization will be better able to respond to claims of failure to consult.** If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact via email: Sharaya.souza@nahc.ca.gov.

Sincerely,

Sharaya Souza
Staff Services Analyst

Native American Heritage Commission
Native American Contacts
4/11/2017

Federated Indians of Graton Rancheria
Greg Sarris, Chairperson
6400 Redwood Drive, Ste 300 Coast Miwok
Rohnert Park , CA 94928 Southern Pomo
(707) 566-2288 Office
(707) 566-2291 Fax

Federated Indians of Graton Rancheria
Gene Buvelot
6400 Redwood Drive, Ste 300 Coast Miwok
Rohnert Park , CA 94928 Southern Pomo
gbuvelot@gratonrancheria.
(415) 279-4844 Cell
(707) 566-2288 ext 103

Kashia Band of Pomo Indians of the Stewarts Point
Reno Keoni Franklin, Chairperson
1420 Guerneville Rd. Ste 1 Pomo
Santa Rosa , CA 95403
reno@stewartspoint.org
(707) 591-0580 Office

(707) 591-0583 Fax

Lytton Rancheria of California
Marjorie Mejia, Chairperson
437Aviation Blvd Pomo
Santa Rosa , CA 95403
margiemejia@aol.com
(707) 575-5917
(707) 575-6974 - Fax

Mishewal-Wappo Tribe of Alexander Valley
Scott Gabaldon, Chairperson
2275 Silk Road Wappo
Windsor , CA 95492
scottg@mishewalwappotribe.com
(707) 494-9159

This list is current only as of the date of this document and is based on the information available to the Commission on the date it was produced.

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 assessments for the updated contact list for 655 West Spain Street, Sonoma, Sonoma County.

Tom Origer & Associates
Archaeology / Historical Research

March 31, 2017

Gene Buvelot
Federated Indians of Graton Rancheria
6400 Redwood Drive, Suite 300
Rohnert Park, CA 94928

Re: Oliva Apartment Community, Sonoma, Sonoma County.

Dear Mr. Buvelot:

I write to notify you of a proposed project within Sonoma County, for which our firm is conducting an historical resources study. This letter does not constitute formal consultation. We are conducting a survey of 1.5 acres for the Oliva Apartment Community project in Sonoma. The City of Sonoma is reviewing the project for CEQA compliance.

Enclosed is a portion of the Sonoma, Calif. 7.5' USGS topographic quadrangle showing the project location.

Sincerely,

Julia Franco
Associate

P.O. Box 1531, Rohnert Park, California 94927 ♦ www.origer.com Phone (707) 584-8200

Tom Origer & Associates
Archaeology / Historical Research

March 31, 2017

Buffy McQuillen
Federated Indians of Graton Rancheria
6400 Redwood Drive, Suite 300
Rohnert Park, CA 94928

Re: Oliva Apartment Community, Sonoma, Sonoma County.

Dear Ms. McQuillen:

I write to notify you of a proposed project within Sonoma County, for which our firm is conducting an historical resources study. This letter does not constitute formal consultation. We are conducting a survey of 1.5 acres for the Oliva Apartment Community project in Sonoma. The City of Sonoma is reviewing the project for CEQA compliance.

Enclosed is a portion of the Sonoma, Calif. 7.5' USGS topographic quadrangle showing the project location.

Sincerely,

Julia Franco
Associate

P.O. Box 1531, Rohnert Park, California 94927 ♦ www.origer.com Phone (707) 584-8200

Tom Origer & Associates
Archaeology / Historical Research

March 31, 2017

Peter Nelson
Federated Indians of Graton Rancheria
6400 Redwood Drive, Suite 300
Rohnert Park, CA 94928

Re: Oliva Apartment Community, Sonoma, Sonoma County.

Dear Mr. Nelson:

I write to notify you of a proposed project within Sonoma County, for which our firm is conducting an historical resources study. This letter does not constitute formal consultation. We are conducting a survey of 1.5 acres for the Oliva Apartment Community project in Sonoma. The City of Sonoma is reviewing the project for CEQA compliance.

Enclosed is a portion of the Sonoma, Calif. 7.5' USGS topographic quadrangle showing the project location.

Sincerely,

Julia Franco
Associate

P.O. Box 1531, Rohnert Park, California 94927 ♦ www.origer.com Phone (707) 584-8200

Tom Origer & Associates
Archaeology / Historical Research

March 31, 2017

Greg Sarris
Federated Indians of Graton Rancheria
6400 Redwood Drive, Suite 300
Rohnert Park, CA 94928

Re: Oliva Apartment Community, Sonoma, Sonoma County.

Dear Mr. Sarris:

I write to notify you of a proposed project within Sonoma County, for which our firm is conducting an historical resources study. This letter does not constitute formal consultation. We are conducting a survey of 1.5 acres for the Oliva Apartment Community project in Sonoma. The City of Sonoma is reviewing the project for CEQA compliance.

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Sincerely,

Julia Franco
Associate

P.O. Box 1531, Rohnert Park, California 94927 ♦ www.origer.com Phone (707) 584-8200

Tom Origer & Associates
Archaeology / Historical Research

April 17, 2017

Reno Franklin
Kashia Band of Pomo Indians of the Stewarts Point
1420 Guerneville Road, Suite 1
Santa Rosa, CA 95403

Re: Oliva Apartment Community, Sonoma, Sonoma County.

Dear Mr. Franklin:

I write to notify you of a proposed project within Sonoma County, for which our firm is conducting an historical resources study. This letter does not constitute formal consultation. We are conducting a survey of 1.5 acres for the Oliva Apartment Community project in Sonoma. The City of Sonoma is reviewing the project for CEQA compliance.

Enclosed is a portion of the Sonoma, Calif. 7.5' USGS topographic quadrangle showing the project location.

Sincerely,

Taylor Alshuth
Associate

P.O. Box 1531, Rohnert Park, California 94927 ♦ www.origer.com Phone (707) 584-8200

Tom Origer & Associates
Archaeology / Historical Research

April 17, 2017

Marjorie Mejia
Lytton Rancheria of California
437 Aviation Blvd
Santa Rosa, CA 95403

Re: Oliva Apartment Community, Sonoma, Sonoma County.

Dear Ms. Mejia:

I write to notify you of a proposed project within Sonoma County, for which our firm is conducting an historical resources study. This letter does not constitute formal consultation. We are conducting a survey of 1.5 acres for the Oliva Apartment Community project in Sonoma. The City of Sonoma is reviewing the project for CEQA compliance.

Enclosed is a portion of the Sonoma, Calif. 7.5' USGS topographic quadrangle showing the project location.

Sincerely,

Taylor Alshuth
Associate

P.O. Box 1531, Rohnert Park, California 94927 ♦ www.origer.com Phone (707) 584-8200

Tom Origer & Associates
Archaeology / Historical Research

March 31, 2017

Scott Gabaldon
Mishewal-Wappo Tribe of Alexander Valley
2275 Silk Road
Windsor, CA 95492

Re: Oliva Apartment Community, Sonoma, Sonoma County.

Dear Mr. Gabaldon:

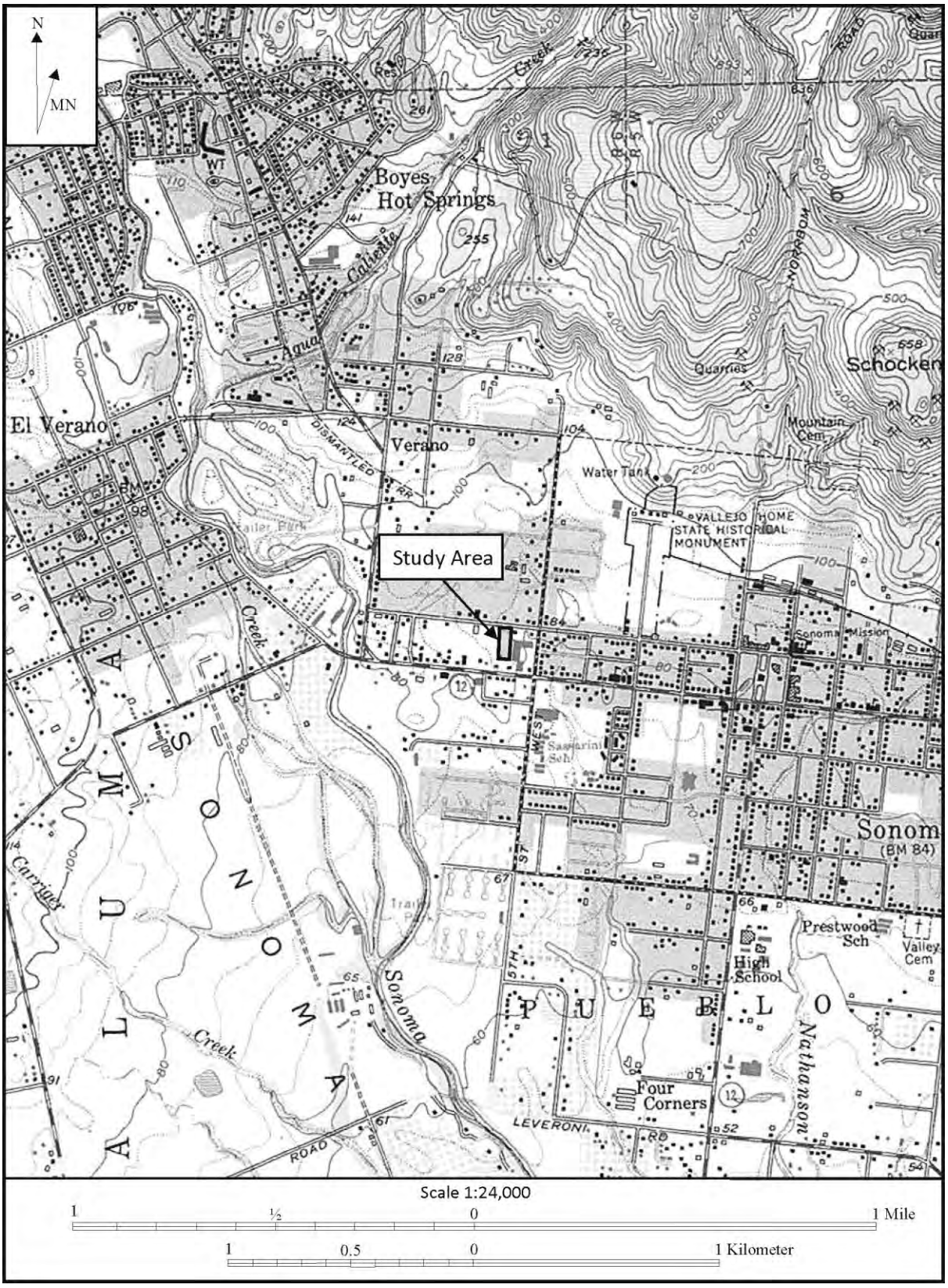
I write to notify you of a proposed project within Sonoma County, for which our firm is conducting an historical resources study. This letter does not constitute formal consultation. We are conducting a survey of 1.5 acres for the Oliva Apartment Community project in Sonoma. The City of Sonoma is reviewing the project for CEQA compliance.

Enclosed is a portion of the Sonoma, Calif. 7.5' USGS topographic quadrangle showing the project location.

Sincerely,

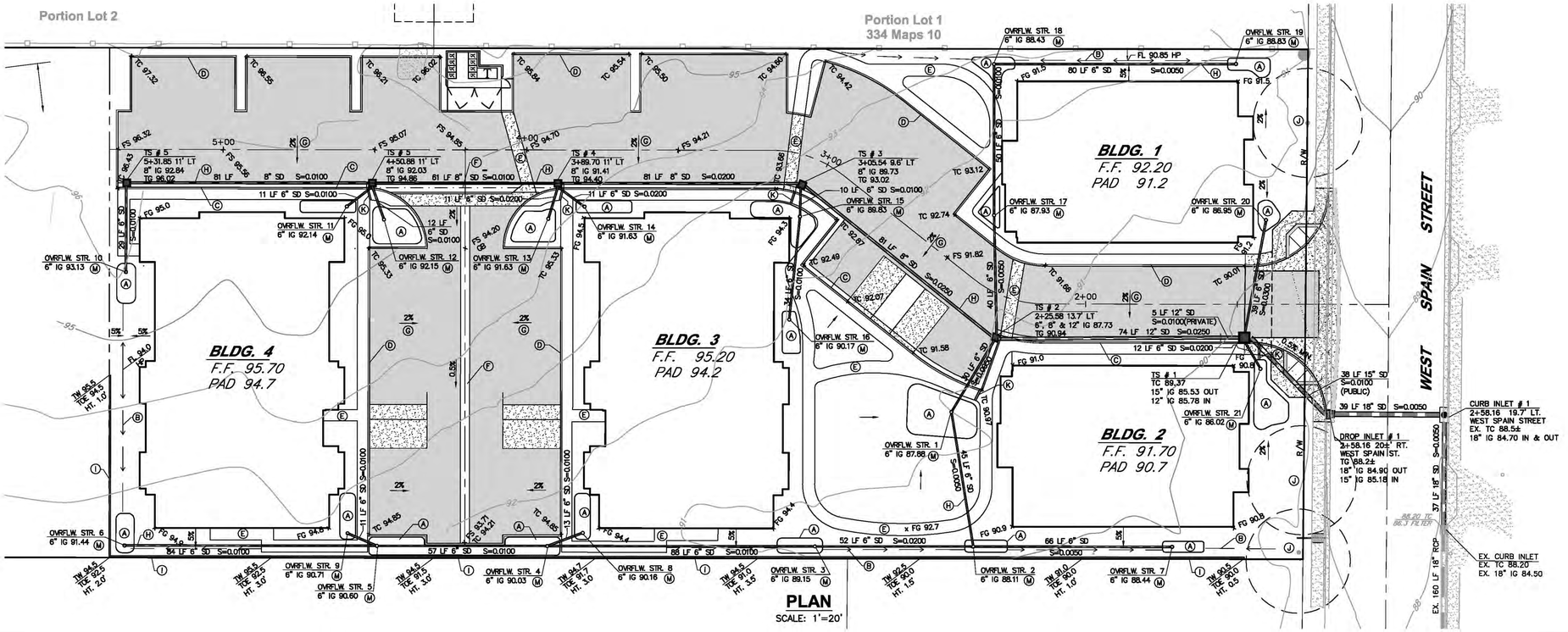
Julia Franco
Associate

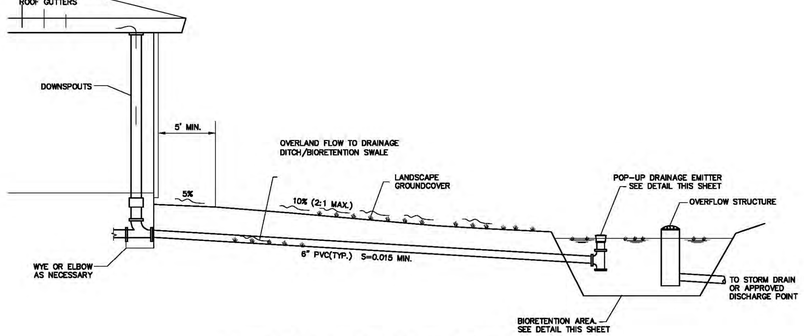
P.O. Box 1531, Rohnert Park, California 94927 ♦ www.origer.com Phone (707) 584-8200


N
MN
Study Area
Boyes Hot Springs
El Verano
Verano
Water Tank
VALLEJO HOME STATE HISTORICAL MONUMENT
Quarries
Schocken
Mountain Cem
Sonoma Mission
Sonom
(BM 84)
Prestwood Sch
Valley Cem
High School
Four Corners
LEVERONI RD
Nathanson
Sonoma
Creek
Carriger
ROAD
PUEBLO
Scale 1:24,000
1 ½ 0 1 Mile
1 0.5 0 1 Kilometer

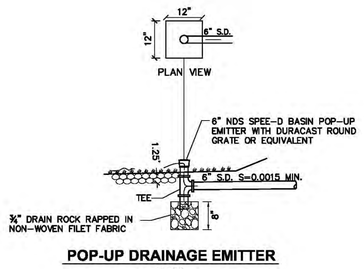
ATTACHMENT 4

PRELIMINARY GRADING AND DRAINAGE PLAN AND STORM WATER CONTROL PLAN





DOWN SPOUT AND STORM DRAIN DETAIL
N.T.S.



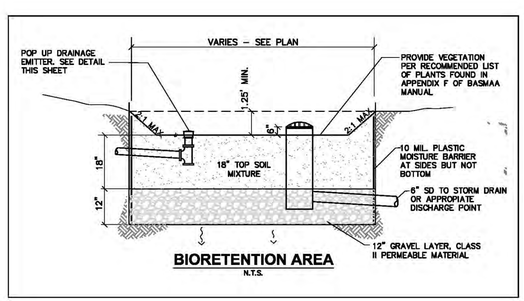
POP-UP DRAINAGE EMITTER
(N.T.S.)

KEYNOTES

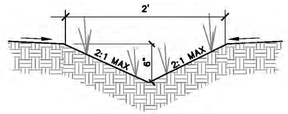
- (A) BIORETENTION AREA. SEE DETAIL THIS SHEET.
- (B) 2' WIDE DRAINAGE SWALE. SEE DETAIL THIS SHEET
- (C) CURB, GUTTER AND MONOLITHIC SIDEWALK PER CITY OF SONOMA STANDARD PLAN NO. 110.
- (D) VERTICAL CURB. SEE DETAIL THIS SHEET.
- (E) 4' WIDE WALKWAY – CONCRETE OR APPROVED EQUIVALENT.
- (F) 3' WIDE CONCRETE VALLEY GUTTER. SEE DETAIL THIS SHEET.
- (G) ASPHALT PAVEMENT SECTION: 3" AC OVER 11" CLASS 2 AB (R VALUE=5, TI=5 FOR DRIVEWAY ACCESS AND COURTS)
- (H) STORM DRAIN OUTSIDE OF CITY RIGHT OF WAY SHALL BE SDR-35 PVC OR ADS N-12, OR APPROVED EQUAL.
- (I) RETAINING WALL. SEE STRUCTURAL PLANS.
- (J) TREE TO BE SAVED AND PROTECTED. SEE ARBORIST REPORT.
- (K) CURB OPENING AND UNDER SIDEWALK DRAIN (FLOW FROM FACE OF CURB TO BACK OF SIDEWALK). SEE DETAIL SHEET C-2.
- (L) TURNING STRUCTURE SHALL BE PER OLDCASTLE PRECAST DRAINAGE INLET DI-1818 WITH GALVANIZED CHECKER COVER PLATE OR EQUIVALENT).
- (M) OVERFLOW STRUCTURE SHALL ADS NYOPLAST 12" ROUND DRAIN INLET WITH GRATED DOME COVER OR EQUIVALENT.

LEGEND

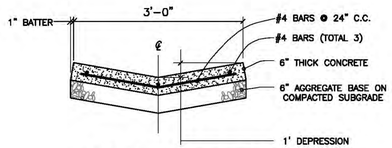
EXISTING	PROPOSED	
		CENTERLINE
+13.0	x 13.50	SPOT ELEVATION
30		CONTOUR
-o-o-x-		WOOD/CHAIN LINK/BARBED WIRE FENCE
		PROPERTY LINE/RW
		EASEMENT LINE
		CONCRETE
		CURB & GUTTER
		ASPHALT CONCRETE
		CURB INLET
		DROP INLET/STORM DRAIN
		BIORETENTION AREA (BMA)
		SURFACE FLOW
	#2	TREE DRIPLINE & TREE NO.



BIORETENTION AREA
N.T.S.

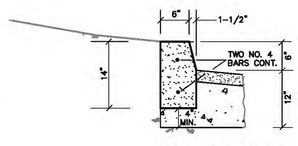


DRAINAGE DITCH
N.T.S.



NOTE: ASPHALT CONCRETE SHALL BE HELD 1/4" HIGH AT EDGE OF CONCRETE.

CONCRETE VALLEY GUTTER
N.T.S.

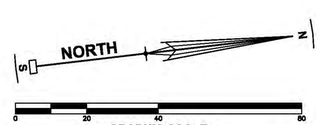


VERTICAL CURB
N.T.S.

ABBREVIATIONS

AB	AGGREGATE BASE	PVC	POLYVINYL CHLORIDE
AC	ASPHALTIC CONCRETE	RT	RIGHT
BRA	BIORETENTION AREA	RCP	REINFORCED CONCRETE PIPE
DMA	DRAINAGE MAINTENANCE AREA	S	SLOPE
EP	EDGE OF PAVEMENT	SCWA	SONOMA COUNTY WATER AGENCY
F.F.	FINISH FLOOR	SD	STORM DRAIN
FG	FINISH GRADE	SF	SQUARE FEET
FS	FINISH SURFACE	STR.	STRUCTURE
HT.	HEIGHT	TC	TOP OF CURB
IG	INVERT GRADE	TG	TOP OF GRATE
LT	LEFT	TS	TOP OF SURFACE
NTS	NOT TO SCALE	TW	TOP OF WALL
OVRFLW	OVERFLOW		

A GEOTECHNICAL REPORT HAS BEEN PREPARED FOR THIS PROJECT BY STEVENS, FERRONE & BAILEY, PROJECT No. 155-80 AND DATED JUNE 28, 2016. THE GEOTECHNICAL RECOMMENDATIONS CONTAINED IN THE GEOTECHNICAL REPORT, LETTER & MEMO ARE BY REFERENCE INCORPORATED IN THESE PLANS.



GRAPHIC SCALE

REGISTERED PROFESSIONAL ENGINEER
STEVEN J. LAFRANCHI
No. 49302
CIVIL
STATE OF CALIFORNIA

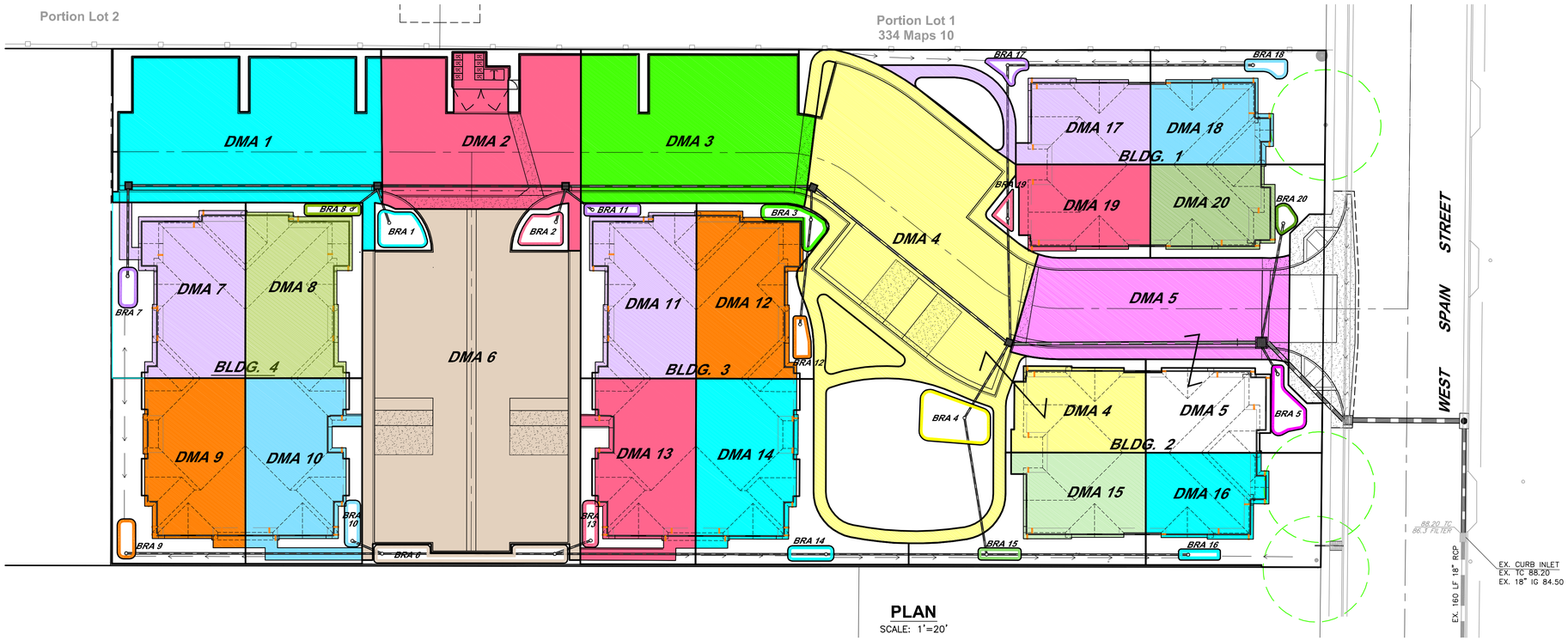
REVISIONS	BY

GRADING AND DRAINAGE PLAN

LANDS OF NORRBOM
590 WEST NAPA STREET APN 127-221-005
SONOMA CALIFORNIA

STEVEN J. LAFRANCHI & ASSOCIATES, INC.
CIVIL ENGINEERS - LAND SURVEYORS - LAND PLANNERS
PETALUMA THEATRE SQUARE
140 SECOND STREET, SUITE 312
PETALUMA, CALIFORNIA 94952
(707) 762-5152 FAX (707) 762-3239

DATE:	2017.03.15
SCALE:	1"=10'
DESIGN:	SJL, RRB
DRAWN:	RRB
CHECK:	SJL
JOB:	DENOVA-Oliva
JOB No:	161870
SHEET	C-1
OF	2 SHEETS



PLAN
SCALE: 1'=20'

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 1		
Roof	0	Roof	1.0	0.0			
Landscape	461	Landscape	0.1	46.1		Minimum Facility Area	Proposed Facility Area
Pavement	3,955	AC	1.0	3,955.0	Sizing Factor		
Total				4,001.1	0.04	160.0	168

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 2		
Roof	0	Roof	1.0	0.0			
Landscape	239	Landscape	0.1	23.9		Minimum Facility Area	Proposed Facility Area
Pavement	3,169	AC	1.0	3,169.0	Sizing Factor		
Total				3,192.9	0.04	127.7	135

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 3		
Roof	0	Roof	1.0	0.0			
Landscape	163	Landscape	0.1	16.3		Minimum Facility Area	Proposed Facility Area
Pavement	3,495	AC	1.0	3,495.0	Sizing Factor		
Total				3,511.3	0.04	140.5	147

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 4		
Roof	1,171	Roof	1.0	1,171.0			
Landscape	3,135	Landscape	0.1	313.5		Minimum Facility Area	Proposed Facility Area
Pavement	6,523	AC	1.0	6,523.0	Sizing Factor		
Total				8,007.5	0.04	320.3	327

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 5		
Roof	0	Roof	1.0	0.0			
Landscape	523	Landscape	0.1	52.3		Minimum Facility Area	Proposed Facility Area
Pavement	3,935	AC	1.0	3,935.0	Sizing Factor		
Total				3,987.3	0.04	159.5	167

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 6		
Roof	0	Roof	1.0	0.0			
Landscape	682	Landscape	0.1	68.2		Minimum Facility Area	Proposed Facility Area
Pavement	7,290	AC/Conc	1.0	7,290.0	Sizing Factor		
Total				7,358.2	0.04	294.3	295

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 7		
Roof	1,791	Roof	1.0	1,791.0			
Landscape	682	Landscape	0.1	68.2		Minimum Facility Area	Proposed Facility Area
Pavement	0	AC/Conc.	1.0	0.0	Sizing Factor		
Total				1,859.2	0.04	74.4	78

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 8		
Roof	1,697	Roof	1.0	1,697.0			
Landscape	474	Landscape	0.1	47.4		Minimum Facility Area	Proposed Facility Area
Pavement	0	AC/Conc.	1.0	0.0	Sizing Factor		
Total				1,744.4	0.04	69.8	71

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 9		
Roof	1,720	Roof	1.0	1,720.0			
Landscape	892	Landscape	0.1	89.2		Minimum Facility Area	Proposed Facility Area
Pavement	0	AC/Conc.	1.0	0.0	Sizing Factor		
Total				1,809.2	0.04	72.4	74

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 10		
Roof	1,826	Roof	1.0	1,826.0			
Landscape	465	Landscape	0.1	46.5		Minimum Facility Area	Proposed Facility Area
Pavement	0	AC/Conc.	1.0	0.0	Sizing Factor		
Total				1,872.5	0.04	74.9	77

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 11		
Roof	1,698	Roof	1.0	1,698.0			
Landscape	447	Landscape	0.1	44.7		Minimum Facility Area	Proposed Facility Area
Pavement	0	AC/Conc.	1.0	0.0	Sizing Factor		
Total				1,742.7	0.04	69.7	71

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 12		
Roof	1,705	Roof	1.0	1,705.0			
Landscape	423	Landscape	0.1	42.3		Minimum Facility Area	Proposed Facility Area
Pavement	0	AC/Conc.	1.0	0.0	Sizing Factor		
Total				1,747.3	0.04	69.9	74

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 13		
Roof	1,824	Roof	1.0	1,824.0			
Landscape	444	Landscape	0.1	44.4		Minimum Facility Area	Proposed Facility Area
Pavement	0	AC/Conc.	1.0	0.0	Sizing Factor		
Total				1,868.4	0.04	74.7	77

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 14		
Roof	1,719	Roof	1.0	1,719.0			
Landscape	891	Landscape	0.1	89.1		Minimum Facility Area	Proposed Facility Area
Pavement	0	AC/Conc.	1.0	0.0	Sizing Factor		
Total				1,808.1	0.04	72.3	73

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 15		
Roof	1,123	Roof	1.0	1,123.0			
Landscape	831	Landscape	0.1	83.1		Minimum Facility Area	Proposed Facility Area
Pavement	0	AC/Conc.	1.0	0.0	Sizing Factor		
Total				1,206.1	0.04	48.2	55

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 16		
Roof	1,034	Roof	1.0	1,034.0			
Landscape	1,063	Landscape	0.1	106.3		Minimum Facility Area	Proposed Facility Area
Pavement	0	AC	1.0	0.0	Sizing Factor		
Total				1,140.3	0.04	45.6	48

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 17		
Roof	1,123	Roof	1.0	1,123.0			
Landscape	1,197	Landscape	0.1	119.7		Minimum Facility Area	Proposed Facility Area
Pavement	250	AC/Conc.	1.0	250.0	Sizing Factor		
Total				1,492.7	0.04	59.7	71

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 18		
Roof	1,034	Roof	1.0	1,034.0			
Landscape	1,083	Landscape	0.1	108.3		Minimum Facility Area	Proposed Facility Area
Pavement	0	AC/Conc.	1.0	0.0	Sizing Factor		
Total				1,142.3	0.04	45.7	66

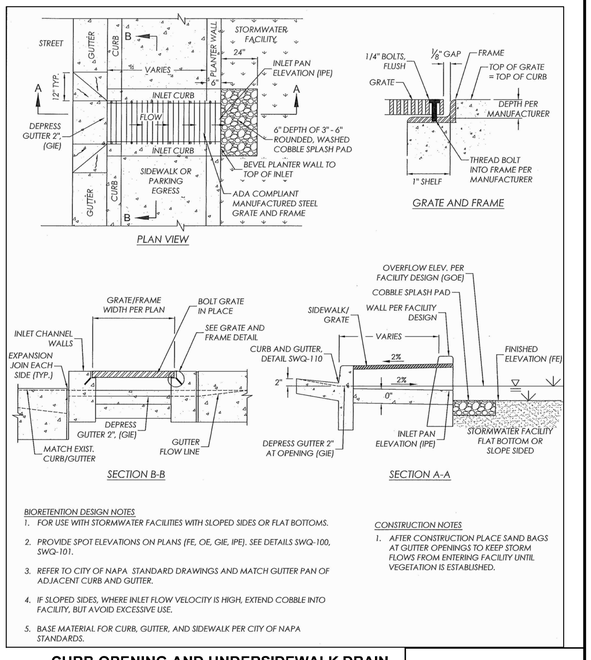
DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 19		
Roof	1,171	Roof	1.0	1,171.0			
Landscape	246	Landscape	0.1	24.6		Minimum Facility Area	Proposed Facility Area
Pavement	0	AC/Conc.	1.0	0.0	Sizing Factor		
Total				1,195.6	0.04	47.8	53

DMA Name	DMA Area (s.f.)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					DMA 20		
Roof	1,078	Roof	1.0	1,078.0			
Landscape	502	Landscape	0.1	50.2		Minimum Facility Area	Proposed Facility Area
Pavement	0	AC/Conc.	1.0	0.0	Sizing Factor		
Total				1,128.2	0.04	45.1	56

ABBREVIATION:

DMA *DRAINAGE MAINTENANCE AREA*

BRA *BIORETENTION AREA*



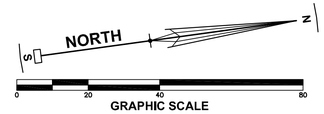
BIORETENTION DESIGN NOTES

1. *FOR USE WITH STORMWATER FACILITIES WITH SLOPED SIDES OR FLAT BOTTOMS.*
2. *PROVIDE SPOT ELEVATIONS ON PLANS (FE, OE, GIE, IPE). SEE DETAILS SWQ-100, SWQ-101.*
3. *REFER TO CITY OF NAPA STANDARD DRAWINGS AND MATCH GUTTER PAN OF ADJACENT CURB AND GUTTER.*
4. *IF SLOPED SIDES, WHERE INLET FLOW VELOCITY IS HIGH, EXTEND COBBLE INTO FACILITY, BUT AVOID EXCESSIVE USE.*
5. *BASE MATERIAL FOR CURB, GUTTER, AND SIDEWALK PER CITY OF NAPA STANDARDS.*

CONSTRUCTION NOTES

1. *AFTER CONSTRUCTION PLACE SAND BAGS AT GUTTER OPENINGS TO KEEP STORM FLOWS FROM ENTERING FACILITY UNTIL VEGETATION IS ESTABLISHED.*

CURB OPENING AND UNDERSIDEWALK DRAIN
N.T.S.



REGISTERED PROFESSIONAL ENGINEER
STEVEN J. LAFRANCHI
No. 49302
CIVIL
STATE OF CALIFORNIA

REVISIONS	BY

BASMAA LID PLAN

LANDS OF NORRBOM
590 WEST NAPA STREET APN 127-221-005
SONOMA CALIFORNIA

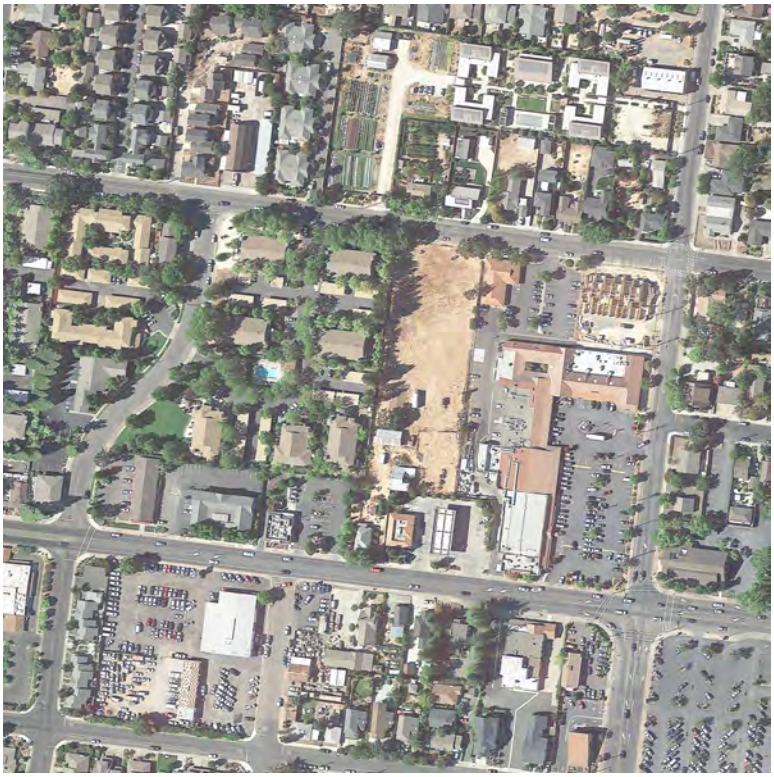
STEVEN J. LAFRANCHI & ASSOCIATES, INC.
CIVIL ENGINEERS - LAND SURVEYORS - LAND PLANNERS
PETALUMA THEATRE SQUARE
140 SECOND STREET, SUITE 312
PETALUMA, CALIFORNIA 94952
(707) 762-3122 * FAX (707) 762-2339

DATE:	2017.03.15
SCALE:	1"=10'
DESIGN:	SJL, RRB
DRAWN:	RRB
CHECK:	SJL
JOB:	DENOVA-Oliva
JOB No:	161870
SHEET	C-2
OF	2 SHEETS

ATTACHMENT 5

TRAFFIC IMPACT STUDY

Traffic Impact Study for the Oliva-W. Spain Apartments



Prepared for the City of Sonoma

Submitted by
W-Trans

July 26, 2017

TRAFFIC ENGINEERING
TRANSPORTATION PLANNING
Balancing Functionality and Livability since 1995
w-trans.com

Table of Contents

Executive Summary

The proposed Oliva-West Spain Apartments project includes 30 apartment units to be located on a 1.52-acre portion of an existing, mostly-vacant 2.04-acre parcel at 655 West Spain Street bounded by West Spain Street to the north and West Napa Street to the south. The site is in the process of being subdivided into two parcels with the southern 0.52 acres to retain a single-family dwelling with a barn. The project would be expected to generate an average of 200 trips on a daily basis, including 15 during the morning peak hour and 19 during the p.m. peak hour.

Project impacts were evaluated at three intersections in the vicinity of the project site. At the study intersection of West Spain Street/Fifth Street West, there are planned improvements to replace the existing all-way stop-controls with either a traffic signal or roundabout. Operations with these improvements were included in the analysis for all scenarios.

Under existing conditions, all the study intersections with the exception of West Spain Street/Fifth Street West operate acceptably during both peak periods. While this intersection currently operates unacceptably at LOS E during the evening peak period, with either of the planned improvements it would be expected to operate at LOS C or better.

Under the Future Conditions for the year 2040, the intersections of West Spain Street/Fifth Street West and West Napa Street/Fifth Street West would operate at LOS F and LOS E, respectively, during the evening peak hour. With the planned improvements at the former to either install a signal or roundabout, the intersection would operate at LOS C or better. For the latter, it is recommended that the north leg be widened to install a southbound right-turn lane, which would require land acquisition from Sonoma Marketplace, and add a westbound right-turn overlap phase at the signal. With these recommended improvements, the intersection would operate at an acceptable LOS D.

Upon the addition of project trips to the existing and future scenarios, with and without the planned project at West Spain Street/Fifth Street West and recommended improvements at the intersection of West Napa Street/ Fifth Street West, the intersections would continue to operate at the same service levels. In order to mitigate the project's impacts at the two intersections, it is recommended that the project pay a proportional share of 5.2 percent of the project cost at West Spain Street/Fifth Street West and 0.4 percent of the improvements cost at West Napa Street/Fifth Street West.

Facilities for transit riders, bicyclists, and pedestrians are adequate. The collision rate at each of the study intersections was above the statewide average for similar facilities but it was noted that the City is currently preparing a systemic safety study that could address the trend of speed-related crashes.

Introduction

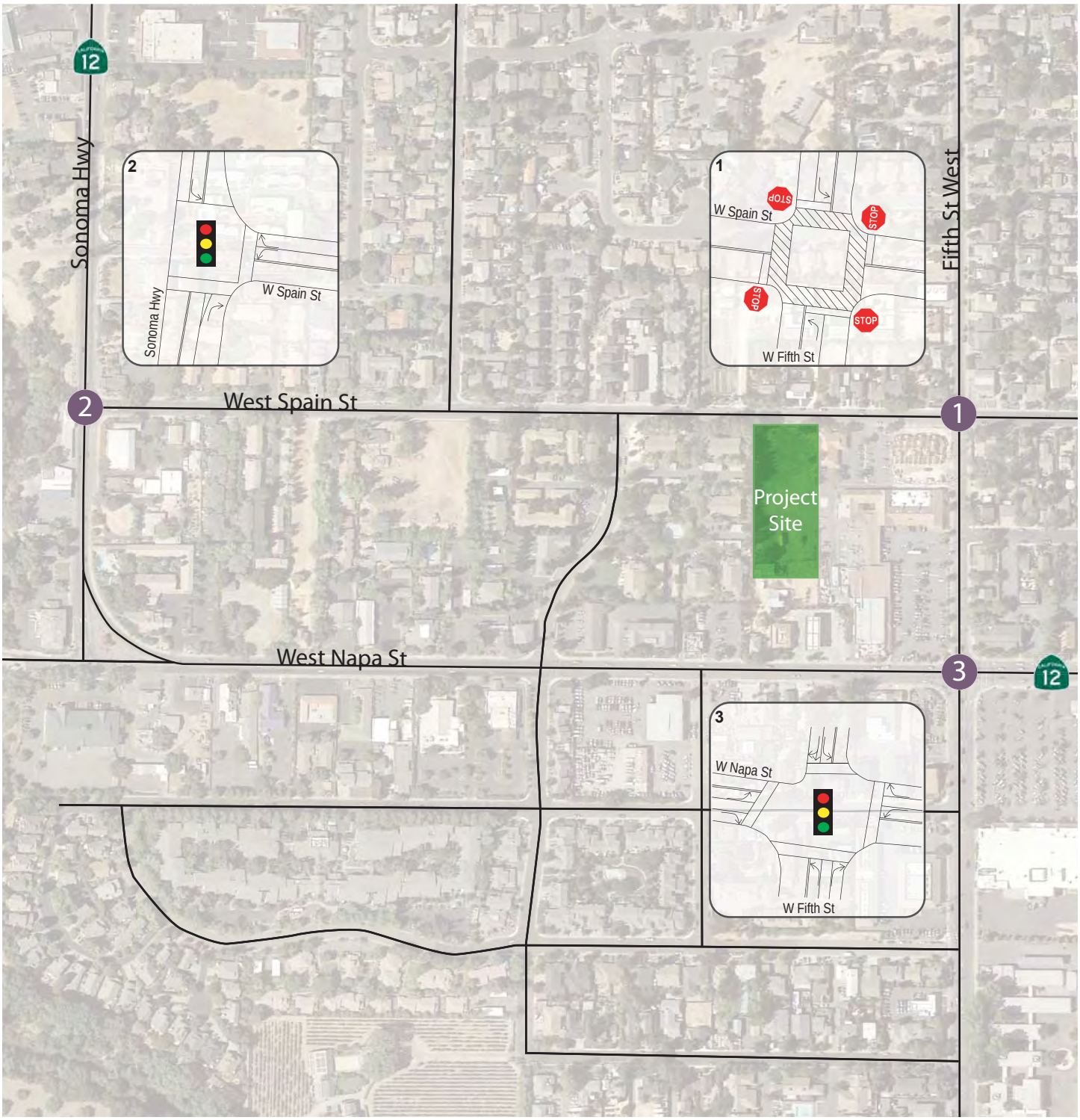
This report presents an analysis of the potential traffic impacts that would be associated with development of a proposed 30-unit apartment project to be located at 655 West Spain Street in the City of Sonoma. The traffic study was completed in accordance with the criteria established by the City of Sonoma, and is consistent with standard traffic engineering techniques.

Prelude

The purpose of a traffic impact study is to provide City staff and policy makers with data that they can use to make an informed decision regarding the potential traffic impacts of a proposed project, and any associated improvements that would be required in order to mitigate these impacts to a level of insignificance as defined by the City's General Plan or other policies. Vehicular traffic impacts are typically evaluated by determining the number of new trips that the proposed use would be expected to generate, distributing these trips to the surrounding street system based on existing travel patterns or anticipated travel patterns specific to the proposed project, then analyzing the impact the new traffic would be expected to have on critical intersections or roadway segments. Impacts relative to access for pedestrians, bicyclists, and to transit are also addressed.

Project Profile

The proposed project is a 30-unit apartment complex to be located on 1.52-acre portion of an existing, mostly-vacant 2.04-acre parcel at 655 West Spain Street that stretches between West Napa Street and West Spain Street. The parcel is in the process of being subdivided, with the owners retaining the 0.52 acres adjoining West Napa Street occupied by an existing single family home and a barn. The parcel has a General Plan land use designation of Mixed Use. The location of the project site is shown in Figure 1.



son052.ai 5/17

Traffic Impact Study for the Oliva-W. Spain Apartments

Figure 1 – Study Area & Lane Configurations

W-Trans

Transportation Setting

Operational Analysis

Study Area and Periods

The study area consists of the section of West Spain Street fronting the project site and the project access point as well as the following intersections:

1. West Spain Street/Fifth Street West
2. West Spain Street/Sonoma Highway
3. West Napa Street/Fifth Street West

Operating conditions during the a.m. and p.m. peak periods were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute.

Study Intersections

West Spain Street/Fifth Street West is a four-legged all-way stop-controlled intersection. Crosswalks exist on all four approaches.

West Spain Street/Sonoma Highway is a signalized tee intersection. Crosswalks with pedestrians phases are located on the south and east legs. The southbound left-turn movement is a protected left turn. There are no sidewalks along the western edge of the intersection and sidewalk gaps on the eastern side north and south of the intersection.

West Napa Street/Fifth Street West is a four-legged signalized intersection with protected-left turn phasing in the east-west direction on West Napa Street and split phasing in the north and south directions. There are crosswalks on each leg.

The locations of the study intersections and the existing lane configurations and controls are shown in Figure 1.

Study Roadway

West Spain Street runs along an east-west alignment and has one lane in each direction. This collector roadway has a posted speed limit of 30 mph. On-street parking is permitted near the project site. Continuous pedestrian facilities exist within the study area. There are no bicycle facilities on West Spain Street along the project site. Based on counts performed April 20, 2017, West Spain Street is carrying about 8,000 vehicles per day near the project site.

Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is January 1, 2012 through December 31, 2016.

As presented in Table 1, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2013 Collision Data on California State Highways*, California Department of Transportation (Caltrans). All three intersections had collision rates above the statewide averages for similar facilities. The collision rate calculations are provided in Appendix A.

Table 1 – Collision Rates at the Study Intersections

Study Intersection	Number of Collisions (2012-2016)	Calculated Collision Rate (c/mve)	Statewide Average Collision Rate (c/mve)
1. W Spain St/Fifth St W	8	0.29	0.21
2. W Spain St/Sonoma Hwy	12	0.34	0.21
3. W Napa St/Fifth St W	19	0.43	0.27

Note: c/mve = collisions per million vehicles entering

Though none of the collision rates are substantially above the statewide averages, the records were reviewed in greater detail to determine if any specific trends or patterns exist.

Of the eight crashes at West Spain Street/Fifth Street West, five were broadsides; this is a type of crash that is typically considered "preventable" by installing all-way stop controls. Increased enforcement, and in particular, enforcement of rules regarding right-of-way between vehicles turning left and those proceeding straight, may serve to reduce the number of such crashes at this location.

At West Spain Street/Sonoma Highway, six of the 12 crashes reported were rear-end collisions, and another was a sideswipe. All of these collisions involve drivers traveling in the same direction, and many had unsafe speed cited as the primary factor causing the crash. Increased enforcement of the speed limit may reduce the incidence of this type of collision.

Based on the collision records for the signalized intersection of West Napa Street/Fifth Street West, 12 of the 19 reported collisions were rear-end collisions due to unsafe speeds. While rear-end collisions are common at signalized intersections, increased enforcement is recommended at this location as well to address the types of crashes occurring.

Alternative Modes

Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. In general, a network of sidewalks, crosswalks, pedestrian signals, and curb ramps provide access for pedestrians in the vicinity of the proposed project site; however, sidewalk gaps can be found along some of the roadways connecting to the project site. Existing gaps and obstacles along the connecting roadways impact convenient and continuous access for pedestrians and present safety concerns in those locations where appropriate pedestrian infrastructure would address potential conflict points.

- **West Spain Street** – Along West Spain Street in the study area there is a continuous network of sidewalks. Curb ramps are located at approaches along the street and crosswalks at the controlled intersections. The posted speed is 30 mph. Lighting is provided by overhead streetlights.

- **Sonoma Highway (SR 12)** – There are no sidewalks along the west side of Sonoma Highway in the study area. Along the east side, there are significant gaps in the sidewalk where properties have not been developed recently. The posted speed in the study area is 30 mph. Lighting is provided by existing overhead streetlights.

- **Fifth Street West** – Sidewalks are located along most parcels with a gap on the west wide of the street north of West Spain Street. There are curb ramps at each of the minor street approaches. The posted speed in the study area is 25 mph and there is no on-street parking south of West Spain Street but to the north, on-street parking is intermittent. There is intermittent overhead lighting.

- **West Napa Street (SR 12)** – Continuous sidewalks are provided on both sides of the street starting east of the intersection with Sonoma Highway, with curb ramps at the minor approached. The posted speed on West Napa Street is 25 miles per hour.

Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2012, classifies bikeways into three categories:

- **Class I Multi-Use Path** – a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- **Class II Bike Lane** – a striped and signed lane for one-way bike travel on a street or highway.
- **Class III Bike Route** – signing only for shared use with motor vehicles within the same travel lane on a street or highway.

In the project area, Class II bike lanes exist on Fifth Street West south of West Napa Street to the southern City limits. Bicyclists ride in the roadway and on sidewalks along all other streets within the project study area. Table 2 summarizes the existing and planned bicycle facilities in the project vicinity, as contained in the *Sonoma Bicycle and Pedestrian Master Plan, 2014 Update*.

Table 2 – Bicycle Facility Summary

Status Facility	Class	Length (miles)	Begin Point	End Point
Existing				
Sonoma Bike Path	I	1.5	Sonoma Highway	Fourth Street East
Fifth Street W	II	0.7	South of Hwy 12	South City Limits
Planned				
Sonoma Hwy	II	0.7	North City Limits	West Napa St
W Napa St	II	1.0	Sonoma Hwy	Broadway
Seventh St	III	0.2	W Napa St	W Spain St

Source: *Sonoma Bicycle and Pedestrian Master Plan, 2014 Update*

Transit Facilities

Sonoma County Transit (SCT) provides fixed route bus service in Sonoma County. Locally, Route 32 loops through the Sonoma area, providing service as far north as Agua Caliente Road, through Boyes Hot Springs, Downtown Sonoma and south to Temelec. The headways on weekdays are about every 45 minutes starting as early as 7:45 am and going to 5:00 in the evening. On Saturdays, the service runs four to five times, depending on direction, with headways of an hour and 15 minutes.

Route 38, a commuter route, runs along Sonoma Highway as far north as Oakmont, through Boyes Hot Springs, Sonoma, and as far south as San Rafael. At the north end, the route starts at 5:45 am to arrive in San Rafael Transit Center at about 7:00 am. For the reverse route, the bus leaves San Rafael at 6:30 pm and arrives in Oakmont at about 7:50 pm.

Route 34 is also a commuter route that provides service from Santa Rosa to Sonoma. Starting from the transit Mall in Santa Rosa, the route starts at 6:45 a.m. and arrives at the Sonoma plaza just before 8:00 a.m. The reverse trip begins at 4:35 p.m. at the Sonoma Plaza and arrives at the Transit Mall at 5:45 p.m. Route 30 is similar to Route 34 but has more stops and headways of slightly more than an hour; this route runs on Saturdays as well.

Two bicycles can be carried on most SCT buses. Bike rack space is on a first come, first served basis. Additional bicycles are allowed on SCT buses at the discretion of the driver.

Paratransit is available for those who are unable to independently use the transit system due to a physical or mental disability. SCT Paratransit is designed to serve the needs of individuals with disabilities within the greater Sonoma County area.

Capacity Analysis

Intersection Level of Service Methodologies

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections were analyzed using methodologies published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 2010. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle.

The study intersection of West Spain Street/Fifth Street West, which has stop signs on all approaches, was analyzed using the "All-Way Stop-Controlled" methodology from the HCM. This methodology evaluates delay for each approach based on turning movements, opposing and conflicting traffic volumes, and the number of lanes. Average vehicle delay is computed for the intersection as a whole, and is then related to a Level of Service.

The study intersections that are currently controlled by a traffic signal, or may be in the future, were evaluated using the signalized methodology from the HCM. This methodology is based on factors including traffic volumes, green time for each movement, phasing, whether or not the signals are coordinated, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology. For purposes of this study, delays were calculated using optimized signal timing.

Intersections that are currently or are proposed to be controlled by modern roundabouts were evaluated using the FHWA Roundabout Method, also contained within the Unsignalized Methodology of the HCM. This methodology determines intersection operation using the gap acceptance method using basic geometric and volume data to calculate entering and circulating flows. This information is then translated to an overall average vehicle delay, with LOS break points at the same delays as used in the sign controlled methodology. Because the HCM roundabout methodology is relatively unsophisticated, the much more advanced SIDRA roundabout analysis software was utilized in any cases where the basic HCM methodology predicts operation worse than LOS B.

The ranges of delay associated with the various levels of service are indicated in Table 3.

Table 3 – Intersection Level of Service Criteria		
LOS	**All-Way Stop-Controlled***	**Signalized**
A	Delay of 0 to 10 seconds. Upon stopping, drivers are immediately able to proceed.	Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all.
B	Delay of 10 to 15 seconds. Drivers may wait for one or two vehicles to clear the intersection before proceeding from a stop.	Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop.
C	Delay of 15 to 25 seconds. Drivers will enter a queue of one or two vehicles on the same approach, and wait for vehicle to clear from one or more approaches prior to entering the intersection.	Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.
D	Delay of 25 to 35 seconds. Queues of more than two vehicles are encountered on one or more approaches.	Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop.
E	Delay of 35 to 50 seconds. Longer queues are encountered on more than one approach to the intersection.	Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.
F	Delay of more than 50 seconds. Drivers enter long queues on all approaches.	Delay of more than 80 seconds. Vehicles may wait through more than one cycle to clear the intersection.

Note: * Ranges indicated for sign control also apply to roundabout-controlled intersections
Reference: *Highway Capacity Manual*, Transportation Research Board, 2010

Traffic Operation Standards

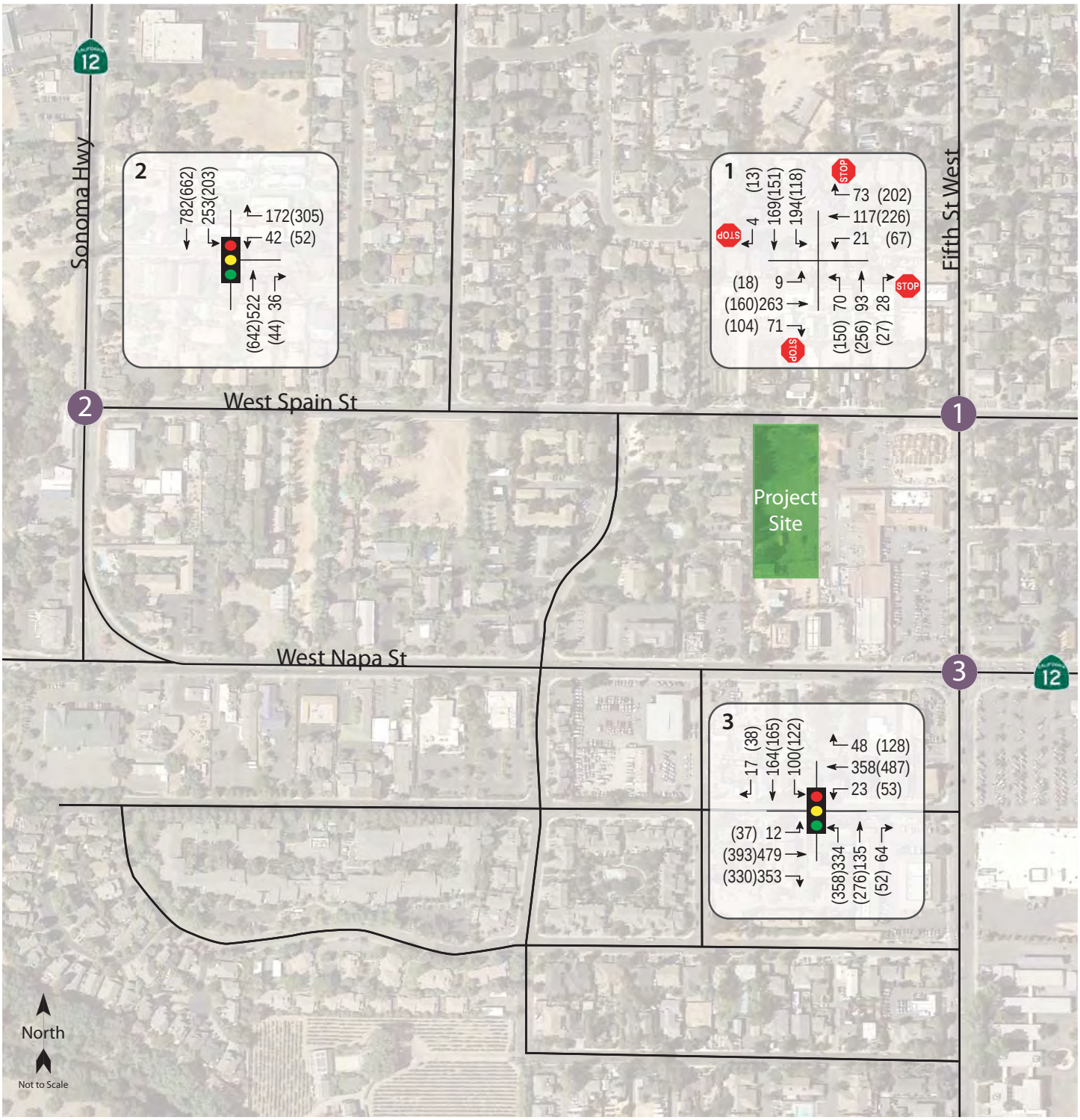
The City of Sonoma adopted their operational policy in the 2016 Circulation Element Update to their General Plan. Per Policy 1.5: Establish a motor vehicle Level of Service (LOS) standard of LOS D at intersections. The following shall be taken into consideration in applying this standard:

- Efforts to meet the vehicle LOS standard shall not result in diminished safety for other modes including walking, bicycling, or transit.
- The standard shall be applied to the overall intersection operation and not that of any individual approach or movement.
- Consideration shall be given to the operation of the intersection over time, rather than relying exclusively on peak period conditions.
- The five intersections surrounding the historic Sonoma Plaza shall be exempt from vehicle LOS standards in order to maintain the historic integrity of the Plaza and prioritize non-auto modes.

Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the a.m. and p.m. peak periods. This condition does not include project-generated traffic volumes. Volume data was collected on April 20, 2017, while local schools were in session. Because there are plans to signalize or install a roundabout at the intersection of West Spain Street/Fifth Street West at some point in the future, conditions both under the existing all-way stop controls and with a signal were evaluated.

Under existing volumes, two of the three intersections are operating acceptably. The intersection of West Spain Street/Fifth Street West is operating an unacceptable LOS E during the evening peak hour under the existing stop controls. With either the planned signal or roundabout, the intersection is expected to operate acceptably. The existing traffic volumes are shown in Figure 2. A summary of the intersection level of service calculations is contained in Table 4, and copies of the Level of Service calculations are provided in Appendix B.



LEGEND

- Study Intersection
- xx AM Peak Hour Volume
- (xx) PM Peak Hour Volume

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Traffic Impact Study for the Oliva-W. Spain Apartments

Figure 2 – Existing Traffic Volumes

W-Trans

Table 4 – Existing Peak Hour Intersection Levels of Service				
Study Intersection	**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**
1. W Spain St/Fifth St W	16.1	C	**42.8**	**E**
Signalized	*17.9*	*B*	*31.0*	*C*
Roundabout	*10.1*	*B*	*15.3*	*B*
2. W Spain St/Sonoma Hwy	14.3	B	16.3	B
3. W Napa St/Fifth St W	32.6	C	38.4	D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; **Bold** text = deficient operation; Shaded cells = conditions with recommended improvements

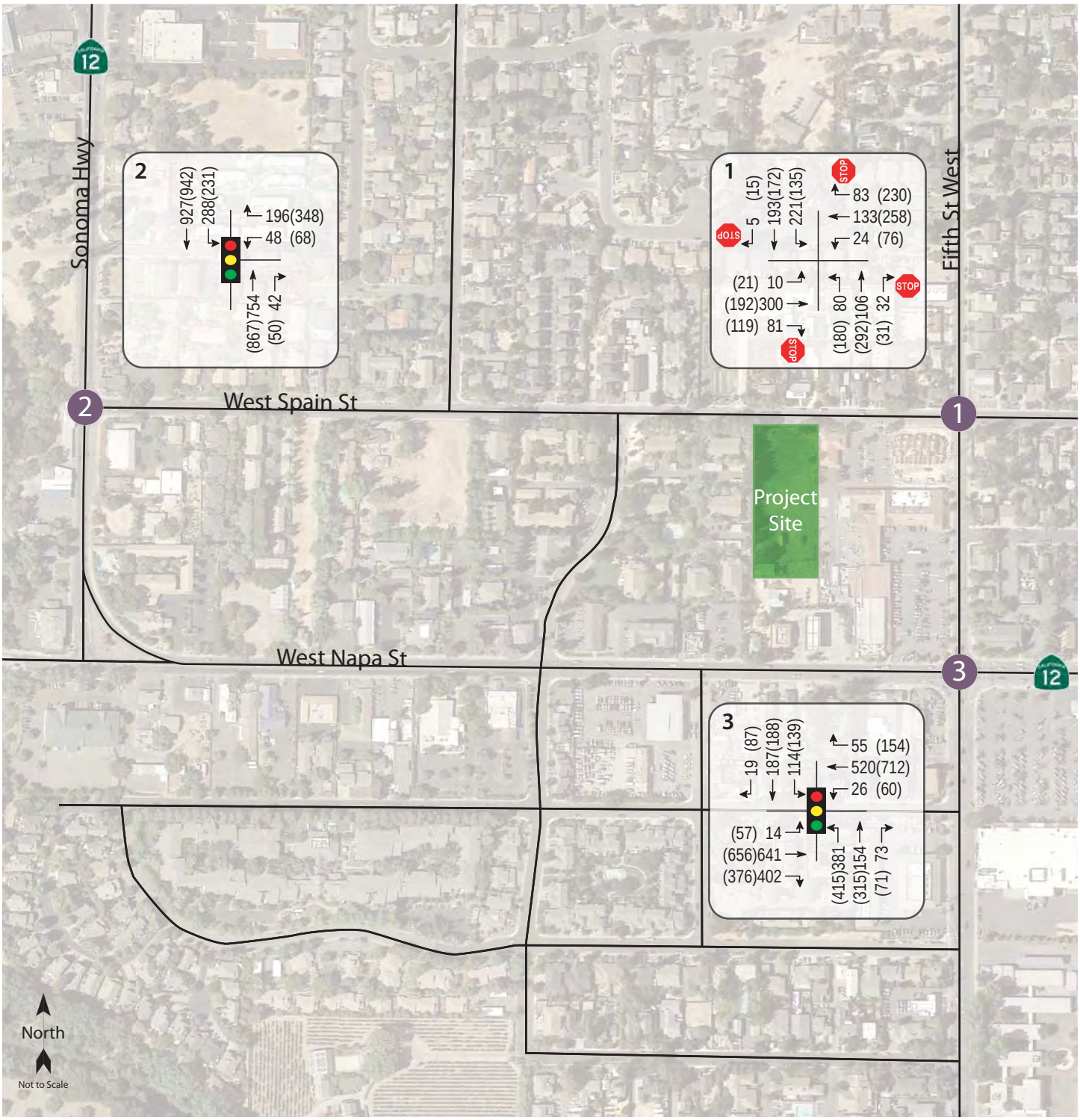
Though the intersection of West Spain Street/Fifth Street West would operate acceptably with the roundabout, it should be noted that even with an "Urban Compact" roundabout, with an 80- to 100-foot diameter it would require an additional 150 to 200 square feet of right-of-way.

It should also be noted that the delay at Fifth Street West/Spain Street increases slightly during the morning peak hour with the planned signal compared to all-way stop controls, but the service level is better. This is a result of the threshold for the two control types. At a signalized intersection, drivers generally tolerate waiting longer periods of time as this type of control is more predominant at higher-volume locations. An increase in delay and better service level is counter-intuitive, but in terms of delay, the change is so minimal that the drivers would be unlikely to notice it.

Future Conditions

Segment volumes for the horizon year of 2040 were obtained from the County's gravity demand model and translated to turning movement volumes at each of the study intersections using a combination of the "Furness" method and factoring. The Furness method is an iterative process that employs existing turn movement data, existing link volumes, and future link volumes to project likely future turning movement volumes at intersections. These volumes were compared to a straight-line growth of 0.5 percent per year. Of these two methods of projecting volumes, the higher was used to be conservative.

Again, as with Existing Conditions, operation was evaluated both without and with the either the signal or roundabout at West Spain Street/Fifth Street West. The control type and lane configurations for the signal improvement were used as identified in the *Traffic Impact Study for the Woven Shade Project,* W-Trans (2010). Under the anticipated Future volumes, only the West Spain Street/Sonoma Hwy intersection is expected to operate acceptably. The other two study intersections are expected to operate at LOS E or F during the evening peak hour. Future volumes are shown in Figure 3 and operating conditions are summarized in Table 5.



LEGEND

- Study Intersection
- xx AM Peak Hour Volume
- (xx) PM Peak Hour Volume

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Traffic Impact Study for the Oliva-W. Spain Apartments

Figure 3 – Future Traffic Volumes

W-Trans

Table 5 – Future Peak Hour Intersection Levels of Service				
Study Intersection	**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**
1. W Spain St/Fifth St W	16.9	C	**60.4**	**F**
Signalized	*18.3*	*B*	*34.6*	*C*
Roundabout	*10.5*	*B*	*19.1*	*C*
2. W Spain St/Sonoma Hwy	22.5	C	36.5	D
3. W Napa St/Fifth St W	47.7	D	**72.4**	**E**
SB Right and WB Right Overlap	*43.2*	*D*	*53.8*	*D*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; **Bold** text = deficient operation; Shaded cells = conditions with recommended improvements

The intersection of West Spain Street/Fifth Street West, which operates unacceptably under existing conditions, is expected to continue to operate unacceptably under future volumes; however, with either the signal or roundabout planned for the intersection operation would be expected to improve to LOS C during the evening peak hour.

The intersection of West Napa Street/Fifth Street West is expected to operate at LOS E during the evening peak hour. To address this, it is recommended that the southbound approach be widened to include a right-turn lane. Construction of a right-turn pocket would require land acquisition from Sonoma Marketplace. In addition, in order to achieve an acceptable service, a right-turn overlap should be installed on the westbound approach. A westbound right-turn overlap phase provides a protected right-turn movement that would operate concurrently with the adjacent northbound left turns as there is no conflict point between these movements. With this improvement LOS D operation could be achieved during both peak periods.

Project Description

The project consists of the construction of 30 apartment dwellings with access from West Spain Street. The site is currently vacant. The proposed project site plan is shown in Figure 4.

Trip Generation

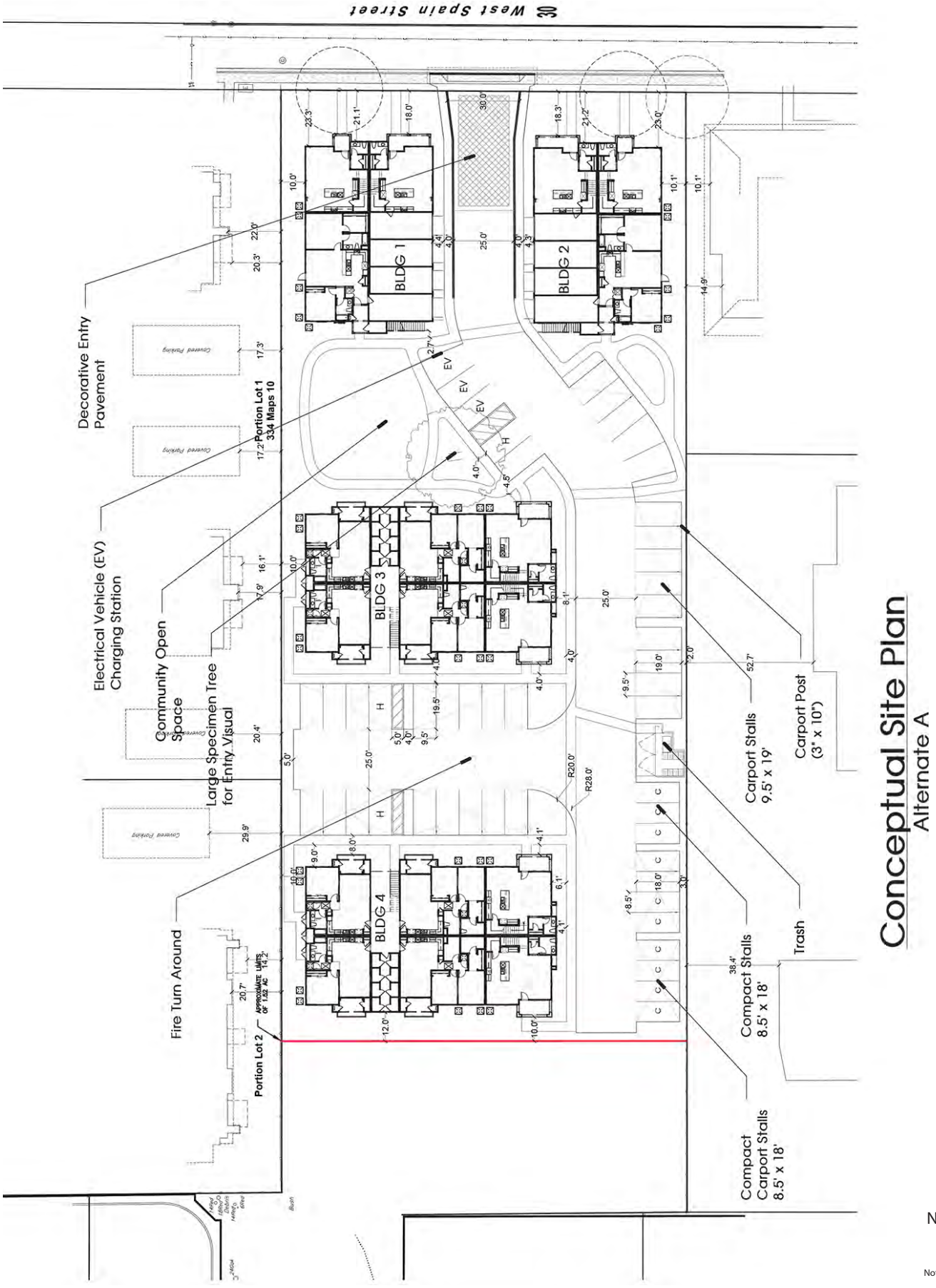
The anticipated trip generation for the proposed project was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 9th Edition, 2012 for "Apartments" (ITE #220). As shown in Table 6, the proposed project is expected to generate an average of 200 trips per day, including 15 trips during the a.m. peak hour and 19 during the p.m. peak hour.

Table 6 – Trip Generation Summary											
Land Use	**Units**	**Daily**		**AM Peak Hour**				**PM Peak Hour**			
		Rate	**Trips**	**Rate**	**Trips**	**In**	**Out**	**Rate**	**Trips**	**In**	**Out**
Apartments	30 du	6.65	200	0.51	15	3	12	0.62	19	12	7

Note: du = dwelling unit

Trip Distribution

The pattern used to allocate new project trips to the street network was based on traffic counts collected at nearby intersections. The applied distribution assumptions and resulting trips are shown in Table 7.



Source: William Hezmalhalch Architects, Inc. 4/17

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Traffic Impact Study for the Oliva-W. Spain Apartments

Figure 4 – Site Plan

W-Trans

Table 7 – Trip Distribution Assumptions	
Route	**Percent**
North on Sonoma Highway	40%
West on Napa Street	10%
East on Spain St West	30%
South on Fifth Street West	20%
TOTAL	**100%**

Intersection Operation

Existing plus Project Conditions

Upon the addition of project-related traffic to the Existing volumes, the study intersections are expected to operate at the same service level as without the project. Other than the intersection of West Spain Street/Fifth Street West, which currently operates at LOS E during the evening peak hour, all other intersections operate acceptably at LOS D or better. With either of the improvements at West Spain Street/Fifth Street West, the intersection would be expected to operate at LOS C. Project traffic volumes are shown in Figure 5 and these results are summarized in Table 8.

Table 8 – Existing and Existing plus Project Peak Hour Intersection Levels of Service

Study Intersection	**Existing Conditions**				**Existing plus Project**			
	AM Peak		**PM Peak**		**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1. W Spain St/Fifth St W	16.1	C	**42.8**	**E**	16.4	C	**44.2**	**E**
Signalized	*17.9*	*B*	*31.0*	*C*	*18.0*	*B*	*31.3*	*C*
Roundabout	*10.1*	*B*	*15.3*	*C*	*10.2*	*B*	*15.6*	*C*
2. W Spain St/Sonoma Hwy	14.3	B	16.3	B	14.5	B	16.6	B
3. W Napa St/Fifth St W	32.6	C	38.4	D	32.6	C	38.6	D

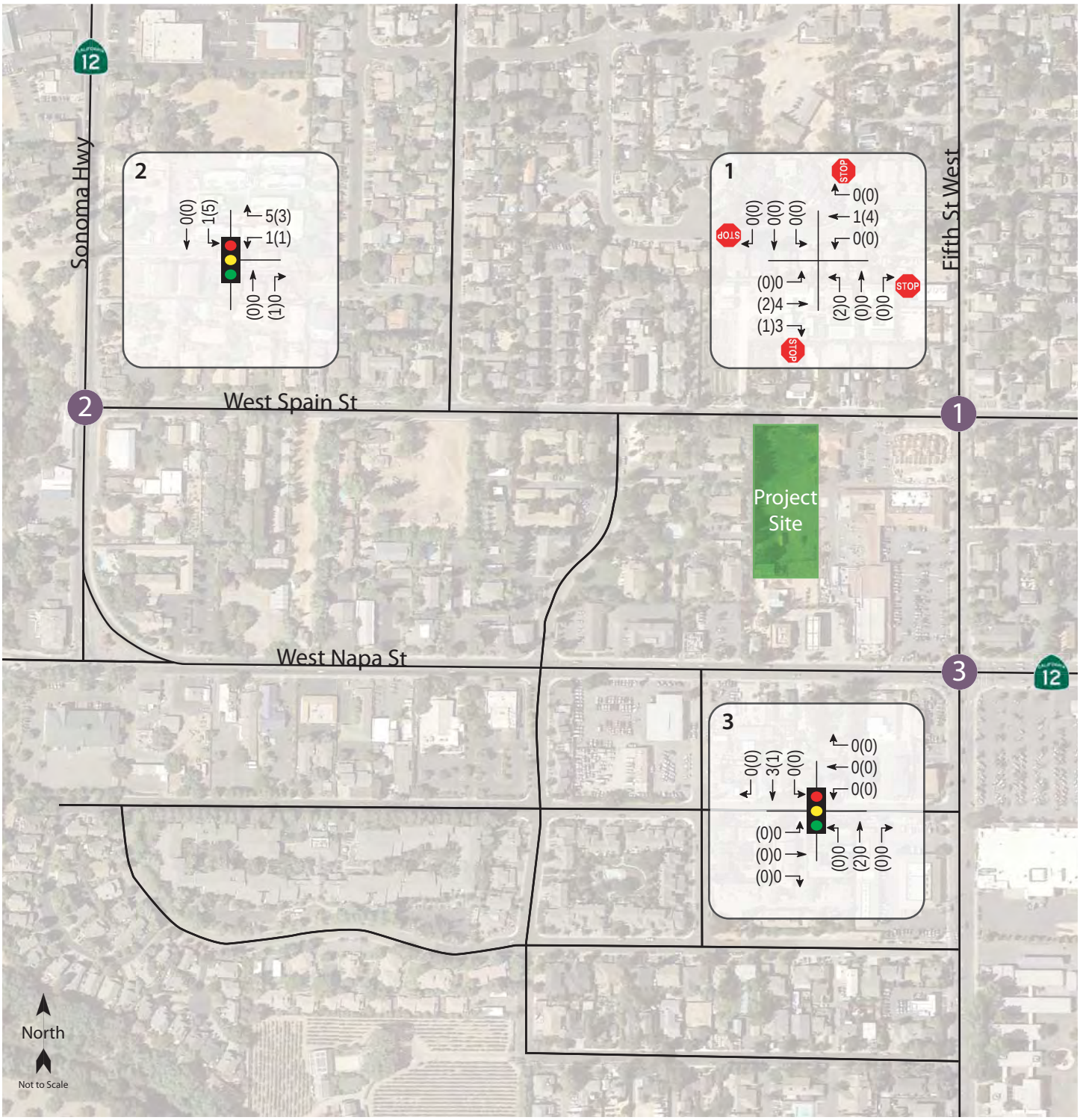
Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; **Bold** text = deficient operation; Shaded cells = conditions with recommended improvements

Finding – Two of the three study intersections are expected to continue operating acceptably at the same levels of service upon the addition of project-generated traffic. The intersection of West Spain Street/Fifth Street West operates unacceptably without the project during the evening peak hour, and would continue to do so at the same level of service with project trips added.

Recommendation – In order to achieve acceptable operation at the West Spain Street/Fifth Street West intersection, the project applicant should pay a proportional share of the cost to either install a signal or roundabout at the intersection.

Future plus Project Conditions

Upon the addition of project-generated traffic to the anticipated Future volumes, the study intersections are expected to continue to operate at the same service levels as without the project. The intersections of West Spain Street/Fifth Street West and West Napa Street/Fifth Street West are expected to operate unacceptably. The Future plus Project operating conditions are summarized in Table 9.



LEGEND

- Study Intersection
- xx AM Peak Hour Volume
- (xx) PM Peak Hour Volume

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Traffic Impact Study for the Oliva-W. Spain Apartments

Figure 5 – Project Traffic Volumes

W-Trans

Table 9 – Future and Future plus Project Peak Hour Levels of Service								
Study Intersection	**Future Conditions**				**Future plus Project**			
	AM Peak		**PM Peak**		**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1. W Spain St/Fifth St W	16.9	C	**60.4**	**F**	17.3	C	**62.1**	**F**
Signalized	*18.3*	*B*	*34.6*	*C*	*18.4*	*B*	*34.7*	*C*
Roundabout	*10.5*	*B*	*19.1*	*C*	*10.6*	*B*	*19.5*	*C*
2. W Spain St/Sonoma Hwy	22.5	C	36.5	D	22.7	C	37.8	D
3. W Napa St/Fifth St W	47.7	D	**72.4**	**E**	48.1	D	**77.0**	**E**
SB Right and WB Right Overlap	*43.2*	*D*	*53.8*	*D*	*45.2*	*D*	*53.9*	*D*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; **Bold** text = deficient operation; Shaded cells = conditions with recommended improvements

Finding – The study intersections would be expected to continue operating at the same service levels as without the project upon adding project trips to Future volumes, with West Spain Street/Fifth Street West and West Napa Street/Fifth Street West expected to operate unacceptably. To achieve acceptable operation under Future plus Project volumes either a signal or roundabout would need to be installed at West Spain Street/Fifth Street West.

Recommendation – To achieve acceptable operation at West Spain Street/Fifth Street West, a signal is recommended instead of a roundabout as a roundabout would require acquisition of right-of-way. At the intersection of West Napa Street/Fifth Street West, the north leg should be widened to include a southbound right-turn lane and a right-turn overlap phase should be installed for the westbound approach. The project should pay a proportional share of both of these improvements.

Proportional Share

In order to mitigate the project's cumulative impacts at the intersection of West Spain Street/Fifth Street West where a signal installation is planned for the future, the project should contribute to the funds already being accumulated by the City. The proportional ("fair") shares of the costs of improvements was determined using a modified methodology published by Caltrans in their *Guide for Preparation of Traffic Impact Studies*. The equitable proportion as determined is the ratio between the number of project trips at an intersection and the expected increase in traffic volumes between existing and future conditions. Based on the calculation, the project should pay 5.2 percent of the total cost estimated by the City.

At the intersection of West Napa Street/Fifth Street West, where a southbound right-turn lane, which would require land acquisition, and westbound right-turn overlap are recommended, the project's proportional share is 0.4 percent of the project cost.

Proportional share calculations are provided in Appendix C.

Alternative Modes

Pedestrian Facilities

Given the proximity of downtown Sonoma, commercial properties, and schools surrounding the site, it is reasonable to assume that some project residents will want to walk, bicycle, or use transit for trips to and from the project site.

Project Site – Sidewalks exist along the project frontage. A network of sidewalks is proposed within the project site.

Finding – Pedestrian facilities serving the project site are adequate.

Bicycle Facilities

Existing bicycle facilities, including bike lanes on Fifth Street West south of West Napa Street, the Sonoma Bike Path to the north, together with shared use of West Spain Street provide adequate access for bicyclists.

Bicycle Storage

Covered bicycle parking, or a "bike corral," is proposed in the open space of the site along with picnic tables in order to provide a space for residents to gather for trips to the nearby events or markets.

Finding – Bicycle facilities serving the project site are adequate.

Transit

Existing transit routes are adequate to accommodate project-generated transit trips. Existing stops are within acceptable walking distance of the site at the West Napa Street intersections with either Seventh Street West or the Fifth Street West.

Finding – Transit facilities serving the project site are adequate.

Access and Circulation

Site Access

Access to the site would be from West Spain Street; no other access is proposed.

Access Analysis

Left-Turn Lane Warrants

The need for a left-turn lane on West Spain Street at the project driveway was evaluated based on criteria contained in the *Intersection Channelization Design Guide*, National Cooperative Highway Research Program (NCHRP) Report No. 279, Transportation Research Board, 1985, as well as a more recent update of the methodology developed by the Washington State Department of Transportation. The NCHRP report references a methodology developed by M. D. Harmelink that includes equations that can be applied to expected or actual traffic volumes in order to determine the need for a left-turn pocket based on safety issues. Under future volumes with the project, a left-turn lane is not warranted on West Spain Street during either of the peak periods evaluated. Turn lane warrants are included in Appendix D.

Site Circulation

The conceptual site plans were review to determine if emergency vehicles could navigate the site entrance and the firetruck turn-around located near the southern end of the both plans. The AutoTURN application of AutoCAD was used to review adequacy of this turn-around. The vehicles reviewed were the Sonoma Fire Department's pumper truck and the much larger ladder truck. Both firetrucks would be able to enter the site, navigate to the end, and pull into the turn-around. To exit, the truck would be able to reverse out of firetruck turnaround and then drive forward to exit. The turning movement exhibits are included in Appendix D.

Conclusions and Recommendations

Conclusions

- All three of the study intersections have been experiencing collisions at a rate higher than the statewide averages for similar facilities. The City is currently preparing a systemic safety study that would be expected to address the trend of speed-related crashes evident at two of the three study intersections.
- The proposed project would be expected to generate an average of 200 daily trips, of which 15 would be during the morning peak hour and 19 during the evening peak hour.
- Under Existing Conditions, two study intersections operate acceptably while West Spain Street/Fifth Street West operates unacceptably at LOS E during the p.m. peak hour. Upon installation of the traffic signal or roundabout for this intersection, it is expected to operate acceptably.
- Under the Future Conditions, only the West Spain Street/Sonoma Highway intersection is expected to operate acceptably. With the planned improvements at Fifth Street West/West Spain Street, the intersection would operate acceptably. In order to achieve acceptable operation at the intersection of West Napa Street/Fifth Street West, the north leg should be widened to include a southbound right-turn lane, which would require land acquisition from Sonoma Market, and the phasing modified to add a westbound right-turn overlap.
- All of the study intersections are expected to operate at the same levels of service with project trips added to both Existing and Future volumes, and without and with planned or recommended improvements.
- The project applicant should pay a proportional share of the costs to construct improvements needed to achieve or maintain acceptable operating conditions.
- The facilities for pedestrians, bicyclists, and transit users are adequate.
- Under Future conditions, which represent the scenario with the highest volumes, a left-turn lane is not warranted at the project driveway during either of the peak periods reviewed.
- The firetruck turn-around was reviewed and it was determined that it would accommodate the circulation of emergency response vehicles on-site.

Recommendations

- The project applicant should pay its proportional share of costs to signalize West Spain Street/Fifth Street West, determined to be 5.2 percent of the improvement cost.
- The applicant should pay 0.4 percent of the total cost of the improvements recommended for the intersection of West Napa Street/Fifth Street West.

Study Participants and References

Study Participants

Principal in Charge	Dalene J. Whitlock, PE, PTOE
Assistant Engineer	Briana Byrne, EIT
Graphics	Hannah Yung
Editing/Formatting	Angela McCoy

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Appendix A

Collision Rate Calculations

Intersection Collision Rate Calculations

TIS for Oliva-W. Spain Apartments

Intersection # 1: West Spain Street & Fifth Street West

Date of Count: Thursday, April 20, 2017

Number of Collisions: 8
Number of Injuries: 3
Number of Fatalities: 0
ADT: 14900
Start Date: January 1, 2012
End Date: December 31, 2016
Number of Years: 5

Intersection Type: Four-Legged
Control Type: 4 Way Stop
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{8 \times 1{,}000{,}000}{14{,}900 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.29 c/mve**	**0.0%**	**37.5%**
Statewide Average*	**0.21 c/mve**	**0.4%**	**35.6%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Intersection # 2: West Spain Street & Sonoma Highway

Date of Count: Thursday, April 20, 2017

Number of Collisions: 12
Number of Injuries: 5
Number of Fatalities: 0
ADT: 19100
Start Date: January 1, 2012
End Date: December 31, 2016
Number of Years: 5

Intersection Type: Tee
Control Type: Signals
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{12 \times 1{,}000{,}000}{19{,}100 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.34 c/mve**	**0.0%**	**41.7%**
Statewide Average*	**0.21 c/mve**	**0.3%**	**42.4%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Calculaions

TIS for Oliva-W. Spain Apartments

Intersection # 3: West Napa Street & Fifth Street West

Date of Count: Thursday, April 20, 2017

Number of Collisions: 19
Number of Injuries: 8
Number of Fatalities: 0
ADT: 24400
Start Date: January 1, 2012
End Date: December 31, 2016
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{collision rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x 365 Days per Year x Number of Years}}$$

$$\text{collision rate} = \frac{19 \times 1{,}000{,}000}{24{,}400 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.43 c/mve**	**0.0%**	**42.1%**
Statewide Average*	**0.27 c/mve**	**0.4%**	**41.9%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Appendix B

Intersection Level of Service Calculations

Intersection Level Of Service Report
Intersection 1: Fifth Street West/West Spain Street

Control Type:	All-way stop	Delay (sec / veh):	16.1
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.657

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	95.00	100.00	100.00	55.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Base Volume Input [veh/h]	70	93	28	194	169	4	9	263	71	21	117	73
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	70	93	28	194	169	4	9	263	71	21	117	73
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	26	8	54	47	1	3	73	20	6	33	20
Total Analysis Volume [veh/h]	78	103	31	216	188	4	10	292	79	23	130	81
Pedestrian Volume [ped/h]	6			1			3			3		

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Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	454	496	478	514	579	554
Degree of Utilization, x	0.17	0.27	0.45	0.37	0.66	0.42

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.61	1.08	2.31	1.72	4.82	2.09
95th-Percentile Queue Length [ft]	15.37	27.09	57.78	42.90	120.51	52.13
Approach Delay [s/veh]	12.49		15.13		20.33	14.17
Approach LOS	B		C		C	B
Intersection Delay [s/veh]	16.10					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 1: Fifth Street West/West Spain Street

Control Type:	Signalized	Delay (sec / veh):	17.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.463

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	95.00	100.00	100.00	55.00	100.00	100.00	75.00	100.00	100.00	75.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Base Volume Input [veh/h]	70	93	28	194	169	4	9	263	71	21	117	73
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	70	93	28	194	169	4	9	263	71	21	117	73
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	26	8	54	47	1	3	73	20	6	33	20
Total Analysis Volume [veh/h]	78	103	31	216	188	4	10	292	79	23	130	81
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6			1			3			3		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	5	0	5	5	0	5	5	0	5	5	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	9	20	0	14	25	0	9	20	0	16	27	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
C, Cycle Length [s]	40	40	40	40	40	40	40	40
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	5	7	9	1	12	1	12
g / C, Green / Cycle	0.07	0.11	0.18	0.22	0.01	0.29	0.03	0.30
(v / s)_i Volume / Saturation Flow Rate	0.05	0.08	0.14	0.11	0.01	0.23	0.01	0.13
s, saturation flow rate [veh/h]	1597	1605	1597	1670	1597	1612	1597	1569
c, Capacity [veh/h]	117	182	282	362	22	462	46	474
d1, Uniform Delay [s]	18.32	17.39	15.91	14.06	19.86	13.40	19.41	11.41
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.40	5.66	4.36	1.21	14.76	3.30	8.18	0.66
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.67	0.74	0.77	0.53	0.46	0.80	0.50	0.45
d, Delay for Lane Group [s/veh]	24.72	23.05	20.26	15.26	34.62	16.70	27.59	12.07
Lane Group LOS	C	C	C	B	C	B	C	B
Critical Lane Group	No	Yes	Yes	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	0.82	1.32	1.93	1.40	0.17	2.89	0.29	1.29
50th-Percentile Queue Length [ft]	20.58	32.95	48.18	35.06	4.26	72.22	7.28	32.29
95th-Percentile Queue Length [veh]	1.48	2.37	3.47	2.52	0.31	5.20	0.52	2.33
95th-Percentile Queue Length [ft]	37.04	59.31	86.73	63.10	7.67	129.99	13.10	58.13

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	24.72	23.05	23.05	20.26	15.26	15.26	34.62	16.70	16.70	27.59	12.07	12.07
Movement LOS	C	C	C	C	B	B	C	B	B	C	B	B
d_A, Approach Delay [s/veh]	23.67			17.91			17.17			13.60		
Approach LOS	C			B			B			B		
d_I, Intersection Delay [s/veh]	17.85											
Intersection LOS	B											
Intersection V/C	0.463											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MOVEMENT SUMMARY

Site: 1 [AM Existing]

West Spain Street/Fifth Street West
80' Roundabout

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Fifth Street W											
3	L2	78	2.0	0.325	9.8	LOS A	1.6	40.6	0.63	0.59	19.3
8	T1	103	2.0	0.325	9.8	LOS A	1.6	40.6	0.63	0.59	19.4
18	R2	31	2.0	0.325	9.8	LOS A	1.6	40.6	0.63	0.59	18.7
Approach		212	2.0	0.325	9.8	LOS A	1.6	40.6	0.63	0.59	19.3
East: WB W Spain Street											
1	L2	23	2.0	0.255	6.5	LOS A	1.2	29.2	0.37	0.25	21.6
6	T1	130	2.0	0.255	6.5	LOS A	1.2	29.2	0.37	0.25	21.8
16	R2	81	2.0	0.255	6.5	LOS A	1.2	29.2	0.37	0.25	20.9
Approach		234	2.0	0.255	6.5	LOS A	1.2	29.2	0.37	0.25	21.4
North: SB Fifth Street W											
7	L2	216	2.0	0.448	9.4	LOS A	2.5	62.5	0.48	0.37	19.3
4	T1	188	2.0	0.448	9.4	LOS A	2.5	62.5	0.48	0.37	19.4
14	R2	4	2.0	0.448	9.4	LOS A	2.5	62.5	0.48	0.37	18.7
Approach		408	2.0	0.448	9.4	LOS A	2.5	62.5	0.48	0.37	19.4
West: EB W Spain Street											
5	L2	10	2.0	0.532	13.2	LOS B	3.6	90.6	0.68	0.70	18.2
2	T1	292	2.0	0.532	13.2	LOS B	3.6	90.6	0.68	0.70	18.3
12	R2	79	2.0	0.532	13.2	LOS B	3.6	90.6	0.68	0.70	17.6
Approach		381	2.0	0.532	13.2	LOS B	3.6	90.6	0.68	0.70	18.1
All Vehicles		1236	2.0	0.532	10.1	LOS B	3.6	90.6	0.55	0.49	19.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection Level Of Service Report
Intersection 2: Sonoma Hwy (SR 12)/Fifth Street West

Control Type:	Signalized	Delay (sec / veh):	14.2
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.545

Intersection Setup

Name	Sonoma Hwy (SR 12)		Sonoma Hwy (SR 12)		Fifth Street West	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	125.00	250.00	100.00	100.00	110.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

Volumes

Name	Sonoma Hwy (SR 12)		Sonoma Hwy (SR 12)		Fifth Street West	
Base Volume Input [veh/h]	522	36	253	782	42	172
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	3	0	0	0	114
Total Hourly Volume [veh/h]	522	33	253	782	42	58
Peak Hour Factor	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	139	9	67	208	11	15
Total Analysis Volume [veh/h]	556	35	269	833	45	62
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		1	
Bicycle Volume [bicycles/h]	0		0		1	

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal group	2	0	1	6	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	0	10	10	10	0
Maximum Green [s]	45	0	16	45	18	0
Amber [s]	3.7	0.0	3.7	3.7	3.7	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	39	0	23	62	28	0
Vehicle Extension [s]	4.0	0.0	2.0	4.0	2.0	0.0
Walk [s]	7	0	0	5	7	0
Pedestrian Clearance [s]	10	0	0	10	16	0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.7	0.0	2.7	2.7	2.7	0.0
Minimum Recall	Yes		No	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	54	54	54	54	54	54
L, Total Lost Time per Cycle [s]	4.70	4.70	4.70	4.70	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.70	2.70	2.70	2.70	2.70	2.70
g_i, Effective Green Time [s]	21	21	11	37	8	8
g / C, Green / Cycle	0.39	0.39	0.20	0.68	0.15	0.15
(v / s)_i Volume / Saturation Flow Rate	0.33	0.02	0.17	0.50	0.03	0.04
s, saturation flow rate [veh/h]	1676	1423	1597	1676	1597	1393
c, Capacity [veh/h]	656	557	319	1137	237	207
d1, Uniform Delay [s]	14.98	10.27	20.84	5.58	20.19	20.53
k, delay calibration	0.15	0.15	0.04	0.20	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.40	0.07	2.38	1.70	0.14	0.30
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	0.06	0.84	0.73	0.19	0.30
d, Delay for Lane Group [s/veh]	19.38	10.33	23.23	7.27	20.33	20.83
Lane Group LOS	B	B	C	A	C	C
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	6.00	0.23	3.16	3.77	0.47	0.66
50th-Percentile Queue Length [ft]	149.94	5.86	79.08	94.18	11.68	16.47
95th-Percentile Queue Length [veh]	10.01	0.42	5.69	6.78	0.84	1.19
95th-Percentile Queue Length [ft]	250.34	10.55	142.35	169.53	21.03	29.65

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	19.38	10.33	23.23	7.27	20.33	20.83
Movement LOS	B	B	C	A	C	C
d_A, Approach Delay [s/veh]	18.84		11.17		20.62	
Approach LOS	B		B		C	
d_I, Intersection Delay [s/veh]	14.25					
Intersection LOS	B					
Intersection V/C	0.545					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Fifth Street West/West Napa Street

Control Type:	Signalized	Delay (sec / veh):	32.6
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.902

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	1	1	0	1
Pocket Length [ft]	200.00	100.00	105.00	90.00	100.00	100.00	80.00	100.00	195.00	70.00	100.00	255.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Base Volume Input [veh/h]	334	135	64	100	164	17	12	479	353	23	358	48
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	38	0	0	1	0	0	199	0	0	29
Total Hourly Volume [veh/h]	334	135	26	100	164	16	12	479	154	23	358	19
Peak Hour Factor	0.9470	0.9470	0.9470	0.9470	0.9470	0.9470	0.9470	0.9470	0.9470	0.9470	0.9470	0.9470
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	88	36	7	26	43	4	3	126	41	6	95	5
Total Analysis Volume [veh/h]	353	143	27	106	173	17	13	506	163	24	378	20
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	7			5			6			8		
Bicycle Volume [bicycles/h]	0			3			1			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	114
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	23.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	7	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	11	0	0	13	0	13	12	0	13	12	0
Maximum Green [s]	0	25	0	0	21	0	12	39	0	12	39	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	29	0	0	25	0	15	44	0	15	44	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	6	0	0	6	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	13	0	0	21	0	0	13	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	R
C, Cycle Length [s]	84	84	84	84	84	84	84	84	84	84	84
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	3.00	5.00	5.00	3.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	1.00	3.00	3.00	1.00	3.00	3.00
g_i, Effective Green Time [s]	21	21	21	13	13	3	29	29	6	32	32
g / C, Green / Cycle	0.25	0.25	0.25	0.16	0.16	0.04	0.35	0.35	0.07	0.38	0.38
(v / s)_i Volume / Saturation Flow Rate	0.22	0.09	0.02	0.07	0.12	0.01	0.30	0.12	0.02	0.23	0.01
s, saturation flow rate [veh/h]	1597	1676	1402	1597	1642	1597	1676	1381	1597	1676	1416
c, Capacity [veh/h]	395	414	347	248	255	65	589	485	107	633	534
d1, Uniform Delay [s]	30.44	25.92	24.18	31.99	33.77	38.81	25.21	19.96	36.99	20.94	16.45
k, delay calibration	0.26	0.11	0.11	0.11	0.11	0.11	0.29	0.23	0.11	0.23	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	15.36	0.49	0.09	1.17	4.30	1.48	9.27	0.86	1.05	1.93	0.06
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.89	0.35	0.08	0.43	0.75	0.20	0.86	0.34	0.22	0.60	0.04
d, Delay for Lane Group [s/veh]	45.81	26.42	24.27	33.15	38.07	40.29	34.48	20.82	38.04	22.87	16.51
Lane Group LOS	D	C	C	C	D	D	C	C	D	C	B
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	8.30	2.34	0.41	1.98	3.90	0.28	10.34	2.37	0.49	5.98	0.24
50th-Percentile Queue Length [ft]	207.41	58.44	10.27	49.44	97.39	7.02	258.43	59.14	12.21	149.61	6.09
95th-Percentile Queue Length [veh]	13.02	4.21	0.74	3.56	7.01	0.51	15.61	4.26	0.88	10.00	0.44
95th-Percentile Queue Length [ft]	325.50	105.19	18.48	89.00	175.29	12.63	390.25	106.46	21.99	249.91	10.96

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	45.81	26.42	24.27	33.15	38.07	38.07	40.29	34.48	20.82	38.04	22.87	16.51
Movement LOS	D	C	C	C	D	D	D	C	C	D	C	B
d_A, Approach Delay [s/veh]	39.39			36.31			31.32			23.43		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	32.55											
Intersection LOS	C											
Intersection V/C	0.902											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 1: Fifth Street West/West Spain Street

Control Type:	All-way stop	Delay (sec / veh):	42.8
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.064

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	95.00	100.00	100.00	55.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Base Volume Input [veh/h]	150	256	27	118	151	13	18	160	104	67	226	202
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	150	256	27	118	151	13	18	160	104	67	226	202
Peak Hour Factor	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	40	68	7	32	40	3	5	43	28	18	60	54
Total Analysis Volume [veh/h]	160	274	29	126	161	14	19	171	111	72	242	216
Pedestrian Volume [ped/h]	7			1			3			6		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	413	441	396	422	464	530
Degree of Utilization, x	0.39	0.69	0.32	0.42	0.65	1.06

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.80	5.08	1.35	2.00	4.52	16.22
95th-Percentile Queue Length [ft]	44.93	127.05	33.68	50.02	113.09	405.60
Approach Delay [s/veh]	23.44		16.68		23.93	85.12
Approach LOS	C		C		C	F
Intersection Delay [s/veh]	42.75					
Intersection LOS	E					

Intersection Level Of Service Report
Intersection 1: Fifth Street West/West Spain Street

Control Type:	Signalized	Delay (sec / veh):	22.7
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.571

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	95.00	100.00	100.00	55.00	100.00	100.00	75.00	100.00	100.00	75.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Base Volume Input [veh/h]	150	256	27	118	151	13	18	160	104	67	226	202
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	150	256	27	118	151	13	18	160	104	67	226	202
Peak Hour Factor	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	40	68	7	32	40	3	5	43	28	18	60	54
Total Analysis Volume [veh/h]	160	274	29	126	161	14	19	171	111	72	242	216
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	7			1			3			6		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	5	0	5	5	0	5	5	0	5	5	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	12	19	0	12	19	0	9	19	0	20	30	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
C, Cycle Length [s]	52	52	52	52	52	52	52	52
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	12	5	10	1	16	3	18
g / C, Green / Cycle	0.13	0.23	0.10	0.20	0.02	0.30	0.06	0.34
(v / s)_i Volume / Saturation Flow Rate	0.10	0.18	0.08	0.11	0.01	0.18	0.05	0.30
s, saturation flow rate [veh/h]	1597	1646	1597	1652	1597	1560	1597	1546
c, Capacity [veh/h]	207	375	163	331	37	469	100	525
d1, Uniform Delay [s]	21.95	19.06	22.81	18.64	25.16	15.57	23.98	16.14
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.08	4.18	7.51	1.31	10.27	1.24	9.27	4.65
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.77	0.81	0.77	0.53	0.51	0.60	0.72	0.87
d, Delay for Lane Group [s/veh]	28.03	23.24	30.31	19.95	35.43	16.81	33.25	20.79
Lane Group LOS	C	C	C	B	D	B	C	C
Critical Lane Group	No	Yes	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	2.07	3.50	1.72	1.81	0.32	2.64	1.06	5.00
50th-Percentile Queue Length [ft]	51.73	87.56	42.94	45.35	8.05	66.10	26.49	125.03
95th-Percentile Queue Length [veh]	3.72	6.30	3.09	3.26	0.58	4.76	1.91	8.67
95th-Percentile Queue Length [ft]	93.12	157.61	77.29	81.62	14.49	118.98	47.68	216.72

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	28.03	23.24	23.24	30.31	19.95	19.95	35.43	16.81	16.81	33.25	20.79	20.79
Movement LOS	C	C	C	C	B	B	D	B	B	C	C	C
d_A, Approach Delay [s/veh]	24.90			24.29			17.99			22.48		
Approach LOS	C			C			B			C		
d_I, Intersection Delay [s/veh]	22.68											
Intersection LOS	C											
Intersection V/C	0.571											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MOVEMENT SUMMARY

Site: 1 [PM Existing]

West Spain Street/Fifth Street West
80' Roundabout

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Fifth Street W											
3	L2	160	2.0	0.565	12.8	LOS B	3.9	99.8	0.63	0.58	18.0
8	T1	274	2.0	0.565	12.8	LOS B	3.9	99.8	0.63	0.58	18.1
18	R2	29	2.0	0.565	12.8	LOS B	3.9	99.8	0.63	0.58	17.5
Approach		463	2.0	0.565	12.8	LOS B	3.9	99.8	0.63	0.58	18.0
East: WB W Spain Street											
1	L2	72	2.0	0.755	23.0	LOS C	8.2	208.1	0.85	1.04	14.5
6	T1	242	2.0	0.755	23.0	LOS C	8.2	208.1	0.85	1.04	14.5
16	R2	216	2.0	0.755	23.0	LOS C	8.2	208.1	0.85	1.04	14.1
Approach		529	2.0	0.755	23.0	LOS C	8.2	208.1	0.85	1.04	14.4
North: SB Fifth Street W											
7	L2	126	2.0	0.441	11.6	LOS B	2.5	63.9	0.66	0.65	18.4
4	T1	161	2.0	0.441	11.6	LOS B	2.5	63.9	0.66	0.65	18.5
14	R2	14	2.0	0.441	11.6	LOS B	2.5	63.9	0.66	0.65	17.9
Approach		302	2.0	0.441	11.6	LOS B	2.5	63.9	0.66	0.65	18.4
West: EB W Spain Street											
5	L2	19	2.0	0.393	9.7	LOS A	2.0	51.5	0.57	0.49	19.8
2	T1	171	2.0	0.393	9.7	LOS A	2.0	51.5	0.57	0.49	20.0
12	R2	111	2.0	0.393	9.7	LOS A	2.0	51.5	0.57	0.49	19.2
Approach		302	2.0	0.393	9.7	LOS A	2.0	51.5	0.57	0.49	19.7
All Vehicles		1596	2.0	0.755	15.3	LOS C	8.2	208.1	0.70	0.73	16.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection Level Of Service Report
Intersection 2: Sonoma Hwy (SR 12)/Fifth Street West

Control Type:	Signalized	Delay (sec / veh):	16.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.655

Intersection Setup

Name	Sonoma Hwy (SR 12)		Sonoma Hwy (SR 12)		Fifth Street West	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	105.00	275.00	100.00	100.00	110.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

Volumes

Name	Sonoma Hwy (SR 12)		Sonoma Hwy (SR 12)		Fifth Street West	
Base Volume Input [veh/h]	642	44	203	662	52	305
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	4	0	0	0	140
Total Hourly Volume [veh/h]	642	40	203	662	52	165
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	167	10	53	172	14	43
Total Analysis Volume [veh/h]	669	42	211	690	54	172
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		4	
Bicycle Volume [bicycles/h]	6		2		1	

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal group	2	0	1	6	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	0	10	10	10	0
Maximum Green [s]	45	0	16	45	18	0
Amber [s]	3.7	0.0	3.7	3.7	3.7	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	39	0	23	62	28	0
Vehicle Extension [s]	4.0	0.0	2.0	4.0	2.0	0.0
Walk [s]	7	0	0	5	7	0
Pedestrian Clearance [s]	10	0	0	10	16	0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.7	0.0	2.7	2.7	2.7	0.0
Minimum Recall	Yes		No	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	61	61	61	61	61	61
L, Total Lost Time per Cycle [s]	4.70	4.70	4.70	4.70	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.70	2.70	2.70	2.70	2.70	2.70
g_i, Effective Green Time [s]	28	28	10	42	10	10
g / C, Green / Cycle	0.45	0.45	0.16	0.69	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.40	0.03	0.13	0.41	0.03	0.12
s, saturation flow rate [veh/h]	1676	1383	1597	1676	1597	1393
c, Capacity [veh/h]	758	626	254	1153	254	222
d1, Uniform Delay [s]	15.34	9.51	25.06	5.09	22.48	24.78
k, delay calibration	0.16	0.15	0.04	0.18	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.29	0.06	2.72	0.81	0.15	2.19
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.07	0.83	0.60	0.21	0.77
d, Delay for Lane Group [s/veh]	20.63	9.57	27.78	5.90	22.63	26.97
Lane Group LOS	C	A	C	A	C	C
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	8.31	0.29	2.98	3.13	0.65	2.38
50th-Percentile Queue Length [ft]	207.65	7.27	74.47	78.23	16.27	59.55
95th-Percentile Queue Length [veh]	13.03	0.52	5.36	5.63	1.17	4.29
95th-Percentile Queue Length [ft]	325.81	13.09	134.05	140.82	29.29	107.19

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	20.63	9.57	27.78	5.90	22.63	26.97
Movement LOS	C	A	C	A	C	C
d_A, Approach Delay [s/veh]	19.97		11.03		25.93	
Approach LOS	B		B		C	
d_I, Intersection Delay [s/veh]	16.32					
Intersection LOS	B					
Intersection V/C	0.655					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Fifth Street West/West Napa Street

Control Type:	Signalized	Delay (sec / veh):	38.4
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.915

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	1	1	0	1
Pocket Length [ft]	200.00	100.00	105.00	90.00	100.00	100.00	80.00	100.00	195.00	70.00	100.00	255.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Base Volume Input [veh/h]	358	276	52	122	165	38	37	393	330	53	487	128
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	25	0	0	5	0	0	199	0	0	73
Total Hourly Volume [veh/h]	358	276	27	122	165	33	37	393	131	53	487	55
Peak Hour Factor	0.9690	0.9690	0.9690	0.9690	0.9690	0.9690	0.9690	0.9690	0.9690	0.9690	0.9690	0.9690
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	92	71	7	31	43	9	10	101	34	14	126	14
Total Analysis Volume [veh/h]	369	285	28	126	170	34	38	406	135	55	503	57
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14			8			7			5		
Bicycle Volume [bicycles/h]	2			1			1			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	114
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	23.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	7	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	11	0	0	13	0	13	12	0	13	12	0
Maximum Green [s]	0	25	0	0	21	0	12	39	0	12	39	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	29	0	0	25	0	15	44	0	15	44	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	6	0	0	6	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	13	0	0	21	0	0	13	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	R
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	3.00	5.00	5.00	3.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	1.00	3.00	3.00	1.00	3.00	3.00
g_i, Effective Green Time [s]	23	23	23	14	14	8	29	29	10	31	31
g / C, Green / Cycle	0.25	0.25	0.25	0.15	0.15	0.09	0.32	0.32	0.11	0.34	0.34
(v / s)_i Volume / Saturation Flow Rate	0.23	0.17	0.02	0.08	0.13	0.02	0.24	0.10	0.03	0.30	0.04
s, saturation flow rate [veh/h]	1597	1676	1379	1597	1614	1597	1676	1364	1597	1676	1408
c, Capacity [veh/h]	406	427	351	242	244	142	536	436	173	568	478
d1, Uniform Delay [s]	32.64	30.24	25.62	35.30	37.22	38.39	27.56	23.18	37.19	28.17	20.55
k, delay calibration	0.33	0.17	0.11	0.11	0.11	0.11	0.24	0.23	0.11	0.31	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	19.78	2.84	0.10	1.74	7.67	1.00	4.86	0.85	1.05	12.18	0.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.91	0.67	0.08	0.52	0.83	0.27	0.76	0.31	0.32	0.88	0.12
d, Delay for Lane Group [s/veh]	52.42	33.07	25.71	37.03	44.89	39.39	32.42	24.03	38.24	40.35	20.79
Lane Group LOS	D	C	C	D	D	D	C	C	D	D	C
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	9.80	5.75	0.46	2.63	4.81	0.81	8.30	2.22	1.16	11.74	0.84
50th-Percentile Queue Length [ft]	245.06	143.81	11.50	65.67	120.14	20.36	207.44	55.54	28.92	293.40	21.06
95th-Percentile Queue Length [veh]	14.94	9.69	0.83	4.73	8.40	1.47	13.02	4.00	2.08	17.35	1.52
95th-Percentile Queue Length [ft]	373.42	242.14	20.71	118.21	210.02	36.65	325.55	99.97	52.06	433.86	37.91

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.42	33.07	25.71	37.03	44.89	44.89	39.39	32.42	24.03	38.24	40.35	20.79
Movement LOS	D	C	C	D	D	D	D	C	C	D	D	C
d_A, Approach Delay [s/veh]	43.24			41.89			30.92			38.35		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	38.44											
Intersection LOS	D											
Intersection V/C	0.915											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 1: Fifth Street West/West Spain Street

Control Type:	All-way stop	Delay (sec / veh):	16.9
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.685

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	95.00	100.00	100.00	55.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Base Volume Input [veh/h]	80	106	32	221	193	5	10	300	81	24	133	83
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	80	106	32	221	193	5	10	300	81	24	133	83
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	20	27	8	55	48	1	3	75	20	6	33	21
Total Analysis Volume [veh/h]	80	106	32	221	193	5	10	300	81	24	133	83
Pedestrian Volume [ped/h]	6			1			3			3		

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Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	446	488	471	507	571	544
Degree of Utilization, x	0.18	0.28	0.47	0.39	0.69	0.44

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.65	1.15	2.46	1.84	5.28	2.24
95th-Percentile Queue Length [ft]	16.15	28.83	61.48	45.98	132.08	55.89
Approach Delay [s/veh]	12.80		15.69		21.91	14.73
Approach LOS	B		C		C	B
Intersection Delay [s/veh]	16.93					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 1: Fifth Street West/West Spain Street

Control Type:	Signalized	Delay (sec / veh):	18.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.476

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	95.00	100.00	100.00	55.00	100.00	100.00	75.00	100.00	100.00	75.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Base Volume Input [veh/h]	80	106	32	221	193	5	10	300	81	24	133	83
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	80	106	32	221	193	5	10	300	81	24	133	83
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	20	27	8	55	48	1	3	75	20	6	33	21
Total Analysis Volume [veh/h]	80	106	32	221	193	5	10	300	81	24	133	83
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6			1			3			3		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	5	0	5	5	0	5	5	0	5	5	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	19	0	15	19	0	9	27	0	9	27	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
C, Cycle Length [s]	41	41	41	41	41	41	41	41
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	5	7	9	1	12	1	13
g / C, Green / Cycle	0.07	0.12	0.18	0.22	0.01	0.29	0.03	0.31
(v / s)_i Volume / Saturation Flow Rate	0.05	0.09	0.14	0.12	0.01	0.24	0.02	0.14
s, saturation flow rate [veh/h]	1597	1605	1597	1669	1597	1612	1597	1569
c, Capacity [veh/h]	117	186	286	370	21	469	47	482
d1, Uniform Delay [s]	18.82	17.79	16.28	14.30	20.39	13.71	19.90	11.59
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.86	5.67	4.44	1.20	15.14	3.45	8.21	0.65
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.68	0.74	0.77	0.53	0.47	0.81	0.51	0.45
d, Delay for Lane Group [s/veh]	25.68	23.46	20.72	15.50	35.53	17.16	28.11	12.24
Lane Group LOS	C	C	C	B	D	B	C	B
Critical Lane Group	No	Yes	Yes	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	0.88	1.40	2.04	1.49	0.18	3.09	0.31	1.37
50th-Percentile Queue Length [ft]	21.97	34.89	50.99	37.27	4.38	77.21	7.74	34.14
95th-Percentile Queue Length [veh]	1.58	2.51	3.67	2.68	0.32	5.56	0.56	2.46
95th-Percentile Queue Length [ft]	39.55	62.81	91.78	67.09	7.88	138.99	13.94	61.45

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	25.68	23.46	23.46	20.72	15.50	15.50	35.53	17.16	17.16	28.11	12.24	12.24
Movement LOS	C	C	C	C	B	B	D	B	B	C	B	B
d_A, Approach Delay [s/veh]	24.27			18.25			17.63			13.83		
Approach LOS	C			B			B			B		
d_I, Intersection Delay [s/veh]	18.26											
Intersection LOS	B											
Intersection V/C	0.476											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MOVEMENT SUMMARY

Site: 1 [AM Future]

West Spain Street/Fifth Street West
80' Roundabout

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Fifth Street W											
3	L2	80	2.0	0.338	10.1	LOS B	1.7	42.6	0.64	0.61	19.2
8	T1	106	2.0	0.338	10.1	LOS B	1.7	42.6	0.64	0.61	19.3
18	R2	32	2.0	0.338	10.1	LOS B	1.7	42.6	0.64	0.61	18.6
Approach		218	2.0	0.338	10.1	LOS B	1.7	42.6	0.64	0.61	19.1
East: WB W Spain Street											
1	L2	24	2.0	0.263	6.7	LOS A	1.2	30.3	0.38	0.26	21.5
6	T1	133	2.0	0.263	6.7	LOS A	1.2	30.3	0.38	0.26	21.7
16	R2	83	2.0	0.263	6.7	LOS A	1.2	30.3	0.38	0.26	20.8
Approach		240	2.0	0.263	6.7	LOS A	1.2	30.3	0.38	0.26	21.4
North: SB Fifth Street W											
7	L2	221	2.0	0.463	9.7	LOS A	2.6	65.6	0.50	0.38	19.2
4	T1	193	2.0	0.463	9.7	LOS A	2.6	65.6	0.50	0.38	19.3
14	R2	5	2.0	0.463	9.7	LOS A	2.6	65.6	0.50	0.38	18.6
Approach		419	2.0	0.463	9.7	LOS A	2.6	65.6	0.50	0.38	19.2
West: EB W Spain Street											
5	L2	10	2.0	0.552	13.9	LOS B	3.9	98.0	0.70	0.73	17.9
2	T1	300	2.0	0.552	13.9	LOS B	3.9	98.0	0.70	0.73	18.0
12	R2	81	2.0	0.552	13.9	LOS B	3.9	98.0	0.70	0.73	17.4
Approach		391	2.0	0.552	13.9	LOS B	3.9	98.0	0.70	0.73	17.8
All Vehicles		1268	2.0	0.552	10.5	LOS B	3.9	98.0	0.56	0.51	19.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection Level Of Service Report
Intersection 2: Sonoma Hwy (SR 12)/Fifth Street West

Control Type:	Signalized	Delay (sec / veh):	22.5
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.689

Intersection Setup

Name	Sonoma Hwy (SR 12)		Sonoma Hwy (SR 12)		Fifth Street West	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	125.00	250.00	100.00	100.00	110.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

Volumes

Name	Sonoma Hwy (SR 12)		Sonoma Hwy (SR 12)		Fifth Street West	
Base Volume Input [veh/h]	754	42	288	927	48	196
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	3	0	0	0	114
Total Hourly Volume [veh/h]	754	39	288	927	48	82
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	189	10	72	232	12	21
Total Analysis Volume [veh/h]	754	39	288	927	48	82
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		1	
Bicycle Volume [bicycles/h]	0		0		1	

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal group	2	0	1	6	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	0	10	10	10	0
Maximum Green [s]	45	0	16	45	18	0
Amber [s]	3.7	0.0	3.7	3.7	3.7	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	39	0	23	62	28	0
Vehicle Extension [s]	4.0	0.0	2.0	4.0	2.0	0.0
Walk [s]	7	0	0	5	7	0
Pedestrian Clearance [s]	10	0	0	10	16	0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.7	0.0	2.7	2.7	2.7	0.0
Minimum Recall	Yes		No	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	76	76	76	76	76	76
L, Total Lost Time per Cycle [s]	4.70	4.70	4.70	4.70	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.70	2.70	2.70	2.70	2.70	2.70
g_i, Effective Green Time [s]	37	37	15	57	9	9
g / C, Green / Cycle	0.49	0.49	0.20	0.75	0.12	0.12
(v / s)_i Volume / Saturation Flow Rate	0.45	0.03	0.18	0.55	0.03	0.06
s, saturation flow rate [veh/h]	1676	1424	1597	1676	1597	1392
c, Capacity [veh/h]	818	694	324	1261	197	172
d1, Uniform Delay [s]	18.08	10.23	29.40	5.20	30.02	30.94
k, delay calibration	0.30	0.15	0.25	0.42	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	11.80	0.05	16.93	3.21	0.24	0.76
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.92	0.06	0.89	0.73	0.24	0.48
d, Delay for Lane Group [s/veh]	29.88	10.27	46.33	8.40	30.25	31.70
Lane Group LOS	C	B	D	A	C	C
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	13.49	0.33	6.40	5.95	0.78	1.39
50th-Percentile Queue Length [ft]	337.35	8.14	160.03	148.71	19.55	34.77
95th-Percentile Queue Length [veh]	19.52	0.59	10.55	9.95	1.41	2.50
95th-Percentile Queue Length [ft]	487.96	14.65	263.76	248.71	35.19	62.58

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	29.88	10.27	46.33	8.40	30.25	31.70
Movement LOS	C	B	D	A	C	C
d_A, Approach Delay [s/veh]	28.92		17.39		31.17	
Approach LOS	C		B		C	
d_I, Intersection Delay [s/veh]	22.50					
Intersection LOS	C					
Intersection V/C	0.689					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Fifth Street West/West Napa Street

Control Type:	Signalized	Delay (sec / veh):	47.7
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.988

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	1	1	0	1
Pocket Length [ft]	200.00	100.00	105.00	90.00	100.00	100.00	80.00	100.00	195.00	70.00	100.00	255.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Base Volume Input [veh/h]	381	154	73	114	187	19	14	641	402	26	520	55
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	38	0	0	1	0	0	199	0	0	29
Total Hourly Volume [veh/h]	381	154	35	114	187	18	14	641	203	26	520	26
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	95	39	9	29	47	5	4	160	51	7	130	7
Total Analysis Volume [veh/h]	381	154	35	114	187	18	14	641	203	26	520	26
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	7			5			6			8		
Bicycle Volume [bicycles/h]	0			3			1			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	114
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	23.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	7	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	11	0	0	13	0	13	12	0	13	12	0
Maximum Green [s]	0	25	0	0	21	0	12	39	0	12	39	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	29	0	0	25	0	15	44	0	15	44	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	6	0	0	6	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	13	0	0	21	0	0	13	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	R
C, Cycle Length [s]	101	101	101	101	101	101	101	101	101	101	101
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	3.00	5.00	5.00	3.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	1.00	3.00	3.00	1.00	3.00	3.00
g_i, Effective Green Time [s]	25	25	25	15	15	4	39	39	7	41	41
g / C, Green / Cycle	0.25	0.25	0.25	0.15	0.15	0.04	0.39	0.39	0.07	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.24	0.09	0.02	0.07	0.12	0.01	0.38	0.15	0.02	0.31	0.02
s, saturation flow rate [veh/h]	1597	1676	1402	1597	1643	1597	1676	1383	1597	1676	1416
c, Capacity [veh/h]	396	416	348	235	242	69	649	535	109	691	583
d1, Uniform Delay [s]	37.36	31.33	29.18	39.41	41.82	46.47	30.60	22.15	44.45	25.24	17.74
k, delay calibration	0.43	0.11	0.11	0.11	0.15	0.11	0.46	0.23	0.11	0.36	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	33.12	0.55	0.12	1.54	10.93	1.41	30.72	0.95	1.12	5.48	0.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.96	0.37	0.10	0.48	0.85	0.20	0.99	0.38	0.24	0.75	0.04
d, Delay for Lane Group [s/veh]	70.48	31.87	29.30	40.96	52.74	47.89	61.31	23.10	45.57	30.72	17.80
Lane Group LOS	E	C	C	D	D	D	E	C	D	C	B
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	12.70	3.13	0.66	2.67	5.64	0.36	20.29	3.52	0.65	11.24	0.37
50th-Percentile Queue Length [ft]	317.59	78.31	16.54	66.80	141.02	9.10	507.18	88.04	16.15	281.04	9.22
95th-Percentile Queue Length [veh]	18.55	5.64	1.19	4.81	9.54	0.66	27.67	6.34	1.16	16.74	0.66
95th-Percentile Queue Length [ft]	463.72	140.96	29.78	120.25	238.39	16.38	691.85	158.48	29.07	418.51	16.60

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	70.48	31.87	29.30	40.96	52.74	52.74	47.89	61.31	23.10	45.57	30.72	17.80
Movement LOS	E	C	C	D	D	D	D	E	C	D	C	B
d_A, Approach Delay [s/veh]	57.52			48.53			52.05			30.81		
Approach LOS	E			D			D			C		
d_I, Intersection Delay [s/veh]	47.67											
Intersection LOS	D											
Intersection V/C	0.988											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Fifth Street West/West Napa Street

Control Type:	Signalized	Delay (sec / veh):	43.2
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.981

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Pocket Length [ft]	200.00	100.00	105.00	90.00	100.00	50.00	80.00	100.00	195.00	70.00	100.00	255.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Base Volume Input [veh/h]	381	154	73	114	187	19	14	641	402	26	520	55
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	38	0	0	1	0	0	199	0	0	29
Total Hourly Volume [veh/h]	381	154	35	114	187	18	14	641	203	26	520	26
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	95	39	9	29	47	5	4	160	51	7	130	7
Total Analysis Volume [veh/h]	381	154	35	114	187	18	14	641	203	26	520	26
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	7			5			6			8		
Bicycle Volume [bicycles/h]	0			3			1			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	114
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	23.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal group	0	8	0	0	7	0	5	2	8	1	6	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	11	0	0	13	0	13	12	11	13	12	0
Maximum Green [s]	0	25	0	0	21	0	12	39	25	12	39	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	3.0	3.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	1.0	0.5	0.0	1.0	0.0
Split [s]	0	30	0	0	30	0	22	38	30	16	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	3.0	3.0	5.0	0.0
Walk [s]	0	6	0	0	6	0	0	7	6	0	7	0
Pedestrian Clearance [s]	0	17	0	0	13	0	0	21	17	0	13	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	1.0	3.0	1.5	1.0	3.0	0.0
Minimum Recall		No			No		No	Yes	No	No	Yes	
Maximum Recall		No			No		No	No	No	No	No	
Pedestrian Recall		No			No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	99	99	99	99	99	99	99	99	99	99	99	99
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	3.50	3.00	5.00	5.00	3.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	1.50	1.00	3.00	0.00	1.00	3.00	3.00
g_i, Effective Green Time [s]	25	25	25	13	13	13	4	39	77	7	41	41
g / C, Green / Cycle	0.25	0.25	0.25	0.13	0.13	0.13	0.04	0.39	0.78	0.07	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.24	0.09	0.02	0.07	0.11	0.01	0.01	0.38	0.15	0.02	0.31	0.02
s, saturation flow rate [veh/h]	1597	1676	1402	1597	1676	1354	1597	1676	1390	1270	1676	1416
c, Capacity [veh/h]	403	423	354	216	227	183	70	659	1083	138	701	592
d1, Uniform Delay [s]	36.42	30.53	28.44	39.93	41.73	37.58	45.75	29.57	2.83	45.55	24.36	17.12
k, delay calibration	0.42	0.11	0.11	0.11	0.11	0.11	0.11	0.45	0.23	0.11	0.36	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	29.54	0.53	0.12	2.00	7.40	0.23	1.40	27.18	0.18	0.66	5.05	0.06
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

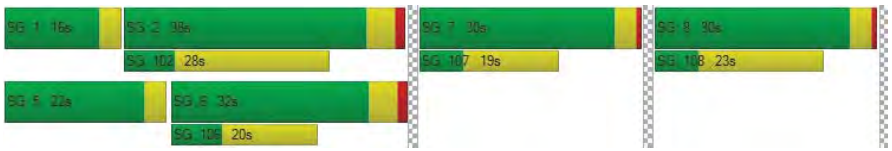
X, volume / capacity	0.95	0.36	0.10	0.53	0.83	0.10	0.20	0.97	0.19	0.19	0.74	0.04
d, Delay for Lane Group [s/veh]	65.95	31.06	28.56	41.93	49.13	37.81	47.16	56.75	3.01	46.21	29.41	17.18
Lane Group LOS	E	C	C	D	D	D	D	E	A	D	C	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	12.15	3.06	0.65	2.69	4.87	0.39	0.36	19.29	0.81	0.64	10.86	0.36
50th-Percentile Queue Length [ft]	303.72	76.49	16.16	67.20	121.73	9.84	8.96	482.22	20.22	16.04	271.55	8.94
95th-Percentile Queue Length [veh]	17.87	5.51	1.16	4.84	8.49	0.71	0.64	26.49	1.46	1.15	16.27	0.64
95th-Percentile Queue Length [ft]	446.63	137.68	29.09	120.97	212.20	17.70	16.12	662.28	36.40	28.87	406.68	16.10

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	65.95	31.06	28.56	41.93	49.13	37.81	47.16	56.75	3.01	46.21	29.41	17.18
Movement LOS	E	C	C	D	D	D	D	E	A	D	C	B
d_A, Approach Delay [s/veh]	54.23			45.92			43.88			29.62		
Approach LOS	D			D			D			C		
d_I, Intersection Delay [s/veh]	43.19											
Intersection LOS	D											
Intersection V/C	0.981											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: Fifth Street West/West Spain Street

Control Type:	All-way stop	Delay (sec / veh):	60.4
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.193

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	95.00	100.00	100.00	55.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Base Volume Input [veh/h]	180	292	31	135	172	15	21	192	119	76	258	230
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	180	292	31	135	172	15	21	192	119	76	258	230
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	45	73	8	34	43	4	5	48	30	19	65	58
Total Analysis Volume [veh/h]	180	292	31	135	172	15	21	192	119	76	258	230
Pedestrian Volume [ped/h]	7			1			3			6		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	402	429	385	409	451	564
Degree of Utilization, x	0.45	0.75	0.35	0.46	0.74	1.19

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	2.25	6.22	1.55	2.33	5.99	21.33
95th-Percentile Queue Length [ft]	56.25	155.54	38.66	58.35	149.87	533.30
Approach Delay [s/veh]	27.59		18.02		30.31	131.43
Approach LOS	D		C		D	F
Intersection Delay [s/veh]	60.35					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 1: Fifth Street West/West Spain Street

Control Type:	Signalized	Delay (sec / veh):	34.5
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.609

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	95.00	100.00	100.00	55.00	100.00	100.00	75.00	100.00	100.00	75.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Base Volume Input [veh/h]	180	292	31	135	172	15	21	192	119	76	258	230
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	180	292	31	135	172	15	21	192	119	76	258	230
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	45	73	8	34	43	4	5	48	30	19	65	58
Total Analysis Volume [veh/h]	180	292	31	135	172	15	21	192	119	76	258	230
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	7			1			3			6		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	5	0	5	5	0	5	5	0	5	5	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	14	21	0	12	19	0	9	33	0	14	38	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
C, Cycle Length [s]	80	80	80	80	80	80	80	80
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	27	8	25	2	25	5	27
g / C, Green / Cycle	0.13	0.33	0.10	0.31	0.02	0.31	0.06	0.34
(v / s)_i Volume / Saturation Flow Rate	0.11	0.20	0.08	0.11	0.01	0.20	0.05	0.32
s, saturation flow rate [veh/h]	1597	1647	1597	1652	1597	1563	1597	1547
c, Capacity [veh/h]	201	547	161	507	40	480	97	530
d1, Uniform Delay [s]	34.56	22.27	35.43	21.71	38.64	24.06	37.14	25.31
k, delay calibration	0.11	0.50	0.11	0.50	0.11	0.11	0.11	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	13.19	4.64	10.93	2.05	10.37	1.48	12.66	13.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.90	0.59	0.84	0.37	0.53	0.65	0.78	0.92
d, Delay for Lane Group [s/veh]	47.75	26.90	46.36	23.77	49.01	25.54	49.80	38.35
Lane Group LOS	D	C	D	C	D	C	D	D
Critical Lane Group	No	Yes	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	4.10	5.51	3.02	2.93	0.52	5.07	1.78	10.30
50th-Percentile Queue Length [ft]	102.46	137.65	75.38	73.16	12.89	126.74	44.53	257.44
95th-Percentile Queue Length [veh]	7.38	9.35	5.43	5.27	0.93	8.76	3.21	15.56
95th-Percentile Queue Length [ft]	184.42	233.85	135.69	131.69	23.20	219.06	80.15	389.01

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	47.75	26.90	26.90	46.36	23.77	23.77	49.01	25.54	25.54	49.80	38.35	38.35
Movement LOS	D	C	C	D	C	C	D	C	C	D	D	D
d_A, Approach Delay [s/veh]	34.36			33.24			27.02			39.89		
Approach LOS	C			C			C			D		
d_I, Intersection Delay [s/veh]	34.55											
Intersection LOS	C											
Intersection V/C	0.609											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MOVEMENT SUMMARY

Site: 1 [PM Future]

West Spain Street/Fifth Street West
80' Roundabout

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Fifth Street W											
3	L2	180	2.0	0.634	15.2	LOS C	5.2	132.0	0.70	0.71	17.0
8	T1	292	2.0	0.634	15.2	LOS C	5.2	132.0	0.70	0.71	17.0
18	R2	31	2.0	0.634	15.2	LOS C	5.2	132.0	0.70	0.71	16.5
Approach		503	2.0	0.634	15.2	LOS C	5.2	132.0	0.70	0.71	17.0
East: WB W Spain Street											
1	L2	76	2.0	0.839	31.0	LOS D	11.4	289.7	0.94	1.27	12.5
6	T1	258	2.0	0.839	31.0	LOS D	11.4	289.7	0.94	1.27	12.5
16	R2	230	2.0	0.839	31.0	LOS D	11.4	289.7	0.94	1.27	12.2
Approach		564	2.0	0.839	31.0	LOS D	11.4	289.7	0.94	1.27	12.4
North: SB Fifth Street W											
7	L2	135	2.0	0.491	13.1	LOS B	3.1	78.6	0.70	0.74	17.7
4	T1	172	2.0	0.491	13.1	LOS B	3.1	78.6	0.70	0.74	17.8
14	R2	15	2.0	0.491	13.1	LOS B	3.1	78.6	0.70	0.74	17.2
Approach		322	2.0	0.491	13.1	LOS B	3.1	78.6	0.70	0.74	17.8
West: EB W Spain Street											
5	L2	21	2.0	0.443	10.8	LOS B	2.4	62.2	0.61	0.55	19.2
2	T1	192	2.0	0.443	10.8	LOS B	2.4	62.2	0.61	0.55	19.4
12	R2	119	2.0	0.443	10.8	LOS B	2.4	62.2	0.61	0.55	18.7
Approach		332	2.0	0.443	10.8	LOS B	2.4	62.2	0.61	0.55	19.1
All Vehicles		1721	2.0	0.839	19.1	LOS C	11.4	289.7	0.76	0.87	15.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection Level Of Service Report
Intersection 2: Sonoma Hwy (SR 12)/Fifth Street West

Control Type:	Signalized	Delay (sec / veh):	36.5
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.811

Intersection Setup

Name	Sonoma Hwy (SR 12)		Sonoma Hwy (SR 12)		Fifth Street West	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	105.00	275.00	100.00	100.00	110.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

Volumes

Name	Sonoma Hwy (SR 12)		Sonoma Hwy (SR 12)		Fifth Street West	
Base Volume Input [veh/h]	867	50	231	942	68	348
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	4	0	0	0	140
Total Hourly Volume [veh/h]	867	46	231	942	68	208
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	217	12	58	236	17	52
Total Analysis Volume [veh/h]	867	46	231	942	68	208
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		4	
Bicycle Volume [bicycles/h]	6		2		1	

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal group	2	0	1	6	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	0	10	10	10	0
Maximum Green [s]	45	0	16	45	18	0
Amber [s]	3.7	0.0	3.7	3.7	3.7	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	39	0	23	62	28	0
Vehicle Extension [s]	4.0	0.0	2.0	4.0	2.0	0.0
Walk [s]	7	0	0	5	7	0
Pedestrian Clearance [s]	10	0	0	10	16	0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.7	0.0	2.7	2.7	2.7	0.0
Minimum Recall	Yes		No	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	89	89	89	89	89	89
L, Total Lost Time per Cycle [s]	4.70	4.70	4.70	4.70	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.70	2.70	2.70	2.70	2.70	2.70
g_i, Effective Green Time [s]	45	45	15	64	15	15
g / C, Green / Cycle	0.51	0.51	0.16	0.72	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.52	0.03	0.14	0.56	0.04	0.15
s, saturation flow rate [veh/h]	1676	1385	1597	1676	1597	1393
c, Capacity [veh/h]	851	703	261	1215	270	236
d1, Uniform Delay [s]	21.80	11.10	36.21	7.67	31.92	35.92
k, delay calibration	0.47	0.15	0.21	0.50	0.04	0.17
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	34.70	0.06	16.70	4.88	0.18	14.90
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.02	0.07	0.88	0.78	0.25	0.88
d, Delay for Lane Group [s/veh]	56.50	11.15	52.91	12.55	32.10	50.83
Lane Group LOS	F	B	D	B	C	D
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	24.17	0.45	5.99	10.02	1.26	5.27
50th-Percentile Queue Length [ft]	604.28	11.25	149.81	250.57	31.52	131.75
95th-Percentile Queue Length [veh]	32.71	0.81	10.01	15.21	2.27	9.04
95th-Percentile Queue Length [ft]	817.69	20.25	250.17	380.37	56.73	225.88

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	56.50	11.15	52.91	12.55	32.10	50.83
Movement LOS	F	B	D	B	C	D
d_A, Approach Delay [s/veh]	54.21		20.50		46.21	
Approach LOS	D		C		D	
d_I, Intersection Delay [s/veh]	36.54					
Intersection LOS	D					
Intersection V/C	0.811					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Fifth Street West/West Napa Street

Control Type:	Signalized	Delay (sec / veh):	72.4
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.147

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	1	1	0	1
Pocket Length [ft]	200.00	100.00	105.00	90.00	100.00	100.00	80.00	100.00	195.00	70.00	100.00	255.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Base Volume Input [veh/h]	415	315	71	139	188	87	57	656	376	60	712	154
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	25	0	0	5	0	0	199	0	0	73
Total Hourly Volume [veh/h]	415	315	46	139	188	82	57	656	177	60	712	81
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	104	79	12	35	47	21	14	164	44	15	178	20
Total Analysis Volume [veh/h]	415	315	46	139	188	82	57	656	177	60	712	81
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14			8			7			5		
Bicycle Volume [bicycles/h]	2			1			1			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	23.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	3	8	0	4	7	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5	0
Maximum Green [s]	0	25	0	0	21	0	12	39	0	12	39	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	27	0	0	23	0	15	41	0	29	55	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	6	0	0	6	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	13	0	0	21	0	0	13	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	R
C, Cycle Length [s]	103	103	103	103	103	103	103	103	103	103	103
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	3.00	5.00	5.00	3.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	1.00	3.00	3.00	1.00	3.00	3.00
g_i, Effective Green Time [s]	25	25	25	20	20	5	39	39	5	39	39
g / C, Green / Cycle	0.24	0.24	0.24	0.19	0.19	0.04	0.38	0.38	0.05	0.38	0.38
(v / s)_i Volume / Saturation Flow Rate	0.26	0.19	0.03	0.09	0.17	0.04	0.39	0.13	0.04	0.42	0.06
s, saturation flow rate [veh/h]	1597	1676	1378	1597	1569	1597	1676	1369	1597	1676	1410
c, Capacity [veh/h]	385	405	332	303	297	73	631	516	76	635	534
d1, Uniform Delay [s]	39.30	36.71	30.84	34.23	37.84	48.14	25.79	18.09	47.97	25.63	16.71
k, delay calibration	0.50	0.29	0.11	0.11	0.34	0.11	0.48	0.23	0.11	0.50	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	67.97	8.42	0.19	1.09	25.12	16.53	45.72	0.84	15.96	73.85	0.28
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.08	0.78	0.14	0.46	0.91	0.78	1.04	0.34	0.79	1.12	0.15
d, Delay for Lane Group [s/veh]	107.27	45.13	31.03	35.31	62.96	64.68	71.51	18.93	63.93	99.49	16.99
Lane Group LOS	F	D	C	D	E	E	F	B	E	F	B
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	16.88	8.28	0.92	2.94	8.26	1.76	21.26	2.49	1.84	26.32	1.05
50th-Percentile Queue Length [ft]	421.99	207.04	22.93	73.44	206.45	44.06	531.55	62.18	45.99	658.04	26.30
95th-Percentile Queue Length [veh]	24.64	13.00	1.65	5.29	12.97	3.17	29.61	4.48	3.31	37.51	1.89
95th-Percentile Queue Length [ft]	615.92	325.02	41.28	132.20	324.27	79.31	740.24	111.93	82.79	937.84	47.34

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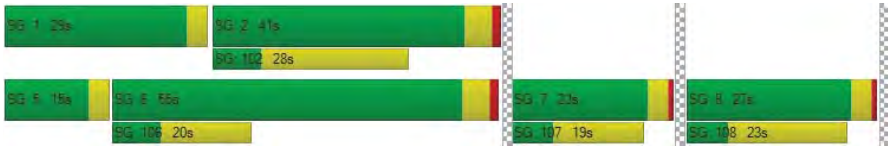
Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	107.27	45.13	31.03	35.31	62.96	62.96	64.68	71.51	18.93	63.93	99.49	16.99
Movement LOS	F	D	C	D	E	E	E	F	B	E	F	B
d_A, Approach Delay [s/veh]	77.52			53.56			60.62			89.15		
Approach LOS	E			D			E			F		
d_I, Intersection Delay [s/veh]	72.43											
Intersection LOS	E											
Intersection V/C	1.147											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Fifth Street West/West Napa Street

Control Type:	Signalized	Delay (sec / veh):	53.8
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.084

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Pocket Length [ft]	200.00	100.00	105.00	90.00	100.00	50.00	80.00	100.00	195.00	70.00	100.00	255.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Base Volume Input [veh/h]	415	315	71	139	188	87	57	656	376	60	712	154
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	25	0	0	5	0	0	199	0	0	73
Total Hourly Volume [veh/h]	415	315	46	139	188	82	57	656	177	60	712	81
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	104	79	12	35	47	21	14	164	44	15	178	20
Total Analysis Volume [veh/h]	415	315	46	139	188	82	57	656	177	60	712	81
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14			8			7			5		
Bicycle Volume [bicycles/h]	2			1			1			0		

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Version 5.00-00

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	23.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal group	3	8	0	4	7	0	5	2	8	1	6	7
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	5	5	5	5
Maximum Green [s]	0	25	0	0	21	0	12	39	25	12	39	21
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	3.0	3.0	4.0	3.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	1.0	0.5	0.0	1.0	0.5
Split [s]	0	35	0	0	27	0	8	47	35	11	50	27
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	3.0	3.0	5.0	3.0
Walk [s]	0	6	0	0	6	0	0	7	6	0	7	6
Pedestrian Clearance [s]	0	17	0	0	13	0	0	21	17	0	13	13
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	1.0	3.0	1.5	1.0	3.0	1.5
Minimum Recall		No			No		No	Yes	No	No	Yes	
Maximum Recall		No			No		No	No	No	No	No	
Pedestrian Recall		No			No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	99	99	99	99	99	99	99	99	99	99	99	99
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	3.50	3.00	5.00	5.00	3.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	1.50	1.00	3.00	0.00	1.00	3.00	3.00
g_i, Effective Green Time [s]	25	25	25	13	13	13	4	39	77	7	41	41
g / C, Green / Cycle	0.25	0.25	0.25	0.14	0.14	0.14	0.04	0.39	0.78	0.07	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.26	0.19	0.03	0.09	0.11	0.06	0.04	0.39	0.13	0.05	0.42	0.06
s, saturation flow rate [veh/h]	1597	1676	1378	1597	1676	1357	1597	1676	1383	1270	1676	1411
c, Capacity [veh/h]	402	422	347	217	228	184	72	659	1077	136	697	587
d1, Uniform Delay [s]	37.13	34.21	28.74	38.39	39.50	37.30	46.19	23.55	0.00	45.86	22.10	13.52
k, delay calibration	0.48	0.27	0.11	0.11	0.11	0.11	0.11	0.46	0.23	0.11	0.50	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	52.41	6.35	0.17	3.13	7.35	1.68	17.35	32.64	0.15	2.22	39.46	0.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.03	0.75	0.13	0.64	0.82	0.44	0.79	1.00	0.16	0.44	1.02	0.14
d, Delay for Lane Group [s/veh]	89.54	40.56	28.91	41.52	46.85	38.97	63.53	56.19	0.15	48.08	61.57	13.75
Lane Group LOS	F	D	C	D	D	D	E	E	A	D	F	B
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	15.39	7.63	0.86	3.20	4.64	1.81	1.71	18.70	0.05	1.51	20.80	0.89
50th-Percentile Queue Length [ft]	384.78	190.67	21.52	79.93	116.07	45.33	42.77	467.53	1.14	37.82	519.92	22.20
95th-Percentile Queue Length [veh]	22.23	12.16	1.55	5.76	8.18	3.26	3.08	25.79	0.08	2.72	28.71	1.60
95th-Percentile Queue Length [ft]	555.85	303.90	38.73	143.88	204.41	81.59	76.99	644.84	2.05	68.08	717.68	39.96

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	89.54	40.56	28.91	41.52	46.85	38.97	63.53	56.19	0.15	48.08	61.57	13.75
Movement LOS	F	D	C	D	D	D	E	E	A	D	F	B
d_A, Approach Delay [s/veh]	66.06			43.46			45.52			56.08		
Approach LOS	E			D			D			E		
d_I, Intersection Delay [s/veh]	53.75											
Intersection LOS	D											
Intersection V/C	1.084											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 1: Fifth Street West/West Spain Street

Control Type:	All-way stop	Delay (sec / veh):	16.4
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.673

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	95.00	100.00	100.00	55.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Base Volume Input [veh/h]	70	93	28	194	169	4	9	263	71	21	117	73
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	4	3	0	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	70	93	28	194	169	4	9	267	74	21	118	73
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	26	8	54	47	1	3	74	21	6	33	20
Total Analysis Volume [veh/h]	78	103	31	216	188	4	10	297	82	23	131	81
Pedestrian Volume [ped/h]	6			1			3			3		

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Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	451	493	475	511	579	552
Degree of Utilization, x	0.17	0.27	0.45	0.38	0.67	0.43

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.62	1.09	2.33	1.73	5.07	2.12
95th-Percentile Queue Length [ft]	15.47	27.30	58.27	43.25	126.84	52.91
Approach Delay [s/veh]	12.57		15.25		21.06	14.30
Approach LOS	B		C		C	B
Intersection Delay [s/veh]	16.43					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 1: Fifth Street West/West Spain Street

Control Type:	Signalized	Delay (sec / veh):	18.0
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.468

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	95.00	100.00	100.00	55.00	100.00	100.00	75.00	100.00	100.00	75.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Base Volume Input [veh/h]	70	93	28	194	169	4	9	263	71	21	117	73
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	4	3	0	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	70	93	28	194	169	4	9	267	74	21	118	73
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	26	8	54	47	1	3	74	21	6	33	20
Total Analysis Volume [veh/h]	78	103	31	216	188	4	10	297	82	23	131	81
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6			1			3			3		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	5	0	5	5	0	5	5	0	5	5	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	9	20	0	14	25	0	9	20	0	16	27	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
C, Cycle Length [s]	41	41	41	41	41	41	41	41
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	5	7	9	1	12	1	12
g / C, Green / Cycle	0.07	0.11	0.18	0.21	0.01	0.29	0.03	0.31
(v / s)_i Volume / Saturation Flow Rate	0.05	0.08	0.14	0.11	0.01	0.24	0.01	0.14
s, saturation flow rate [veh/h]	1597	1605	1597	1670	1597	1611	1597	1569
c, Capacity [veh/h]	116	181	280	360	21	468	46	480
d1, Uniform Delay [s]	18.44	17.52	16.03	14.18	19.98	13.42	19.53	11.36
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.56	5.81	4.47	1.22	15.08	3.39	8.35	0.64
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.67	0.74	0.77	0.53	0.47	0.81	0.50	0.44
d, Delay for Lane Group [s/veh]	25.00	23.32	20.50	15.40	35.07	16.80	27.88	12.00
Lane Group LOS	C	C	C	B	D	B	C	B
Critical Lane Group	No	Yes	Yes	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	0.83	1.34	1.95	1.42	0.17	2.98	0.29	1.30
50th-Percentile Queue Length [ft]	20.84	33.38	48.83	35.48	4.31	74.53	7.36	32.49
95th-Percentile Queue Length [veh]	1.50	2.40	3.52	2.55	0.31	5.37	0.53	2.34
95th-Percentile Queue Length [ft]	37.50	60.08	87.89	63.87	7.76	134.15	13.25	58.48

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	25.00	23.32	23.32	20.50	15.40	15.40	35.07	16.80	16.80	27.88	12.00	12.00
Movement LOS	C	C	C	C	B	B	D	B	B	C	B	B
d_A, Approach Delay [s/veh]	23.94			18.10			17.27			13.55		
Approach LOS	C			B			B			B		
d_I, Intersection Delay [s/veh]	17.98											
Intersection LOS	B											
Intersection V/C	0.468											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MOVEMENT SUMMARY

Site: 1 [AM Existing+Prj]

West Spain Street/Fifth Street West
80' Roundabout

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Fifth Street W											
3	L2	78	2.0	0.327	9.8	LOS A	1.6	40.8	0.63	0.60	19.3
8	T1	103	2.0	0.327	9.8	LOS A	1.6	40.8	0.63	0.60	19.4
18	R2	31	2.0	0.327	9.8	LOS A	1.6	40.8	0.63	0.60	18.7
Approach		212	2.0	0.327	9.8	LOS A	1.6	40.8	0.63	0.60	19.3
East: WB W Spain Street											
1	L2	23	2.0	0.257	6.6	LOS A	1.2	29.4	0.37	0.25	21.6
6	T1	131	2.0	0.257	6.6	LOS A	1.2	29.4	0.37	0.25	21.8
16	R2	81	2.0	0.257	6.6	LOS A	1.2	29.4	0.37	0.25	20.9
Approach		236	2.0	0.257	6.6	LOS A	1.2	29.4	0.37	0.25	21.4
North: SB Fifth Street W											
7	L2	216	2.0	0.449	9.4	LOS A	2.5	62.6	0.49	0.37	19.3
4	T1	188	2.0	0.449	9.4	LOS A	2.5	62.6	0.49	0.37	19.4
14	R2	4	2.0	0.449	9.4	LOS A	2.5	62.6	0.49	0.37	18.7
Approach		408	2.0	0.449	9.4	LOS A	2.5	62.6	0.49	0.37	19.4
West: EB W Spain Street											
5	L2	10	2.0	0.543	13.5	LOS B	3.7	94.5	0.69	0.71	18.0
2	T1	297	2.0	0.543	13.5	LOS B	3.7	94.5	0.69	0.71	18.1
12	R2	82	2.0	0.543	13.5	LOS B	3.7	94.5	0.69	0.71	17.5
Approach		389	2.0	0.543	13.5	LOS B	3.7	94.5	0.69	0.71	18.0
All Vehicles		1244	2.0	0.543	10.2	LOS B	3.7	94.5	0.55	0.49	19.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection Level Of Service Report
Intersection 2: Sonoma Hwy (SR 12)/Fifth Street West

Control Type:	Signalized	Delay (sec / veh):	14.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.549

Intersection Setup

Name	Sonoma Hwy (SR 12)		Sonoma Hwy (SR 12)		Fifth Street West	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	125.00	250.00	100.00	100.00	110.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

Volumes

Name	Sonoma Hwy (SR 12)		Sonoma Hwy (SR 12)		Fifth Street West	
Base Volume Input [veh/h]	522	36	253	782	42	172
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	1	0	1	5
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	3	0	0	0	114
Total Hourly Volume [veh/h]	522	33	254	782	43	63
Peak Hour Factor	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	139	9	68	208	11	17
Total Analysis Volume [veh/h]	556	35	271	833	46	67
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		1	
Bicycle Volume [bicycles/h]	0		0		1	

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal group	2	0	1	6	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	0	10	10	10	0
Maximum Green [s]	45	0	16	45	18	0
Amber [s]	3.7	0.0	3.7	3.7	3.7	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	39	0	23	62	28	0
Vehicle Extension [s]	4.0	0.0	2.0	4.0	2.0	0.0
Walk [s]	7	0	0	5	7	0
Pedestrian Clearance [s]	10	0	0	10	16	0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.7	0.0	2.7	2.7	2.7	0.0
Minimum Recall	Yes		No	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	55	55	55	55	55	55
L, Total Lost Time per Cycle [s]	4.70	4.70	4.70	4.70	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.70	2.70	2.70	2.70	2.70	2.70
g_i, Effective Green Time [s]	21	21	11	37	8	8
g / C, Green / Cycle	0.39	0.39	0.20	0.68	0.15	0.15
(v / s)_i Volume / Saturation Flow Rate	0.33	0.02	0.17	0.50	0.03	0.05
s, saturation flow rate [veh/h]	1676	1423	1597	1676	1597	1393
c, Capacity [veh/h]	655	556	320	1136	240	210
d1, Uniform Delay [s]	15.16	10.39	21.03	5.65	20.30	20.71
k, delay calibration	0.15	0.15	0.04	0.20	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.45	0.07	2.41	1.74	0.14	0.32
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	0.06	0.85	0.73	0.19	0.32
d, Delay for Lane Group [s/veh]	19.61	10.46	23.44	7.39	20.44	21.03
Lane Group LOS	B	B	C	A	C	C
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	6.09	0.24	3.23	3.87	0.48	0.72
50th-Percentile Queue Length [ft]	152.25	5.95	80.68	96.80	12.06	18.04
95th-Percentile Queue Length [veh]	10.14	0.43	5.81	6.97	0.87	1.30
95th-Percentile Queue Length [ft]	253.43	10.71	145.22	174.24	21.71	32.47

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	19.61	10.46	23.44	7.39	20.44	21.03
Movement LOS	B	B	C	A	C	C
d_A, Approach Delay [s/veh]	19.07		11.33		20.79	
Approach LOS	B		B		C	
d_I, Intersection Delay [s/veh]	14.45					
Intersection LOS	B					
Intersection V/C	0.549					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Fifth Street West/West Napa Street

Control Type:	Signalized	Delay (sec / veh):	32.6
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.904

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	1	1	0	1
Pocket Length [ft]	200.00	100.00	105.00	90.00	100.00	100.00	80.00	100.00	195.00	70.00	100.00	255.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Base Volume Input [veh/h]	334	135	64	100	164	17	12	479	353	23	358	48
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	3	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	38	0	0	1	0	0	199	0	0	29
Total Hourly Volume [veh/h]	334	135	26	100	167	16	12	479	154	23	358	19
Peak Hour Factor	0.9470	0.9470	0.9470	0.9470	0.9470	0.9470	0.9470	0.9470	0.9470	0.9470	0.9470	0.9470
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	88	36	7	26	44	4	3	126	41	6	95	5
Total Analysis Volume [veh/h]	353	143	27	106	176	17	13	506	163	24	378	20
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	7			5			6			8		
Bicycle Volume [bicycles/h]	0			3			1			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	114
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	23.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	7	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	11	0	0	13	0	13	12	0	13	12	0
Maximum Green [s]	0	25	0	0	21	0	12	39	0	12	39	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	29	0	0	25	0	15	44	0	15	44	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	6	0	0	6	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	13	0	0	21	0	0	13	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	R
C, Cycle Length [s]	84	84	84	84	84	84	84	84	84	84	84
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	3.00	5.00	5.00	3.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	1.00	3.00	3.00	1.00	3.00	3.00
g_i, Effective Green Time [s]	21	21	21	13	13	3	29	29	6	32	32
g / C, Green / Cycle	0.25	0.25	0.25	0.16	0.16	0.04	0.35	0.35	0.07	0.38	0.38
(v / s)_i Volume / Saturation Flow Rate	0.22	0.09	0.02	0.07	0.12	0.01	0.30	0.12	0.02	0.23	0.01
s, saturation flow rate [veh/h]	1597	1676	1402	1597	1643	1597	1676	1381	1597	1676	1416
c, Capacity [veh/h]	395	415	347	248	255	65	589	485	107	633	534
d1, Uniform Delay [s]	30.45	25.93	24.18	32.00	33.85	38.82	25.21	19.96	37.00	20.94	16.45
k, delay calibration	0.26	0.11	0.11	0.11	0.11	0.11	0.29	0.23	0.11	0.23	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	15.36	0.49	0.09	1.17	4.56	1.48	9.27	0.86	1.05	1.93	0.06
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.89	0.34	0.08	0.43	0.76	0.20	0.86	0.34	0.22	0.60	0.04
d, Delay for Lane Group [s/veh]	45.81	26.42	24.28	33.16	38.41	40.30	34.48	20.82	38.05	22.87	16.51
Lane Group LOS	D	C	C	C	D	D	C	C	D	C	B
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	8.30	2.34	0.41	1.98	3.98	0.28	10.34	2.37	0.49	5.99	0.24
50th-Percentile Queue Length [ft]	207.43	58.45	10.27	49.46	99.47	7.02	258.47	59.16	12.22	149.63	6.09
95th-Percentile Queue Length [veh]	13.02	4.21	0.74	3.56	7.16	0.51	15.61	4.26	0.88	10.00	0.44
95th-Percentile Queue Length [ft]	325.53	105.21	18.49	89.02	179.04	12.63	390.30	106.48	21.99	249.94	10.97

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	45.81	26.42	24.28	33.16	38.41	38.41	40.30	34.48	20.82	38.05	22.87	16.51
Movement LOS	D	C	C	C	D	D	D	C	C	D	C	B
d_A, Approach Delay [s/veh]	39.39			36.55			31.33			23.43		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	32.60											
Intersection LOS	C											
Intersection V/C	0.904											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 1: Fifth Street West/West Spain Street

Control Type:	All-way stop	Delay (sec / veh):	44.2
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.076

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	95.00	100.00	100.00	55.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Base Volume Input [veh/h]	150	256	27	118	151	13	18	160	104	67	226	202
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	0	0	0	0	0	0	2	1	0	4	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	152	256	27	118	151	13	18	162	105	67	230	202
Peak Hour Factor	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	68	7	32	40	3	5	43	28	18	61	54
Total Analysis Volume [veh/h]	163	274	29	126	161	14	19	173	112	72	246	216
Pedestrian Volume [ped/h]	7			1			3			6		

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Version 5.00-00

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	412	441	395	421	464	534
Degree of Utilization, x	0.40	0.69	0.32	0.42	0.66	1.08

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.85	5.10	1.35	2.01	4.63	16.70
95th-Percentile Queue Length [ft]	46.34	127.55	33.79	50.21	115.86	417.48
Approach Delay [s/veh]	23.55		16.73		24.35	88.99
Approach LOS	C		C		C	F
Intersection Delay [s/veh]	44.20					
Intersection LOS	E					

Intersection Level Of Service Report
Intersection 1: Fifth Street West/West Spain Street

Control Type:	Signalized	Delay (sec / veh):	22.8
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.573

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	95.00	100.00	100.00	55.00	100.00	100.00	75.00	100.00	100.00	75.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Base Volume Input [veh/h]	150	256	27	118	151	13	18	160	104	67	226	202
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	0	0	0	0	0	0	2	1	0	4	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	152	256	27	118	151	13	18	162	105	67	230	202
Peak Hour Factor	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	68	7	32	40	3	5	43	28	18	61	54
Total Analysis Volume [veh/h]	163	274	29	126	161	14	19	173	112	72	246	216
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	7			1			3			6		
Bicycle Volume [bicycles/h]	0			0			0			0		

Generated with PTV VISTRO
Version 5.00-00

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	5	0	5	5	0	5	5	0	5	5	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	12	19	0	12	19	0	9	19	0	20	30	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
C, Cycle Length [s]	52	52	52	52	52	52	52	52
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	12	5	10	1	16	3	18
g / C, Green / Cycle	0.13	0.23	0.10	0.20	0.02	0.30	0.06	0.34
(v / s)_i Volume / Saturation Flow Rate	0.10	0.18	0.08	0.11	0.01	0.18	0.05	0.30
s, saturation flow rate [veh/h]	1597	1646	1597	1652	1597	1560	1597	1548
c, Capacity [veh/h]	210	374	163	326	37	471	100	528
d1, Uniform Delay [s]	21.94	19.12	22.87	18.81	25.21	15.55	24.03	16.15
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.09	4.25	7.64	1.37	10.39	1.25	9.39	4.73
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.78	0.81	0.77	0.54	0.51	0.60	0.72	0.87
d, Delay for Lane Group [s/veh]	28.03	23.37	30.50	20.18	35.60	16.81	33.43	20.87
Lane Group LOS	C	C	C	C	D	B	C	C
Critical Lane Group	No	Yes	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	2.11	3.52	1.73	1.83	0.32	2.68	1.07	5.07
50th-Percentile Queue Length [ft]	52.81	88.06	43.19	45.79	8.09	66.97	26.63	126.76
95th-Percentile Queue Length [veh]	3.80	6.34	3.11	3.30	0.58	4.82	1.92	8.76
95th-Percentile Queue Length [ft]	95.06	158.52	77.75	82.43	14.56	120.54	47.93	219.08

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	28.03	23.37	23.37	30.50	20.18	20.18	35.60	16.81	16.81	33.43	20.87	20.87
Movement LOS	C	C	C	C	C	C	D	B	B	C	C	C
d_A, Approach Delay [s/veh]	25.00			24.50			17.98			22.57		
Approach LOS	C			C			B			C		
d_I, Intersection Delay [s/veh]	22.77											
Intersection LOS	C											
Intersection V/C	0.573											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MOVEMENT SUMMARY

Site: 1 [PM Existing+Prj]

West Spain Street/Fifth Street West
80' Roundabout

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Fifth Street W											
3	L2	163	2.0	0.569	12.9	LOS B	4.0	101.5	0.63	0.59	17.9
8	T1	274	2.0	0.569	12.9	LOS B	4.0	101.5	0.63	0.59	18.0
18	R2	29	2.0	0.569	12.9	LOS B	4.0	101.5	0.63	0.59	17.4
Approach		465	2.0	0.569	12.9	LOS B	4.0	101.5	0.63	0.59	18.0
East: WB W Spain Street											
1	L2	72	2.0	0.763	23.5	LOS C	8.4	214.3	0.86	1.06	14.3
6	T1	246	2.0	0.763	23.5	LOS C	8.4	214.3	0.86	1.06	14.4
16	R2	216	2.0	0.763	23.5	LOS C	8.4	214.3	0.86	1.06	14.0
Approach		534	2.0	0.763	23.5	LOS C	8.4	214.3	0.86	1.06	14.2
North: SB Fifth Street W											
7	L2	126	2.0	0.444	11.7	LOS B	2.6	64.8	0.66	0.66	18.4
4	T1	161	2.0	0.444	11.7	LOS B	2.6	64.8	0.66	0.66	18.5
14	R2	14	2.0	0.444	11.7	LOS B	2.6	64.8	0.66	0.66	17.8
Approach		302	2.0	0.444	11.7	LOS B	2.6	64.8	0.66	0.66	18.4
West: EB W Spain Street											
5	L2	19	2.0	0.397	9.7	LOS A	2.1	52.2	0.57	0.50	19.8
2	T1	173	2.0	0.397	9.7	LOS A	2.1	52.2	0.57	0.50	19.9
12	R2	112	2.0	0.397	9.7	LOS A	2.1	52.2	0.57	0.50	19.2
Approach		305	2.0	0.397	9.7	LOS A	2.1	52.2	0.57	0.50	19.6
All Vehicles		1605	2.0	0.763	15.6	LOS C	8.4	214.3	0.70	0.74	16.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection Level Of Service Report
Intersection 2: Sonoma Hwy (SR 12)/Fifth Street West

Control Type:	Signalized	Delay (sec / veh):	16.6
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.661

Intersection Setup

Name	Sonoma Hwy (SR 12)		Sonoma Hwy (SR 12)		Fifth Street West	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	105.00	275.00	100.00	100.00	110.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

Volumes

Name	Sonoma Hwy (SR 12)		Sonoma Hwy (SR 12)		Fifth Street West	
Base Volume Input [veh/h]	642	44	203	662	52	305
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	1	5	0	1	3
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	4	0	0	0	140
Total Hourly Volume [veh/h]	642	41	208	662	53	168
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	167	11	54	172	14	44
Total Analysis Volume [veh/h]	669	43	217	690	55	175
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		4	
Bicycle Volume [bicycles/h]	6		2		1	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal group	2	0	1	6	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	0	10	10	10	0
Maximum Green [s]	45	0	16	45	18	0
Amber [s]	3.7	0.0	3.7	3.7	3.7	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	39	0	23	62	28	0
Vehicle Extension [s]	4.0	0.0	2.0	4.0	2.0	0.0
Walk [s]	7	0	0	5	7	0
Pedestrian Clearance [s]	10	0	0	10	16	0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.7	0.0	2.7	2.7	2.7	0.0
Minimum Recall	Yes		No	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	62	62	62	62	62	62
L, Total Lost Time per Cycle [s]	4.70	4.70	4.70	4.70	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.70	2.70	2.70	2.70	2.70	2.70
g_i, Effective Green Time [s]	28	28	10	43	10	10
g / C, Green / Cycle	0.45	0.45	0.16	0.69	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.40	0.03	0.14	0.41	0.03	0.13
s, saturation flow rate [veh/h]	1676	1383	1597	1676	1597	1393
c, Capacity [veh/h]	758	625	260	1158	253	220
d1, Uniform Delay [s]	15.52	9.62	25.19	5.06	22.79	25.17
k, delay calibration	0.17	0.15	0.04	0.18	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.43	0.07	2.71	0.82	0.16	2.47
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.07	0.83	0.60	0.22	0.79
d, Delay for Lane Group [s/veh]	20.95	9.69	27.90	5.87	22.95	27.64
Lane Group LOS	C	A	C	A	C	C
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	8.45	0.30	3.09	3.14	0.67	2.48
50th-Percentile Queue Length [ft]	211.14	7.56	77.35	78.50	16.82	61.88
95th-Percentile Queue Length [veh]	13.21	0.54	5.57	5.65	1.21	4.46
95th-Percentile Queue Length [ft]	330.30	13.61	139.23	141.30	30.27	111.39

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	20.95	9.69	27.90	5.87	22.95	27.64
Movement LOS	C	A	C	A	C	C
d_A, Approach Delay [s/veh]	20.27		11.14		26.52	
Approach LOS	C		B		C	
d_I, Intersection Delay [s/veh]	16.57					
Intersection LOS	B					
Intersection V/C	0.661					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Fifth Street West/West Napa Street

Control Type:	Signalized	Delay (sec / veh):	38.6
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.915

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	1	1	0	1
Pocket Length [ft]	200.00	100.00	105.00	90.00	100.00	100.00	80.00	100.00	195.00	70.00	100.00	255.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Base Volume Input [veh/h]	358	276	52	122	165	38	37	393	330	53	487	128
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	0	1	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	25	0	0	5	0	0	199	0	0	73
Total Hourly Volume [veh/h]	358	278	27	122	166	33	37	393	131	53	487	55
Peak Hour Factor	0.9690	0.9690	0.9690	0.9690	0.9690	0.9690	0.9690	0.9690	0.9690	0.9690	0.9690	0.9690
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	92	72	7	31	43	9	10	101	34	14	126	14
Total Analysis Volume [veh/h]	369	287	28	126	171	34	38	406	135	55	503	57
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14			8			7			5		
Bicycle Volume [bicycles/h]	2			1			1			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	114
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	23.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	7	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	11	0	0	13	0	13	12	0	13	12	0
Maximum Green [s]	0	25	0	0	21	0	12	39	0	12	39	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	29	0	0	25	0	15	44	0	15	44	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	6	0	0	6	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	13	0	0	21	0	0	13	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	R
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	3.00	5.00	5.00	3.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	1.00	3.00	3.00	1.00	3.00	3.00
g_i, Effective Green Time [s]	23	23	23	14	14	8	29	29	10	31	31
g / C, Green / Cycle	0.25	0.25	0.25	0.15	0.15	0.09	0.32	0.32	0.11	0.34	0.34
(v / s)_i Volume / Saturation Flow Rate	0.23	0.17	0.02	0.08	0.13	0.02	0.24	0.10	0.03	0.30	0.04
s, saturation flow rate [veh/h]	1597	1676	1379	1597	1614	1597	1676	1364	1597	1676	1408
c, Capacity [veh/h]	406	426	351	243	245	142	536	436	173	568	477
d1, Uniform Delay [s]	32.70	30.34	25.66	35.31	37.25	38.45	27.61	23.22	37.26	28.23	20.59
k, delay calibration	0.33	0.17	0.11	0.11	0.12	0.11	0.24	0.23	0.11	0.31	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	19.87	2.97	0.10	1.72	7.85	1.00	4.87	0.85	1.05	12.23	0.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.91	0.67	0.08	0.52	0.84	0.27	0.76	0.31	0.32	0.89	0.12
d, Delay for Lane Group [s/veh]	52.57	33.30	25.76	37.03	45.10	39.45	32.48	24.07	38.31	40.46	20.83
Lane Group LOS	D	C	C	D	D	D	C	C	D	D	C
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	9.83	5.82	0.46	2.63	4.85	0.82	8.32	2.23	1.16	11.76	0.84
50th-Percentile Queue Length [ft]	245.66	145.61	11.53	65.72	121.21	20.40	207.89	55.65	28.98	294.11	21.11
95th-Percentile Queue Length [veh]	14.97	9.78	0.83	4.73	8.46	1.47	13.04	4.01	2.09	17.39	1.52
95th-Percentile Queue Length [ft]	374.19	244.55	20.75	118.30	211.49	36.72	326.12	100.17	52.16	434.74	37.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.57	33.30	25.76	37.03	45.10	45.10	39.45	32.48	24.07	38.31	40.46	20.83
Movement LOS	D	C	C	D	D	D	D	C	C	D	D	C
d_A, Approach Delay [s/veh]	43.39			42.03			30.98			38.45		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	38.56											
Intersection LOS	D											
Intersection V/C	0.915											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 1: Fifth Street West/West Spain Street

Control Type:	All-way stop	Delay (sec / veh):	17.3
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.699

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	95.00	100.00	100.00	55.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Base Volume Input [veh/h]	80	106	32	221	193	5	10	300	81	24	133	83
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	4	3	0	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	80	106	32	221	193	5	10	304	84	24	134	83
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	20	27	8	55	48	1	3	76	21	6	34	21
Total Analysis Volume [veh/h]	80	106	32	221	193	5	10	304	84	24	134	83
Pedestrian Volume [ped/h]	6			1			3			3		

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Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	444	485	469	504	570	542
Degree of Utilization, x	0.18	0.28	0.47	0.39	0.70	0.44

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.65	1.16	2.48	1.85	5.53	2.27
95th-Percentile Queue Length [ft]	16.24	29.03	61.95	46.33	138.21	56.69
Approach Delay [s/veh]	12.87		15.80		22.65	14.86
Approach LOS	B		C		C	B
Intersection Delay [s/veh]	17.26					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 1: Fifth Street West/West Spain Street

Control Type:	Signalized	Delay (sec / veh):	18.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.480

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	95.00	100.00	100.00	55.00	100.00	100.00	75.00	100.00	100.00	75.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Base Volume Input [veh/h]	80	106	32	221	193	5	10	300	81	24	133	83
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	4	3	0	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	80	106	32	221	193	5	10	304	84	24	134	83
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	20	27	8	55	48	1	3	76	21	6	34	21
Total Analysis Volume [veh/h]	80	106	32	221	193	5	10	304	84	24	134	83
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6			1			3			3		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	5	0	5	5	0	5	5	0	5	5	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	19	0	15	19	0	9	27	0	9	27	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
C, Cycle Length [s]	42	42	42	42	42	42	42	42
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	5	7	9	1	12	1	13
g / C, Green / Cycle	0.07	0.12	0.18	0.22	0.01	0.29	0.03	0.31
(v / s)_i Volume / Saturation Flow Rate	0.05	0.09	0.14	0.12	0.01	0.24	0.02	0.14
s, saturation flow rate [veh/h]	1597	1605	1597	1669	1597	1611	1597	1569
c, Capacity [veh/h]	117	186	286	371	21	475	47	488
d1, Uniform Delay [s]	19.03	17.97	16.46	14.44	20.60	13.77	20.11	11.58
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.97	5.67	4.46	1.20	15.16	3.50	8.24	0.64
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.69	0.74	0.77	0.53	0.47	0.82	0.51	0.44
d, Delay for Lane Group [s/veh]	25.99	23.64	20.92	15.64	35.76	17.26	28.35	12.21
Lane Group LOS	C	C	C	B	D	B	C	B
Critical Lane Group	No	Yes	Yes	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	0.89	1.41	2.07	1.51	0.18	3.18	0.31	1.38
50th-Percentile Queue Length [ft]	22.28	35.29	51.65	37.77	4.41	79.57	7.82	34.49
95th-Percentile Queue Length [veh]	1.60	2.54	3.72	2.72	0.32	5.73	0.56	2.48
95th-Percentile Queue Length [ft]	40.10	63.52	92.97	67.99	7.93	143.22	14.08	62.08

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	25.99	23.64	23.64	20.92	15.64	15.64	35.76	17.26	17.26	28.35	12.21	12.21
Movement LOS	C	C	C	C	B	B	D	B	B	C	B	B
d_A, Approach Delay [s/veh]	24.51			18.42			17.73			13.82		
Approach LOS	C			B			B			B		
d_I, Intersection Delay [s/veh]	18.38											
Intersection LOS	B											
Intersection V/C	0.480											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MOVEMENT SUMMARY

Site: 1 [AM Future+Prj]

West Spain Street/Fifth Street West
80' Roundabout

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Fifth Street W											
3	L2	80	2.0	0.340	10.2	LOS B	1.7	42.9	0.64	0.61	19.1
8	T1	106	2.0	0.340	10.2	LOS B	1.7	42.9	0.64	0.61	19.2
18	R2	32	2.0	0.340	10.2	LOS B	1.7	42.9	0.64	0.61	18.6
Approach		218	2.0	0.340	10.2	LOS B	1.7	42.9	0.64	0.61	19.1
East: WB W Spain Street											
1	L2	24	2.0	0.264	6.7	LOS A	1.2	30.4	0.38	0.26	21.5
6	T1	134	2.0	0.264	6.7	LOS A	1.2	30.4	0.38	0.26	21.7
16	R2	83	2.0	0.264	6.7	LOS A	1.2	30.4	0.38	0.26	20.8
Approach		241	2.0	0.264	6.7	LOS A	1.2	30.4	0.38	0.26	21.4
North: SB Fifth Street W											
7	L2	221	2.0	0.464	9.7	LOS A	2.6	65.7	0.50	0.39	19.2
4	T1	193	2.0	0.464	9.7	LOS A	2.6	65.7	0.50	0.39	19.3
14	R2	5	2.0	0.464	9.7	LOS A	2.6	65.7	0.50	0.39	18.6
Approach		419	2.0	0.464	9.7	LOS A	2.6	65.7	0.50	0.39	19.2
West: EB W Spain Street											
5	L2	10	2.0	0.562	14.2	LOS B	4.0	101.7	0.70	0.74	17.7
2	T1	304	2.0	0.562	14.2	LOS B	4.0	101.7	0.70	0.74	17.8
12	R2	84	2.0	0.562	14.2	LOS B	4.0	101.7	0.70	0.74	17.2
Approach		398	2.0	0.562	14.2	LOS B	4.0	101.7	0.70	0.74	17.7
All Vehicles		1276	2.0	0.562	10.6	LOS B	4.0	101.7	0.56	0.51	19.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection Level Of Service Report
Intersection 2: Sonoma Hwy (SR 12)/Fifth Street West

Control Type:	Signalized	Delay (sec / veh):	22.7
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.693

Intersection Setup

Name	Sonoma Hwy (SR 12)		Sonoma Hwy (SR 12)		Fifth Street West	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	125.00	250.00	100.00	100.00	110.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

Volumes

Name	Sonoma Hwy (SR 12)		Sonoma Hwy (SR 12)		Fifth Street West	
Base Volume Input [veh/h]	754	42	288	927	48	196
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	1	0	1	5
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	3	0	0	0	114
Total Hourly Volume [veh/h]	754	39	289	927	49	87
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	189	10	72	232	12	22
Total Analysis Volume [veh/h]	754	39	289	927	49	87
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		1	
Bicycle Volume [bicycles/h]	0		0		1	

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal group	2	0	1	6	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	0	10	10	10	0
Maximum Green [s]	45	0	16	45	18	0
Amber [s]	3.7	0.0	3.7	3.7	3.7	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	39	0	23	62	28	0
Vehicle Extension [s]	4.0	0.0	2.0	4.0	2.0	0.0
Walk [s]	7	0	0	5	7	0
Pedestrian Clearance [s]	10	0	0	10	16	0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.7	0.0	2.7	2.7	2.7	0.0
Minimum Recall	Yes		No	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	76	76	76	76	76	76
L, Total Lost Time per Cycle [s]	4.70	4.70	4.70	4.70	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.70	2.70	2.70	2.70	2.70	2.70
g_i, Effective Green Time [s]	37	37	15	57	9	9
g / C, Green / Cycle	0.49	0.49	0.20	0.75	0.12	0.12
(v / s)_i Volume / Saturation Flow Rate	0.45	0.03	0.18	0.55	0.03	0.06
s, saturation flow rate [veh/h]	1676	1424	1597	1676	1597	1392
c, Capacity [veh/h]	817	694	324	1261	198	173
d1, Uniform Delay [s]	18.17	10.28	29.50	5.22	30.11	31.13
k, delay calibration	0.30	0.15	0.26	0.42	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	11.94	0.05	17.29	3.23	0.24	0.84
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.92	0.06	0.89	0.74	0.25	0.50
d, Delay for Lane Group [s/veh]	30.11	10.33	46.78	8.45	30.35	31.97
Lane Group LOS	C	B	D	A	C	C
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	13.59	0.33	6.48	6.00	0.80	1.49
50th-Percentile Queue Length [ft]	339.74	8.19	161.91	150.06	20.05	37.21
95th-Percentile Queue Length [veh]	19.64	0.59	10.65	10.02	1.44	2.68
95th-Percentile Queue Length [ft]	490.88	14.74	266.25	250.51	36.08	66.97

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	30.11	10.33	46.78	8.45	30.35	31.97
Movement LOS	C	B	D	A	C	C
d_A, Approach Delay [s/veh]	29.13		17.56		31.39	
Approach LOS	C		B		C	
d_I, Intersection Delay [s/veh]	22.71					
Intersection LOS	C					
Intersection V/C	0.693					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Fifth Street West/West Napa Street

Control Type:	Signalized	Delay (sec / veh):	48.1
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.990

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	1	1	0	1
Pocket Length [ft]	200.00	100.00	105.00	90.00	100.00	100.00	80.00	100.00	195.00	70.00	100.00	255.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Base Volume Input [veh/h]	381	154	73	114	187	19	14	641	402	26	520	55
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	3	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	38	0	0	1	0	0	199	0	0	29
Total Hourly Volume [veh/h]	381	154	35	114	190	18	14	641	203	26	520	26
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	95	39	9	29	48	5	4	160	51	7	130	7
Total Analysis Volume [veh/h]	381	154	35	114	190	18	14	641	203	26	520	26
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	7			5			6			8		
Bicycle Volume [bicycles/h]	0			3			1			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	114
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	23.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	7	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	11	0	0	13	0	13	12	0	13	12	0
Maximum Green [s]	0	25	0	0	21	0	12	39	0	12	39	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	29	0	0	25	0	15	44	0	15	44	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	6	0	0	6	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	13	0	0	21	0	0	13	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	R
C, Cycle Length [s]	101	101	101	101	101	101	101	101	101	101	101
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	3.00	5.00	5.00	3.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	1.00	3.00	3.00	1.00	3.00	3.00
g_i, Effective Green Time [s]	25	25	25	15	15	4	39	39	7	41	41
g / C, Green / Cycle	0.25	0.25	0.25	0.15	0.15	0.04	0.39	0.39	0.07	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.24	0.09	0.02	0.07	0.13	0.01	0.38	0.15	0.02	0.31	0.02
s, saturation flow rate [veh/h]	1597	1676	1402	1597	1643	1597	1676	1383	1597	1676	1416
c, Capacity [veh/h]	396	415	347	238	245	69	648	534	109	689	582
d1, Uniform Delay [s]	37.49	31.43	29.28	39.34	41.83	46.57	30.74	22.25	44.55	25.36	17.82
k, delay calibration	0.43	0.11	0.11	0.11	0.16	0.11	0.46	0.23	0.11	0.36	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	33.62	0.55	0.13	1.49	11.43	1.42	31.24	0.95	1.12	5.55	0.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.96	0.37	0.10	0.48	0.85	0.20	0.99	0.38	0.24	0.75	0.04
d, Delay for Lane Group [s/veh]	71.11	31.98	29.40	40.84	53.26	47.99	61.97	23.20	45.67	30.91	17.89
Lane Group LOS	E	C	C	D	D	D	E	C	D	C	B
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	12.78	3.14	0.66	2.67	5.77	0.36	20.43	3.54	0.65	11.29	0.37
50th-Percentile Queue Length [ft]	319.49	78.56	16.60	66.76	144.16	9.12	510.74	88.40	16.19	282.36	9.26
95th-Percentile Queue Length [veh]	18.64	5.66	1.19	4.81	9.70	0.66	27.84	6.36	1.17	16.81	0.67
95th-Percentile Queue Length [ft]	466.06	141.41	29.87	120.17	242.61	16.42	696.05	159.12	29.14	420.15	16.67

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	71.11	31.98	29.40	40.84	53.26	53.26	47.99	61.97	23.20	45.67	30.91	17.89
Movement LOS	E	C	C	D	D	D	D	E	C	D	C	B
d_A, Approach Delay [s/veh]	57.98			48.86			52.57			30.99		
Approach LOS	E			D			D			C		
d_I, Intersection Delay [s/veh]	48.07											
Intersection LOS	D											
Intersection V/C	0.990											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Fifth Street West/West Napa Street

Control Type:	Signalized	Delay (sec / veh):	45.2
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.977

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Pocket Length [ft]	200.00	100.00	105.00	90.00	100.00	50.00	80.00	100.00	195.00	70.00	100.00	255.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Base Volume Input [veh/h]	381	154	73	114	187	19	14	641	402	26	520	55
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	3	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	38	0	0	1	0	0	199	0	0	29
Total Hourly Volume [veh/h]	381	154	35	114	190	18	14	641	203	26	520	26
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	95	39	9	29	48	5	4	160	51	7	130	7
Total Analysis Volume [veh/h]	381	154	35	114	190	18	14	641	203	26	520	26
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	7			5			6			8		
Bicycle Volume [bicycles/h]	0			3			1			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	114
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	23.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	7	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	11	0	0	13	0	13	12	0	13	12	0
Maximum Green [s]	0	25	0	0	21	0	12	39	0	12	39	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	30	0	0	30	0	22	38	0	16	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	6	0	0	6	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	13	0	0	21	0	0	13	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	99	99	99	99	99	99	99	99	99	99	99	99
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	3.50	3.00	5.00	5.00	3.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	1.50	1.00	3.00	3.00	1.00	3.00	3.00
g_i, Effective Green Time [s]	25	25	25	14	14	14	4	39	39	7	41	41
g / C, Green / Cycle	0.25	0.25	0.25	0.14	0.14	0.14	0.04	0.39	0.39	0.07	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.24	0.09	0.02	0.07	0.11	0.01	0.01	0.38	0.15	0.02	0.31	0.02
s, saturation flow rate [veh/h]	1597	1676	1402	1597	1676	1355	1597	1676	1383	1597	1676	1416
c, Capacity [veh/h]	402	422	353	219	229	185	69	658	542	109	699	591
d1, Uniform Delay [s]	36.54	30.64	28.53	39.86	41.74	37.51	45.85	29.71	21.51	43.83	24.48	17.20
k, delay calibration	0.42	0.11	0.11	0.11	0.11	0.11	0.11	0.45	0.23	0.11	0.36	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	29.99	0.53	0.12	1.92	7.47	0.23	1.41	27.64	0.92	1.11	5.11	0.06
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.95	0.37	0.10	0.52	0.83	0.10	0.20	0.97	0.37	0.24	0.74	0.04
d, Delay for Lane Group [s/veh]	66.53	31.17	28.66	41.78	49.21	37.73	47.25	57.35	22.42	44.95	29.58	17.26
Lane Group LOS	E	C	C	D	D	D	D	E	C	D	C	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	12.22	3.07	0.65	2.69	4.96	0.39	0.36	19.42	3.43	0.64	10.91	0.36
50th-Percentile Queue Length [ft]	305.52	76.73	16.21	67.14	124.00	9.83	8.98	485.55	85.83	15.91	272.83	8.98
95th-Percentile Queue Length [veh]	17.95	5.52	1.17	4.83	8.61	0.71	0.65	26.65	6.18	1.15	16.33	0.65
95th-Percentile Queue Length [ft]	448.84	138.12	29.18	120.85	215.31	17.70	16.16	666.24	154.49	28.65	408.27	16.17

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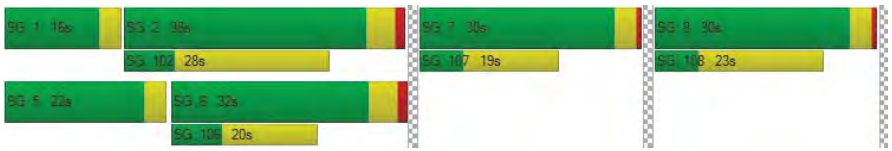
Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	66.53	31.17	28.66	41.78	49.21	37.73	47.25	57.35	22.42	44.95	29.58	17.26
Movement LOS	E	C	C	D	D	D	D	E	C	D	C	B
d_A, Approach Delay [s/veh]	54.65			45.94			48.92			29.72		
Approach LOS	D			D			D			C		
d_I, Intersection Delay [s/veh]	45.19											
Intersection LOS	D											
Intersection V/C	0.977											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: Fifth Street West/West Spain Street

Control Type:	All-way stop	Delay (sec / veh):	62.1
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.205

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	95.00	100.00	100.00	55.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Base Volume Input [veh/h]	180	292	31	135	172	15	21	192	119	76	258	230
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	0	0	0	0	0	0	2	1	0	4	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	182	292	31	135	172	15	21	194	120	76	262	230
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	73	8	34	43	4	5	49	30	19	66	58
Total Analysis Volume [veh/h]	182	292	31	135	172	15	21	194	120	76	262	230
Pedestrian Volume [ped/h]	7			1			3			6		

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	401	428	384	408	450	568
Degree of Utilization, x	0.45	0.75	0.35	0.46	0.74	1.21

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	2.30	6.24	1.55	2.34	6.13	21.85
95th-Percentile Queue Length [ft]	57.43	156.11	38.76	58.54	153.36	546.22
Approach Delay [s/veh]	27.73		18.07		30.92	136.12
Approach LOS	D		C		D	F
Intersection Delay [s/veh]	62.13					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 1: Fifth Street West/West Spain Street

Control Type:	Signalized	Delay (sec / veh):	34.7
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.612

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	95.00	100.00	100.00	55.00	100.00	100.00	75.00	100.00	100.00	75.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Spain Street			West Spain Street		
Base Volume Input [veh/h]	180	292	31	135	172	15	21	192	119	76	258	230
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	0	0	0	0	0	0	2	1	0	4	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	182	292	31	135	172	15	21	194	120	76	262	230
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	73	8	34	43	4	5	49	30	19	66	58
Total Analysis Volume [veh/h]	182	292	31	135	172	15	21	194	120	76	262	230
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	7			1			3			6		
Bicycle Volume [bicycles/h]	0			0			0			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	5	0	5	5	0	5	5	0	5	5	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	14	21	0	12	19	0	9	33	0	14	38	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
C, Cycle Length [s]	80	80	80	80	80	80	80	80
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	27	8	25	2	25	5	28
g / C, Green / Cycle	0.13	0.33	0.10	0.31	0.02	0.31	0.06	0.34
(v / s)_i Volume / Saturation Flow Rate	0.11	0.20	0.08	0.11	0.01	0.20	0.05	0.32
s, saturation flow rate [veh/h]	1597	1647	1597	1652	1597	1563	1597	1548
c, Capacity [veh/h]	201	543	161	504	40	483	97	534
d1, Uniform Delay [s]	34.61	22.42	35.43	21.86	38.64	23.96	37.14	25.22
k, delay calibration	0.11	0.50	0.11	0.50	0.11	0.11	0.11	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	14.17	4.74	10.93	2.09	10.37	1.48	12.66	13.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.91	0.59	0.84	0.37	0.53	0.65	0.78	0.92
d, Delay for Lane Group [s/veh]	48.78	27.16	46.36	23.95	49.01	25.44	49.80	38.45
Lane Group LOS	D	C	D	C	D	C	D	D
Critical Lane Group	No	Yes	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	4.20	5.54	3.02	2.94	0.52	5.11	1.78	10.40
50th-Percentile Queue Length [ft]	104.88	138.45	75.38	73.52	12.89	127.74	44.53	260.03
95th-Percentile Queue Length [veh]	7.55	9.40	5.43	5.29	0.93	8.82	3.21	15.69
95th-Percentile Queue Length [ft]	188.78	234.93	135.69	132.33	23.20	220.41	80.15	392.25

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Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	48.78	27.16	27.16	46.36	23.95	23.95	49.01	25.44	25.44	49.80	38.45	38.45
Movement LOS	D	C	C	D	C	C	D	C	C	D	D	D
d_A, Approach Delay [s/veh]	34.95			33.34			26.91			39.97		
Approach LOS	C			C			C			D		
d_I, Intersection Delay [s/veh]	34.74											
Intersection LOS	C											
Intersection V/C	0.612											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MOVEMENT SUMMARY

Site: 1 [PM Future+Prj]

West Spain Street/Fifth Street West
80' Roundabout

Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Fifth Street W											
3	L2	182	2.0	0.638	15.4	LOS C	5.3	134.0	0.70	0.72	16.9
8	T1	292	2.0	0.638	15.4	LOS C	5.3	134.0	0.70	0.72	17.0
18	R2	31	2.0	0.638	15.4	LOS C	5.3	134.0	0.70	0.72	16.4
Approach		505	2.0	0.638	15.4	LOS C	5.3	134.0	0.70	0.72	16.9
East: WB W Spain Street											
1	L2	76	2.0	0.846	31.9	LOS D	11.8	299.3	0.95	1.29	12.3
6	T1	262	2.0	0.846	31.9	LOS D	11.8	299.3	0.95	1.29	12.3
16	R2	230	2.0	0.846	31.9	LOS D	11.8	299.3	0.95	1.29	12.0
Approach		568	2.0	0.846	31.9	LOS D	11.8	299.3	0.95	1.29	12.2
North: SB Fifth Street W											
7	L2	135	2.0	0.494	13.3	LOS B	3.1	79.5	0.70	0.75	17.7
4	T1	172	2.0	0.494	13.3	LOS B	3.1	79.5	0.70	0.75	17.8
14	R2	15	2.0	0.494	13.3	LOS B	3.1	79.5	0.70	0.75	17.2
Approach		322	2.0	0.494	13.3	LOS B	3.1	79.5	0.70	0.75	17.7
West: EB W Spain Street											
5	L2	21	2.0	0.447	10.9	LOS B	2.5	63.3	0.61	0.56	19.2
2	T1	194	2.0	0.447	10.9	LOS B	2.5	63.3	0.61	0.56	19.3
12	R2	120	2.0	0.447	10.9	LOS B	2.5	63.3	0.61	0.56	18.6
Approach		335	2.0	0.447	10.9	LOS B	2.5	63.3	0.61	0.56	19.1
All Vehicles		1730	2.0	0.846	19.5	LOS C	11.8	299.3	0.76	0.88	15.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection Level Of Service Report
Intersection 2: Sonoma Hwy (SR 12)/Fifth Street West

Control Type:	Signalized	Delay (sec / veh):	37.8
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.816

Intersection Setup

Name	Sonoma Hwy (SR 12)		Sonoma Hwy (SR 12)		Fifth Street West	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	105.00	275.00	100.00	100.00	110.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

Volumes

Name	Sonoma Hwy (SR 12)		Sonoma Hwy (SR 12)		Fifth Street West	
Base Volume Input [veh/h]	867	50	231	942	68	348
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	1	5	0	1	3
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	4	0	0	0	140
Total Hourly Volume [veh/h]	867	47	236	942	69	211
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	217	12	59	236	17	53
Total Analysis Volume [veh/h]	867	47	236	942	69	211
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		4	
Bicycle Volume [bicycles/h]	6		2		1	

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal group	2	0	1	6	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	0	10	10	10	0
Maximum Green [s]	45	0	16	45	18	0
Amber [s]	3.7	0.0	3.7	3.7	3.7	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	39	0	23	62	28	0
Vehicle Extension [s]	4.0	0.0	2.0	4.0	2.0	0.0
Walk [s]	7	0	0	5	7	0
Pedestrian Clearance [s]	10	0	0	10	16	0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.7	0.0	2.7	2.7	2.7	0.0
Minimum Recall	Yes		No	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
C, Cycle Length [s]	89	89	89	89	89	89
L, Total Lost Time per Cycle [s]	4.70	4.70	4.70	4.70	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.70	2.70	2.70	2.70	2.70	2.70
g_i, Effective Green Time [s]	45	45	15	65	15	15
g / C, Green / Cycle	0.50	0.50	0.17	0.72	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.52	0.03	0.15	0.56	0.04	0.15
s, saturation flow rate [veh/h]	1676	1385	1597	1676	1597	1393
c, Capacity [veh/h]	845	698	266	1213	273	239
d1, Uniform Delay [s]	22.12	11.35	36.35	7.79	32.02	36.11
k, delay calibration	0.48	0.15	0.23	0.50	0.04	0.18
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	36.97	0.06	17.99	4.92	0.18	15.97
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.03	0.07	0.89	0.78	0.25	0.88
d, Delay for Lane Group [s/veh]	59.08	11.41	54.35	12.71	32.20	52.08
Lane Group LOS	F	B	D	B	C	D
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	24.72	0.47	6.25	10.20	1.29	5.45
50th-Percentile Queue Length [ft]	617.97	11.72	156.29	254.95	32.18	136.24
95th-Percentile Queue Length [veh]	33.54	0.84	10.35	15.44	2.32	9.28
95th-Percentile Queue Length [ft]	838.53	21.10	258.81	385.89	57.92	231.95

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.08	11.41	54.35	12.71	32.20	52.08
Movement LOS	F	B	D	B	C	D
d_A, Approach Delay [s/veh]	56.63		21.05		47.18	
Approach LOS	E		C		D	
d_I, Intersection Delay [s/veh]	37.84					
Intersection LOS	D					
Intersection V/C	0.816					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Fifth Street West/West Napa Street

Control Type:	Signalized	Delay (sec / veh):	72.6
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.148

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	1	1	0	1
Pocket Length [ft]	200.00	100.00	105.00	90.00	100.00	100.00	80.00	100.00	195.00	70.00	100.00	255.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Base Volume Input [veh/h]	415	315	71	139	188	87	57	656	376	60	712	154
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	0	1	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	25	0	0	5	0	0	199	0	0	73
Total Hourly Volume [veh/h]	415	317	46	139	189	82	57	656	177	60	712	81
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	104	79	12	35	47	21	14	164	44	15	178	20
Total Analysis Volume [veh/h]	415	317	46	139	189	82	57	656	177	60	712	81
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14			8			7			5		
Bicycle Volume [bicycles/h]	2			1			1			0		

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Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	23.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	3	8	0	4	7	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5	0
Maximum Green [s]	0	25	0	0	21	0	12	39	0	12	39	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	27	0	0	23	0	15	41	0	29	55	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	6	0	0	6	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	13	0	0	21	0	0	13	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	R
C, Cycle Length [s]	104	104	104	104	104	104	104	104	104	104	104
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	3.00	5.00	5.00	3.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	1.00	3.00	3.00	1.00	3.00	3.00
g_i, Effective Green Time [s]	25	25	25	20	20	5	39	39	5	39	39
g / C, Green / Cycle	0.24	0.24	0.24	0.19	0.19	0.04	0.38	0.38	0.05	0.38	0.38
(v / s)_i Volume / Saturation Flow Rate	0.26	0.19	0.03	0.09	0.17	0.04	0.39	0.13	0.04	0.42	0.06
s, saturation flow rate [veh/h]	1597	1676	1378	1597	1569	1597	1676	1369	1597	1676	1410
c, Capacity [veh/h]	385	404	332	303	298	73	631	515	76	635	534
d1, Uniform Delay [s]	39.33	36.80	30.87	34.20	37.83	48.18	25.83	18.12	48.00	25.67	16.74
k, delay calibration	0.50	0.30	0.11	0.11	0.34	0.11	0.48	0.23	0.11	0.50	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	68.21	8.77	0.19	1.08	25.31	16.54	45.94	0.84	15.97	74.13	0.28
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

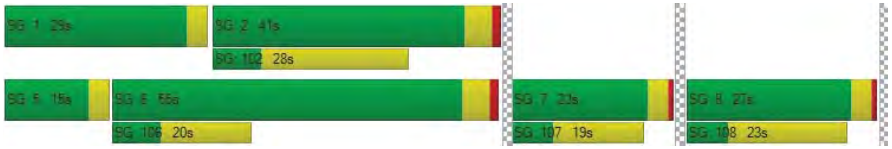
X, volume / capacity	1.08	0.78	0.14	0.46	0.91	0.78	1.04	0.34	0.79	1.12	0.15
d, Delay for Lane Group [s/veh]	107.54	45.57	31.06	35.28	63.15	64.72	71.77	18.96	63.97	99.80	17.02
Lane Group LOS	F	D	C	D	E	E	F	B	E	F	B
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	16.90	8.39	0.92	2.94	8.31	1.76	21.30	2.49	1.84	26.37	1.05
50th-Percentile Queue Length [ft]	422.55	209.63	22.95	73.41	207.69	44.09	532.56	62.28	46.02	659.22	26.34
95th-Percentile Queue Length [veh]	24.67	13.13	1.65	5.29	13.03	3.17	29.67	4.48	3.31	37.59	1.90
95th-Percentile Queue Length [ft]	616.83	328.35	41.32	132.14	325.86	79.36	741.79	112.10	82.84	939.69	47.41

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	107.54	45.57	31.06	35.28	63.15	63.15	64.72	71.77	18.96	63.97	99.80	17.02
Movement LOS	F	D	C	D	E	E	E	F	B	E	F	B
d_A, Approach Delay [s/veh]	77.77			53.70			60.81			89.42		
Approach LOS	E			D			E			F		
d_I, Intersection Delay [s/veh]	72.64											
Intersection LOS	E											
Intersection V/C	1.148											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Fifth Street West/West Napa Street

Control Type:	Signalized	Delay (sec / veh):	53.9
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.092

Intersection Setup

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Pocket Length [ft]	200.00	100.00	105.00	90.00	100.00	50.00	80.00	100.00	195.00	70.00	100.00	255.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Fifth Street West			Fifth Street West			West Napa Street (SR 12)			West Napa Street (SR 12)		
Base Volume Input [veh/h]	415	315	71	139	188	87	57	656	376	60	712	154
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	0	1	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	25	0	0	5	0	0	199	0	0	73
Total Hourly Volume [veh/h]	415	317	46	139	189	82	57	656	177	60	712	81
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	104	79	12	35	47	21	14	164	44	15	178	20
Total Analysis Volume [veh/h]	415	317	46	139	189	82	57	656	177	60	712	81
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14			8			7			5		
Bicycle Volume [bicycles/h]	2			1			1			0		

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Version 5.00-00

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	23.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	3	8	0	4	7	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5	0
Maximum Green [s]	0	25	0	0	21	0	12	39	0	12	39	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	27	0	0	23	0	15	41	0	29	55	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	6	0	0	6	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	13	0	0	21	0	0	13	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	97	97	97	97	97	97	97	97	97	97	97	97
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	3.50	3.00	5.00	5.00	3.00	5.00	5.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	1.50	1.00	3.00	3.00	1.00	3.00	3.00
g_i, Effective Green Time [s]	25	25	25	13	13	13	4	39	39	5	39	39
g / C, Green / Cycle	0.26	0.26	0.26	0.14	0.14	0.14	0.05	0.40	0.40	0.05	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.26	0.19	0.03	0.09	0.11	0.06	0.04	0.39	0.13	0.04	0.42	0.06
s, saturation flow rate [veh/h]	1597	1676	1379	1597	1676	1357	1597	1676	1371	1597	1676	1411
c, Capacity [veh/h]	411	432	355	220	231	187	73	674	551	77	678	570
d1, Uniform Delay [s]	36.03	32.99	27.68	37.33	38.43	36.27	45.08	22.03	15.11	44.91	22.38	13.98
k, delay calibration	0.46	0.26	0.11	0.11	0.11	0.11	0.11	0.45	0.23	0.11	0.49	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	45.00	5.69	0.16	2.97	6.94	1.61	16.12	27.04	0.71	15.54	48.35	0.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

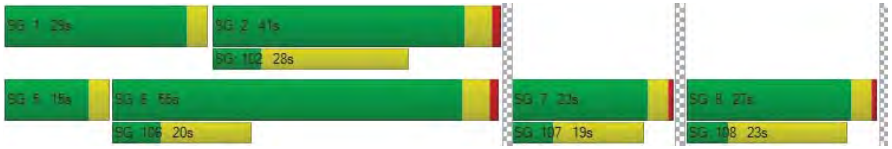
X, volume / capacity	1.01	0.73	0.13	0.63	0.82	0.44	0.78	0.97	0.32	0.78	1.05	0.14
d, Delay for Lane Group [s/veh]	81.04	38.69	27.84	40.30	45.37	37.88	61.21	49.08	15.82	60.45	70.73	14.22
Lane Group LOS	F	D	C	D	D	D	E	D	B	E	F	B
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	14.60	7.36	0.83	3.10	4.52	1.76	1.65	16.89	2.12	1.73	21.65	0.90
50th-Percentile Queue Length [ft]	364.97	183.97	20.72	77.45	112.98	43.95	41.35	422.28	53.06	43.14	541.19	22.48
95th-Percentile Queue Length [veh]	20.98	11.81	1.49	5.58	8.01	3.16	2.98	23.63	3.82	3.11	30.33	1.62
95th-Percentile Queue Length [ft]	524.50	295.19	37.29	139.41	200.14	79.11	74.43	590.79	95.50	77.65	758.18	40.46

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	81.04	38.69	27.84	40.30	45.37	37.88	61.21	49.08	15.82	60.45	70.73	14.22
Movement LOS	F	D	C	D	D	D	E	D	B	E	F	B
d_A, Approach Delay [s/veh]	60.63			42.15			43.24			64.64		
Approach LOS	E			D			D			E		
d_I, Intersection Delay [s/veh]	53.93											
Intersection LOS	D											
Intersection V/C	1.092											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Appendix C

Proportional Share Calculations

Equitable Share Calculations
Olivia-West Spain Apartments

	PM	Total Volume Entering the Intersection of W Napa Street/Fifth Street W	PM
		Existing	2439
Project Trips (T)	3	Future Year	3230

Description of Project Improvement:

Widen the north leg to include a southbound right turn lane. On the west leg, add a right-turn overlap.

Calculation of Project Share

P = T / (TB - TE)
where:
P = Equitable Share
T = Project trips during the affected peak hour
TB = Build-out volumes
TE = Existing volumes

T	3
TB	3230
TE	2439
P	**0.4%**

Equitable Share (per Caltrans "Guide for the Preparation of Traffic Impact Studies")

Equitable Share Calculations
Olivia-West Spain Apartments

	PM	Total Volume Entering the Intersection of W Spain Street/Fifth Street W	PM
		Existing	1489
Project Trips (T)	12	Future Year	1721

Description of Project Improvement:

Install traffic signal with protected left-turn phasing at the intersection. Restripe the east and west leg to have a left-turn lane.

Calculation of Project Share

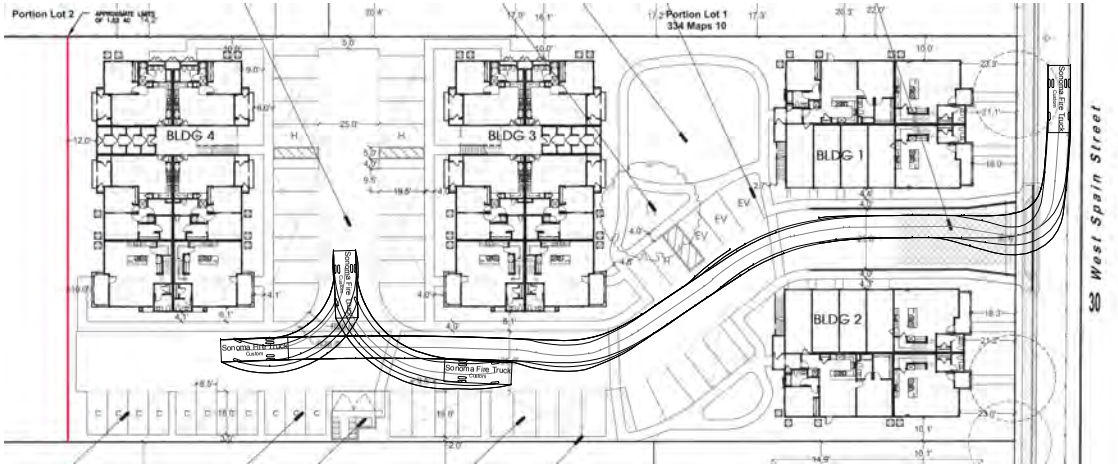
P = T / (TB - TE)
where:
P = Equitable Share
T = Project trips during the affected peak hour
TB = Build-out volumes
TE = Existing volumes

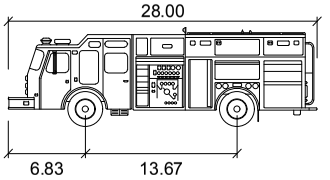
T	12
TB	1721
TE	1489
P	**5.2%**

Equitable Share (per Caltrans "Guide for the Preparation of Traffic Impact Studies")

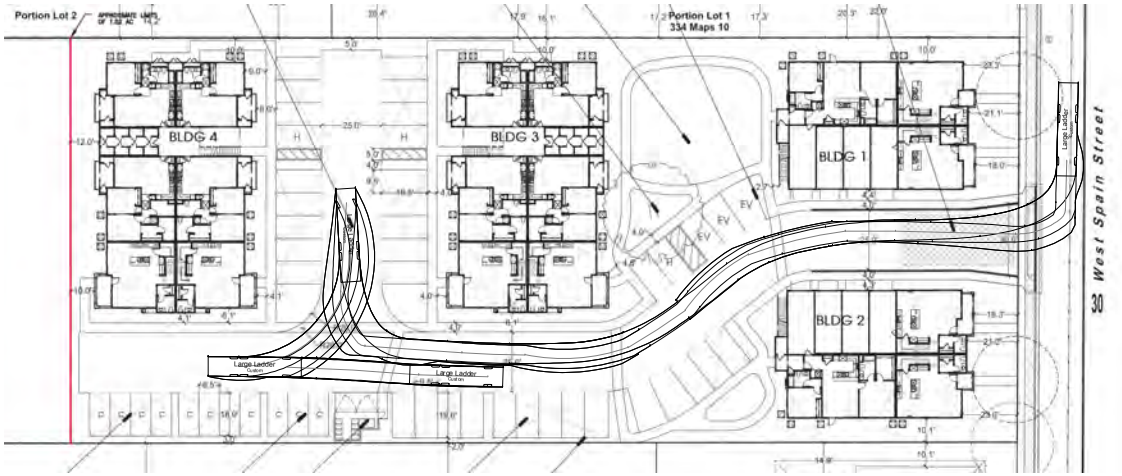
Appendix D

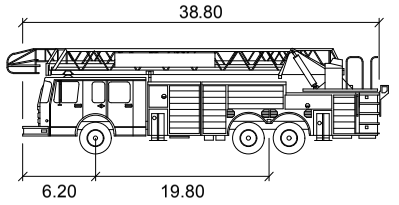
Site Access





Sonoma Fire Truck	feet
Width	: 9.24
Track	: 9.24
Lock to Lock Time	: 6.0
Steering Angle	: 40.0





Large Ladder	feet
Width	: 8.20
Track	: 8.20
Lock to Lock Time	: 6.0
Steering Angle	: 45.0

Olivia Apartment Community

AutoTURN for Sonoma Fire Truck

SON052

May 2017

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Project Dirveway
Study Scenario: AM Future with Project

Direction of Analysis Street: East/West
Cross Street Intersects: From the South

West Spain Street

Eastbound Volumes (veh/hr)
Through Volume = 330
Right Turn Volume = 1

West Spain Street

Westbound Volumes (veh/hr)
218 = Through Volume
1 = Left Turn Volume

Project Driveway

Eastbound Speed Limit: 30 mph
Eastbound Configuration: 2 Lanes - Undivided

Westbound Speed Limit: 30 mph
Westbound Configuration: 2 Lanes - Undivided

Eastbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	1042.6
Advancing Volume	Va =	331
If AV<Va then warrant is met		No

Right Turn Lane Warranted: **NO**

Eastbound Right Turn Taper Warrants
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

2. Check advance volume threshold criteria for taper

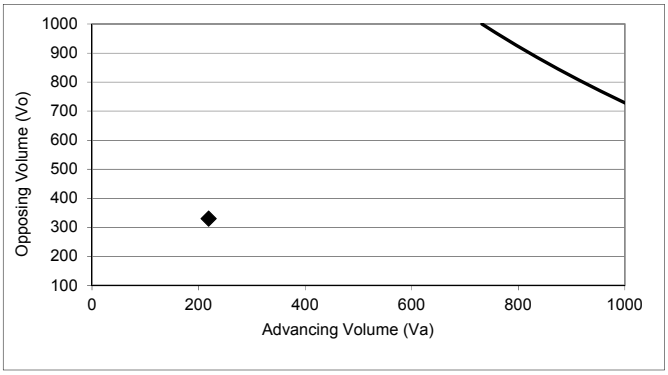
Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	331
If AV<Va then warrant is met		-

Right Turn Taper Warranted: **NO**

Westbound Left Turn Lane Warrants

Percentage Left Turns	%lt	0.5 %
Advancing Volume Threshold	AV	1583 veh/hr

If AV<Va then warrant is met



◆ Study Intersection
Two lane roadway warrant threshold for: 30 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: **NO**

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements* , January 1997.
The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

Turn Lane Warrant Analysis - Tee Intersections

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Study Scenario: PM Future with Project

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Cross Street Intersects: From the South

West Spain Street

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Through Volume = 330
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Project Driveway

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Westbound Volumes (veh/hr)
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1 = Left Turn Volume

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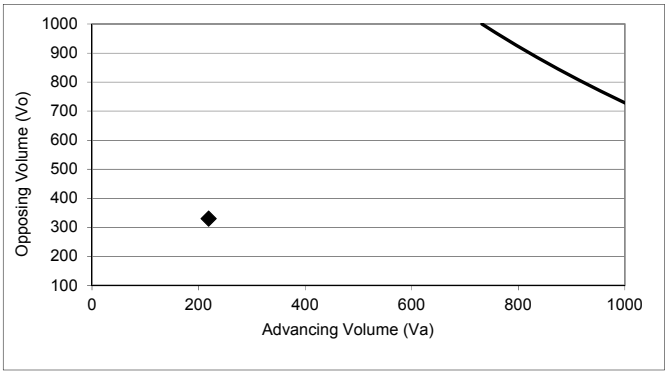

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